

# RUN

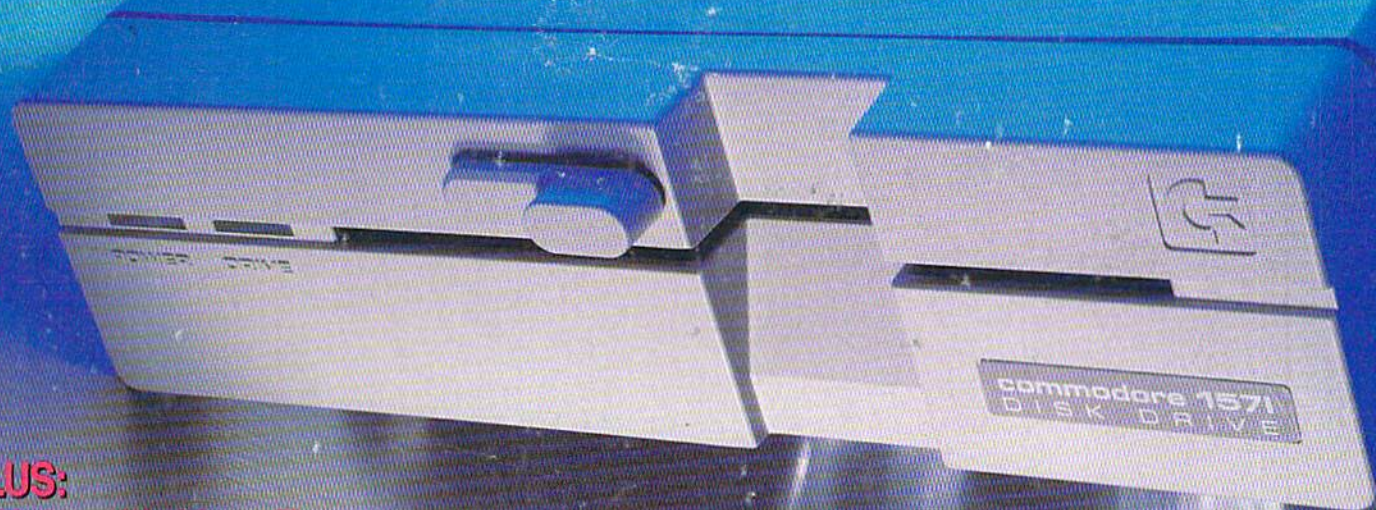
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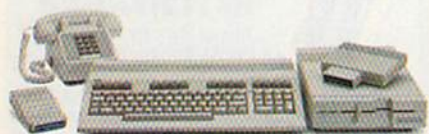


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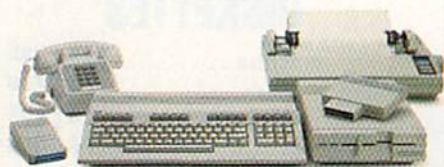


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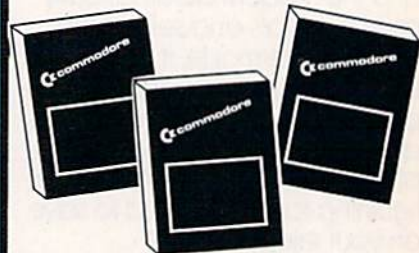
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February 1986



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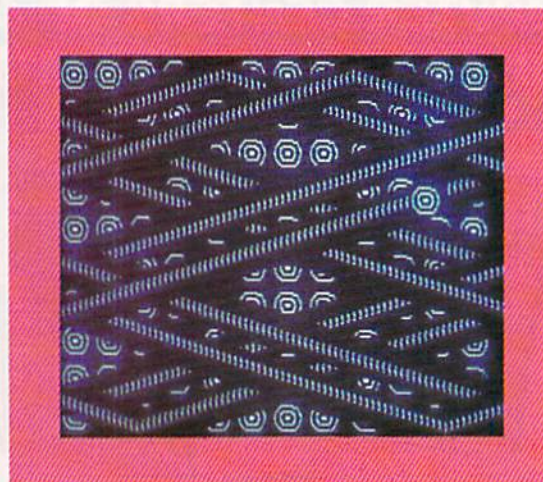
The 1541's disk operating system doesn't provide a command for renaming disks. But we do...

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If you've ever considered a career in the fast-food business, this program is great preparation.

By George Decker



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*RUN* is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Asia's *The Asian Computerworld*; Australia's *Computerworld Australia*, *Australian PC World*, *Macworld* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark*, *PC World* and *RUN* (Commodore); Finland's *Mikro*; France's *Le Monde Informatique*, *Golden* (Apple), *OPC* (IBM) and *Distributique*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *SoftwareMarkt*, *CW Edition/Seminar*, *Computer Business*, *RUN* and *Apple's*; Italy's *Computerworld Italia* and *PC Magazine*; Japan's *Computerworld Japan*; Mexico's *Computerworld/Mexico* and *CompuMundo*; The Netherlands' *ComputerWorld Benelux* and *PC World Benelux*; Norway's *Computerworld Norge*, *PC World* and *RUN* (Commodore); Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana*, *Microsistemas/PC World* and *Commodore World*; Sweden's *ComputerSweden*, *Mikrodatorn*, and *Svenska PC*; the UK's *Computer Management*, *Computer News*, *PC Business World* and *Computer Business Europe*; the U.S.' *AmigaWorld*, *Computerworld*, *Focus Publications*, *HOT CoCo*, *inCider*, *InfoWorld*, *MacWorld*, *Micro Marketworld*, *On Communications*, *PC World*, *RUN*, *73 Magazine*, *80 Micro*; Venezuela's *Computerworld Venezuela*.

*RUN* (ISSN 0741-4285) is an independent journal not connected with Commodore Business Machines, Inc. *RUN* is published monthly by CW Communications/Peterborough, Inc., 80 Pine St., Peterborough, NH 03458. U.S. subscription rates \$19.97, one year; \$29.97, two years; \$41.97, three years. Canada and Mexico \$22.97, one year, U.S. funds drawn on U.S. bank. Foreign \$39.97, one year, U.S. funds drawn on U.S. bank. Foreign air mail subscriptions—please inquire. Second class postage paid at Peterborough, NH, and at additional mailing offices. (Canadian second class mail registration number 9565.) Phone: 603-924-9471. Entire contents copyright 1986 by CW Communications/Peterborough, Inc. No part of this publication may be printed or otherwise reproduced without written permission from the publisher. Postmaster: send address changes to *RUN*, Subscription Services, PO Box 954, Farmingdale, NY 11737. (Send Canadian changes of address to *RUN*, PO Box 1051, Fort Erie, Ontario, Canada L2A 5N8.) Nationally distributed by International Circulation Distributors. *RUN* makes every effort to assure the accuracy of articles, listings and circuits published in the magazine. *RUN* assumes no responsibility for damages due to errors or omissions.

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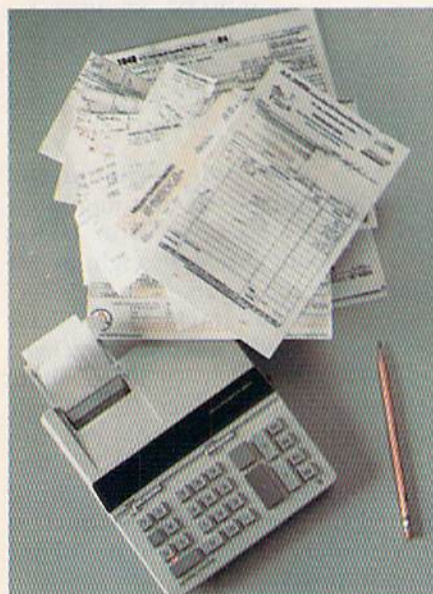


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## An Improved ReRUN

ReRUN promises to be bigger and better than ever in 1986...and, you'll see it more often!

Since its inception in 1984, ReRUN has been a vital support product for *RUN* magazine. It eliminates the tedium of entering program listings from the magazine, along with any risk of entry error.

We have recently surveyed our ReRUN audience to see how we could serve them better with an improved product. The survey responses corroborated our own observations about ReRUN:

- ReRUN users want to see more programs.
- respondees would like to see ReRUN offered more frequently.
- respondees consider the accompanying booklet helpful and want to see the documentation continue to be offered in the booklet, as opposed to relying on articles in the magazine.
- ReRUN users would like to have ReRUN offered on a subscription basis.
- most respondents would like to be offered never-before-published programs, in addition to those offered in the magazine.

In response to the concerns and interests of our readers, ReRUN 1986 will be offered on a bimonthly, instead of a quarterly, basis. *All* of the programs published in *RUN* will be made available on ReRUN, and each bimonthly ReRUN will contain two months' worth of programs published from *RUN*.

So, for example, the February 1986 version of ReRUN will contain every program published in the January and February issues of *RUN*. The next ReRUN—in April—will contain March and April's *RUN* programs, and so on.

This format allows you to receive *all* of *RUN*'s programs; you will no longer be limited to selected programs. And, ReRUN users will not have to wait as long from the time programs appear in *RUN* to the time they become available on ReRUN.

Here's a sampling of some of the kinds of programs you can expect on ReRUN this year:

—Productivity. ReRUN will cover this topic in a big way in 1986, with C-64 and C-128 programs that increase your word processing, spreadsheet, database and telecommunications skills.

—Utilities. Disk utilities, music utilities, graphics utilities, programming utilities and more. These programs will let you take full advantage of your system's capabilities and make your computer easier to use.

—Applications. Whether you use your Commodore computer in the home, office or at school, you'll find interesting applications in each and every issue of ReRUN.

—C-128 mode. ReRUN 1986 is committed to providing C-128 owners with programs to use in 128 mode, as well as in 64 mode.

—Bonus programs. In addition, each ReRUN issue will contain a never-before-published program.

If you're interested in receiving more great Commodore programs six times a year, see the ReRUN ad elsewhere in this issue, or write to ReRUN, 80 Pine St., Peterborough, NH 03458.

## Trailblazers

That pioneering spirit—so vital to the beginnings of the computer industry and essential to its continuation—is alive and well in this issue of *RUN*. "Ultra Hi-Res Graphics" represents a dramatic breakthrough in 80-column graphics capability on the C-128.

The authors, Louis Wallace and David Darus, have uncovered capabilities of the C-128 no one—not even Commodore engineers—knew existed. To learn about their programming efforts, which produce C-128 high-resolution comparable to that found on an IBM PC, turn to p. 34.

*RUN* is pleased to be able to bring you this exciting, heretofore undocumented information. Articles such as this help to keep *RUN* readers riding the wave of the Commodore computing industry.



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## VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."

AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."

INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."

RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."

Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in some ways better than 1-2-3."

Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."

Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."

Philip Ressler, MA. End User



## VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

## PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

## RISK-FREE OFFER

Vizastar 128 is priced at \$119.97. Vizawrite's price is \$79.97. Vizastar 64 XL8 is now available for \$119.97. We are so positive you will be satisfied with our programs that we offer a 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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# MAGIC



Compiled by LOUIS F. SANDER

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

Every month, *Magic* brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

*Magic* solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). *RUN* will pay up to \$50 for each trick accepted. Send your tricks to:

MAGIC  
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PO Box 101011  
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, we'll send you a *Trick Writer's Guide*. Readers outside the United States may omit the stamp.

This season always brings a wave of new readers to *Magic* and to *RUN*. If you are one of them, we welcome you and invite you to become a regular. You're sure to find, as thousands have found, that *Magic* is a vital source of instruction, ideas and inspiration. In bringing these treasures to light, we never forget the newcomers, who need such guidance.

Nor do we forget the seasoned veterans, since they give us our best items and always appreciate a better way of doing things. They tell us, in fact, that many advances in computing are first presented in *Magic*. What all this means, of course, is that in the world of Commodore computing, the best ideas show up in *Magic*. And what that means, of course, is that if you have or need a great idea, the place to come is *Magic*.

**\$2A5 Funny Valentine**—Can a computer program make you cry? Depending on your mood, it might. This one, for the C-64 or the C-128 in 64 mode, plays a bell-like rendition of this well-known bittersweet song.

```
10 PRINT "{SHT CLR}VALENTINE - JOSEPH R. CH
ARNETSKI":PRINT
20 FORJ=1TO154:READK:CS=CS+K:NEXT:IFCS<>624
5THENPRINT"DATA ERROR!":STOP
30 RESTORE:S=54272:V=S+24:FORJ=STOV-1:POKEJ
,0:NEXT:POKEV,15
40 READN,D:IFD=255THENPRINT"MAGIC!":END
50 POKES+1,N:POKES+5,9:POKES+15,9
60 POKES+4,17:FORDL=1TOD*250:NEXT
70 POKES+4,0:FORDL=1TO45:NEXT:GOTO40
71 DATA 59,3,67,1,71,1,67,1,71,1,67,5
72 DATA 59,2,67,1,71,1,67,1,71,1,67,6
73 DATA 59,2,67,1,71,1,106,3,94,1,89,1
74 DATA 79,7,71,1,67,1,106,3,71,1,71,2
75 DATA 67,1,71,5,71,1,67,1,119,3,71,1
76 DATA 71,2,67,1,71,5,71,1,67,1,134,3
77 DATA 71,1,71,2,67,1,71,3,79,1,89,1
78 DATA 119,5,71,2,79,1,89,1,79,1,89,1
79 DATA 79,3,71,5,59,2,67,1,71,1,106,3
80 DATA 94,1,89,1,79,7,59,2,67,1,71,1
81 DATA 67,1,71,1,67,3,71,2,79,1,89,1
82 DATA 79,1,89,1,79,3,71,2,79,1,89,1
83 DATA 79,1,89,1,79,3,71,1,0,255
```

Joseph R. Charnetski  
Dallas, PA

**\$2A6 Better video display**—Don't forget your monitor's video controls, since their proper adjustment can make an amazing difference in your picture. When using my word processor, I turn the color control all the way down; by removing the color fringe around the letters, it makes things much easier on the eyes.

Lucy S. Terrier  
Alton, IL

**\$2A7 Colorful Print Shop**—Output from the popular Print Shop program can be brightened up by using colored marker pens. It's easy to color The Print Shop text and designs, and with the range of colors available in



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**Roger Baillie**  
Kensington, PEI  
Canada

**\$2A8 Modem buyer's guide**—Unless you've used both of them at length, it's hard to know whether to buy a 300-baud modem or a more expensive 1200-baud unit. I worked at 300 baud for over a year, then upgraded to 1200. In my opinion, the speed and convenience of 1200 baud make the faster modem a significantly better investment for most people.

Although 300-baud units are tantalizingly inexpensive, they are s-l-o-w, and their slowness diminishes the value of the on-line experience. In many cases, operations that are great at 1200 baud are tedious and unpleasant at 300. If you start out at 300 baud, you might wrongly decide that on-line work is not your cup of tea.

Some on-line services (QuantumLink, for example) have uniform rates, regardless of the speed of your modem. In those cases, your connect-time savings can quickly offset the additional purchase cost of a 1200-baud modem. (Let's say you're downloading an interesting program. What takes ten minutes at 1200 baud takes 40 minutes at 300. Compare the savings in money and personal time, and you'll start to get the picture.) Also, if one day you want to sell your modem, you'll find more buyers and better prices if you're offering a 1200-baud unit.

When choosing your modem, you should also consider how it connects to the telephone system. Most modems connect directly to the phone line via a modular connector; modular cables and connectors are readily available at Radio Shack and elsewhere. Some modems connect, not to the phone line, but to the handset, via a smaller modular connector. If your telephone doesn't use such a connector (and many don't), you can't use these modems with it at all. Also, handset connectors and cables can be hard or impossible to find in stores.

The final means of connection, seldom seen these days, is acoustic coupling. Here, there's no wiring at all between the modem and the phone line. Instead, the telephone handset is placed in a cradle with rubber cups, and the tones are coupled acoustically. This is the least desirable method of connecting your modem.

The bottom line is this: Unless you can't afford it, start off with a 1200-baud modem. And regardless of which speed you choose, look for a modem that connects directly to the phone line, rather than to the handset.

**Louis F. Sander**  
Pittsburgh, PA

**\$2A9 QuantumLink scrolling**—Whenever text scrolls off the screen in QuantumLink, you can recall up to 85 lines of it at the press of a key. Just press the cursor-up key and watch the previous text scroll down from the top of the screen.

This feature is particularly useful when you're in an ongoing dialogue with other users, such as in the Conference Centers and in People Connection.

**Al G. Bell**  
Boston, MA

**\$2AA C-128 slow listing**—When you want to slow down a C-128 listing or other printout, just press the Commodore logo key. This performs the same function as pressing the CTRL key on the Commodore 64.

**Robert B. Cook**  
Braintree, MA

**\$2AB C-128 bytes free**—At power-up, the f8 function key activates the machine language monitor, which is a feature that most of us seldom use. I redefine that key to give me something more valuable—an instantaneous reading of the amount of remaining memory. Doing the magic is simple:

KEY 8, "?FRE(0)" + CHR\$(13)

**Gerhard Schilling**  
Hemet, CA

**\$2AC C-128 ESC key**—There are several errors in the C-128 system guide's description of the escape sequences. On my machine, for example, ESC A activates Automatic Insert mode, while ESC C cancels it. ESC C does *not* cancel Quote mode, as stated in the manual.

ESC O is a powerful sequence that cancels Quote mode, RVS mode and the 80-column Flash (CTRL O) and Underline (CTRL B) modes. Contrary to the manual's description, ESC O does *not* cancel the Automatic Insert mode.

Be sure you use the proper technique with all escape sequences—first you press and release the ESC key, and then you press the others. It's totally different from using shift or CTRL, where the keys must be pressed at the same time.

**Jim Borden**  
Carlisle, PA

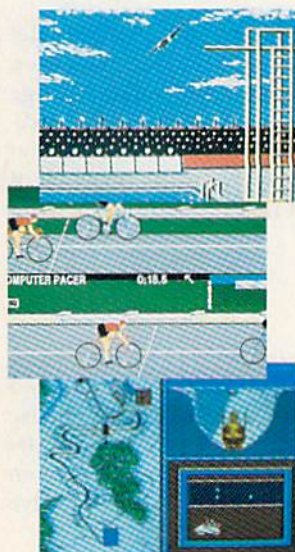
**\$2AD C-128 40/80 display key sense**—This key's status can be detected by Peeking location 54533, then ANDing the result with 128. If the final result is zero, the key is depressed, or in the 80-column position. If the final result is 128, the key is released, or in the 40-column position.

Remember that the computer uses this key to set the display *only* when it is reset or when the stop/restore combination is pressed. Since ESC X can be used at any time to switch displays, the status of the 40/80 key cannot be used to tell which display is in use. With the Peek given above, it *can* be used as a handy push-on, push-off controller.

**Ken Garber**  
Windsor, Ontario  
Canada



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**\$2AE C-128 tab stops**—The manual doesn't give the whole story on setting and clearing tab stops. You can clear all tab stops by pressing and releasing the ESC key, then pressing and releasing Z. You can restore the default tab stops by using ESC Y in the way described above. You can set or clear a tab stop by moving your cursor to the desired position and pressing [SHIFT TAB] or [CTRL X].

Jerry W. Jarvis  
Spokane, WA

**\$2AF Spritebusters**—This sprightly sprite is out of sight! In white and red on any suitable background, he's very much worth seeing. Lines 10-90 are a multicolor version of the Sprite Demo program we've printed in our 1986 Special Issue. If you already have that program, just change line 60 to read as shown, add the sprite and watch that you don't get slimed.

```
10 REM MULTICOLOR SPRITEDEMO C-64 - LFS
20 POKE53281,16:PRINT"{SHFT CLR}{COMD 7}{4
  CRSR DNs}"
30 FORS=832TO894:READT:POKE5,T:NEXT
40 V=53248:POKE2040,13:REM SPRITE AREA
50 POKEV+21,1:REM DISPLAY SPRITE
60 POKEV+28,1:POKEV+37,1:POKEV+38,2:POKEV+3
  9,2:REM MULTICOLOR SETUP
70 POKEV+1,60:REM Y POSITION
80 FORJ=1TO255:POKEV,J:NEXTJ:REM X POS
90 LIST
91 REM SPRITEBUSTERS - TIM WHITECOTTON
92 DATA 000,001,064,000,021,080,000,085
93 DATA 064,003,085,064,005,153,240,005
94 DATA 085,240,053,085,124,245,153,127
95 DATA 065,101,255,213,087,255,197,095
96 DATA 195,085,127,065,193,253,087,195
97 DATA 253,087,255,213,085,255,085,067
98 DATA 253,085,079,061,085,124,015,215
99 DATA 240,015,255,240,003,255,192,000
```

Tim Whitecotton  
Manson, IA

**\$2B0 Racehorse**—This program packs so much into a short space that we've waived Magic's usual limit of one screenful for the listing. Usable on the C-64 or on the C-128 in 64 mode, it shows an animated galloping racehorse, complete with jockey and sound effects. If you want to use the sprites elsewhere, they're presented in our normal form; each sprite corresponds to one position of the galloping horse.

```
10 PRINT"{SHFT CLR}{COMD 7}RACEHORSE - BOB/
  DAVE SNADER"
20 POKE53281,1:FORJ=832TO959:READK:POKEJ,K:
  NEXT:B=13:S=54296:V=53248
30 POKE2040,B:FORJ=0TO100:NEXT:POKEV+21,1:P
  OKEV+39,9:POKEV+1,150:POKEV,X:X=X+5
40 FORJ=5TO15STEP5:POKE5,J:POKE5,0:FORK=0TO
  50:NEXT:NEXT:IFX=255THENEND
50 B=14+(B=14):GOTO30
51 DATA 000,000,000,000,000,000,000,000
52 DATA 000,000,000,000,000,000,000,000
```

```
53 DATA 001,000,000,003,192,000,003,128
54 DATA 000,030,016,048,063,188,121,190
55 DATA 127,135,255,255,015,255,240,015
56 DATA 255,224,007,255,192,007,255,192
57 DATA 015,057,224,018,000,176,011,128
58 DATA 144,004,069,096,002,002,000,000
59 REM
60 DATA 000,000,000,000,000,000,000,000
61 DATA 000,000,000,000,000,000,000,000
62 DATA 002,000,000,007,128,000,007,000
63 DATA 000,030,016,048,063,188,249,190
64 DATA 127,007,255,255,015,255,240,015
65 DATA 255,224,007,255,192,007,255,192
66 DATA 015,057,224,028,000,216,054,001
67 DATA 160,065,000,016,128,000,008,000
```

Bob and David Snader  
Baltimore, MD

**\$2B1 Easy SEQ file viewing**—When I am writing programs that create sequential files, I often want to examine the files to find if they're being properly put together. I just use my Easy Script word processor and load the files as though they were regular Easy Script documents.

If I need to edit the file, I use Easy Script; then I save the file as I would any document.

Tom Kinsel  
Sandusky, OH

**\$2B2 Reading the status variable**—When working with disk files, it's useful to check ST, the computer's status variable, to determine when the end of file has been reached. If you're also checking for disk errors by reading channel 15, you must always make the error check after the status check. Disk error checking sets ST to 64, which is also the end-of-file value.

Keith W. Marshall  
San Juan, Trinidad

**\$2B3 Disk drive speed adjustment**—I adjusted the speed of my 1540 with the drive upside down. However, when I put it right-side up, there was a noticeable change in speed. Cure: While the drive was right-side up, I removed the necessary covers, then used a mirror to reflect the light onto the stroboscope pattern. In the absence of a fluorescent light source, I used the all-white light from my monitor screen.

Erkki I. Suikki  
Vaasa, Finland

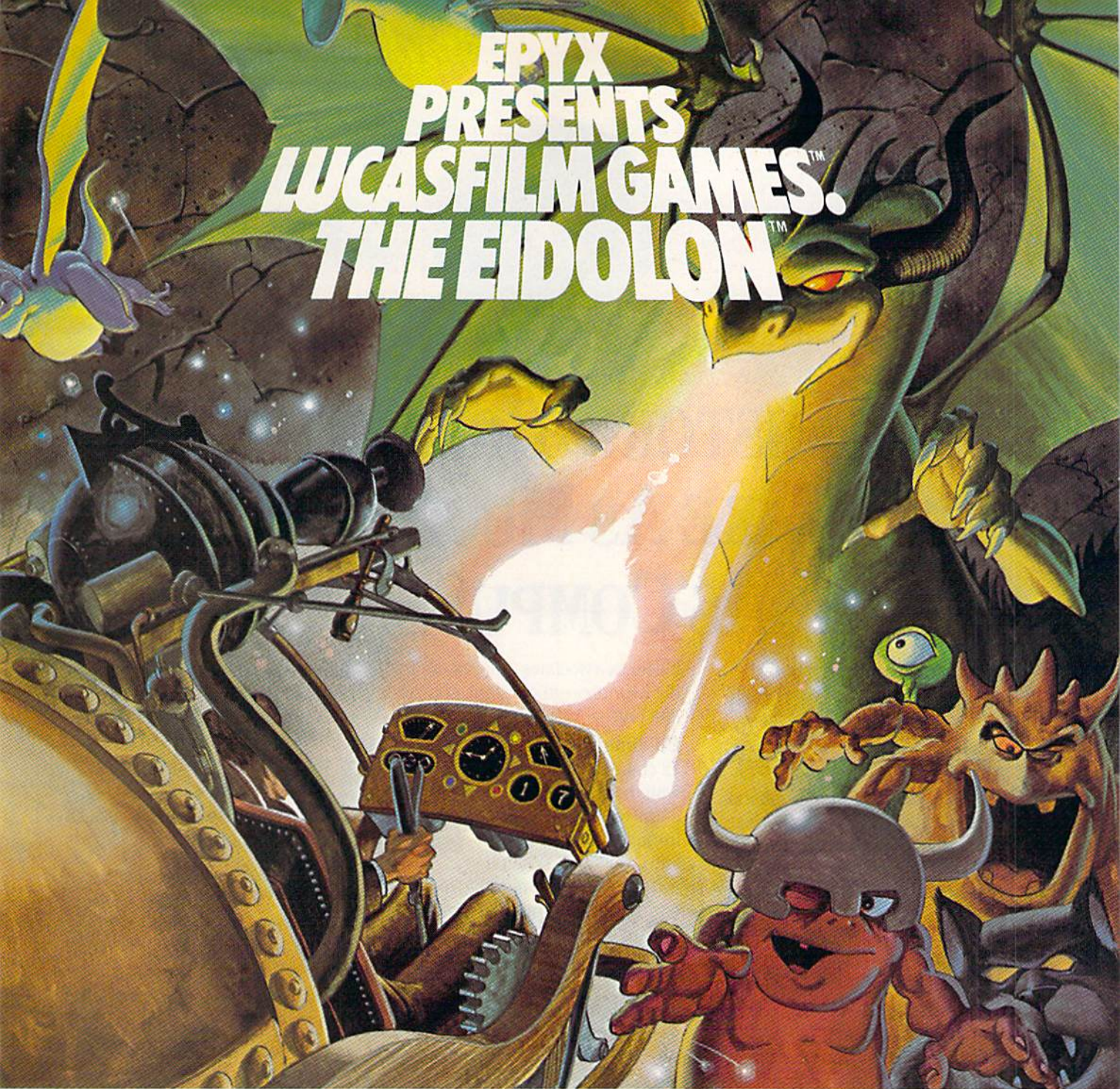
**\$2B4 Fast Load flakiness**—This popular cartridge is a wonderful help in disk operations, but it tends to cause programming problems. If something unusual occurs with my Fast Load-equipped computer, especially when working with files or the printer, I can usually resolve the problem by disabling my Fast Load cartridge.

Donald E. Griffey  
Hopkinsville, KY

Continued on p. 86.



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In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

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Compiled by SUSAN TANONA

## CalKit

*A High-Powered Spreadsheet for the Novice and Expert Alike*

**C**alKit is a spreadsheet package designed to solve problems. It goes beyond the average spreadsheet program by offering 20 ready-made applications worksheets, each supported by a sample version filled with data. Unlike so many other programs that leave you wondering what to do next, CalKit quickly gets you up and running.

This is a full-featured spreadsheet with superb documentation. It offers help screens, simple commands, a quick-reference card and complete editing capabilities. Moving around the spreadsheet is easy to accomplish with the cursor keys.

You can integrate information from your spreadsheet into Batteries Included's PaperClip word processor, and you can create an 80-column viewing screen with the company's BI-80 plug-in module.

Included on the disk is a useful single-drive backup program that lets you make copies of your system disk and any data disks you create with the program. The software is not copy-protected, because CalKit can only run with a special key (dongle) inserted into control port 1. So, any copies that you make of the program are truly for backup purposes only.

CalKit is compatible with any printer that connects through the serial port of your C-64 or that connects

to the computer with an IEEE interface. Owners of non-Commodore printers must go through a setup routine to select the appropriate secondary address and the control characters you'd like sent to your printer. This may require some experimentation for your printer and interface combination, but this program is definitely worth the time involved.

Other features of this spreadsheet include insertion and deletion of columns and rows; global and block formatting of values into decimal, scientific or graphic modes; variable column widths; and the option to copy cell contents, either by the individual cell or by blocks of cells.

What really makes this program stand out are the ready-to-use, pre-designed forms. Each form has a sample version and a blank version. There are forms for such uses as home budgeting, installment loans, starting a business, balancing your checkbook and monitoring your personal stock portfolio.

You simply use the sample form to get an idea of how it might be used, then switch to the blank form and start working. Or, you can change the blank form to suit your own particular application.

CalKit will probably encourage such users as homeowners, landscapers, teachers and students to enter the world of electronic spreadsheets, as the program offers example after example of how a spreadsheet can solve all kinds of problems.

CalKit is a high-powered program from a company that continues to demonstrate its commitment to bringing quality software to the Commodore market. (*Batteries Included*, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5. C-64/\$49.95 disk.)

**Ken Silverstein**  
Raymond, NH

## 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!

## Fast Tracks

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### Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the best printer on the market today at a bargain price.

### The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seiko-sha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

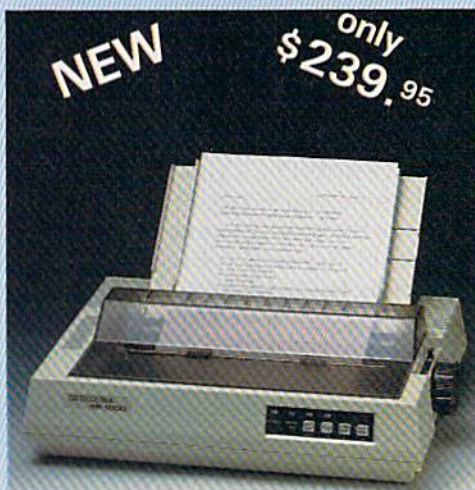
### "NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking *quality* printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for hundreds more.

### Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about command codes. This fantastic

machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and ... VOILA! The letter now fits on one page.



### Forms? Yes!

#### Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

### Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark

printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only \$11.00. Order #2001.)

### The Best Part

When shopping for a printer with this quality and these features, you could expect to pay much more. *Not now!* We sell this fantastic printer for **only \$239.95!** You need **absolutely nothing else** to start printing — just add paper (single sheet or fanfold tractor).

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### The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, graphics interface & cable built in.

IBM-PC and compatibles, Order #2100, plus 8' shielded cable #1103, \$26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

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We also have interfaces and cables for many other computers not listed. Call Customer Service at 805/987-2454 for details.

Shipping and insurance is \$10.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air), APO or FPO is \$22.00. Canada, Alaska, Mexico are \$30.00 (air). Other foreign is \$70.00 (air). California residents add 6% tax. The above are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

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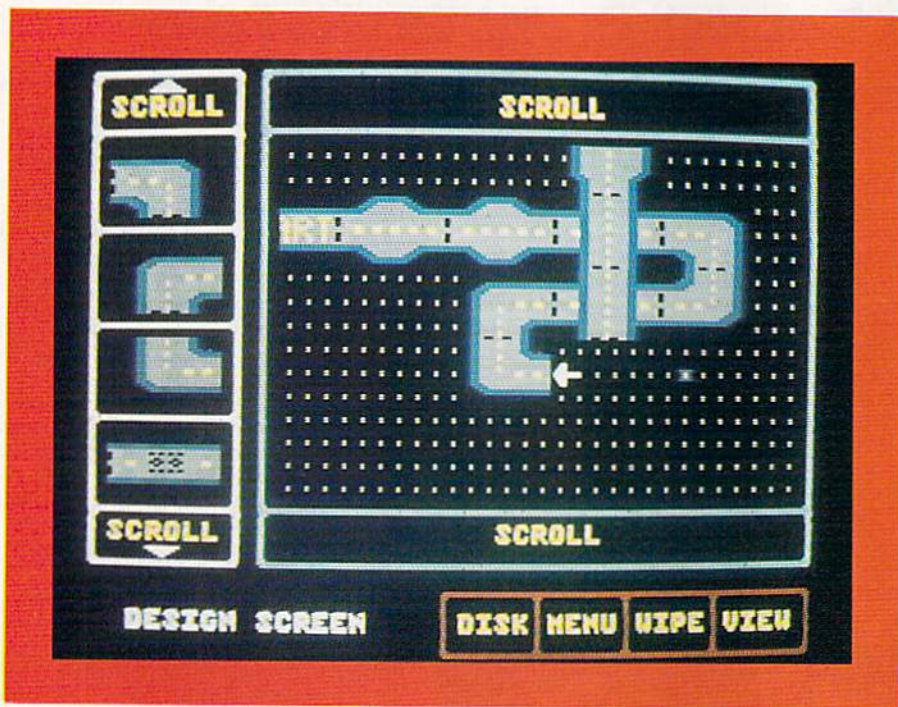
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Activision's *Fast Tracks*.

that they can be considered a category unto themselves.

*Fast Tracks* brings the construction syndrome to slot-car racing and is thus one of the most logical translations from real life to computers. (I mean, really, wouldn't you love to hit a turn at full speed and not have to chase your slot car halfway across the room?)

*Fast Tracks* first presents you with a selection of such track pieces as straightaways, curves and crossovers. If you can name it, it's probably here. The menu board runs down the left one-third of the screen, and scrolling action allows you to scan the sections until you find the one most likely to do you harm.

Obvious impossibilities, such as constructing 90-degree turns by placing two crossovers at right angles, are disallowed. Those of you who are really hell-bent upon slot-car suicide, take note.

Since you construct tracks that are much larger than the screen, the View option will show you your track in its entirety at any phase of the construction. Other options allow you to stretch a section to make longer straightaways or to erase sections that may seem too tame.

Now you're ready to race. You may choose to race on your track or on

one of the six others included on the master disk. Once you've made your selection, you may take an overview of the track to get your bearings.

As in the construction phase, the track is larger than your monitor's screen. A very smooth and quick scrolling action keeps your car in view at all times, while other cars that you have passed (or that have passed you) will disappear now and then as they move to sections outside your view.

As with real slot-car racing, there is no need to steer your car. It does so by itself, leaving observers to believe you have incredible reflexes. Your real control comes in keeping to the center of the track, bumping other cars off the track and slowing down as you come to an oil slick or a particularly bad turn. Really bad turns will send your car skittering off the track (but, thankfully, not across the floor), costing you time.

Beating your own or someone else's time is the challenge. The difference is in hundredths of a second, measured by the real-time clock at the bottom of the screen.

*Fast Tracks* strives to be different and succeeds. Graphics, animation and sound are great and the play value is high. I recommend it for any age group—especially for those who have worn out the knees of their jeans

chasing real slot cars across the carpet.

So, I'll have to say yes, there is room for another computer construction set, as long as the theme is original and as long as the quality of execution remains as high as in *Fast Tracks*. (Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/\$29.95 disk.)

Ervin Bobo  
St. Peters, MO

## Snowdrifts and Sunny Skies **B**

*Learn How Fronts and Barometric Pressure Affect the Weather*

**S**nowdrifts and Sunny Skies is a charming way to learn about the weather. It is an arcade-style game that scores points based on how well you decipher weather clues to make accurate weather predictions. You use a joystick to dodge people, animals and other creatures as you search for data to guess tomorrow's weather.

You begin by grabbing keys from weather balloons without touching the balloons. You have to avoid dust devils, lightning and snowmen. A collision makes you drop a key. You need keys to gain entrance to rooms that contain essential weather information.

The doors of these rooms face a busy street full of moving objects. Getting through them without falling and losing all your keys is quite a challenge. As you move up the levels of difficulty, the sprite people move more quickly, and the time you're allowed on each screen decreases.

In the main hall, there are four doors that you can enter without a key: Window (today's weather picture); Predict (make your prediction); Exit (from the screen and round of play); and End (stop or restart). All the other doors need a key to be opened and offer such information as today's weather, pressure areas and fronts affecting today's weather, historical weather data for a partic-



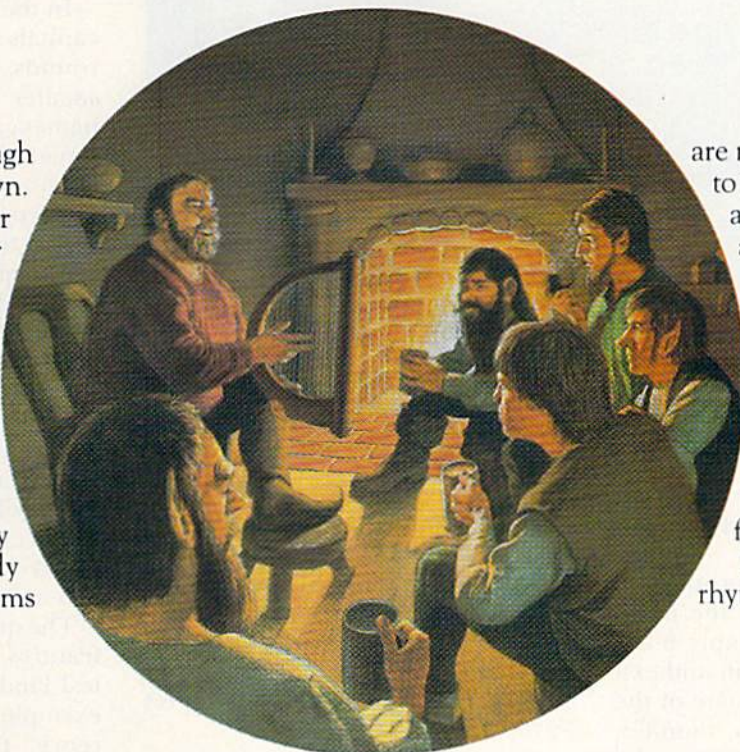
(No I.D. required for half-elves.)

# When the Going Gets Tough, the Bard Goes Drinking.

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are magic, the Bard is ready to boogie. All he needs is a band of loyal followers: a light-fingered rogue to find secret doors, a couple of fighters to bash heads, a conjurer to create weird allies, a magician for magic armor.

Then it's off to combat, as soon as the Bard finishes one more verse.

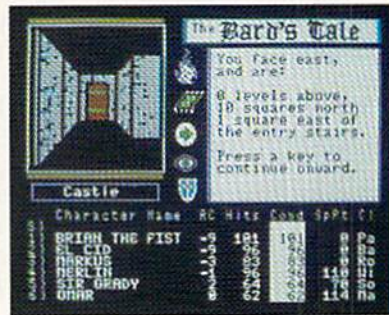
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Radarsoft's Maps 64 USA.

ular city and month, and weather folklore.

If you lose your keys in a collision before you can gather all the information you need, you simply make the best prediction you can and exit the hall. You predict the state of the weather—hurricane, snow, thunderstorm, rain, clouds or sun—and the temperature highs and lows. You earn points based on how close you come to an actual weather pattern in the city and month you chose.

Snowdrifts and Sunny Skies has several nice features. Your character can be male or female, light or dark colored. When several players compete, the program alternates the player who is first in each round, so position is not an advantage in the 12-round game.

This program is fun simply as a game, although it is not as action-packed as an arcade game. Its slower pace is easier for young children to handle. As educational software, it is effective and well-designed. You can learn a surprising amount about the weather as you play. With nine cities and 12 months to cover, the game has plenty of variety.

The scoring is based on actual weather history. While hurricanes and snow occur more frequently in the game than in nature, you nonetheless learn real relationships between the weather map and barometric pressure and how the weather

behaves. These relationships easily transfer to understanding the evening weather report. Snowdrifts and Sunny Skies is a positive educational experience that's well worth buying for children 8 and older. (Tri Micro, 14072 Stratton Way, Santa Ana, CA 92705. C-64/\$14.95 disk.)

Annette Hinshaw  
Tulsa, OK

## Maps 64 USA

**B**

*Polish Your Geography Skills as You Explore The United States*

**R**adarsoft's Maps 64 USA is an educational game designed to help you practice your geography skills. You locate American states, capitals, cities and geographical landmarks on accurately drawn high-resolution maps. One map shows the entire United States, and five other maps magnify various regions across the country.

The program gives you several ways to practice your knowledge. A helicopter game allows you to cruise around the country and look for different towns; and a search section lets you select cities for the program to hunt down.

The helicopter game combines the excitement of an arcade game with

the repetition necessary to remember place names. You have to locate towns within a given time period. You can choose the skill level and time limit.

In the first level, you look for state capitals and large cities. In the higher rounds, the towns you must find are smaller and less well-known. State names can even be removed from the screen to make the game more challenging. Some cities will repeat during a round; this helps you remember where they are.

The quizzes in the program are like the familiar geography tests you probably had in school. You are shown a state, state capital, city or topographic feature, and you have to identify it. Your answers must be exact, or they'll be counted as wrong. If you answer incorrectly, the program will show you the right answer. At the end of the quiz, you get a score based on the percentage of questions you answered correctly.

The quizzes have a few bothersome features. The names of the geographical landmarks are inconsistent. For example, you must answer "St. Lawrence" for St. Lawrence River, but don't answer "Galveston" for Galveston Bay, or you'll be incorrect. Also, you are not able to set the skill level for these quizzes.

I found the city search quiz a little too difficult for younger children. It includes many small towns along with the large ones, and despite the detailed maps, it is sometimes difficult to distinguish between the towns.

The search section lets you look up the locations of more than 5000 places. My brother (a traveler and map collector) turned this section into a stump-the-software game. We were amazed by all the locations the program has on file. It found over a dozen small communities around Los Angeles alone!

Maps 64 USA, particularly the helicopter segment of the program, will provide you with a fun way to practice your geography skills. The program's flexibility and large library of place names make it ideal for students in grades four and up. Adults will also find Maps 64 USA a unique and challenging game.

Once you have found your way through America, Radarsoft has two



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other map programs—Maps 64 Europe and Maps 64 World—so you can continue your explorations. (*Radarsoft, 655 John Muir Drive, E411, San Francisco, CA 94132. C-64/\$39.50 disk.*)

**Matthew Stern  
Reseda, CA**

### Real Estate 64



*Here's the Computer  
Version of a  
Classic Board Game*

**W**hy mess around with a good thing?

There are some things even modern technology can't improve upon. Game lovers—even those who fancy the computer variety—need only try Handic Software's Real Estate 64 to realize it is no substitute for Monopoly, the board game on which it's based. While the program does offer a few interesting variations on the original theme, I don't foresee it turning on gamers the way the Parker Brothers classic has.

If you've ever played the original board game, you know the basic rules and objectives of Handic's computerized version. The idea is to travel around a city, buying up pieces of property and developing them. The winner is the player who bankrupts all of his opponents, or the one who has the most cash and property when everyone decides to end the game.

Handic has adapted that premise for the C-64 program. Push a button and the computer rolls a couple of "video dice" for you, then moves your on-screen car through the streets of the city. Push another button to buy a piece of property. If it's already owned by an opponent, the computer automatically deducts the rent from your account. The computer keeps the players' turns in order.

The computer also keeps track of each player's net worth and possessions. Features of the original game, such as going to jail and drawing Community Chest or Chance cards, are also included in this version.

Pressing a key here and a key there allows you to mortgage a property, list one for auction, build on a prop-

erty or see how much money and property has been accumulated.

Since Real Estate 64 is played using a computer, it offers some features the original board game does not. For example, you can instantly find out what you're worth and don't have to worry about being short-changed when making a transaction.

Another interesting feature is that you can play solitaire against as many as three computerized foes. (The game can be played by up to four human or computer players in any combination.)

An option that may appeal to some gamers is the opportunity to play Real Estate 64 in one of five languages (English, Swedish, Finnish, German or French). Instructions and property names appear in the language of your choice, except when there is a glitch in the program. In the English version, for example, a few property names appear in German.

By far the most intriguing option is the one that allows you to play your game on the streets of Stockholm, London, Atlantic City, Paris, Rome, Amsterdam, Helsinki or any other city you select. That's right, there's a provision that lets you create your own city with your choice of two utilities, four railroads and 22 streets. You can even save it for future games!

Unfortunately, computerization of this game brings with it some insurmountable problems. One is that everything operates from the C-64's keyboard. It's downright annoying having to switch places with the other players on every turn. Also, since all financial data appears on the screen, it's not possible to use old Monopoly ploys such as secretly amassing a fortune before moving in for the kill.

But perhaps Real Estate 64's biggest disadvantage in comparison to the board game is an aesthetic one. Monopoly is about capitalism and materialism, and those concepts manifest themselves in one's possessions.

In other words, having piles of money—even if it's play money—and a stack of property cards in your hands is at least half the fun of Monopoly. Real Estate 64 deprives you of the joy of flaunting a pile of deeds or fanning a thick wad of bills in an opponent's face.

