The Commodore C-128/C-64 Home Computing Guide

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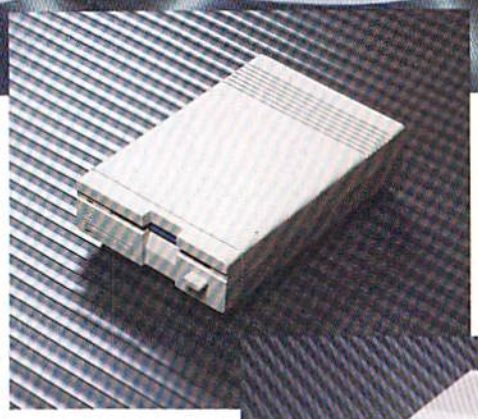
July 1986 A CWC/I Publication



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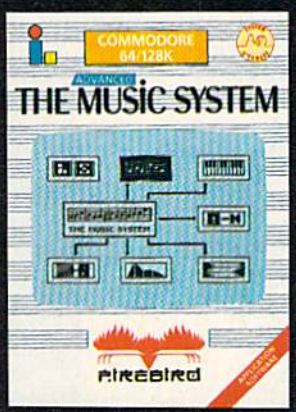

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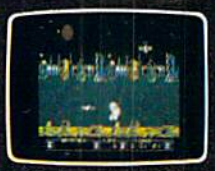

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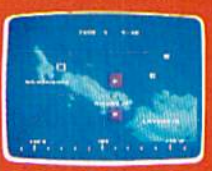

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COMMODORE 64/128K

If you own a C-64, you

The one you purchased. And the

GEOS realizes the technical potential that has been in the C-64 all along. Speed. Power. Ease of use. Sophistication. Elegant, practical applications you might expect of a high-end personal computer, all made possible with GEOS. It's so simple—but then, so was fire. Once it caught on.

To begin at the beginning. **GEOS** stands for **GRAPHIC ENVIRONMENT OPERATING SYSTEM.** Why?

GRAPHIC: Because menus and icons replace long, typed command lines. Point and click, that's it.

ENVIRONMENT: Because GEOS provides a consistent, powerful way to use your computer. Learning new applications is a snap (or should we say click).

OPERATING SYSTEM: Because GEOS orchestrates every function so that they all work together systematically, even symphonically.

Some basics. Icons are graphic images which represent files or utilities. Each is different, and all are easy to recognize and easy to use.

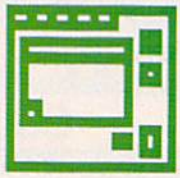
A menu is just that: a list of functions available for selection. When a menu appears, move the pointer to any item you wish. Click. Click. You're on your way.

A pointer is used to select and activate items. To move the pointer, roll the mouse or trackball or rotate the joystick. Once on target, click once to select; click a second time to activate.

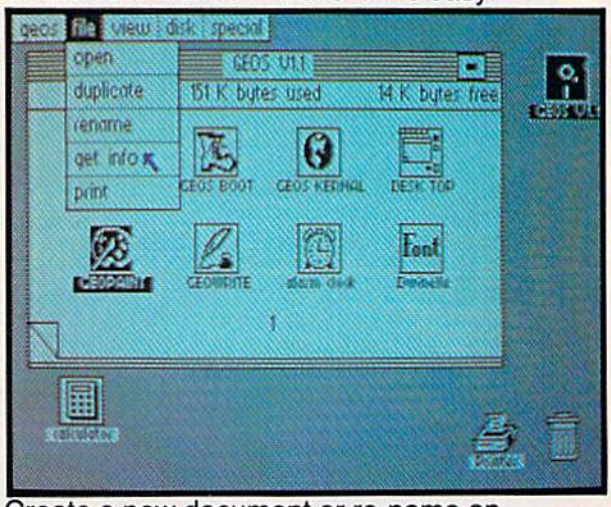
Fonts are a new way of looking at text. Choose from 5 different fonts (with more on the way). Try Dwinelle, or Roma, **bold,** or *italics,* even underline and outline. Need to fit more words on a line? Pick a smaller point size, like University 6 point, and get over one hundred characters per line.

All this and fast too. Because the integrated diskTurbo software improves 1541 disk drive performance 5 to 7 times. That's right. On both reads and writes.

GEOS can be divided into 4 areas: two functional aspects (deskTop and Desk Accessories), and two major applications (geoPaint and geoWrite).



deskTop. deskTop is a graphic interface, making file organization and management easy. As always, you call the shots. Load a disk. Files appear as icons on the disk notepad; to flip through, point at the folded corner and click. Prefer a file appear on a different sheet? Move it. It's easy.



Create a new document or re-name an existing one. Want to copy a file onto the same or a different disk? Fine. Forgotten what a file contains? Select "get info" from the file menu. A description of that file's contents appears. Finished with a file? Print it. Save it. Or drop it in the trash and have done with it. Your call.

geoPaint. A full-featured, color graphics workshop at your fingertips. The pointer operates any one of the fourteen graphic tools and shapes in the drawing menu. Create masterpieces on the Drawing Window. By turns, use a pencil, an airbrush or a paint brush, each with a character all its own. Draw straight lines, squares, rectangles or circles. Fill in with any of the 32 patterns. Switch to pixel-mode, where each dot in a selected section is magnified many times its size for easy manipulation.

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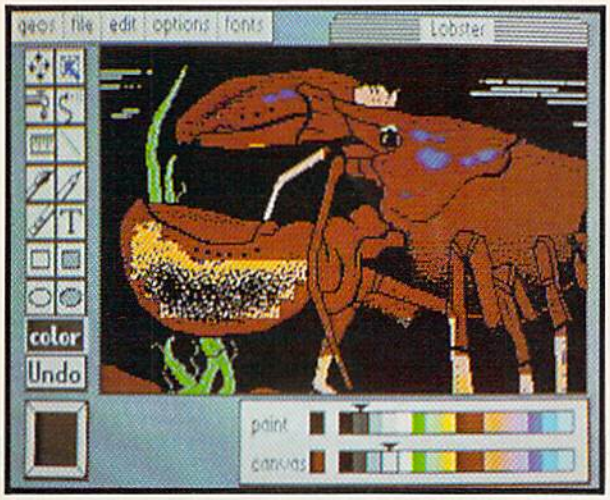
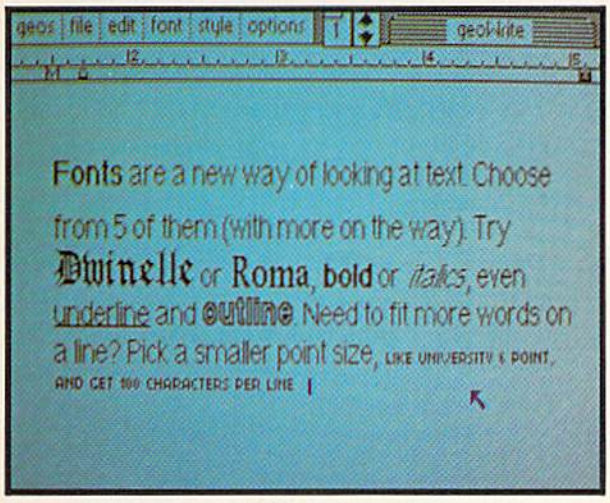


Second thoughts? Erase what you don't want. Or "UNDO" your last act. (If only life could imitate art!)

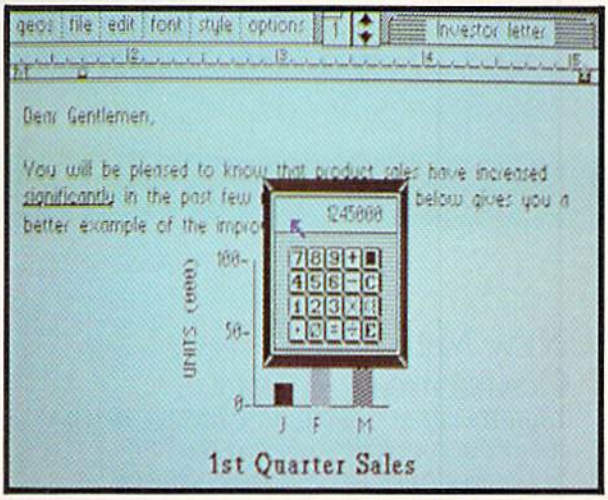
Add text if you like, in different fonts, styles or point sizes. Even change its position or layout at will.

Move or copy any part of your creation. Once done, you can include your artwork in another document—a letter home perhaps. (Won't Mother be pleased?) GEOS makes it easy.



geoWrite. An easy to use, "what you see is what you get" word processor. Create documents. Insert, copy, move or delete text as you wish. Choose from 5 different fonts in many different styles and point sizes. Preview your page exactly as it will appear off the printer. Typists will appreciate tabs, word-wrap and page breaks.

Documents may contain up to 64 pages. What's more, you can move to any page instantly. If you like, you can cut selected text from one section and move or copy it to another. Add graphics from geoPaint. It's a cinch.



Desk Accessories. Handy programs you can use while in any GEOS application. These include an alarm clock, a notepad for reminders, a four-function calculator, and photo and text albums which store pictures and phrases you may then paste into applications. The Preference Manager even lets you establish parameters for everything from mouse speed to the date and time—even background color. Civilized options, every one.

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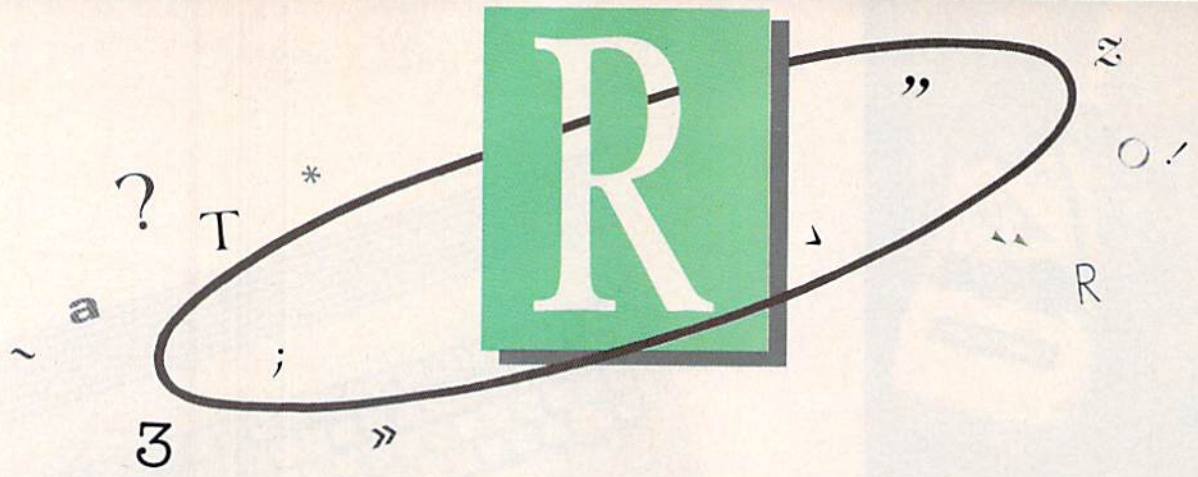

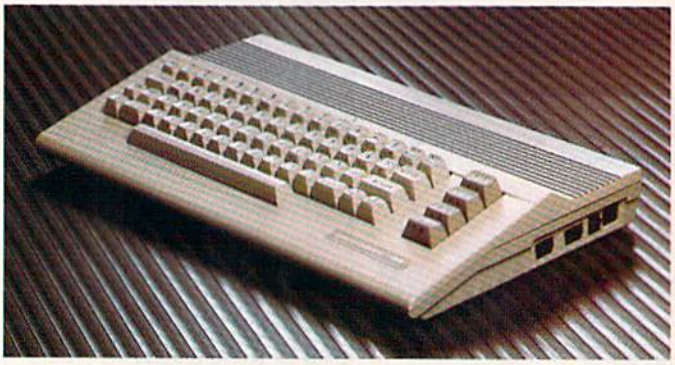

Commodore's New Look

There's a new look about Commodore these days—in more ways than one.

First, the company has undergone a restructuring of its management players. Thomas Rattigan is in as the company's president and chief executive officer; Marshall Smith is out. Beginning at the top and continuing on down the line, Commodore is showing new faces at the management level.

Second, the C-64 product line also has a new look about it. As you can see from this month's cover and lead article, sleek and sophisticated is in; brown and boxy is out.

Commodore intends to unveil these newly fashioned products, which resemble the C-128 in color scheme and design, at the Consumer Electronics Show in Chicago. (I am writing this about a month before the show.)

In addition to their enhanced visual appeal, these new products represent a slight improvement over the existing family of C-64 products: The computer features an improved keyboard, the disk drive is quieter and the monitor has 80-column capability.

Perhaps the most significant new product is the 3.5-inch 1581 disk drive, which can be used as a second drive and is a faster storage device with greater capacity than the 1541.

For the new computerist, the new C-64C system represents an impressive package. But what about the current C-64 owner?

Well, there is no trade-in program, and we wouldn't recommend that you replace your old equipment with the new C-64C system. However, if you're in the market for a new monitor or disk drive, you're in luck. The new C-64C peripherals are compatible with your old 64.

It wasn't Commodore's intention to dramatically change the 64 computer. According to Nigel Shepherd, general manager of Commodore North America, "We wanted to bring out a new look but retain the identity that the C-64 has with end users and to modify the machine as little as possible."

Essentially, the introduction of the C-64C system is a relaunching of the C-64 and an attempt to accommodate the surprising continued demand for it.

Commodore states that sales of the C-64 were brisk last year, despite a slumping year for the home computer industry. With one million sales worldwide last year, the C-64 has staying power.

According to Shepherd, "The 64 has become a household word, and we're not about to give that up. The consumer continues to purchase the C-64 at a phenomenal rate. And the sales of disk drives and monitors are equally strong."

Does this demand for the C-64 imply that C-128 sales are faltering? Commodore appears content with 600,000 C-128 sales worldwide last year. And, officials realize that the 128 appeals to somewhat different users than the C-64.

From a marketing standpoint, Commodore clearly differentiates between the two markets. The C-64C system, which comprises the computer, the 1541 disk drive and the 1802 monitor, is aimed at the entry-level computerist. For the more sophisticated user, there's the C-128 system, which features 80-column capability, CP/M, more memory, enhanced Basic and a numeric keypad.

Both systems, however, will be packaged with applications software—including the new icon-based GEOS operating system—that positions the machines as application tools for productivity.

Commodore will continue to be active in the telecommunications area with the introduction of a new entertainment feature from Lucasfilms on QuantumLink. Commodore also has planned a major price breakthrough in telecommunications: a 1200-baud modem for under $100.

Commodore officials have revealed that additional hardware enhancements, including a hard disk drive, a 3.5-inch dual disk drive, an 80-column expansion board and a new mouse device, are in the works. Some of these may be announced at CES, but others not until later in the year. **db**

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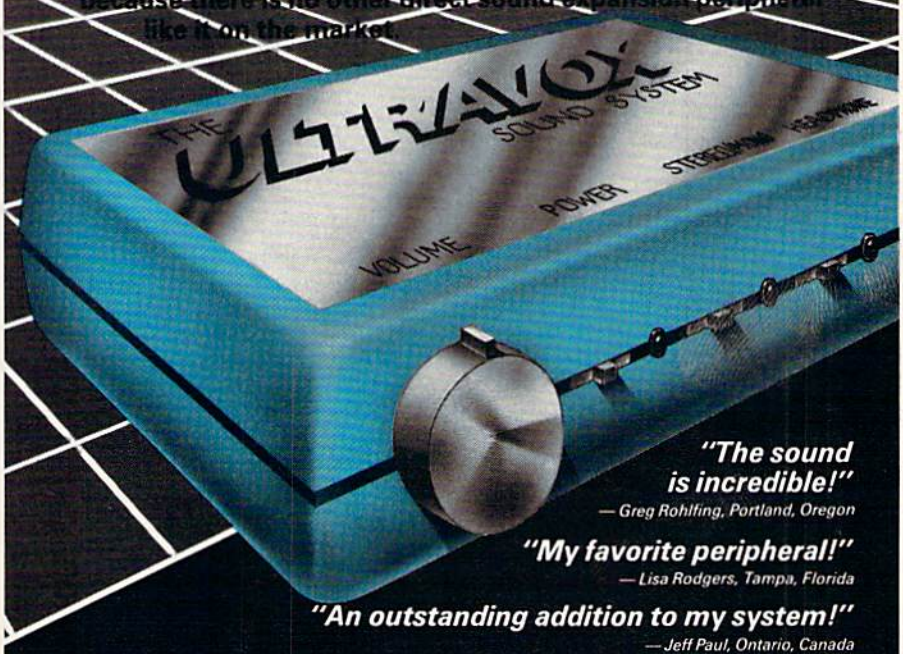

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Hints and tips for Commodore users

Magic is the original *column of reader-submitted hints and tips. Each month we present brief, useful computer "tricks" to help you get the most out of your Commodore computing system—whether you're a beginning or advanced computerist, a C-64 or C-128 owner. Magic is a forum for* RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to:*

Magic
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Beginning with the August issue, if your trick is accepted for publication in the column, you will receive a colorful RUN Magic T-shirt.

July conjures up images of fireworks, backyard barbecues and a cool dip in the lake. Well, this month's collection of jewels contains none of that, but it does promise you some refreshing and useful information for a midsummer's night. We present an enchanting assortment of gems—for the electronic handyman, the modem and BBS user, C-128 owners and computerists of all ability levels and persuasions. Try them out and add them to your repertoire.

$2FA C-128 window work—If a window is established, all normal printing takes place inside it. But you can print outside the window by Poking to location 235, as shown by this little program.

```
100 PRINT"{SHFT CLR}C-128 WINDOW DEMO - E.
    DAM RAVN"
110 WINDOW 0,10,39,20
120 PRINT"INSIDE THE WINDOW":GOSUB180
130 POKE235,1:PRINT
140 PRINT"OUTSIDE THE WINDOW!":GOSUB180
150 POKE235,10:PRINT
160 FORJ=1TO20:PRINT"INSIDE AGAIN!":NEXT
170 END
180 PRINT"PRESS A KEY!":GETKEYA$:RETURN
```

E. Dam Ravn
Olstykke, Denmark

$2FB Musical staff maker—This program prints eight sets of musical staff lines on a standard sheet of paper. My daughter uses it for music class, and I use it for planning computer music. Making your music paper is much less expensive than buying it, and it's a lot more fun.

```
100 REM MAGIC MUSICAL STAFF - M.L.OAKES
110 OPEN4,4:PRINT#4:PRINT#4:PRINT#4
120 FORJ=1TO79:A$=A$+CHR$(164):NEXT
130 FORK=1TO8
140 FORL=1TO5:PRINT#4,A$:NEXTL
150 PRINT#4:PRINT#4
160 NEXTK
170 CLOSE4
```

Melvin L. Oakes
Louisville, KY

$2FC Modem improvement—I'm pleased with my Commodore 1670 modem and its 1200-baud operation, but there's one annoying problem—it doesn't have an on-off switch. If the computer is on, the modem will answer any incoming calls, sending the carrier tone right into the caller's ear.

One solution is to get a ringer silencer from Radio Shack (#43-127). You install it in the line to the modem, and it can disable the modem from answering incoming calls.

Mark Hodge
Louisville, KY

$2FD Turbodial—Auto-dial modem owners know how agonizingly slow the auto-dial process is, especially when using pulse dialing. If your telephone has speed dialing, however, you can speed up the process immensely. (Speed dialing lets you dial commonly called numbers by dialing one or two digits.) Just establish your QuantumLink or BBS number as one of your speed dialing numbers, then set your terminal program to call it. Now that your computer has only one or two digits to dial, things like dialing and redialing will proceed more rapidly.

Craig Edward Given
Chattanooga, TN

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$2FE Summertime magician—This C-64 audiovisual spectacular shows a miracle worker in full flower. There are no bugs in the program, but there *is* a CHR$(66) that you'll only see when you run it.

```
10 PRINT"{SHFT CLR}{CTRL 2}SUMMERTIME MAGIC
   IAN - BOB & DAVID SNADER
15 S=54296:V=53248
20 FORJ=832TO959:READK:POKEJ,K:NEXT
25 FORJ=0TO7:READK,L:POKEV+K,L:NEXT
30 S=54296:V=53248:FORJ=0TO255:POKEV,J
35 POKES,5:POKE2040,B:POKES,0
40 IFB=14THENB=13:GOTO35
45 B=14:NEXT
50 DATA 000,240,000,003,252,000,003,255
51 DATA 000,003,255,001,000,255,004,000
52 DATA 255,016,000,063,016,000,063,004
53 DATA 001,143,028,073,153,093,025,153
54 DATA 085,009,153,085,001,153,020,000
55 DATA 145,000,000,004,064,000,001,016
56 DATA 000,004,064,000,017,000,000,000
57 DATA 000,000,000,000,000,000,000,000
60 DATA 000,000,000,000,000,000,000,000
61 DATA 000,000,000,001,000,000,004,000
62 DATA 000,016,000,000,016,000,000,004
63 DATA 003,255,028,075,252,093,025,249
64 DATA 085,009,153,085,001,153,020,000
65 DATA 145,000,000,004,064,000,001,016
66 DATA 000,004,064,000,017,000,000,000
67 DATA 000,000,000,000,000,000,000,000
70 DATA 032,005,033,014,037,000,038,015
71 DATA 039,007,021,001,028,001,001,108
```

Bob Snader & David Snader
Baltimore, MD

$2FF Password maker—Our bulletin board needed passwords that were unique and easy to remember. We wrote the accompanying program to create easily pronounceable, eight-letter passwords. If you need a printout, you can alter the program to accomplish this.