If those things don't mean any-

thing to you, or if you've never played the real thing (is there anyone who hasn't?), you may find playing Real Estate 64 richly rewarding. But if you're a materialistic, money-hungry slumlord at heart—as I am when it comes to Monopoly—then this game will probably leave your coffers empty. (*Handic Software, 400 Patterson Plank Road, Carlstadt, NJ 07072. C-64/\$39.95 disk.*)

**Scott Wasser  
Wilkes-Barre, PA**

### The Whole Bit



*This Simple Yet Powerful  
Word Processor Offers a Lot  
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**T**he first thing you'll notice about The Whole Bit is that its plain plastic package contains no user's manual. Don't let that put you off. This newly released version of a long-overlooked word processor from Applied Technologies is part of a new approach to software marketing. Eliminating the manual has allowed the company to bring this software onto the market at a price reduction of almost 40 percent.

At first encounter, the program appears to be just another menu-driven word processor designed for ease of use.

If you're anxious to start writing immediately, you can jump right into this program. Even without instructions, The Whole Bit is very simple to use. In fact, it almost doesn't need a manual. You can enter, edit and print out text simply by relying on the easy-to-follow menus and four help screens. The program's default settings and simple commands allow short letters or notes to be composed and printed almost immediately.

If you find you do need the manual, you must simply put your new word processor to work printing the 36 pages of documentation that are included on the program disk. (Instructions for printing the manual are provided in a tiny six-page booklet that comes with the program.)

The Whole Bit's capabilities make it useful for small-business as well as home applications. It allows you to





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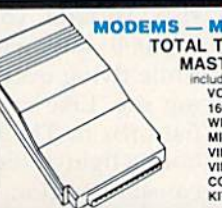


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chain files without embedding special instructions at the end of each file, insert non-printing remarks within the text, create indented paragraphs and automatically align columns. The last two features are almost mandatory for creating reports or lists of numbers. A small but useful convenience is the ability to assign one or two frequently needed words or phrases to individual function keys.

The Whole Bit supports most of the popular printers and can be programmed with custom commands and initialization routines. Commands to call such printer options as subscripts and enhanced fonts are logical and easy to remember. The same command is used both to begin and terminate an option, cutting in half the number of commands you have to remember. The program also offers the welcome feature that allows you to print or preview any portion of the text held in the 20K RAM buffer.

While printer commands and remarks are embedded within your text, format instructions, such as margins, tabs, headers, footers and page numbering, are not. You enter these via the Print Options menu, and they need not be saved as part of the text file. This allows you a good deal of flexibility in recalling files for use in other documentation.

When text is written to a disk file, you have the option to save it with or without special format instructions. Files that include these instructions are designated master files, and a special symbol identifies them in the disk directory. (Unfortunately, there is no way of easily determining what special instructions are stored with a document.)

The black and gray display screen has a somewhat unusual appearance. Blank and forced spaces are displayed with a horizontal line between words or to the edge of the screen. Once you become used to these lines, the screen display seems logical and easy to use.

Text would be easier to proofread, however, if word wrap were built into the program. I also missed being able to switch from single to double spacing within a document. Instead of embedding a command within the

text to set spacing, you must change a value in the Print Options menu.

Text is stored on your disk as a program file. While this is not uncommon, The Whole Bit also allows you to load any program file that is on the disk. This can lead to trouble, as accidentally loading a non-text file can crash the program.

Previewing the formatted output on an 80-column screen is accomplished with a slick scrolling system that even allows you to return to the top of a page that has already scrolled off of your 40-column screen.

Overall, this is an excellent word processor. Don't let the low price fool you. The Whole Bit is a high-powered package that's easy to begin using and hard to outgrow. (*Applied Technologies, Lyndon Way, Kittery, ME 03904. C-64/\$24.95 disk.*)

John Premack  
Lexington, MA

## The Halley Project

*Journey to Distant Planets,  
Orbiting Satellites and  
Your Local Library*

Subtitled, "A Mission In Our Solar System," The Halley Project is actually ten missions that will take you to the outer reaches of our solar system and back. As you successfully complete each mission, you are advanced from an unranked pilot up to the level of Starbird. Only then do you receive your secret code number and become eligible to participate in the ultimate mission—The Halley Project.

You begin each mission by reading your flight instructions and blasting off from a secret installation on the comet Halley. Using the stars as your guide, you must pilot your spaceship to distant locations within the solar system. Sometimes your destination will be a specified, although little-known, moon, while other missions will send you to "any outer planet," or "a planet warmer than Earth."

Unless you are already an astronomy buff or don't mind spending hours cruising the solar system for a heavenly body that happens to fit the description, this is where you will

have to do a little outside research. Fortunately, the program's "top secret" dossier, which also serves as your technical reference guide, includes several excellent sources of information on the solar system.

Once you determine exactly where a particular moon or planet is located, you will need your radar, star map and keen scrutiny through the ship's viewing screen to plot a course to your destination. The radar displays the location of the sun and all nine planets in relation to your ship, as well as the 12 constellations that are listed around the radar screen. By zooming in until the appropriate planet appears on the edge of the radar screen, you'll learn which direction to fly and your approximate distance from the planet.

Though the names of the 12 constellations will sound familiar to anyone who's ever read a horoscope, you'll probably have to check the star map to see exactly what the constellation looks like.

Perhaps even more difficult than finding a specific moon or planet is landing on its surface once you arrive. To land, you must pass within 100,000 kilometers of the surface while flying over an unmarked landing site. Like real planets, the celestial orbs in The Halley Project have both a light and dark side and are in constant motion, making a successful voyage and landing somewhat like hitting a moving target that's occasionally invisible.

Although both planets and moons are simply drawn as solid-colored spheres, the view from space is often surprisingly realistic. Against a backdrop of stars, planets smoothly evolve from tiny dots to huge globes, and individual moons slowly swing into view.

It is this beauty and realism that make all the research necessary to complete Halley's missions seem worthwhile. The Halley Project is an enjoyable tour of the solar system and the kind of software that could spark an interest in astronomy that will linger long after you've completed all ten missions. (*Mindscape, 3444 Dundee Road, Northbrook, IL 60062. C-64/\$39.95 disk.*)

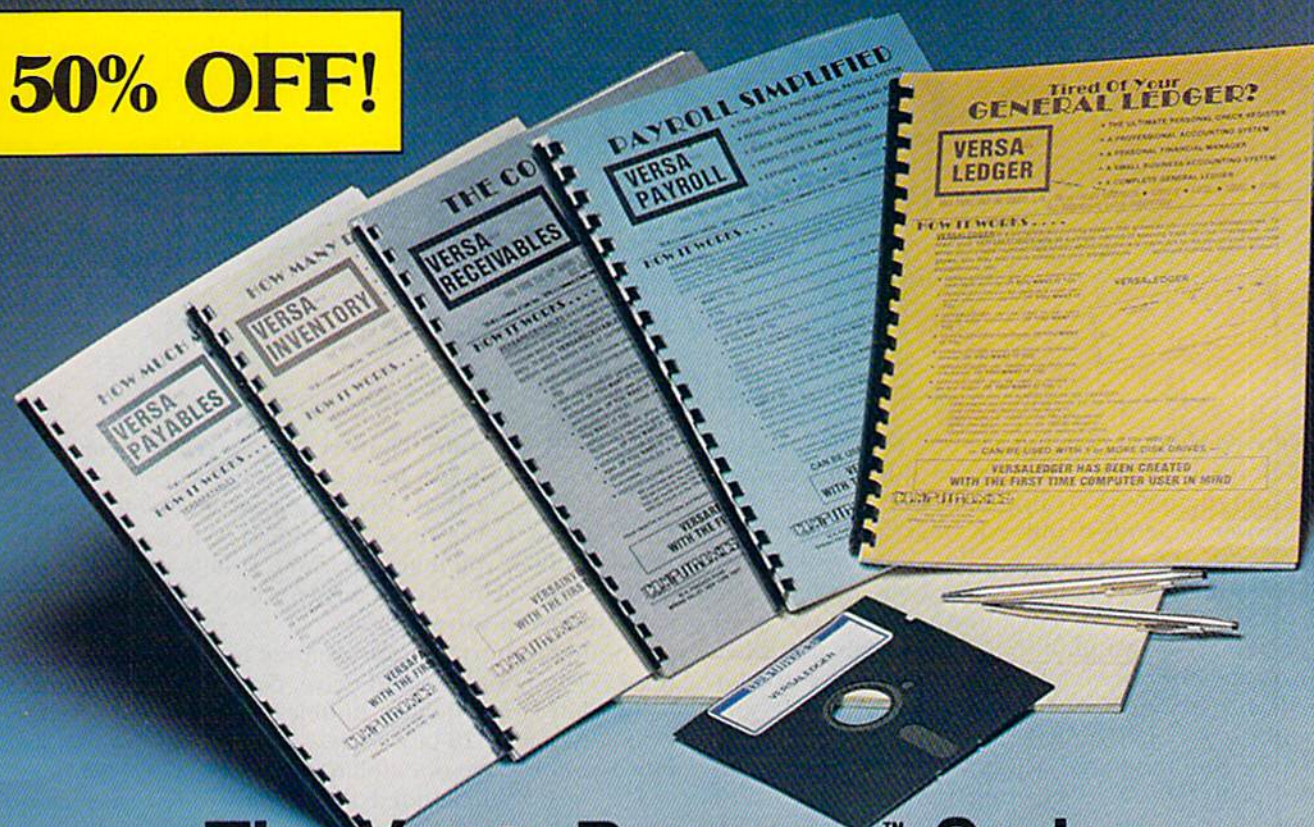
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# Commodore's New Disk Drive

*Meet the 1571. C-128 owners will find that Commodore's new disk drive offers some vast improvements—especially in speed and capacity—over the 1541. Here's an overview of what you can expect.*

By JIM BORDEN

If you're considering buying a C-128, or simply buying a new disk drive for your Commodore, just what can you expect from the new 1571 disk drive?

The answer depends mainly on what computer you'll be using with the 1571 drive. With any Commodore computer, you'll immediately notice how much quieter this drive is. Gone is the solid stop to locate the head. It's been replaced by a photocell. This means that when copy-protected software is loaded, you won't have to listen to the head banging into the stop and worry that your drive will go out of alignment.

The drive's motor starts each time a disk is inserted or removed. (This takes a little getting used to.) The purpose of this is to allow the disk to better center itself as the drive shaft is moved into the center hole. The result is less wear and tear on the center hole and longer disk life. Another possible result is more reliable disk read/write operations. If the center hole were to become slightly elongated, you might begin to experience problems with the disk.

It is safe to remove the disk any time the *green* light is off, even if the motor is running. And no, I don't know why Commodore decided to change the color of the power and busy lights. Red is now the power light and green is the busy light.

Another nice feature is the DIP switch that's located on the back of the 1571; it allows you to set the drive's device number from 8 to 11. This is far better than changing the device number via software, which lasts only until the drive is turned off, or via hardware, which involved cutting the pad in the 1541.

## *Some Improvements*

Unless you'll be using a C-128, those are the only changes you can expect from the 1571. If you have, or plan to buy, a C-128, however, you'll find the 1571 to be a great improvement over the 1541.

The major improvement involves speed. Table 1 compares the time required for various operations on the 1541 with a C-64, and the 1571 with a C-128 in C-128 mode. (The C-64/1571 combination performed nearly the same as the 1541.) These times were found using a 54-

block Basic program. The last column (1541 format) surprised me. This was a load or verify of a program saved by a C-64 with a 1541. Even these programs load much faster on the C-128 (in C-128 mode). When the C-128 is in C-64 mode, you'll get the same results as if you were using a 1541. (This is necessary for the C-64 mode to load copy-protected software.)

Another important improvement in C-128 mode is that the 1571 is a double-sided drive. For this reason, I advise using only good quality double-sided disks. A double-sided disk has 1328 blocks free—do you want to risk that much data to save one dollar per disk?

The terms single-sided and double-sided may cause some confusion. A true double-sided drive (such as the 1571) has two heads to allow reading/writing on both sides of the disk without flipping it. The 1541 is a single-sided drive, since it can only write to one side of a disk. If you do use the other side of a disk by flipping it, you should be very careful with the 1571. Although it cannot read the flip side, it will, when in C-128 mode, format both sides of *any* disk. For this reason, you might want to copy any data on the flip side of your disks onto double-sided 1571 disks. Then store the original disk as a backup. (You cannot read the second side of a 1571 disk with a 1541 or a C-64.)

## *The 1571 User's Guide*

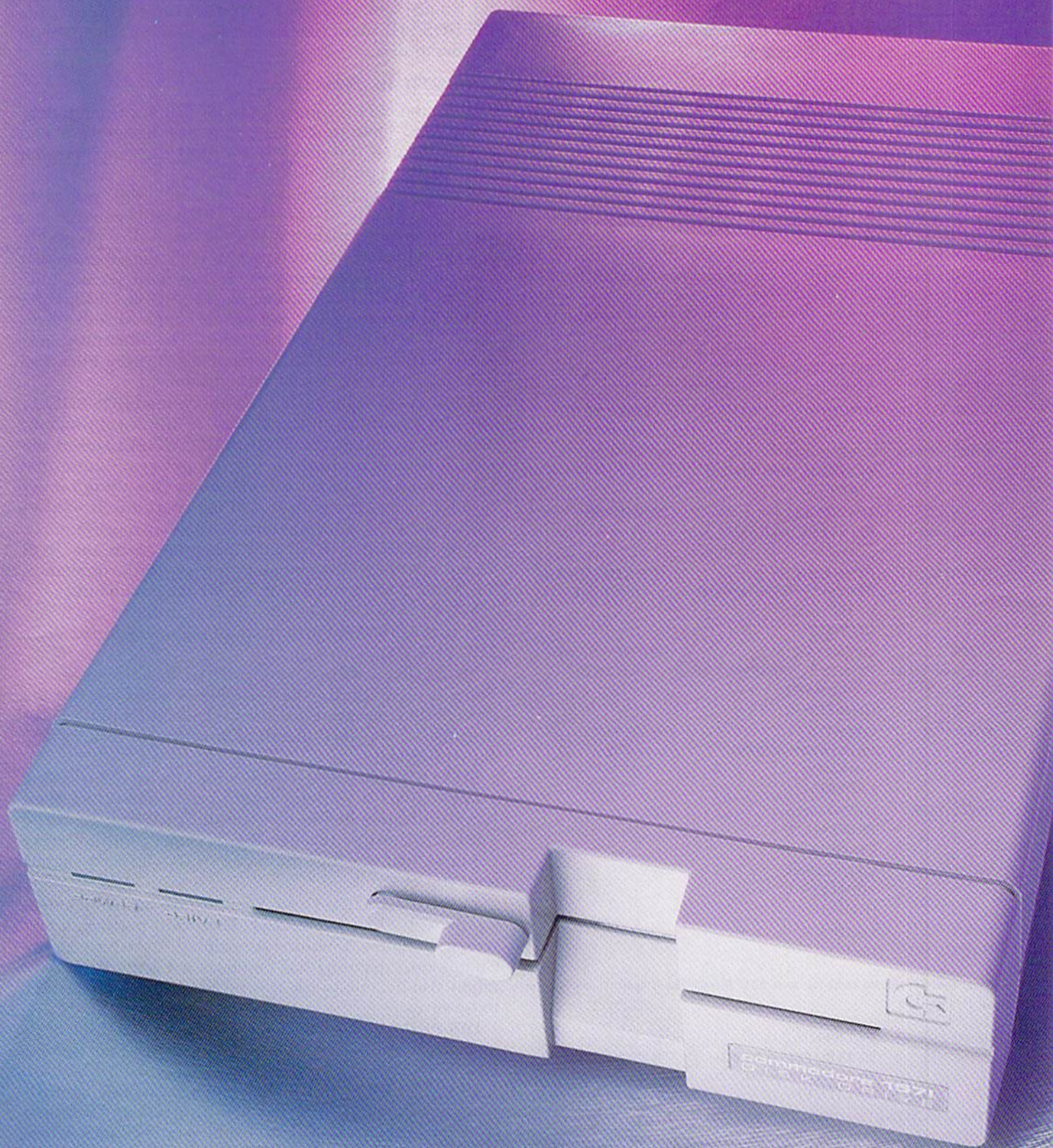
The *Commodore 1571 Disk Drive User's Guide* is an improvement over the 1541's manual. It is well organized and in a logical order. You are told how (and why) to format a disk as soon as you've connected the drive to your computer.

There are, however, two additions I'd like to see to the manual. First, an index would be handy, especially for the beginner.

The second oversight by Commodore is the lack of reference to the C-64 Wedge. Maybe Commodore doesn't expect you to use Basic 2.0 for disk commands. The only useful reference made to the wedge is in the "How to Use" file on the demo disk. This file only explains how to read the directory and how to load a program, and even these aren't covered very well. In case you're working

Photograph by Ed Justice







Command	1541/C-64	1571/C-128	1541 Format
Save	41 sec.	33 sec.	(n/a)
Load	37 sec.	4.5 sec.	8.5 sec.
Verify	37 sec.	4.5 sec.	8.5 sec.

**Table 1.** Comparisons of time requirements for various operations on the C-64 with the 1541 and on the C-128 with the 1571.

COMMAND	WITH BASIC	WITH DOS WEDGE
LOAD (Basic Programs)	LOAD"PROG. NAME",8	/PROG. NAME
LOAD (ML Programs)	LOAD"PROG. NAME",8,1	%PROG. NAME
LOAD & RUN (Basic)	LOAD"PROG. NAME",8 RUN	!PROG. NAME

NOTE: The above commands can be used with the directory by listing the directory (@\$) and typing the correct character in the first column (over the blocks number). You do not have to delete any of the quotes, etc. Just hit the return key after typing the proper character.

SAVE	SAVE"PROG. NAME",8	-PROG. NAME
REPLACE	SAVE"@0:PROG. NAME",8	-@0:PROG. NAME
VERIFY	VERIFY"PROG. NAME",8	VERIFY"PROG. NAME",8
FORMAT (new)	OPEN15,8,15 PRINT#15,"N0:NAME,ID" CLOSE15	@N0:NAME,ID
FORMAT (Clear Dir)	OPEN15,8,15 PRINT#15,"N0:NAME" CLOSE15	@N0:NAME
RENAME	OPEN#15,8,15 PRINT#15,"R0:NEWNAME = OLDNAME" CLOSE15	@R:NEWNAME = OLDNAME
COPY (On same disk)	OPEN#15,8,15 PRINT#15,"C0:NEWNAME = OLDNAME" CLOSE15	@C:NEWNAME = OLDNAME
SCRATCH	OPEN15,8,15 PRINT#15,"S0:PROG. NAME" CLOSE15	@S0:PROG. NAME
INITIALIZE	OPEN15,8,15 PRINT#15,"I" CLOSE15	@I
VALIDATE	OPEN15,8,15 PRINT#15,"V" CLOSE15	@V
READ DIRECTORY	LOAD"\$",8 LIST	@\$

Note: You may tap the space bar to stop the listing. Tap it again to continue (or hit the stop key).

READ ERROR	10 OPEN15,8,15	@
CHANNEL	20 INPUT#15,A,B\$,C,D	@#9 (for drive #9)
	30 PRINTA;B\$;C;D	
	40 CLOSE15	

CHANGE DEFAULT DRIVE FOR WEDGE.

NOTE: You can use a DOS Wedge command within a Basic program by typing the '@' and enclosing the command within quotes. Example: 10 @"I0:REM INITIALIZE DRIVE

**Table 2.** 64 mode DOS Wedge commands.

in C-64 mode, Table 2 is included to show you the DOS Wedge commands.

I have a copy of DOS 5.1 on each of my C-64 disks, and I load it as soon as I turn on my C-64. I still won't work without it when I'm in C-64 mode! Although DOS 5.1 is a machine language program, it can be copied using the DOS SHELL or SD.COPY.C64, both of which are on the demo disk.

### The 1571 Test/Demo Disk

Since the 1571 is compatible with so many Commodore computers, some programs on the disk have several versions. The first two files ("HOW TO USE") explain what the programs on the disk can do.

Some of the programs are very useful, while others do nothing that one or two Basic commands couldn't do. Here are brief explanations of the demo disk programs.

**DOS SHELL** (C-128 only)—This is a large program that contains ten subprograms. Several of these seem a little silly, such as Run a Program, Format a Disk, Clean Up a Disk and Rename Files, and can be replaced with single Basic 7.0 or DOS Wedge commands. The other programs (Copy a Disk, Copy Files, Delete Files, Restore Files and Reorder Directory) can be quite useful.

The manual suggests that you always load DOS SHELL, but I don't bother unless I want to use a subprogram from the second group. To load DOS SHELL, insert the disk in your drive (with the drive's power on), reset the C-128 and the program will autoboot. One thing I don't care for in this program is that the space bar is used to enter your selection; the return key is much more familiar.

**C-64 WEDGE** (C-64)—This program loads the DOS Wedge (DOS 5.1) into memory for easy disk commands. See Table 2 for a full list of the Wedge commands.

**VIC-20 WEDGE** (VIC-20)—This is a scaled-down version of the C-64 Wedge (a result of the unexpanded VIC's 3.5K of RAM).

**SD.BACKUP.##**—A single drive backup program. There is a version for the C-16, Plus/4 and C-64. Use the DOS SHELL program for the C-128. Always put a cover over the write-protect notch of your source disk for any copy program!

**SD.COPY.C64** (C-64)—Copy a file or a list of files using a single drive. If you only want to copy one or two files, know the names before you run this program. To create a list, you must go through the directory and find every filename that matches the name (with wild-card characters) you entered.

**PRINT.##.UTIL**—Three versions are again included, for the C-16, Plus/4 and C-64. These will perform a text screen dump to a Commodore printer. If you have a non-Commodore printer that emulates a Commodore, you might also be able to use this program. Try your printer to be sure.

**DIR PRINT** (all)—This is a program to print directories of disks. It would not print anything on my Star Gemini 10X printer.

**DIR SQUEEZE** (all)—This program will remove scratched filenames from the disk directory and will then close up any blank spaces left by the scratched files. There is also an option to alphabetize the directory.

**DISK-DUMP** (all)—If you've ever wanted to look at a file byte by byte, this program is for you. The values are displayed in hex, but the addresses are in decimal. I feel that all hex would have been easier to work with, but that could be because I'm a machine language programmer.



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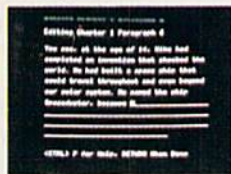
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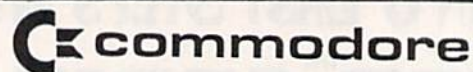
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**FILE.DEMO** (all)—These two programs demonstrate the basic ideas of relative and sequential files. Both programs contain REM statements to guide you through them. Remember to save these programs to a disk without the write-protect notch covered; otherwise, a disk error will result.

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**DATAMAKER.##** (C-64, C-16 and Plus/4)—If you need to convert a machine language program into Data statements, first load your machine language program and then run the DATAMAKER program for your computer.

**HEADER CHANGE** (all)—Perhaps you have a disk that you named long ago and now realize that another name would describe it better. With this program, you are able to rename the disk without changing anything else on the disk.

**64.AUTOSTART** (C-64)—Create a new program that will automatically run the original program. This will be handy for machine language programs. By converting the original ML program to an auto-start program, you'll never forget the SYS address required for the original ML program, as it runs automatically. (This is not the same as the AUTOBOOT MAKER for the C-128; that program boots a program, while this one requires you to specify the program to load.)

**PRINTER TEST** (all)—Test your Commodore printer with this program to see if all the characters are printed properly.

**FORMAT DISK** (all)—If you are a beginner and don't know how to format a disk, this program will do the job for you. (Read your user's guide to find how to format on your computer.)

**AUTOBOOT MAKER** (C-128)—You can have one autoboot program on any disk you use with the C-128. This program will set up an autoboot function for the program you specify.

Well, there you have it. If you have a C-128, I think you'll enjoy the 1571's added features and speed. [R]

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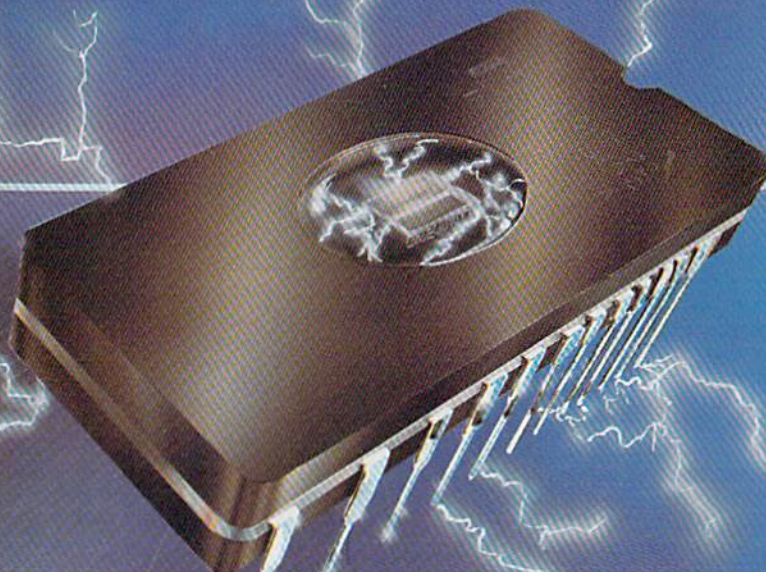
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Music Shop (BRODERBUND)	?	105 sec	105 sec*	105 sec*	21 sec
Hitchhiker's Guide to the Galaxy (INFOCOM)	?	70 sec	70 sec*	**	68 sec*
On-field Football (GAMESTAR)	?	159 sec	66 sec	63 sec	56 sec
EASY FINANCE I (COMMODORE)	?	58 sec	13 sec	13 sec	11 sec

\* = Will not fast load — defaulted back to regular load.

\*\* = Failed to load at all.

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# Ultra Hi-Res Graphics— A Breakthrough On Your C-128

*They said it couldn't be done. But this article proves them wrong. Not only can you generate high-resolution graphics in 80-column mode on your C-128, but these graphics rival that of the IBM PC and Amiga.*

By LOUIS R. WALLACE and DAVID P. DARUS

The Commodore 128 computer is a remarkable machine. It contains one of the best Basic languages ever included with a microcomputer, has 128K of RAM and is expandable. It supports high-resolution graphics in Composite mode. It contains both a working C-64 and a Z-80 CP/M computer, has a great keyboard and a beautiful 80-column display. Perhaps best of all, it's inexpensive. What more could you want?

The 80-column screen on the C-128 is also a welcome blessing to those of us who find 40 columns a limitation. This new 80-column capability is made possible by a second graphics chip, the 8563. This is a very powerful device, making possible the crisp, clear, color text on the C-128 in 80-column mode. This chip provides 640 × 200 resolution instead of the standard 320 × 200 resolution that is available in 40-column mode.

There's a lot of mystery surrounding the C-128's graphics capabilities, and many of you must have a lot of questions. This article is meant to dispel them.

First and foremost, the question arises about bit-mapping, or hi-res graphics. Since the 80-column text is made possible by a resolution of 640 × 200, many of us hoped that we'd be able to use that for graphics. However, Basic 7.0 contains no provision for high-resolution graphics using the 80-column display.

We were told originally that we might be able to do some elementary graphics via custom characters on the 80-column screen, but not true hi-res graphics.

Also, the technical specifications for the 8563 state that it has only limited bit-mapping capabilities. This, more than anything, fired our interest in seeing just how limited it actually is.

## *Good News*

We are pleased to announce that our research has led to the discovery that yes, it is possible to use the 640 × 200 screen in Bit Map mode! This means that in Composite mode, you can have twice the resolution of the C-64 or

**RUN It Right**

*C-128 (in 80-column mode); disk drive*





C-128. And since it is an RGB display, the graphics are crisper and cleaner than ever. In case you're interested,  $640 \times 200$  is equivalent to the resolution available on the IBM PC and the Amiga (in Non-Interlaced mode).

The 8563 has a special 16K RAM area completely separated from the normal system RAM, so no user RAM is needed for the display. However, because of this, trying to communicate with the chip is very difficult. In fact, there are only two addresses in the whole C-128 memory map that have any effect on the chip at all. These registers, \$D600 (54784) and \$D601 (54785), serve as a window from which you may address the chip registers and its 16K RAM bank.

The first address, \$D600, is the 8563 register-select byte; the second, \$D601, is the 8563 data I/O byte. To access the chip, you must put into \$D600 the chip register number you want to read or write to, wait until the chip is ready, and then Peek or Poke into \$D601 the value you want. It is quite a bottleneck, effectively precluding any

usable hi-res graphics using Peeks or Pokes from Basic. But from machine language it's a different story.

We have created a set of machine language commands that are wedged into the C-128 to take advantage of its  $640 \times 200$  graphics power. These will give you a very powerful command set that works with Basic 7.0 and allows you to use these new graphics freely.

There are 14 new commands (see Table 1), most of which are used to work with the  $640 \times 200$  display. One, @FONT, is a special command—for 80-column Text mode only—that allows you to download new character sets from system RAM to the 80-column chip RAM. Since the 80-column text screen allows for two complete character fonts at once, you can use @FONT for some very interesting text displays.

#### *Accompanying Programs*

Included with this article are several programs. The first is called C-128 Ultra Hi-Res. It is a Basic loader

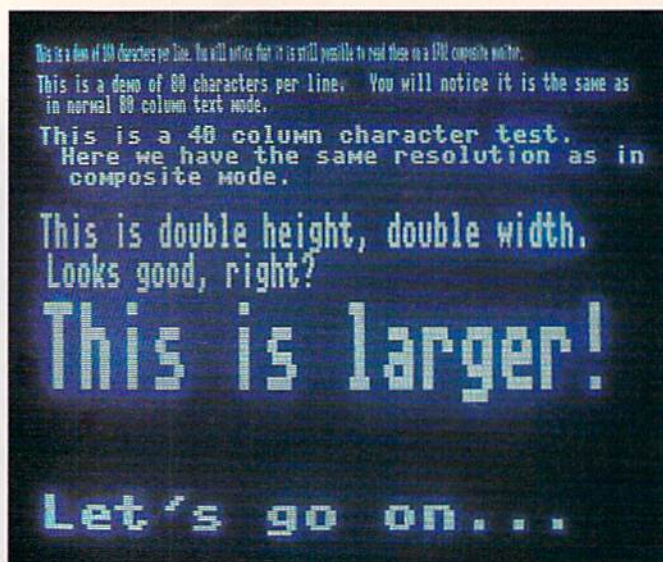


```

@FONT,Char Set #,RAM Address
@TEXT
@GRAPHIC,BC,FC
@CLR,Value
@DOT,X,Y,Mode
@DRAW,X1,Y1,X2,Y2,Mode
@BOX,X1,Y1,X2,Y2,Mode
@BAR,X,Y,dX,dY,Ht,Mode
@SAVE,Type,"filename"
@LOAD,Type,"filename"
@CHAR,Charset Address,X,Y,Ht,Width,"string"
@COPY,SX,SY,dX,dY,Destination X, Destination Y
@STASH,Buffer Address,X,Y,dX,dY
@FETCH,Buffer Address,X,Y

```

**Table 1.** C-128 Ultra Hi-Res command set.



program that will Poke the machine language into memory for you and save the program as a small machine language module called Ultra Hi-Res, which you can easily load into memory.

The second program is called Ultra Hi-Res Boot and should be used to load the Ultra Hi-Res machine language module and set up the computer for its use. You should run it only once, as Ultra Hi-Res creates some tables that cannot be written over. The best method is to use the C-128's autoboot feature and create an autoboot disk that loads and runs Ultra Hi-Res Boot for you. This boot performs several functions. First, it issues a

```
GRAPHIC 1,1:GRAPHIC 5
```

command. This is the only time you should use the normal Graphic command. It allocates a 9K area in the computer to be used for composite hi-res graphics. Since you're going to be using the new Ultra Hi-Res mode, this area can now be used to hold the machine language commands in the wedge.

Next, it Pokes the start-of-Basic variables in bank 1 up to 16K, giving you a 16K RAM buffer for the @STASH command.

It then loads the Ultra Hi-Res machine language module and activates it with SYS 8448. At this point, you now have the wedge active.

The third program is called Program Setup and is intended as a base from which you can start writing your own programs.

It begins by going into Fast mode. One of the nice features about the 80-column chip is that you can use the Fast command to allow the computer to run at 2 MHz instead of 1 MHz, and the screen display is always visible. (In Composite mode, the screen goes blank during Fast mode.)

Next, it issues the Poke to set up the 16K buffer for @Stash (see @Stash later in this article for information about increasing or decreasing the buffer). The new @Graphic command is issued next, going to Ultra Hi-Res mode and setting up background and foreground colors.

Line 50 issues the @CLR command with a value of 0, which will clear the 640x200 bit-map display, and line 60 sets up the Basic 7.0 Trap command. This is very important because, in case of a Syntax error or program

crashing, it will instruct the computer to go to the line following the Trap instruction. Here it goes to line 10010, which gets you out of Ultra Hi-Res mode, prints the line that has the problem (with the Help command) and ends the program. Even pressing the stop key is handled by the Trap statement. It is highly recommended that you include the Trap statement in your programs.

### The Demo Programs

Next are five short demo programs that use various forms of the new command set. The first is an example of the versatility of the @CHAR command, which allows many different sizes of text (and many different styles) all at once. It even has a special form that will give you 160 columns on one line! Imagine the possibilities!

The second demo program is a simple line-drawing demo that creates a very interesting graphics effect called a *moire* pattern. It looks very good in 640x200.

The third demo is one that uses the 3-D Bar command. This command allows you to create three-dimensional bar graphs so easily it will amaze you (and your friends)!

The fourth demo uses Basic to create circles, and the circle routine could very easily be modified for use as a general-purpose subroutine. After the circles are drawn it uses the @Copy command to duplicate them, and then uses the @Stash and @Fetch commands to create a form of animation called *Blitters*. That's right, the C-128 now has blitter graphics capabilities. (Blitters are a form of high-speed bit-map transfers, often mentioned in reference to Commodore's new Amiga computer.)

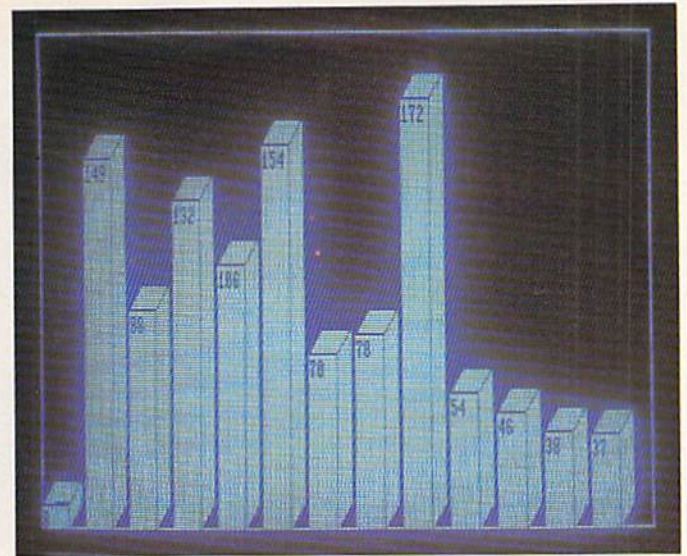
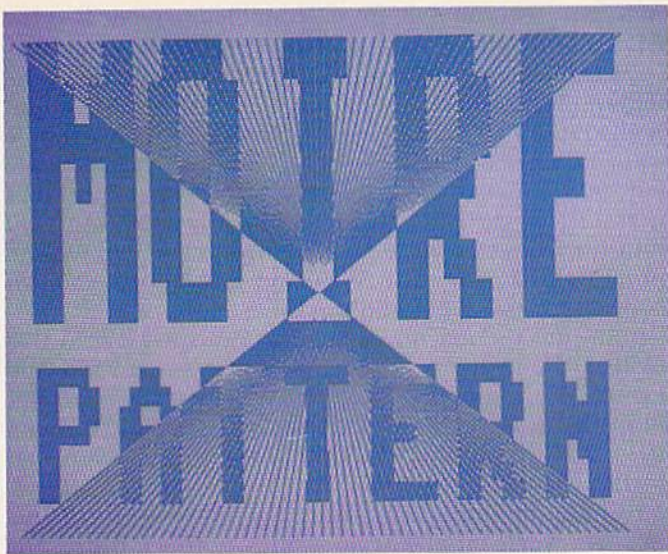
The last demo is an impressive demonstration of the power of the new commands. It creates a fully animated demonstration of a three-dimensional cube rotating and changing size in real time. It uses the @Stash and @Fetch commands (and a 32K @Stash buffer) to create a small movie. After seeing this, you'll probably be highly motivated to begin using these new Basic commands on your C-128.

### The C-128's Memory

The memory organization of the C-128 is a very complex subject, and we cannot go into it in detail in this article. However, you need some information to use the Ultra Hi-Res command set effectively.

In an unexpanded C-128 there are two banks of RAM,





bank 0 and bank 1. Bank 0 is where your Basic program resides, and bank 1 is where your variables are stored. When you enable the normal composite bit-map graphics display with the

#### GRAPHIC 1,1

statement, the C-128 moves your program in bank 0 up 9K to make room for the graphics screen and its color memory. That's why the Ultra Hi-Res Boot program issues it as its first statement.

This area can now be used to store the machine language program that gives you Ultra Hi-Res mode. If you were to use that area again in a program while in Ultra Hi-Res mode, it would erase the whole program and crash the computer.

This is also true of graphic multicolor composite Bit Map mode, which you should never use in your programs while Ultra Hi-Res is enabled. The same thing is true of the Graphic CLR command, which de-allocates the 9K, making it available for Basic. And the SCNCLR command should never be used, for the same reasons as the Graphic command.

Bank 1 contains about 64K to be used for variables. Registers 47 and 48 contain the address for the start-of-Basic variables. The normal value for 47 is 0; for 48, it's 4 (this is the address \$0400 in hex and 1024 in decimal). Everything above that is used for variables. But by Poking a larger value in register 48, followed by the Basic CLR command, you can trick the C-128 into giving you some extra RAM that you can use in your programs. The Ultra Hi-Res Boot program, for example, automatically sets up an extra 16K buffer in line 20 with

```
POKE47,0:POKE48,68:CLR
```

You can increase or decrease this buffer by changing the contents of register 48. (Be careful not to make it less than 4!) If your program will be using a lot of variables and won't be using the @Stash and @Fetch commands, you won't need a buffer area. In this case, you might want that RAM to be used strictly for variables, so start off your program base with the line:

```
POKE47,0:POKE48,4:CLR
```

However, some programs (such as the 3-D cube demo) require even more RAM in their buffer, so you will have to increase the size by Poking to register 47 and 48.

```
POKE47,0:POKE48,132:CLR
```

This provides you with a 32K buffer in which to store graphics. However, you've now cut your variable RAM in half. You will have to decide if you need to change it. In most cases, the default of 16K will be sufficient.

One more point. The screen resolution (640×200) calculates to 128,000 bits, or 16K of RAM. That's exactly the amount of RAM available to the 8563 chip, and does not leave any RAM for 80-column Text mode. If you need to use the Text mode and have an important screen in Hi-Res mode, you will have to save that screen (to disk, using the @Save command, or in the @Stash buffer), go to Text mode with the @Text command, perform your needed function, return to Ultra Hi-Res mode with the @Graphic command and restore your screen from the buffer or disk.

When would you need to do this? One time might be when you need to input some value from the keyboard while the program is running. The Input command prints a question mark on the text screen. In Ultra Hi-Res mode, however, there's no RAM left for the 80-column text screen, so the operating system would corrupt your Ultra Hi-Res program with the question mark. Therefore, use the GETKEY in place of the Input command, unless you toggle back to Text mode.

#### C-128 Ultra Hi-Res Commands

After you have successfully activated the C-128 Ultra Hi-Res program, the following commands are available to you in addition to all of Basic 7.0 (except those graphics previously mentioned).

**@FONT**, character set #, RAM Address. This command allows you to display (in 80-column Text mode) character fonts other than those offered by the default character set. There is room in the 8563 RAM for two sets, and they are normally the uppercase/graphics and the lowercase/uppercase sets. If you have access to other fonts that you wish to use, simply load them using the BLoad command, to some area of RAM in bank 0 (in Direct or Program mode) and issue the @Font command. There is 3K available for this, from 12992 to 16383. The Char Set # is either 0 or 1, and the RAM address is where BLoad placed the character set. You can change character fonts by pressing the shift key with the Commodore key or by printing CHR\$(14) or CHR\$(142).

**@GRAPHIC**, BC, FC. This turns on the 640×200 Bit Map mode. BC is background color and FC is foreground





color. When you're in Ultra Hi-Res mode, you are limited to two colors, and this command lets you choose them.

**@TEXT.** This turns off the Ultra Hi-Res mode and returns you to the normal 80-column text screen. You also return to the standard character font, so you'll have to issue the **@Font** command to re-enable any extra text fonts you want.

**@CLR,value.** This is used to clear the Ultra Hi-Res screen. Use a value of 0 to clear it and a value of 255 to fill it. Others can be used for special effects.

**@DOT,X,Y,mode.** This is used to plot a dot on the 640 x 200 screen. X is from 0-639; Y is from 0-199. Mode is either 0 (for erase) or 1 (for draw).

**@DRAW,X1,Y1,X2,Y2,mode.** This is the line-drawing command. X is 0-639; Y is 0-199. Mode is the same as in **@DOT**.

**@BOX,X1,Y1,X2,Y2,mode.** This will draw a box on the 640 x 200 screen. X1,Y1 are the coordinates of the upper-left corner; X2,Y2 are those of the lower-right corner. X is 0-639 and Y is 0-199. Mode is as in **@DOT**.

**@BAR,X,Y,dX,dY,Ht,mode.** **@BAR** draws a 3-D bar of a given height. X and Y are the coordinates of the lower-left side of the bar; dX and dY are the depth and width you wish; Ht is the height; mode is as in **@DOT**; X is 0-639; Y is 0-199; dX is 1-255; dY is 1-199; Ht is 1-199. The sum of Ht and dY cannot exceed 199; if it does, no bar will be drawn.

**@SAVE,type,"filename".** This will save to disk your hi-res screen display (not your program listing) called "filename." There are two types of saves. Type 0 is a normal 16K screen dump, which will give a disk file of 65 blocks. Type 1 is a special compressed form of save, where an intelligent data-compression process will shrink your screen to its smallest possible size. In some cases, it can cut the 65 disk blocks down to only a couple of blocks; but in other cases, it can cut more than 50% off the size of your file! The actual amount of reduction will depend on what is being displayed. It will never be bigger than 65 blocks. In most cases, this Compressed mode will be the best way to save your screens. Use the regular Basic 7.0 Save and Load commands for saving and retrieving your Ultra Hi-Res program listings.

**@LOAD,type,"filename".** This loads a screen called "filename" from disk. Type is either 0 or 1, depending on how it was saved. Be sure to load your file under the

same type, or you will get a scrambled screen. Use the **@Load** and **@Save** commands in Program mode.

**@CHAR,charset address,X,Y,Ht,Wd,"string".** This is the high-resolution character driver. It allows you to print on the 640 x 200 bit-map screen in many sizes and styles. X is any number 0-639; Y is 0-199; Ht is 1-16; Wd is 0-16; and string is what you want it to print, either in quotes or as a string variable. The address is where in RAM you want the character set to be taken from. You can use the built-in sets at 53248 and 55296, or, with **BLoad**, you can load others into RAM and use them.

Built into the machine language is a special font that allows 160 characters per line. Its address is at 7168, and it requires a width of 0. You can use almost any character set made for the C-64 or C-128, as long as they are binary files. Check your user's group library for extra fonts, as it will probably have many.

You may also use special control codes inside the string, such as reverse-on and reverse-off. Control E causes the text to erase anything under it, while Control X performs an XOR on the screen, leaving anything already on your screen still visible. You can also underline your text with Control U and turn off underlining with Control N. Color codes have no effect.

**@COPY,SX,SY,dX,dY,destination X,destination Y.** This will allow you to duplicate any rectangular area of the screen in any other area. SX,SY are the starting coordinates of the upper-left corner you wish to duplicate. The dX and dY are the lengths (in pixels) you want to copy from SX,SY; dX is from 1-640, and dY is from 1-200. Destinations X and Y are the coordinates of the upper-left corner of the new position.

**@STASH,buffer address,X,Y,dX,dY.** This command allows you to store to the buffer a section of the screen and then recall it when needed. X and Y are the upper-left coordinates of the screen you want to save, and dX and dY are the lengths. The section of screen you store may be as small as a byte or as large as a screen. The buffer address is the location in the buffer where the piece of screen is to be stored. The buffer starts at 0, so the first section of screen you store should go to that address. You will need to know where the first stash of data ends in the buffer so you can store other screen data after it. You can find the next available buffer address with:

$$AD = \text{PEEK}(250) + \text{PEEK}(251) * 256 + 1$$

You must do this immediately after issuing the Stash command. AD now contains the next available buffer address. You must keep these addresses stored so that you can recall them later with the **@Fetch** command.

**@FETCH,buffer address,X,Y.** This will recall the stored area at the buffer address and put it at X,Y. No other information is needed, as the **@Stash** command saves the length and depth of the area. The **@Stash** and **@Fetch** commands are very rapid, fast enough for some types of animation. See the circle demo and 3-D cube demo programs. You can use a simple For...Next loop with **@Fetch** to accomplish some pretty impressive blitter animation.

### Room for Expansion

The 8563 chip can perform many unsuspected functions. It can scroll and handle light pens, double-pixel modes, interlaced modes and more. We've only begun to explore it, and the wedge is written to make it easily expandable to handle new commands (perhaps a Hard



Copy command or a Fill). There's 9K of RAM set aside for growth; also, the program only goes from 7168 to 12992. That leaves room for you to add even more commands in the area from 12992 to 16383. For now, you could use that free RAM for character-set storage, but be careful and don't disturb the RAM from 7168 to 12992.