The words are far from English, but they could easily have come from a tribal tropical paradise. Some consonants were omitted from B$ to make the words easier to pronounce.

```
100 PRINT"{SHFT CLR} MAGIC PASSWORDS - BUCK
    SOMMERKAMP{CRSR DN}"
110 A$="AEIOU":B$="BCDFGHKLMNPRSTWZ":PW$=""
    :K=RND(-TI)
120 FORJ=1TO4
130 K=INT(5*RND(1)+1):V$=MID$(A$,K,1)
140 L=INT(16*RND(1)+1):C$=MID$(B$,L,1)
150 PW$=PW$+C$+V$
160 NEXT
170 PRINTPW$,
180 GOTO110
```

Buck Sommerkamp
Warrensburg, MO

$300 Jotto answers—A guessing game named Jotto appears on p. 145 of my *Commodore 64 User's Guide*. If you're like me, that was one of your first programs. The accompanying lines, an accessory to that program, will show you all the right answers. Just add them to the original unchanged Jotto, then save the combined program under some appropriate name.

```
10 PRINT"{SHFT CLR}JOTTO ANSWERS - CARL E.
   MADSEN{CRSR DN}"
20 FORJ=1TO50:READA$
30 FORK=1TO5
40 T$(K)=MID$(A$,K,1)
50 JK=ASC(T$(K)):JK=JK-1
60 PRINTCHR$(JK);
70 NEXTK
80 PRINT
90 NEXTJ
```

Carl E. Madsen
Bayard, IA

$301 C-128 Sweeper—You can have some fun with this program, Sweeper, which I first wrote for the Timex-Sinclair ZX-81. It works even better on the C-128, with its CHAR and Color commands. Try your own sounds in the program, and try fitting your own words to the sounds.

```
10 PRINT"{SHFT CLR} MAGIC SWEEPER C-128 - B
   .BUSH
20 A=INT(RND(1)*16+1):IFA=2THEN20
30 B=INT(RND(1)*6+1)
40 IFB=1THENA$=" WHO?":B$=" >-YOU! "
50 IFB=2THENA$=" WHAT?":B$=" {LEFT ARROW}GE
   T OUT! "
60 IFB=3THENA$=" WHY?":B$=" <-BECAUSE "
70 IFB=4THENA$=" IT'S ME!":B$=" (-GO!! "
80 IFB=5THENA$=".AW":B$=" )-BEGONE "
90 IFB=6THENA$=" ME?":B$=" YES, YOU! "
100 COLOR0,2:COLOR5,A:COLOR4,7
110 FORJ=1TOA+10
120 CHAR1,J,A,A$:SOUND3,1050*B,2,1,1000*(J
    +A+B),6000,0,3000
130 NEXTJ
140 FORJ=30TO(2*B)STEP-1
150 CHAR1,J,A,B$:SOUND3,800*(A+J),2,,J,100*
    (J+A),3,50*(J+A)
160 NEXTJ
170 GOTO20
```

Bernard Bush
Address unknown

$302 C-128 Perfect Typist fix—To keep the SYS addresses on screen for this vital *RUN* program, insert the following in line 60, between the Print statement and the SYS5120.

```
:WINDOW 0,4,79,23:
```

J. C. Vollmer
Prior Lake, MN

$303 C-128 CP/M screen color—You can change the screen color when in CP/M mode by holding down the control key and one of the number keys on the keypad (*not* the number keys on the top row); CTRL 2 = white, CTRL 3 = red, and so on.

Michael L. Knapp
Omaha, NE

Continued on p. 78.

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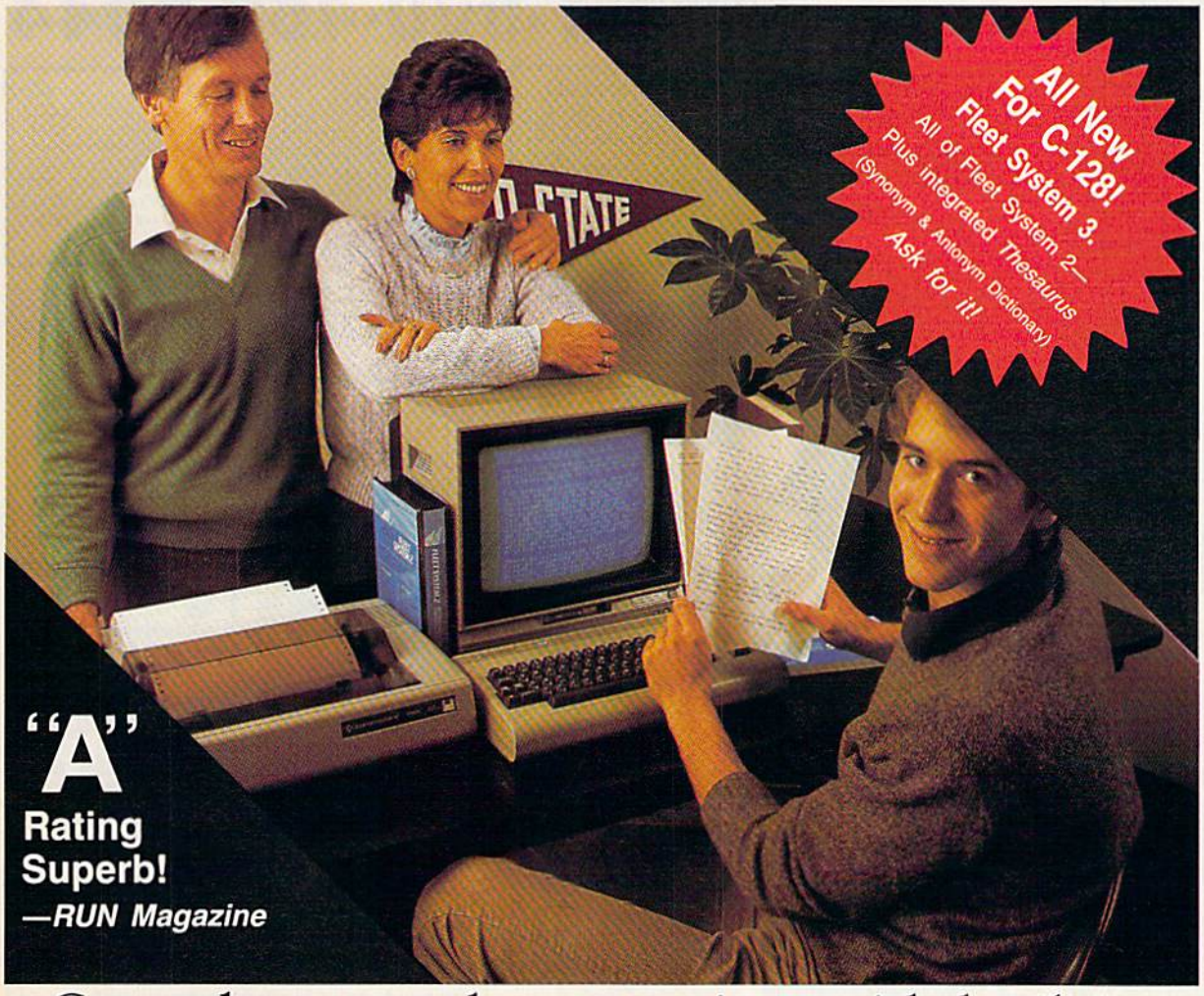

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Compiled by HAROLD R. BJORNSEN

Alter Ego

A

Experience Life's Trials Without Going Off The Deep End

In case you've been wondering where simulations were headed and what the ultimate simulation might be, Alter Ego could be it. Although the publishers describe it as a "fantasy role-playing game about life," you could also look upon it as a simulation of life itself.

Contained on three disks, with all six sides in use at various times during play, Alter Ego is certainly one of the most ambitious programs ever written for the C-64; but more than that, it's fun.

You begin at any one of the seven stages of life, decide on a personality and work to resolve to your satisfaction the situations confronting you. The purpose of the game is to present you with a personality profile based on how you reacted to the various situations you meet.

After you've chosen a stage of life and a personality, you're presented with a graphics screen showing blocks connected by lines. Each block contains a life situation represented by a symbol: the heart symbolizes the emotional; the brain, the intellectual; the crest, the familial; and so on. It really doesn't seem to matter whether you tackle situations in the order presented or skip some and come back to them later. But, to complete a level, you must involve yourself in every situation.

At the edges of the screen are other symbols, representing actions you must take in order to work through the situations. When you've chosen a situation, the screen changes to text to describe it. After reading the scenario, you're asked to choose from a list of possible actions to take.

The action you select may lead to a further complication, or it may entail your selecting a subsequent action before you're through. When the situation has been resolved, for good or ill, an interlocuter will make an appearance with congratulatory or chiding comments and, usually, a brief explanation of the situation from a psychological point of view.

Following the resolution, the screen returns to the path of icons, and you're ready for your next move. As in a text adventure, the choice you now make seems to affect what will occur later. Don't try, however, to guess the "correct" answer, for there is none. Instead, look for the feelings and choices you'd make (or did make!) in real life.

At any time, you may go to the profile icon to see how you are faring. Here you'll find a chart that measures your intellectual bent, emotional stability, trustworthiness, and more. You'll also be reminded of your personal wealth, the status of your relationships with the opposite sex and the possessions you've accumulated.

Speaking of sex, Alter Ego comes in both male and female versions, so be sure you buy the appropriate one. The package also carries a PG rating, warning that "explicit" materials are contained in the program. While playing, you're also warned when the icon you've chosen contains explicit material, and you're given the option of skipping it.

These sections, I feel, do not go beyond the bounds of good taste. The warnings simply represent Activision's bending over backward to ensure that your sensibilities are not offended.

In a sense, Alter Ego is a fantasy, for it is possible to give answers completely adverse to your real character and see how you turn out. It is also possible to answer as you think you would really behave in every situation and then compare the ending evaluation with your own self-assessment.

Of course, the results should be taken with a grain of salt, and the difference between Alter Ego and

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!

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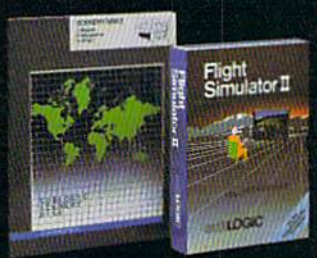

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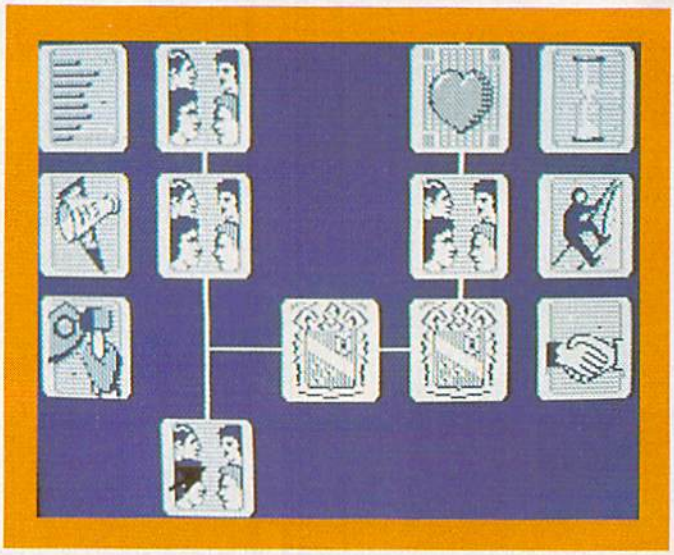

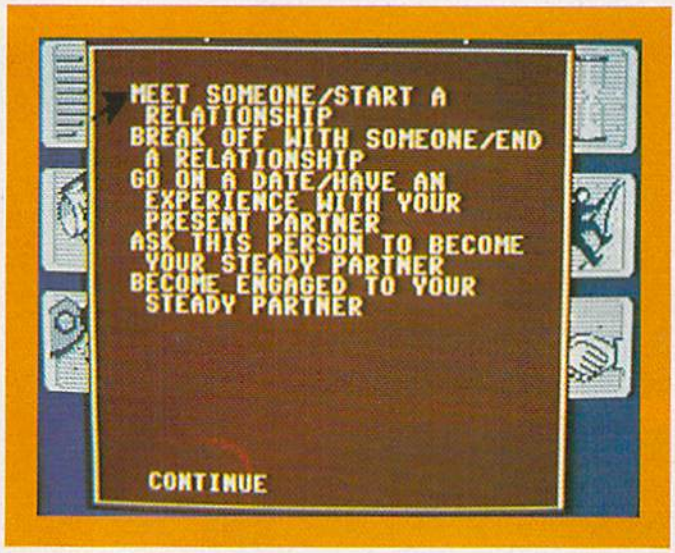

Screen displays from the Alter Ego program.

other computer routines that purport to measure personalities is that Alter Ego is fun. *(Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/$49.95 disk.)*

Ervin Bobo
St. Peters, MO

CMS General Accounting System 128

Get Down to Business With this No-Nonsense Accounting Package

The CMS General Accounting System 128 is not a home- or personal-productivity program. Nor is it for the casual user. CMS President, Chuck Stuart, who wrote both the program and its documentation, has created a complete accounting system that will require a committed effort on your part to learn to operate.

Those willing to make that commitment will discover a program that can handle the bookkeeping chores of businesses ranging in size from tiny to moderately large. It can track income and expenses, bill clients, estimate job costs and pay salaries to employees and withholding taxes to the government.

It will do all of that with a modest amount of hardware. The basic requirements are a C-128, a 1541 or 1571 disk drive, an 80-column printer and an 80-column monitor.

It should be noted, however, that the preferred setup is to have two linked 1571 disk drives. As Stuart points out in his introduction, using one drive would require you to do an arm-wearying amount of disk-swapping, and the 1541's slow data-transfer rate would really hamper productivity. Also, note that the monitor should be capable of 80-column reproduction.

The disks and well-indexed documentation are contained in a small looseleaf binder. Inside, you'll find a three-page introduction that describes system requirements and loading procedures and explains how to make working copies of the non-copy-protected software. Then comes a price list and order sheet for preprinted business forms, followed by a five-page overview of the accounting system itself.

Four tabbed sections form the heart of the documentation. These are: General Ledger, Accounts Receivable with Billing, Accounts Payable with Job Costing, and Payroll.

Each section represents a program disk. A fifth program disk in the system, "Data Disk," is the key to getting started with the accounting system. Stuart has prepared the disk with sample information that you may replace or adapt to suit your own needs.

A pleasant surprise of Stuart's system is that you needn't be an accountant, or even, for that matter, well-versed in accounting principles, in order to use it. The software is so well-designed that even accounting neophytes should have it up and running in ten hours or less. And, if you run into any snags, designer Stuart is just a phone call away. Users have told me he's very accessible and helpful.

To someone who has never used a Commodore computer for anything more serious than writing book reports or filing recipes, ten hours may sound like a lot of time to invest in learning a program. But it's time well spent, considering the capabilities of a business program as serious and comprehensive as this one. Similar programs for other computers take much longer to master.

When used with the proper preprinted material available from CMS, this accounting system is also capable of printing out virtually all related items, such as billing statements, paychecks and government tax forms.

It should be obvious by now that this program's great strengths are its versatility and completeness. But one of the nicest things about it is that those attributes belong to a serious business program designed for a Commodore computer. CMS Accounting System really accentuates

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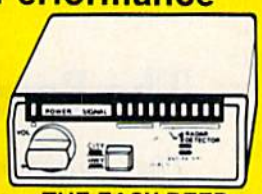

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the new C-128's capabilities. As the saying goes, this could be the start of something big. *(CMS Software Systems, Inc., 2204 Camp David, Mesquite, TX 75149. C-128/$179.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

The Graphics Magician Junior C

Draw Praise from Your Friends with a Dazzling Display of Artwork

The Graphics Magician Junior is a solid paint program. A few years ago it would have been fantastic. But compared to some other programs currently available, it has serious limitations, such as no print program.

You draw by using keys, a joystick or a touch tablet, and all three can be activated at once. You may need all three if you want precision drawing. I don't have a touch tablet, so I couldn't test that method of input. Using keys is awkward; instead of cursor keys, the program uses the letters I, J, K and M.

I suspect the conversion from the original Apple program to the C-64 skipped the cursor keys so that the same documentation could be used for both. In any case, the all-purpose instructions are confusing, and the screen illustrations are from the Apple version. The documentation is a 2- by 3-foot poster printed on both sides, instructions are sparse, and beginners may have trouble following them.

Unlike other Commodore graphics programs, The Graphics Magician Junior does not have cursor-speed control when you use a joystick. The cursor whizzes past your stopping point; to position it, you have to use keys that don't repeat when you hold them down. If you make mistakes, you can undo your last operation, or use the excellent two-size Magnify mode to edit individual pixels.

One of Magician Junior's better points is its 256-item palette. In addition to the Commodore's 16 colors, the palette has several textures, which combine two colors in various checkerboard and striped patterns. These are not too good for drawing, but they are spectacular for filling areas or making borders.

Also, the program's Brush mode offers a menu of 100 sizes and patterns. They range from thicker drawing lines to snowflakes to icons like spirals and a coiled snake, all of which can be repeated to make fascinating patterns. One disappointment is that you cannot change the size of the drawing line for the geometric modes (circle, rectangle, triangle, etc.).

Two other features I like are the non-copy-protected disk and the Basic program, which displays pictures created by Magician Junior. "Pic Display" has subroutines that you can incorporate into your own programs to display your finished art.

I've never found a program with every feature I wanted. Magician Junior is a good paint program if you don't need printouts of your drawings or features like a layout grid and cut-and-paste. The palette size and the number of brush styles offer excitement for the computer painter, and, like any good paint program, The Graphics Magician Junior is fun to play with. *(Polarware, 2600 Keslinger Road, PO Box 311, Geneva, IL 60134. C-64/$34.95 disk.)*

Annette Hinshaw
Tulsa, OK

The Bard's Tale B

This Dungeon Fantasy Is a Perfect Blend of Music, Magic and Mayhem

The first volume in Electronic Arts' "Tales of the Unknown" series, The Bard's Tale, is a fantasy role-playing game that takes place in the streets, castles and dungeons of the mythical country and town of Skara Brae. The town has fallen under the domination of Mangar the Dark, and it is up to you to assemble a small band of hearty adventurers to vanquish the evil wizard.

You'll need six brave souls to make the quest. For those in a hurry, the program includes a pre-assembled party that's fully-equipped with weapons and armor. If you're a do-it-yourselfer, you'll probably want to create your own characters. You begin by selecting a race (human, elf, dwarf, hobbit, half-elf, half-orc or gnome) and then a character-class or profession for each member of your team.

The available classes are hunter, monk, warrior, paladin, rogue, bard, conjurer and magician. Two additional classes—sorcerer and wizard—can be attained by magic users through experience. As each race is selected, random values are assigned for typical role-playing character traits, such as physical strength, intelligence, dexterity, hit points and luck.

Besides the six regular members of your adventuring party, there is also a special, seventh slot that can be filled either by an illusionary or real character summoned through a magic user's spell or by a friendly character who offers his services to the party. Special members, like regular adventurers, can be turned against the party by enemy magic. If this happens, the possessed member must be returned to his normal state through magic or destroyed through intra-party fighting.

To reach Mangar, your party will have to battle its way through 16 levels of dungeons, spread out among Skara Brae's sewers, towers, castles and catacombs. The town also features temples where injured adventurers can be healed; an equipment shop where you can purchase weapons, armor and other necessary items; and taverns where the bard can quench his thirst after a rough day in the dungeons.

Although The Bard's Tale is similar in many ways to other role-playing fantasies, the designers of the game have added enough unique twists to keep play interesting. For starters, the town and all its various labyrinths are represented on screen in colorful, scrolling, 3-D perspective. Also, when your party is attacked, the assailant appears in full color and is often animated.

Another feature that distinguishes

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The Bard's Tale from other Dungeons & Dragons-type games is the passage of time. As you roam the streets of Skara Brae, hours pass and night eventually falls. In fact, if you're inside a building when night arrives, you'll be told that it's closing time and that you should come back and finish your business in the morning. When you leave, you'll notice that the once-blue sky of Skara Brae is now black and filled with stars.

Finally, in addition to 85 spells that can be cast by magic users, there are six magical Bard's Songs, which can be played by a properly equipped bard, either during combat or while exploring. When the bard runs out of tunes, however, he must down a few tankards of ale at the local tavern before playing again.

These features, as well as many other options, puzzles and surprises, make The Bard's Tale a first-rate adventure for the fantasy role-playing fanatic. *(Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. C-64/ $39.95 disk.)*

Bob Guerra
Charlestown, MA

Fontmaster II

Use the Font You Want for Your Printouts, and Get a Word Processor to Boot

Fontmaster II is in a class by itself. As a word processor, it matches the features of all but the most powerful programs available for the C-64. Beyond that, it offers 30 different fonts, including Greek, Russian and Hebrew (which the program prints right to left), to use for your printed output.

You can mix and match up to nine fonts in one document, in addition to calling for expanded and compressed print, super- and subscripts, half- and double-height letters, three different pitches and a special pitch for script. Printed text may be justified or proportionally spaced. Unfortunately, not all printers support all these features.