I'd like to thank Andy Finkle and Carolyn Sheppner of Commodore for their kind assistance on the 8563's technical aspects. [R]

*Address all author correspondence to Louis R. Wallace, 6124B SW 11th Place, Gainesville, FL 32607.*

### Listing 1. C-128 Ultra Hi-Res Basic loader.

```

10 GRAPHIC1,1:GRAPHICS          :REM*44
20 FORZ=7168TO12992:READY:POKEZ,Y:TT=TT+Y:N
  EXT                             :REM*28
30 IF TT<>481470THENPRINT"YOU HAVE AN ERROR
  .":END                         :REM*192
40 BSAVE"ULTRA HIRES",B0,P7168 TO P12992
  :REM*134
50 PRINT"ULTRA HIRES ML HAS BEEN SAVED!"
  :REM*106
60 END                           :REM*62
70 DATA4,10,10,10,8,8,6,0      :REM*72
80 DATA0,0,12,2,14,10,14,0     :REM*244
90 DATA8,8,12,10,10,10,12,0    :REM*244
100 DATA0,0,6,8,8,8,6,0        :REM*112
110 DATA2,2,6,10,10,10,6,0     :REM*114
120 DATA0,0,4,10,14,8,6,0      :REM*50
130 DATA2,4,4,14,4,4,4,0       :REM*138
140 DATA0,0,4,10,10,6,2,4      :REM*222
150 DATA8,8,12,10,10,10,10,0   :REM*16
160 DATA0,4,0,4,4,4,4,0        :REM*124
170 DATA0,2,0,2,2,2,10,4       :REM*60
180 DATA8,8,10,10,12,10,10,0   :REM*172
190 DATA12,4,4,4,4,4,14,0      :REM*156
200 DATA0,0,10,14,14,10,10,0   :REM*32
210 DATA0,0,12,10,10,10,10,0   :REM*10
220 DATA0,0,4,10,10,10,4,0     :REM*134
230 DATA0,0,12,10,10,12,8,8    :REM*142
240 DATA0,0,6,10,10,6,2,2      :REM*52
250 DATA0,0,12,10,8,8,8,0      :REM*134
260 DATA0,0,14,8,14,2,14,0     :REM*83
270 DATA0,4,14,4,4,4,4,0       :REM*131
280 DATA0,0,10,10,10,10,14,0   :REM*143
290 DATA0,0,10,10,10,10,4,0    :REM*163
300 DATA0,0,10,10,14,14,10,0   :REM*109
310 DATA0,0,10,10,4,10,10,0    :REM*131
320 DATA0,0,10,10,6,2,2,12     :REM*167
330 DATA0,0,14,2,4,8,14,0      :REM*183
340 DATA6,4,4,4,4,4,6,0        :REM*101
350 DATA4,10,8,12,8,8,14,0     :REM*181
360 DATA6,2,2,2,2,2,6,0        :REM*229
370 DATA2,7,2,2,2,2,2,2        :REM*113
380 DATA0,2,4,15,4,2,0,0       :REM*179
390 DATA0,0,0,0,0,0,0,0        :REM*57
400 DATA4,4,4,4,4,0,4,0        :REM*15
410 DATA10,10,0,0,0,0,0,0      :REM*137
420 DATA0,10,14,10,14,10,0,0   :REM*73
430 DATA4,14,8,14,2,14,4,0     :REM*207
440 DATA10,2,4,4,4,8,10,0      :REM*237
450 DATA4,10,10,4,10,10,6,1    :REM*71
460 DATA2,2,4,0,0,0,0,0        :REM*209
470 DATA2,4,8,8,8,4,2,0        :REM*239
480 DATA8,4,2,2,2,4,8,0        :REM*237
490 DATA0,10,4,14,4,10,0,0     :REM*17
500 DATA0,0,4,14,4,0,0,0       :REM*103
510 DATA0,0,0,0,0,6,2,4        :REM*123
520 DATA0,0,0,14,0,0,0,0       :REM*58
530 DATA0,0,0,0,0,0,4,0        :REM*200
540 DATA1,1,2,6,4,8,8,0        :REM*44
550 DATA4,10,10,10,10,10,4,0   :REM*34
560 DATA4,12,4,4,4,4,14,0      :REM*228
570 DATA4,10,2,4,8,8,14,0      :REM*172
580 DATA14,2,4,2,2,10,4,0       :REM*212
590 DATA10,10,14,2,2,2,2,0     :REM*154
600 DATA14,8,14,2,2,10,6,0     :REM*46
610 DATA4,10,8,12,10,10,4,0    :REM*186

```

```

620 DATA14,2,2,4,4,8,8,0       :REM*108
630 DATA4,10,10,4,10,10,4,0    :REM*204
640 DATA4,10,10,6,2,4,8,0      :REM*44
650 DATA0,0,4,0,0,4,0,0        :REM*192
660 DATA0,0,4,0,0,4,4,8        :REM*220
670 DATA1,2,4,8,4,2,1,0        :REM*140
680 DATA0,0,14,0,14,0,0,0      :REM*208
690 DATA8,4,2,1,2,4,8,0        :REM*190
700 DATA4,10,2,4,4,0,4,0       :REM*108
710 DATA0,0,0,15,0,0,0,0       :REM*252
720 DATA4,10,10,14,10,10,10,0  :REM*116
730 DATA12,10,10,12,10,10,12,0  :REM*184
740 DATA4,10,8,8,8,10,4,0       :REM*166
750 DATA12,10,10,10,10,10,12,0  :REM*140
760 DATA14,8,8,14,8,8,14,0     :REM*44
770 DATA14,8,8,14,8,8,8,0      :REM*65
780 DATA4,10,8,10,10,10,4,0    :REM*85
790 DATA10,10,10,14,10,10,10,0  :REM*149
800 DATA14,4,4,4,4,4,14,0     :REM*33
810 DATA14,2,2,2,2,10,4,0      :REM*185
820 DATA10,10,10,12,10,10,10,0  :REM*115
830 DATA8,8,8,8,8,8,14,0       :REM*203
840 DATA10,14,14,10,10,10,10,0  :REM*89
850 DATA12,10,10,10,10,10,10,0  :REM*113
860 DATA14,10,10,10,10,10,14,0  :REM*157
870 DATA12,10,10,12,8,8,8,0     :REM*23
880 DATA4,10,10,10,10,10,4,2    :REM*237
890 DATA12,10,10,12,10,10,10,0  :REM*217
900 DATA6,8,8,4,2,2,12,0       :REM*5
910 DATA14,4,4,4,4,4,4,0       :REM*15
920 DATA10,10,10,10,10,10,14,0  :REM*153
930 DATA10,10,10,10,10,10,4,0   :REM*211
940 DATA10,10,10,10,14,14,10,0  :REM*207
950 DATA10,10,4,4,4,10,10,0     :REM*167
960 DATA10,10,10,4,4,4,4,0      :REM*169
970 DATA14,2,4,4,4,8,14,0      :REM*73
980 DATA2,2,2,15,2,2,2,2       :REM*7
990 DATA4,8,4,8,4,8,4,8        :REM*251
1000 DATA2,2,2,2,2,2,2,2       :REM*73
1010 DATA5,10,5,10,5,10,5,10    :REM*111
1020 DATA2,9,4,2,9,4,2,9       :REM*197
1030 DATA0,0,0,0,0,0,0,0       :REM*188
1040 DATA12,12,12,12,12,12,12  :REM*114
1050 DATA0,0,0,0,15,15,15,15   :REM*158
1060 DATA15,0,0,0,0,0,0,0      :REM*90
1070 DATA0,0,0,0,0,0,0,15      :REM*186
1080 DATA8,8,8,8,8,8,8,8       :REM*154
1090 DATA10,5,10,5,10,5,10,5   :REM*254
1100 DATA1,1,1,1,1,1,1,1       :REM*86
1110 DATA0,0,0,0,10,5,10,5     :REM*118
1120 DATA4,9,2,4,9,2,4,9       :REM*254
1130 DATA3,3,3,3,3,3,3,3       :REM*32
1140 DATA2,2,2,3,2,2,2,2       :REM*216
1150 DATA0,0,0,0,3,3,3,3       :REM*52
1160 DATA2,2,2,3,0,0,0,0       :REM*150
1170 DATA0,0,0,14,2,2,2,2      :REM*112
1180 DATA0,0,0,0,0,0,15,15     :REM*66
1190 DATA0,0,0,3,2,2,2,2       :REM*184
1200 DATA2,2,2,15,0,0,0,0      :REM*58
1210 DATA0,0,0,15,2,2,2,2      :REM*156
1220 DATA2,2,2,14,2,2,2,2      :REM*244
1230 DATA8,8,8,8,8,8,8,8       :REM*48
1240 DATA12,12,12,12,12,12,12  :REM*58
1250 DATA3,3,3,3,3,3,3,3       :REM*152
1260 DATA15,15,0,0,0,0,0,0     :REM*176
1270 DATA15,15,15,0,0,0,0,0    :REM*112

```

*Continued on p. 90.*





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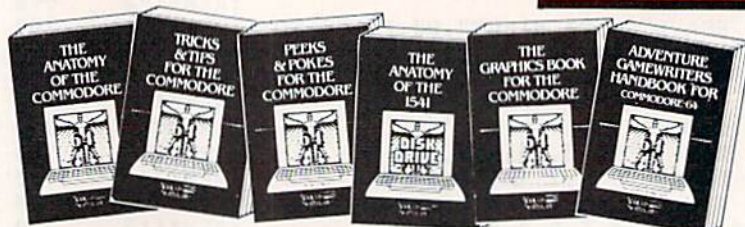
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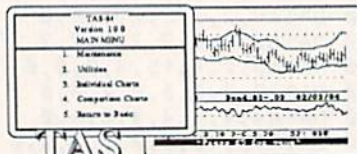
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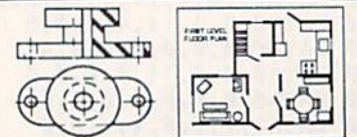
The Report

Portfolio: 1000000  
Assets: 1000000  
Date: 10/1/85

Symbol	Type	Unit	Purchase Price	Current Price	Gain	Loss	Div.	Yield	MC
IBM	Stock	50	84/20/1985	100/20/1985	1587.50	0.00	0.00	17.34	87
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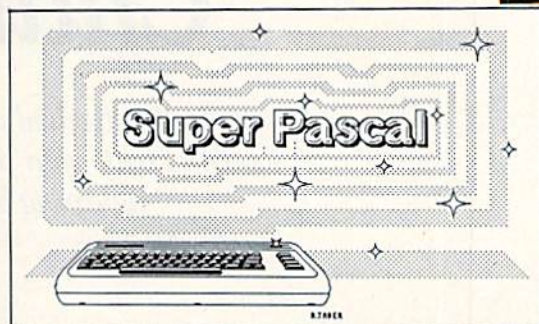
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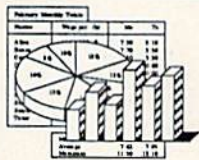
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# C-128 Custom Character Sets

*You're not limited to the C-128's standard characters when you can create your own—from a foreign language symbol to a lightning bolt. This article shows you how.*

By ISAAC MALITZ

Have you ever wanted your C-128 to produce characters from the keyboard that are not part of the standard character set? Perhaps you've wanted Greek or Hebrew characters displayed, or maybe special symbols, such as a double arrow or a lightning bolt.

This article will show you how to program the C-128 to do just that—generate character sets of your own design. (You may be familiar with how to do this on the C-64, but the technique is somewhat different on the C-128. This article will show you clearly what the differences are.)

## The Shape Table

First, you have to understand how the computer draws characters on the screen. For instance, when you press the Z key, the computer draws a Z on the screen. The letter Z possesses a certain shape, which the computer recognizes. But how?

Stored in ROM is a table of values that describes the shape of every letter in the alphabet and all other symbols used by the computer. This table is sometimes known as the "shape table." Whenever the computer wants to draw a symbol on the screen, it consults the shape table to find out that character's shape. Let's find out how the shape table works.

From the computer's point of view, every symbol is seen as a collection of dots in an 8x8 grid of dots, where

each dot may be on or off. For example, a Z appears like this:

```

. * * * * *
. . . . * *
. . . . * *
. . . * *
. . * *
. * *
. * * * *
. . . . .
```

If you examine a Z on your screen, you may be able to see the individual dots that compose it. The pattern of dots is exactly like that depicted above.

The shape table describes for each character exactly which dots are on and which ones are off. Eight bytes are required to describe the entire grid. One byte is required to describe each row in the grid. In the above example, the eight bytes are as follows:

```

. * * * * * 127
. . . . * * 6
. . . . * * 12
. . . * * 24
. . * * 48
. * * 96
. * * * * * 127
. . . . . 0
```

Each number represents the binary value of that row of dots. For instance, the binary value of

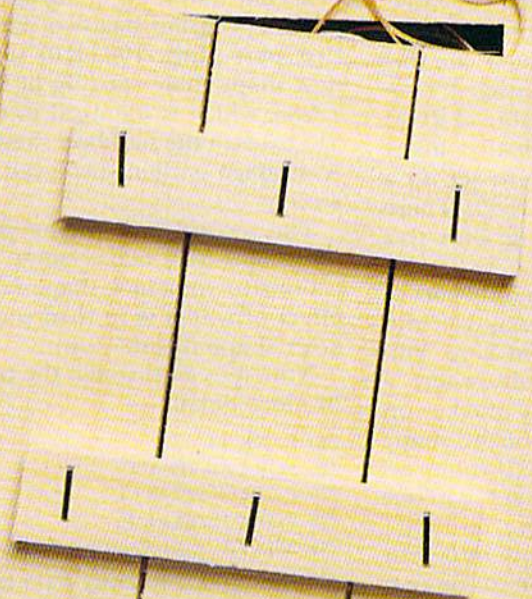
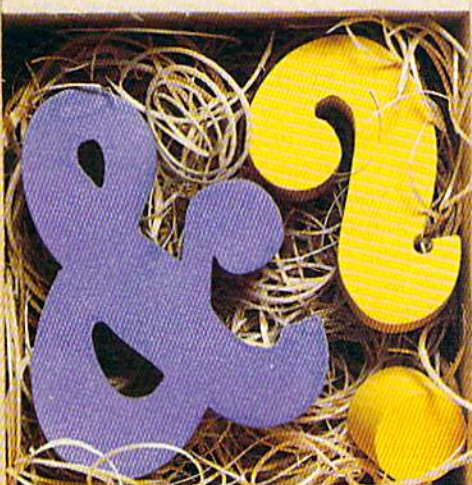
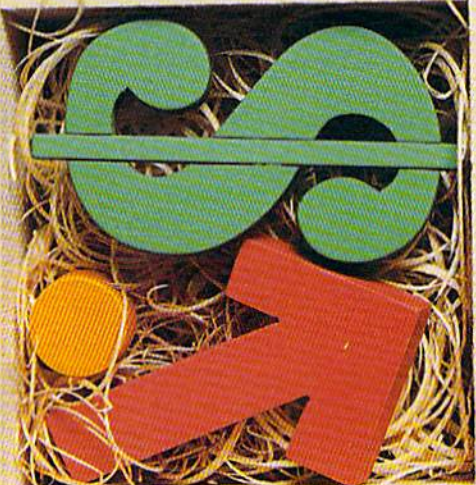
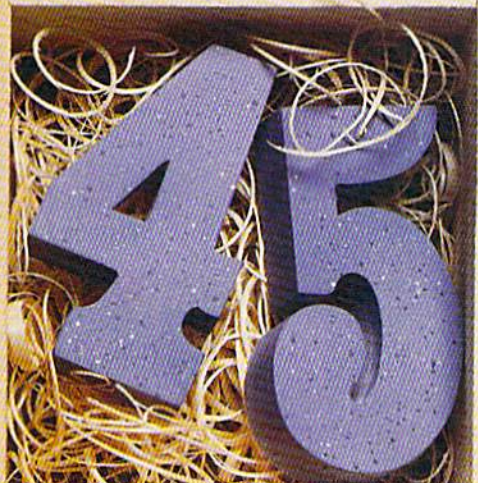
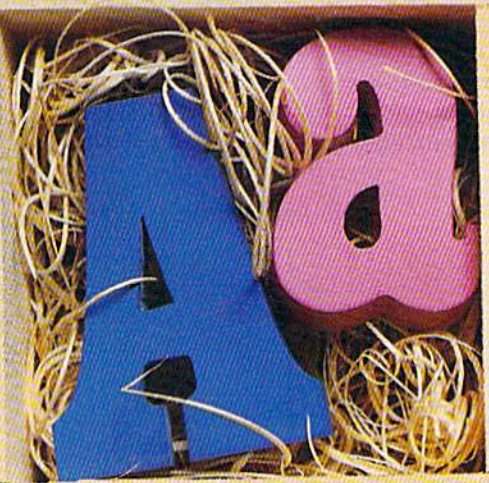
```

. * * * * *
is
0 + 64 + 32 + 16 + 8 + 4 + 2 + 1
which is equal to 127.
```

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The binary value of

is

0 + 0 + 0 + 0 + 0 + 4 + 2 + 0

which is equal to 6.

In summary, the shape table represents the shape of the letter Z as eight codes: 127, 6, 12, 24, 48, 96, 127 and 0. These eight codes are stored as eight bytes in the shape table.

If the information in the shape table could be changed, you could define new symbols that could be produced from the keyboard. For instance, you could modify the shape table so that when you pressed the A, B and C keys, the Greek letters alpha, beta and gamma would appear.

The bad news is that the shape table cannot actually be altered. It is stored in ROM (read-only memory) and cannot be erased or changed. (If you attempt to Poke new values into ROM, nothing will happen to ROM.)

The good news is that you can set up your own shape table in a different part of memory, and then tell the computer to use your table instead of the standard shape table. You can use your own shape tables to define your own symbols. The sample programs that follow will show you how to do this.

### Creating Part of a Shape Table

Enter and run this first sample program. When you press the @ key, a lightning bolt symbol will be produced on the screen.

```
1 REM LIGHTNING
100 PRINT CHR$(147)
110 FOR I=12288 TO 12799
120 POKE I,255
130 NEXT I
200 FOR I=12288 TO 12295
210 READ C
220 POKE I,C
230 NEXT I
300 POKE 2604, 28
400 DATA 3,6,12,30,3,6,12,24
```

The program sets up a small portion of a custom shape table, starting at location 12288 in memory. It stores data in the area of the shape table that corresponds to the @ key on your keyboard. This data describes the shape of a lightning bolt. Let's go through the program line by line to see exactly how it works:

```
100 PRINT CHR$(147)
```

Line 100 clears the screen.

```
110 FOR I=12288 TO 12799
```

```
120 POKE I,255
130 NEXT I
```

The next three lines are used for initializing the section of memory with which you'll be working. This ensures there is no garbage in this area of memory.

```
200 FOR I=12288 TO 12295
210 READ C
220 POKE I,C
230 NEXT I
```

This section of the program Pokes data into memory locations 12288-12295. (The data to be Poked is stored in the Data statement at the end of the program.) These eight locations are the first eight bytes of what will be your new shape table. They correspond to the @ key on your keyboard, describing, each time the @ key is pressed, what shape the computer should draw on the screen. The data you Poke into locations 12288-12295 describes the shape of a lightning bolt:

```
. . . . . * * 3
. . . . . * * 6
. . . . . * * 12
. . . . . * * 30
. . . . . * * 3
. . . . . * * 6
. . . . . * * 12
. . . . . * * 24
300 POKE 2604, 28
```

Line 300 tells the computer that the location of the shape table now starts at 12288. The purpose of this command is to tell the computer to use your new custom shape table, rather than the computer's standard shape table. (By Poking a value other than 28 into location 2604, it's possible to place your shape table at a location other than 12288. However, this will usually trigger some difficult technical problems, which are beyond the scope of this article.)

The complete shape table in ROM is 4096 bytes long. With that many bytes, it's difficult work to set up a new shape table from scratch. There are two ways of dealing with this problem.

First, you could set up only part of a complete shape table, as you did with the sample program here. You set up a new shape table, where a shape is defined for only one key on the keyboard. The rest of the shape table was left undefined. (If you press any other keys, you'll get garbage characters on the screen.)

Second, you could copy into your new shape table location all or part of the ROM shape table, which you

could then use as a basis for defining your new table. (Of course, this strategy makes sense only if at least part of your new character set is similar or identical to the standard character set.) The next program will show you how to do this.

### Transferring the ROM Shape Table

The program below creates an upside-down character set. That is, each time you press a key, the usual character appears on the screen upside down!

```
1 REM UPSIDE DOWN
100 PRINT CHR$(147)
200 BANK 14
210 FOR I=0 TO 511
220 P=PEEK(53248+I)
230 POKE 12288+I, P
240 NEXT I
300 BANK 15
310 POKE 2604, 28
400 PRINT "A COPY OF THE STANDARD
SHAPE TABLE"
410 PRINT "IS NOW AT 12288."
420 PRINT "NOW, LET'S PLAY WITH IT."
500 FOR I=12288 TO 12799 STEP 8
510 FOR J=0 TO 3
520 A=PEEK(I+J)
530 B=PEEK(I+7-J)
540 POKE (I+J), B
550 POKE (I+7-J), A
560 NEXT J
570 NEXT I
```

Enter this program and run it. The screen will clear, the program will process for about 15 seconds, then a message will appear on the screen. The program will continue to process, and you'll gradually see all the letters in the message turn upside down. After the program is finished, try pressing some keys on the keyboard. The usual characters will appear, but they'll all be upside down.

This program has two parts. The first part (lines 100-410) sets up a new shape table starting at location 12288, which is identical to the first 512 bytes of the standard shape table. A message is then displayed on the screen.

The second part of the program (lines 500-570) makes some modifications to your new shape table, the effect of which is to turn each character shape upside down.

Now, let's go through the program in more detail.

```
200 BANK 14
210 FOR I=0 TO 511
220 P=PEEK(53248+I)
230 POKE 12288+I, P
240 NEXT I
```

Lines 200-240 copy data from the standard shape table into the loca-



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tion that will hold your new shape table.

Normally, the standard shape table is inaccessible; it lies in an area of memory that cannot be reached by the Peek command. To access it, you need to use the Bank command, which allows you to reach portions of memory that are not ordinarily addressable.

BANK 14 makes the shape table accessible, starting at location 53248. Once it is made accessible, you use a For...Next loop to copy the table's first 512 bytes to a new location, which starts at 12288.

Following this, you issue a BANK 15 command to restore memory to its normal configuration (BANK 15 is the default memory configuration for the C-128). A POKE 2604, 28 tells the computer that you are now using the shape table starting at 12288.

The next part of the program (lines 500-570) modifies the shape table. If you study the code carefully, you'll see that it reverses the order of every group of eight bytes. That is, the first eight bytes of the table are initially:

60,102,110,110,96,98,60,0

(This represents the "at" character.) When the program is finished, these eight bytes are reversed:

0,60,98,96,110,110,102,60

The result is an upside-down "at" symbol. The following grids show you why:

.	.	*	*	*	*	.	60
.	*	*	*	*	*	.	102
.	*	*	*	*	*	.	110
.	*	*	*	*	*	.	110
.	*	*	*	*	*	.	96
.	*	*	*	*	*	.	98
.	*	*	*	*	*	.	60
.	.	.	.	.	.	.	0
.	.	.	.	.	.	.	0
.	*	*	*	*	*	.	60
.	*	*	*	*	*	.	98
.	*	*	*	*	*	.	96
.	*	*	*	*	*	.	110
.	*	*	*	*	*	.	110
.	*	*	*	*	*	.	102
.	*	*	*	*	*	.	60

This completes our discussion of custom character sets. Now, if you want to create your own character sets, the sample programs in this article should provide a reliable basis for your own programs. ®

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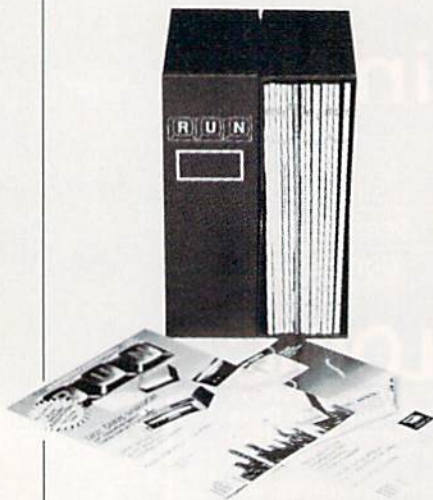
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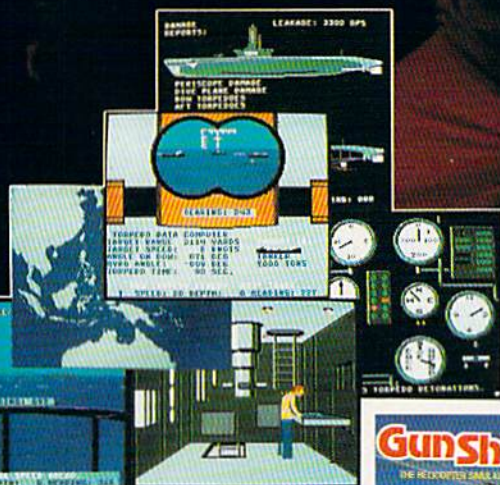
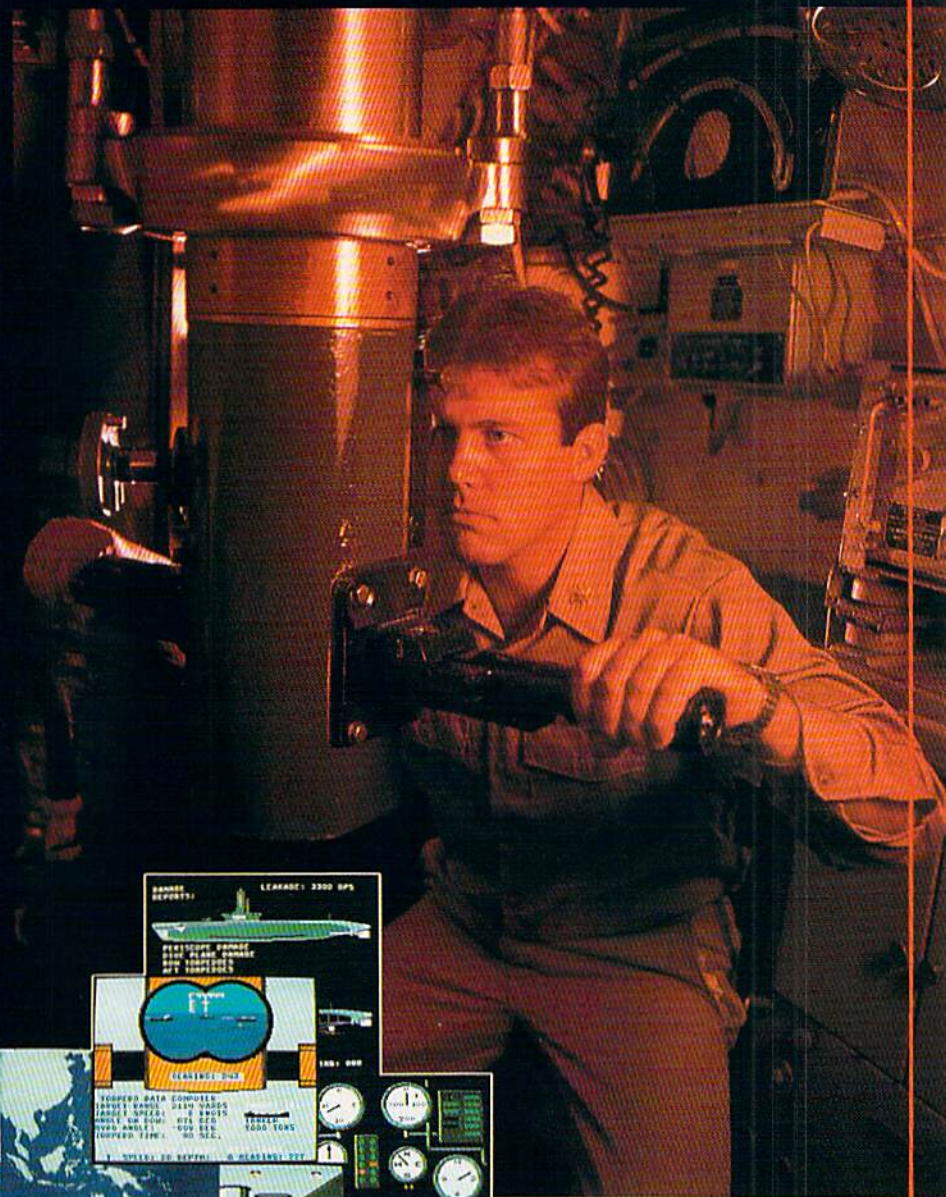
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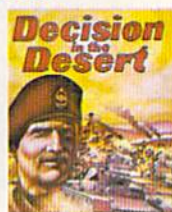
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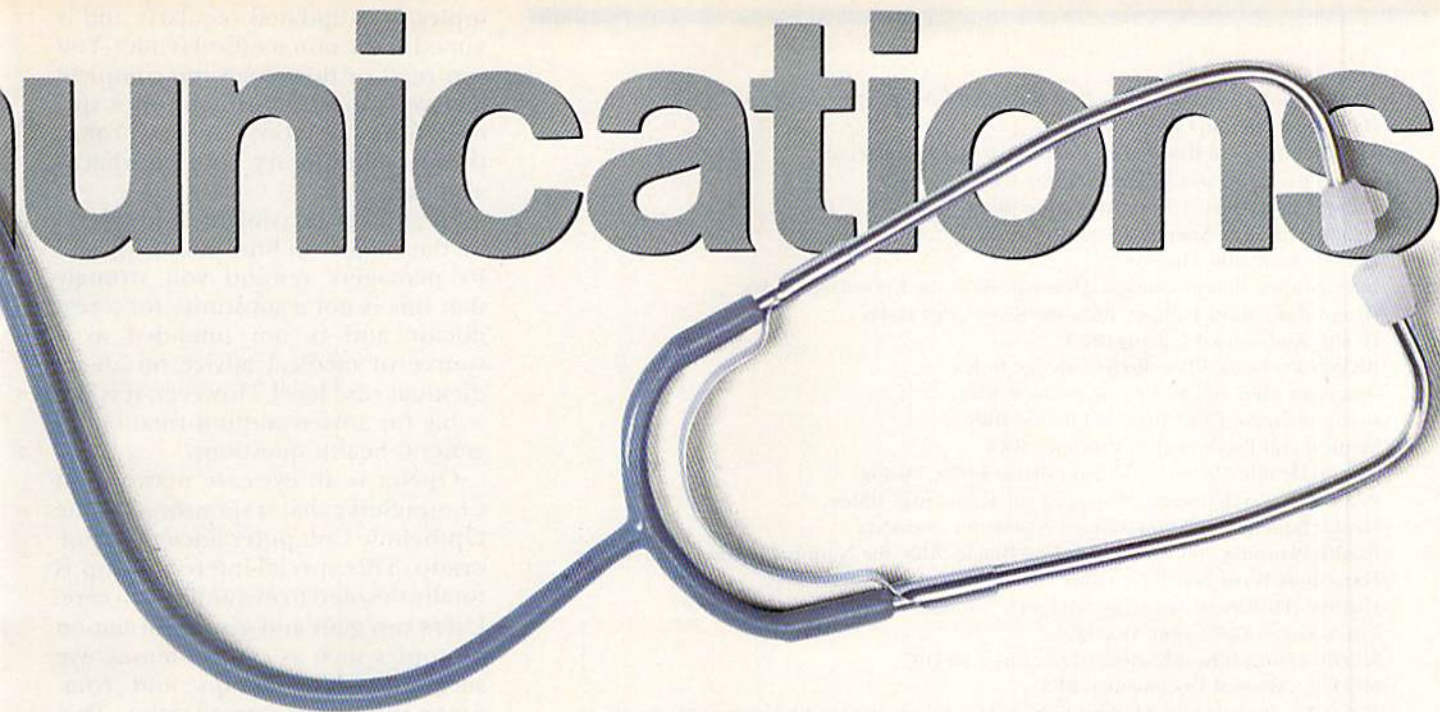
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The American Association for Medical Systems and Informatics (AAMSI) Communications Network



# Communications



is one of these medical services. It is open to anyone interested in computers in medicine. The *AAMSI Medical Network* is published quarterly, and members receive the network's monthly "Medicine and Computer" newsletter.

This newsletter contains medical journal abstracts, book reviews, vendor information and an index of current journals covering computers in medicine.

This network serves the medical profession and those who need information concerning the use of computers in hospitals and medical practices. Information about computer applications in medicine is available, new hardware and software are reviewed, and the Association holds two national meetings yearly.

AAMSI has a special-interest group, called MedSIG, which consists of volunteers—professionals and others from the general public—whose goal is to develop and share information in the area of medical computing. The SIG is composed of physicians, dentists, nurses, physical therapists, hospital administrators, medical research scientists and others.

Professional specialty groups are an important element of MedSIG. Through these specialty groups, people of similar interests within the broad field of medicine can gather

and focus on particular needs and questions. Database topics include consumer health, professional topics, hardware and software interests and medical students' information.

Another active medical group on CompuServe is the Micro MD Network. This is similar to AAMSI in that it provides a focus on the utilization of microcomputers in the health-care professions. Micro MD serves not only health professionals, but also educators, corporate executives, programmers and computer consultants who are interested in computers in medicine.

Micro MD has a database filled with 300 software and hardware products for the medical and health-care field. Topics covered include medical accounting, health appraisal, hospital information systems, education, diet and nutrition, psychiatry and psychology.

Other areas addressed are word processing, database software, clinical and business applications, statistics, graphics, telecommunications, languages and laboratory applications. Here, you can see what is available and receive a description of the product and its intended application in the medical field. You can take advantage of the SIG's feedback feature for asking questions about any of the products that you see listed.

Consultant's Corner is a section of Micro MD that provides lists of computer consultants who can be contacted for advice on how to implement computerization in hospitals and private practices. Resumes form a key component of this list.

There is also a monthly newsletter that provides reviews of medical software, articles from contributors, user's group news, tips on using the on-line network, and more. Also, you can join the Medical Software Club and get discounts on medical software purchases.

Micro MD is planning to provide two new services. A resume service for health-care professionals is being created. This will provide job listings from major hospitals, clinics and agencies, and you will be able to send your resumes directly to the employers who have job openings. Also, there will be a Medical-Legal database. This will hold a list of resources for professionals who need expert witnesses and legal counsel.

## **Women's Health Care**

The American College of Obstetricians and Gynecologists (ACOG) and its Nurses' Association (NAA-COG) are two national health-care organizations whose combined membership consists of over 40,000 health-care professionals.





Medical and Drug Reference: Dow Jones News/Retrieval  
 HealthNet: Delphi, CompuServe  
 Medline: BRS, the Knowledge Index, Dialog, CompuServe  
 Health Planning and Administration: BRS  
 Nursing and Allied Health Literature: BRS  
 Health Tips: The Source  
 Science & Health: The Source  
 International Pharmaceutical Abstracts: BRS, the Knowledge Index  
 Drug Information Fulltext: BRS, the Knowledge Index  
 Health Audiovisual Catalog: BRS  
 BIOSIS Previews: BRS, the Knowledge Index  
 American Men and Women in Science: BRS  
 Comprehensive Core Medical Library: BRS  
 Medical and Psychological Previews: BRS  
 Mental Health Abstracts: the Knowledge Index, Dialog  
 PsycINFO (Psychological Abstracts): the Knowledge Index  
 Health Benefit Cost Containment Newsletter: NewsNet  
 Health Planning and Administration: Dialog, BRS, the National Library of Medicine  
 Hazardous Waste News: NewsNet  
 Histline (History of Medicine On-Line): National Library of Medicine  
 Life Sciences Collection: Dialog  
 MEDIC (Finnish health/science literature): MEDIC  
 MEDOC (Medical Documents): BRS  
 MeSH Vocabulary File (Medical Subject Headings): National Library of Medicine  
 NISH (National Information Sources on the Handicapped): BRS  
 Nutrition Analysis System: Honeywell Datanetwork

**Table 1.** Some of the many on-line medical services and databases available to personal computer owners. This is not a complete list of networks holding medical services; it is intended only as a sample of the offerings available on the networks mentioned.

The ACOG Resource Center is an on-line group that is open to ACOG and NAACOG members, the general public and other interested health-care professionals. The Center's goal is to keep the public aware of ACOG's services, to promote continuing education for its members, to promote consumer-health information and to provide an arena for communication among professionals and the public on the topic of women's health care.

Features available on ACOG include obstetrical/gynecological national data, consumer health and medical practice guidelines; also, continuing medical education, women's health questions and answers, library resources and information on office computers. There is an on-line newsletter, as well.

#### General Health Care

HealthNet is another popular on-line health center for the general public. You can read current information on various health topics in the HealthNet Newsletter section. In HouseCalls, you can leave a question for a medical professional to answer.

All answers are given by licensed and qualified specialist physicians.

There are two areas within HouseCalls. In Current Questions and Answers, you can read questions submitted by other HealthNet users and read the answers provided by the panels of specialty physicians. In Ask HealthNet, you can ask your own questions, which will be answered in the Current Q & A section. Not every question is answered; only those questions of broad interest, special relevance and other general appeal are selected.

HealthNet provides HealthQuiz, which tests your knowledge about general medical topics. The quizzes feature multiple-choice questions and show your score as well as provide a discussion of the answers. Questions are continually changed, thus making this section a good learning tool.

Furthermore, HealthNet has a reference library, which is open to all. The HealthNet Reference Library is a large collection of information on diseases, drugs, symptoms, first aid, sports medicine and other medical

topics. It is updated regularly and is aimed at the non-medical reader. You can read or download the complete text version of all articles on a specific topic, or you can just browse through the library and see what is available.

HealthNet is available on several of the major on-line networks, and its managers remind you strongly that this is not a substitute for a real doctor and is not intended as a source of medical advice on an individual case level. However, it is valuable for advice and information on general health questions.

OpNet is an eye-care network on CompuServe that is sponsored by the Ophthalmic Computer Society of Colorado. This special-interest group is totally devoted to eye and vision care. Users can gain and give information on topics such as contact lenses, eye surgery, vision therapy and computer use in eye-care practice. This SIG is open to the general public as well as interested eye-care specialists.

PaperChase offers Medline, the National Library of Medicine database provided by Beth Israel Hospital in Boston. Medline is updated monthly and has over 2,700,000 references from 3400 biomedical journals, ranging in date from January 1975 to the present. You use Medline to search for lists of medical references on a particular topic. These references hold the subject heading, subheadings, author's name, journal title and year and language of publication. Medline is available on several on-line networks.

The Health Forum is another section available to both the public and medical professionals. It is a gathering place for all interested parties to discuss health-related topics such as nutrition, mental health, child care and sexuality. The forum contains information about current topics of interest and has a Rare Disease database.

The Rare Disease database is sponsored by the National Organization for Rare Diseases, Inc. (NORD), which is a non-profit, voluntary health agency specifically aimed at helping people who suffer from rare diseases. In this database, you can search by keywords for references to your disease within the biomedical journals present in the forum.

#### Human Sexuality

On a different note, the Human Sexuality and Support Group Forum (HSX) on CompuServe provides ad-



vice and information on problems and questions concerning human sexuality. This is aimed primarily at families and individuals, rather than at medical professionals. This SIG features findings from a new branch of health care called sexual medicine, which draws its information from the areas of urology, gynecology, psychiatry, pharmacology, endocrinology and others.

HSX gives the public a direct line to authorities in the medical field who are dealing with a wide range of related topics. The publishers and editors of HSX are Howard and Martha Lewis, authors of several books and many magazine articles.

The forum is composed of transcripts of discussions responding to readers' questions about various topics of interest; transcripts of interviews with experts on a variety of subjects; reader comments; support groups and conferences; data libraries; on-line quizzes and interactive games; and personal mail to the managers.

#### Stay Informed

The subject of health care and medicine affects all of us on a daily basis. The on-line networks provide a huge amount of research information, as well as avenues for personal interaction with physicians and psychologists in all areas of medicine. This wealth of opportunity for research, study and advice is invaluable.

If you have a question that has been concerning you, but hasn't been serious enough for you to actually take to your doctor, you could very easily allay your concern by logging on and asking your question or performing your own research on the topic.

See the accompanying table, which lists a variety of on-line medical databases and the networks in which they are located.

RUN will continue its regular coverage of telecommunications next month under a new format. We will begin a new question-and-answer series, which will deal with your questions about modems, terminal software and other telecommunications topics. ®

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

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# Answering Attack Phone

Let's vanquish the problem of bulky complicated answering machines. And let's conquer the problem of lost beepers. Now when you're out, just the sound of your voice is all you need to retrieve your messages.

Stamp out beepers. Here's a microprocessor controlled answering machine that's so smart it will give you your messages without using a beeper.

But, before we explore just how easy it is to use and all of its sophisticated features, such as, toll saver, 2-way record, and remote saving or erasing of messages, let's take a look at the phone.

Like the answering machine, the phone has attacked wasted motion, complicated commands and uncomfortable fit with the latest in technology.

Here's a phone that will dial any of your 10 most frequently called numbers with the touch of a single button. Just touch another electronic button and the phone will operate in Tone or Pulse.

Another button gives you instant redial. And, as for comfort, well just wait till you cradle the great sounding Phone Company style handset on your shoulder.

This phone which can be desk or wall mounted, is no larger than a conventional feature phone. It's just 9" deep and 8½" wide. And, a standard instantly changeable audio cassette (included) is concealed just to the right of the handset.



## TOLL SAVER, OR THE 4TH RING

If you're across town or out of town, why invest a dime or pay for a toll call if you have no messages?

Each time you reset your machine, it will answer the first call on the 4th ring. After it's taken its first message, it automatically starts answering on the second ring. So, when you call in, just hang up if you get to the third ring. You'll automatically know that you have no messages.

If you do have messages, just give the machine a special signal with your own voice, and you'll receive your messages. Then you can have the machine save or erase the messages that you have heard.

## MISSILE GUIDANCE

This machine is so smart that it electronically marks each message's location. It knows precisely where your outgoing announcement as well as each message that has been left is located.

The action is fascinating to watch. First, it plays your outgoing announcement. Then, it sounds a tone as it zips to the end of the last message it took.

It then beeps and starts taking the new message. Finally, it rewinds back to the precise start of your outgoing announcement, prepared to start again.



## MORE SMARTS

If you want to record both sides of a call, just touch the 2-way record button

and you'll have a record of the call.

Everything is automated. Just touch one of the full logic controlled buttons and this computer answers with a confirming beep and jumps into action.

To play back messages at home, just touch the 'Message Report' Button. A flashing message light even tells you at a glance if you've received any messages while you were out.

## EASY INSTALLATION

Just plug in the modular phone jack and the included AC adaptor. Then, just record your announcement.

The Answerer Attack Phone is ready to take messages or act as your super automated office or home telephone. It's made by Unitech and backed by their standard limited warranty.

## THE ANSWERER ATTACK PHONE RISK FREE

It's new. And, it will set you free. From its Phone Company feel handset to its electronic convenience extras to its state of the art answerer, you'll have incredible convenience and simply great sound.

If you're not 100% thrilled, simply return it to DAK within 30 days in its original box for a courteous refund.

To order your Unitech Answerer Attack Phone with totally automated telephone features and easy to use answering machine risk free with your credit card, call toll free or send your check for DAK's breakthrough price of just \$99 plus \$7 P&H. Order No. 4359. CA res add tax.

Wait till you hear the phone. Wait till you use the 1 touch dialing. And, wait till you hear the sound quality and enjoy the convenience of this answering machine.



**DAK**  
INDUSTRIES INCORPORATED

## TOLL-FREE ORDER LINE

For credit card orders call 24 hours a day 7 days a week  
**CALL TOLL-FREE. 1-800-325-0800**  
8200 Remmet Ave., Canoga Park, CA 91304

RN33

## VANQUISH THE REST

Easy to use. Forget cumbersome 'fixed time' outgoing announcements. Most machines make you fill a 20 second continuous loop cassette.

If you've ever tried to do this, you know just what a pain it is to make your message just the right length. With the Attack Answerer, just push 'Record Announcement' and talk into the built-in microphone from 2 seconds to 50 seconds.

After you've recorded your announcement, the machine will automatically play it back for your approval.

When you get your first call, it will be answered on the 4th ring. (Read on to see why.) If you're at home, you'll hear the message being left by the caller over the built-in speaker if you desire.

If you wish to talk to the person, just pick up the receiver and start talking. If you don't, you've just experienced the privacy protection called 'call screening', which lets you hear who's calling before you decide to answer.

This machine will let your caller leave any length message up to one minute long. If they hang up in 20 seconds, that's how long the message will be.

If they don't choose to leave a message, the machine will ignore the call. So, when you play back your messages, all you'll hear are messages, no dead space. And of course, you won't have to listen to your own announcement between each message you receive.



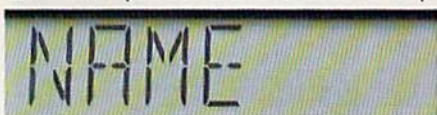
# A Rose By Any Other Name

*It's the sweetest phone that this writer has ever used. From its elegant good looks to its elegant sounding speakerphone, it's a class act. And, it remembers and dials up to 200 numbers by THE NAME of the person you want to call. Plus you can use it on 1 or 2 lines.*

By Drew Kaplan

It's not red. And it has no aroma. But not only is it not just a rose amongst the thorns, Mura's all new name dialing 2-line conferencing speakerphone is the rose amongst roses.

As president of DAK, I've tested hundreds of phones. Some are very good and you will find them in DAK's catalog. But, I've never used a better sounding, more useful phone, at home or at the office, than the phone pictured above. Let me tell you some of the reasons why.