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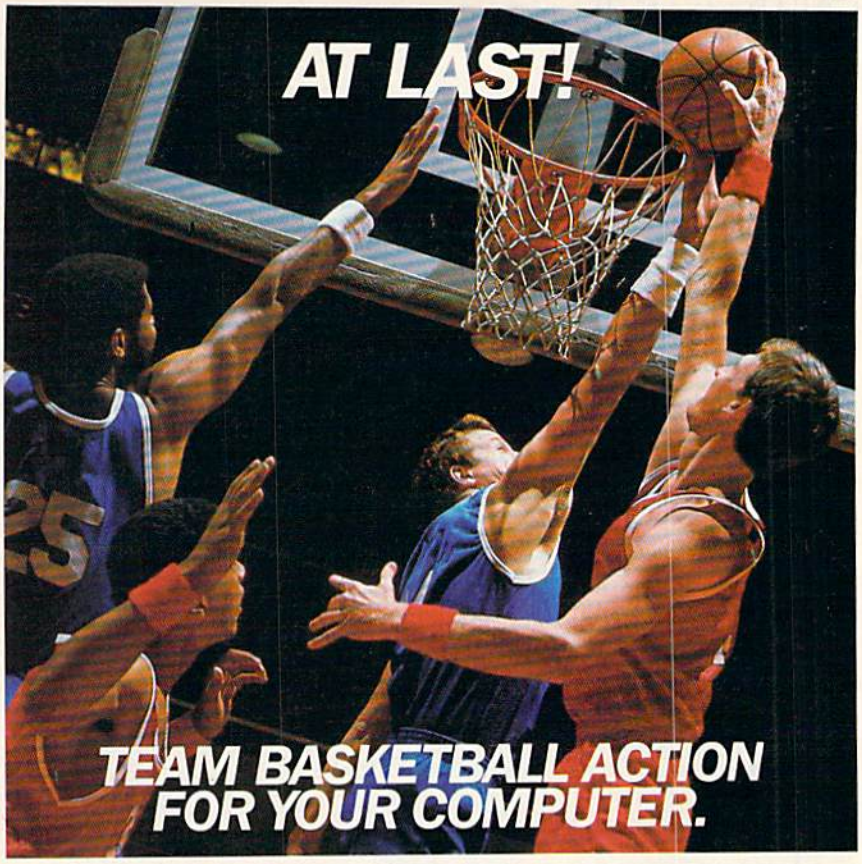

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For foreign alphabets you can change the screen character set to match the printout, including mirror printing and displaying characters from right to left for Hebrew. In non-foreign character sets, underlined letters show on screen.

Fontmaster II has many special features. You can alternate between two printer-configuration files and turn word-wrap on or off. The program also provides temporary indents and allows you to define up to four columns. Furthermore, its Global Replace feature lets you agree to each instance of replacing text.

Fontmaster II provides both headers and footers, which can use either Roman or Arabic numerals. On odd- and even-numbered pages, you can alternate left and right headers and left and right justification. The control line shows your tabs, and you can clear them with a single command.

You can insert "soft" hyphens, which are used only when the word is at the end of a line. The Mail Merge option lets you personalize form letters, and in case you don't like the fonts supplied, the program includes a utility for making your own fonts and character sets.

Fontmaster II is sophisticated, and it may be difficult for beginners to use. Although the manual is quite good and contains an excellent index, it misses on some points—I had to guess how to obtain a double-spaced printout. You really have to read the entire manual to understand fully how to operate the many commands and format markers.

The program's operation is fairly straightforward (you access the program's disk operations from a menu), its Help feature is a godsend, and the package includes a quick-reference card and a backup disk. I know from experience, too, that Xetec supports its products very well.

My only serious complaint is that Fontmaster II won't read a program file that it didn't write. It only reads and saves sequential files, so you'll have to convert previously saved program files to sequential files in order to tap Fontmaster II's Typewriter font. The output with this font is not as good as letter-quality printing, but it's close. My Gemini 10X has never looked so good.

Using the special fonts is slower than the Dot Matrix mode, because the printer operates in Graphics mode. But it compares favorably with the speed of letter-quality printers. In Font mode, my printer prints every line twice, but is no longer bidirectional. Since I can print at the usual speed for drafts, this seems a small price to pay for output of much higher quality. Especially if you need Greek, Russian or Hebrew word processing, or perhaps just a few foreign letters to insert in your text, Fontmaster II is the answer to a prayer. I recommend it highly. *(Xetec, 2804 Arnold Road, Salina, KS 67401. C-64/ $49.95 disk.)*

Annette Hinshaw
Tulsa, OK

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New Members Of the Commodore Family

In an interview earlier this spring, top officials at Commodore divulged details about the company's new products that were scheduled to be announced at CES in Chicago. What follows is a synopsis of this conversation, not a review of the products.

By DENNIS BRISSON and MARGARET MORABITO

This spring, Commodore officials gave *RUN* an advance description of the new family of products—scheduled for release at the recent CES—that promises to expand the home computer market. This group of products includes a more stylish-looking C-64 and 1541 disk drive, a new 40-/80-column monitor and a 3.5-inch disk drive, called the 1581.

"We're not just selling computers," noted Nigel Shepherd, general manager of Commodore North America. "We're selling a complete system."

These new products are being marketed to meet the needs of the entry-level computerist and represent a family of products totally compatible with one another in both function and design. They also bear the traditional Commodore trademark—quality at a low cost.

The "New" 64

The popular C-64 computer has been redesigned with a sleeker, wedge shape to match the look of the C-128. This low-profile computer is being marketed as the C-64C. The "C" designation differentiates it from the old 64, but, Commodore assures us, the differences are only in outward appearance and styling.

"Internally it's the same," notes Ed Parks, Commodore's director of new product development. The inside components, as well as the external ports, are identical and in the same locations on both models. This, according to Commodore, guarantees that all C-64 peripherals will run on the C-64C and that the new machine is 100 percent compatible with C-64 software.

The C-64C features exactly the same keys that millions of C-64 owners have become accustomed to.

The color scheme, however, is identical to that of the C-128: the outer casing and most keys are light beige; the function keys a darker beige.

The new computer is the same width as the C-64. However, to allow for air vents on top of the computer, Commodore has added over an inch and a half to the depth of the machine, so new owners will have to find a little more space on their computer tables to accommodate it.

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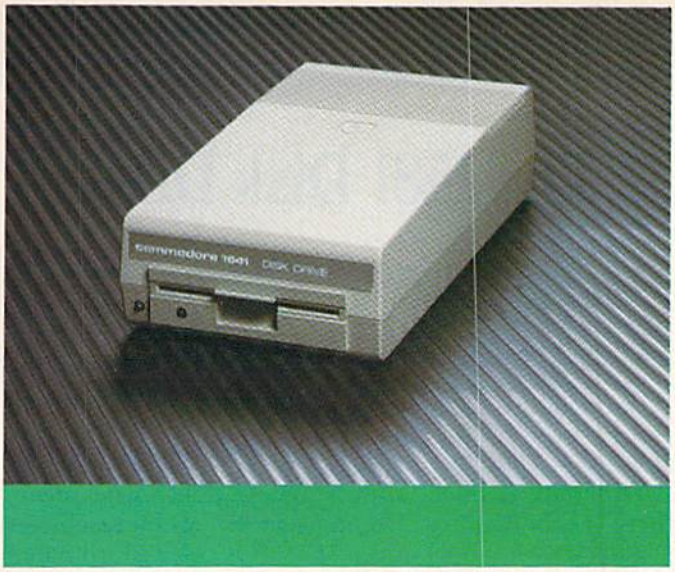
The C-64 power-supply problem (overheating) associated with certain vendors has been eliminated, according to Parks, "so we don't anticipate that the new power supplies are going to be a problem as they have in the past."

Commodore informs us that the retail price of the C-64C will be in the range of $179–$199.



The "New" 1541

The 1541 disk drive has also undergone a cosmetic change to match the new-looking C-64C. The casing color is now light beige.

A more significant change involves the redesign of the drive's circuit board. Also, the disk drive features a track-zero sensor for the home position, and the DOS has been modified to take advantage of this sensor. According to Parks, this eliminates the annoying head-banging noise that has become so familiar to 1541 users when running some commercial software.

Other than that, the features of the 1541 are the same: it's a single-sided disk drive with the same storage capacity and speed and is 100 percent compatible with existing C-64 software.

The 1802 Monitor

In keeping with its new family of peripherals for the C-64C, Commodore is now producing the 1802 monitor (not to be confused with the 40-column, charcoal-colored 1802 monitor that came out with the Plus/4 back in 1984).

This 1802 is color-coordinated with the C-64C. The monitor is internally identical to the 1702, but is externally different in its color and case design and in that it has a 40-/80-column switch. It can display the same 40-column programs that the 1702 now handles, but can also be switched to accommodate a black and white, 80-column display.

This dual functioning is not as impressive as it sounds. The 80-column display is not RGB and is the same composite display achieved on the 1702. (For more details on the 1702 and its 80-column display, see Margaret Morabito's article, "Video Monitors for Your C-128," in *RUN*, October 1985.) The 1802 is more convenient than the 1702, though, due to the 40/80 switch, which lets you easily change from 40-column color to 80-column black and white.

To use the 80-column capability (which you can't with the C-64C), you need the C-128 with a cable coming out of the 9-pin RGB port. However, if you have a C-128 and want to use 80 columns, you should get either the 1902 RGB monitor or an inexpensive monochrome composite monitor, either of which will give you a much clearer 80-column display than the 1702 or 1802.

The 1802 seems to be a logical replacement for the old 1702 and should be purchased by those who primarily want to use its 40-column color capabilities. It will cost about $10 more than the 1702.

Another Plus: Bundling

The C-64C and its new peripherals give the new Commodore owner a more attractive-looking and slightly better computer system at the same low price as the old C-64 system. Beyond this, the consumer will find new support products and applications packaged with the C-64C, which add to the appeal of this computer system.

Commodore recently announced that GEOS (see *RUN*'s June 1986 issue), the new software product that includes a word processor and graphics program, will be bundled with the new C-64C. "It's a natural," states general manager Shepherd, "because it immediately gives the new owner a sophisticated program that's easy to use."

He also noted that Commodore will be bundling the QuantumLink terminal disk and an education program disk with the new machine.

This marketing strategy focuses on the wide range of benefits—education, productivity, telecommunications and fun—that you can achieve with the purchase of a new C-64C. "We want to address the consumer's concerns about how to use the new machine and what applications are available for it," said Shepherd.

The last six to eight months have seen the C-64 still selling strongly, revealing the public's continued desire for this computer. The new C-64C and its redesigned peripherals serve to emphasize Commodore's complete and continued support of the C-64 in the home computer market. R

Address all author correspondence to RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

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The 1581 Disk Drive

By MARGARET MORABITO

Commodore 128 and 64 owners who are thinking of getting a second disk drive will want to take a close look at the new 1581.

The 1581 is small, approximately nine inches deep, three inches high and five inches wide, and it resembles a scaled-down model of the 1571. It is color-coordinated to match the C-128 and C-64C, uses double-sided, standard 3.5-inch rigid floppies, like those used in the Amiga, and it is connected through the standard Commodore serial bus. Its external power supply comes in the form of a small, wall-mounted ac adapter, which makes the drive compact and keeps the internal heat down.

Specifications

The 1581 is compatible with the 1571 and the 1541, making it a valuable second drive for the C-64, C-64C, Plus/4 and C-128 (in all three modes). It has its own superset of DOS commands (which had not been finalized at the time of this writing), and supports all those of the 1541 and 1571 as well.

The 1581 has the same 6502 microprocessor as the 1541 and 1571. It has 8K of RAM, which is four times that of the other two drives. This extra RAM allows for full-track buffering, which improves the drive's performance for both loading and saving. As with the 1571, the 1581 has 32K of ROM, two serial ports and a switch on the back for designating the drive as device 8, 9, 10 or 11. It will probably sell for about $245.

Transfer Rates and Disk Storage

This new drive provides a significant improvement in speed over both the 1541 and 1571. Using the 1581 with the C-64, C-64C and Plus/4, the transfer rate is 500 characters per second (cps), which is 60% faster than the 1541. Using it with the C-128's burst commands, the transfer rate is 8500 cps, or 60% faster than the 1571.

The 1581's double-sided floppies provide one megabyte of data storage unformatted, 737K bytes when formatted. This is comparable to the disk storage on the Amiga.

Software Compatibility

Since you can't use your 5.25-inch disks in the 1581, you'll need to copy your programs from them onto the 3.5-inch disks. Don't even think of reproducing any copy-protected software. However, all of your non-protected programs and any sequential and relative files that you've created from other application programs (using the 1541 or 1571) can be copied and should run properly. You simply use a disk backup program, such as the DOS Shell or other public domain copy programs, and change the device number on the back of the 1581.

Although the 1581 has the same microprocessor and is compatible with the 1541 and 1571, it has a different internal architecture. There are different peripheral chips, different amounts of RAM and different addresses for the locations of RAM and ROM. This means that those programs that need to download code into the drive will not work. Only those programs that use Commodore DOS control are guaranteed to work. (Because of this feature, current releases of GEOS will not run properly on the 1581.)

You should be wary of using commercial copy programs that require code to be downloaded into both drives. Some of these copy programs try to speed up the transfer rate from one drive to another by totally bypassing the drive's DOS.

CP/M Software

For you C-128 users, the 1581 can handle the same CP/M programs you now use with the 1571. Off-the-shelf MFM- and GCR-formatted CP/M software will work (if you can find it in 3.5-inch form), as well as public domain software. Most CP/M software is on 5.25-inch disks and is not copy-protected, so it will be easy to back up your CP/M library onto the 1581.

Commodore is working closely with software developers to make them aware of the new 3.5-inch drive and its specifications. According to Nigel Shepherd, "There is a transition underway toward the 3.5-inch drive. It may well become a standard in the future."

Commercial software will be coming out for this new disk format, but, as Shepherd puts it, "There's no hurry." The 1581 drive is marketed right now mainly as a second drive for those who want a high capacity, mass storage device to complement their 5.25-inch drive. In time, commercial software will appear.

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Extra! Extra! Read All About It

Is writing a newsletter for your user's group or small business becoming a time-consuming and expensive burden? Save yourself some paper and pain and put it all on disk—with this desktop publishing program.

By DAVID A. HOOK

The world of literature changed dramatically with the development of the printing press; no longer was manual transcription the only way to produce copies of valuable works. In our century, the photocopy machine proved to be another liberating step for mass access to the printed word. Yet these processes, whether manual or automatic, still involve traditional paper copies.

You have all heard of the "paperless society" that computerization is making possible. I invite you to take another step towards this goal.

Electronic Newsletter

One of the benefits of our thriving 125-member local computer club, the Barrie User's Group (BUG), has been a free, 24-page monthly newsletter—an ambitious undertaking for a small group. Although we enjoyed the low-cost services of an "after-hours" printer, it became physically and financially impossible to produce and distribute so many printed pages.

A solution came to mind during the Christmas 1984 season. Robert Sims, whose telecommunications talents are now familiar to *RUN* readers, had started a disk-based magazine called *Bozart*. Program updates, technical information and a serialized work of fiction marked the early copies. Why, I wondered, couldn't our user's group put out a disk-based newsletter?

Inspired by *Bozart*, I began developing the process. Our newsletter text could be produced with the word processor, then put into the form of a text file. A file-reading program would then enable members to see the issue on their monitor screens.

Members were already turning in a disk each month to get our public domain library releases; now they could supply a second disk for the newsletter, and our problems would be solved. No commercial printer to pay, no lead time and virtually no cost! (We do have a number of members with dual disk drives, and no shortage of assistance in making up the disk copies.)

We quickly developed programs to produce the text file, read it to the screen and print a paper copy. Refinements have been made over the past year to include a colorful cover page (either KoalaPainter or Doodle format). Though we have been using the PaperClip word processor, the arrival of Robert Rockefeller's RUN Script 64 word processor (see *RUN*, March and April 1986) makes this system available to you for free.

Of course, a club newsletter is not the only use for this system. With it, you could provide documentation for another program in screen-readable, rather than printed, form. Maybe your family Christmas letter to computer-equipped relatives could take a revolutionary form.

After more than a dozen issues, our members are still enthusiastic. Line-ups for the cover art are long—a lot of people have the graphics packages and love to share their creations. And I think we are less intimidating to potential writers in this form. The end product provides a bigger and better service to our membership.

Perhaps your local group has been unable to produce a newsletter for lack of funds or resources. If so, you might take a close look at our experience. It could be the answer for you, too.

Requirements

Changing from a printed to an electronic newsletter requires some preparation. First, you must have a

RUN It Right

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

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C-64, a disk drive and a copy of the RUN Script word processor.

The Koala Painter or Doodle cover page is optional. As the publisher, you don't need the graphics software. The finished picture may be prepared by anyone with these packages, then copied over to the newsletter disk.

Use a file copy utility, such as Jim Butterfield's Unicopy, to transfer the Koala or Doodle picture to the newsletter disk. (Make sure its name matches the one you use in the Mag Reader Data statement, which will be explained later in this article.)

Each article or news item appearing in the newsletter must be prepared using RUN Script. You must add a few commands to create the special text files needed later. These will be explained fully below.

Three programs make up the system: Mag Production, Mag Reader and Mag Printer. They're all written in Basic, so just follow the normal loading procedure. Be sure to save them, but don't run them yet, as we're not ready to use them.

Mag Production has all the functions necessary to prepare the large relative file (the entire newsletter). Mag Reader is a flexible, screen-oriented display program, which reads the relative file and sends it to the screen, one page at a time. Function keys control the various modes of operation as you step through the magazine. Mag Printer is for those who wish a partial or complete copy of the newsletter on paper.

Only the newsletter's editor uses Mag Production. The other two programs, Mag Reader and Mag Printer, must be copied to the newsletter disk for each issue, so that it can be read and copied.

The Editing Process

Before using any of the three programs, contributors will have to prepare their articles on a word processor. You can accept article submissions in RUN Script or other compatible format (PaperClip sequential text files are usable). Tell your writers not to insert special codes, such as double spacing, justification, underlining, headers or page numbering; otherwise, you'll just have to remove them. Just have them send you the plain-Jane, raw-text file.

Exercise your editorial blue pencil via word processor until the article is ready for publication. Then, from within RUN Script, insert the following format line as the first line of the article (don't forget to terminate the line with a Return):

```
.pl25.pw41.lm1.rm1.tm1.bm1
```

This sets up a "screen page" of 25 lines, with minimum margins on all sides. At this point, you can save files as either program or sequential. Later, however, any program files will be converted to sequential form. Set aside two disks for your magazine preparation: a source disk and a newsletter disk. Save the article at this point, using appropriate (and short) filenames. Repeat this process for all the other articles in the issue. Your source disk should have text files only.

The newsletter disk will hold the articles from your source disk that you will modify slightly. (You should put the Mag Reader and Mag Printer on this disk, too.) Using RUN Script, you will transfer articles from the source disk to the newsletter disk. It will receive the modified text files, too.

Output from RUN Script will now be directed to the disk drive, instead of to a printer. Here's how to accomplish this. Reload the first article into RUN Script from the source disk. Insert the newsletter disk and activate the Print command. Specify "8" as the output device. You'll then be asked for a filename. If "text1" is the title of the first article, then respond with "p/text1,s,w". The output of text to the disk will be continuous, until the entire article has been stored. (Output it as a regular Commodore file, not straight ASCII.)

The prefix "p/" is a handy designation for these special "printer file" article conversions. The suffix ",s,w" specifies a sequential file. This is *not* optional.

Repeat the process: Load each article from its source disk, change disks and print it to the newsletter disk. Make note of the exact filenames. These "p/" files may be prepared in any order, not necessarily the order in which they will appear in the magazine.

Exit RUN Script for the time being. Now you are ready to use the first program contained in this article.

Mag Production

Load Mag Production (Listing 1). List lines 7000–8000. The Data statements include a default issue name for the magazine, the number of the drive (usually 0) where the newsletter disk resides and a suggested length of 60 screen pages. Change these to suit your own preferences or equipment, then run the program. The menu provides six options.