## FIRST, IT DIALS BY NAME

I hate having to remember phone numbers. With this phone, all I do is push the 'H' button when I want to dial Home. The 'M' button dials Mura (this phone's manufacturer). And, the 'I' button dials my insurance broker. It's really great at home.

Where I have more than one name that begins with the same letter, I can scroll through the names before it dials, or enter just the first 3 letters. So, if I want to dial Howard instead of home, I push 'H', 'O', 'W'.



It's quick, it's easy and you'll never have to remember or look up and dial anyone's number again. Each memory location can hold up to 32 digits and you can store up to 200 different names. It has a memory capacity of 4096 digits.

You can store your Sprint and MCI codes with the person's name, in a separate location that the phone automatically accesses as it dials, or totally separately so that you can automatically access the service and then dial a number manually.



And speaking of manual dialing, you don't even have to push the speakerphone button to dial. When you touch the first number, the phone automatically seizes the line, turns on its speaker, and you have on-hook dialing.

So, you never have to lift the receiver or activate the speakerphone unless someone answers the line.

## FORGOTTEN HANDSET

This phone has the latest K2 handset. It gives you traditional Phone Company fit and feel, yet, I find it even more comfortable to use.

But, you'll probably never use it. The speakerphone is so powerful, so clean, and so easy to use, you'll never pick up the handset unless you need privacy.

I've used good speakerphones before, but this speakerphone's sound quality rivals an in-person conversation, not a phone call. How's that for a description



of a phone you can try on a 30 day risk free trial?

## 2-LINE MASTERPIECE

This is a two-line phone, but even if you only have one line, I'd plug it in and forget about its two-line capabilities.

You can select Line 1 or Line 2. And, you can push Conference to combine both lines for convenient business conferences or friendly group calls with friends. There are LEDs that show which line is 'In Use', 'On Hold', or which line is 'Ringing'. And, there are different rings for each line.

**Installation is a breeze.** It simply plugs into one standard modular 2 line jack or two modular 1 line jacks. Nothing could be simpler.

## PAGES OF HELPFUL FEATURES

The list of features would have to be microfilmed to fit on this page. There's a large LCD display that shows you the name you want to call and the number.

An automatic timer tells you exactly how long you've been talking. And, a clock appears on the display whenever you hang up.

Every conceivable feature from Mute to Tone/Pulse switching, to Pause, to Flash, to battery backup (2 C batteries not included), to three direct Emergency Access Memory Keys and a lot more is included.

There's even Automatic Redial which will redial a busy number for you every 30 seconds.

## YUPPIE POWER

I'm anything but a yuppie, even though I just turned 39, but when you look at the sleek, swept back, silver-blue HiTec appearance, and when you examine its complete computer keyboard, you'll understand why it would warm a yuppie's heart. My heart is warmed by what it

does, but I must admit it is impressive.

It's made by Mura and here's one reason why the phone sounds so great. Mura is a division of TIE/communications, Inc., which just happens to be one of the largest inter-connect (big business phone systems) companies in the world. In fact, they're listed on the Stock Exchange.

The phone is about 9" wide, and it's backed by Mura's limited warranty.

## PUT A ROSE ON YOUR LINE RISK FREE

It's the best sounding speakerphone I've ever heard. Dialing by names instead of numbers is a quantum leap in both technology and convenience.

If you are not 100% convinced, as I am, that this is the best sounding, most convenient phone you have ever used, simply return it in its original box within 30 days for a courteous refund.

To order your Mura Name Dialing 2-Line Speakerphone with God only knows how many features risk free with your credit card, call toll free or send your check for DAK's introductory price of just \$129 plus \$4 for postage and handling. Order No. 4335. CA res add tax.

**Note:** Order today for September delivery. We will ship on a first come first served basis. Your credit card won't be charged until shipment is made.

In DAK's electronic world, where a new best is achieved almost every day, this phone stands out as the 'best' best I've ever had the pleasure of introducing.



**DAK**  
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## TOLL-FREE ORDER LINE

For credit card orders call 24 hours a day 7 days a week  
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RUN FEBRUARY 1986 / 55



# BSR's Endangered Colossus

Prepare for bone jarring bass and dramatically clear highs from these newly developed 15" 3-way 5 speaker systems that nearly missed their chance to charm an audiophile's ear. BSR moved its dbx and ADC divisions into one facility and these speakers almost became orphans. So now, they're yours at a close-out price.

By Drew Kaplan

It's a shame. But, it's also a great opportunity to get a pair of 15" audiophile loudspeakers with the newest in stereo imaging at a market-breaking price.

Imagine a precisely matched mirror image pair of top-of-the-line BSR speakers that can effortlessly recreate the cataclysmic impact of a full orchestral crescendo at full volume and yet offer flawlessly subtle sound detail to 21,500hz.

You'll thrill to thunderous bass all the way down to 26hz. Incredibly rich, full, vibrant sound at low volume will explode with life as you increase the volume.

But before we examine the front speaker complement, the twin overlapping crossovers and the top mounted sonic placement and ambient speakers, let's see why they were almost orphaned.

You see, BSR, the half billion dollar electronics giant, is the parent company of two of the best names in up-scale audio, dbx and ADC.

Last year dbx developed a new multi-thousand dollar speaker system called the Soundfield One which lets you sit virtually anywhere in your room and have full stereo imaging and terrific sound.

BSR decided to consolidate ADC and dbx into one building (still 2 companies) and put all its speaker efforts into dbx.

## POOR JACK

Well, while dbx's engineers were off designing their multi-thousand dollar masterpieces, BSR's Senior Acoustical Engineer (he had been Fisher's Chief Engineer for 10 years during its top end component stereo days), was designing BSR's radically new speaker line.

The revolutionary top of the line 15" stereo imaging pair pictured above will let you enjoy superb stereo imaging without sitting directly in front of your speakers.

But unfortunately, in the consolidation move, BSR's speakers went by the wayside, and so did Jack.

Enter DAK. After a few fearful negotiations and considering the engineering costs BSR had already expended, they agreed to make the speakers just for DAK.

Because there's virtually no BSR overhead left on these speakers, and the R&D was all but complete, we've gotten these speakers for virtually the component costs plus a little BSR labor.

And don't worry about Jack. BSR had him finish the engineering (they really are great people) and they'll pay him a royalty on each speaker we sell. Besides, by the time you read this, Jack is sure to be snapped up as the Chief Engineer at another esoteric audio company.

## WHAT'S STEREO IMAGING?

Stereo imagery is the logical separation and interaction between channels. It's the successful creation of a panoramic wall or stage of music rather than the confined, easily located 2 speaker sound. IT'S WHAT'S INSIDE THAT COUNTS

Imagine the full thunder of a kettle drum, or the pluck of a string bass being explosively recreated in your living room. BSR's 15" sub-bass acoustic suspension driver will revolutionize your concept of low clean bass.



Its magnetic structure weighs a thundering 48 ounces. But that's not all. The magnetic field is developed by the rare earth metal Strontium for state of the art massive but flawlessly controlled bass.

A 38mm voice coil with a 200° centigrade temperature capacity, will handle the most demanding digital or analog recordings. And, a new super rigid cabinet design virtually eliminates coloration due to uncontrolled cabinet resonance.

At low volume, the bass will fill in and envelope you. At high volume, your room, your walls and your neighbors will shake. This is definitely not a speaker system for apartment dwellers.



## MATCHED PAIRS

The mid-range and high end of BSR's speakers are truly unique. Front mounted 8" polypropylene mid-range drivers provide rich sound while top mounted 5" polypropylene mid-range drivers provide an open, lifelike ambience.

Front mounted exponential horn tweeters provide awesome brilliance to 21,500

hz, while top mounted tweeters enhance separation because they are mounted to the outside edge of each speaker.

So, this system has a specific left and a specific right speaker. You'll find wide, but interactive separation that will vastly widen your ideal listening area.

The imagery will give the illusion of musicians actually playing in front of you. Your music will take on a three dimensional quality. You'll enjoy superb stereo imagery regardless of each speaker's specific placement in your room.

## MORE SPECIFICS

The exponential horn tweeters, both in front and on the top of these systems, employ 25mm rigid phenol diaphragms for stability and accurate response.

Polyamid-imid binders and ferro-fluid coolant allow for a 300% increase in heat dissipation so you can drive the voice coils up to 200° centigrade.

Now, the mid-range. Both the 8" front firing and the 5" top firing polypropylene drivers reproduce the mid-range frequencies like no ordinary speakers.

It's amazing that so many speaker manufacturers simply slap in 5" paper mid-ranges to reproduce what's really the major portion of the sound spectrum.

BSR's 8" and 5" polypropylene mid-ranges are rigid, exacting drivers that deliver incredibly pure uncolored sound.

They have matched 25mm voice coils, also protected by ferro-fluid and polyamid-imid to 200° centigrade. They are driven by powerful barium ferrite magnetic fields.

## NOT QUITE FINISHED YET

To prevent phase shift and cancellation, two totally separate crossover networks are employed in these speakers.

Next page please. . .



### ...BSR's Colossus Continued

All frequencies below 800 hz are directed to the 15" woofer. The front system routes frequencies above 800hz to the 8" mid-range to take full advantage of its superb reproduction capabilities. Frequencies above 3400hz are routed to the horn tweeter.

The top mounted system routes only frequencies above 1200hz to the 5" polypropylene ambience mid-range driver, and frequencies above 3400hz are routed to the top sonic placement tweeter.

There are level controls for both the top and front mounted speakers so that you can voice the speakers to match your musical taste and environment.

Note: Only the top tweeters are mounted at the the edges. The front mounted tweeters are conventionally mounted

for acoustical symmetry.

Each speaker is fuse protected for up to 200 watts peak, 150 watts continuous power. You can operate these super efficient speakers with as little as 20 watts.

### AND OH WHAT A PRETTY FACE

The speaker systems are 30" tall, 19 1/4" wide and 10 1/2" deep. Their lovely oak wood-grain appearance is enhanced by the dark removable grill cloths that beautifully contrast with the rich wood-grain tones. They're a statement of audio elegance when placed in any room. They're backed by BSR's 2 year limited warranty.

### A COLOSSAL DREAM COMES TRUE

#### RISK FREE

You'll hear depth of sound at low levels that was previously unobtainable. And yes, when you crank up the volume, your music will explode with realism and drama.

Try these speakers in your own system. Then compare them at any Hi-Fi Store with any pair of speakers up to \$1000. If they don't beat all the competition hands down, simply return them to DAK in their original boxes within 30 days for a courteous refund.

To order your matched pair of BSR top-of-the-line 15" 3-way 5 speaker systems with unique stereo imaging risk free with your credit card, call toll free or send your check for DAK's market-breaking price of just \$298 for the **MATCHED PAIR** plus \$22 for Postage and Handling. Order No. 4352. CA res add tax.

It's a dream system for an audiophile. Sonically pure, thunderously powerful, these BSR speakers will make your future listening years an on-going fabulous, if not earthshaking experience.



**So, your spouse or neighbors aren't into thunder and paint peeling audio. Don't worry, BSR has developed two smaller but still mighty versions of the colossus that use the same basic components, at incredible prices.**

Don't despair. You won't be relegated to 'little sound' by these more sane versions of the Colossus. After all, a 15" 3-way system is usually a distant dream of only the most ardent audiophile.

### 10" 3-WAY SANE COLOSSUS

You will experience the same dramatic highs to 21,500hz produced by the identical exponential horn tweeters with the same rigid phenol diaphragms. There's even a variable brightness control.

And, don't look for any cheap paper mid-range speakers. You'll thrill to rich, full, incredibly pure music from a 5" rigid polypropylene mid-range driver.

The 10" woofers utilize a massive Strontium magnetic structure and can reproduce dramatically clean, massive bass down to 32hz. Unless you actually set these speakers next to the Colossus, you'd think the bass is incomparable.

The crossover points are at 1200hz and 3400hz. The speakers are rated for 90 watts peak and 45 watts continuous power and require at least 15 watts.

If you're a normal audio person, you'll be thrilled with these as main speaker systems for your stereo. But, if you're a slightly crazy DAK-type audiophile, the big Colossus Systems add a thrill to your music that goes far beyond printed specs.

These speakers are 23 1/4" tall, 13 1/4" wide, and 8 1/2" deep. Their rich oak wood-grain appearance which surrounds the contrasting dark grill cloth, will be an elegant addition to any room.

### 8" BOOKSHELF COLOSSUS

Where space is a consideration, your music need not suffer. BSR's newest 2-way 8" systems provide an astounding level of musical fullness.

BSR's exponential horn tweeter produces superb highs to 21,500hz. The 8" woofer/mid-range produces bass down to a very respectable 38hz and powerfully clean mid-range up to 2500hz.

On the floor or in a bookcase, these speakers will give you years of full rich beautiful sound. They are just 19 1/4" tall, 11 1/4" wide and 8 1/2" deep. Their rich oak wood-grain appearance which surrounds the contrasting grill will be a beautiful addition to any room.

All BSR speaker systems are fuse protected and backed by BSR's standard 2 year limited warranty.

### TRY RICH DRAMATIC SOUND RISK FREE

These smaller versions of the Colossus may have a hard time competing with the awe inspiring sonic violence of their bigger brother. But, compared with tra-

ditional speakers, you'll find they've gained greatly by their genetic origin.

If you're not 100% satisfied, simply return them to DAK within 30 days in their original boxes for a refund.

To order the 10" 3-way Sane Colossus with its horn tweeter, polypropylene mid-range and 10" Strontium woofer risk free with your credit card, call toll free, or send your check for DAK's breakthrough price of just \$69 each plus \$9 P&H each. (2 required for stereo). Order No. 4348.

To order the 8" 2-way Bookshelf Colossus with its exponential horn tweeter and 8" Strontium woofer/mid-range risk free with your credit card, call toll free, or send your check for DAK's breakthrough price of just \$44 each plus \$6.50 P&H each. (2 required for stereo). Or. No. 4347.

These speakers have gained a great deal from their big brothers. They'll bring you years of superb musical sound and add truly elegant visual appeal to any room.



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RUN FEBRUARY 1986 / 57



**PRICE SLASHED**  
List price was \$999  
DAK sold it for \$689  
**NOW JUST \$599**  
Use Order No. 4313 plus (\$11 P&H)



# Daddy's Pride And Joy

## And Now, Much Much More

- For Real Estate
- For Tennis
- For Golf
- For Sales Training

- For Actors
- For Parties
- For Copying Cassettes
- For Private Pilots

- For Factory Tours
- For Equipment Demonstrations
- For Family Memories
- For Video Christmas Cards

SPECIAL NOTE By Drew Kaplan

It was amazing. Last summer, we offered a portable video system complete with color camera for just \$689.

I, and actually my whole family, tested the equipment before I wrote the ad that follows. But, it was really only after I printed the catalog that I started using the system regularly.

And, as you'll see, use it I did. My older son, Chris, and I took it on a roller coaster. Wow, just turn the page (and maybe your stomach) to see the results.

You'll see the tennis and golf swings of two DAK pros. (I still don't have time to play myself.) What's really interesting, is what Chris said when I asked him (he takes tennis lessons), what he thought of my neat tennis pictures.

He said, "The guy's feet shouldn't have left the ground and he shouldn't crouch so much." I wanted him to critique my neat pictures, not the swing. But, it does prove the value of using video to analyze any games you play.

And the best thing about this system, besides the new \$599 price, is that it is so incredibly easy to use. Just turn it on and record. There are no fancy complicated controls.

There's virtually nothing to learn. You'll be recording 15 minutes from the time that you open the box.

Below you'll find an expanded version of my original story. I've added pictures as well as lots of new uses, some suggested by DAK customers.

You can be sure that I would never have thought that plastic surgeons would use a video system. Or, that bull riders at a rodeo would want to record their feats.

By the way, I unfortunately can't reproduce moving video pictures in this catalog, so I had to use conventional cameras along side the video camera

for the pictures in this ad.

The video is much more exciting, but you'll have to see that for yourself. Here's my expanded ad.

### Daddy's Pride And Joy Expanded

By Drew Kaplan

"Where's the Unicorn?" was the title of my son's speech. And, I was going to miss it.

I had also missed the trip to Knotts Berry Farm where he had won the Unicorn. He was especially proud because neither his older brother nor any of the adults had been able to win anything.

#### POSSIBLE DIVORCE?

Everyone in the family thought I should skip the meeting, and they were probably right. But I had an idea.

I called Emerson and asked to borrow one of their portable video machines with a camera that would 1) be light enough for my wife to easily carry, and 2) wouldn't require any training.



The next day we received the system you see above. I didn't plan to sell it (I told Emerson that at \$999 it was too expensive), but I really needed it for that day.

Well, not only did this system save my marriage, but we've had a heck of a lot of

fun. Yes, I've seen the Unicorn Speech many times, as have all the grandparents. But that was just the beginning.

The very first night we unpacked the recorder, the kids turned into 'hams'. And by the way, the speech was probably much better because we used the video recorder over and over again to practice.

So, whether you're a movie star, a model, an extra or simply giving a speech at school or at work, you can practice and evaluate your presentation as often as you like.

If you're like me, speaking in public is awesome. I want to know what I look like, what I sound like and how I make my points before I go live.

#### SUPER EASY TO USE

Inside and out, (yes it came right out of the box with everything, including an AC power supply and a rechargeable battery) we really put this thing to use.

Just plug the camera into the recorder. Then insert the rechargeable battery or the AC power supply. Finally insert a standard VHS cassette and away you go.

Cables are included to connect this recorder to any TV inputs from 75 ohm cable to 300 ohm flat wire to direct video for a monitor or another recorder.



Next page please. . .

RN16



Daddy's Pride And Joy Continued. . . Everything you need is included.

#### LOTS OF USES

My older son is taking tennis lessons. Making recordings of your swing out on the court is an ideal way to improve. He can really study his wrist and arm action.

Here are some pictures of our resident DAK tennis pro doing his thing for my cameras. Do you think his swing is good? (See previous page.) Of course, you can freeze the action at any point to really study your swing.



It's also terrific out on the golf course for improving your golf swing. In fact, it's such a powerful method of game improvement that they sell video cassettes showing you how to improve your game.

Here's our resident DAK golf pro demonstrating his skill for my cameras. On the video tape you could freeze the action frame by frame. (He asked me to tell you that he only looks fat in the picture because of the effect of the number of exposures I needed to show his full swing.)



With this system you can really refine your game. I can't personally attest to improving your tennis or golf games, because I'm too busy writing catalogs to take time off to play.

And anyway, when I was growing up, playing ping pong seemed to be an extravagant sport to me.

#### GOOD FOR WORK TOO

It's easy to see how many pleasurable uses it has. But, wait till you see what it can do for you at work. Here are just a few of the many types of work that can be enhanced by using this video system.

**For Communication.** I've already mentioned public speaking, but look at this. If you have salesmen in the field, wouldn't it be great to be able to send out a personal video description.

It can be of your newest products, automated equipment, or a message from the president about what the sales force should know about the company's future plans. It's great for morale.

With over 30% of households in the U.S. already having video recorders, you probably won't even have to supply a recorder. And, think how powerful the presentations of your sales force will be when they can show live videos of your products **IN ACTION** instead of boring price list pictures.

**For Real Estate.** It's already happening. Just imagine walking in to a prospective buyer's home with tours of 5 or 6 homes ready to show on their TV. All you have to do is walk through a home to show the view, amenities, and give a true feeling of the home.

You'll save hours. Your clients will appreciate the time you save them and you'll only take them to see the homes they'll be likely to buy.

Some agencies even have the 'sign planters' tape the houses so all the brokers in the office can get an easy look.

And, no matter what, you should have a stock tape showing the schools, the churches, the stores and any other assets of the community that are likely to help with the sale.

**For The Factory.** Why teach each new employee how to run the same machine. Sit them down in front of a TV and let the video tape do the work. You'll always know for sure exactly what the new employee has been told and they can watch the tape several times if they wish.



When you do bring them out 'on the line', you'll find the fine tuning is really easy and you'll have saved hours of repetitive teaching. Making the tapes is easy and it can really pay off.

**There's Lots More.** The power of a plant tour or equipment demonstration on tape shown to a prospective out of town customer is awesome. It can make the ultimate difference.

Why not have an introduction to your company in the personnel office for all new employees. And, providing live, up to the minute information for your sales force is simply priceless.

#### LIVING CHRISTMAS CARDS

With video cassettes costing as little as \$5, why not send one to an old friend who lives across the country. Wow, what a great way to revive old friendships.

As many as 30% of all households are estimated to have VHS recorders. So, there's a good chance your old friends already have recorders.

My wife is planning to send out about 6 copies of a tape about us to her old 'best' friends in Akron, Ohio and Denver, Colorado and Phoenix, Arizona.



Here's the view from a twin engine island hopper we took to visit DAK's retired controller while we were in Hawaii. Unfortunately I'm not a private pilot, but just think of all the great moments you've had in the air that you can show on the ground.





If you look at the picture below, you'll see my son heading for a soccer ball. If you're into comedy, you'd have to see the video to see him not only miss the ball, but end up flat on the ground. (He was fine as usual.)



#### REALLY EASY

Touch the trigger on the camera. The tape will start. Touch the trigger again and the tape will stop.

You'll have easy TTL (through the lens) viewing. There's a focus control and a 3X zoom lens. A green LED shows you that you're recording and a red LED shows you if there's not enough light.

But don't worry about light. You need only 35 lux, which is about normal room light for perfect recordings.

A 4-position switch lets you optimize the camera for standard incandescent light bulbs, fluorescent bulbs, full sun, or cloudy days. It's easy; it's quick, and you'll be amazed at the results.

A unidirectional electret condenser mike mounted on the camera picks up the sound with astonishing clarity.

You'll have loads of features, including speed search, still frame, audio dubbing, and automatic fine editing.

You'll particularly like the remote control because it allows you to freeze frame, advance frame by frame, and activate fast forward or reverse visual scan.

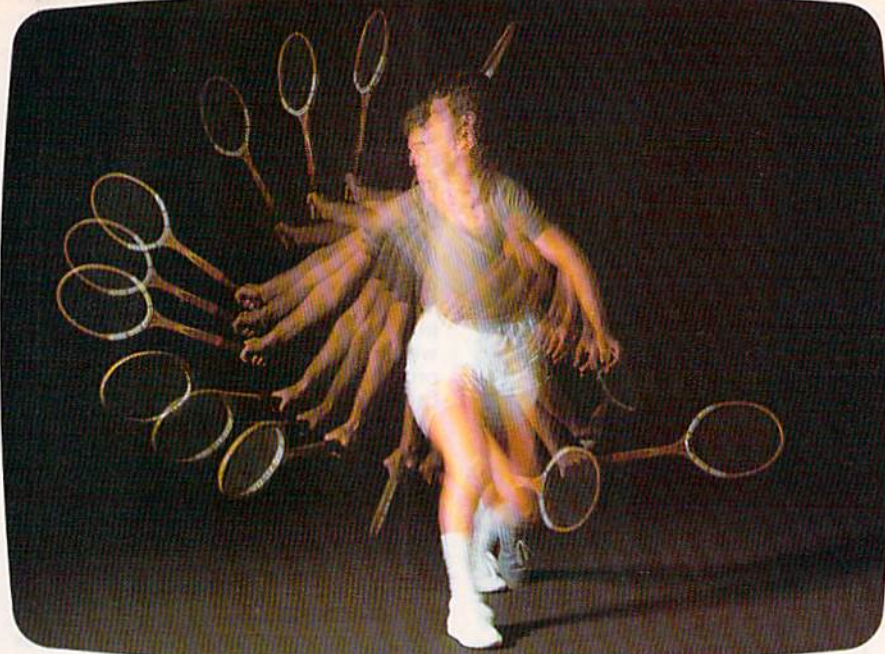
#### A FRANK COMPARISON OF CAMCORDERS AND SEPARATES

There are two types of video systems on the market, and a dizzying array of formats. Let's look at formats first.

Camcorders use 8 millimeter cassettes, mini VHS, Beta or full size VHS. Obviously, standard VHS cassettes with their 100% compatibility with all VHS home units and their 6 hour recording capability are our choice.

The problem is that while a few of the smaller format cameras with 20 minute recording capability can weigh somewhat less than 5 pounds, VHS camcorders can weigh over 8 pounds.

Emerson's system has a camera that only weighs 1.54 pounds. Holding up 8 pounds to your eye can be a real pain.



Of course, when you add Emerson's recorder at 10.6 pounds, it weighs more overall. But, the 10.6 pound recorder is supported by a comfortable shoulder strap. So, you only hold the 1.54 pound camera up to your eye.

And, with separates, you can take the recorder without the camera for dubbing or playing tapes.

It's impossible to say which format will eventually win the contest. But, whether it's separates like the Emerson, or full size VHS camcorders, your tapes will be 100% compatible.

#### AT HOME TOO

You'll get a TV tuner that turns this recorder into a standard home video recorder. You can record off the air VHF 2-13 and UHF 14-83.

The recorder has both VHF channel 3 and 4 output capability, so you can connect the recorder to any TV.

It also has 'video' inputs and outputs, so you can connect it directly to a TV monitor or to any other video recorder.

Just use normal 'audio' type RCA patch cords for really clean copies of cassettes. So, it's a portable dubbing machine.

There's an adjustable shoulder strap. And, it's backed by a limited warranty.

#### CAPTURE YOUR FAMILY OR BUSINESS RISK FREE

It's not like using expensive film that has to be processed. With six hours costing about \$5, you'll have a ball.

If you're not 100% satisfied, or even if you don't like to watch your family on TV, simply return the system in its original box within 30 days for a courteous refund.

To order your Emerson Video System (Emerson's camera is by Konica), risk free with your credit card, call toll free, or send your check for ~~only \$689~~ plus \$11 P&H. Order No. 4313. CA res add tax.

You've got to try this! Take the camera in the car and drive around your block or to your office with someone holding the camera out of the window. Wait till you see the results. It's like a roller coaster.

In fact, we rode a roller coaster 4 times to get the pictures on the previous page. It's really hard holding on for your life while you try to shoot pictures. But, the tape sure is a blast to watch.

#### UNNECESSARY OPTIONS

Basically the system comes with everything you need. But, here are a few extras.

You can order extra rechargeable batteries. Each charge (2½ to 4 hours) gives you about an hour of recording. So, if you want to record more than an hour without recharging, an extra battery is just \$24.95 (\$2 P&H) Order No. 4363.

You can operate this system from your car, boat or plane's 12V cigarette lighter. The cable is just \$9.95 (\$1 P&H) Order No. 4364.

What if you're alone and you want to record yourself. We have a tripod for the camera. (Yes, there's a standard tripod mount on the camera.) You absolutely do not need this to hold the camera steady when you're recording on the move. But, if you're working alone, it's just \$39 (\$4 P&H). Order No. 4365.

Finally, if you're out in the bushes where you don't have access to a TV and you'd like to show off your tapes, we've got an AC/DC black and white (D cells not included) 5" TV for just \$69 (\$5 P&H) Order No. 4366.

Or, you can go in style with an AC/DC 5" color set (D cells not included) for just \$199 (\$7 P&H). Order No. 4367.

Of course, any TV anywhere will work perfectly with this system, so chances are you don't need any of the optional accessories. This is not just a 'starter system'. This is a complete video system just the way it comes out of the box.

#### PRICE SLASHED

List price was \$999

DAK sold it for \$689

#### NOW JUST \$599

Use Order No. 4313 plus (\$11 P&H)



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# Cable Controller Plus

Get all the cable channels on any TV or video recorder with this all new wireless infrared remote control cable tuning system. And at just \$88, we're sure to break the cable market wide open.

If you've got cable, we've got it all. Now you can tune in up to 60 cable channels from your easy chair.

The Universal Cable Controller receives all VHF Low Band channels 2-13 and VHF Midband 14(A)-22(I).

Plus it tunes the Super Band VHF channels 23(J)-36(W) and Hyper Band channels from 37-60. You'll get a lot of stations for our breakthrough price.

## MOVIE CHANNELS

If there are movie channels on your cable and they're not scrambled, the Controller is all you need. If they're scrambled, you'll need the cable company's box.

**Note:** Check with your cable company before viewing anything at all, to see if they require you to pay a fee.

## SPORTS PLUS

There are lots of 'Super Channels' broadcast on cable. On the all sports channel you'll watch 'World Class Sports' whenever you wish. All Movie Channels give you entertainment at all hours.

And 'Super Stations' from New York and Atlanta give you major city TV for cities other than your own. Plus, there's Cable News Network for a world wide perspective on the news and much more. Why not see what's on your cable?

## ONLY FOR CABLE

If you don't have cable, the Cable Controller isn't for you. It only finds you extra channels when you are connected to a cable. And, it doesn't tune in UHF.

But, if you're on cable, your cable company is rebroadcasting UHF over unused VHF channels. So with the Cable Controller tuner, you'll get it all.

## TOTAL RANDOM ACCESS TUNING

The wireless infrared remote hand controller does it all. It switches both the TV and the Controller on and off and selects your channels. And, look at this. You can select your favorite channels (up to 6) and store them in a special section.

Then just touch the special 'RCL' Recall Button and you'll be able to sequence through only your favorite channels. This is especially convenient if you like to flip through movie channels during commercials on regular TV.

For the other channels, you'll enjoy total random access tuning. You can go directly from channel 2 to 28. Or you can step tune one channel at a time.

Once you've set your own TV to channel 3, you can just forget it. Any fine tuning is handled from the wireless infrared remote handset. And you'll have crystal controlled frequency phase lock loop synthesizer tuning for the finest picture.

You'll see the number of the station that you have selected displayed on the command base. And, you can tune channels either from the remote or the base.

Color tints, volume, brightness and contrast are all controlled by whatever method you now use.

## INSTALLATION

Nothing to it. All cable systems use 75 ohm round cable. Simply unscrew the end from your TV and screw it into the Controller base input.



Then screw in an identical cable (included) between the Cable Controller and your TV. Finally, plug your TV's AC plug into the Controller and the Controller's AC plug into the wall.

## WHAT IT IS

The Cable Controller is actually a very sophisticated, all electronic VHF TV tuner/receiver. It's really like a TV set without a picture tube.

Since it's all electronic, you won't be getting snow from dirty tuning contacts and loss of fine tuning as the set ages.

The Controller tunes all the possible stations that your cable can broadcast, something that would be very expensive to build into standard TVs, because not all TVs are going to be used on cable.

dreds of dollars extra. You can feed both your TV and video recorder. Or, you can separate them so that you can easily watch one thing and record another.

## WHAT IT ISN'T

It isn't one of the infamous 'black boxes' you might have read about that illegally decode various 'Pay TV' channels. On cable, most of the programming isn't scrambled, it's just found outside the tuning range of the average TV.

So, if there is a Pay TV channel that is scrambled, or is only unscrambled on one TV in your house, the Controller is not made and should not be used to tune it in without paying.

Actually 'Cable Ready' TVs and video recorders do basically the same thing as the Cable Controller, but cable tuning is usually an added on feature that often doesn't cover as many channels.

The Cable Controller is made and backed by a standard limited warranty from Universal Security Instruments Inc.

## TRY THE WORLD OF CABLE RISK FREE

Relax up to 20 feet away. Change channels, adjust the fine tuning or turn your set on or off. Explore the vast number of cable channels available to you.

Try it risk free. If you aren't 100% satisfied, simply return it in its original box within 30 days for a refund.

To order your Universal 60 Channel Cable Controller with Wireless Infrared Remote Control, risk free with your credit card, call toll free or send your check for DAK's market breaking price of just \$88 plus \$5 for postage and handling. Order Number 4147. CA res add tax.

There's a whole new world of entertainment waiting for you just off your normal TV tuning range. With the Cable Controller, you can sit back in your favorite easy chair and tune in the world.



## GREAT FOR VIDEO RECORDERS

Now you can record off cable. With the Cable Controller hooked to your video recorder you can open the world of cable to your video recorder too.

Cable ready video recorders that don't even tune in 60 channels can cost hun-



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# The \$4 Energizers for Commodore 64 & 128

Yes, it's a trap. You can't buy Super Huey, the top rated helicopter flight simulator for \$4, Swift Calc's 6600 cell spreadsheet program, or TextPro/DataPro Word Processing and Data Base programs for \$4 each. Or, can you?

By Drew Kaplan

Life is tough. And then, you die. And that little idiom of life has certainly been proven true in the computer industry.

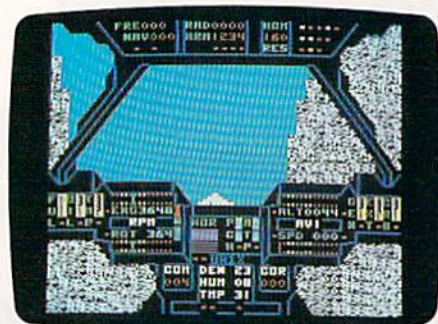
Well, I've been personally depressed by the fall in the computer market. It's not a fad. It's really a human triumph.

So, just when nobody wanted my 'trap', I jumped in and bought over 10,000 units.

Then Commodore, in its infinite wisdom, brought out their new 128 computer (it's really neat, I've been using it) and my 'outdated, dead product', has its very own slot. So read on, and I'll tell you

why I believed in this product. And remember, even though it's a trap, you're going to get a mind boggling deal.

Of course, if you don't have a Commodore 64 or a 128, and you're not going to buy one, you'll just feel left out if you read on, so you better stop here.



## SUPER HUEY

This is a true flight simulator. You're in the cockpit as you lift off and guide your copter through treacherous mountain passes, and over desert bases.

It will take you hours to master the 'collective' and control the 12 types of movements as you go on rescue, exploration and combat missions. The list price is \$19.95, but it's yours for \$4 as bait.



## SWIFT-CALC SPREADSHEET

You can have sophisticated spreadsheet capabilities on the Commodore. Just imagine, with over 6600 cells, you can do loan analysis, expense reports and much more. If you invest or budget, Swift-Calc is ideal. It has pop-up menus and it's yours for just \$4 as bait.



## TEXTPRO/DATAPRO

Imagine a word processing program that is so easy to use that you don't even have to read the instructions. Just type your letters, term papers, or memos.

Then add a data base program that will let you create, organize and search up to 200 files, each with 8 sections.



And you can create as many different data bases as you wish, each with up to 200 files. You can keep the information in your computer or print it out.

The data base program can arrange it for you numerically or alphabetically. Or, use 'Greater Than' or 'Less Than' commands. For example, you could have the computer list all your stocks that are worth more or less than a certain value.

These 2 programs list for \$39.95. But, they're both yours for just \$4 as bait.



## RICHARD PETTY'S TALADEGA

Take your seat and try to qualify. There are 18 drivers on the track, each with their own style of driving. It lists for \$19.95, but it's yours for \$4 as bait.

## SLINKY (Picture Next Column)

Guide Slinky from square to square. You have to change the color of each square to finish a level. Finish a perfect level and you'll get an instant replay of your moves. Its list is \$19.95, but, it's yours for just \$4 as bait.

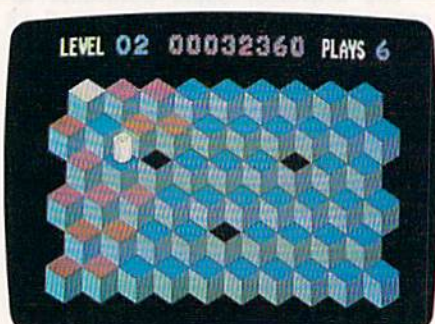
## MORE

Not pictured is Forbidden Forest, picked as one of the 50 best games of all time. You'll be attacked by savage beasts as you try to shoot them with arrows. It's almost 3D and it's tough. \$19.95 is list, but it's yours for \$4 as bait.

Finally, there's Monster Trivia with over 2000 trivia questions. 1 to 4 people can play. Good luck! It lists for \$19.95, but it's yours for \$4 as bait.

## IT'S COME BACK TO LIFE

So, what did Commodore put into its new 128 computer? They put in a cassette port. And, I think they recognized that aside from the \$150 odd dollars you save on a disk drive, that cassettes are a



very safe, reliable and easy way to save and retrieve data.

So, we've taken these wonderful productivity programs and thrilling games, had them manufactured on cassettes (the list prices are for disks) and you may choose 1 or all of them only when you buy the data cassette recorder.

If you now have disk, you'll be amazed at the speed and accuracy of cassette storage. If you have a data drive already, here's a great spare and oh, the software.

It just plugs into the cassette port of either your Commodore 64 or 128. It's



reliable. It's easy. Cassettes are cheap and protect your data. And everything is backed by a standard limited warranty.

## \$4 SOFTWARE BONANZA

### RISK FREE

Order any or all of the above programs. Try out the data cassette recorder. If you're not 100% delighted, simply return the recorder and all programs you purchased in their original boxes within 30 days for a courteous refund. Note: You may not return the recorder without all the programs you purchased.

To order your Fortronics Data Recorder for your Commodore 64 or 128 and any programs you desire, risk free with your credit card, call toll free, or send your check for DAK's close-out price of just \$29 (\$4 P&H) Order No. 4143.

You may order one copy each of any or all of the cassette programs for \$4 (\$1 P&H) each. Use the following Order Nos.: For Super Huey, No. 4368. For Swift-Calc, No. 4369. For TextPro/DataPro, No. 4370. For Taladega, No. 4371. For Slinky, No. 4372. For Forbidden Forest, No. 4373. For Monster Trivia, No. 4374.

Imagine all this productivity and challenge for just \$4 each. DAK originally offered the recorder for \$49. Now, at \$29, and with this software. Wow!

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# No Button Chess

**Just follow the blinking lights for the most challenging game of your life. There are 8 levels. It's fully automated. And, wait till you see the price.**

It's you against the computer. Chess comes alive with the latest breakthrough in computer technology.

There are no more bothersome buttons to push and complicated calculator displays to decipher. This computer uses 'sensor technology' to interpret what you have done, and simply lights 2 LEDs to tell you what it wants to do.

It's the newest version of 'follow the bouncing ball'. Now it's follow the blinking light. So, let the war begin!

It's smart. It has 8 levels of difficulty and its brain is an 80C50 Processor running at 6 megahertz with a memory capability of 32,000 bits, so you better come out fighting.

## SIMPLE TO USE

Notice that I said, "simple to use", not simple to beat. Using this computer is incredibly easy. Just move your man. The computer will know exactly what you've done.

Then it's the computer's turn. Two LEDs will light to show you the man the computer wants to move. Then two more light show you where to move the man.

It's simple. It's easy. And, there are no buttons to push. You can concentrate on the game, not on the computer.

## BUT, THERE ARE BUTTONS

The only buttons you really need are the on/off switch and the new game button. But, look at this.

**There's help.** Just touch a button, and the computer will join your team. It will pick your best possible move. A second button touch will send its brain back to pick its best response.

**You can cheat.** Let's say you make a really dumb move. After you see what the computer is going to do to you (hor-

rors, you've lost your Queen), you make the computer take back its last move and then you can take back yours.

And that's not all. If you're the type of person who says, "If I only had my Queen back, I could beat this thing," no problem. You can add back in any piece anywhere, with the push of a button.

**But there are limits.** This computer won't let you make an illegal move. And if you move its man to the wrong location, it emits an unpleasant sound and flashes the lights re-showing you where it wants to go. So, what could be easier?

**There's more.** You can do a lot with the powerful brain of this computer. Not only can you add back in a piece you lost, you can take one of the computer's away. Plus, you can set up a classic game in mid-play to see how you would do.

This computer does everything a chess master would do. It castles, it has pawn promotion and en passant. So brush up, you'll have to play your best.

Even level one is a challenge. I can't beat this computer at level 4. And, I don't even want to talk about levels 5, 6, 7 and 8. And here's a nice extra.

You won't have to wait for the computer. With its super fast 6 megahertz speed, it thinks while you're playing (I think it knows what you're going to do).

It reacts in 5 seconds on level 1, 30 seconds on level 4 and so on. See if your brain can keep up with this computer.

## WOW, IT'S REAL CHESS

But, when all is said and done, playing chess is what it's all about. And this game is very smart, very tough, but incredibly easy to use. Every move is even audibly confirmed.

It is only 10 1/2" X 11" X 2 1/2". The com-

batants are magnetic and the King stands 2" tall. Using the newest IC technology, this computer operates for more than 500 hours on 4 C batteries.

So, this chess player goes where you go. And, with more than 500 hours of battery life, you don't even need to buy an AC adaptor.

It's made in the United States (isn't that a change) by Fidelity Electronics. They are the largest and best known of the chess computer manufacturers. And, it's backed by their limited warranty.

## TRY NO BUTTON CHESS RISK FREE

If you like a challenge and your ego is strong enough to withstand losing to a computer, why not play just one game.

If you aren't 100% satisfied, even if you just lose too often, you can return this computer within 30 days in its original box for a courteous refund.

To order your Fidelity No Button Chess Computer risk free with your credit card, call toll free, or send your check for DAK's breakthrough price of just \$69 plus \$4 for P&H. Order No. 4306. CA res add 6% sales tax.

Whether you're a novice or a master, one of the 8 levels is sure to keep you humble. Chess taxes intelligence, not reflexes, which is why it's always been a game of Kings and Diplomats.



**DAK**  
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RUN FEBRUARY 1986 / 63



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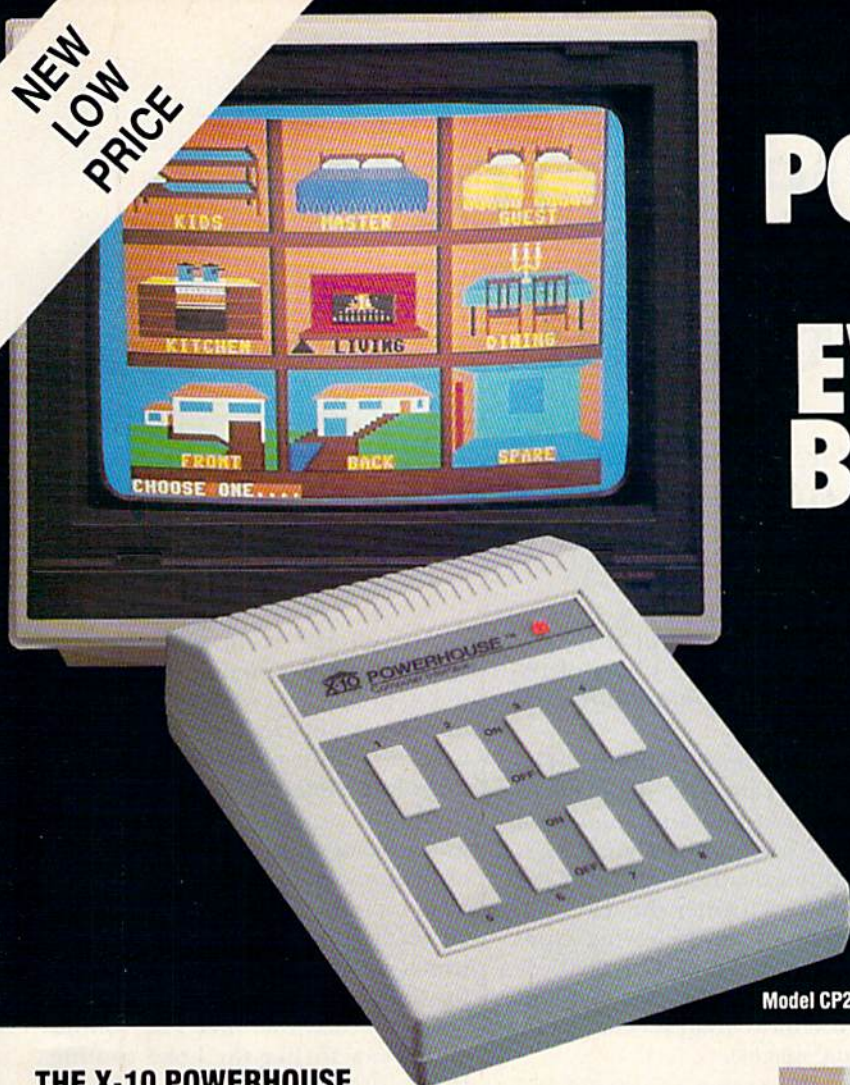
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Circle 77 on Reader Service card.



# Tax Deductor's Delight

*This program lets you file, sort, total, print and save all records that pertain to Schedule A of Form 1040.*

By BARBARA SCHULAK

Itemized Tax Deductions will keep a file of all your itemized deductions. The fields for each record are category, date, check number, description and amount. The categories are—as on Schedule A—medical and dental expenses, taxes, interest expense, contributions, casualty and theft and miscellaneous.

Records may be added, changed or deleted. They may also be displayed on the screen or outputted to the printer, either in toto or by category. The latter option provides a sort of all the records by category and includes a statement of each category's total expenditures. The data may then be saved to either disk or tape. The program allows for the filing of 200 individual records. If more are required, the DIM statements in line 5 should be changed.

The program first presents a main menu. The options are as follows:

1. Load data
2. Add a record
3. Find a record
4. Change a record
5. Delete a record
6. Display file
7. Print file
8. Save data
9. End program

When running the program for the first time, choose Option 2, add a record. After the first session and once data has been saved, you must start with Option 1, load data.

The program will then ask for a filename. I would suggest using something like TAX-1985. If you're using

a disk, the program will display a message that gives the status of the load. Then the program returns you to the main menu.

To add data, choose Option 2. The prompts are category, date, check number, description and amount of check. The category designation is entered numerically (1-6) from the displayed list. To enter the date, you may use any of the following types of formats: AUG 01, AUG 1, 08/01 or 8/1. Mainly, you should be consistent and not use more than six characters (including spaces).

The check number is entered as a string, so you may enter other strings of four characters or less (such as CASH) if the expense was not in the form of a check. The description can be anything, as long as it's 20 characters or less. Do not use dollar signs (\$) when entering the amount. Enter 100 or 100.00, but *not* \$100. Again, consistency will provide you with neater outputs.

In addition to adding records to the file, you may also change or delete an entry. To find which entry to change, you may use Option 3, find a record, which will sort through the records by any category or field. Or you may use Option 6, display file. Know your check number, because it is the key field for deleting or changing an entry. Then, just follow the prompts on the screen, using the same guidelines for data input as outlined above.


To see your file, choose Option 6. A submenu will then ask if you want

to see all the records, or records sorted by field. You may then choose the field that you want. Any of these options results in the output of all necessary information to the screen, including a total of the amount spent.

Option 7, printing the file, works in the exact same manner. Examples of printouts may be seen in Table 3, which shows a sample printout for all records in a file, and in Table 4, which shows a printout of all records for the contributions category.

Option 8 is the Save File routine and is exactly like the Load routine. Don't forget to save the data before ending the program (Option 9)!

For those interested in programming or in making modifications to the program, I have included a list of the variables used in the program (Table 1) as well as a list of the program structure (Table 2).

This program might not do everything for you in Schedule A, but it is an excellent way to collect, store and sort your records for tax purposes and should also save you some time. 

Note: The program will work on the Plus/4 with these two changes:

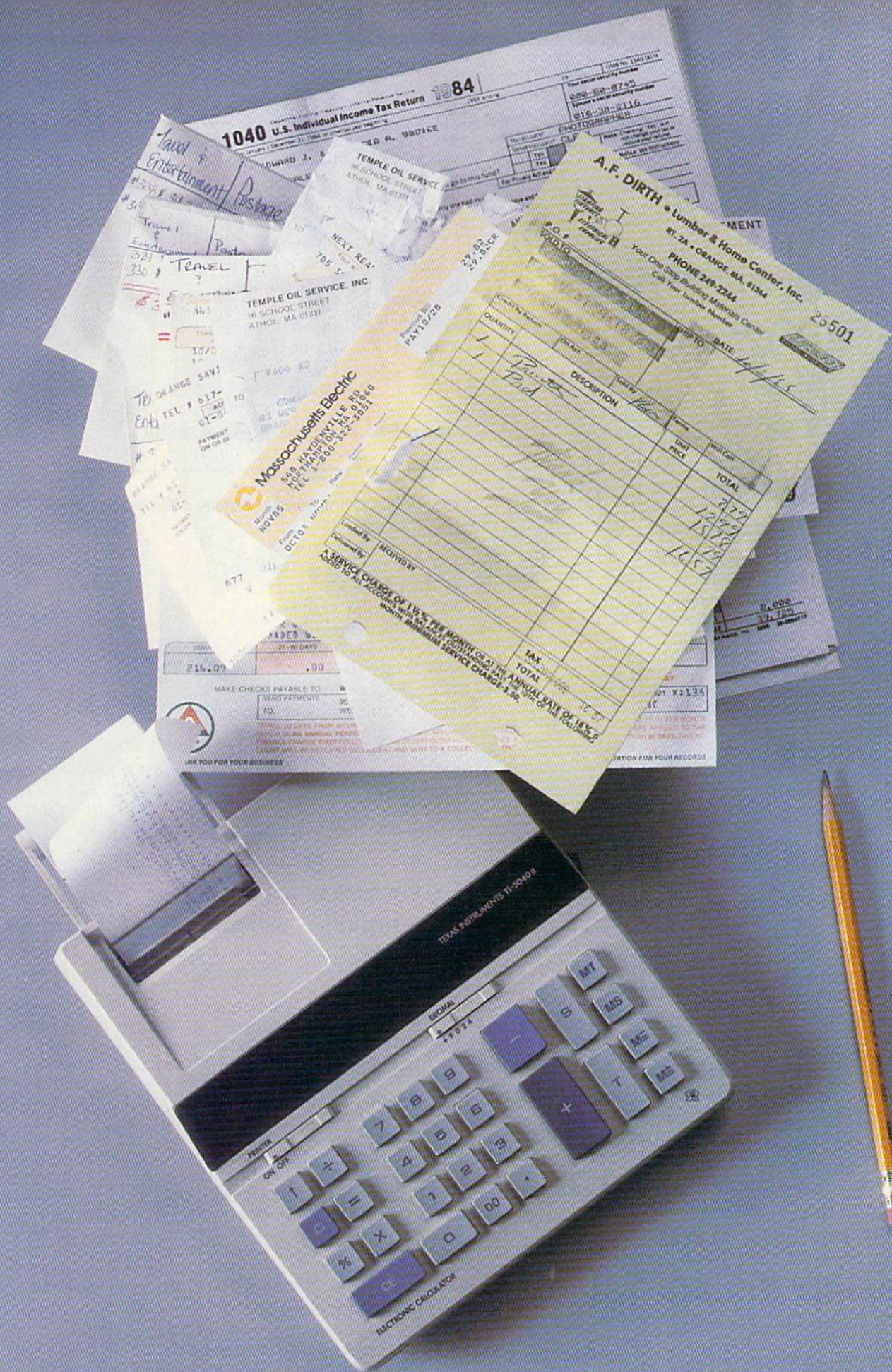
```
Line 15REM  
Line 85IF K=9THENEND
```

Address all author correspondence to Barbara H. Schulak, 2 Forest Glen, Iowa City, IA 52240.

## RUN It Right

C-64; C-128 (in C-64 mode)  
Plus/4 (with modifications)





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Than wish a snow in May's  
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CS()	Category names
CAS()	Field names
AS(X,1)	Category
AS(X,2)	Date
AS(X,3)	Check number
AS(X,4)	Description
AS(X,5)	Amount of check
N	Number of records in file
FL\$	Filename
E,E\$,E1,E2	Disk error checking
TL	Total amounts
K,K\$,I\$,N\$	Input
R,R\$,C,C\$	Input
F,F\$,G,G\$	Input
FL,F1	Flags
I,J,X,A\$	Utility

Table 1. Itemized Tax Deductions program variables.

5-95.	Dimension arrays, display main menu
100-180.	Load data
200-250.	Add a record
300-320.	Change a record
400-470.	Delete a record
500-585.	Display records
600-685.	Print records
700-720.	Find a record
800-880.	Save data
1000-1035.	Sort records
2000-2040.	Input filename subroutine
3000-3010.	Get a key subroutine
4000-4050.	Input data subroutine
5000-5175.	Input field subroutine
6000-6020.	Data statements

Table 2. Line-by-line program structure.

#### ITEMIZED TAX DEDUCTIONS

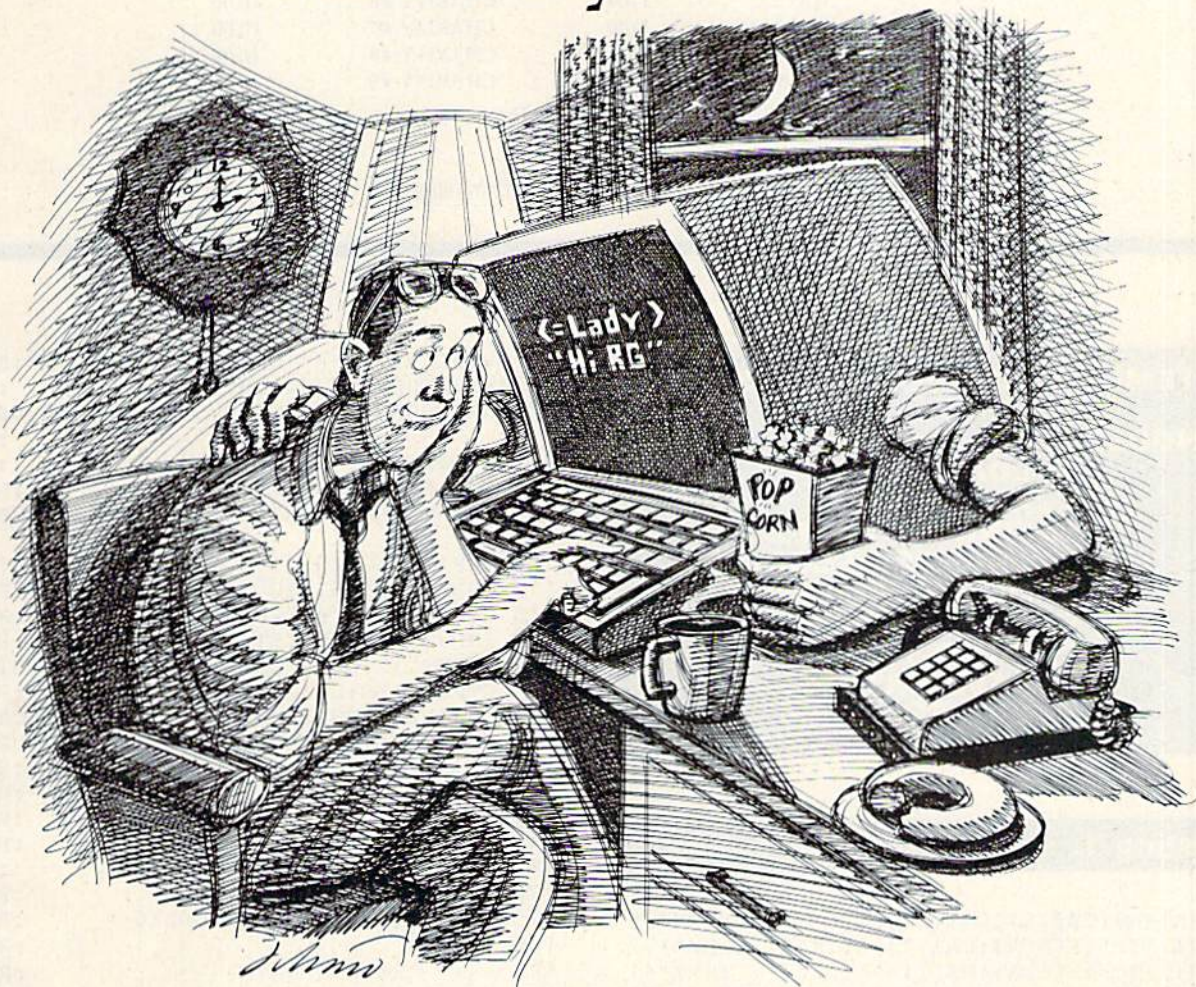
CAT	DATE	CHECK#	DESCRIPTION	AMOUNT
CON	JAN 2	900	CHARITY #1	10.00
MED	JAN 10	910	MEDICINE	10.98
CON	FEB 10	950	CHARITY #2	25.00
MED	FEB 15	960	DOCTOR	78.00
CON	MAR 10	980	CHARITY #3	15.00
CON	MAR 15	1000	CHARITY #4	10.00
TAX	MAR 30	1010	PROPERTY TAX	1000.00
MED	APR 10	1020	DENTIST	57.25
MED	MAY 5	1040	MEDICINE	15.44
INT	JUN 15	VISA	FINANCE CHARGE	11.33
CON	JUL 11	1083	CHARITY #5	25.00
CON	AUG 13	1100	CHARITY #6	10.00
MED	SEP 3	1115	MEDICINE	19.99
TAX	SEP 30	1125	PROPERTY TAX	1000.00
CON	OCT 15	1140	CHARITY #7	10.00
CON	NOV 3	1155	CHARITY #8	15.00
CON	DEC 5	1165	CHARITY #9	13.75
MED	DEC 10	1170	DOCTOR	55.00
INT	DEC 31	MORT	MORTGAGE INT	10000.00

TOTAL: 12381.74

Table 3. Sample printout of all a file's records.



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# ITEMIZED TAX DEDUCTIONS CONTRIBUTIONS

CAT	DATE	CHECK#	DESCRIPTION	AMOUNT
CON	JAN 2	900	CHARITY #1	10.00
CON	FEB 10	950	CHARITY #2	25.00
CON	MAR 10	980	CHARITY #3	15.00
CON	MAR 15	1000	CHARITY #4	10.00
CON	JUL 11	1083	CHARITY #5	25.00
CON	AUG 13	1100	CHARITY #6	10.00
CON	OCT 15	1140	CHARITY #7	10.00
CON	NOV 3	1155	CHARITY #8	15.00
CON	DEC 5	1165	CHARITY #9	13.75

TOTAL: 133.75

Table 4. Sample printout of a file by category.

## ITEMIZED TAX DEDUCTIONS

### CHOOSE:

1. LOAD DATA
2. ADD RECORD
3. FIND A RECORD
4. CHANGE RECORD
5. DELETE RECORD
6. DISPLAY FILE
7. PRINT FILE
8. SAVE DATA
9. END PROGRAM

### Listing 1. Itemized Tax Deductions program for the C-64.

```

5 N=0: DIMA$(200,5), CA$(5), C$(6) : REM*95
10 FOR I=1 TO 5: READ A$: CA$(I)=A$: NEXT I : REM*172
11 FOR I=1 TO 6: READ A$: C$(I)=A$: NEXT I : REM*41
15 POKE 53281, 15: POKE 53280, 12 : REM*103
20 PRINT "{SHIFT CLR}{CTRL 1}" TAB(9) "{CTRL 9}" : REM*206
ITEMIZED TAX DEDUCTIONS : REM*206
25 PRINT "{2 CURSR DNs} CHOOSE: {2 CURSR DNs}" : REM*59
30 PRINT TAB(5) "1. {2 SPACES} LOAD DATA : REM*236
35 PRINT TAB(5) "2. {2 SPACES} ADD RECORD : REM*153
36 PRINT TAB(5) "3. {2 SPACES} FIND A RECORD : REM*174
40 PRINT TAB(5) "4. {2 SPACES} CHANGE RECORD : REM*130
45 PRINT TAB(5) "5. {2 SPACES} DELETE RECORD : REM*133
50 PRINT TAB(5) "6. {2 SPACES} DISPLAY FILE : REM*50
55 PRINT TAB(5) "7. {2 SPACES} PRINT FILE : REM*95
60 PRINT TAB(5) "8. {2 SPACES} SAVE DATA : REM*200
65 PRINT TAB(5) "9. {2 SPACES} END PROGRAM : REM*117
75 GET K$: IF K$="" THEN 75 : REM*15

```

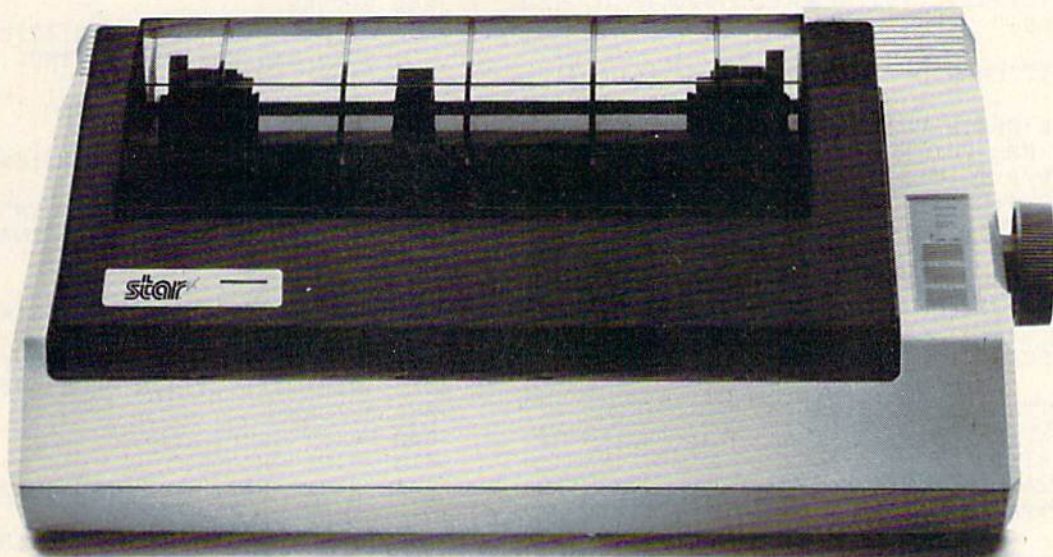
```

80 K=VAL(K$): IF K<1 OR K>9 THEN 75 : REM*132
85 IF K=9 THEN SYS 2048: END : REM*67
90 ON K GOSUB 100, 200, 700, 300, 400, 500, 600, 800 : REM*92
95 GOTO 20 : REM*27
99 ----- REM LOAD DATA ----- : REM*253
100 PRINT "{SHIFT CLR} LOAD-": F1=0: GOSUB 200 : REM*4
105 IF F1 THEN OPEN 2, 1, 0, FL$: GOTO 135 : REM*67
110 OPEN 15, 8, 15, "IO" : REM*216
115 OPEN 2, 8, 2, "0: "+FL$+", S, R" : REM*107
120 INPUT #15, E, E$, E1, E2 : REM*196
125 PRINT "{2 CURSR DNs} {CTRL 9} DISK STATUS: { : REM*253
CTRL 0} "E; E$; E1; E2 : REM*253
130 IF E THEN CLOSE 2: CLOSE 15: PRINT "{2 CURSR DNs : REM*246
} FILE NOT LOADED": GOSUB 300: RETURN : REM*183
135 INPUT #2, N : REM*128
140 FOR I=1 TO N : REM*255
145 FOR J=1 TO 5 : REM*88
150 INPUT #2, A$(I, J) : REM*174
170 NEXT J : REM*115
175 CLOSE 2: IF F1=0 THEN CLOSE 15 : REM*238
180 RETURN : REM*221
199 ----- REM ADD DATA ----- : REM*52
200 N=N+1: X=N : REM*200
210 PRINT "{SHIFT CLR}" : REM*202
220 GOSUB 400 : REM*156
230 INPUT "ANY MORE ENTRIES"; I$ : REM*254
240 IF LEFT$(I$, 1) = "Y" THEN 200 : REM*52
250 RETURN : REM*142
299 ----- REM CHANGE RECORD ----- : REM*159
300 PRINT "{SHIFT CLR}": FL=0: F=3 : REM*117
310 INPUT "CHECK# TO BE CHANGED"; N$ : REM*188
315 GOSUB 100: IF FL=1 THEN RETURN : REM*219
320 GOSUB 400: RETURN : REM*180
399 ----- REM DELETE ----- : REM*3
400 PRINT "{SHIFT CLR}": FL=0: F=3 : REM*57
410 INPUT "CHECK# TO BE DELETED"; N$ : REM*32
415 GOSUB 100: IF FL=1 THEN RETURN : REM*27
420 N=N-1 : REM*132
425 FOR I=X TO N : REM*29
430 FOR J=1 TO 5 : REM*196
435 A$(I, J)=A$(I+1, J) : REM*204
455 NEXT J : REM*195
460 PRINT "{CURSR DN} RECORD DELETED." : REM*105
470 GOSUB 300: RETURN

```



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Listing 1 continued.

```

499 -----REM VIEW DATA-----:REM*52
500 R=0:F=0:J=0:TL=0:GOSUB5000:REM*221
505 PRINT"SHFT CLR":REM*240
510 PRINT"CAT DATE{4 SPACES}CK#{3 SPACES}DF
    SCRIPTON{6 SPACES}AMT":REM*175
515 FORI=1TO39:PRINT"COMD Y";:NEXT:PRINT
    :REM*153
520 FORI=1TON:REM*254
535 IFR=2THENIFN$<>A$(I,F)THEN575:REM*85
540 J=J+1:REM*36
545 PRINTA$(I,1);:REM*179
550 PRINTTAB(4)A$(I,2);:REM*110
555 PRINTTAB(12)A$(I,3);:REM*25
560 PRINTTAB(18)LEFT$(A$(I,4),12);:REM*12
561 PRINTTAB(39-LEN(A$(I,5)))A$(I,5)
    :REM*119
565 TL=TL+VAL(A$(I,5)):REM*23
570 IFJ/15=INT(J/15)THENGOSUB3000:PRINT"SH
    FT CLR":REM*172
575 NEXT:REM*75
580 PRINT"CRSR DN}{CTRL 9}TOTAL:{CTRL 0}"T
    L:REM*84
585 GOSUB3000:RETURN:REM*221
599 -----REM PRINT DATA-----:REM*77
600 R=0:F=0:TL=0:GOSUB5000:REM*40
605 OPEN2,4:CMD2:REM*69
607 PRINTTAB(25)"ITEMIZED TAX DEDUCTIONS":P
    RINT:REM*233
608 IFR=2ANDF=1THENPRINTTAB(35-(LEN(C$(G)))
    /2);C$(G):PRINT:REM*100
610 PRINTTAB(5)"CAT"SPC(5)"DATE"SPC(7)"CHEC
    K#"SPC(7)"DESCRIPTION"SPC(15)"AMOUNT"
    :REM*38
615 PRINTTAB(5);:FORI=1TO64:PRINT"COMD Y"
    ;:NEXT:PRINT:REM*25
620 FORI=1TON:REM*98
625 IFR=2ANDN$<>A$(I,F)THEN675:REM*199
645 PRINTTAB(5);A$(I,1);TAB(5)A$(I,2);
    :REM*235
650 PRINTCHR$(16)"25";:PRINTTAB(5-LEN(A$(I,
    3)))A$(I,3);:REM*132
655 PRINTCHR$(16)"37"A$(I,4);:REM*205
660 PRINTCHR$(16)"60";:PRINTTAB(9-LEN(A$(I,
    5)))A$(I,5):REM*222
665 TL=TL+VAL(A$(I,5)):REM*123
675 NEXT:REM*175
680 PRINT:PRINTTAB(25)"TOTAL:"TL:REM*236
685 PRINT#2:CLOSE2:RETURN:REM*147
699 -----REM FIND A RECORD-----:REM*251
700 GOSUB5070:REM*148
710 GOSUB1000:REM*158
720 RETURN:REM*12
799 -----REM SAVE DATA-----:REM*4
800 PRINT"SHFT CLR)SAVE-":F1=0:GOSUB2000
    :REM*173
805 IFF1THENOPEN2,1,1,FL$:GOTO835:REM*38
810 OPEN15,8,15,"IO":REM*151
815 OPEN2,8,2,"@0:"+FL$+"S,W":REM*50
820 INPUT#15,E,E$,E1,E2:REM*131
825 PRINT"{2 CRSR DNs}{CTRL 9}DISK STATUS:{
    CTRL 0}"E;E$;E1;E2:REM*188
830 IFTHENCLOSE2:CLOSE15:PRINT"{2 CRSR DNs
    }FILE NOT SAVED.":GOSUB3000:RETURN
    :REM*157
835 PRINT#2,N:REM*198
840 FORI=1TON:REM*63
845 FORJ=1TO5:REM*190
850 PRINT#2,A$(I,J):REM*103
870 NEXT:NEXT:REM*109
875 CLOSE2:IFF1=0THENCLOSE15:REM*50
880 RETURN:REM*173
999 *****REM SORT RECORDS*****:REM*124
1000 FORX=1TON:REM*87
1010 IFN$<>A$(X,F)THEN1030:REM*243
1015 PRINT:FORI=1TO5:PRINTA$(X,I):NEXT
    :REM*164
1020 INPUT"CRSR DN)IS THIS THE RECORD";I$
    :REM*223
1025 IFLEFT$(I$,1)="Y"THENRETURN:REM*177
1027 PRINT"SHFT CLR":REM*253
1030 NEXT:REM*20
1035 PRINT"CRSR DN)RECORD NOT FOUND":GOSUB
    3000:FL=1:RETURN:REM*235
1999 -----REM FILENAME INPUT-----:REM*34
2000 INPUT"CRSR DN){CTRL 9}FILENAME:{CTRL
    0}";FL$:REM*77
2010 INPUT"CRSR DN){CTRL 9}D{CTRL 0}ISK OR
    {CTRL 9}T{CTRL 0}APE:":K$:REM*129
2020 IFK$<>"D"ANDK$<>"T"THEN2010:REM*125
2030 IFK$="T"THENF1=1:REM*47
2040 RETURN:REM*57
3000 PRINTTAB(5)"CRSR DN){CTRL 9}{COMD 4}P
    RESS ANY KEY TO CONTINUE.{CTRL 0}{CTRL
    1}":REM*217
3005 GETK$:IFK$=""THEN3005:REM*24
3010 RETURN:REM*7
4000 PRINT:FORI=1TO6:PRINTI;C$(I):NEXT
    :REM*103
4001 INPUT"CRSR DN)CATEGORY#";C$:REM*28
4002 C=VAL(C$):IFC<1ORC>6THEN4001:REM*99
4003 A$(X,1)=LEFT$(C$(C),3):REM*254
4005 FORI=2TO5:REM*58
4010 PRINTC$(I)":":INPUTA$(X,I):REM*215
4020 NEXT:REM*205
4030 INPUT"{2 CRSR DNs}CORRECT";I$:REM*231
4040 IFLEFT$(I$,1)="N"THEN4000:REM*243
4050 RETURN:REM*27
5000 PRINT"SHFT CLR":REM*145
5010 PRINT"CHOOSE:":REM*175
5020 PRINTTAB(5)"CRSR DN)1.{2 SPACES}ALL R
    ECORDS:REM*117
5030 PRINTTAB(5)"2.{2 SPACES}BY FIELD
    :REM*25
5040 GETR$:IFR$=""THEN5040:REM*11
5050 R=VAL(R$):IFR<1ORR>2THEN5000:REM*63
5060 IFR=1THENRETURN:REM*27
5070 PRINT"SHFT CLR":REM*215
5080 PRINT"CHOOSE:{CRSR DN}":REM*141
5090 FORI=1TO5:REM*91
5100 PRINTTAB(5)I".{2 SPACES}"C$(I):NEXT
    :REM*115
5120 GETF$:IFF$=""THEN5120:REM*54
5130 F=VAL(F$):IFF<1ORF>5THEN5070:REM*222
5135 IFF=1THEN5155:REM*201
5140 PRINT"CRSR DN)ENTER "C$(F);:INPUTN$
    :REM*144
5150 RETURN:REM*108
5155 PRINT:FORI=1TO6:PRINTI;C$(I):NEXT
    :REM*239
5160 INPUT"CRSR DN)CATEGORY#";G$:REM*172
5165 G=VAL(G$):IFG<1ORG>6THEN5160:REM*191
5170 N$=LEFT$(C$(G),3):REM*226
5175 RETURN:REM*133
6000 DATA CATEGORY, DATE, CHECK#, DESCRIPTI
    ON, AMOUNT:REM*23
6010 DATA MEDICAL, TAXES, INTEREST, CONTRIB
    UCTIONS, CASUALTY/THEFT:REM*143
6020 DATA MISCELLANEOUS:REM*29
9000 OPEN15,8,15,"S0:TAX DED":CLOSE15:SAVE"
    @0:TAX DED",8:REM*25

```



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# New Names for Old Disks

By ROBERT DICKOW

The 1541's disk operating system (DOS) provides a fairly comprehensive set of commands. However, it doesn't include a command for renaming a disk, at least not without destroying all the files on it.

Fortunately, the accompanying disk utility (Listing 1) remedies this problem, letting you rename your disks as often as you like without damaging them.

Type in the program; save and run it. It will wait for you to place a disk in the drive, then prompt you to enter the new disk name, which can be up to 16 characters long. After you've done this, you may press the return key to verify the change or insert another disk and repeat the process.

If at some point you decide not to make the change, hit the left-arrow key. The only way of editing your new name is via the INST/DEL key. In any case, all the necessary user information is displayed on the screen after you run the program. When testing this program and correcting any typing errors, I suggest you use an old scratch disk.

---

*The 1541's disk  
operating system doesn't  
provide a command for  
renaming disks.  
But we do...*

---

To see how the program works, study the commands in lines 230 and 410 to 440. You can find a description of these commands in your disk drive owner's manual in the section on random-access files. A number of these commands can be used to access any byte on the disk, and reading bytes is as easy as writing them.

Following is a description of how to read a byte from the disk. First, you must open the command channel with the statement:

```
OPEN 15,8,15
```

Command channel 15 is needed for locating the bytes you want later on and for reading the I/O errors. A buffer is then set up for a block of data. Open a channel to access the data:

```
OPEN fl, dv, ch, "#"
```

The fl is the file number; dv is the device number (8, usually); and ch is the channel number (any number from 2 to 14). Now, pull the block of data you want into the drive RAM buffer with:

```
PRINT#15, "UA";dv;0;tr;bl
```

This last command works the same as the User1, or U1, command, and it's similar to the Block Read command. The tr and bl stand for the track and sector you want to access. The dv is, of course, the device number, normally 8.

Finally, point to the byte you want to retrieve with the Buffer Pointer command as follows:

```
PRINT#15, "B - P";ch;x
```

The x is the number of the byte (1

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to 256) that will start the byte-retrieving process, and ch is the channel number used when the data channel is first opened. To recover the disk name, you need to look in track 18, sector 0. This block houses the block-availability map, or BAM. The disk name follows immediately after the BAM data.

There, starting with the 144th byte of track 18, sector 0, and for 16 bytes following, you can find the name. The lower locations in the BAM are important, as they indicate to the DOS where free blocks for saving files are located. Therefore, you must

be careful not to write data there accidentally!

From this point on, just use the Get# command to retrieve each successive byte of data. You can then display the data on the screen, transfer it to another file or perform any number of operations.

The process of writing data to the disk is similar to the process of reading data from it. When reading, however, use the USER2 (or U2 or UB) command after outputting to the datafile via the Print# command. Finally, close the data channel and then the command channel.

The commands discussed in this article can open up a new world of disk exploration for you. Try writing a program that will access blocks of data from the disk drive and allow the user to edit any byte. You can also change the loading address of machine language programs, change sequential files to program files (and vice versa), and even change filenames. Enjoy. R

*Address all author correspondence to Robert Dickow, 2095 Rambler Road, Lexington, KY 40503.*

### Listing 1. Name Changer program.

```

1 REM *****:REM*25
2 REM * DISK NAME CHANGER *:REM*206
3 REM *{8 SPACES}BY{9 SPACES}* :REM*109
4 REM *{4 SPACES}BOB DICKOW{5 SPACES}* :REM*136
5 REM *****:REM*29
6 : :REM*238
70 REM --INITIALIZE & DISPLAY SCREEN--:REM*70
80 Q$=CHR$(34): AR$=CHR$(95): BK$=CHR$(20):
  DE$="{CRSR LF}-{CRSR LF}": CH$=CHR$(221)
  ):REM*240
90 BX$="{11 SPACES}{SHFT U}{16 SHFT *s}{SHF
  T I}":BY$="{11 SPACES}{SHFT J}{16 SHFT *
  s}{SHFT K}":REM*214
100 DH$=CHR$(166):FORX=1TO40:LN$=LN$+DH$:NE
  XT:R$=CHR$(13): DISK=8:REM*104
110 FORX=1TO16:SP$=SP$+CHR$(160):BL$=BL$+"-
  ":NEXT:REM*2
120 PRINT"{SHFT CLR}{CRSR DN}{CTRL 8}{9 SPA
  CES}***DISK NAME CHANGER***{CTRL 2}"
  ):REM*18
130 PRINT:PRINT"{4 SPACES}"Q$;AR$;Q$ = ABO
  RT THE CHANGE OR EXIT":REM*24
140 PRINT"{4 SPACES}"Q$INST/DEL"Q$ = DELE
  TE A CHARACTER":REM*6
150 PRINT"{4 SPACES}HIT "Q$RETURN"Q$" KEY
  TO ENTER CHANGE.":PRINT:REM*204
160 PRINTLN$:REM*208
170 PRINT" INSERT DISK & HIT ";Q$;"RETURN"Q
  $" WHEN READY":REM*236
180 CU=0: GOSUB 520:REM*76
190 IF A$=AR$ THEN PRINT"{SHFT CLR}":END
  ):REM*64
200 IF A$<>R$ THENPRINT"{CRSR UP}";:GOTO170
  ):REM*206
210 OPEN 15,8,15:PRINT#15,"I0":GOSUB 570
  ):REM*96
220 REM --GET DISK NAME FROM BAM--:REM*48
230 B$="": OPEN8,DI,8,"#":PRINT#15,"UA:";8;
  0;18;0:PRINT#15,"B-P:";8;144:REM*12
240 FORX=1TO20:GET#8,A$:B$=B$+A$:NEXT
  ):REM*118
250 CLOSE8: CLOSE 15:REM*220
260 NM$=LEFT$(B$,16):ID$=RIGHT$(B$,2)
  ):REM*25
270 PRINT"{CRSR UP} CURRENT DISK NAME: {CTR
  L 9}"NM$;";";ID$:B$="":REM*95
280 PRINT"{CTRL 9}{CRSR DN}{2 SPACES}TYPE N
  EW DISK NAME (16 CHRS MAXIMUM): ":PRINT
  BX$:REM*245

```

```

290 PRINT SPC(11);CH$;BL$;CH$:PRINTBY$:PRIN
  T"{2 CRSR UPs}";SPC(12);:REM*11
300 CU=1:GOSUB520:REM*229
310 IF A$=R$ AND PEEK(211)<>28 THEN PRINT"-{C
  RSR LF}";:GOTO 410:REM*225
320 Z=LEN(B$):IF A$=R$ THEN 410:REM*143
330 IF A$=BK$ AND Z=0 THEN300:REM*225
340 IF A$=BK$ANDPEEK(211)=28 THENPRINT CH$"{C
  RSR LF}";DE$;:B$=LEFT$(B$,Z-1):GOTO300
  ):REM*155
350 IF A$=BK$ THEN PRINT"-{CRSR LF}";DE$;:B$=
  LEFT$(B$,Z-1):GOTO300:REM*193
360 IF A$=AR$ THEN B$="":PRINT:PRINT"{CRSR U
  P}{CTRL 9}ABORTED":GOTO 480:REM*107
370 IF A$="{CRSR UP}"OR A$="{CRSR DN}"OR A$="{
  HOME}"OR A$="{SHFT CLR}"OR A$="{CRSR RT}"
  OR A$="{CRSR LF}" THEN300:REM*135
380 IF Z<16 THENB$=B$+A$:CU=1:PRINTA$;:REM*73
390 Z=LEN(B$):GOTO300:REM*211
400 REM --WRITE TO DISK ROUTINE--:REM*27
410 OPEN15,DI,15:OPEN 8,DI,8,"#":FORX=1TO2:
  PRINT#15,"B-P:";8;144:REM*195
420 IFX=1 THENPRINT#8,SP$;:NEXT:REM*247
430 PRINT#8,B$;:REM*133
440 PRINT#15,"U2:";8;0;18;0:GOSUB 570
  ):REM*101
450 CLOSE8:CLOSE15:REM*165
460 PRINT:PRINTSPC(20);"{6 CRSR UPs}{CTRL 9
  }";B$;:REM*209
470 PRINTRIGHT$(SP$,16-LEN(B$));";ID$;"{5
  CRSR DNs}":REM*5
480 PRINT:PRINT SPC(12){CTRL 9}CONTINUE?{2
  SPACES}(Y/N){4 CRSR LFs}";:CU=1:GOSUB5
  20:REM*197
490 IF A$="Y" OR A$=R$ THEN POKE 204,1:PRINT
  :GOTO120:REM*55
500 PRINT:END:REM*53
510 REM --INPUT SUBROUTINE--:REM*3
520 GETA$:IF CU THEN POKE 204,0:POKE 207,0
  ):REM*166
530 IF CU AND A$=" " AND PEEK(211)=28 THEN C
  U=0:POKE204,1:PRINT CH$"{CRSR LF}";
  ):REM*78
540 IF A$=" " THEN 520:REM*228
550 POKE204,1:RETURN:REM*158
560 REM --ERROR CHECK SUBROUTINE--:REM*218
570 INPUT#15,E,E$,T,S:REM*38
580 IF E>=20 THENPRINT:PRINT"{CRSR DN}ERROR#"
  E;"{CTRL 9}"E$:CLOSE8:CLOSE 15:END
  ):REM*36
590 RETURN:REM*138

```



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The programs include on each diskette are listed below

### TOP SECRET STUFF I

The Dock (view/repair disk contents)  
Sync Checker (diskette)  
Imbedded Track Number Creator  
Disk Manipulation System  
3 Minute Copy (backup program)  
Diskette Matcher (compare sectors)  
Unscratch A File (recover file)  
View BAM (block allocation map)  
1541 Read/Write Test  
1/2 Track Reader  
Header Reader (display disk header)  
Sync Maker  
Device Number Change (disk drive)  
Electronic Arts Backup  
Drive Mon (disk drive m/1 monitor)  
Diskette File Log (start/end address)  
Write-Protect Sensor Test  
Repair A Track (recover data)  
Fast Format (10 seconds)  
1/2 Track Formatter

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### TOP SECRET STUFF II

RAM Test (test Computer RAM)  
Copy \$A000-\$FFF (under ROMS)  
Display G.C.R. (All sector data)  
Un-Write Protect (diskette)  
Unnew Program  
Wedge - \$8000  
Smooth Scroll (messages up screen)  
Koala Dump (koala pad screen dump)  
Disk Manipulation System  
Disk Eraser (20 second clean wipe)  
Split Screen (TWO screen colors)  
Disk Protection System (stops copies)  
Write Protect (diskette)  
Boot Maker (autobook BASIC programs)  
Wedge - \$C000  
Diskmatcher II (high speed version)  
No Drive Rattle (on reading errors)  
3 Times Disk Drive Head Speed  
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# Fast-Food Chef

*If you've ever considered a career in the fast-food business, this program is great preparation.*

By GEORGE DECKER

Take two parts Basic, add in seven spicy machine language subroutines, throw in a tasty systems interrupt, mix with a dash of high-resolution and multicolor graphics, make into beefy patties and add your toppings and buns. You can prepare these culinary delights with a C-64 and devour them vicariously to your heart's content.

## *How to Play*

Burgers is a game that will drive you a little crazy. In these days of mass production, fixing a burger shouldn't be at all difficult. Push a computer key and on squirts the catsup. Push another key and you've got the mustard. Still another finishes the burger by putting the top bun in place. Sound easy? Well, what if the keys you needed to push kept changing? And suppose the burgers kept coming faster and faster? You might get a little frazzled.

Burgers begins with the bottom bun moving down the screen. It will pause (the duration depends on the skill level you select) beside the catsup, mustard and top bun holder. Next to each item will be a letter that changes as the bottom bun moves.

When the bun pauses, the letters will stop, and you must type in the three letters selected.

You must build each burger in a specific order: catsup first, mustard second and top bun last. If you miss putting on the catsup, then you can't add the mustard and top bun. To add the bun, you must top the burger with both catsup and mustard.

At the bottom of the screen is a red bar showing what fixings you must add to the burger. Under this is your score. Every unfinished burger causes the red bar to go down, and if this bar runs out, the game is over.

You receive 100 points for every finished burger. For every 1000 points you earn, the fixings bar will rise. High score is displayed at the top of the screen.

There are three skill levels: easy, normal and hard. Each level determines the length of the bun's pause. As you play, regardless of which level you select, the pauses will get shorter and shorter. ®

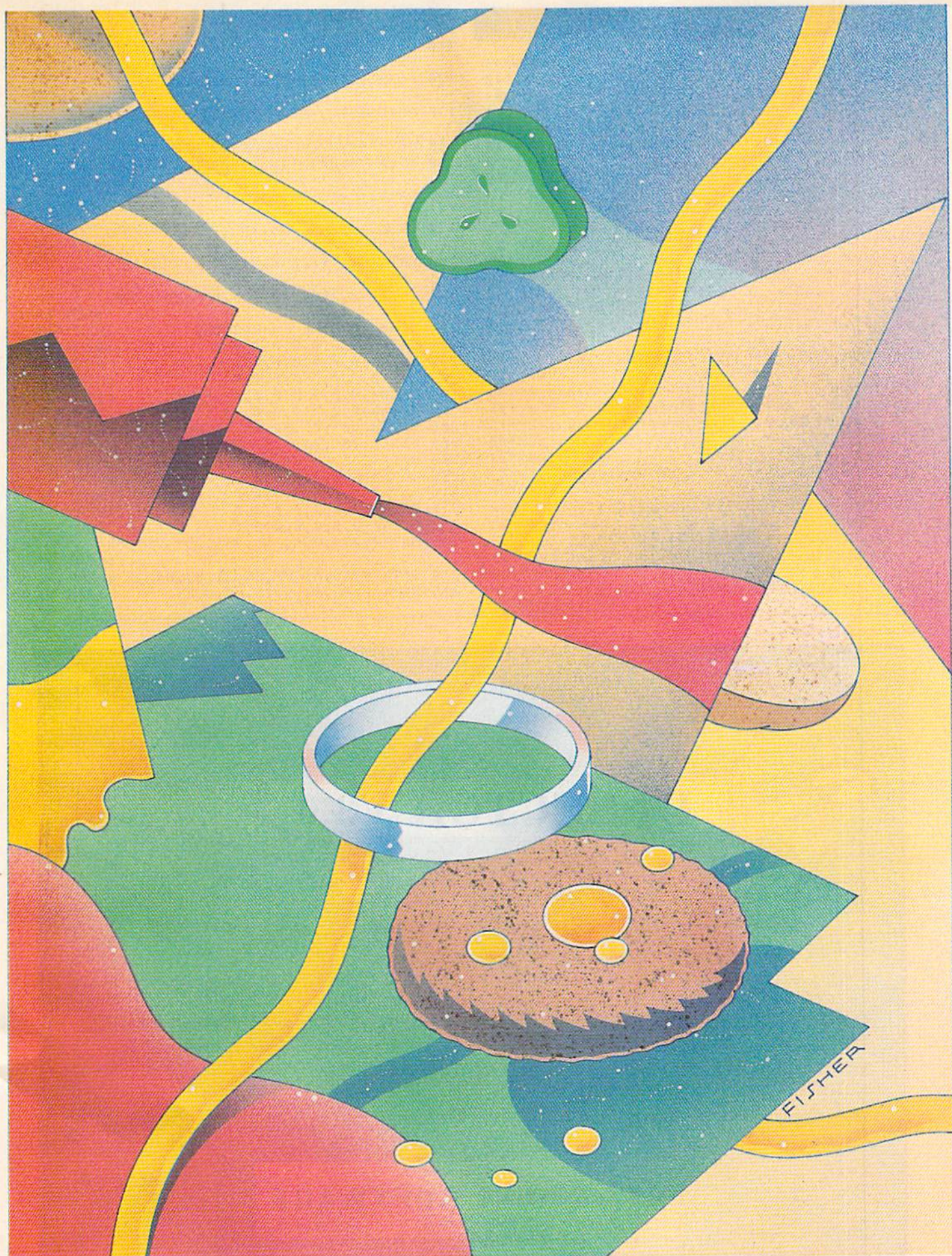
---

*Address all author correspondence to George Decker, 251 N. Luzerne Ave., Baltimore, MD 21224.*

**RUN It Right**

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





FISHER



# Listing 1. Burgers program for the C-64.

```

1 REM BURGERS :REM*93
2 REM 10/18/84 :REM*140
3 REM GEORGE DECKER :REM*223
4 REM 251 N. LUZERNE AVE. :REM*254
5 REM BALTO., MD. 21224 :REM*183
6 REM***** :REM*300
10 POKE52,48:POKE56,48:CLR :REM*230
15 DIMZ$(26):B=65:FORA=1TO26:Z$(A)=CHR$(B):
   B=B+1:NEXT :REM*113
20 POKE53281,1:PRINT" {SHFT CLR}{CTRL 7}{15
   CRSR RTs}{CRSR DN}BURGERS :REM*202
22 PRINT" {17 CRSR RTs}BY":PRINT" {11 CRSR RT
   s}GEORGE R. DECKER" :REM*88
25 PRINT" {5 CRSR DNs}{CTRL 3}{10 CRSR RTs}S
   ELECT SKILL LEVEL":PRINT:PRINT :REM*97
30 PRINT" {CTRL 1}F1 - EASY":PRINT" {F3 - NORM
   AL":PRINT" {F5 - HARD":PRINT" {F7 - CHILDREN
   " :REM*198
35 GETA$:IFA$="{FUNCT 1}"THENK=150:GOTO70 :REM*247
40 IFA$="{FUNCT 3}"THENK=100:GOTO70:REM*246
45 IFA$="{FUNCT 5}"THENK=50:GOTO70 :REM*195
50 IFA$="{FUNCT 7}"THENK=200:GOTO70 :REM*16
60 GOTO35 :REM*80
63 REM GET SKILL LEVEL :REM*27
70 PRINT" {CRSR DN}{11 CRSR RTs}{CTRL 3}WAIT
   ONE MOMENT" :REM*60
73 FORA=54272TO55295:POKEA,0:NEXT:REM CLEAR
   OUT SID :REM*25
75 POKE54273,48:POKE54272,127:POKE54277,0:P
   OKE54278,128:POKE54296,15 :REM*25
76 REM SET MUSIC :REM*244
80 POKE53265,PEEK(53265)AND239:REM BLANK SC
   REEN :REM*126

100 POKE56334,PEEK(56334)AND254:POKE1,PEEK(
   1)AND251 :REM*138
110 FORA=0TO463:POKE14336+A,PEEK(53248+A):N
   EXT :REM*28
120 POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)O
   R1 :REM*300
130 POKE53272,(PEEK(53272)AND240)OR14 :REM*242
140 REM***MOVE CHARACTER ROM*** :REM*116
150 FORA=14800TO14831:READB:POKEA,B:NEXT
   :REM*180
160 DATA3,3,15,15,63,63,255,255:REM 58 :REM*216
170 DATA255,255,255,255,255,255,255,255:REM
   59 :REM*240
180 DATA192,192,240,240,252,252,255,255:REM
   60 :REM*26
190 DATA192,240,252,255,255,252,240,192:REM
   61 :REM*68
200 REM***CUSTOM CHARACTERS :REM*234
201 DATA0,0,0,0,0,0,0,0 :REM*123
202 DATA0,0,0,0,0,0,0,0 :REM*124
203 DATA0,0,0,0,0,0,0,0 :REM*125
204 DATA0,0,0,0,0,0,0,0 :REM*126
205 DATA0,0,0,0,0,0,0,85 :REM*99
206 DATA85,85,85,85,85,21,85,84 :REM*242
207 DATA21,85,84,5,85,80,5,85 :REM*65
208 DATA80,1,85,64,1,85,64,0 :REM*150
209 DATA0,0,0,0,0,0,0,0 :REM*131
210 DATA0,0,0,0,0,0,0,0 :REM*132
211 DATA0,0,0,0,0,0,0,0 :REM*133
212 DATA0,0,0,0,0,0,0,0 :REM*134
213 DATA0,255,255,255,255,255,255,85 :REM*119
214 DATA85,85,85,85,85,21,85,84 :REM*250
215 DATA21,85,84,5,85,80,5,85 :REM*73

```

Circle 22 on Reader Service card.