1. Create. Select this option to create a new issue.

Insert the newsletter disk. The issue name (from the Data statement) will appear to the right of the question mark. You may change it if you

```
.cm:toc
.p125.pw41.lm1.rm1.tm1.bm1.cn
BUG Newsletter March 1985
Table of Contents

.lj
Departments:                                          Screen Page

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```

Figure 1. *Example of table of contents.*

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C-54 Number Chaser
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C-57 Let's Count
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C-60 Math Manor
C-61 Typing Tutor
C-62 Speed Reader

Electric Book Co. Education Series

C-63 Why?
C-64 When?
C-65 The Three Bears
C-66 Gingerbread Man
C-67 Baby Animals
C-68 Hoppy the Curious Kangaroo
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A-43 Addition III
A-44 Addition IV
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A-46 Subtraction II
A-47 Subtraction III
A-48 Multiplication I
A-49 Multiplication II
A-50 Multiplication III
A-51 Division I
A-52 Division II
A-53 Division III
A-54 Division IV

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A-56 When?
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wish; if you're satisfied, just press the return key.

The drive number and its default will be offered next, so reply accordingly. The third question offers a change in length from the default value.

By first changing the data values, you need only press the return key at each prompt, thereby saving time. It will take a few moments to create the relative file. When this is done, press the space bar to return to the menu.

2. Add. Select this option to add an article to the issue.

Respond to the first two prompts as before. The third prompt will ask for a text filename. You must assemble your news items in the order in which you want them read. Provide the filename of the first "p/" file (the lead news item of the issue). In the example above, you would respond "p/text1". Do *not* add the ",s,w" suffix! You'll have to enter the drive number next; then the "Working. . ." message will appear.

While the text file is being transferred to the relative file, the disk error light will blink on and off. This is normal, so you shouldn't be concerned. If there is a real disk error, the program will abort, giving a full description of the error. (Go have a cup of coffee if your text file is long; this process takes a while.)

Upon successful completion of the transfer, the starting and ending screen pages will be given to you. Record these on a sheet of paper, so that you can prepare the table of contents later. Note that p. 2 is the lowest page available, as p. 1 is reserved for the table of contents.

Continue accessing menu option 2 for each article to be added to the issue.

3. Table of Contents. With your handwritten record of article titles and their page numbers, you're ready to exit the Mag Production program and reload RUN Script. You will create the table of contents (TOC) using RUN Script and then print the file to disk as described in "The Editing Process," above.

I've provided a sample screen dump for your guidance (see Figure 1). You cannot exceed 22 lines of text or you'll clobber p. 2 of the issue. I suggest you design your own model and save it for future issues. Once you get it right, you won't need to worry about overflow.

You must make the TOC into a "p/" file, as you did with each article. Print it to the newsletter disk. Exit RUN Script and reload Mag Production.

Select option 3 to create the table of contents. At the "contents" prompt, supply the "p/" filename you gave to the TOC, and it will be quickly transferred to the relative file.

4. Delete Text Files. This option has been provided for your convenience. The "p/" files are just the intermediate files and really don't belong on the finished newsletter disk. If you were consistent in using a prefix like "p/" for all of these, then option 4 would automatically delete them from the newsletter disk. Otherwise, you'll have to do this manually.

The prompt lets you use another prefix, in lieu of "p/". You'll have one last chance to abort before any scratching takes place.

This will most likely be the last step you'll perform on this newsletter, as it is now finished.

5. Fix Page Counter. This option might be called the "Oops" function. It lets you reset the ending page number to any value.

It may be that you inadvertently processed the files in the wrong order and would like to rebuild the magazine. You could always start from the beginning (Create), but that's often a lot of work. Use this option to set the page to the end of the last "good" news item, then resume the Add process.

Perhaps you've discovered a significant error in the finished issue? Make a (corrected) new "p/" file with RUN Script. Load and run Mag Production and note the current ending page. Reset the page counter just before the starting point of the old file, perform the Add, then reset again to the proper ending page.

You may find other uses for this option when something goes wrong. When finished with Mag Production, press 6 from the menu to exit the program. Next, you'll work on Listing 2, Mag Reader.

Customizing Mag Reader

You will have to customize Mag Reader (Listing 2) for your own use. Load the program and list lines 6999–8000. The data items identify the variables that must be changed for each issue.

I chose a white background and border with light-blue text for easy readability. Change the values in line 7000 to suit your preference.

The graphics picture information appears in line 7100. If it's a Koala type, use its exact name, without the graphics symbol or the extra spaces at the end. The second field must be a "k" to signify its type. For a Doodle type, don't include the "dd" prefix in the field, and use "d" for the second field.

If you don't want to use a graphics cover, you must include a dummy name in the Data statement. Also, put an "n" in the second field, to indicate no graphics picture. The third field is the color for the border of the screen. Change this to suit your picture.

In line 7200, you need to provide the issue name, which is the exact name you chose when you created the issue with option 1 of Mag Production.

There is a title screen in the program. A date and a name for your newsletter should replace the data in line 7300.

Now you can save this modified version to the newsletter disk. I use a "month" suffix as a naming convention for the modified version (e.g., Mag Reader—jul). The user loads and runs this program to read the disk magazine.

Customizing Mag Printer

Load Mag Printer (Listing 3) and list lines 890–1000. Note the Data statement with the issue name. Correct this to the name you chose in the Create option. Save this modified version to the newsletter disk (Mag Printer—jul).

Now you've really completed the newsletter. Pass the disk over to your copying team to make duplicates for your members. You can take it easy until next month's deadline.

Some Technical Jazz

All three programs rely on a file-reading utility called The String Thing. This was originally composed for the PET/CBM computers by Bill MacLean, President of BMB Compuscience in Milton, Ontario. Jim Butterfield reworked the input function to make it more efficient. The Universal String Thing was published in the September/October 1982 issue of *The Transactor* magazine, and the follow-up C-64 version in that magazine's April 1983 issue.

The String Thing reads a file from disk without choking on commas, quotation marks or colons, as does Basic's Input# instruction. You define the input's maximum length in variable A$, the first variable used in

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the program (preset to length 40 or 41 here). A carriage return (in the file) will delimit the string. A RAM location holds the actual string length, and a Peek will fetch it. This machine language subroutine is a fantastic utility. The alternative to this would have been a convoluted (and slow) Get# loop.

The other machine language program appears in Mag Reader only. Its purpose is to move large portions of hi-res graphics characters into their proper place, then activate the correct graphics mode. RAM (location 2) will have been preset to identify the type of cover picture.

I've documented the programs with lots of REM statements, so you should be able to follow the logic fairly easily.

Mag Reader Features

You'll see a Help screen while the hi-res cover page loads from the disk. The graphics picture will then be displayed. Press any key or the space bar to advance beyond the cover picture.

Next, you'll see the text cover page, which gives your newsletter title and its issue month.

A prompt line will always appear on the bottom line of the screen. It identifies how to access the Help screen and indicates the page number you are reading. Since help is always available, the program is self-explanatory.

If you try to advance past the last page of the issue, the last page is redisplayed. If you back up from p. 1, you'll see the cover again. The table of contents is always just one keystroke away (f1); then you can go to any page using the f3 key.

Mag Printer Features

This program will dump the issue either to the screen (device 3) or to the printer (device 4 or 5). Most printers that are interfaced to the C-64 will require that you set the secondary address to 7, so that upper- and lowercase will be printed.

Be sure that your printer is turned on. You must use continuous-form paper (fan-fold or roll). Advance the paper so that the perforation is one-half inch (three lines) above the print head. The program will print 60 lines of text, then skip over the perforation (six blank lines).

You may select the range of screen pages. If you wish to pause the printing, strike any key (except the run/stop). Resume by striking another key (Q will quit the program).

There you have it: a commercial-quality system that allows you to produce a software magazine with your C-64 and RUN Script word processor. After one issue, you'll find it to be a pretty routine process. It will neither tax your skill, nor take horrendous amounts of your time to produce the finished product. Then you'll be able to concentrate on the main function of an editor—flogging authors to get them to meet deadlines! R

Address all author correspondence to David Hook, 215 Anne St. N., Barrie, Ontario, Canada L4N 4T4.

Listing 1. *Mag Production program.*

```
Ø GOTO 1ØØ                    :REM*186
1 REM MAG PROD V1.2           :REM*199
2 REM (C) 1986 DAVID A. HOOK
                              :REM*24Ø
9 REM POSITION AT REC #R      :REM*27
1Ø PRINT#15,"P"+CHR$(3)+CHR$(RAN
   D255)+CHR$(R/256)+CHR$(1):RET
   URN                        :REM*15Ø
19 REM DISK ERROR CHECK       :REM*41
2Ø INPUT#15,DE,DE$,T,S: IF DE<2Ø
    OR DE=5Ø OR DE=51 THEN RETUR
   N                          :REM*182
25 PRINT "{CRSR DN}{CTRL 9} {SHF
   T D}ISK {SHFT E}RROR{CTRL Ø}"
   ;DE;DE$;T;S                :REM*65
3Ø CLOSE 3: CLOSE 2: CLOSE 15: E
   ND                         :REM*76
49 REM EXIT SUBROUTINE        :REM*71
5Ø CLOSE 3: CLOSE 2: CLOSE 15
                              :REM*134
55 PRINT "{2 CRSR DNs} {CTRL 9}{
   SHFT P}RESS {SHFT S}{SHFT P}{
   SHFT A}{SHFT C}{SHFT E} {SHFT
    T}O {SHFT E}XIT"          :REM*131
6Ø GET Z$: IF Z$<>CHR$(32) GOTO
   6Ø                         :REM*124
65 RETURN                     :REM*123
1ØØ A$="ABCDEFGHIJKLMNOPQRST": A
   $=A$+A$+"U"                :REM*178
12Ø REM ISSUE NAME, DRIVE#, MAX
   PAGES                      :REM*21Ø
13Ø READ F3$, D3$, MP         :REM*84
15Ø LP=25: AD=896: CK=Ø: IF PEEK
   (AD)=16Ø GOTO 19Ø          :REM*238
16Ø FOR I=AD TO AD+41: READ DA:
   POKE I,DA: CK=CK+DA: NEXT
                              :REM*238
18Ø IF CK<>6121 THEN PRINT "ERRO
   R IN DATA": STOP           :REM*28
19Ø :                         :REM*166
2ØØ PRINT "{SHFT CLR}{CTRL N}";
   TAB(11); "{SHFT S}{SHFT O}{S
   HFT F}{SHFT T}{SHFT W}{SHFT
   A}{SHFT R}{SHFT E} {SHFT M}{
   SHFT A}{SHFT G}{SHFT A}{SHFT
    Z}{SHFT I}{SHFT N}{SHFT E}"
   ; SPC(21); "(C)1986 {SHFT D}
   AVID {SHFT A}. {SHFT H}OOK"
                              :REM*156
21Ø PRINT "{2 CRSR DNs} 1. {SHFT
    C}REATE {SHFT N}EW {SHFT I}
   SSUE": PRINT " 2. {SHFT A}DD
    {SHFT T}O {SHFT A}N {SHFT I
   }SSUE"                     :REM*144
22Ø PRINT " 3. {SHFT T}ABLE {SHF
   T O}F {SHFT C}ONTENTS": PRIN
   T " 4. {SHFT D}ELETE {SHFT T
   }EXT {SHFT F}ILES"         :REM*176
23Ø PRINT " 5. {SHFT F}IX {SHFT
   P}AGE {SHFT C}OUNTER": PRINT
    " 6. {SHFT Q}UIT {SHFT P}RO
   GRAM"                      :REM*14
25Ø PRINT "{2 CRSR DNs} {SHFT C}
   HOICE (1-5): ?{CRSR LF}";
                              :REM*94
26Ø GET Z$: IF Z$<"1" OR Z$>"6"
   GOTO 26Ø                   :REM*217
27Ø PRINT "{CTRL 9}"; Z$ :REM*13
28Ø FOR I=1 TO 15ØØ: NEXT
                              :REM*2Ø5
3ØØ ON VAL(Z$) GOSUB 1ØØØ, 2ØØØ,
    3ØØØ, 4ØØØ, 5ØØØ, 3Ø
                              :REM*171
31Ø GOTO 2ØØ                  :REM*249
499 REM ISSUE SBR             :REM*54
5ØØ PRINT"{2 CRSR DNs} {SHFT P}L
   ACE THE {SHFT I}SSUE {SHFT D
   }ISK IN THE DRIVE"         :REM*41
51Ø PRINT "{2 CRSR DNs}"; TAB(15
   ); F3$                     :REM*79
52Ø INPUT "{CRSR UP} {SHFT I}SSU
   E {SHFT N}AME: "; F3$:REM*6Ø
53Ø PRINT TAB(15); D3$  :REM*116
54Ø INPUT "{CRSR UP} {SHFT O}N {
   SHFT D}RIVE #: "; D3$
                              :REM*246
56Ø OPEN 15, 8, 15, "I"+D3$: GOS
   UB 2Ø                      :REM*52
58Ø F$ = D3$ + ":" + F3$: IF Z$=
   "1" THEN F$= F3$ + ",L,"+ CH
   R$(4Ø)                     :REM*64
59Ø OPEN 3, 8, 3, F$: GOSUB 2Ø
                              :REM*28
61Ø RETURN                    :REM*158
999 REM CREATE NEW ISSUE:REM*254
1ØØØ PRINT "{SHFT CLR}"; TAB(12)
    ; "{SHFT C}REATE {SHFT N}EW
     {SHFT I}SSUE"            :REM*225
1Ø1Ø PRINT"{2 CRSR DNs} {SHFT P}
   LACE A {SHFT F}ORMATTED {SH
   FT D}ISK IN THE DRIVE"
                              :REM*255
1Ø2Ø GOSUB 51Ø                :REM*249
1Ø4Ø PRINT "{CRSR DN}"; TAB(14);
     MP                       :REM*12Ø
1Ø5Ø INPUT "{CRSR UP} {SHFT M}AX
     {SHFT P}AGE #: "; MP
                              :REM*2Ø6
1Ø7Ø PRINT "{2 CRSR DNs} {SHFT P
   }LEASE WAIT A FEW MOMENTS..
   ."                         :REM*1Ø6
1Ø9Ø REM CREATE LAST RECORD
                              :REM*238
11ØØ LN=LP*MP+1               :REM*54
111Ø R=LN: GOSUB 1Ø           :REM*174
112Ø PRINT#3, CHR$(255) :REM*13Ø
113Ø R=LN: GOSUB 1Ø           :REM*194
115Ø REM POINT TO ISSUE PAGE 2
                              :REM*162
116Ø R=1: GOSUB 1Ø            :REM*244
117Ø PRINT#3, LP+1            :REM*122
118Ø R=1: GOSUB 1Ø              :REM*8
12ØØ GOSUB 2Ø                 :REM*128
122Ø PRINT "{2 CRSR DNs} {SHFT D
   }ONE."                     :REM*116
124Ø GOTO 5Ø                  :REM*176
1999 REM ADD TO AN ISSUE:REM*12Ø
2ØØØ PRINT "{SHFT CLR}"; TAB(12)
    ; "{SHFT A}DD {SHFT T}O {SH
```

Continued on p. 80.

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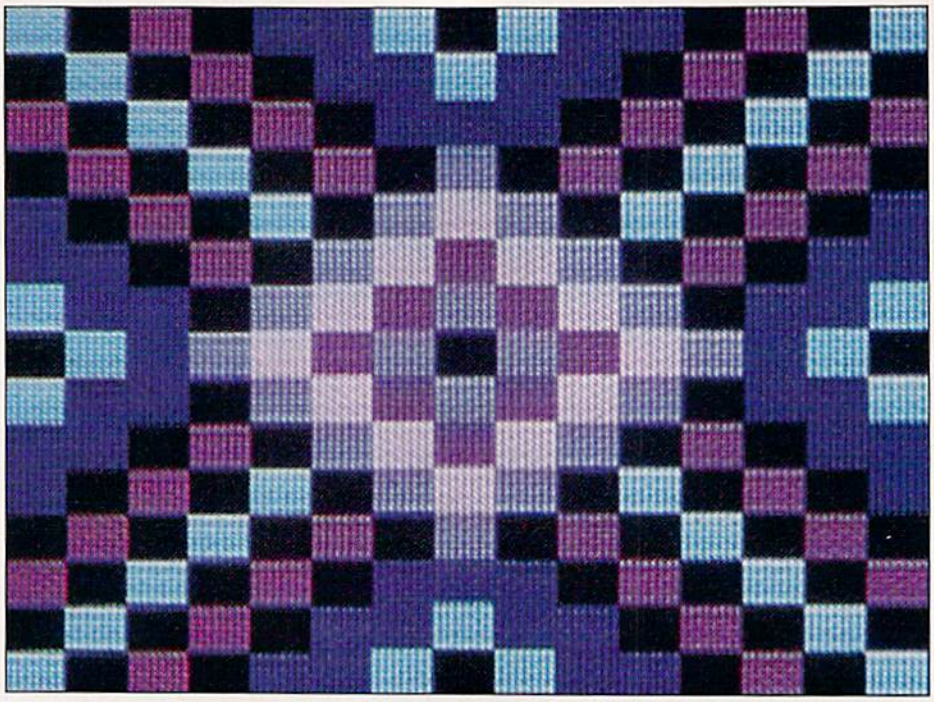

Needlegraph

By DOUG VENATOR

Who said computers are only for hackers? If you enjoy needlepoint or other design-related crafts, here's a program for you.

My wife recently asked me if I could write a program to help her with her latest needlepoint project. Naturally, I jumped at the chance to show what the computer could do.

She was creating colorful designs by weaving the yarn into little mesh squares, which she then sewed into cubes to form durable blocks for children to play with. She wanted a program that would simulate the mesh grid she was using. Her intention was to place vari-colored squares, representing the yarn stitches, on the grid, and then "edit" the colors until she got the design she wanted.

She also said it would be nice if she could make a printout of the design to save for later use. I set out to accommodate her, and the accompanying program, Needlegraph (Listing 1), seemed to fit the bill perfectly, with even a little bonus: The printouts formed useful little color-by-number designs that our kids found irresistible.

Program Description

The program, written in Basic, is fairly fast, although when it's compiled, the routines will be executed even more quickly. Once you enter and run the program, the screen displays a 15 by 15 drawing grid of squares, represented by asterisks, along with instructions for most of the key commands.

The program begins in the Draw mode. In the upper-left corner is a blinking cursor, which you can move around the grid with the cursor controls in the same manner as in normal Basic. If you move it off any edge of the grid, it will wrap around to the opposite side.

Pressing the space bar will fill the cursor position with the color indicated by the square in the upper-left corner of the screen. To color a line of squares in the current color, hold down the space bar; the line will extend in the direction of the last cursor key pressed.

Key Commands

Number keys 1 to 4: In the upper-left corner of the screen, there is always a palette of four colors, indicated by three small circles and a square, the latter indicating the current color. (When black is one of the four on-screen colors, its circle—or square—is, of course, invisible against the black background.) You may make any of the four the current color by pressing the appropriate number key (1–4).

Function keys f1, f3, f5 and f7: These four keys correspond to the four on-screen colors. Pressing any one of these will increment the associated color circle (or square, for the current color) through all 16 of the 64's colors. In this way, you can make any combination of four colors quickly available, and all 16 can be used in the same design by simply

RUN It Right

C-64; C-128 (in C-64 mode); disk drive; printer

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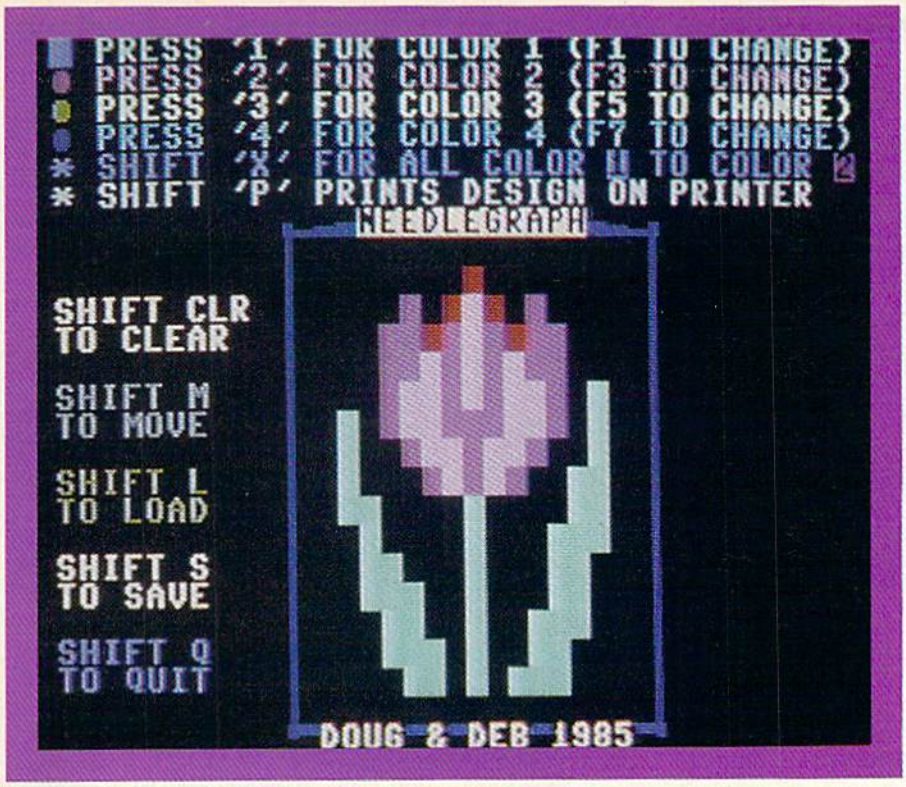

changing one or more of the four you originally chose.

Shifted S: By simultaneously pressing the S and shift keys, you can save the displayed design to disk. The cursor stops blinking, and you are prompted for a filename, which can be any legal, disk drive-acceptable string. It's limited to 14 characters, however, since the program reserves the first two for prefixing a file identifier to the filename. This identifier aids in searching for and loading the saved designs, which are stored in sequential files.

If you type in a filename that already exists on the disk present in the drive, you'll be asked if you wish to replace the existing design on file with the one on the screen. If you type Y, the old file is scratched and replaced with the new one. If any other key is pressed, the program switches back to Draw mode, and you can save the design under another name by again using the shifted S.

Shifted L: You use this key combination to load a previously saved design from disk onto the drawing grid. Again, the cursor stops blinking, and you're prompted for a filename. If you're not sure what to call your design, you can type in a dollar sign for the filename, and the saved designs will be displayed on the right side of the screen, one disk block at a time.

You'll then be prompted to press any key to advance to the next set of filenames, until all have been displayed. At this time, the program will return to Draw mode, and you can again use the shifted L to load the desired design.

Shifted M: This key combination places the program in the Move mode. Now, if you press any cursor key, the displayed design will move one space in the indicated direction. Color squares shifted off the design grid will be rotated onto the opposite edge. In this way, you can move a design off one side of the grid and back onto the other.

You may move a design in any direction at any time, but I recommend that you first color in all the squares you want filled, since only colored squares are shifted. An alternative to filling in the squares individually is to load a previously saved solid background before starting your design.

Shifted X: This combination enables you to change all squares containing color 1 to color 2.

Shifted P: This combination of keys prompts you for a title for the on-screen design, and then prints the title, the design and a color key table to the printer. The design is printed as a grid of letters, with each letter corresponding to one of the 64's 16 colors as indicated in the color key table printed beside the grid. Each letter represents one stitch of yarn of the color indicated. As mentioned before, these printouts make great color-by-letter exercises that children greatly enjoy.

CLR/HOME: This key (unshifted) returns the blinking cursor to the upper-left corner of the drawing grid.

Shifted/CLR: This key combination clears the drawing grid of all colors and covers it with white asterisks, as if the program had just been loaded and run. The cursor will also return to the upper-left corner of the drawing grid. Be careful of this feature, for a lot of work can be erased if it's used at the wrong time.

Shifted Q: This combination restores use of the run/stop and restore keys, ends the program and returns the computer to Basic.

When I wrote this program, I certainly had no intention of publishing it, but several of my friends saw what it could do, asked for copies for their wives and urged me to submit it for publication. Apparently, there are a lot of people doing needlepoint or other similar design work who might find Needlegraph useful. I hope that many of you do. R

Address all author correspondence to Doug Venator, PO Box 470, Chadwicks, NY 13319.

Listing 1. *Needlegraph program.*

```
10 DIMPL$(16),PC$(16):FORD=0TO15
   :READPL$(D),PC$(D):NEXT:AK$="
   **************"        :REM*168
20 P=55629:CM=P:EC=CM+(560):CC(1
   )=3:CC(2)=4:CC(3)=5:CC(4)=6
                           :REM*54
30 CD=54272:N=1:N1=1:N2=2:TY=31:
   SP=32:AS=42:SB=60:RS=160
                           :REM*196
40 FR=14:FT=15:FY=40:FS=560:SH=6
   00:S1=55483:S2=55494:DL$="{HO
   ME}{6 CRSR DNs}":ML$=DL$+"{CR
   SR DN}"                 :REM*54
50 POKE5328,2:POKE53281,0:POKE8
   08,225                  :REM*56
60 PRINT"{SHFT CLR}{CRSR RT}{CTR
   L 4}{CTRL 9} {CTRL 0} PRESS '
   1' FOR COLOR 1 (F1 TO CHANGE)
   ":X(1)=55297:POKEX(1),3
                           :REM*100
70 PRINT"{CRSR RT}{COMD 3}{SHFT
   Q} PRESS '2' FOR COLOR 2 (F3
   TO CHANGE)":X(2)=X(1)+40:POKE
   X(2),4                  :REM*206
80 PRINT"{CRSR RT}{COMD 6}{SHFT
   Q} PRESS '3' FOR COLOR 3 (F5
   TO CHANGE)":X(3)=X(2)+40:POKE
   X(3),5                  :REM*48
90 PRINT"{CRSR RT}{COMD 7}{SHFT
   Q} PRESS '4' FOR COLOR 4 (F7
   TO CHANGE)":X(4)=X(3)+40:POKE
   X(4),6                  :REM*80
```

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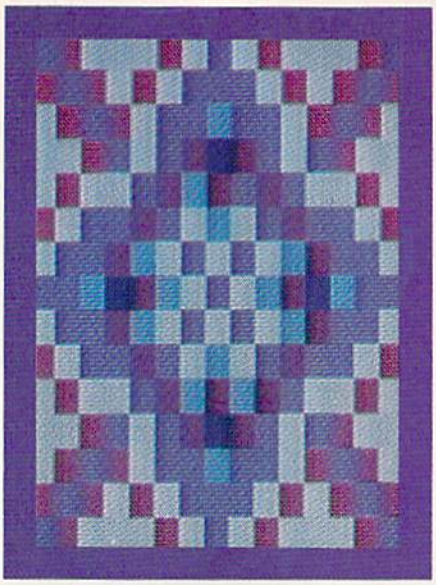

Listing 1 continued.

```
10Ø PRINT"{CRSR RT}{CTRL 5}* SHI
    FT 'X' FOR ALL COLOR {CTRL 9
    }1{CTRL Ø} TO COLOR {CTRL 9}
    2{CTRL Ø}":POKES1,3:POKES2,4
                              :REM*132
11Ø PRINT"{CRSR RT}{COMD 8}* SHI
    FT 'P' PRINTS DESIGN ON PRIN
    TER":PRINT:PRINT          :REM*152
12Ø PRINT"{CRSR DN}{CTRL 3} SHIF
    T CLR"                    :REM*152
13Ø PRINT" TO CLEAR"          :REM*2Ø8
14Ø PRINT"{CRSR DN}{CTRL 7} SHIF
    T M"                      :REM*118
15Ø PRINT" TO MOVE"           :REM*16
16Ø PRINT"{CRSR DN}{CTRL 6} SHIF
    T L"                      :REM*74
17Ø PRINT" TO LOAD"           :REM*198
18Ø PRINT"{CRSR DN}{CTRL 8} SHIF
    T S"                      :REM*78
19Ø PRINT" TO SAVE"           :REM*34
2ØØ PRINT"{CRSR DN}{CTRL 5} SHIF
    T Q"                      :REM*226
21Ø PRINT" TO QUIT{COMD 8}"
                              :REM*124
22Ø PRINT"{CTRL 7}{HOME}{6 CRSR
    DNs}{11 SPACEs}{COMD D}{COMD
     P}{COMD O}{COMD I}{CTRL 8}{
    CTRL 9}NEEDLEGRAPH{CTRL Ø}{C
    TRL 7}{COMD I}{COMD O}{COMD
    P}{COMD F}"               :REM*46
23Ø PRINT"{HOME}{6 CRSR DNs}":FO
    RV=1TO17:PRINTTAB(11)"{COMD
    L}"TAB(29)"{COMD J}":NEXT
                              :REM*232
24Ø PRINT"{11 SPACEs}{COMD C}{CO
    MD U}{CTRL 8}DOUG{CTRL 7}{CO
    MD U}{CTRL 8}&{CTRL 7}{COMD
    U}{CTRL 8}DEB{CTRL 7}{COMD U
    }{CTRL 8}1985{CTRL 7}{COMD U
    }{COMD V}";               :REM*114
25Ø PRINT"{CTRL 2}{HOME}{7 CRSR
    DNs}":FORV=1TO15:PRINTTAB(13
    )AK$:NEXT:PRINT"{COMD 8}"
                              :REM*124
27Ø CC=CC(N):IFFC=ØTHENFC=CC-((C
    C=Ø)*11):GOTO29Ø          :REM*229
28Ø IFFC>ØTHENFC=Ø            :REM*219
29Ø IFPEEK(P-CD)=ASTHENPOKEP,FC
                              :REM*231
3ØØ IFPEEK(P-CD)=RSTHENPOKEP-CD,
    SP:GOTO27Ø                :REM*75
31Ø IFPEEK(P-CD)=SPTHENPOKEP-CD,
    RS                        :REM*2Ø3
32Ø GETK$:CH=PEEK(P-CD)       :REM*193
33Ø IFK$="{CRSR RT}"THEN39Ø
                              :REM*141
34Ø IFK$="{CRSR LF}"THEN43Ø
                              :REM*171
35Ø IFK$="{CRSR DN}"THEN47Ø
                              :REM*143
36Ø IFK$="{CRSR UP}"THEN51Ø
                              :REM*173
37Ø IFK$=" "THEN55Ø           :REM*31
38Ø GOTO63Ø                   :REM*143
39Ø IFCH=ASTHENPOKEP,N1       :REM*41
4ØØ P=P+N1:IFPEEK(P-CD)=SPTHENP=
    P-FT                      :REM*65
41Ø M$="{CRSR LF}":IFPEEK(2Ø3)=S
    BTHENCH=PEEK(P-CD):GOTO55Ø
                              :REM*159
42Ø GOTO27Ø                   :REM*215
43Ø IFCH=ASTHENPOKEP,N1       :REM*81
44Ø P=P-N1:IFPEEK(P-CD)=SPTHENP=
    P+FT                      :REM*135
45Ø M$="{CRSR RT}":IFPEEK(2Ø3)=S
    BTHENCH=PEEK(P-CD):GOTO55Ø
                              :REM*167
46Ø GOTO27Ø                   :REM*255
47Ø IFCH=ASTHENPOKEP,N1       :REM*121
48Ø P=P+FY:IFPEEK(P-CD)=SPTHENP=
    P-SH                      :REM*141
49Ø M$="{CRSR UP}":IFPEEK(2Ø3)=S
    BTHENCH=PEEK(P-CD):GOTO55Ø
                              :REM*235
5ØØ GOTO27Ø                   :REM*39
51Ø IFCH=ASTHENPOKEP,N1       :REM*161
52Ø P=P-FY:IFPEEK(P-CD)=SPTHENP=
    P+SH                      :REM*212
53Ø M$="{CRSR DN}":IFPEEK(2Ø3)=S
    BTHENCH=PEEK(P-CD):GOTO55Ø
                              :REM*244
54Ø GOTO27Ø                   :REM*8Ø
55Ø POKEP-CD,RS:POKEP,CC(N)
                              :REM*84
56Ø FORTT=1TO1ØØ:NEXT         :REM*96
57Ø CH=PEEK(P-CD):IFPEEK(2Ø3)<>S
    BTHEN27Ø                  :REM*36
58Ø IFM$="{CRSR UP}"THENM$="":GO
    TO47Ø                     :REM*246
59Ø IFM$="{CRSR DN}"THENM$="":GO
    TO51Ø                     :REM*17Ø
6ØØ IFM$="{CRSR RT}"THENM$="":GO
    TO43Ø                     :REM*192
61Ø IFM$="{CRSR LF}"THENM$="":GO
    TO39Ø                     :REM*32
62Ø GOTO27Ø                   :REM*16Ø
63Ø FK=ABS(ASC(K$+CHR$(Ø))-132):
    ON(K$>"{COMD 1}"ANDK$<"{FUNC
    T 2}")+1GOTO68Ø           :REM*4
64Ø CC(FK)=CC(FK)+1:IFCC(FK)=16T
    HENCC(FK)=Ø               :REM*15Ø
65Ø POKEX(FK),CC(FK)          :REM*118
66Ø IFFK=1THENPOKES1,CC(FK)
                              :REM*236
67Ø IFFK=2THENPOKES2,CC(FK)
                              :REM*58
```


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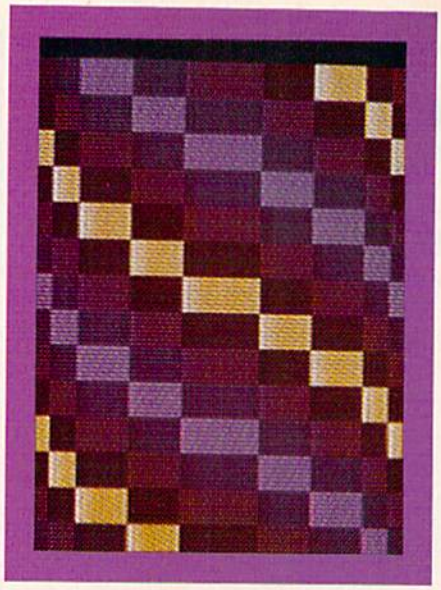

Listing 1 continued.

```
68Ø IFK$>"Ø"ANDK$<"5"THENPOKEX(N
    )-CD,81:N=VAL(K$):CC=CC(N):F
    C=Ø:POKEX(N)-CD,RS   :REM*1Ø4
69Ø IFK$="{SHFT X}"THENGOSUB1ØØØ
                         :REM*16
7ØØ IFK$="{SHFT P}"THENGOSUB2ØØØ
                         :REM*3Ø
71Ø IFK$="{HOME}"THENGOSUB3ØØØ
                         :REM*82
72Ø IFK$="{SHFT CLR}"THENGOSUB5Ø
    ØØ                   :REM*172
73Ø IFK$="{SHFT S}"THENGOSUB6ØØØ
                         :REM*222
74Ø IFK$="{SHFT L}"THENGOSUB7ØØØ
                         :REM*1Ø8
75Ø IFK$="{SHFT M}"THENGOSUB8ØØØ
                         :REM*254
76Ø IFK$="{SHFT Q}"THENPOKE8Ø8,2
    37:END               :REM*22Ø
77Ø GOTO27Ø              :REM*55
1ØØØ FORVV=CMTOECSTEPFY:FORHH=ØT
    OFR:CP=VV+HH         :REM*119
1Ø1Ø IF(PEEK(CP)ANDFT)=CC(N1)THE
    NPOKECP,CC(N2)       :REM*219
1Ø2Ø NEXT:NEXT:RETURN    :REM*239
2ØØØ NN=1:PRINTML$;:INPUT"{4 SPA
    CEs}TITLE ";PT$:PT$=LEFT$(P
    T$,16)               :REM*35
2Ø1Ø OPEN4,4:PRINT#4,CHR$(27)CHR
    $(66)CHR$(2)         :REM*161
2Ø2Ø PRINT#4,CHR$(27)CHR$(87)CHR
    $(1)                 :REM*127
2Ø3Ø PRINT#4,CHR$(27)CHR$(51)CHR
    $(23)                :REM*13
2Ø4Ø PRINT#4,PT$:PRINT#4,"{2Ø SP
    ACEs}"PL$(Ø)"-"PC$(Ø)
                         :REM*77
2Ø5Ø FORML=CMTOECSTEP4Ø:FORBY=ML
    TOML+FR              :REM*166
2Ø6Ø PRINT#4,PL$(PEEK(BY)ANDFT);
    :NEXT:PRINT#4,"{5 SPACEs}";
    PL$(NN)"-"PC$(NN)    :REM*16
2Ø7Ø NN=NN+N1:NEXT        :REM*86
2Ø8Ø PRINT#4,CHR$(27)CHR$(64)
                         :REM*42
2Ø9Ø PRINT#4:CLOSE4       :REM*252
21ØØ PRINT"{HOME}{7 CRSR DNs}{2
    CRSR RTs}{9 SPACEs}{CRSR RT
    }{17 SPACEs}{CTRL 7}{COMD J
    }{COMD 8}"           :REM*18
211Ø RETURN              :REM*128
3ØØØ IFPEEK(P-CD)=ASTHENPOKEP,N1
    :                    :REM*31
3Ø1Ø P=CM:RETURN          :REM*89
4ØØØ S=1:OPEN2,8,2,"#"   :REM*175
4Ø1Ø PRINT#15,"U1:"2;Ø;18;S:INPU
    T#15,E:IFE>ØTHENCLOSE2:RETU
    RN                   :REM*127
4Ø2Ø PRINTDL$:FOREN=1TO8:REM*1Ø5
4Ø3Ø GET#2,TT$,SS$,PT$,L1$,L2$:I
    FEN=1THENTL=ASC(TT$+CHR$(Ø)
    ):S=ASC(SS$+CHR$(Ø))
                         :REM*221
4Ø4Ø IFASC(PT$+CHR$(Ø))<>129THEN
    FORBY=1TO27:GET#2,CH$:NEXT:
    GOTO412Ø             :REM*99
4Ø5Ø GET#2,I1$,I2$:ID$=I1$+I2$
                         :REM*169
4Ø6Ø IFID$<>"N."THENFORBY=1TO25:
    GET#2,CH$:NEXT:GOTO412Ø
                         :REM*153
4Ø7Ø FORBY=1TO8:GET#2,CH$:PRINTT
    AB(3Ø)CH$;:NEXT      :REM*57
4Ø8Ø IFASC(CH$+CHR$(Ø))<>32THENP
    RINT"-"              :REM*155
4Ø9Ø IFASC(CH$+CHR$(Ø))=32THENFO
    RBY=1TO6:GET#2,CH$:NEXT:PRI
    NT:PRINT:GOTO411Ø    :REM*255
41ØØ FORBY=1TO6:GET#2,CH$:PRINTT
    AB(3Ø)CH$;:NEXT:PRINT:REM*4
411Ø FORBY=1TO11:GET#2,CH$:NEXT
                         :REM*252
412Ø NEXT                :REM*5Ø
413Ø PRINTTAB(3Ø)"{CTRL 3}HIT A
    KEY{COMD 8}";:WAIT198,1:POK
    E198,Ø:GOSUB42ØØ     :REM*254
414Ø IFTL>ØTHENGOTO4Ø1Ø   :REM*38
415Ø CLOSE2:CLOSE15:RETURN
                         :REM*8Ø
42ØØ PRINTDL$:FORER=1TO17:PRINTT
    AB(3Ø)"{9 SPACEs}":NEXT:RET
    URN                  :REM*236
5ØØØ PRINTML$"{11 SPACEs}{CRSR R
    T}{CTRL 3}{2 SPACEs}ERASE?
    (Y/N){COMD 8}"       :REM*143
5Ø1Ø WAIT198,1:GETAN$:IFAN$<>"Y"
    THEN5Ø4Ø             :REM*63
5Ø2Ø FORML=CMTOECSTEPFY:FORER=ML
    TOML+FR              :REM*135
5Ø3Ø POKEER,N1:POKEER-CD,AS:NEXT
    :NEXT:P=CM           :REM*113
5Ø4Ø PRINT"{HOME}{7 CRSR DNs}{2
    CRSR RTs}{9 SPACEs}{CRSR RT
    }{17 SPACEs}{CTRL 7}{COMD J
    }{COMD 8}"           :REM*153
5Ø5Ø RETURN               :REM*7
6ØØØ INPUT"{HOME}{7 CRSR DNs}{2
    CRSR RTs}FILENAME";SF$:SF$=
    LEFT$(SF$,14):SF$="N."+SF$
                         :REM*165
6Ø1Ø POKEP-CD,16Ø:OPEN15,8,15,"I
    "                    :REM*215
6Ø2Ø OPEN8,8,8,SF$+",S,W":INPUT#
    15,E                 :REM*2Ø3
6Ø3Ø IFE=63THENCLOSE8:GOSUB61ØØ:
    ON(RF+1)GOTO6Ø2Ø,6Ø8Ø
                         :REM*219
6Ø4Ø IFE<>ØTHENPRINTML$TAB(12)"{
    CTRL 3}{3 SPACEs}DISK ERROR
    {3 SPACEs}{COMD 8}":FORTT=1
    TO3ØØØ:NEXT:GOTO6Ø8Ø
                         :REM*249
6Ø5Ø FORML=CMTOECSTEPFY:FORBY=ML
    TOML+FR:BY$=STR$(PEEK(BY)AN
    DFT)                 :REM*135
6Ø6Ø FC$=RIGHT$(BY$,LEN(BY$)-1)
                         :REM*185
6Ø7Ø PRINT#8,FC$:NEXT:NEXT
                         :REM*153
6Ø8Ø CLOSE8:CLOSE15:PRINT"{HOME}
    {7 CRSR DNs}{2 CRSR RTs}{9
    SPACEs}{CRSR RT}{17 SPACEs}
    {CTRL 7}{COMD J}{COMD 8}"
                         :REM*225
6Ø9Ø RETURN               :REM*27
61ØØ RF=Ø:PRINTML$"{11 SPACEs}{C
    RSR RT}{CTRL 3} REPLACE? (Y
    /N){COMD 8}"         :REM*115
611Ø GETAN$:IFAN$<>"Y"ANDAN$<>"N
    "THEN611Ø            :REM*179
612Ø IFAN$="N"THENRF=1:RETURN
                         :REM*2Ø9
613Ø PRINTML$"{12 CRSR RTs}{CTRL
     2} {CTRL 6}O.K., REPLACING
    {COMD 8}"            :REM*15
6135 PRINTML$"{11 SPACEs}{CRSR R
    T}{CTRL 3}{2 SPACEs}ERASE?
    (Y/N){COMD 8}"       :REM*143
614Ø RETURN              :REM*77
7ØØØ INPUT"{HOME}{7 CRSR DNs}{2
    CRSR RTs}FILENAME";SF$:SF$=
    LEFT$(SF$,14):SF$="N."+SF$
                         :REM*145
7Ø1Ø OPEN15,8,15,"I":IFMID$(SF$,
    3,1)="$"THENGOSUB4ØØØ:ONE+1
    GOTO7Ø6Ø:GOTO7Ø3Ø    :REM*129
7Ø2Ø OPEN8,8,8,SF$+"*,S,R":INPUT
    #15,E                :REM*45
7Ø3Ø IFE<>ØTHENPRINTML$TAB(12)"{
    CTRL 3}{3 SPACEs}DISK ERROR
    {3 SPACEs}{COMD 8}":FORTT=1
    TO2999:NEXT:GOTO7Ø6Ø
                         :REM*141
7Ø4Ø FORML=CMTOECSTEPFY:FORBY=ML
    TOML+FR:INPUT#8,FC$:FC=VAL(
    FC$)                 :REM*43
7Ø5Ø POKEBY-CD,RS:POKEBY,FC:NEXT
    :NEXT                :REM*237
7Ø6Ø CLOSE8:CLOSE15:PRINT"{HOME}
    {7 CRSR DNs}{2 CRSR RTs}{9
    SPACEs}{CRSR RT}{17 SPACEs}
    {CTRL 7}{COMD J}{COMD 8}"
                         :REM*185
7Ø7Ø RETURN              :REM*243
8ØØØ GETSH$:IFSH$=""THEN8ØØØ
                         :REM*161
8Ø1Ø IFSH$<>"{CRSR RT}"ANDSH$<>"
    {CRSR LF}"ANDSH$<>"{CRSR DN
    }"ANDSH$<>"{CRSR UP}"THENRE
    TURN                 :REM*181
8Ø2Ø IFSH$="{CRSR RT}"THENGOSUB8
    1ØØ:GOTO8ØØØ         :REM*245
8Ø3Ø IFSH$="{CRSR LF}"THENGOSUB8
    2ØØ:GOTO8ØØØ         :REM*159
8Ø4Ø IFSH$="{CRSR DN}"THENGOSUB8
    3ØØ:GOTO8ØØØ         :REM*61
8Ø5Ø IFSH$="{CRSR UP}"THENGOSUB8
    4ØØ:GOTO8ØØØ         :REM*231
81ØØ FORVV=CMTOECSTEPFY:FORHH=VV
    +FRTOVVSTEP-N1       :REM*169
811Ø IFHH=VV+FRTHENPP=PEEK(HH)AN
    DFT                  :REM*177
812Ø IFHH=VVTHENPOKEHH,PP:GOTO81
    4Ø                   :REM*129
813Ø POKEHH,PEEK(HH-N1)ANDFT
                         :REM*229
814Ø NEXT:NEXT:RETURN    :REM*219
82ØØ FORVV=CMTOECSTEPFY:FORHH=VV
    TOVV+FR              :REM*1Ø
821Ø IFHH=VVTHENPP=PEEK(HH)ANDFT
                         :REM*12
822Ø IFHH=VV+FRTHENPOKEHH,PP:GOT
    O814Ø                :REM*166
823Ø POKEHH,PEEK(HH+N1)ANDFT
                         :REM*7Ø
824Ø NEXT:NEXT:RETURN    :REM*64
83ØØ FORHH=CMTOCM+FR:FORVV=HH+FS
    TOHHSTEP-FY          :REM*118
831Ø IFVV=HH+FSTHENPP=PEEK(VV)AN
    DFT                  :REM*152
832Ø IFVV=HHTHENPOKEVV,PP:GOTO83
    4Ø                   :REM*192
833Ø POKEVV,PEEK(VV-FY)ANDFT
                         :REM*1Ø8
834Ø NEXT:NEXT:RETURN    :REM*164
84ØØ FORHH=CMTOCM+FR:FORVV=HHTOH
    H+FSSTEPFY           :REM*248
841Ø IFVV=HHTHENPP=PEEK(VV)ANDFT
                         :REM*38
842Ø IFVV=HH+FSTHENPOKEVV,PP:GOT
    O834Ø                :REM*188
843Ø POKEVV,PEEK(VV+FY)ANDFT
                         :REM*2Ø4
844Ø NEXT:NEXT:RETURN     :REM*8
9ØØØ DATA K,BLACK,W,WHITE,R,RED,
    C,CYAN,V,VIOLET,G,GREEN,B,B
    LUE,Y,YELLOW         :REM*43
9Ø1Ø DATA O,ORANGE,T,TAN,P,PINK,
    1,DK. GRAY,2,MED. GRAY,L,LI
    ME,S,SKY BLUE        :REM*17
9Ø2Ø DATA 3,LT. GRAY      :REM*61
```

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Video Fantasia

By NOEL NYMAN and CHRIS NEWMAN

Here are some eye-catching video stunts for your C-128 to perform.

One of the best features of the C-128 is its ability to switch between 40- and 80-column modes. But did you know that you can run programs in C-64 mode and watch their execution in 80-column 128 mode? This article provides the programs and know-how needed to perform these remarkable feats.

To understand how the 80-column screen works, it helps to think of it as a peripheral, not unlike a printer or disk drive, which is sent information one bit or byte at a time through a "port." The computer gives the peripheral some data, along with an instruction on how to use it. The device then manipulates the data, using its own processor and memory.

The C-128's 8563 video controller generates the 80-column screen and uses it like a peripheral. The 8563 has 16K of RAM, which holds the character sets and the screen and color memories. The controller receives and sends data and instructions via two address locations (ports) in the C-128 to make changes in the screen display. Once you know how to control the 8563, you can make any changes you like on the 80-column screen, even from C-64 mode!

To see how the 8563 controls screen functions, first start up your C-128 in 80-column mode. Next, type the following command in Direct mode and press the return key.