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*Listing 1 continued.*

```

216 DATA80,1,85,64,1,85,64,0 :REM*158
217 DATA0,0,0,0,0,0,0,0 :REM*139
218 DATA0,0,0,0,0,0,0,0 :REM*140
219 DATA0,0,0,0,0,0,0,0 :REM*141
220 DATA0,0,0,170,170,170,170 :REM*184
221 DATA170,255,255,255,255,255,255,85 :REM*83
222 DATA85,85,85,85,85,21,85,84 :REM*2
223 DATA21,85,84,5,85,80,5,85 :REM*81
224 DATA80,1,85,64,1,85,64,0 :REM*166
225 DATA0,0,0,1,85,64,1,85 :REM*51
226 DATA64,5,85,80,5,85,80,21 :REM*148
227 DATA85,84,21,85,84,85,85,85 :REM*16
228 DATA85,85,85,170,170,170,170,170 :REM*202
229 DATA170,255,255,255,255,255,255,85 :REM*91
230 DATA85,85,85,85,85,21,85,84 :REM*10
231 DATA21,85,84,5,85,80,5,85 :REM*89
232 DATA80,1,85,64,1,85,64,0 :REM*174
235 FORA=12288TO12543:READB:POKEA,B:NEXT :REM*95
240 FORA=12544TO12606:POKEA,0:NEXT :REM*0
250 REM***SPRITE CHARACTERS*** :REM*36
310 POKE53280,14:POKE53281,1 :REM*233
320 PRINT"{SHFT CLR}{2 SPACES}{CTRL 1}SCORE {8 SPACES}{CTRL 6};;;;;;;;;;{5 SPACES}{CTRL 1}HIGH SCORE{6 CRSR LFs}{CRSR DN}"H S"{CRSR UP}" :REM*245
330 PRINTTAB(15)"{CTRL 6};{CTRL 5}BURGERS{CTRL 6};" :REM*125
340 PRINTTAB(15)"{CTRL 6};;;;;;;;;;" :REM*11
350 FORA=1184TO1223:POKEA,59:POKEA+760,59:POKEA+800,59 :REM*95
360 POKEA+54272,14:POKEA+55032,14:POKEA+55072,2:NEXT :REM*81
370 FORA=1224TO1904STEP40:POKEA,59:POKEA+39,59 :REM*215
380 POKEA+54272,14:POKEA+54311,14:NEXT:Z=2 :REM*173
390 FORA=1356TO1916STEP40:FORB=0TO3:POKEA+B,59:POKEA+B+54272,Z :REM*223
400 IFZ=2THENZ=7:GOTO430 :REM*37
410 IFZ=7THENZ=12:GOTO430 :REM*117
420 Z=2 :REM*201
430 NEXTB:NEXTA :REM*15
440 FORA=1360TO1372:POKEA,59:POKEA+200,59:POKEA+400,59 :REM*75
450 POKEA+54272,2:POKEA+54472,7:POKEA+54672,12:NEXT :REM*43
460 POKE1372,61:POKE1572,61 :REM*171
470 PRINT"{HOME}{17 CRSR DNs}"TAB(16)"{COMD 2}::<::<::<::<::<" :REM*57
480 FORA=1133TO1135:POKEA+54272,1:POKEA,59 :REM*167
485 POKE1893,59:POKE1894,59:POKE1933,59:POKE1934,59:POKE1935,59 :REM*74
487 POKE56165,13:POKE56166,13:POKE56205,13:POKE56206,13 :REM*208
488 POKE1895,59:POKE56167,13:POKE56207,13 :REM*231
490 POKEA+54312,1:POKEA+40,59:NEXT :REM*193
500 REM***SCREEN SET UP*** :REM*131
505 POKE53275,15:REM SPRITE BEHIND BACKGROUND :REM*110
510 V=53248:POKEV+21,15:REM TURN ON FIRST 4 SPRITES :REM*99
520 POKE2040,196:POKE2041,196:POKE2042,196:POKE2043,196:REM SPRITES BLANK :REM*158
530 POKEV+39,7:POKEV+40,7:POKEV+41,7:POKEV+42,7:REM SET SPRITE COLOR :REM*108
540 POKEV+28,15:POKEV+37,9:POKEV+38,10:REM SET MULTI COLOR SPRITES :REM*108

```

```

560 POKE2040,192:POKEV+0,0:POKEV+2,0:POKEV+4,0:POKEV+6,0      :REM*184
570 POKEV+1,68:POKEV+3,107:POKEV+5,146:POKEV+7,185:POKEV+16,15      :REM*170
575 REM*** SET SPRITE POSITIONS***      :REM*53
576 REM***START OF GAME FOLLOWS***      :REM*114
577 POKE53265,PEEK(53265)OR16:FORA=1TO600:NEXT      :REM*205
578 SC=0:FB=39:UB=0      :REM*54
580 FORA=1TO39:POKE54276,33      :REM*244
590 S=INT(RND(1)*26)+1      :REM*44
600 T=INT(RND(1)*26)+1:IFT=STHEN600:REM*116
610 U=INT(RND(1)*26)+1:IFU=TTHEN610      :REM*22
620 PRINT"{HOME}{8 CRSR DNs}{10 CRSR RTs}{CTRL 3}"Z$(S)      :REM*22
630 PRINT"{4 CRSR DNs}{10 CRSR RTs}{CTRL 8}"Z$(T)      :REM*92
640 PRINT"{4 CRSR DNs}{10 CRSR RTs}{CMD 2}"Z$(U)      :REM*194
650 POKEV+1,A+68:POKEV+3,A+107:POKEV+5,A+146:POKEV+7,A+185:POKE54276,32:NEXT      :REM*238
655 POKE2044,PEEK(2043)      :REM*127
660 POKE2043,PEEK(2042):POKEV+7,185:REM*120
670 POKE2042,PEEK(2041):POKEV+5,146:REM*148
680 POKE2041,PEEK(2040):POKEV+3,107:REM*172
690 POKE2040,192:POKEV+1,68      :REM*140
700 FORB=1TOK      :REM*248
710 GETA$      :REM*154
720 IFA$=Z$(S)THENPOKE2041,193      :REM*44
730 IFA$=Z$(T)ANDPEEK(2042)=193THENPOKE2042,194      :REM*238
740 IFA$=Z$(U)ANDPEEK(2043)=194THENPOKE2043,195      :REM*80
750 NEXTB      :REM*12
760 IFPEEK(2044)=196THEN580      :REM*124
770 IFPEEK(2044)<>195THEN800      :REM*207
780 SC=SC+100:PRINT"{HOME}{CTRL 1}{7 CRSR Ts}"SC      :REM*159
790 UB=UB+100:IFUB=1000THEN820      :REM*167
795 GOTO580      :REM*120
796 REM UPDATE SCORE      :REM*81
800 POKE56256+FB,1:FB=FB-1:IFFB=0THEN860      :REM*245
810 GOTO580      :REM*135
815 REM DECREASE FIXINGS-SEE IF GAME IS OVER      :REM*142
820 FB=FB+1:IFFB>39THENFB=39      :REM*53
830 POKE56256+FB,2:UB=0      :REM*245
840 K=K-5:IFK<25THENK=25      :REM*55
850 GOTO580      :REM*175
855 REM INCREASE FIXINGS-SPEED UP GAME      :REM*166
860 POKEV+21,0      :REM*241
863 IFSC=>HSTHENHS=SC      :REM*10
865 PRINT"{SHFT CLR}{CRSR DN}{13 CRSR RTs}{CTRL 1}GAME OVER!"      :REM*4
870 PRINT"{5 CRSR DNs}{8 CRSR RTs}FINAL SCORE "SC      :REM*121
880 PRINT"{3 CRSR DNs}{8 CRSR RTs}HIGH SCORE "HS      :REM*165
890 PRINT"{CTRL 7}{6 CRSR RTs}{4 CRSR DNs}TO PLAY AGAIN PUSH ANY KEY.":POKE198,0      :REM*149
900 WAIT198,1:RESTORE:GOTO20      :REM*77
910 REM END GAME-SEE IF ANYONE WANTS TO PLAY AGAIN      :REM*44

```



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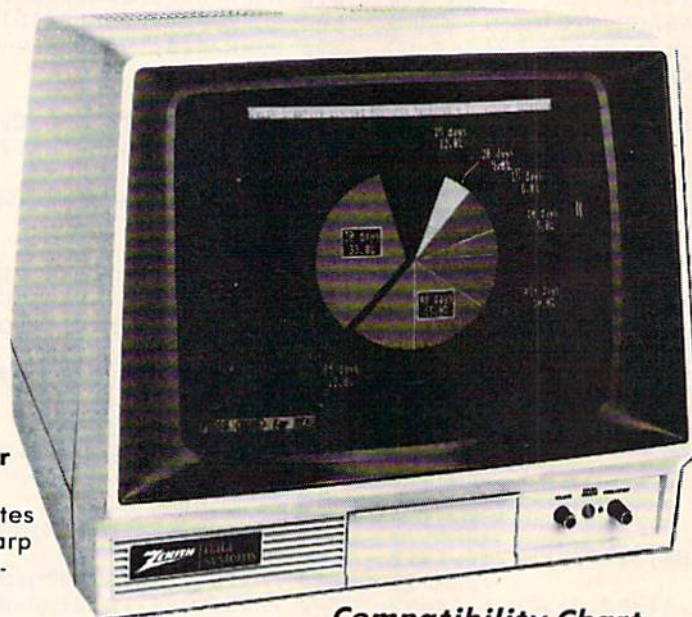
**Constant Intensity Character  
 Definition Quality**

Quality circuitry design generates crisp lines, pure colors, and sharp character definition for easy-to-read displays. DC-coupling permits the video display to retain its color balance from a single dot to a full screen of data.

List \$499.00

**Sale  
 \$139.95**

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**ZVM 131-Accessible by  
 Many Popular Systems**

The ZVM 131 is designed to interface with most personal computers, VCRs, video discs, video games and modular TV tuners that have either composite video or RGB direct drive outputs.

## Compatibility Chart

Computer	Interfaces Via
Apple II	Composite
Aplus 3000	RGB
Apple III	RGB
IBM PC	RGB
Commodore 128	RGB/Composite
Commodore 64	Composite
Commodore Vic-20	Composite
TI 99/4	Composite
Atari 800	Composite
Atari 1200	Composite
Atari 1400	Composite

**The ZVM 131  
 Sound Of Quality**

The output sound level is externally regulated by a user-adjustment volume control. Use the Zenith quality sound system to monitor the modern audio capabilities of the computer generation.

**Easy-To-Reach Front Access  
 Controls**

ZVM 131's 13" diagonal display screen can exhibit impressive graphics and intensely clear copy. Easy-to-reach front access user controls (picture, black level, color level, tint, sharpness, audio volume, background noise control) make display adjustment simple and fast. An LED power on indicator notifies the user when the monitor is operable.

**Multiple Monitors On  
 A Single Computer**

The composite video "loop-thru" feature permits a single composite video source to drive several monitors at the same time. This allows easy display possibilities for multiple viewers in business and educational applications. No more crowding around a single terminal. Everyone enjoys a clear, unobstructed view of important data.

**Connection Cables RGB Cable — \$19.95**  
 C128, Aplus 3000 (Specify)

**Composite — \$9.95**  
 Commodore, Aplus 3000, Atari (Specify)

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- Six pitches • Graphics capability • Centronics compatible parallel interface
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### SUPER GRAPHICS

This is a sample of our *emphasized* near-letter-quality print. *italic print.* There is standard data processing quality print

(IBM — Commodore)

#### Size/Weight

Height 5.04" Width 16.7"  
Depth 13.4" Weight 18.7 lbs.

#### Internal Char. Coding

ASCII Plus ISO

#### Print Buffer Size

120 CPS: 132 Bytes (1 line)

120/160 CPS Plus LQM: 2K

#### No. of Char. In Char. Set

96 ASCII Plus International

#### Graphics Capability

Standard 60, 72, 120 DPI

Horizontal 72 DPI Vertical

#### Pitch

10, 12, 16.7, 5, 6, 8.3, Proportional Spacing

#### Printing Method

Impact Dot Matrix

## SPECIFICATIONS

#### Char. Matrix Size

9H x 9V (Standard) to 10H x 9V  
(Emphasized & Elongate)

#### Printing Features

Bi-directional, Short line seeking, Vertical  
Tabs, Horizontal Tabs

#### Forms Type

Fanfold, Cut Sheet, Roll (optional)

#### Max Paper Width

11"

#### Feeding Method

Friction Feed Std.; Tractor Feed Std.

#### Ribbon

Cassette — Fabric inked ribbon

#### Ribbon Life

4 million characters

(Apple — Atari — Etc.)

#### Interfaces

Parallel 8 bit Centronics compatible  
120/160 CPS Plus NLQ: RS232 Serial inc.

#### Character Mode

10 x 8 Emphasized; 9 x 8 Standard; 10 x 8  
Elongated; 9 x 8 Super/Sub Script (1 pass)

#### Character Set

96 ASCII  
11 x 7 International Char.

#### Line Spacing

6/8/12/72/144 LPI

#### Character Spacing

10 cpi normal; 5 cpi elongated normal; 12 cpi  
compressed; 6 cpi elongated compressed;  
16.7 cpi condensed; 8.3 cpi elongated  
condensed; 5.12.5 cpi elongated proportional

Cartridge Ribbon — List \$19.95. Sale \$12.95.

## Interfaces

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Apple \$59.00

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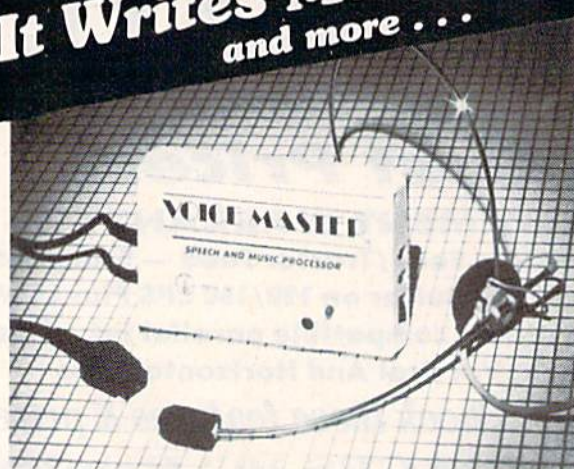
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From p. 12.

**R Magic**

**\$2B5 Fast Load and drive 9**—There's an easy way to make the popular Epyx Fast Load cartridge work with drive 9 (or any other drive) rather than the default drive 8. Just open a command channel to the drive in question, and Fast Load will adopt it as its default drive. Here's an example for drive 9:

OPEN 15,9,15

To return to drive 8, just do this:

CLOSE 15 : OPEN 15,8,15 : CLOSE 15

**Donald E. Griffey**  
Hopkinsville, KY

**\$2B6 Probability function**—Here's a neat little function that evaluates to logic true or logic false (-1 or 0), with the probability of "true" depending on a value assigned by you:

10 DEF FNP(X)=RND(1)<X

In this case, FNP(.2) will be true 20% of the time, FNP(.5) 50% of the time, and so forth.

One use of this is to cause certain lines to be executed or not, at random, but with a fixed probability. For example, consider this line:

100 IF FNP(.25) THEN GOSUB 1000

When the line is executed, the program may or may not jump to the subroutine at 1000, but the probability that it will go there is one in four (.25).

I've used this technique to add interesting highlights to games, and I hope you can use it as well.

**Davie Cooley**  
Dothan, AL

**\$2B7 Input with variable default**—Sometimes you may like to build a variable default value into an Input statement. That is, you want the default value to be based on conditions that vary from time to time when you're running the program. The way to do it is to print the prompting message and the variable, then use a Poke to place your cursor on the last character of your prompt. Here's an example:

PRINT "PROMPT";N; : POKE X,6 : INPUT N

The value of X is 211 for the C-64 and VIC; 202 for the Plus/4 and C-16; and 236 for the C-128.

The Input statement's question mark will appear directly after the prompt, followed by a space and the cursor flashing on the first digit of the number N. Just press the return key to make this your entry, or type another number to change it. The trick can also be used when the default is a string variable, but you must insert an extra space at the end of the prompt.

**Joseph R. Charnetski**  
Dallas, PA

**\$2B8 Unprotector**—Have you been frustrated by C-64 programs that use REM [SHIFT L] to protect them from being listed? Have you laboriously gone through those



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programs, deleting the offending lines by hand? Well, if you have, that drudgery is behind you. Type in the accompanying program, run it, then load a program containing some of those disturbing REMs. Enter SYS 49152, and, in a few seconds, all the shifted Ls will be removed. You can then list your program without encountering syntax errors.

```
10 PRINT "{SHIFT CLR}UNPROTECTOR - RALPH NEAL"
20 FOR J=49152 TO 49200: READ K: POKE J, K: CS=CS+K:
   NEXT J: PRINT
30 IF CS<>8220 THEN PRINT "ERROR IN DATA STATEMENTS": STOP
40 PRINT "SYS49152 REMOVES REM SHIFT L'S FROM": PRINT
50 PRINT "THE BASIC PROGRAM IN MEMORY. MAGIC!"
61 DATA 169,000,133,251,169,008,133,252
62 DATA 160,000,177,251,201,143,208,020
63 DATA 192,255,208,002,230,252,200,177
64 DATA 251,201,204,208,007,169,032,145
65 DATA 251,076,010,192,200,208,227,230
66 DATA 252,165,252,197,174,208,219,096
67 DATA 255
```

Ralph Neal  
Nash, TX

**\$2B9 Magazine indexing**—If you subscribe to *RUN* or any other publication, you know how hard it can be to search the back issues for a single memorable article. I've learned that most issues contain one or two articles that are more interesting to me than all the others combined. When each issue arrives, I identify those articles and write their names on the binding of the magazine. It is amazing how much search time that eliminates thereafter.

James Albrecht  
Kalispell, MT

**\$2BA Cartridge repair**—Don't discard faulty software cartridges until you've given them this CPR. First clean the metal contacts with a pencil eraser. If that doesn't help, disassemble the plastic case and use your fingers to apply even pressure to any socket-mounted components. Reassemble the case and try the cartridge again.

This procedure may or may not resuscitate your cartridge, but it works often enough to be worth a try.

Lee A. Seats  
Mountville, PA

Circle 121 on Reader Service card.

## PROTECTION REVEALED

Take command of your software. End the spiral of buying copy programs. *The Protection Revealed Handbook* unravels the puzzle of software protection. For authors and users—become a master of illusion. Learn how to protect or un-protect your software. Includes a large section on successful BASIC program security. Covers the latest evolution of copy protection techniques. Topics include:

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## Listing 1 continued.

```

1280 DATA0,0,0,0,0,15,15,15 :REM*181
1290 DATA1,1,1,1,1,1,1,15 :REM*233
1300 DATA0,0,0,0,0,12,12,12,12 :REM*125
1310 DATA3,3,3,3,0,0,0,0 :REM*213
1320 DATA2,2,2,14,0,0,0,0 :REM*175
1330 DATA12,12,12,12,0,0,0,0 :REM*155
1340 DATA12,12,12,12,3,3,3,3 :REM*165
1350 DATA0,0,0,0,0,0,0,0 :REM*253
1360 DATA0,0,0,0,0,0,0,0 :REM*7
1370 DATA0,0,0,0,0,0,0,0 :REM*17
1380 DATA0,0,0,0,0,0,0,0 :REM*27
1390 DATA0,0,0,0,0,0,0,0 :REM*37
1400 DATA0,0,0,0,0,0,0,0 :REM*47
1410 DATA0,0,0,0,0,0,0,0 :REM*57
1420 DATA0,0,0,0,0,0,0,0 :REM*67
1430 DATA0,0,0,0,0,0,0,0 :REM*77
1440 DATA0,0,0,0,0,0,0,0 :REM*87
1450 DATA0,0,0,0,0,0,0,0 :REM*97
1460 DATA0,0,0,0,0,0,0,0 :REM*107
1470 DATA0,0,0,0,0,0,0,0 :REM*117
1480 DATA0,0,0,0,0,0,0,0 :REM*127
1490 DATA0,0,0,0,0,0,0,0 :REM*137
1500 DATA0,0,0,0,0,0,0,0 :REM*147
1510 DATA0,0,0,0,0,0,0,0 :REM*157
1520 DATA0,0,0,0,0,0,0,0 :REM*167
1530 DATA0,0,0,0,0,0,0,0 :REM*177
1540 DATA0,0,0,0,0,0,0,0 :REM*188
1550 DATA0,0,0,0,0,0,0,0 :REM*198
1560 DATA0,0,0,0,0,0,0,0 :REM*208
1570 DATA0,0,0,0,0,0,0,0 :REM*218
1580 DATA0,0,0,0,0,0,0,0 :REM*228
1590 DATA0,0,0,0,0,0,0,0 :REM*238
1600 DATA0,0,0,0,0,0,0,0 :REM*248
1610 DATA0,0,0,0,0,0,0,0 :REM*2
1620 DATA0,0,0,0,0,0,0,0 :REM*12
1630 DATA0,0,0,0,0,0,0,0 :REM*22
1640 DATA0,0,0,0,0,0,0,0 :REM*32
1650 DATA0,0,0,0,0,0,0,0 :REM*42
1660 DATA0,0,0,0,0,0,0,0 :REM*52
1670 DATA173,0,3,201,228,240,31,169 :REM*174
1680 DATA63,141,231,49,169,77,141,232 :REM*56
1690 DATA49,169,228,141,0,3,169,3 :REM*90
1700 DATA141,1,3,162,7,189,39,33 :REM*204
1710 DATA157,228,3,202,16,247,96,169 :REM*136
1720 DATA1,141,0,255,76,47,33,142 :REM*216
1730 DATA229,49,224,11,208,16,32,134 :REM*158
1740 DATA3,205,233,49,208,8,104,104 :REM*34
1750 DATA76,241,33,174,229,49,173,0 :REM*148
1760 DATA255,41,241,141,0,255,108,231 :REM*30
1770 DATA49,162,1,32,128,3,221,97 :REM*130
1780 DATA33,208,232,202,16,245,76,33 :REM*94
1790 DATA38,82,65,32,128,3,201,84 :REM*206
1800 DATA208,217,76,249,37,162,1,32 :REM*31
1810 DATA128,3,221,125,33,208,204,202 :REM*251
1820 DATA16,245,76,13,43,84,145,162 :REM*149
1830 DATA2,32,128,3,221,143,33,208 :REM*241
1840 DATA186,202,16,245,76,159,34,84 :REM*89
1850 DATA88,69,32,128,3,201,244,208 :REM*239
1860 DATA170,76,185,50,162,4,32,128 :REM*163
1870 DATA3,221,172,33,208,157,202,16 :REM*55
1880 DATA245,76,185,50,76,79,82 :REM*159
1890 DATA67,162,4,32,128,3,221,193 :REM*137
1900 DATA33,208,136,202,16,245,76,203 :REM*111
1910 DATA47,83,85,82,76,65,32,128 :REM*99
1920 DATA3,162,3,221,214,33,240,10 :REM*21
1930 DATA202,16,248,76,67,33,6,7 :REM*61
1940 DATA31,33,189,233,33,141,232,33 :REM*1
1950 DATA189,237,33,141,231,33,76,0 :REM*223
1960 DATA0,50,50,44,45,185,185,88 :REM*71
1970 DATA106,32,128,3,201,254,240,206 :REM*167
1980 DATA201,235,208,3,76,99,33,162 :REM*161
1990 DATA8,221,54,34,240,57,202,16 :REM*253
2000 DATA248,201,66,208,3,76,81,33 :REM*123
2010 DATA201,70,208,3,76,109,33,201 :REM*171
2020 DATA72,208,3,76,146,33,201,83 :REM*233
2030 DATA208,3,76,156,33,201,84,208 :REM*1
2040 DATA3,76,127,33,201,87,208,3 :REM*133
2050 DATA76,177,33,76,67,33,229,224 :REM*100
2060 DATA225,156,244,222,147,148,223,189 :REM*82
2070 DATA78,34,141,77,34,189,87,34 :REM*242
2080 DATA141,76,34,76,0,0,35,39 :REM*126
2090 DATA37,34,43,34,46,46,50,63 :REM*146
2100 DATA207,80,218,155,96,96,24,185 :REM*104
2110 DATA32,128,3,32,9,136,138,41 :REM*18
2120 DATA15,141,235,49,32,9,136,138 :REM*196
2130 DATA10,10,10,10,13,235,49,141 :REM*168
2140 DATA235,49,168,173,0,255,41,254 :REM*140
2150 DATA141,0,255,169,25,141,0,214 :REM*148
2160 DATA173,1,214,9,128,41,191,162 :REM*172
2170 DATA25,142,0,214,141,1,214,232 :REM*12
2180 DATA142,0,214,140,1,214,96,32 :REM*212
2190 DATA128,3,162,0,32,224,34,173 :REM*254
2200 DATA235,49,41,240,32,122,34,162 :REM*146
2210 DATA25,142,0,214,173,1,214,41 :REM*22
2220 DATA127,9,64,142,0,214,141,1 :REM*92
2230 DATA214,173,0,255,41,207,141,0 :REM*232
2240 DATA255,32,39,192,169,147,32,210 :REM*76
2250 DATA255,173,0,255,9,48,141,0 :REM*122
2260 DATA255,96,32,128,3,32,9,136 :REM*244
2270 DATA142,221,49,173,0,255,41,254 :REM*164
2280 DATA141,0,255,169,0,160,0,162 :REM*130
2290 DATA18,32,145,48,169,255,141,237 :REM*32
2300 DATA49,162,0,32,6,35,232,224 :REM*222
2310 DATA64,208,248,76,46,35,173,221 :REM*161
2320 DATA49,32,172,48,169,24,141,0 :REM*43
2330 DATA214,173,1,214,41,127,72,169 :REM*161
2340 DATA24,141,0,214,104,141,1,214 :REM*247
2350 DATA169,30,141,0,214,173,237,49 :REM*143
2360 DATA141,1,214,76,185,48,160,24 :REM*13
2370 DATA140,0,214,173,1,214,9,128 :REM*193
2380 DATA140,0,214,141,1,214,96,32 :REM*221
2390 DATA128,3,32,135,49,32,9,136 :REM*209
2400 DATA142,7,50,173,0,255,41,254 :REM*71
2410 DATA141,0,255,32,113,35,32,237 :REM*19
2420 DATA36,173,210,49,237,204,49,173 :REM*237
2430 DATA211,49,237,205,49,144,1,96 :REM*189
2440 DATA32,99,36,32,237,36,76,89 :REM*121
2450 DATA35,56,173,200,49,237,196,49 :REM*73
2460 DATA141,204,49,173,201,49,237,197 :REM*187
2470 DATA49,141,205,49,56,173,202,49 :REM*11
2480 DATA237,198,49,141,206,49,173,203 :REM*173
2490 DATA49,237,199,49,141,207,49,162 :REM*109
2500 DATA0,142,212,49,142,218,49,142 :REM*155
2510 DATA213,49,142,215,49,142,217,49 :REM*185
2520 DATA142,219,49,232,142,214,49,142 :REM*83
2530 DATA216,49,173,205,49,16,27,24 :REM*211

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2540 DATA169,255,141,216,49,141,217,49
      :REM*153
2550 DATA77,204,49,105,1,141,204,49:REM*239
2560 DATA173,205,49,73,255,105,0,141
      :REM*220
2570 DATA205,49,173,207,49,16,27,24:REM*206
2580 DATA169,255,141,214,49,141,215,49
      :REM*158
2590 DATA77,206,49,105,1,141,206,49 :REM*30
2600 DATA173,207,49,73,255,105,0,141 :REM*8
2610 DATA207,49,56,173,204,49,237,206
      :REM*128
2620 DATA49,173,205,49,237,207,49,176
      :REM*122
2630 DATA74,173,205,49,141,211,49,173
      :REM*152
2640 DATA204,49,141,210,49,173,206,49
      :REM*106
2650 DATA141,204,49,173,207,49,141,205
      :REM*136
2660 DATA49,173,210,49,141,206,49,173
      :REM*234
2670 DATA211,49,141,207,49,173,216,49
      :REM*196
2680 DATA141,212,49,173,217,49,141,213
      :REM*236
2690 DATA49,162,0,142,216,49,142,217:REM*88
2700 DATA49,173,214,49,141,218,49,173
      :REM*146
2710 DATA215,49,141,219,49,142,214,49
      :REM*158
2720 DATA142,215,49,173,205,49,74,141
      :REM*238
2730 DATA209,49,173,204,49,106,141,208
      :REM*98
2740 DATA49,162,1,142,210,49,202,142
      :REM*124
2750 DATA211,49,96,24,173,196,49,109
      :REM*214
2760 DATA216,49,141,196,49,173,197,49
      :REM*38
2770 DATA109,217,49,141,197,49,24,173
      :REM*124
2780 DATA198,49,109,218,49,141,198,49
      :REM*216
2790 DATA173,199,49,109,219,49,141,199
      :REM*228
2800 DATA49,24,173,208,49,109,206,49:REM*46
2810 DATA141,208,49,173,209,49,109,207
      :REM*130
2820 DATA49,141,209,49,238,210,49,208
      :REM*115
2830 DATA3,238,211,49,56,173,204,49:REM*149
2840 DATA237,208,49,173,205,49,237,209
      :REM*23
2850 DATA49,176,57,56,173,208,49,237:REM*37
2860 DATA204,49,141,208,49,173,209,49
      :REM*231
2870 DATA237,205,49,141,209,49,24,173
      :REM*173
2880 DATA196,49,109,212,49,141,196,49
      :REM*229
2890 DATA173,197,49,109,213,49,141,197
      :REM*229
2900 DATA49,24,173,198,49,109,214,49
      :REM*175
2910 DATA141,198,49,173,199,49,109,215
      :REM*241
2920 DATA49,141,199,49,96,173,196,49
      :REM*125
2930 DATA133,252,173,198,49,133,254,173
      :REM*7
2940 DATA197,49,133,253,32,2,37,76 :REM*69
2950 DATA25,37,32,191,48,165,252,41:REM*219
2960 DATA7,170,189,72,37,141,223,49:REM*157
2970 DATA162,18,165,251,164,250,76,145
      :REM*39
2980 DATA48,173,7,50,240,2,169,128 :REM*155
2990 DATA141,224,49,32,2,37,32,161 :REM*119
3000 DATA48,141,221,49,141,222,49,32
      :REM*245
3010 DATA16,37,173,223,49,44,224,49 :REM*51
3020 DATA48,8,73,255,45,221,49,76 :REM*83
3030 DATA69,37,13,221,49,76,172,48 :REM*169
3040 DATA128,64,32,16,8,4,2,1 :REM*5
3050 DATA32,128,3,32,135,49,32,9 :REM*23
3060 DATA136,142,7,50,173,196,49,141
      :REM*185
3070 DATA243,49,173,197,49,141,244,49
      :REM*123
3080 DATA173,198,49,141,245,49,173,199
      :REM*244
3090 DATA49,141,246,49,173,200,49,141
      :REM*198
3100 DATA247,49,173,201,49,141,248,49
      :REM*240
3110 DATA173,202,49,141,249,49,173,203
      :REM*154
3120 DATA49,141,250,49,173,247,49,141
      :REM*18
3130 DATA200,49,173,248,49,141,201,49
      :REM*174
3140 DATA173,245,49,141,202,49,173,246
      :REM*182
3150 DATA49,141,203,49,32,75,35,173:REM*126
3160 DATA247,49,141,200,49,173,248,49
      :REM*180
3170 DATA141,201,49,173,249,49,141,202
      :REM*76
3180 DATA49,173,250,49,141,203,49,32:REM*70
3190 DATA75,35,173,243,49,141,200,49:REM*52
3200 DATA173,244,49,141,201,49,173,249
      :REM*96
3210 DATA49,141,202,49,173,250,49,141
      :REM*32
3220 DATA203,49,32,75,35,173,243,49 :REM*36
3230 DATA141,200,49,173,244,49,141,201
      :REM*180
3240 DATA49,173,245,49,141,202,49,173
      :REM*150
3250 DATA246,49,141,203,49,32,75,35:REM*244
3260 DATA96,32,128,3,32,161,49,32 :REM*244
3270 DATA9,136,142,7,50,173,200,49 :REM*62
3280 DATA141,196,49,173,201,49,141,197
      :REM*80
3290 DATA49,173,202,49,141,198,49,173
      :REM*156
3300 DATA203,49,141,199,49,32,75,35:REM*208
3310 DATA96,32,128,3,32,161,49,173 :REM*208
3320 DATA200,49,141,196,49,173,201,49
      :REM*54
3330 DATA141,197,49,173,202,49,141,198
      :REM*21
3340 DATA49,32,9,136,142,200,49,138:REM*189
3350 DATA74,141,251,49,32,9,136,142 :REM*47
3360 DATA202,49,32,9,136,224,199,176:REM*11
3370 DATA56,240,54,142,252,49,32,9 :REM*65
3380 DATA136,142,7,50,142,8,50,173 :REM*59
3390 DATA196,49,141,253,49,173,197,49
      :REM*83
3400 DATA141,254,49,141,0,50,141,2 :REM*111
3410 DATA50,141,4,50,173,198,49,141:REM*103
3420 DATA249,49,56,237,202,49,141,5:REM*197
3430 DATA50,56,237,252,49,201,199,144
      :REM*157
3440 DATA1,96,173,196,49,24,109,251:REM*127
3450 DATA49,141,255,49,144,6,238,0 :REM*187
3460 DATA50,238,2,50,24,173,255,49 :REM*69
3470 DATA109,200,49,141,1,50,144,3 :REM*123
3480 DATA238,2,50,173,2,50,201,2 :REM*87

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3490 DATA144,11,201,3,176,211,173,1:REM*109
3500 DATA50,201,127,176,204,24,173,253
:REM*157
3510 DATA49,109,200,49,141,3,50,144:REM*233
3520 DATA3,238,4,50,169,1,141,6 :REM*47
3530 DATA50,173,6,50,208,6,32,7 :REM*75
3540 DATA39,24,144,3,32,79,39,206 :REM*61
3550 DATA249,49,206,5,50,206,252,49:REM*143
3560 DATA173,252,49,205,202,49,176,5
:REM*231
3570 DATA169,0,141,6,50,173,252,49 :REM*103
3580 DATA201,199,144,213,169,0,141,7:REM*95
3590 DATA50,141,8,50,76,79,39,173 :REM*182
3600 DATA253,49,141,196,49,174,254,49
:REM*172
3610 DATA142,197,49,172,249,49,140,198
:REM*212
3620 DATA49,173,255,49,141,200,49,174
:REM*92
3630 DATA0,50,142,201,49,172,5,50 :REM*60
3640 DATA140,202,49,32,189,39,173,255
:REM*222
3650 DATA49,141,196,49,174,0,50,142:REM*184
3660 DATA197,49,172,5,50,140,198,49:REM*254
3670 DATA173,1,50,141,2,00,49,174,2 :REM*212
3680 DATA50,142,201,49,32,189,39,173:REM*36
3690 DATA1,50,141,196,49,174,2,50 :REM*144
3700 DATA142,197,49,172,5,50,192,200
:REM*236
3710 DATA144,2,160,0,140,198,49,173 :REM*60
3720 DATA3,50,141,200,49,174,4,50 :REM*42
3730 DATA142,201,49,172,249,49,140,202
:REM*148
3740 DATA49,32,189,39,173,3,50,141 :REM*244
3750 DATA196,49,174,4,50,142,197,49 :REM*86
3760 DATA172,249,49,140,198,49,173,253
:REM*108
3770 DATA49,141,200,49,174,254,49,142
:REM*124
3780 DATA201,49,32,189,39,169,0,141 :REM*92
3790 DATA7,50,173,3,50,141,196,49 :REM*206
3800 DATA141,200,49,173,4,50,141,197
:REM*248
3810 DATA49,141,201,49,173,249,49,141
:REM*174
3820 DATA198,49,141,202,49,169,0,141
:REM*240
3830 DATA199,49,141,203,49,32,75,35:REM*228
3840 DATA173,8,50,141,7,50,96,32 :REM*105
3850 DATA128,3,162,0,142,43,50,232 :REM*223
3860 DATA142,44,50,32,15,136,165,22:REM*145
3870 DATA141,27,50,165,23,141,28,50 :REM*5
3880 DATA201,208,144,9,201,224,176,5
:REM*127
3890 DATA169,14,141,43,50,32,15,136 :REM*99
3900 DATA165,22,141,29,50,165,23,141
:REM*247
3910 DATA30,50,32,9,136,142,31,50 :REM*1
3920 DATA32,9,136,142,32,50,32,9 :REM*35
3930 DATA136,142,33,50,224,17,144,3:REM*103
3940 DATA76,67,33,32,92,121,32,200 :REM*99
3950 DATA42,141,34,50,165,36,133,158:REM*97
3960 DATA165,37,133,159,169,0,141,237
:REM*185
3970 DATA49,173,0,255,41,254,141,0 :REM*61
3980 DATA255,173,237,49,205,34,50,208
:REM*133
3990 DATA1,96,168,174,44,50,169,158:REM*53
4000 DATA32,116,255,238,237,49,32,201
:REM*173
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:REM*221
4030 DATA205,34,50,208,4,169,32,208 :REM*39
4040 DATA19,168,174,44,50,169,158,32:REM*63
4050 DATA116,255,238,237,49,32,201,41
:REM*31
4060 DATA224,0,208,225,141,36,50,32 :REM*81
4070 DATA127,42,174,33,50,208,51,169:REM*89
4080 DATA255,141,38,50,173,35,50,32 :REM*33
4090 DATA106,42,160,7,32,254,42,10 :REM*169
4100 DATA10,10,10,153,49,50,136,16 :REM*90
4110 DATA243,173,36,50,32,106,42,160
:REM*250
4120 DATA7,32,254,42,41,15,25,49 :REM*66
4130 DATA50,153,49,50,136,16,242,76 :REM*66
4140 DATA78,41,173,36,50,32,106,42 :REM*98
4150 DATA160,7,32,254,42,153,49,50 :REM*52
4160 DATA136,16,247,169,0,170,160,127
:REM*152
4170 DATA153,57,50,136,16,250,160,7:REM*240
4180 DATA173,33,50,141,38,50,185,188:REM*38
4190 DATA49,61,49,50,240,2,169,255 :REM*174
4200 DATA141,47,50,173,47,50,10,62 :REM*152
4210 DATA57,50,62,65,50,62,73,50 :REM*30
4220 DATA62,81,50,62,89,50,62,97 :REM*224
4230 DATA50,62,105,50,62,113,50,62 :REM*232
4240 DATA121,50,62,129,50,62,137,50 :REM*48
4250 DATA62,145,50,62,153,50,62,161:REM*232
4260 DATA50,62,169,50,62,177,50,24 :REM*30
4270 DATA206,38,50,208,198,136,16,176
:REM*56
4280 DATA232,224,8,208,169,169,0,141
:REM*182
4290 DATA38,50,172,33,50,136,140,39:REM*208
4300 DATA50,162,0,172,39,50,185,184 :REM*24
4310 DATA42,168,185,57,50,157,49,50:REM*220
4320 DATA200,232,224,8,144,244,160,0:REM*76
4330 DATA173,32,50,141,37,50,185,49:REM*214
4340 DATA50,77,40,50,141,45,50,174 :REM*152
4350 DATA41,50,240,9,32,236,42,32 :REM*136
4360 DATA161,48,77,45,50,32,236,42 :REM*211
4370 DATA32,172,48,24,165,250,105,80
:REM*183
4380 DATA133,250,144,2,230,251,173,45
:REM*171
4390 DATA50,206,37,50,208,214,200,192
:REM*121
4400 DATA8,208,197,174,42,50,240,20 :REM*85
4410 DATA56,165,250,233,160,133,250,176
:REM*29
4420 DATA2,198,251,32,236,42,173,42 :REM*19
4430 DATA50,32,172,48,24,173,29,50 :REM*171
4440 DATA105,8,141,29,50,144,3,238 :REM*133
4450 DATA30,50,32,127,42,206,39,50 :REM*55
4460 DATA238,38,50,173,38,50,205,33:REM*161
4470 DATA50,240,3,76,57,41,76,57 :REM*223
4480 DATA40,162,0,201,32,144,25,201 :REM*25
4490 DATA64,176,1,96,201,128,176,4 :REM*211
4500 DATA56,233,64,96,201,160,144,8 :REM*5
4510 DATA201,192,144,244,56,233,128,96
:REM*65
4520 DATA170,169,0,224,21,208,6,169:REM*147
4530 DATA255,141,42,50,96,224,14,208:REM*71
4540 DATA4,141,42,50,96,224,5,208 :REM*83
4550 DATA4,141,41,50,96,224,24,208 :REM*59
4560 DATA4,142,41,50,96,224,18,208 :REM*137
4570 DATA6,169,255,141,40,50,96,224 :REM*61
4580 DATA146,208,4,141,40,50,96,224 :REM*33
4590 DATA17,208,12,24,173,31,50,105 :REM*55
4600 DATA8,141,31,50,24,144,55,224 :REM*61
4610 DATA145,208,12,56,173,31,50,233
:REM*170
4620 DATA8,141,31,50,24,144,39,224 :REM*210
4630 DATA157,208,17,56,173,29,50,233:REM*64
4640 DATA8,141,29,50,176,24,206,30 :REM*148
4650 DATA50,24,144,18,224,29,208,14:REM*136
4660 DATA24,173,29,50,105,8,141,29 :REM*148
4670 DATA50,144,3,238,30,50,32,127 :REM*206
4680 DATA42,96,160,0,162,8,32,28 :REM*234

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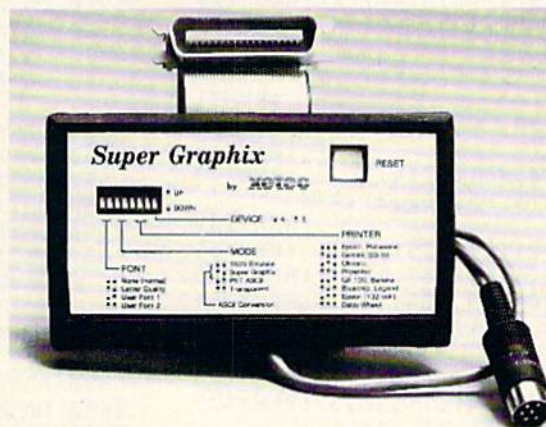
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4690 DATA49,138,24,109,27,50,133,174:REM*56
4700 DATA152,109,28,50,133,175,96,173
:REM*122
4710 DATA29,50,133,252,173,30,50,133
:REM*180
4720 DATA253,173,31,50,133,254,32,191
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4730 DATA48,173,26,50,201,79,144,31:REM*176
4740 DATA162,0,172,32,50,24,185,184 :REM*36
4750 DATA42,109,31,50,141,31,50,201:REM*118
4760 DATA198,144,3,142,31,50,142,29:REM*156
4770 DATA50,142,30,50,76,127,42,96 :REM*236
4780 DATA0,8,16,24,32,40,48,56 :REM*216
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4810 DATA133,5,169,15,160,135,162,123
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4830 DATA255,165,5,72,165,6,166,7 :REM*2
4840 DATA164,8,40,96,72,140,46,50 :REM*86
4850 DATA162,18,165,251,164,250,32,145
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:REM*177
4880 DATA255,174,48,50,96,32,128,3 :REM*165
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4910 DATA134,166,140,17,50,132,167,200
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4950 DATA129,43,232,169,0,76,80,43 :REM*123
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:REM*230
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5230 DATA15,50,172,14,50,32,145,48 :REM*114
5240 DATA162,30,173,9,50,142,0,214 :REM*12
5250 DATA141,1,214,32,185,48,24,173:REM*132
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5270 DATA3,238,13,50,24,173,14,50 :REM*254
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5320 DATA22,105,0,141,22,50,166,48 :REM*56
5330 DATA202,202,202,202,228,23,144,51
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5340 DATA202,228,23,176,6,165,22,201
:REM*142
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:REM*234
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5400 DATA50,208,3,76,67,33,173,202 :REM*91
5410 DATA49,141,11,50,168,240,244,24
:REM*235
5420 DATA173,20,50,109,9,50,141,20 :REM*3
5430 DATA50,144,3,238,21,50,136,208 :REM*21
5440 DATA238,24,173,23,50,109,21,50:REM*105
5450 DATA197,48,176,215,173,0,255,41
:REM*215
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:REM*185
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5540 DATA144,2,230,251,162,18,173,15
:REM*153
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5580 DATA208,237,173,10,50,141,9,50:REM*117
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5610 DATA50,208,201,56,165,251,233,4
:REM*255
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:REM*200
5740 DATA32,16,46,141,11,50,136,32 :REM*80
5750 DATA16,46,141,9,50,173,0,255 :REM*2
5760 DATA41,254,141,0,255,24,165,250:REM*16

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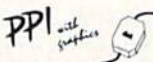
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```

5770 DATA105,2,133,250,144,2,230,251 :REM*232
5780 DATA162,18,173,15,50,172,14,50:REM*138
5790 DATA32,145,48,160,0,32,16,46 :REM*110
5800 DATA32,172,48,230,250,208,2,230:REM*34
5810 DATA251,206,9,50,208,237,173,10 :REM*210
5820 DATA50,141,9,50,24,173,14,50 :REM*74
5830 DATA105,80,141,14,50,144,3,238 :REM*28
5840 DATA15,50,206,11,50,208,201,96:REM*132
5850 DATA169,250,162,1,32,116,255,96:REM*30
5860 DATA32,128,3,32,9,136,142,48 :REM*34
5870 DATA50,160,0,140,241,49,140,242:REM*68
5880 DATA49,200,32,176,47,32,201,255 :REM*116
5890 DATA173,0,255,41,254,141,0,255:REM*127
5900 DATA162,18,169,0,168,32,145,48:REM*189
5910 DATA173,48,50,240,3,76,146,46 :REM*53
5920 DATA32,161,48,32,210,255,238,241 :REM*139
5930 DATA49,208,245,238,242,49,173,242 :REM*43
5940 DATA49,201,64,144,235,76,123,47:REM*13
5950 DATA32,128,3,32,9,136,142,48 :REM*125
5960 DATA50,160,0,32,176,47,32,198 :REM*219
5970 DATA255,173,0,255,41,254,141,0:REM*211
5980 DATA255,162,18,169,0,168,32,145 :REM*101
5990 DATA48,173,48,50,240,3,76,47 :REM*151
6000 DATA47,32,113,47,32,172,48,24 :REM*219
6010 DATA144,247,160,0,140,236,49,140 :REM*211
6020 DATA238,49,32,161,48,141,239,49 :REM*183
6030 DATA169,1,141,237,49,32,161,48 :REM*43
6040 DATA141,221,49,238,241,49,208,3 :REM*117
6050 DATA238,242,49,173,242,49,201,64 :REM*97
6060 DATA144,3,76,123,47,173,221,49 :REM*49
6070 DATA205,239,49,208,8,238,237,49 :REM*181
6080 DATA208,219,206,237,49,173,237,49 :REM*7
6090 DATA201,5,144,40,173,240,49,208:REM*73
6100 DATA14,169,1,141,240,49,32,131 :REM*51
6110 DATA47,141,236,49,32,210,255,173 :REM*69
6120 DATA237,49,32,210,255,173,239,49 :REM*85
6130 DATA32,210,255,173,221,49,141,239 :REM*189
6140 DATA49,76,160,46,173,240,49,240 :REM*103
6150 DATA5,169,0,141,240,49,173,239:REM*168
6160 DATA49,174,237,49,172,238,49,173 :REM*248
6170 DATA239,49,153,0,32,238,238,49:REM*246
6180 DATA208,9,206,238,49,32,131,47:REM*214
6190 DATA76,12,47,202,208,230,173,221:REM*0
6200 DATA49,141,239,49,76,160,46,169 :REM*102
6210 DATA1,141,240,49,32,113,47,141:REM*138
6220 DATA237,49,240,23,172,240,49,240 :REM*170
6230 DATA34,32,113,47,141,221,49,172 :REM*4
6240 DATA237,49,32,172,48,136,208,250 :REM*182
6250 DATA76,52,47,173,240,49,240,215:REM*40
6260 DATA169,0,141,240,49,32,113,47 :REM*64
6270 DATA141,237,49,32,113,47,32,172:REM*86
6280 DATA48,206,237,49,208,245,76,52 :REM*194
6290 DATA47,164,144,208,4,32,207,255:REM*88
6300 DATA96,104,104,169,2,32,195,255 :REM*152
6310 DATA76,204,255,142,48,50,173,236 :REM*222
6320 DATA49,208,8,160,1,140,236,49 :REM*204
6330 DATA32,210,255,173,238,49,32,210 :REM*184
6340 DATA255,160,0,185,0,32,32,210 :REM*174
6350 DATA255,200,204,238,49,208,244,169 :REM*66
6360 DATA0,141,238,49,174,48,50,96 :REM*186
6370 DATA32,204,255,169,2,162,8,32 :REM*86
6380 DATA186,255,32,54,146,162,1,32:REM*164
6390 DATA104,255,32,192,255,162,2,142 :REM*234
6400 DATA240,49,96,32,128,3,160,5 :REM*113
6410 DATA162,0,142,44,50,169,14,141:REM*235
6420 DATA43,50,169,0,141,27,50,169 :REM*1
6430 DATA208,141,28,50,189,47,48,141 :REM*123
6440 DATA29,50,232,189,47,48,141,30:REM*135
6450 DATA50,232,189,47,48,141,31,50 :REM*77
6460 DATA232,189,47,48,141,32,50,232:REM*55
6470 DATA189,47,48,141,33,50,232,189:REM*55
6480 DATA47,48,141,34,50,232,189,47:REM*215
6490 DATA48,133,158,232,189,47,48,133 :REM*45
6500 DATA159,142,45,48,140,46,48,32 :REM*1
6510 DATA44,40,174,45,48,172,46,48 :REM*189
6520 DATA232,136,208,184,96,0,0,80 :REM*241
6530 DATA0,0,8,10,6,87,48,128 :REM*157
6540 DATA0,70,4,6,8,93,48,0 :REM*145
6550 DATA1,118,1,2,8,101,48,64 :REM*107
6560 DATA0,140,5,4,16,109,48,240 :REM*169
6570 DATA0,185,1,1,20,125,48,87 :REM*77
6580 DATA65,76,82,85,83,83,79,70 :REM*19
6590 DATA84,87,65,82,69,80,82,69 :REM*227
6600 DATA83,69,78,84,83,67,49,50 :REM*3
6610 DATA56,32,85,76,84,82,65,32 :REM*41
6620 DATA72,73,82,69,83,40,67,41 :REM*41
6630 DATA49,57,56,53,32,82,85,78 :REM*181
6640 DATA32,77,65,71,65,90,73,78 :REM*123
6650 DATA69,142,0,214,141,1,214,232:REM*253
6660 DATA142,0,214,140,1,214,76,185:REM*226
6670 DATA48,169,31,141,0,214,173,1 :REM*164
6680 DATA214,76,185,48,72,169,31,141 :REM*104
6690 DATA0,214,104,141,1,214,76,185 :REM*50
6700 DATA48,44,0,214,16,251,96,32 :REM*146
6710 DATA255,48,169,0,133,251,165,254 :REM*240
6720 DATA10,38,251,10,38,251,10,38 :REM*118
6730 DATA251,10,38,251,141,227,49,164:REM*0
6740 DATA251,140,228,49,10,38,251,10:REM*84
6750 DATA38,251,24,109,227,49,133,250 :REM*46
6760 DATA173,228,49,101,251,133,251,24 :REM*70
6770 DATA165,250,109,225,49,133,250,165 :REM*138
6780 DATA251,109,226,49,133,251,96,165 :REM*72
6790 DATA252,141,225,49,165,253,74,110 :REM*164
6800 DATA225,49,74,110,225,49,74,110:REM*56
6810 DATA225,49,141,226,49,173,225,49 :REM*140
6820 DATA141,26,50,96,141,131,49,142:REM*94
6830 DATA133,49,140,132,49,162,0,142 :REM*140
6840 DATA129,49,142,130,49,41,1,240 :REM*40
6850 DATA9,140,130,49,174,133,49,142 :REM*226
6860 DATA129,49,169,128,141,134,49,45 :REM*170
6870 DATA131,49,240,42,174,133,49,172 :REM*112