```
POKE 54784,24: POKE 54785,
XOR(PEEK(54785),64)
```

You should see the entire 80-column screen reverse. If that's not what happens, check to be sure you typed in the command correctly.

The command first Pokes a 24 at 54784 to tell the 8563 that you want to work with register 24. The second part of the command first Peeks location 54785 to look at the value from register 24, and then, using XOR, it combines the value 64 with the data from location 54784 and puts the result back in the same location. Each time you execute this command, the screen will toggle to the opposite video mode.

Let's try a different register with some underlined text on the screen. Press and release the CTRL and B keys simultaneously; then type a few words. They should be underlined as they appear on the screen.

To exit from Underline mode, simultaneously press the ESC and 0 keys or press the return key. Leave a line of underlined text on the screen, then type the following command and press the return key.

```
FOR X=0 TO 500:FOR Y=0 TO 30:POKE
54784,29:POKE54785,Y:NEXT:NEXT
```

Register 29 contains the number of the line within each character set that the 8563 must access to achieve underlining. Try other values in the FOR Y=0 TO 30 loop to see how they speed up and slow down the line movement.

Now, write a short three- or four-line program and enter the following command in Direct mode.

```
POKE 54784,8: POKE 54785,3
```

Next, press the shift and CLR keys and then list your program. If you look closely, you'll see that you have two screens. On the top screen, four pixel lines are used for each character. The remaining four pixel lines are used for the same characters on the bottom screen. Register 8 holds some information about interlace modes that the 8563 uses to produce its display. Use the run/stop and restore keys to return your screen to normal.

Listings 1 and 2 illustrate two registers that control the horizontal and vertical locations of the screen display. Type them in; then save and run them.

These experiments are useful in that they serve to illustrate how the address/status and data locations (54784 and 54785, respectively) are used to communicate with the 8563 video controller. The rest of this article deals with the machine language techniques to read from and write to the 80-column screen.

80-Column Screen Reading and Writing

Listing 3 is a program that demonstrates how to manipulate characters on the 80-column screen. Type it in, save and run it; then try some

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of the following commands in 80-column mode.

First, clear the screen, then enter

```
SYS 3328,0,0,1
```

You should see an *A* in the upper-left corner of the screen. The demonstration program gets the row number, column number and screen code for the character from the three numbers following the SYS address. Next, clear the screen and enter

```
SYS 3328,1,10,2
```

This displays a *B* at row 1 (the second row), column 11. The program multiplies the row number by 80 and adds the column number to get the character-map address, then puts the appropriate values in registers 18 and 19. Clear the screen once again and enter

```
SYS 3331,0,0,0
```

This demonstrates the attribute registers by printing a sample text string at the row and column determined by the numbers following the SYS address. Leave the message on the screen and enter

```
SYS 3334,0,0,4
```

This routine places the value *4* in the attribute map for each of the characters in the text string. You should see the message change color, or, if you're using a monochrome monitor, you should see the brightness level change. In place of the *4*, try different values between 0 and 15. With the message still on the screen, try the following commands in Direct mode.

```
SYS 3334,0,0,4 + 128
```

This swaps character sets.

```
SYS 3334,0,0,4 + 64
```

This reverses the text.

```
SYS 3334,0,0,4 + 32
```

This underlines the text.

```
SYS 3334,0,0,4 + 16
```

This causes the text to flash. Notice that the flash rate of the cursor is the same as that of the text. With the text still flashing, type the following in Direct mode.

```
POKE 54784,24: POKE
54785,XOR(PEEK(54785),32)
```

This command alters bit 6 of register 24 to increase the flash rate.

You can even control the 80-column screen from C-64 mode. With flashing text on the screen, type NEW and press the return key. Then enter the one-line program "1 GO64", press the return key and run the program. Switching your monitor to Composite mode will show you the C-64 start-up screen. But switching back to RGB mode reveals the text still in place and flashing on the 80-column screen.

Now that you've switched to 64 mode from 80-column 128 mode, load Listing 3, list line 180, remove the first REM statement and press the return key. Now run the program and try the earlier examples, using the same SYS numbers. Switch the monitor to RGB mode to see the result of each SYS command. The last example won't work as is, because of the XOR command.

To access the 80-column screen from C-64 mode, you have to turn on the C-128 in 80-column mode. If you power up the computer as a C-64 by holding down the Commodore key or placing a C-64 cartridge in the expansion port, the 80-column screen will not work.

The last program, Listing 4, is a demonstration of hi-res graphics on the 80-column screen. Type in, save and run it in either 40- or 80-column 128 mode. Using the Basic 7.0 commands, the program creates a hi-res 40-column screen, then copies it onto the 80-column screen. Switch your monitor between Composite and RGB modes to see the results.

If you see a flickering vertical line on the right side of your screen, you have a newer model 128, and you must make the changes to lines 40, 100 and 1001 as noted in the REMS in those listing lines. R

Address all author correspondence to Noel Nyman, PO Box 58587, Seattle, WA 98188.

Listing 1. *Demonstration of vertical movement.*

```
10 FAST: REM PROGRAM #1                    :REM*186
20 REM VERTICAL MOVEMENT OF 80 COLUMN SCREE
   N                                       :REM*54
40 FORX=0TO6STEP1                          :REM*116
50 POKE54784,5:POKE54785,X                 :REM*122
60 FORY=1TO20:NEXT:NEXT                    :REM*74
100 FORX=6TO0STEP-1                        :REM*38
110 POKE54784,5:POKE54785,X                :REM*182
120 FORY=1TO20:NEXT:NEXT                   :REM*134
150 GOTO40                                 :REM*98
```

Listing 2. *Demonstration of horizontal movement.*

```
5 PRINT"{SHFT CLR}"                        :REM*251
20 REM 80-COL HORIZONTAL MOVEMENT          :REM*26
30 FORX=1 TO 7:LIST20:NEXT                 :REM*174
40 FORX=0 TO 116                           :REM*130
50 SLOW:POKE54784,2:POKE54785,117-X:FORY=1
   TO 30:NEXT:NEXT                         :REM*126
100 FAST:FORX=116 TO 0 STEP-1              :REM*28
110 POKE54784,2:POKE54785,117-X:FORY=1 TO 3
    0:NEXT:NEXT                            :REM*28
150 GOTO40                                 :REM*98
```

Listing 3. *Demonstrates printing to screen.*

```
10 REM PROGRAM #3--PRINTING TO 80-COLUMN SC
   REEN                                    :REM*158
100 B=3328: E=3545: CK=23689: CT=0  :REM*58
110 FOR X=B TO E:READ A:POKE X,A:CT=CT+A:NE
    XT                                     :REM*186
160 IF CT<>CK THEN PRINT "ERROR IN DATA STA
    TEMENTS"                               :REM*198
180 REM POKE 3510,32: REM C-64 ONLY:REM*230
200 END                                    :REM*202
1000 DATA 76,36,13,76,54,13,32,182  :REM*63
1010 DATA 13,32,106,13,32,113,13,24:REM*221
1020 DATA 165,251,105,8,133,251,32,78
                                           :REM*133
1030 DATA 13,165,254,160,24,32,92,13
                                           :REM*190
1040 DATA 136,208,250,96,32,182,13,32
                                           :REM*226
1050 DATA 106,13,32,113,13,32,78,13:REM*168
1060 DATA 165,254,32,92,13,96,32,182
                                           :REM*218
1070 DATA 13,32,106,13,32,113,13,32 :REM*14
1080 DATA 78,13,185,157,13,240,6,32 :REM*82
1090 DATA 92,13,200,208,245,96,165,251
                                           :REM*50
1100 DATA 162,18,32,94,13,165,250,232
                                           :REM*134
1110 DATA 32,94,13,96,162,31,142,0 :REM*252
1120 DATA 214,44,0,214,16,251,141,1:REM*174
1130 DATA 214,96,133,252,134,253,132,254
                                           :REM*226
1140 DATA 96,169,0,133,250,133,251,165
                                           :REM*182
```

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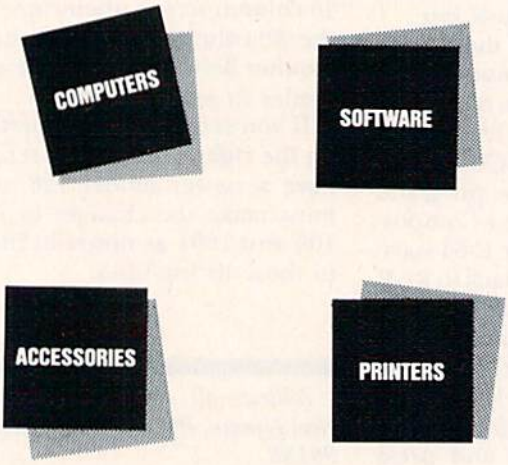

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Listing 3 continued.

```
115Ø DATA 252,24Ø,19,2Ø1,25,176,15,17Ø
                                        :REM*6
116Ø DATA 24,169,8Ø,1Ø1,25Ø,133,25Ø,144
                                        :REM*8
117Ø DATA 2,23Ø,251,2Ø2,2Ø8,242,165,253
                                        :REM*128
118Ø DATA 2Ø1,8Ø,176,8,1Ø1,25Ø,133,25Ø
                                        :REM*23Ø
119Ø DATA 144,2,23Ø,251,96,2Ø,8,9  :REM*198
12ØØ DATA 19,32,9,19,32,1,32,19     :REM*142
121Ø DATA 1,13,16,12,5,32,13,5      :REM*224
122Ø DATA 19,19,1,7,5,Ø,96,253       :REM*84
123Ø DATA 174,32,158,173,32,17Ø,177,132
                                        :REM*158
124Ø DATA 252,32,253,174,32,158,173,32
                                        :REM*78
125Ø DATA 17Ø,177,132,253,32,253,174,32
                                        :REM*14Ø
126Ø DATA 158,173,32,17Ø,177,165,252,166
                                        :REM*178
127Ø DATA 253,96                     :REM*5Ø
```

Listing 4. *Displays graphics.*

```
1Ø REM PROGRAM #4{2 SPACEs}4Ø/8Ø COL. GRAPH
   ICS                                  :REM*188
4Ø IF (PEEK(251)AND128)=Ø THEN SCNCLR: PRIN
   TCHR$(27)"X":REM IF FLICKERING OCCURS, C
   HANGE PEEK(251) TO PEEK(215), THEN FOLLO
   W INSTRUCTIONS IN LINES 1ØØ & 1ØØ1
                                        :REM*186
5Ø SCNCLR: PRINTCHR$(27)"X"          :REM*84
1ØØ B=3328: E=3448: CK=14653: CT=Ø : REM CH
    ANGE CK=14653 TO CK=1466Ø AFTER CHANGIN
    G THE PEEK IN LINE 4Ø TO ELIMINATE 8Ø-C
    OLUMN SCREEN FLICKERING         :REM*186
11Ø FOR X=B TO E                    :REM*118
12Ø READ A:POKE X,A:CT=CT+A:NEXT    :REM*136
16Ø IF CT<>CK THEN PRINT "ERROR IN DATA STA
    TEMENTS": END                    :REM*46
2ØØ GRAPHIC 1,1                     :REM*182
21Ø CIRCLE 1,18Ø,14Ø,4Ø,4Ø          :REM*212
22Ø BOX 1,2Ø,1ØØ,8Ø,16Ø,9Ø,1       :REM*224
23Ø DRAW 1,1Ø,2Ø TO 3ØØ,2Ø TO 15Ø,8Ø TO 1Ø,
    2Ø                              :REM*234
25Ø CHAR1,5,Ø,"HIRES GRAPHICS ON BOTH SCREE
    NS!"                             :REM*6
3ØØ SYS 3328: REM COPY HIRES TO 8Ø COL SCRE
    EN                              :REM*181
4ØØ GETKEYA$: REM WAIT FOR KEYPRESS :REM*93
41Ø GRAPHIC Ø: REM BACK TO 4Ø COLUMN SCREEN
                                        :REM*27
42Ø SCNCLR: PRINT "PRESS RESET BUTTON TO CL
    EAR"                            :REM*25
43Ø PRINT "EIGHTY COLUMN SCREEN" :END
                                        :REM*139
1ØØØ DATA169,Ø,133,251,169,32,133,252,169,2
     5,133,253,169,4Ø,133,254       :REM*121
1ØØ1 DATA162,25,169,128,32,2Ø4,2Ø5,162,18,1
     69,Ø,32,2Ø4,2Ø5,232,32: REM CHANGE THE
      FOURTH DATA ELEMENT, 128, TO 135 TO C
     ORRECT FLICKERING              :REM*224
1ØØ2 DATA2Ø4,2Ø5,16Ø,Ø,185,Ø,32,32,2Ø2,2Ø5,
     24,173,37,13,1Ø5,8             :REM*167
1ØØ3 DATA141,37,13,144,3,238,38,13,198,254,
     2Ø8,232,169,4Ø,133,254         :REM*62
1ØØ4 DATA169,Ø,32,2Ø2,2Ø5,162,3Ø,169,39,32,
     2Ø4,2Ø5,2ØØ,192,8,24Ø          :REM*2Ø7
1ØØ5 DATA13,165,251,141,37,13,165,252,141,3
     8,13,76,36,13,198,253          :REM*122
1ØØ6 DATA24Ø,22,24,165,251,1Ø5,64,133,251,1
     41,37,13,169,1,1Ø1,252         :REM*251
1ØØ7 DATA133,252,141,38,13,76,34,13,96
                                        :REM*98
```


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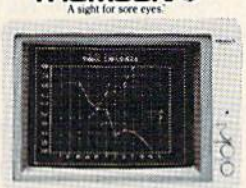

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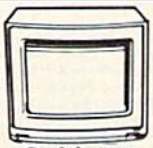

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RAM Expansion for The C-128

By LOUIS WALLACE

Need more room in your C-128? Here are two RAM expanders to boost your memory to 256K or 640K.

The C-128's power is greatly increased by its potential for RAM expansion beyond the built-in 128K. You can easily accomplish this by plugging one of two RAM expansion modules into the cartridge expansion port, located in the rear of the computer.

The RAM expansion comes in two sizes. The first is called the 1700 RAM Expansion Module, which adds an extra 128K to the C-128, giving you a total user RAM of 256K. The other is the 1750 RAM Expansion Module, and it adds an extra 512K of user RAM, giving your computer a whopping 640K. That's as much as the 16-bit IBM PC has!

How do you use this extra memory? Unfortunately, the modules don't give you any extra *system* RAM, which is the RAM available for your Basic programs and their variables. On the C-128, RAM bank 0 is used for Basic text, and bank 1 for variables. So don't think that adding an expansion module will automatically enable you to write Basic programs twice the size as before; it doesn't work that way. Basic will still only be able to use banks 0 and 1 for its operations. If you're using machine language, however, you can write very large executable programs using the Kernal routines like JMPFAR, JSRFAR, and so on.

So, what good is the extra RAM if you can't use it in your programs? The answer is that you *can* use it in Basic programs, not for the program itself, but for temporary storage of data, such as pictures (hi-res or text), music files, help screens, sprites or anything that you must now store in valuable system RAM.

The 128's Basic 7.0 contains three commands, STASH, FETCH and SWAP, that are designed especially for use with the RAM expansion modules. All three use the same set of parameters, which greatly simplifies learning to use them. The commands are:

```
STASH # bytes, intsa, expsa, expb #
FETCH # bytes, intsa, expsa, expb #
SWAP # bytes, intsa, expsa, expb #
```

where # bytes indicates the number of bytes involved in the transfer (1–65536); intsa, the internal starting address (in system RAM); expsa, the expansion starting address (in expansion RAM); and expb #, the expansion bank number.

For example, you might wish to use several different graphics screens in a program. To store a high-resolution screen until it's needed again, you'd use the command:

```
STASH 9024,7168,0,0
```

This would store 9024 bytes (bitmap and color), starting at 7168 decimal, to address 0 in RAM expansion bank 0. (By the way, the Stash and Fetch commands are so fast—one megabyte per second—that you can store and recall screens instantly.)

What the Module Offers

Each RAM expansion module comes with a disk, on one side of which are some Basic demos. These show the speed of the RAM expansion data transfer. Using many high-resolution screens, they demonstrate the ease with which you can do full-screen animation by recalling complete screens and color memories from RAM storage.

Commodore is working on a RAM disk utility for Basic that will allow you to use the extra RAM as a high-speed disk drive. This would mean that you could load and store programs at one megabyte per second. And with the 512K expander, you could have a storage area in RAM equivalent to almost three 1541 disks. (At this writing, there is no announced date for the Basic RAM disk to be released.)

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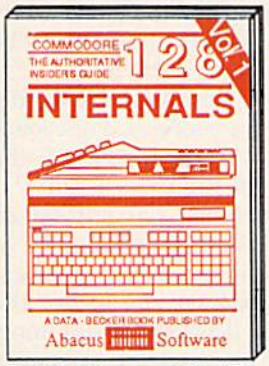

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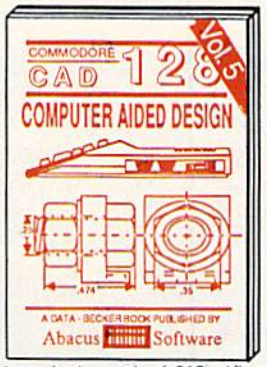

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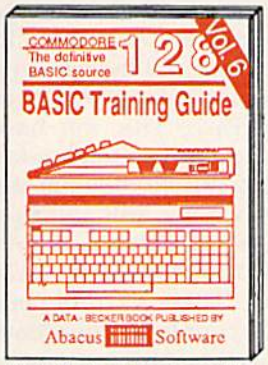

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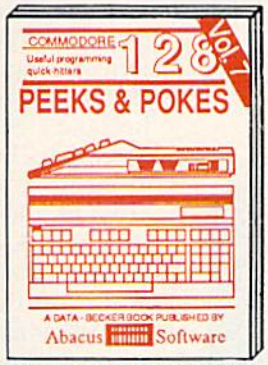

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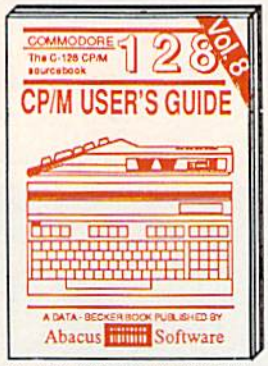

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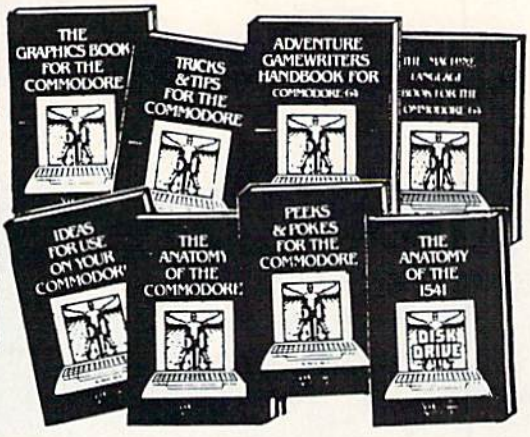

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The 1700 Expansion Module

The 1750 Expansion Module

You can, however, use the RAM expansion as a RAM disk in CP/M mode. On the flip side of the demo disk, there is a new CP/M system disk. This CP/M system supports the RAM expansion as device M, whereas the earlier releases of CP/M did not support RAM expansion at all. By booting CP/M from this new system disk, you can greatly increase the efficiency of your CP/M sessions.

Using the command

```
PIP M:A:*.*
```

which copies all of drive A to drive M, I copied all the system disk files, plus two disks of CP/M utilities, to the 512K RAM disk. You can then use it as a standard drive, except that disk access is now about 12 times faster than a 1571 and 150 times faster than a 1541. If you're using a 1541 with CP/M, you should think seriously about adding the RAM expansion; it's more than the difference between night and day.

Support for RAM Graphics

Another way of using RAM expansion is with commercial programs that utilize its talents. Since the 1700 and 1750 modules are new products, only a few companies are currently supporting them, but that will undoubtedly change as the number of units increases. (As of this writing, there have been between 7000–10,000 modules sold.)

Pro-Line Software has announced it will make its powerful C compiler available to the C-128 with RAM expansion. C is perhaps the most popular development language today, and Pro-Line's compiler has received very good reviews. It will undoubtedly be even better with the extra RAM.

Also, Digital Solutions is adapting its C-128 word processor, Paperback Writer, to take advantage of the added power of the extra RAM.

Batteries Included has redesigned its word processor, PaperClip II, to make it even better. Some of its enhancements involve the use of the 1700 and 1750 RAM expansion modules; they will be used for storage of utilities (such as spell checkers and dictionaries) and as extra storage for text.

In addition, Cardco will be marketing several new products that support the RAM expansion systems. In June, the company will be releasing Hidden Assets, a program similar to Borland's SideKick. This will have several useful programs that reside in memory and can be called at the press of a key. Cardco will also produce a series of CP/M business programs that will utilize the extra RAM as a RAM disk. These six programs are Personal Accountant, Time Manager, Personal Inventory, General Ledger, Accounts Receivable and Accounts Payable.

There are probably many other companies that are developing software to take advantage of these powerful additions to the C-128. Thousands of users are already writing their own custom programs, many of which will show up as public domain programs in user's group libraries, on networks such as CompuServe and QuantumLink, and, of course, in magazines such as *RUN*.

I expect we shall soon see programs running on the C-128 that will rival, and in some cases actually outshine, those on supposedly more powerful, and certainly more expensive, computers. R

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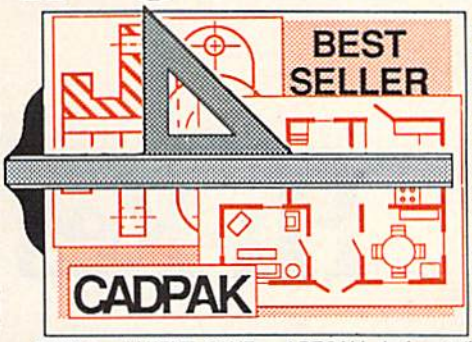

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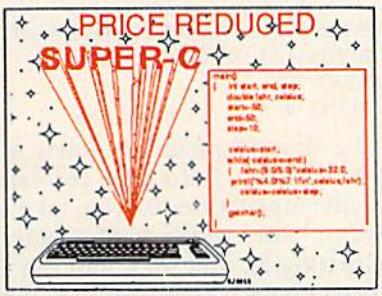

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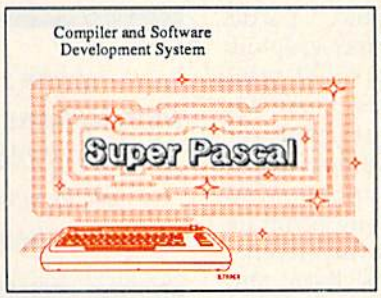

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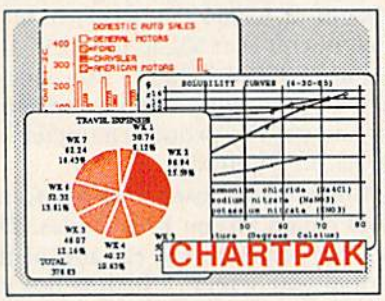

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Hi-Res Writer

By BRUCE JAEGER

Here's a program that explains and simplifies the process of placing text on your hi-res screen. It's never been easier!

Have you ever designed a particularly nice high-resolution graphics screen and wished you could print something on it? Like your name? Or perhaps you wrote a hi-res game for the C-64, with sprites, sound effects, and so on, and found there was no easy way to print something as simple as the player's score on the screen.

While Comal, Simons' Basic and the C-128's Basic 7.0 all have built-in provisions for printing characters on a hi-res screen, the C-64 doesn't. However, with the accompanying program, Hi-Res Writer (Listing 1), it's now remarkably easy to place text on your C-64 hi-res screen.

Writing on the Hi-Res Screen

A shape table (like the set of drawing instructions on the Apple) isn't available on the C-64, but a bit-pattern character-plotting method is. To place an *A* on your C-64's hi-res screen, you Poke into screen memory the exact eight bytes of information that resemble the letter *A*.

Besides having a hi-res addressing arrangement that's fairly easy to deal with, the C-64 has another advantage in displaying text—you don't have to create and load a character set. Why should you, when the 64's own 4K character set ROM is available to borrow from?

By disabling the interrupts and changing the 6510's bank-switching pointers, you can look into the C-64's normally hidden character ROMs, located at $D000 (53248 decimal). At this address, you find both the upper/lowercase and uppercase/graphics sets, including all reversed characters. The next step is to discover how to find an individual character in this ROM and decide where and how to place it on the screen.

Each character is eight bytes long and is stored in the character ROM in the same alphabetical order that you might observe by Poking all the screen codes onto the normal screen. The following demonstration program prints the alphanumeric characters, which are found in location 53272.

```
10 PRINT CHR$(147) : REM CLEAR
   SCREEN
20 POKE 53280,0 : POKE 53281,0 : REM
   BLACK BORDER & SCREEN
30 POKE 53272,21 : REM USE UPPERCASE
   CHARACTER SET
40 FOR X = 0 TO 255
50 POKE 1024+X, X : REM POKE
   CHARACTER ONTO SCREEN
60 POKE 55296+X,1 : REM POKE WHITE
   BEHIND IT IN COLOR RAM
70 NEXT X
80 GOTO 80
```

The first character set starts with "@ABCDEF...". To find, for example, the uppercase *B*, you take its ASC(x) value, which is 66, subtract 64 (getting 2), and then multiply by 8 (because each character uses eight bytes). This means that, since the uppercase/graphics set begins at 53248, the eight numbers defining the letter *B* begin at 53264 (53248 + 16). (The @ character is at 53248 to 53255; the *A* is at 53256 to 53263.) You always have to do a bit of trial-and-error work to get the proper character using its ASCII code.

Hi-Res Writer uses what are sometimes called screen Poke codes. The message is printed at the top of the normal text screen, which is not visible when you are in High-resolution mode. The English pound sign (£) follows the message to mark its end for the machine language routine.

When called, the machine language routine looks at the actual values in the memory addresses "behind" the letters (starting at 1024 decimal). This little trickery yields numbers that can be directly looked up in the character ROMs, saving lots of complicated (and slow!) mathematical computation.

Of course, you needn't fully understand any of this to use Hi-Res

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

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Hi-Res Writer

The demonstration program first sets up the high-resolution bit map and clears the screen. It then sets all colors to a yellow foreground on a dark-gray background. A familiar quotation is printed on the screen, along with the prompt, "Press space bar to continue."

Take a look at the colors before pressing that space bar. Note that the words displayed have foreground and background colors that differ entirely from the rest of the screen—an effect not possible in normal Text mode. (You can achieve somewhat the same effect with the 64's Extended Background Color mode, but you're limited to a few characters and a total of only four colors; here you can use all 16.)

The second demonstration screen begins after you press the space bar. The screen is again cleared, and the color memory is set up with a black background and white foreground. (Note that the program sets its own colors independently.) Several white one-pixel "stars" are then randomly Poked onto the screen, followed by sound effects and a message.

Before running Hi-Res Writer, remove or disable any Basic-extension or cartridge programs; if you don't, your computer may lock up.

Using Hi-Res Writer in Your Programs

Theoretically, the eight-byte character definition can be placed anywhere on the high-resolution screen. I've limited the positioning of the characters to the same 40 horizontal and 25 vertical positions of the standard screen. This eliminates a lot of slow Basic number crunching and really isn't that much of a limitation. (See pp. 122–127 of *The Commodore 64 Programmer's Reference Guide* for a complete description of the high-resolution bit-map addressing.)

You may easily use the hi-res text subroutine in your programs, along with the other machine language aids. The routine is written to use one of the favorite memory locations for the high-resolution bit map and color memory: the bit map is at $6000 (24576 decimal) and the color memory is at $5C00 (23552 decimal). Note

Screen display from Hi-Res Writer program.

that these are the same addresses used by City Software's Doodle! drawing program, so you can load a Doodle!-produced screen into your program.

First, of course, your program has to Poke or somehow load the machine language program into memory. I located the machine language at $8000 (32768 decimal), which normally isn't used when the high-resolution bit map is set at $6000.

Then, as in line 210 of the demonstration program, the top-of-Basic must be reset to protect the bit map (and the machine language code) from Basic variables.

Here's an explanation of how to set up and use the routine within Hi-Res Writer. Each time before calling the text subroutine, you have to make sure that the following five variables are set:

1. The message to be printed is stored in variable S$. Your message may contain any combination of alphanumeric characters; just don't use control characters, such as color changes or reverse.

2. The foreground color must be spcified in variable FC. Use the standard values 0–15 for the colors black through light gray, and store the chosen value in variable FC. For example, if I want my message to be printed in light gray, I'd assign the value of 15 to FC before calling the text subroutine.

3. The background color is assigned in variable BC. Again, use the standard values 0–15 for the colors black through light gray, and store the chosen value in variable BC. For example: for a black background, assign BC = 0.

4. The horizontal starting position of your message is stored in variable H. This is a value from 1 to 40.

5. Store the vertical starting position of your message (1–25) in variable V. For example, to start your message halfway down the left-hand side of the screen, assign H = 1 and V = 13.

After setting those five variables, just enter the Gosub command with the starting line number, and you'll be all set. R

Address all author correspondence to Bruce Jaeger, 1253 Ashland Ave., St. Paul, MN 55104.

Listing 1. *Hi-Res Writer program.*

```
200 REM HI-RES WRITER BY BRUCE J
    AEGER                    :REM*78
210 POKE55,0:POKE56,92:CLR :REM
    PROTECTS BITMAP FROM BASIC
                             :REM*192
220 POKE 5328Ø,11:POKE53281,11 :
     PRINTCHR$(147)      :REM*206
230 GOSUB 114Ø: REM POKE IN ML
                             :REM*54
240 HI=32768: REM VIEW HIRES
                             :REM*5Ø
250 TX=32771: REM BACK TO TEXT
                             :REM*6
260 CL=32774: REM CLEAR BITMAP
                             :REM*145
270 FB=32777: REM FOREGROUND/BAC
    KGROUND COLORS           :REM*235
280 HW=3278Ø: REM PRINT TEXT
                             :REM*143
290 BK=32783: REM BACKGROUND COL
    OR                       :REM*241
300 FG=32784: REM FOREGROUND COL
    OR                       :REM*175
340 SYS HI: REM TURN ON HI-RES
                             :REM*169
350 SYS CL: REM CLEAR HI-RES
                             :REM*3
360 POKE BK,11: REM DARK GREY
                             :REM*241
370 POKE FG,7: REM YELLOW:REM*39
380 SYS FB: REM SET COLORS
                             :REM*133
410 REM PRINT STRINGS    :REM*153
420 S$=CHR$(34)+"{SHFT W}E HAVE
    TWO EARS, BUT ONLY ONE MOUTH
    ,"                       :REM*37
430 H=2:REM HORIZONTAL POSITION
    (1-4Ø)                   :REM*119
440 V=3:REM VERTICAL POSITION (1
    -25)                     :REM*199
450 BC=11:REM BACKGROUND COLOR
                             :REM*73
460 FC=1: REM FOREGROUND COLOR
                             :REM*221
470 GOSUB1Ø4Ø:REM PRINT :REM*125
500 S$="IN ORDER THAT WE MAY LIS
    TEN MORE"                :REM*83
510 H=2:V=4:BC=11:FC=1:GOSUB1Ø4Ø
                             :REM*9
530 S$="AND TALK LESS."+CHR$(34)
                             :REM*18
540 H=2:V=5:BC=11:FC=1:GOSUB1Ø4Ø
                             :REM*42
560 S$="{SHFT Z}ENO,"    :REM*24
570 H=22:V=7:BC=11:FC=3:GOSUB1Ø4
    Ø                        :REM*218
```


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Listing 1 continued.

```
59Ø S$="{SHFT E}PICTETUS"
                          :REM*236
6ØØ H=28:V=7:BC=6:FC=3:GOSUB1Ø4Ø
                          :REM*198
62Ø S$="{SHFT P}RESS{11 SPACEs}T
    O CONTINUE."          :REM*218
63Ø H=5:V=23:FC=1Ø:BC=11:GOSUB1Ø
    4Ø                    :REM*48
64Ø S$="SPACE BAR"        :REM*48
65Ø H=11:V=23:FC=7:BC=2:GOSUB1Ø4
    Ø                     :REM*34
67Ø GETA$:IFA$<>" "THEN67Ø
                          :REM*132
7ØØ REM ANOTHER DEMO      :REM*242
71Ø POKE53328Ø,Ø:REM BLACK BORDER
                          :REM*32
72Ø POKEBK,Ø:REM BLACK HI-RES BA
    CKGROOUND             :REM*1ØØ
73Ø POKE FG,1: REM WHITE FOREGRO
    UND                   :REM*13Ø
74Ø SYS FB: REM SET COLORS
                          :REM*238
75Ø SYS CL: REM CLEAR SCREEN
                          :REM*58
77Ø REM PRINT "STARS"     :REM*15
78Ø DEF FNR(X)=INT(RND(1)*X)+1
                          :REM*47
79Ø FOR X=1TO6Ø+FNR(1Ø) :REM*111
8ØØ Z=2{UP ARROW}FNR(8):IFZ=256T
    HENZ=1                :REM*237
81Ø POKE 24575+FNR(8ØØØ),Z
                          :REM*139
82Ø NEXTX                 :REM*3
84Ø S$="{SHFT S}{SHFT P}{SHFT A}
    {SHFT C}{SHFT E}: {SHFT T}HE
     {SHFT F}INAL {SHFT F}RONTIE
    R."                   :REM*49
85Ø H=8:V=15:FC=7:BC=Ø:GOSUB1Ø4Ø
                          :REM*87
87Ø GOSUB 138Ø : REM ROAR SOUND
                          :REM*239
89Ø S$="*{SHFT P}RESS ANY KEY*"
                          :REM*249
9ØØ H=13:V=24:FC=8:BC=9:GOSUB1Ø4
    Ø                     :REM*81
92Ø FOR DELAY=1TO15ØØ : NEXT
                          :REM*211
93Ø GOSUB 148Ø : REM BEEPS
                          :REM*159
95Ø GETA$:IFA$=""THEN95Ø:REM*129
97Ø SYS TX : REM BACK TO TEXT MO
    DE                    :REM*243
99Ø PRINTCHR$(147) : REM CLEAR S
    CREEN                 :REM*31
1ØØØ POKE 53281,Ø : PRINT CHR$(1
    53)                   :REM*65
1Ø1Ø END                  :REM*247
1Ø4Ø REM WRITER SUBROUTINE:REM*Ø
1Ø5Ø LE=LEN(S$):PRINTCHR$(147)S$
    "{LB.}"               :REM*2Ø
1Ø6Ø CO=BC+FC*16:VP=(V-1)*4Ø*8
                          :REM*96
1Ø7Ø HP=H*8-16:C1=23552+H-2+(4Ø*
    (V-1))                :REM*152
1Ø8Ø HP=HP+8:Q2=24576+VP+HP:POKE
    254,Q2/256:POKE253,Q2-PEEK(
    254)*256              :REM*182
1Ø9Ø SYS HW               :REM*12Ø
11ØØ FORT=1TOLE:POKEC1+T,CO:NEXT
                          :REM*64
111Ø RETURN               :REM*148
114Ø FORJ=32768TO33Ø66:READA:POK
    EJ,A:NEXT: RETURN     :REM*11Ø
116Ø DATA 76,59,128,76,78,128,76
    ,14,129,76,17,128,76,157,12
    8,Ø                   :REM*144
117Ø DATA Ø,173,15,128,41,15,141
    ,8,129,173,16,128,1Ø,1Ø,1Ø,
    1Ø                    :REM*5Ø
118Ø DATA 24,1Ø9,8,129,162,Ø,157
    ,Ø,92,157,Ø,93,157,Ø,94,232
                          :REM*196
119Ø DATA 2Ø8,244,162,232,157,25
    5,94,2Ø2,2Ø8,25Ø,96,169,59,
    141,17,2Ø8            :REM*214
12ØØ DATA 169,12Ø,141,24,2Ø8,173
    ,Ø,221,41,254,141,Ø,221,96,
    169,27                :REM*26
121Ø DATA 141,17,2Ø8,169,23,141,
    24,2Ø8,173,Ø,221,9,1,141,Ø,
    221                   :REM*114
122Ø DATA 96,173,14,22Ø,41,254,1
    41,14,22Ø,165,1,41,251,133,
    1,96                  :REM*98
123Ø DATA 165,1,9,4,133,1,173,14
    ,22Ø,9,1,141,14,22Ø,96,141
                          :REM*38
124Ø DATA 137,128,142,138,128,14
    Ø,139,128,96,Ø,Ø,Ø,173,137,
    128,174               :REM*42
125Ø DATA 138,128,172,139,128,96
    ,32,112,128,32,14Ø,128,96,3
    2,127,128             :REM*12
126Ø DATA 32,97,128,164,253,14Ø,
    9,129,162,Ø,134,253,142,11,
    129,174               :REM*5Ø
127Ø DATA 11,129,189,Ø,4,2Ø1,28,
    24Ø,221,141,8,129,169,Ø,133
    ,251                  :REM*21Ø
128Ø DATA 169,216,133,252,173,8,
    129,24,1Ø,144,8,23Ø,252,23Ø
    ,252,23Ø              :REM*65
129Ø DATA 252,23Ø,252,24,1Ø,144,
    4,23Ø,252,23Ø,252,24,1Ø,144
    ,2,23Ø                :REM*37
13ØØ DATA 252,168,162,Ø,177,251,
    2ØØ,14Ø,1Ø,129,172,9,129,14
    5,253,2ØØ             :REM*33
131Ø DATA 14Ø,9,129,2Ø8,2,23Ø,25
    4,232,224,8,24Ø,6,172,1Ø,12
    9,76                  :REM*251
132Ø DATA 228,128,238,11,129,76,
    175,128,Ø,Ø,Ø,Ø,Ø,Ø,169,127
                          :REM*115
133Ø DATA 133,254,169,Ø,133,253,
    168,133,253,145,253,16Ø,63,
    162,32,145            :REM*137
134Ø DATA 253,136,2Ø8,251,198,25
    4,2Ø2,2Ø8,246,96,Ø    :REM*25
135Ø DATA 252,168,162,Ø,177,251,
    2ØØ,14Ø,1Ø,129,172,9,129,14
    5,253,2ØØ             :REM*83
138Ø REM ROAR             :REM*233
139Ø S=54272              :REM*139
14ØØ POKE S+24,3: POKE S+5,192
                          :REM*187
141Ø POKE S+6,25Ø         :REM*171
142Ø FOR X=5Ø TO 15Ø: POKE S+1,X
                          :REM*185
143Ø POKE S+4,129: NEXT X
                          :REM*141
144Ø POKE S+24,15: POKE S+1,135
                          :REM*75
145Ø POKE S+4,128: RETURN
                          :REM*121
148Ø REM BEEP             :REM*45
149Ø S=54272              :REM*239
15ØØ POKE S+24,5:POKE S+5,5Ø
                          :REM*181
151Ø FOR X=1 TO 15        :REM*253
152Ø POKE S+1,RND(1)*128+8Ø
                          :REM*145
153Ø POKE S+4,19          :REM*5
154Ø FOR J=1 TO 3Ø:NEXT J
                          :REM*12Ø
155Ø POKE S+4,16:NEXT X   :REM*86
156Ø RETURN               :REM*88
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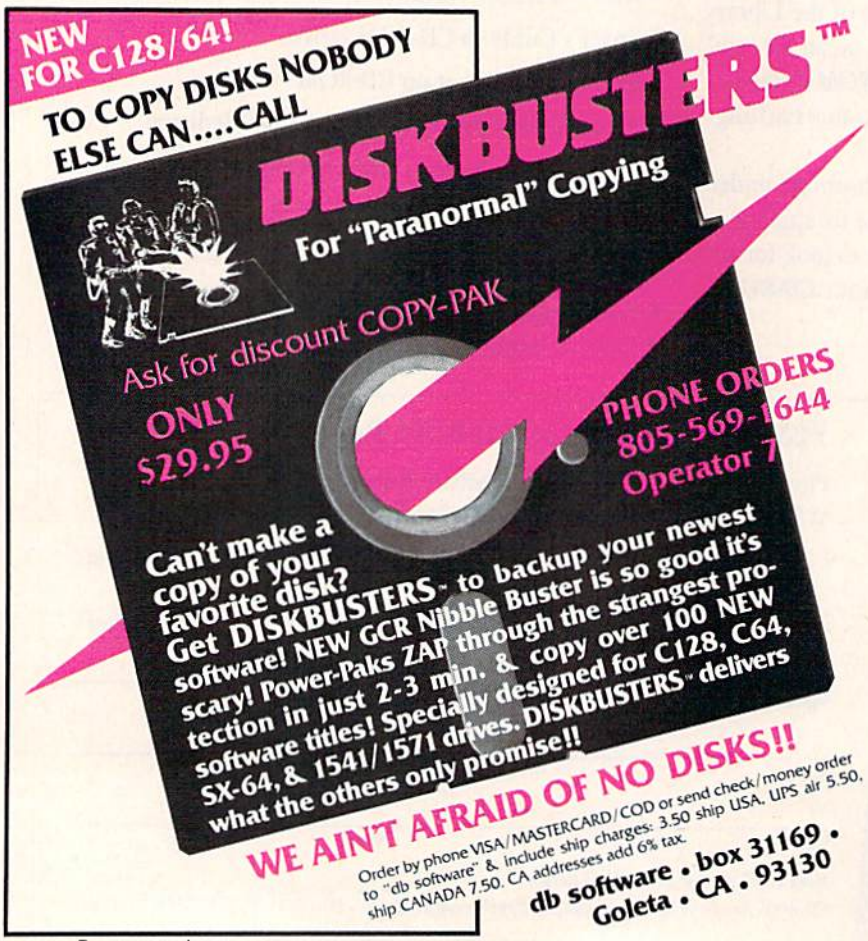