```





# RAVE REVIEWS

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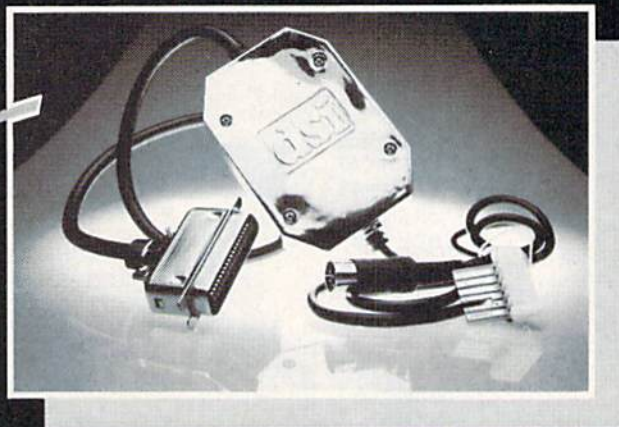
"... 1525 emulation is so near perfect ... you'll be hard pressed to find software designed to work with the Commodore ... that will not work ..."

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Panasonic KXP  
Inforunner  
Star Delta  
Blue Chip  
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Mannesmann Tally MT160  
Olympia Compact NP  
Brother CE-50\*  
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Brother DM-40  
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The PPI works with all Centronics compatible parallel printers that utilize standard ASCII characters and command sets in the transparent mode.



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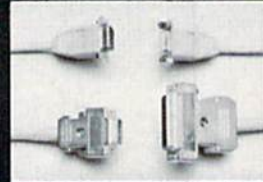
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The MESSENGER is an auto answer/dial modem with complete telecom software for use with Commodore C64 and 128 PC.



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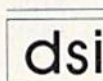
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Listing 1 continued.

```

6880 DATA132,49,142,127,49,140,128,49
                                :REM*32
6890 DATA14,127,49,46,128,49,74,201:REM*184
6900 DATA1,208,245,24,173,127,49,109:REM*36
6910 DATA129,49,141,129,49,173,128,49
                                :REM*68
6920 DATA109,130,49,141,130,49,78,134
                                :REM*113
6930 DATA49,173,134,49,201,1,208,199
                                :REM*187
6940 DATA174,129,49,172,130,49,96,0 :REM*93
6950 DATA0,0,0,0,0,0,0,32          :REM*193
6960 DATA15,136,165,22,141,196,49,165
                                :REM*99
6970 DATA23,141,197,49,32,15,136,165
                                :REM*207
6980 DATA22,141,198,49,165,23,141,199
                                :REM*31
6990 DATA49,32,15,136,165,22,141,200
                                :REM*191
7000 DATA49,165,23,141,201,49,32,15:REM*207
7010 DATA136,165,22,141,202,49,165,23
                                :REM*177
7020 DATA141,203,49,96,1,2,4,8     :REM*91
7030 DATA16,32,64,128,0,0,0,0      :REM*129
7040 DATA0,0,0,0,0,0,0,0          :REM*77
7050 DATA0,0,0,0,0,0,0,0          :REM*87
7060 DATA0,0,0,0,0,0,0,0          :REM*97
7070 DATA0,0,0,0,0,0,0,0          :REM*107
7080 DATA0,64,0,0,0,0,0,0          :REM*157
7090 DATA0,0,0,0,0,0,0,0          :REM*127
7100 DATA0,0,0,0,0,0,0,0          :REM*137
7110 DATA0,0,0,0,0,0,0,0          :REM*147
7120 DATA0,0,0,0,0,0,0,0          :REM*157
7130 DATA0,0,0,0,0,0,0,0          :REM*167
7140 DATA0,0,0,0,0,0,0,0          :REM*177
7150 DATA0,0,0,0,0,0,0,0          :REM*187
7160 DATA0,0,0,0,0,0,0,0          :REM*197
7170 DATA0,0,0,0,0,0,0,0          :REM*208
7180 DATA0,0,0,0,0,0,0,0          :REM*218
7190 DATA0,0,0,0,0,0,0,0          :REM*228
7200 DATA0,0,0,0,0,0,0,0          :REM*238
7210 DATA0,0,0,0,0,0,0,0          :REM*248
7220 DATA0,0,0,0,0,0,0,0          :REM*2
7230 DATA0,0,0,0,0,0,0,0          :REM*12
7240 DATA0,0,0,0,0,0,0,0          :REM*22
7250 DATA0,0,0,0,0,0,0,0          :REM*32
7260 DATA0,0,0,0,0,0,0,0          :REM*42
7270 DATA0,0,0,0,0,0,0,0          :REM*52
7280 DATA0,0,0,0,0,0,0,0          :REM*62
7290 DATA0,0,0,0,0,0,0,0          :REM*72
7300 DATA0,0,0,0,0,0,0,0          :REM*82
7310 DATA0,0,0,0,0,0,0,0          :REM*92
7320 DATA0,0,0,0,0,0,0,0          :REM*102
7330 DATA0,0,0,0,0,0,0,0          :REM*112
7340 DATA0,32,128,3,96,0,0,0      :REM*164
7350 DATA0                          :REM*98

```

Listing 2. Ultra Hi-Res boot program.

```

10 GRAPHIC1,1:GRAPHIC5: REM SET UP 10K BUFF
   ER IN BANK 0 FOR ML          :REM*76
20 POKE47,0:POKE48,68:CLR: REM SET UP 16K B
   UFFER IN BANK 1 FOR @STASH   :REM*6
30 BLOAD"ULTRA HIRES",B0,P7168: REM LOAD MA
   CHINE LANGUAGE               :REM*104
40 SYS8448: REM ACTIVATE C128 ULTRA HIRES
                                :REM*100
50 PRINT"C128 ULTRA HIRES IS NOW ACTIVATED.
   "                             :REM*218

```

```

60 PRINT"YOU HAVE 16K SET ASIDE FOR GRAPHIC
   "                             :REM*170
70 PRINT"STORAGE. MORE CAN BE GOTTEN BY"
                                :REM*210
80 PRINT"INCREASING THE AMOUNT POKED INTO"
                                :REM*184
90 PRINT"REGISTER 48 IN LINE 20. EACH NUMBE
   R"                             :REM*146
100 PRINT"OVER 68 WILL INCREASE THE BUFFER"
                                :REM*116
110 PRINT"BY 256 BYTES. TO GAIN A 32K BUFFE
   R"                             :REM*16
120 PRINT"CHANGE THE 68 TO 132." :REM*174
130 PRINT"YOU CURRENTLY HAVE ";FRE(0);" BYT
   ES"                             :REM*62
140 PRINT"AVAILABLE IN BANK 0 FOR PROGRAMS"
                                :REM*144
150 PRINT"AND ";FRE(1);" IN BANK 1 FOR"
                                :REM*82
160 PRINT"VARIABLES."           :REM*132

```

Listing 3. Program Setup.

```

10 REM BASIC PROGRAM SETUP      :REM*74
20 FAST: REM ENABLE 2 MH MODE   :REM*224
30 POKE47,0:POKE48,68:CLR: REM SET UP 16K B
   UFFER FOR @STASH             :REM*148
40 @GRAPHIC,0,2: REM GOTO ULTRA HIRES SCREE
   N (640 X 200) AND SET COLORS BG,FG
                                :REM*78
50 @CLR,0: REM CLEAR ULTRA HIRES SCREEN
                                :REM*216
60 TRAP 10010:REM SET UP SYNTAX ERROR TRAP
   TO RETURN TO TEXT MODE AND LIST ERROR
                                :REM*174
70 :                             :REM*46
80 REM PROGRAM BEGINS HERE      :REM*78
90 :                             :REM*66
10000 REM GOTO TEXT MODE, PRINT STATUS AND
   END PROGRAM                  :REM*75
10010 @TEXT:HELP:END           :REM*217

```

Listing 4. Hi-res text demo program.

```

10 REM TEXT ON ULTRA HIRES SCREEN DEMO
                                :REM*88
20 FAST: REM ENABLE 2 MH MODE   :REM*224
30 POKE47,0:POKE48,68:CLR: REM SET UP 16K B
   UFFER FOR @STASH             :REM*148
40 @GRAPHIC,0,2: REM GOTO ULTRA HIRES SCREE
   N (640 X 200) AND SET COLORS BG,FG
                                :REM*78
50 @CLR,0: REM CLEAR ULTRA HIRES SCREEN
                                :REM*216
60 TRAP 10010:REM SET UP SYNTAX ERROR TRAP
   TO RETURN TO TEXT MODE AND LIST ERROR
                                :REM*174
70 :                             :REM*46
80 REM PROGRAM BEGINS HERE      :REM*78
90 :                             :REM*66
100 @CHAR,7168,0,0,1,0,"{SHFT T}HIS IS A DE
   MO OF 160 CHARACTERS PER LINE. {SHFT Y}
   OU WILL NOTICE THAT IT IS STILL POSSIBL
   E TO READ THEM ON THIS 1702 COMPOSITE M
   ONITOR."                     :REM*134

```







```

110 @CHAR,55296,0,12,1,1,"(SHFT T)HIS IS A
    DEMO OF 80 CHARACTERS PER LINE.{3 SPACE
    s}{SHFT Y}OU WILL NOTICE IT IS THE SAME
    AS{3 SPACEs}IN NORMAL 80 COLUMN TEXT M
    ODE." :REM*208
120 @CHAR,55296,0,32,1,2,"(SHFT T)HIS IS A
    40 COLUMN CHARACTER TEST.{6 SPACEs}{SHF
    T H}ERE WE HAVE THE SAME RESOLUTION AS
    IN{2 SPACEs}COMPOSITE MODE." :REM*222
130 @CHAR,55296,0,66,2,2,"(SHFT T)HIS IS DO
    UBLE HEIGHT, DOUBLE WIDTH.{4 SPACEs}{SH
    FT L}OOKS GOOD, RIGHT?" :REM*114
140 @CHAR,55296,0,102,5,5,"{2 SPACEs}{SHFT
    W}E COULD DO{3 SPACEs}THIS ALL NIGHT!"
    :REM*60
150 @CHAR,55296,0,180,2,5,"(SHFT B)UT LET'S
    GO ON." :REM*176
160 SLEEP 10 :REM*14
10000 REM GOTO TEXT MODE, PRINT STATUS AND
    END PROGRAM :REM*75
10010 @TEXT:HELP:END :REM*217

```

```

90 : :REM*66
100 SLEEP 2 :REM*220
110 @GRAPHIC,0,2:@CLR,0 :REM*230
120 @BOX,0,0,639,199,1 :REM*4
130 FOR X=0 TO 599 STEP 48 :REM*184
140 {5 SPACEs}HT=INT(RND(1)*179)+8 :REM*164
150 {5 SPACEs}@BAR,X,199,29,10,HT,1 :REM*132
160 {5 SPACEs}Z=199-HT+2 :REM*44
170 {5 SPACEs}IF HT<8 THEN 210 :REM*12
180 {5 SPACEs}C$=STR$(HT) :REM*124
190 {5 SPACEs}C$=RIGHT$(C$,LEN(C$)-1)
    :REM*42
200 {5 SPACEs}@CHAR,53248,X,Z,1,1,C$
    :REM*130
210 NEXT :REM*220
220 SLEEP 6 :REM*148
10000 REM GOTO TEXT MODE, PRINT STATUS AND E
    ND :REM*231
1010 @TEXT:HELP:END :REM*141

```

### Listing 5. Line-drawing demo program.

```

10 REM LINE DEMO WITH TEXT :REM*246
20 FAST: REM ENABLE 2 MH MODE :REM*224
30 POKE47,0:POKE48,68:CLR: REM SET UP 16K B
    UFFER FOR @STASH :REM*148
40 @GRAPHIC,0,2: REM GOTO ULTRA HIRES SCREE
    N (640 X 200) AND SET COLORS BG,FG
    :REM*78
50 @CLR,0: REM CLEAR ULTRA HIRES SCREEN
    :REM*216
60 TRAP 10010:REM SET UP SYNTAX ERROR TRAP
    TO RETURN TO TEXT MODE AND LIST ERROR
    :REM*174
70 : :REM*46
80 REM PROGRAM BEGINS HERE :REM*78
90 : :REM*66
100 FOR I=0 TO 639 STEP 10 :REM*6
110 @DRAW,320,100,I,199,1 :REM*178
120 NEXT :REM*130
130 FOR I=0 TO 639 STEP 10 :REM*36
140 @DRAW,320,100,I,0,1 :REM*248
150 NEXT :REM*160
160 @CHAR,53248,0,0,16,16,"(CTRL X)MOIRE(CT
    RL 2)" :REM*218
170 @CHAR,53248,8,130,8,11,"(CTRL X)PATTERN
    (CTRL 2)" :REM*132
180 SLEEP 6 :REM*108
10000 REM GOTO TEXT MODE, PRINT STATUS AND
    END PROGRAM :REM*75
10010 @TEXT:HELP:END :REM*217

```

### Listing 6. 3-D bar demo program.

```

10 REM 3D BAR DEMO :REM*102
20 FAST: REM ENABLE 2 MH MODE :REM*224
30 @GRAPHIC,0,2:@CLR,0: REM ENABLE ULTRA HI
    RES 640 X 200 AND CLEAR SCREEN :REM*66
40 TRAP 1010: REM SET UP SYNTAX ERROR TRAP
    TO RETURN TO TEXT MODE AND LIST ERROR
    :REM*210
50 @CHAR,53248,0,0,1,1,"(CTRL X)" :REM*226
60 @CHAR,53248,0,24,4,4," 3D BARS BY COMMAN
    D" :REM*60
70 : :REM*46
80 REM PROGRAM STARTS HERE :REM*76

```

### Listing 7. Circle demo with @Copy, @Stash and @Fetch.

```

10 REM CIRCLE DEMO WITH @COPY, @STASH AND @
    FETCH :REM*76
20 FAST: REM ENABLE 2 MH MODE :REM*224
30 POKE47,0:POKE48,68:CLR: REM SET UP 16K B
    UFFER FOR @STASH :REM*148
40 @GRAPHIC,0,2:@CLR,0: REM ENABLE ULTRA HI
    RES 640 X 200 AND CLEAR SCREEN :REM*76
50 TRAP 1010: REM SET UP SYNTAX ERROR TRAP
    TO RETURN TO TEXT MODE AND LIST ERROR
    :REM*220
60 CX=24:CY=8:SC=2.5:FL=0:R=10 :REM*128
70 REM DRAW CIRCLE CENTER X=CX, CENTER Y=CY
    , RADIUS=R, SC CORRECTS ASPECT RATIO
    :REM*160
80 FOR R=1 TO 9 STEP 3 :REM*16
90 {5 SPACEs}FOR T=0 TO 6.4 STEP .2 :REM*76
100 {10 SPACEs}X=R*COS(T):Y=R*SIN(T) :REM*42
110 {10 SPACEs}SX=SC*X+CX:SY=CY-Y :REM*228
120 {10 SPACEs}IF FL=1 THEN 140 :REM*108
130 {10 SPACEs}@DOT,SX,SY,1:FL=1:OX=SX:OY=S
    Y :REM*230
140 {10 SPACEs}@DRAW,OX,OY,SX,SY,1:OX=SX:OY
    =SY :REM*112
150 {4 SPACEs}NEXT :REM*160
160 {4 SPACEs}FL=0 :REM*78
170 NEXT :REM*180
180 SLEEP 3 :REM*60
190 REM DUPLICATE CIRCLE WITH @COPY COMMAND
    :REM*100
200 FOR YC=0 TO 183 STEP 20 :REM*102
210 {7 SPACEs}FOR XC=0 TO 590 STEP 50
    :REM*146
220 {14 SPACEs}@COPY,0,0,48,20,XC,YC
    :REM*198
230 {7 SPACEs}NEXT :REM*240
240 NEXT :REM*250
250 SLEEP 3 :REM*130
260 @STASH,0,0,0,48,16:REM SAVE ONE COPY OF
    CIRCLE :REM*189
270 REM ANIMATE WITH FETCH :REM*95
280 TY=1:TX=8:X=INT(RND(1)*583)+7:Y=INT(RND
    (1)*10)+20 :REM*83
290 FOR I=1 TO 1024 :REM*235
300 {6 SPACEs}@FETCH,0,X,Y :REM*247
310 {6 SPACEs}X=X+TX:IF X>590 THEN TX=TX*-1
    :REM*249
320 {6 SPACEs}IF X<8 THEN TX=TX*-1 :REM*231
330 {6 SPACEs}Y=Y+TY:IF Y>184 THEN TY=TY*-1
    :REM*89
340 {6 SPACEs}IF Y<1 THEN TY=TY*-1 :REM*43

```



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```

350 NEXT :REM*105
360 SLEEP 6 :REM*33
1000 REM EXIT TO TEXT MODE AND PRINT ERRORS
      (IF ANY) :REM*209
1010 @TEXT:HELP:END :REM*141

```

## Listing 8. 3-D animation demo using @Stash and @Fetch.

```

10 REM 3D CUBE DEMO USING @STASH AND @FETCH :REM*70
20 FAST: REM ENABLE 2 MH MODE :REM*224
30 POKE47,0:POKE48,132:CLR: REM SET UP 32K
  BUFFER FOR @STASH :REM*204
40 @GRAPHIC,0,2:@CLR,0: REM GOTO ULTRA HIRE
  S (640 X 200) AND CLEAR SCREEN :REM*46
50 TRAP 47:REM SET UP SYNTAX ERROR TRAP TO
  RETURN TO TEXT MODE AND LIST ERROR :REM*116
60 DIM X(19),Y(19),Z(19),A(65) :REM*238
70 REM READ CUBE DATA INTO ARRAYS :REM*232
80 @CHAR,53248,0,100,2,4,"{CTRL 2}FRAMES TO
  GO " :REM*200
90 FOR I=1 TO 18 :REM*246
100 {6 SPACES}READ X(I),Y(I),Z(I) :REM*80
110 NEXT :REM*120
120 RH=10:D=48:TH=-2*(PI):P=1.4:CX=80:CY=36
  :MC=0:SD=6.5 :REM*232
130 REM LOOP TO DRAW 3D CUBE AND @STASH EAC
  H FRAME INTO BUFFER :REM*130

```

```

140 FOR CT=1 TO 64 :REM*132
150 {6 SPACES}@CHAR,53248,424,100,2,4,STR$(
  65-CT)+"" :REM*200
160 {6 SPACES}S1=SIN(TH):S2=SIN(P):C1=COS(T
  H):C2=COS(P) :REM*136
170 {6 SPACES}X=X(1):Y=Y(1):Z=Z(1):GOSUB 49
  0:OX=SX:OY=SY :REM*230
180 {6 SPACES}FOR I=2 TO 5 :REM*58
190 {12 SPACES}X=X(I):Y=Y(I):Z=Z(I):GOSUB 4
  90:@DRAW,OX,OY,SX,SY,1:OX=SX:OY=SY :REM*2
  :REM*210
200 {6 SPACES}NEXT :REM*210
210 {6 SPACES}X=X(6):Y=Y(6):Z=Z(6):GOSUB 49
  0:OX=SX:OY=SY :REM*64
220 {6 SPACES}FOR I=7 TO 10 :REM*48
230 {12 SPACES}X=X(I):Y=Y(I):Z=Z(I):GOSUB 4
  90:@DRAW,OX,OY,SX,SY,1:OX=SX:OY=SY :REM*42
  :REM*250
240 {6 SPACES}NEXT :REM*250
250 {6 SPACES}FOR I=11 TO 17 STEP 2 :REM*18
260 {12 SPACES}X=X(I):Y=Y(I):Z=Z(I):GOSUB 4
  90:OX=SX:OY=SY :REM*203
270 {12 SPACES}X=X(I+1):Y=Y(I+1):Z=Z(I+1):G
  OSUB 490:@DRAW,OX,OY,SX,SY,1 :REM*97
280 {12 SPACES}OX=SX:OY=SY :REM*223
290 {6 SPACES}NEXT :REM*45
300 {6 SPACES}@STASH,MC,45,10,70,55 :REM*39
310 {6 SPACES}A(CT)=MC:MC=PEEK(250)+PEEK(25
  1)*256+1:REM NEXT AVAILABLE ADDRESS :REM*79
  :REM*223
320 {6 SPACES}D=D+SD:IF D>249 THEN D=249
  :REM*215
330 {6 SPACES}TH=TH+.2:@COPY,320,0,300,75,0
  ,0 :REM*95
340 NEXT :REM*237
350 @CLR,0: REM BEGINNING OF ANIMATION ROUT
  INE :REM*217
360 @CHAR,53248,80,0,2,3,"3D GRAPHICS ARE E
  ASY" :REM*25
370 @CHAR,53248,56,24,2,3,"USING C128 ULTRA
  HIRES" :REM*9
380 @CHAR,53248,56,146,2,3,"WITH @STASH AND
  @FETCH" :REM*197
390 @CHAR,53248,56,170,2,3,"IN YOUR BASIC P
  ROGRAMS" :REM*117
400 REM BLITTER ANIMATION USING THE @FETCH
  COMMAND :REM*71
410 FOR K=1 TO 64:@FETCH,A(K),250,65:NEXT
  :REM*73
420 FOR K=33 TO 64:@FETCH,A(K),250,65:NEXT
  :REM*225
430 FOR K=64 TO 33 STEP-1:@FETCH,A(K),250,6
  5:NEXT :REM*9
440 FOR K=64 TO 1 STEP-1:@FETCH,A(K),250,65
  :NEXT :REM*63
450 GET A$:IF A$<>"*" THEN 410 :REM*201
460 REM GOTO TEXT MODE, PRINT STATUS AND EN
  D :REM*111
470 @TEXT:HELP:END :REM*249
480 REM CONVERT X,Y,Z TO SCREEN X,Y:REM*249
490 XT=-X*S1+Y*C1:YT=-X*C1+C2-Y*S1+C2+Z*S2:
  ZT=-X*S2+C1-Y*S2+S1-Z*C2+RH :REM*121
500 SX=D*XT/ZT+CX:SY=CY-D*YT/ZT:RETURN
  :REM*45
510 REM DATA THAT DESCRIBES 3D CUBE:REM*237
520 DATA -.1,-.75,.5,1,-.75,.5,1,-.75,-.5,-1
  ,-.75,-.5,-1,-.75,.5 :REM*162
530 DATA -.1,.75,.5,-1,.75,-.5,1,.75,-.5,1,.
  75,.5,-1,.75,.5 :REM*84
540 DATA -.1,-.75,.5,-1,.75,-.5,-1,-.75,-.5,-
  1,.75,-.5,1,-.75,.5 :REM*162
550 DATA 1,.75,.5,1,-.75,-.5,1,.75,-.5
  :REM*240

```

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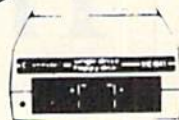
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# The Resource Center

By MARGARET MORABITO

Computer networking is quickly becoming a valuable tool—and even a necessity—for increased productivity in both small businesses and schools. Although networking is usually associated with big business and big budgets, it does not have to be expensive. In fact, networking is catching on in budget-conscious school systems as an inexpensive way to share peripherals, thereby putting more students on computers more often.

## Multi-User Computer Networking

The term multi-user networking has various meanings. In a broad sense, networking refers to the linking together of stand-alone personal computers or dumb terminals so they can communicate or share centralized information or peripherals.

Large companies and institutions often use dumb terminals. These are connected to a central mainframe computer that is usually housed somewhere on the premises, but that can be located in a separate building and be remotely controlled. The terminals can be connected by phone lines or directly by cables. All files and programs are held in the mainframe, ready to be called into individual terminals by the user.

In this setup, information can be shared, and communication between terminals is possible. When the mainframe is off, the terminals cannot function.

School systems that use computers for classroom instruction and administrative purposes often have personal computers (rather than dumb terminals) linked together in a network, primarily for sharing peripherals. The computers in this multi-user system are independent from a

---

*How do you solve the problem of giving students access time with a limited amount of equipment? Read how one small school system makes a little go a long way with networking. And the solution is not as expensive as you might think.*

---

central mainframe, and the user has more direct control of the applications that he or she runs. Eight or more personal computers can be linked to a single disk drive and a printer by direct connection to a multi-user switch housed near the group of computers.

## More Computers for the Money

For a school system with a limited budget, this second type of multi-user networking is the solution. It is cost-effective because, instead of having to invest in a disk drive for each computer, a school can buy just one drive to be shared by a group of eight computers. Furthermore, each group can also share a printer, thereby saving even more money. With the savings, a school can purchase more computers, multi-user switches or software.

Commodore personal computers are a good choice for school systems because they are so inexpensive—

currently, the C-64 is selling for close to \$100 and the C-128 for about \$275. These low prices allow a school to buy five to ten times as many Commodores as it could the more expensive computers, such as Apple IIs and Tandy computers.

Considering the availability of Commodore multi-user networking links (many of which cost only about \$150), the consistently low prices of peripherals and the large amount of software available, any school system would be wise to look into Commodore computers.

## One School System's Experience

The Winchester Elementary School, in Winchester, New Hampshire, has been using computers for five years, according to the principal, Curt Cardine, who is the moving force behind this program.

Winchester now has 32 C-64s and VIC-20s in the classrooms and one C-64 for administrative purposes. The classroom computers are linked together with multi-user switches. They use a combination of 1702 monitors, black-and-white television sets and monochrome monitors.

Two fourth-grade classes use seven VICs and one C-64. Two fifth-grade classes are sharing six VICs and two C-64s, and two sixth-grade classes share 16 C-64s. Only four 1541 disk drives and four Commodore printers are needed to provide peripheral access for these 32 workstations.

When asked why he chose Commodores, Cardine replied, "Money. We are one of the poorest school systems in the entire state." Commodore computers were the obvious choice. Cardine decided that it makes more sense to let your money pay



for a group of C-64s than to buy just one Apple II.

The problem in many school systems is that they are trying to teach computer applications to a class of 20 to 30 students with just one expensive computer. Even a poor school district, however, can get computers into its schools if it takes the time to select cost-effective equipment.

When asked if he would prefer Apple IIs if his budget were bigger, Cardine said emphatically, "No."

The Commodore's easy-to-use screen-editing features, cursor controls and keyboard graphics are some of the reasons for his preference.

"My time on an Apple is double my time on a C-64 because of the Apple's crude screen editing," he said. Also, he finds that the VIC-20s are well-suited to younger elementary grade students because of the large, colorful, easy-to-read letters.

Another benefit of using Commodores in the school system is that students' parents can often afford to buy a C-64 for use at home. This provides an excellent means for doing homework and follow-up study of school training.

The Winchester school has been able to give most students an opportunity to work on a VIC-20 or a C-64 on a weekly, and in some cases, daily, basis. Although Cardine currently provides only one class session of formal instruction per week for the fourth through sixth grades, students work on the computers at recess time, during free time and after school. Without networking, this just would not be possible; there would be too many students waiting around to use the computers.

#### The VIC Switch

Cardine started off five years ago with two VIC-20s (then priced at \$300 each), two monitors and two cassette recorders. He quickly saw that the school needed more computer stations. It was obvious, however, that it would be too expensive to buy the complete system for each station.

The following year, as a result of a federal grant (Title 4C), the school was able to buy a C-64, five more VIC-20s, one disk drive, a 1525 printer and, most important, a VIC Switch (\$150) by Handic Software.

The VIC Switch is typical of the multi-user links on the market today for Commodore computers. It is a small unit, with nine serial ports—eight input ports for connecting directly to eight computers and one

output port. The output port is for connecting a peripheral, such as a disk drive, that will be shared by all eight computers. A printer can then be daisy-chained from the disk drive and shared by the entire network of computers.

The VIC Switch has worked well over the years and has brought computer training to many students in this school. There has been one problem, however. When two computers would try to access a peripheral simultaneously, the VIC Switch would often lock up.

This condition can occur when one student forgets to close his or her channel to the disk drive or printer. When the next student tries to access the peripheral, the lockup occurs. You can avoid this problem by having the student make sure that the channel to a peripheral is properly closed and that the other students know when the peripheral is free for access.

#### The Microshare Multi-User Disk System

Although the Winchester school system does not regularly use the Microshare system (from Comspec Communications), Cardine has tested this networking device in his classrooms. Its price is \$900, which is a prohibitive factor for this school's tight budget.

Despite the price, the Microshare system has strengths. Unlike the VIC Switch, it is designed to allow all users to load the same software simultaneously. But when Cardine tested this unit on various commercial software products, he discovered that the unit would not perform group loads of software that had automatic load routines built into them.

Some other features of this system include a built-in print buffer with a software-selectable device number, individual disk error status reports for each user, individually controllable channel switching delay and the ability to link eight IEEE or seven serial devices. An internal hardware change is required to accept eight computers, whereas both the VIC Switch and the CSI-64 Switch are initially set up to accommodate eight computers.

#### The CSI-64 Switch

Recently, the Winchester Elementary School purchased two CSI-64 Switches, which have proven to be most valuable. The price, performance and availability of the CSI-64

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Switch, from Computer Specialties, Inc., are the features that make it particularly attractive to the Winchester school.

With the CSI-64, which costs about \$130, you can connect up to eight C-64s, VIC-20s, Plus/4s, C-16s or C-128s to a single disk drive and a printer. All Commodore serial printers will work with this, and you can use certain interfaces to allow the use of non-Commodore printers.

Cardine discovered that the CSI-64 Switch rarely locks up. It handles simultaneous requests for access by queuing up the computers. The system works on a first-come, first-serve basis and puts subsequent requesters on hold until the present user has finished. There is a light on the front of the unit that lets the users see which of the eight computers is accessing the drive or printer.

The Winchester school is planning to buy more CSI-64 switches to link together several more classrooms of C-64s and new 128s. The ultimate goal is to provide a computer for every student.

CSI has recently come out with an Instructor Monitor Prompter (IMP) device that lets a teacher monitor any of 16 computers. The IMP allows the

master computer station to observe what each computer on-line is doing, communicate with any of the users and perform group loading of software at an incredibly fast speed. (This is a fairly new product and has yet to be tried at the Winchester school.)

#### Does It Work?

I asked Curt Cardine if he had been able to measure an improvement in learning in those students who had been using computers. He said, "Yes. Their thinking skills went way up." Cardine studied one group in his school and was excited about the trends that he saw. Twenty-four students, after spending one year learning about computers and actually working on them, increased an average of two years on their achievement tests.

"Children can actually push themselves through developmental stages. They definitely advance in their ability to reason things out," said Cardine.

The Winchester school is a prime example of how a non-affluent system is able to bring to its students computer training that is often available only in wealthier schools. Multi-user networking has proven to be the only way that this school has been

able to provide computer education for its students.

I welcome comments about computer networking from those of you who are using this application. I also encourage you to contact me if you are using Commodore computers for any type of educational purpose, whether in a school, community activity or at home. R

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

#### VIC Switch

Handic Software, Inc.  
400 Patterson Plank Road  
Carlstadt, NJ 07072

#### CSI-64 Switch

Computer Specialties, Inc.  
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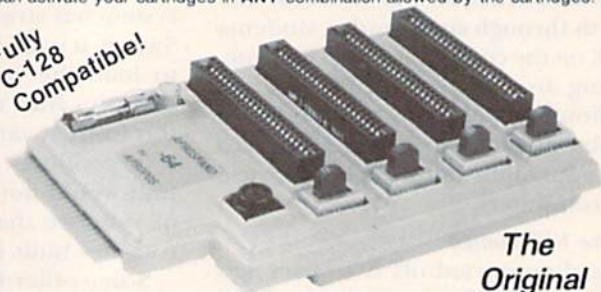
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By JIM STRASMA

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Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

## UPDATES

**Update:** In the September 1985 issue, Philip Jones asked about artificial intelligence (AI) programming. I'd like to send him and any other readers seriously interested in AI programming a copy of the AI Factsheet I've developed; they need only send me a self-addressed stamped #10 envelope with their request. I am not a vendor, but a 64 user who's serious about developing practical artificial intelligence applications.

Eloisa Yeargain  
PO Box 241807  
Los Angeles, CA 90024

**A:** Thanks for the offer and the fact sheet. It is helpful, and I'm sure you'll hear from many readers. AI enthusiasts may also want to investigate Abacus Software's new program, XPER, a serious attempt to squeeze an expert system into the 64. I haven't had it long, but am impressed by what it achieves in what is, by AI standards, a very small computer.

## HARDWARE

**Q:** My question concerns static discharge damage to MOS IC chips. Some sources warn of dire consequences if your grip changes by as much as a millimeter while moving chips. You and others talk casually of replacing ROM and processor chips and I/O switching. What amount of caution do you recommend?

Bruce Fellows  
Anaheim, CA

**A:** This time of year (with heating systems operating full force and indoor air very dry), take every precaution against letting static shocks affect your computer. Any shock you can feel is enough to fry an MOS IC chip. These chips are designed to operate at about five volts, and a typical static shock may reach several thousand volts.

To reduce static, remove nearby nylon rugs, humidify the area, and touch a grounded object, such as a radiator, before touching chips. Also, don't touch the legs of the chips directly, and keep the chips seated in a "bug rug" (pad of conductive foam) whenever they are out of the computer.

Although there is truth to the dire warnings about what could happen to a chip when it is handled, I've never actually lost a chip that way, not even an ultra-sensitive CMOS chip.

**Q:** Is it all right to shut off your computer when the disk drive is booting up a program?

Tim Brend  
Auburn, IA

**A:** Usually, but not always. Disk drives are used for two main chores: reading and writing information. To safely shut off your computer during the start-up operations of a program, you must know which of the two chores the disk is performing when you shut it off. Turning off your computer while your drive is reading a disk harms nothing; turning it off while your drive is writing to a disk could result in a ruined file, which in turn could mean an unusable program. Fortunately, very few programs attempt to write information to the disk during their start-up operations.

Also, when you shut off the computer, do not shut off the disk unit until you have first removed the program disk from the drive. Turning off most Commodore disk drives with a disk inserted in the slot and the access door closed alters the data under the read/write head at that moment, often rendering the disk useless until it is reformatted.

**Q:** I am planning to buy a C-128. However, color monitors and even TVs bother my eyes. I want to know what kinds of monochrome monitors can hold the C-128's 80-column screen.

Antonio Gomez  
Mexicali, Mexico

**A:** Only two kinds of monochrome monitors are commonly sold in the U.S. these days. One is usable only by IBM PC and PC-compatible computers with special monochrome adapter cards. This is recognizable by its video connector, which has eight pins, in two rows of four. The other



kind of monochrome monitor (sometimes called a B&W monitor) has an RCA phono connector (a single pin surrounded by a shield) and works fine on the VIC, C-64 and C-128, as well as on Apples, IBMs with color cards and most other computers.

To use this type of monitor with the C-128 in 80-column mode, you must obtain a suitable cable. Both Commodore and other suppliers have already announced special cables for this purpose; some contain an extra connector and switch, so you can use the cable in both 40- and 80-column modes without changing any plugs.

**Q:** I have a Plus/4 and a printer interface with a power connector that is supposed to plug into the cassette port on a 64. There's no way it will fit into the Plus/4's round cassette port. Can I cut this wire and replace plugs?

**Pete Baron**  
APO NY

**A:** Yes, but that's not necessary. Just supply +5 volts to the interface another way. Most printers supply the proper voltage on pin 18 of the Centronics parallel connector, into which you plug a cable from the interface. Most likely, the corresponding wire in that cable already brings the necessary voltage into the interface and merely needs to be connected to the same point as the unusable power supply wire.

**Q:** Is it possible that Commodore has left an empty ROM socket in the 128 on purpose?

**Tom Moore**  
Birmingham, AL

**A:** It's not only possible; that's just what happened. On both the Plus/4 and C-128, there is an application ROM socket on the main circuit board. On the Plus/4, the socket normally contains the factory-supplied "3 + 1" program, but other ROMs designed for use in Plus/4 cartridges can be put in that same socket. Although the socket is initially empty on the C-128, it is likewise addressed to the same part of memory as ROM cartridges, and it could easily hold a program ROM from a suitable C-128 cartridge.

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## PROGRAMMING

**Q:** I am writing a program in which I want to use the Get# command to retrieve both program files and datafiles from the Datassette. Datafiles come across fine, but the 64 doesn't like reading program files as if they were datafiles. After retrieving the first buffer full of information, it looks for the next file. Is there any way to force the 64 to continue reading the program file?

**Will Johns**  
Deerfield, IL

**A:** Not with Basic's GET# command. The problem is that programs and data are stored very differently on tape. Datafiles are stored in neat 191-character blocks, separated by two-second inter-record gaps, which allow the tape to halt and restart without losing data. Program files, on the other hand, are stored as single blocks (recorded twice in succession) and loaded directly into Basic's program area, rather than into a buffer.

Your computer can read the first 191 characters of a program into the file buffer as though the program were a datafile. However, while that data is being processed, Basic halts the tape. When the tape restarts, Basic looks for another block of data to read, but does not find it until the start of the next program.

The solution is to rewrite your program in machine language and store it in an out-of-the-way part of memory, starting at \$C000, for instance. You may then treat all of Basic's workspace as a huge buffer and read all of the program in at once, thanks to the greater speed of machine language.

**Q:** If a filename listed in a directory appears with an asterisk immediately following it, what is the proper procedure to take?

**Charles Fisher**  
Lockport, IL

**A:** Any disk with a directory entry so marked has an improperly closed file and is in danger of losing information. If the marked file is not important, the disk should be immediately validated, with either the C-128's or the Plus/4's Collect command or the

Circle 60 on Reader Service card.

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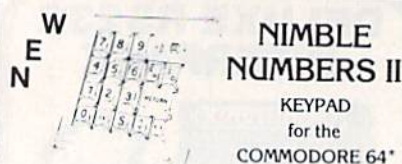
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## Commodore Clinic

VIC-20's and C-64's Disk Validate (v0) command. If the file contains vital information, it may be read first, using the modify option (s,m) of the disk file Open command.

In any case, do not write any new programs or files on that disk until you've successfully validated it. If the validation fails, or if the number of blocks shown as free at the end of the directory changes after the validation, the only safe procedure is to copy (not back up) all programs and files on the disk to another disk, and then to reformat the original.

## REPAIRS

**Q:** I recently lost the color on my 64 and was told the color chip might be the cause. I would like your opinion as to whether or not I should send my computer to Commodore for repair.

**Doug Counce  
Tupelo, MS**

**A:** A faulty VIC chip is only one of many possible reasons for loss of color. Others include a faulty cable, an unplugged chroma connector, slight mistuning of your channel on a color TV, and maladjusted color settings on a TV or monitor. Before seeking repair, try another TV or monitor and another video cable. If these work, your 64 is not at fault.

The next step is to take your 64 to an authorized Commodore service center. These centers should be well-equipped to adjust or replace parts that could affect color; some will do this while you wait.

## SOFTWARE

**Q:** I use Nevada Fortran with my C-64 and a CP/M cartridge. To my surprise, the Fortran manual is geared to the experienced Fortran programmer already familiar with CP/M. Would you please assist me in obtaining a tutorial book on CP/M for the Commodore 64, with respect to Fortran applications?

**Reynaldo Reyes, Sr.  
South Gate, CA**

**A:** First, CP/M and Fortran are entirely different from each other. For-

tran is a very old, but still popular, programming language, of which Basic is a somewhat modified subset. CP/M, on the other hand, is an operating system, helping the computer run whatever language you like with equal ease. Thus, you aren't likely to find a single text that teaches both Fortran and CP/M. On the other hand, most bookstores carry books that deal with each subject separately.

Of the CP/M books, my personal favorite is still Thom Hogan's *Osborne CP/M User Guide*, from Osborne/McGraw-Hill. My favorite Fortran book is the *Fortran Coloring Book*, although nearly all textbook publishers offer good introductory Fortran texts for classroom use, available from the nearest university bookstore.

**Q:** Please advise how I can obtain the second edition of the 1541 manual.

**Lewis Hegyi  
Cinnaminson, NJ**

**A:** It is available directly from Commodore as P/N 1540031-03 for \$5 in the U.S. The address is Customer Support Department, Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

**Q:** In a recent column, you mentioned that the Script/Plus cartridge ROM could be placed inside the Plus/4. Since it makes me nervous to have the cartridge hanging out of the back of my machine, could you publish more specific instructions as to which ROMs in the Plus/4 have to be replaced by the cartridge ROMs?

By the way, I bought the Plus/4 and Script/Plus at a local discount store for less than \$100. At that price, having a dedicated word processor that is compatible with my C-64 peripherals is definitely worth it! I hope RUN will continue to support the Plus/4.

**Craig Ede  
Minneapolis, MN**

**A:** Unfortunately, my Plus/4 was a prototype, so yours may differ, but the ROM you want to swap will be the one containing the "3+1" application program. It may be labeled and may be the only ROM in a socket. If not, it should be at one end of a row of ROMs; removing it (with the power off, of course) should not af-



fect the operation of the computer (except that "3 + 1" will no longer be immediately available).

It may be wise to open your Script/Plus cartridge first, to make sure it contains a single ROM and to help you recognize the similar "3 + 1" chip. There may be a screw in the middle of the cartridge shell, under the label, and several flanges to loosen around the edges when opening the cartridge. Take your time, so as not to break the shell.

Use a small, flat, pointed non-metal object to pry out the "3 + 1" and to remove the Script/Plus ROM. If the Script/Plus ROM is soldered in, you will need a desoldering iron as well, and may wish to have your dealer handle the rest of the swap. When you make the swap, be sure the Script/Plus chip ends up facing the same direction as the "3 + 1" ROM did, and avoid all static shocks. You may also want to install the "3 + 1" ROM in the Script/Plus cartridge, so you can still use it if needed.

**Q:** I am thinking about buying a Fast Load cartridge from Epyx. I want to know if it would be all right for my 1541 drive. I am worried that my drive might overheat or break from all of the pressure on it.

**John Bumstead**  
Upland, CA

**A:** In general, Fast Load and other similar speed-up cartridges work well and won't hurt your disk drive. However, there are two possible problems. One is that the power supply in some 64s is barely adequate, and the added power consumed by even a cartridge like Fast Load could send a marginal power supply over the edge to failure after extended use. If that happens, upgrade the power supply, and it won't happen again.

The other problem readers are reporting is that Fast Load is not entirely compatible with all programs that use the disk, particularly some commercial programs that write relative datafiles. If you attempt to use Fast Load with such programs, you may lose all the data on that disk without warning. Therefore, I suggest using Fast Load and similar speed-up programs to quickly load programs, but not to write programs or files back to the disk.

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Trying to select a printer for your Commodore computer can be difficult because of the variety of printers on the market. In many cases, the features, rather than the amount of money you are able to spend, play a large part in determining which printer you select. Okidata's new 120 printer will probably become very popular among Commodore owners, as it is reasonably priced and offers a variety of useful features.

The Okidata 120 is designed exclusively for the Commodore line of computers; a Commodore-compatible interface cable is included. The printer's compact size (14 x 11 x 3.25 inches) allows it to fit easily onto most desks. Three buttons for form control and a fourth button for on- or off-line selection are located on the front of the unit.

The platen has permanently built-in tractor sprockets at each end; this is a clever design, and helpful when using non-perforated forms in the printer. Poor designing, however, has placed the serial cable on the rear of the unit, where it has a tendency to interfere with the flow of the paper. The serial cable's port position encourages use of the bottom form-feed feature that this printer also offers.

The 120 in the printer's name represents the unit's printing speed in the Draft mode. Unfortunately, the

printer does not have a near letter-quality capacity. Its three print modes are Standard, Enhanced and Emphasized, and they all produce print of very good quality. This is due in part to the printer's use of a small cartridge-type nylon ribbon, which offers greater longevity than film cartridge ribbons; however, nylon does fade over time.

The Okidata 120 offers three print sizes: pica (10 characters per inch); elite (12 cpi); and fine (17.1 cpi). Double-width characters and the three print modes are accessible when using any of the print sizes. Other useful print features include superscripts and subscripts (used in formulas and equations) and an underlining option that can be used with any print mode or character size.

The Okidata 120 is very software-friendly. However, I experimented with accessing the print features from several very different word processors and found the printer's "Programming Features" to be rather confusing, and quite possibly discouraging, to use. Fortunately, Okidata lists a programmer's guide in the manual, with decimal values for each print feature.

Programs designed for the Commodore 1525 printer will work well on the Okidata 120. Standard graphics programs and screen dump programs designed for the 1525 also perform flawlessly on this printer, so you can utilize all of your favorite 1525 print routines in programs you write for the 120.

Compared with other printers in its price range, the Okidata 120 is among the best. Its contemporary de-

sign, ease of use and overall quality are very impressive. I recommend the printer to anyone looking for a fast and reliable dot-matrix printer for his Commodore. (Okidata, 532 Fellowship Road, Mt. Laurel, NJ 08054. \$269.)

Tim Walsh  
RUN staff

## MIDI Interface

### *You and Your Computer Can Make Beautiful Music Together*

The MIDI Interface, from Passport Designs, gives your C-64 and C-128 a communications link to MIDI-equipped synthesizers, keyboards and drum machines.

The interface plugs into the cartridge port of your computer and comes supplied with two 5-pin DIN cables that connect the interface to an external musical instrument.

The MIDI-out connector is attached to the MIDI-in port on the musical instrument, and the MIDI-in connector is attached to the MIDI-out port on the same instrument. There is also a Drum Sync connector on the interface, for which you have to purchase a separate MIDI Drum Sync Cable Kit. The Drum Sync allows you to attach an external drum machine, which will play the accompanying drum beat in time with the musical composition.

If you're a musician, the advantage of a MIDI interface is that you can



## Hardware Gallery

compose songs on one or more piano-like MIDI-equipped keyboards with synchronized percussion accompaniment. These MIDI keyboards offer far more versatility of sound production than single non-MIDI keyboards that are also sold for your computer. As you compose your music, it is fed into the computer, where it can be modified, stored on disk, played back and printed out. I used the CZ-101 synthesizer from Casio (15 Gardner Road, Fairfield, NJ 07006) to try out the MIDI Interface.

The sound interface device (SID) chip within your C-64 and C-128 is a musical voice synthesizer in itself. It can produce three separate, controllable musical voices. The voices can be modified to duplicate a multitude of sounds through a wide variety of software that does not necessarily require an external interface such as MIDI.

With MIDI, however, your control of the SID chip is greatly expanded, and you can more easily create subtle differences in the sounds you are producing. You can also play more than three voices simultaneously. This is accomplished with the external MIDI-equipped instrument, MIDI software and an appropriate external speaker (you can also use the one inside your video monitor).

For example, with the MIDI Music Shop software from Broderbund (17 Paul Drive, San Rafael, CA 94089), you can play up to eight musical parts simultaneously. These eight notes can be distributed over a maximum of four different external instruments. This means you could have four keyboards hooked up, with each one playing a different part. And, using this particular software, you can have each instrument change its voice in the course of one musical score. This provides the flexibility necessary to produce sophisticated musical compositions.

An important feature, available only with a MIDI interface, is the ability to play notes on the external keyboard and have them fed into the computer and displayed on-screen on a musical staff. This makes musical composition more natural for musicians, especially those who have learned to play the piano.

The MIDI Music Shop software lets you play a song on your MIDI keyboard while the program automatically reads your notes and places them onto a computerized staff. The limitation is that you have to set the timing and each note's duration manually.

You can also compose music without a MIDI interface, of course, using the computer's keyboard or a joystick. With this method, you have to place each note on the staff and designate its value and the music's timing.

Passport Designs states that any MIDI-equipped device can be addressed and controlled with the MIDI Interface, as long as you have the proper software. It has already been adopted by many music software companies, so you will not be limited in your software choices. Broderbund and QRS Music Rolls (1026 Niagara St., Buffalo, NY 14213) are two companies writing software for use with this interface.

MIDI is not, however, limited to use with commercial software. The manual that comes with the device describes how to get started in programming the interface on your own. This is not something for beginners in computer programming to try. Although you can program the interface in Basic, it is recommended that you do any serious programming in assembly language.

If you're a student, teacher or home user who is likewise interested in composing, playing, saving, editing and printing out multivoiced music—but with fewer voices and more manual labor—you would probably do better to invest in the \$45 Music Shop (an excellent musical composition and editing program) and a \$6 joystick.

However, if you're a serious musician, Passport's MIDI interface is probably one of your best choices for use with the C-64 and C-128. If you have the money to invest in one or more MIDI instruments (the Casio CZ-101 costs about \$500) and in the MIDI software and interface, this application for your computer is definitely worthwhile. (Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019. C-64, C-128/\$149.)

Margaret Morabito  
RUN staff

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### IBM XT SYSTEM



## Super Graphix Printer Interface

*A Feature-Packed  
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Your Commodore*

The printer interface in the Commodore environment must perform many tasks, such as emulating a Commodore printer and, at the same time, allowing you access to your printer's special features.

The Super Graphix Printer Interface, from Xetec, can successfully perform these and many other duties. When driving a suitable dot-matrix printer, the Super Graphix will provide total emulation of the 1525 printer, including reproduction of all the special Commodore graphics characters.

Finding a compatible printer should not be difficult. Three of the eight small switches on the front of the interface control printer selection. This gives you eight possible choices, covering all of the major printer brands. These switches also let you choose device number, operating mode and type font.

The Super Graphix goes several steps beyond simple emulation of the Commodore printers. Basic programmers will appreciate the Special Listing mode, which translates all of the Commodore embedded control codes into easy-to-read mnemonics. Even graphics characters, which are generated by holding down the Commodore or shift key, are listed by their respective keystroke sequences.

The most impressive features of the Super Graphix interface are its built-in 8K RAM buffer and the near letter-quality print font. As well as being a text storage area, the buffer enables the interface to print text in

any of three high-density fonts. The first of these, the near letter-quality font, is built into the interface and is available by simply setting a pair of the switches on the interface. The remaining two fonts are downloaded to the interface from your computer.

A utility disk is supplied with Super Graphix. This contains 21 fonts that you can download, as well as a support program to help you create your own. Once downloaded, the fonts can be disconnected only by an instruction sent over the interface's command channel (similar to the disk drive command channel). In fact, turning off the computer or resetting the computer or the interface will not affect the fonts, as they can remain in RAM for up to 15 minutes without any source of external power.

Two of the fonts included on the disk—italic and script—require your printer to have very high dot densities. Not all dot-matrix printers are capable of the required density. Printers that support all of Super Graphix's features are the Epson, Gemini and Panasonic machines (and others that function like these).

The Super Graphix provides a simple way to do a screen dump (both character and bit-map) from your computer. Character dumps are supported for the VIC-20, C-64 and C-128. An 8K bit-map dump is available for the C-64 and C-128 graphics screens. Simply open a channel to the interface with the appropriate secondary address; Peek the data (1K or 8K) from the proper section of memory; and send it to the interface, one byte at a time. The Super Graphix will take care of the rest.

The interface is packaged in what appears to be a VIC-20 cartridge case. A reset button is provided to abort the printing of text that may be in the 8K buffer.

The Super Graphix Printer Interface is a high-quality device. If you are presently considering the purchase of a new printer, this interface definitely merits your consideration. (Xetec, 3010 Arnold Road, Salina, KS 67401. VIC, C-64, C-128/\$99.95.)

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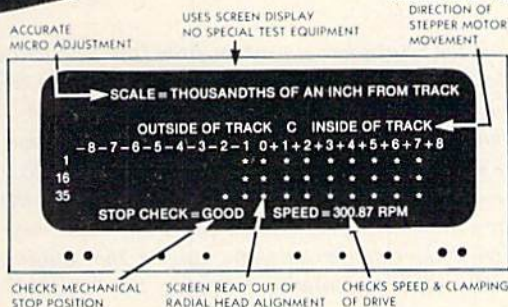


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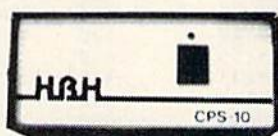
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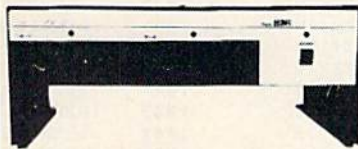
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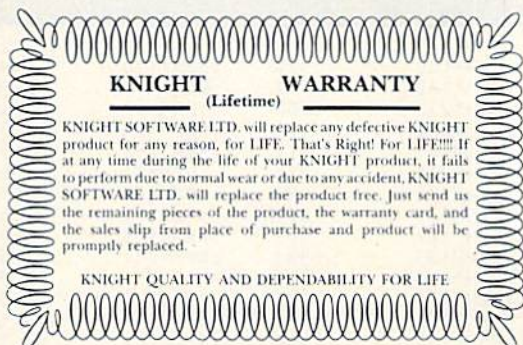
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# Checksums for *RUN* 1985 Programs

64 Perfect Typist, RUN's checksum program, has earned much praise and positive response from our readers since we first introduced the program in our September 1985 issue. Many readers have inquired to find out if we would list checksums for previously published programs. With this issue, we begin a series of listings that will eventually give you checksums for most of the lengthy C-64 programs published from January to August 1985.

This issue features the listings from August. Try entering programs from the August issue and find out how well 64 Perfect Typist works. Simply load and run 64 Perfect Typist (see How to Type Listings, on page 126), get out your August issue and begin typing in any program you find in the listings below. Every

time you hit the return key, a number from 0 to 255 will appear. If you enter a line correctly, the number following the ":REM\*" next to the line number will appear.

If you have already entered one of the programs from August and desire to check it for accuracy, simply enter 64 Perfect Typist, list lines individually or in small groups and position the cursor on the line you want to check. Next, press the return key, and, if you've entered the line correctly, the number that appears below the line will match the number following the ":REM\*" in the listings.

You can look forward to seeing more of these listings of 1985 programs in subsequent 1986 issues of RUN.

## C-64 Screen Formatter, by James Cooper; August, p. 80.

1	:REM*101	79	:REM*29	210	:REM*168	350	:REM*127	500	:REM*3
2	:REM*76	80	:REM*196	220	:REM*80	360	:REM*179	510	:REM*143
3	:REM*155	90	:REM*80	230	:REM*220	370	:REM*111	520	:REM*202
4	:REM*56	100	:REM*120	240	:REM*62	380	:REM*71	530	:REM*30
5	:REM*241	110	:REM*120	250	:REM*4	390	:REM*251	540	:REM*140
6	:REM*12	120	:REM*30	260	:REM*45	400	:REM*135	550	:REM*244
7	:REM*141	129	:REM*81	270	:REM*97	410	:REM*203	560	:REM*78
8	:REM*212	130	:REM*218	279	:REM*184	420	:REM*175	570	:REM*74
9	:REM*243	140	:REM*0	280	:REM*119	430	:REM*87	580	:REM*96
10	:REM*248	150	:REM*140	290	:REM*243	439	:REM*26	590	:REM*0
20	:REM*136	160	:REM*94	300	:REM*161	440	:REM*19	600	:REM*212
30	:REM*20	170	:REM*180	310	:REM*45	450	:REM*139	610	:REM*48
40	:REM*158	180	:REM*154	320	:REM*113	460	:REM*219	620	:REM*252
50	:REM*60	190	:REM*144	330	:REM*85	470	:REM*205	630	:REM*186
60	:REM*162	199	:REM*99	340	:REM*189	480	:REM*123	999	:REM*150
70	:REM*170	200	:REM*232	349	:REM*24	490	:REM*245		

## Trap Shoot, by Lee Fraley; August, p. 52.

1	:REM*129	110	:REM*178	414	:REM*97	800	:REM*29	1030	:REM*90
2	:REM*182	111	:REM*215	498	:REM*129	801	:REM*14	1031	:REM*149
3	:REM*225	200	:REM*28	499	:REM*10	810	:REM*197	1032	:REM*18
4	:REM*252	210	:REM*126	500	:REM*203	811	:REM*210	1040	:REM*102
5	:REM*87	211	:REM*253	501	:REM*94	890	:REM*63	1041	:REM*79
6	:REM*248	212	:REM*34	502	:REM*19	900	:REM*93	1042	:REM*116
10	:REM*78	299	:REM*10	510	:REM*253	901	:REM*12	1043	:REM*55
11	:REM*29	300	:REM*37	511	:REM*54	902	:REM*29	1999	:REM*16
12	:REM*102	302	:REM*179	512	:REM*230	903	:REM*196	2000	:REM*63
13	:REM*89	303	:REM*232	520	:REM*10	910	:REM*153	2001	:REM*240
14	:REM*158	397	:REM*4	521	:REM*19	911	:REM*160	2002	:REM*149
15	:REM*163	398	:REM*233	522	:REM*240	912	:REM*239	2003	:REM*134
16	:REM*64	399	:REM*74	530	:REM*20	913	:REM*180	2004	:REM*227
17	:REM*137	400	:REM*181	531	:REM*249	1000	:REM*225	2005	:REM*164
18	:REM*38	401	:REM*224	532	:REM*250	1001	:REM*54	2006	:REM*207
98	:REM*80	402	:REM*167	540	:REM*32	1002	:REM*127	2007	:REM*124
99	:REM*45	403	:REM*138	541	:REM*245	1003	:REM*182	2008	:REM*219
100	:REM*178	404	:REM*69	542	:REM*38	1004	:REM*171	2009	:REM*128
101	:REM*133	405	:REM*200	590	:REM*134	1010	:REM*65	2010	:REM*229
102	:REM*114	406	:REM*119	591	:REM*105	1011	:REM*88	2011	:REM*138
103	:REM*21	407	:REM*236	599	:REM*147	1012	:REM*209	2012	:REM*155
104	:REM*102	408	:REM*151	600	:REM*84	1013	:REM*24	2013	:REM*46
105	:REM*195	409	:REM*44	601	:REM*11	1020	:REM*77	2014	:REM*207
106	:REM*204	410	:REM*35	602	:REM*122	1021	:REM*108	2015	:REM*26
107	:REM*87	411	:REM*90	603	:REM*165	1022	:REM*15	2016	:REM*39
108	:REM*188	412	:REM*195	604	:REM*88	1023	:REM*40		
109	:REM*79	413	:REM*12	605	:REM*129	1024	:REM*12		



10	:REM*204	480	:REM*111	960	:REM*129	1440	:REM*21	1920	:REM*57
15	:REM*63	490	:REM*53	970	:REM*113	1450	:REM*197	1930	:REM*111
20	:REM*212	500	:REM*179	980	:REM*249	1460	:REM*81	1940	:REM*57
30	:REM*122	510	:REM*51	990	:REM*43	1470	:REM*221	1950	:REM*49
40	:REM*200	520	:REM*48	1000	:REM*149	1480	:REM*183	1960	:REM*89
50	:REM*24	530	:REM*218	1010	:REM*123	1490	:REM*29	1970	:REM*87
60	:REM*154	540	:REM*34	1020	:REM*63	1500	:REM*57	1980	:REM*183
70	:REM*14	550	:REM*242	1030	:REM*92	1510	:REM*93	1990	:REM*243
80	:REM*212	560	:REM*250	1040	:REM*244	1520	:REM*167	2000	:REM*29
90	:REM*36	570	:REM*102	1050	:REM*22	1530	:REM*241	2010	:REM*41
100	:REM*106	580	:REM*198	1060	:REM*46	1540	:REM*224	2020	:REM*185
110	:REM*74	590	:REM*16	1070	:REM*100	1550	:REM*118	2030	:REM*189
120	:REM*134	600	:REM*134	1080	:REM*92	1560	:REM*4	2040	:REM*73
130	:REM*32	610	:REM*92	1090	:REM*92	1570	:REM*132	2050	:REM*136
140	:REM*116	620	:REM*56	1100	:REM*166	1580	:REM*156	2060	:REM*210
150	:REM*86	630	:REM*208	1110	:REM*132	1590	:REM*96	2070	:REM*122
160	:REM*242	640	:REM*210	1120	:REM*212	1600	:REM*122	2080	:REM*118
170	:REM*170	650	:REM*242	1130	:REM*64	1610	:REM*54	2090	:REM*106
180	:REM*254	660	:REM*134	1140	:REM*104	1620	:REM*94	2100	:REM*102
190	:REM*174	670	:REM*56	1150	:REM*230	1630	:REM*186	2110	:REM*228
200	:REM*164	680	:REM*38	1160	:REM*86	1640	:REM*156	2120	:REM*42
210	:REM*4	690	:REM*36	1170	:REM*78	1650	:REM*22	2130	:REM*224
220	:REM*120	700	:REM*34	1180	:REM*186	1660	:REM*80	2140	:REM*148
230	:REM*20	710	:REM*60	1190	:REM*164	1670	:REM*136	2150	:REM*54
240	:REM*254	720	:REM*52	1200	:REM*126	1680	:REM*6	2160	:REM*152
250	:REM*98	730	:REM*80	1210	:REM*20	1690	:REM*188	2170	:REM*42
260	:REM*223	740	:REM*48	1220	:REM*186	1700	:REM*18	2180	:REM*6
270	:REM*87	750	:REM*34	1230	:REM*42	1710	:REM*16	2190	:REM*250
280	:REM*135	760	:REM*136	1240	:REM*198	1720	:REM*118	2200	:REM*90
290	:REM*43	770	:REM*3	1250	:REM*174	1730	:REM*248	2210	:REM*222
300	:REM*227	780	:REM*245	1260	:REM*128	1740	:REM*116	2220	:REM*40
310	:REM*213	790	:REM*145	1270	:REM*14	1750	:REM*172	2230	:REM*154
320	:REM*85	800	:REM*199	1280	:REM*165	1760	:REM*110	2240	:REM*128
330	:REM*71	810	:REM*151	1290	:REM*11	1770	:REM*56	2250	:REM*70
340	:REM*123	820	:REM*61	1300	:REM*255	1780	:REM*242	2260	:REM*216
350	:REM*215	830	:REM*53	1310	:REM*175	1790	:REM*182	2270	:REM*236
360	:REM*157	840	:REM*113	1320	:REM*65	1800	:REM*131	2280	:REM*140
370	:REM*229	850	:REM*91	1330	:REM*59	1810	:REM*185	2290	:REM*218
380	:REM*113	860	:REM*95	1340	:REM*157	1820	:REM*185	2300	:REM*185
390	:REM*159	870	:REM*55	1350	:REM*217	1830	:REM*73	2310	:REM*137
400	:REM*223	880	:REM*31	1360	:REM*81	1840	:REM*5	2320	:REM*51
410	:REM*165	890	:REM*55	1370	:REM*33	1850	:REM*75	2330	:REM*193
420	:REM*217	900	:REM*239	1380	:REM*149	1860	:REM*79	2340	:REM*235
430	:REM*95	910	:REM*85	1390	:REM*197	1870	:REM*27	2350	:REM*225
440	:REM*153	920	:REM*223	1400	:REM*11	1880	:REM*167		
450	:REM*213	930	:REM*53	1410	:REM*187	1890	:REM*171		
460	:REM*163	940	:REM*231	1420	:REM*91	1900	:REM*159		
470	:REM*47	950	:REM*139	1430	:REM*103	1910	:REM*99		

Easy Assembly III, by William Sanders; August, p. 58.

420	:REM*167	720	:REM*234	1020	:REM*175	1320	:REM*41	1620	:REM*138
430	:REM*167	730	:REM*142	1030	:REM*198	1330	:REM*187	1630	:REM*18
440	:REM*187	740	:REM*94	1040	:REM*96	1340	:REM*33	1640	:REM*98
450	:REM*161	750	:REM*42	1050	:REM*80	1350	:REM*135	1650	:REM*156
460	:REM*119	760	:REM*60	1060	:REM*160	1360	:REM*173	1660	:REM*36
470	:REM*41	770	:REM*205	1070	:REM*216	1370	:REM*217	1670	:REM*150
480	:REM*131	780	:REM*81	1080	:REM*180	1380	:REM*161	1680	:REM*130
490	:REM*45	790	:REM*229	1090	:REM*6	1390	:REM*155	1690	:REM*162
500	:REM*137	800	:REM*67	1100	:REM*84	1400	:REM*243	1700	:REM*116
510	:REM*65	810	:REM*117	1110	:REM*210	1410	:REM*239	1710	:REM*108
520	:REM*30	820	:REM*15	1120	:REM*186	1420	:REM*191	1720	:REM*80
530	:REM*192	830	:REM*55	1130	:REM*204	1430	:REM*15	1730	:REM*74
540	:REM*206	840	:REM*35	1140	:REM*170	1440	:REM*105	1740	:REM*124
550	:REM*10	850	:REM*129	1150	:REM*114	1450	:REM*99	1750	:REM*30
560	:REM*100	860	:REM*189	1160	:REM*86	1460	:REM*187	1760	:REM*22
570	:REM*146	870	:REM*39	1170	:REM*242	1470	:REM*251	1770	:REM*102
580	:REM*120	880	:REM*119	1180	:REM*36	1480	:REM*45	1780	:REM*150
590	:REM*216	890	:REM*89	1190	:REM*168	1490	:REM*45	1790	:REM*66
600	:REM*106	900	:REM*39	1200	:REM*42	1500	:REM*203	1800	:REM*191
610	:REM*212	910	:REM*21	1210	:REM*0	1510	:REM*197	1810	:REM*87
620	:REM*152	920	:REM*159	1220	:REM*20	1520	:REM*243	1820	:REM*189
630	:REM*84	930	:REM*235	1230	:REM*108	1530	:REM*51	1830	:REM*241
640	:REM*192	940	:REM*17	1240	:REM*206	1540	:REM*24	1840	:REM*187
650	:REM*142	950	:REM*155	1250	:REM*4	1550	:REM*68	1850	:REM*5
660	:REM*212	960	:REM*143	1260	:REM*216	1560	:REM*90	1860	:REM*237
670	:REM*8	970	:REM*225	1270	:REM*210	1570	:REM*228	1870	:REM*59
680	:REM*240	980	:REM*117	1280	:REM*43	1580	:REM*198	1880	:REM*215
690	:REM*238	990	:REM*51	1290	:REM*255	1590	:REM*180	1890	:REM*37
700	:REM*214	1000	:REM*169	1300	:REM*55	1600	:REM*142		
710	:REM*194	1010	:REM*63	1310	:REM*161	1610	:REM*116		



1	:REM*249	24	:REM*112	47	:REM*43	70	:REM*224	93	:REM*81
2	:REM*246	25	:REM*169	48	:REM*136	71	:REM*81	94	:REM*176
3	:REM*15	26	:REM*156	49	:REM*149	72	:REM*14	95	:REM*53
4	:REM*52	27	:REM*217	50	:REM*62	73	:REM*131	96	:REM*186
5	:REM*149	28	:REM*228	51	:REM*105	74	:REM*220	97	:REM*155
6	:REM*206	29	:REM*125	52	:REM*78	75	:REM*25	98	:REM*162
7	:REM*111	30	:REM*162	53	:REM*67	76	:REM*154	99	:REM*145
8	:REM*214	31	:REM*65	54	:REM*30	77	:REM*23	100	:REM*168
9	:REM*61	32	:REM*146	55	:REM*179	78	:REM*226	101	:REM*67
10	:REM*12	33	:REM*177	56	:REM*82	79	:REM*231	102	:REM*32
11	:REM*203	34	:REM*252	57	:REM*225	80	:REM*56	103	:REM*241
12	:REM*130	35	:REM*211	58	:REM*22	81	:REM*107	104	:REM*220
13	:REM*205	36	:REM*154	59	:REM*169	82	:REM*214	105	:REM*251
14	:REM*42	37	:REM*219	60	:REM*120	83	:REM*141	106	:REM*106
15	:REM*175	38	:REM*58	61	:REM*51	84	:REM*38	107	:REM*217
16	:REM*154	39	:REM*113	62	:REM*130	85	:REM*151	108	:REM*228
17	:REM*213	40	:REM*16	63	:REM*85	86	:REM*146	109	:REM*123
18	:REM*158	41	:REM*55	64	:REM*132	87	:REM*55	110	:REM*72
19	:REM*103	42	:REM*116	65	:REM*49	88	:REM*152	111	:REM*137
20	:REM*170	43	:REM*247	66	:REM*238	89	:REM*175		
21	:REM*227	44	:REM*24	67	:REM*249	90	:REM*156		
22	:REM*228	45	:REM*107	68	:REM*224	91	:REM*57		
23	:REM*177	46	:REM*100	69	:REM*155	92	:REM*80		

The Key to Your Disk Directory, by Robin Franzel; August, p. 70.

10	:REM*242	150	:REM*108	290	:REM*253	430	:REM*41	1010	:REM*235
20	:REM*56	160	:REM*36	300	:REM*63	440	:REM*67	1020	:REM*141
30	:REM*34	170	:REM*152	310	:REM*129	450	:REM*141	1030	:REM*64
40	:REM*228	180	:REM*96	320	:REM*159	460	:REM*243	1040	:REM*14
50	:REM*28	190	:REM*38	330	:REM*219	470	:REM*3	1050	:REM*110
60	:REM*50	200	:REM*56	340	:REM*211	480	:REM*59	1060	:REM*66
70	:REM*186	210	:REM*8	350	:REM*187	490	:REM*137	1070	:REM*112
80	:REM*124	220	:REM*40	360	:REM*33	500	:REM*63	1080	:REM*54
90	:REM*18	230	:REM*204	370	:REM*207	510	:REM*221	1090	:REM*22
100	:REM*242	240	:REM*178	380	:REM*143	520	:REM*194	1100	:REM*120
110	:REM*178	250	:REM*98	390	:REM*217	530	:REM*94		
120	:REM*32	260	:REM*77	400	:REM*197	540	:REM*186		
130	:REM*142	270	:REM*39	410	:REM*97	550	:REM*94		
140	:REM*186	280	:REM*131	420	:REM*231	1000	:REM*49		

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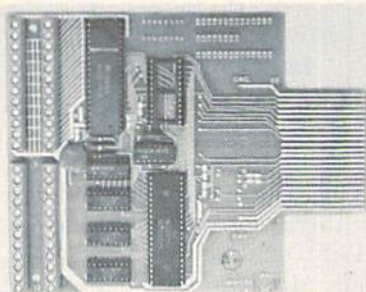
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## Six-Part Harmony Music System

The Visible Music Monitor and the VT-6 cartridge provide an advanced music system for the C-64. The cartridge includes an extra sound chip to add three voices to the three that the 64's SID chip already includes.

Visible Music Monitor software allows you to create, edit, display and play your compositions, and store and retrieve your music on disk or tape.

Editing features include the ability to move or change notes, measures and segments, and to cut, paste and copy. They also provide full editing control over all chip sounds. The system is available from V-Tech (2223 Rebecca, Hatfield, PA 19440) for \$89.

Check Reader Service number 413.

## The Artworx Program Exchange

Artworx (150 North Main St., Fairport, NY 14450) has shipped a new line of software called The Artworx Program Exchange.

The Exchange consists of 11 programs for the C-64, ranging from traditional arcade games to mystery thrillers and family adventures. Each package is available on disk for \$9.95.

Check Reader Service number 414.

## Telecommunications Printer

Okidata (532 Fellowship Road, Mt. Laurel, NJ 08054) has introduced its dot-matrix printer for telecommunications use.

The Microline 182 TTY features

utility-mode printing and bit-image graphics at 120 cps in the Utility mode and at 60 cps in the Emphasized and Enhanced modes.

In the Teletype mode, the printer responds only to carriage-return, line-feed and form-feed commands, thus preventing any extraneous commands from corrupting received data or delaying the printer.

In the CRT mode, page-formatting commands are added. In the Intelligent Printer mode, the printer operates exactly as the standard Microline 182. Available for the C-64 for \$349.

Check Reader Service number 400.

## Sesame Street Software

CBS Software (One Fawcett Place, Greenwich, CT 06836) releases three educational programs for children of ages 4-6.

Sesame Street Pals Around Town introduces your child to some of the physical and social characteristics that make up a community. With help from Sesame Street characters, your child explores five neighborhood locations: a classroom, a school

yard, a busy downtown street, Bert and Ernie's apartment and Sesame Street.

Grover's Animal Adventures features graphics and music in presenting four different animal environments: the African grasslands, the Atlantic Ocean, a North American forest and a barnyard.

In Ernie's Big Splash, Ernie has lost his rubber duck. Your child helps Ernie find the toy by building a pathway that leads the rubber duck from his soap dish into Ernie's bathtub.

The programs are available on disks for the C-64 at \$14.95 each.

Check Reader Service number 401.

## Wargames

Strategic Simulations (883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043) has released three wargames on disks for the C-64.

Battle of Antietam is a tactical Civil War game that takes place during the September 17, 1862, battle along the Antietam Creek at Sharpsburg, Pennsylvania. Three ability levels are included: introductory, intermediate



Three new educational software packages from CBS Software.



and advanced. The game retails for \$49.95.

Norway 1985 deals with an imagined Soviet occupation of Norway and NATO's counterattack. In addition to the normal complement of fighting units, infantry and mortar infantry, ski troops are used. Retail price is \$34.95.

U.S.A.A.F. (United States Army Air Force) is a strategic simulation of the daylight bombing of German industry from 1943-1945. The game retails for \$59.95.

Check Reader Service number 405.

### **Commodore Carrier**

Systems Go Carry-All is a carrying case designed to hold your C-64 keyboard, 1541 disk drive, joystick, cables, programs and documentation. It features hinged foam pads to secure and protect your equipment, and the panels can be removed to accommodate the C-128.

The carry-all's outer fabric is made of Cordura nylon, which is featherweight and washable and resists tearing, stains and mildew; moreover, its inner surface is coated with urethane to enhance waterproofing.

A waterproof, 1/2-inch-thick closed-cell polyethylene foam lining, with twice the impact strength of standard foams, insulates your equipment.

For carrying comfort, the carry-all features a padded hand grip and a padded, nonslip shoulder strap. Available for \$49.95 from Systems Go, 234 Antiquera #6, Coral Gables, FL 33134.

Check Reader Service number 406.

### **For Computer Lovers Everywhere**

King Chip is an action game of chance, strategy, risk and knowledge for two to six players. The object is to attain and keep the throne of King Chip. All other players attempt to dethrone the king by asking him questions of increasing difficulty until he answers incorrectly. A new king ascends the throne at this point.

The questions are based on high technology and the computer, and are grouped into five levels of difficulty. Each answer is accompanied by an explanation designed to inform and educate players. Different handicap levels allow computer nov-



*Carry-All, from Systems Go.*

ices to compete with more knowledgeable players.

The game is available for \$39.95 from Directline, 110 Torbay Road, Markham, Ontario, Canada L3R 1G6.

Check Reader Service number 407.

### **C-128 Word Processor**

Professional Software (51 Fremont St., Needham, MA 02194) has released Fleet System 3, a word processor for the C-128 and compatible printer.

Fleet System 3 features function windows that automatically appear on screen to guide you through the program's operations; it also gives you context-sensitive help windows that provide help with the function on which you are working.

Included are user-definable printer sequences that allow access to any printer feature, proportional spacing, a built-in thesaurus and the ability to include a high-resolution graphics picture within your text files. Available on disk for about \$95.

Check Reader Service number 408.

### **Speakers for Your Computer**

RoomMate, from Bose Corp. (100 The Mountain Road, Framingham, MA 01701), is a compact, lightweight stereo speaker system for your Commodore computer.

Each speaker contains its own power transformer, eliminating the need for a separate amplifier.

There are two versions of the product: the original RoomMate (\$229) and the Video RoomMate (\$279).

Check Reader Service number 409.

### **Whole Body Health Management**

WHM Fitness Software (18653 Ventura Blvd., Suite 137, Tarzana, CA 91356) has released two fitness programs for the C-64.

Physical Fitness Evaluation utilizes tests to evaluate your strength, flexibility, endurance, foot type and body composition. The program includes on-screen directions and a graphics picture of the test. It is self-scoring, and it allows you to save and view data and record forms.

Rehab Fitness Evaluation is a special version of the Physical Fitness Evaluation program that assesses overall body fitness for sedentary persons.

Both programs (available on disk for \$39.95 each) are for users aged 14 to adult.

Check Reader Service number 410.

### **Bilbo Lives**

J.R.R. Tolkien's classic, *The Hobbit*, is now a software adventure game available for the C-64.

Eighty graphics screens illustrate the game, and over 50 different action commands are at your disposal.

The *Hobbit's* documentation includes a copy of Tolkien's fantasy novel as well as a hint booklet and a guide to Middle-earth. Available on



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(CA residents must include \$3.25 tax, \$0.65 for the demo)

## R New Products RUNdown

disk for \$29.95 from Addison-Wesley, General Publishing Group, Reading, MA 01867.

Check Reader Service number 411.



Votrax's Votalker C-64.

### Votalker C-64

Votrax (1394 Rankin, Troy, MI 48083) introduces the Votalker C-64, a new addition to the Votalker family of speech synthesizers.

Its capabilities include a screen echo that allows all words, numbers, punctuation marks and other symbols to be automatically spoken as they are printed to the terminal screen.

In addition, the unit speaks an unlimited vocabulary and has a Speak command that vocalizes text printed to the screen.

Votalker contains its own amplifier, speaker and external speaker jack. Available for \$99.95.

Check Reader Service number 404.

### Three New Games

Mindscape (3444 Dundee Road, Northbrook, IL 60062) has released three new graphics adventure games for the C-64.

In Quake Minus One, a terrorist group has sabotaged an undersea power station. Unless the four renegade robots roaming the power station are destroyed or captured within ten hours, they'll trigger an earthquake that will paralyze the western world.

Shadowfire is a space adventure in which six superheroes board an alien spacecraft, locate and rescue a kidnapped ambassador, apprehend the alien's leader and capture or destroy the alien spacecraft.

Lords of Midnight is a medieval adventure that can be played as a quest, a war or both. Characters must be moved by day across the forbidden terrain of the Land of Midnight in search of Doomark the Witchking. By night, the computer responds to your commands. More than 32,000 landscapes can appear during the course of play.

Each game is available on disk for \$29.95.

Check Reader Service number 412.

### Bottoms Up

The Bartender is a database program that can store over 400 drinks or recipes on one disk and allows you to list drinks alphabetically or by record number. Recipes for over 200 popular drinks are included on a starter disk.

The Bartender is available for the C-64 for \$24.95 from Cursor Products, RR 71, Box 1858, Camdenton, MO 65020.

Check Reader Service number 402.



New Testament Concordance, from Midwest Software.

### New Testament on Disk

Midwest Software (22500 Orchard Lake Road, Suite 1, Farmington, MI 48024) has released The New Testament Concordance, the King James version of the Bible on three disks.

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## How to Type in C-64 and C-128 Listings from RUN

To simplify your typing of RUN's C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., REM\*123). These checksum numbers necessitate your using RUN's Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from RUN as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM\*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in

those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incomplete program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in RUN have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACES}, which instructs you to press the space bar 22 times.

### Listing 1. 64 Perfect Typist program.

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 POKE56, PEEK(56)-1:POKE52, PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
  XT
40 IFT<>16251 THEN PRINT"ERROR IN DATA...":
  END
60 POKEML+4,PG:POKE ML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,P
  G
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}*****
  *****"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
  IST IS NOW ACTIVE{2 SPACES}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACES}
  SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}*****
  *****":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

### Listing 2. 128 Perfect Typist program.

```
1 REM 40/80 COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 FORX=5120TO5379:READD:T=T+D:POKEX,D:NEXT
20 IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
  N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{20 SPACES}
  "
30 PRINT"{SHFT CLR}"A$"{CRSR RT}*****
  *****"
40 PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
  S NOW ACTIVE **"
50 PRINTA$"{CRSR RT}**{2 SPACES}SYS 5120=ON
  {7 SPACES}SYS 5150=OFF{2 SPACES}**"
60 PRINTA$"{CRSR RT}*****
  *****":SYS5120:NEW
5120 DATA 173,005,003,201,020,208,001,096,1
  41,045
5130 DATA 020,173,004,003,141,044,020,162,0
  43,160
5140 DATA 020,142,004,003,140,005,003,096,2
  34,234
5150 DATA 173,044,020,141,004,003,173,045,0
  20,141
5160 DATA 005,003,096,032,013,067,140,255,0
  19,162
5170 DATA 000,142,252,019,142,253,019,142,2
  54,019
5180 DATA 189,000,002,201,032,240,008,201,0
  48,144
5190 DATA 007,201,058,176,003,232,208,238,1
  89,000
5200 DATA 002,240,054,201,032,208,005,172,2
  54,019
5210 DATA 240,042,201,034,208,010,072,173,2
  54,019
5220 DATA 073,001,141,254,019,104,072,238,2
  53,019
5230 DATA 173,253,019,041,007,168,104,024,0
  72,024
5240 DATA 104,016,001,056,042,136,016,246,1
  09,252
5250 DATA 019,141,252,019,232,208,197,173,2
  52,019
5260 DATA 024,101,022,024,101,023,141,252,0
  19,169
5270 DATA 042,032,241,020,032,188,020,160,0
  02,185
```



5280 DATA 185,020,032,241,020,136,016,247,1  
65,116  
5290 DATA 208,009,165,117,208,005,169,145,0  
32,241  
5300 DATA 020,172,255,019,096,013,032,032,1  
62,000  
5310 DATA 173,252,019,232,056,233,100,176,2  
50,105  
5320 DATA 100,202,240,003,032,232,020,201,0  
10,176  
5330 DATA 005,205,252,019,240,015,162,000,2  
32,056  
5340 DATA 233,010,016,250,024,105,010,202,0  
32,232  
5350 DATA 020,170,072,138,009,048,032,241,0  
20,104  
5360 DATA 096,170,173,000,255,072,169,000,1  
41,000  
5370 DATA 255,138,032,210,255,104,141,000,2  
55,096

## RUN AMOK

**Item:** In the Hardware Buyer's Guide (November 1985), the address for Romco (PO Box 18359, Wichita, KS 67218-0359) was unintentionally omitted from the hardware manufacturers' address list.

**Item:** In the Software Buyer's Guide 1985, Part I (December 1985), the correct retail price for The Newsroom (Springboard Software, Inc., 7807 Creekridge Circle, Minneapolis, MN 55435) is \$49.95.

**Item:** In Michael Reich's Credit-Card Keeper program (December 1985, p. 144), line 560 should be changed to read

IFC<>1THENIFN<Y1THENNEXTN

to avoid a possible Next-Without-For error.

**Item:** Editorial changes regrettably distorted the meaning of a section of Robin Franzel's article, 64 BasicAid (December 1985). The last paragraph of column 2 and the first paragraph of column 3 on page 132 should read as follows:

"If you wanted to find GOTO in the program line 100 PRINT"GOTO THE STREAM", the above command won't work. It would search only for the GOTO command or token. To prevent the Basic interpreter from tokenizing your search string, simply use the quote mark as your delimiter. For example, FIND"GOTO" will find all occurrences of the word GOTO that are not commands.

The screen will display each line containing the search string. To prevent the lines from scrolling off the screen, the search stops after the eighth line, and the following message is displayed: CONTINUE Y/N. Y will display. . ."

Also on page 132, further down column 3, the variable name COST\$ should be changed to something else, perhaps COPY\$, since COS (cosine) is a reserved word.

Finally, the last paragraph of the same article (p. 133) neglected to request a disk, as well as \$3 and a mailer. If you have already asked Mr. Franzel for a copy, or intend to do so, please send him a disk, so he won't be out of pocket for that item.

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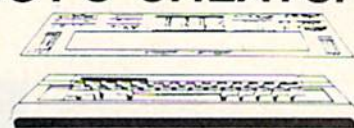
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## March

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- **RUN Word Processor**—In the March issue, we introduce RUN Script 64, a word processing program designed especially for *RUN* readers. RUN Script 64 is both flexible and easy to use and offers many features not found in other word processing programs.
- **Telecomputing Workshop**—This new telecommunications column will provide you with advice and answers to your questions on modems, terminal programs, on-line networks, bulletin board services and more.
- **C-128 Productivity Programs**—If you're looking to put your C-128 to work, these reviews

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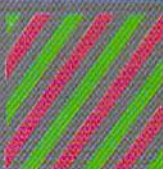
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