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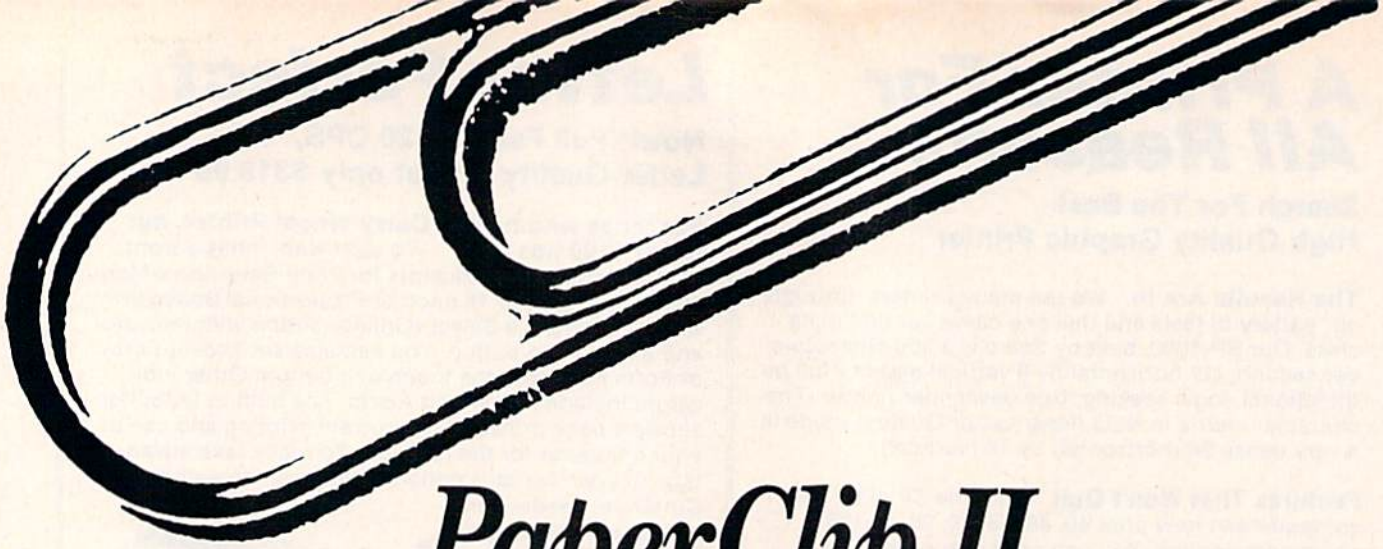

PaperClip II

By TIM WALSH

PaperClip II is the newest software release for the C-128 from Batteries Included. It's a 40- and 80-column package that features a powerful word processor, spelling checker, dictionary and telecommunications module, all on one disk.

The package is Batteries Included's planned replacement for its popular word processor, PaperClip 64/128, which was released in September of 1985. Although PaperClip 64/128 has proven to be a successful product, it was due for more refining and updating, since it was essentially a modified C-64 software package.

A few of the text-handling areas significantly improved in PaperClip II are faster disk accessing routines, a larger (by 15,000 words) dictionary, a faster spelling checker and a simplified format for command directives.

Users of earlier PaperClip word processors will be right at home with this new version, since few changes were made in the design of its primary operational formats. The procedures used to perform text editing, printing and disk accessing are the same.

One feature of PaperClip II that wasn't available until now is word wrap, which can be toggled on and off. PaperClip II is also 100% compatible with files created with earlier versions of PaperClip 64/128 and with Batteries Included's C-128 database management system, The Consultant.

PaperClip II, like its ancestors, is designed to permit continual updates. This allows rapid implementation of enhancements that utilize the Commodore 1700 and 1750 RAM expanders, 2400-baud modems and other hardware improvements.

It's all here—word processing, telecommunications, spelling checker and dictionary! Introducing PaperClip II, a four-in-one software system that turns your C-128 into a powerful productivity tool.

SpellPack

PaperClip II is full of improvements that take advantage of the C-128's features. Perhaps the most noticeable advance over PaperClip 64/128 is the size and performance of PaperClip II's SpellPack spelling checker and dictionary.

First, PaperClip II has a 35,000-word dictionary. I count myself among the users who were disappointed with the limitations of PaperClip 64/128's 20,000-word dictionary, which had a tendency to be stumped by words that larger dictionaries would normally contain.

Second, PaperClip II's SpellPack spelling checker is designed to scan and check the words in a document of any size in only 30 seconds, in contrast with the several minutes required by PaperClip 64/128.

Unfortunately, the SpellPack that accompanies the new product was unavailable at the time of this writing, so I had to limit myself to using PaperClip 64/128's spelling checker, which, incidentally, works well with PaperClip II.

Word Processing Features

Fortunately, column-generating and column-manipulating features found in earlier versions of PaperClip were preserved in PaperClip II. These handy features allow you to create columns of data and text, and then to manipulate and alphabetize the contents of each column individually. This feature permits the rapid development and placement of tables, charts and lists. Anyone familiar with this option will agree that it is one of the most attractive features of the word processor.

In earlier PaperClip word processors, pressing the return key with the cursor positioned in the middle of a line would delete the remainder of that line. This so-called "destructive return" has, happily, been rendered non-destructive in PaperClip II.

Now, pressing the return key anywhere within a line will place a left arrow at the cursor's position and move the cursor and the remainder of the line down to the next line. Should you want to delete text on the line to the right of the cursor, just press the escape key before the return key.

PaperClip II has an improved set

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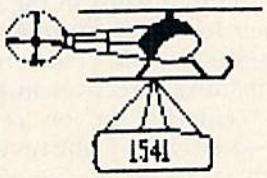

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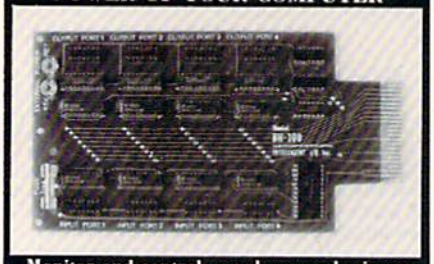

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of text-formatting directives to simplify the sometimes confusing process of entering abbreviated format commands. It reads only the first two letters of the first word in the command, then looks for a number or the words "on" or "off." This lets you enter formatting directives in plain English—"centering on" or "centering off"—instead of abbreviated codes such as "ce on" or "ce off."

Printing is definitely one of PaperClip II's strong points. It supports most of the popular printers used by Commodore computerists and lets you tailor it to your printer. Moreover, you're not limited to serial and parallel printers, because the program is also designed to support RS-232-controlled printers.

Printing to the screen is handled in a unique manner. With your C-128 in 40-column mode, you can print your individual files (or linked global files) to the screen in 40, 80 or 160 columns. In 80-column mode, those values are doubled to 80, 160 and 320 columns. Both the 160-column format in 40-column mode and the 320-column format in 80-column mode are represented as solid lines, not characters.

PaperClip II also permits multiline headers and footers within each document. This is a significant improvement over earlier PaperClips that allow only single-line headers and footers.

Another improvement is a fast loader program that reduces the disk-access time of a Commodore 1541 or comparable third-party disk drive. And Batteries Included has also designed PaperClip II to take advantage of the 1571's Burst mode. These faster disk-access capabilities perform full error-checking and are also active in the telecommunications module.

Like its earlier relatives, the new package can support two disk drives. However, unlike PaperClip 64/128 and other less-refined C-128 programs, it can differentiate between various types of disk drives. This feature lets you take advantage of the 1571's faster disk speed when you're using a 1571 and a 1541 in a two-disk drive system. This is an improvement over other software packages that can utilize a 1571 and a 1541 together, but operate the 1571 in 1541 mode only.

In keeping with its tradition, PaperClip II lets you save text in either program or sequential files. The

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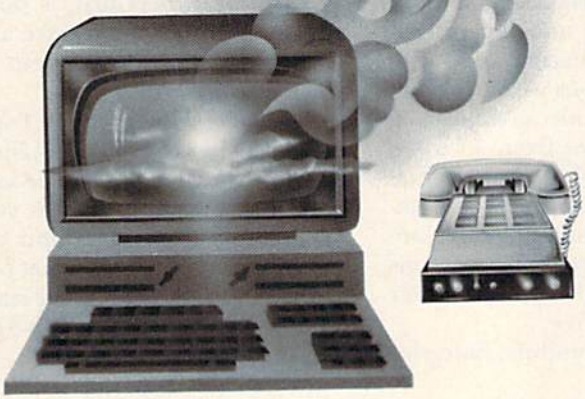

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Default mode saves them as program files in its own PaperClip format, while sequential files are saved as Commodore ASCII files. The text buffer is capable of receiving and sending true ASCII data—an important option, since the package contains a telecommunications module.

While the text area in the word processor is limited to 999 lines in 40-column mode and 499 lines in 80-column mode, long-winded writers needn't worry. Individual text files can be linked together with a linking command at the end of each file. There is provision for numbering the linked (global) files up to a total of 65,535 pages or chapters. This is a feature that authors, students and other writers are sure to appreciate.

Terminal Program

PaperClip II's terminal program, a full-featured telecommunications module, is a very logical addition to round out the package. You can toggle between the terminal program and the word processor by pressing the C-128's ALT key, and the terminal program's buffer is the word processor's text area. Designing the terminal program in this manner facilitates the entering and modifying of both up- and downloaded data.

Rest assured that this telecommunications module is not Batteries Included's first attempt at manufacturing a terminal program. Its popular HomePak software package, originally released in 1984, contains a C-64 terminal program. However, an examination of PaperClip II's specifications reveals an advanced design, faster operation and a longer list of features than you'll find in HomePak, so the two are really not comparable.

The module is designed to support all the Commodore and most third-party modems that can be used with the C-128. The options within the terminal program include an adjustable baud rate that ranges from 50 to an amazing 9600. Naturally, no guarantees of error-free computer-to-computer transmission at 9600 baud are expected, but the telecommunications module delivers 2400 baud and slower transmissions error-free.

In designing this module, Batteries Included was aware that 2400-baud modems are likely to become popular with C-128 owners in the near future. A hardware bug in the C-128's RS-232 port that may generate random errors at high-speed transmission rates has been software-corrected by PaperClip II. As a result, error-free transmission up to the 2400-baud rate is guaranteed.

Batteries Included's unique dongle-based copy-protection scheme is still used with PaperClip II. This type of copy protection requires plugging a small dongle cartridge into one of the C-128's joystick ports before you can use the program. The disk itself, like earlier PaperClips, is not copy-protected, so you can make as many backup copies of the system disk as you want.

As an added incentive for PaperClip 64/128 owners to use PaperClip II, Batteries Included will offer the latter for only $35 if you send them your old PaperClip 64/128 disks and the joystick port dongle used by that package. Without such a trade-in, the suggested retail price of PaperClip II is $79.

Conclusion

Equipped with a faster and more powerful processor, spelling checker, telecommunications module and a 35,000-word dictionary, PaperClip II looks like a success story in the making. These features should give the C-128 the ability to be taken more seriously by the business world.

PaperClip II is also designed to be a well-equipped package for home users, students and nearly all other C-128 owners. Sure, you might find a C-128 word processor with a larger dictionary or text area, or one that's a little easier to learn to use. It's also true that C-128 terminal programs are being developed that will undoubtedly have more features than you'll find in PaperClip II's telecommunications module.

However, I regard PaperClip II as an exceptional value because it combines more features than any other C-128 software package likely to come along in the foreseeable future. It could be one of the best software investments now available for new C-128 owners. R

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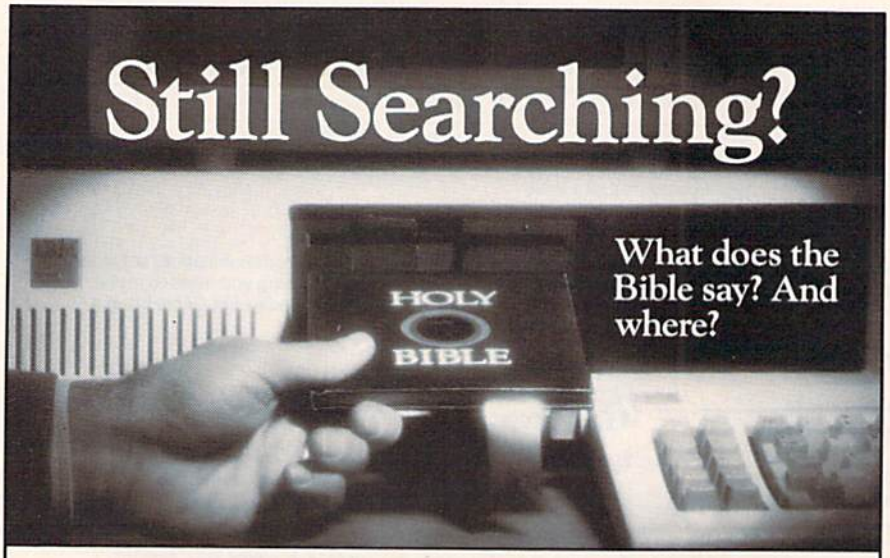

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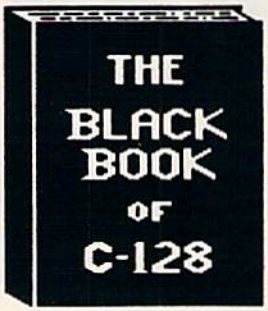

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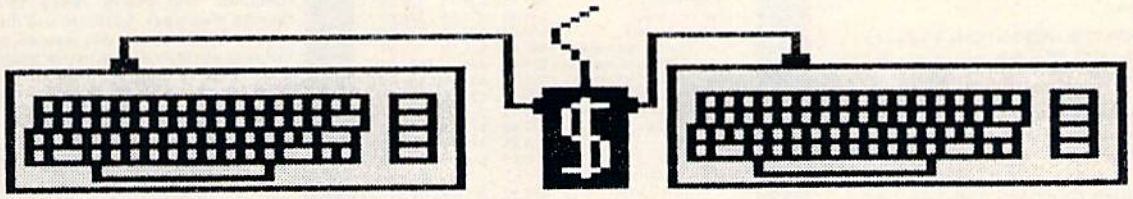

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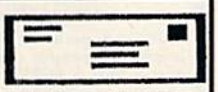

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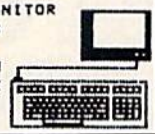

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By WILLIAM W. BRAUN and JIM BORDEN

Explore the ways in which the CHR$ function can help you in your programming.

Like any other skill, your ability to program in Basic grows and develops with time and experience. After you master the fundamentals, you tackle the intermediate and then the advanced programming concepts. Somewhere along this path, you'll discover the CHR$ function and find that it provides you with a better approach for certain tasks as well as giving you some unique capabilities.

Open your computer's reference manual to the section that lists the CHR$ codes. It will list what characters are printed to the screen or what commands will be executed when the proper CHR$ codes are used. They must be used after a Print statement. For example,

```
PRINT CHR$(X)
```

(where X is the code number).

As you can see from your manual, a wide range of functions is possible. You can print any character to the screen, move the cursor position, change character sets, change colors, clear the screen and more. You can use these commands in both the Direct and Programming modes.

For Clarity's Sake

I've found one of the best uses of the CHR$ function to be in producing more readable hard-copy program listings. You've probably seen a printed listing of a program that contains some unusual graphics characters inside quotation marks. It's hard to tell whether these are true graphics characters that would be printed to the screen or whether they're programming commands, and if the latter, *which* ones.

This is especially true when several commands are printed side by side; they run together, forming what appears to be a super character. If you've been away from the program for quite some time, it's often difficult to tell if the program is supposed to be changing printing colors, clearing the screen or just moving the cursor around.

Using the CHR$ functions instead of the keyboard programming commands will clean up your listing and make it much easier for both you and others to understand. Instead of having to decipher those graphics characters, you merely need to look up the code numbers in your manual. You can even use them like the keyboard commands, putting more than one CHR$ command in a single line. For example,

```
PRINT CHR$(147) CHR$(17) CHR$(31)
CHR$(18)
```

This line will clear the screen, move the cursor home, move the cursor down one line, change the print color to blue and turn on reverse video.

If your program repeatedly calls for many of the same CHR$ functions, you can simplify the task of typing them in by assigning string variables to those CHR$ commands. You would most likely do this in the variable initialization section of your program. Perhaps like this:

```
10 REM INITIALIZE VARIABLES
20 CH$ = CHR$(147): REM CLEAR/HOME
30 CD$ = CHR$(17): REM CURSOR DOWN
```

Now when you want to use these commands, you can just use the variables:

```
PRINT CH$ CD$
```

To refresh your memory on the function of the variables, you can refer back to the variable initialization section. Assigning variables to these commands also makes your program more understandable to others. The string variables will be easier to remember if you try to give them letters suggesting their functions, such as CH$ for CLR/HOME, RO$ for RVS ON, RF$ for RVS OFF, and so on.

Worth Quoting

You may have encountered a problem in Basic when trying to print quotation marks. You cannot use quotation marks after a Print statement and expect to see quotation marks. Basic sees them as delimiters, not as printable characters. You could use the programmable character capability of your computer to redefine another key, or you can use the CHR$ code for the quotation mark. For example, to print MARY SAID, "HELLO", use the following statement.

```
PRINT "MARY SAID, "CHR$(34)"HELLO"
CHR$(34)
```

Your program may require you to switch between the uppercase-only character set and the upper/lowercase set. You can do this with Pokes to the appropriate location, or the easy way, with CHR$ commands. This will also make it easier for you to understand your program later on, when the significance of the Poke numbers probably will have faded from your memory.

CHR$ comes to the rescue again

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when you need to evaluate the characters received from a Get statement. You can set it up as follows.

```
10 GET A$
20 IF A$=CHR$(X) THEN 120
30 IF A$=CHR$(Y) THEN 130
```

This coding will branch to line 120 or 130, depending on whether the key you pressed has X or Y as its CHR$ code. You might be asking yourself why you can't just use:

```
10 GET A$
20 IF A$="C" THEN 120
```

This would cause the program to branch to line 120 if the C key were pressed. You can use this technique, but it's better to use the CHR$ technique if you are going to program the large function keys, which would create some more of those difficult special graphics characters in your listing. Just substitute the CHR$ code numbers listed in your manual for the X or Y shown above.

Assigning CHR$ code numbers to characters makes it easier to write a section of a program that requires you to print out alphanumeric characters in ascending or descending order (for lists or charts).

Let's say that you want to print out a listing of some items that you have in inventory. You want to print them in a column, with each row starting with a letter and the letters beginning with A. You could use the following technique.

```
10 FOR X=0 TO 5: READ ITEM$
20 PRINT CHR$(X+65) ITEM$
30 NEXT
40 DATA SHOVEL,HAMMER,RAKE,
   WRENCH,HOE
```

Each time through this loop, the CHR$ code will increase by one and the next inventory item will be read from the Data statement. Similar applications can arise using numerals.

If your program requires you to evaluate the contents of a memory location, entering PEEK<location> will provide you with the Poke code number corresponding to the character in that location (unless, of course, you actually have numeric data in the location; then the numeric value will be displayed).

This Poke number won't tell you much by itself—you must check your manual's Poke table to see what character it represents. The CHR$ function can be used to simplify the process for you, but there isn't always a direct correlation between Poke numbers and CHR$ code numbers, which are not the same for all characters. If they were the same, you could just use the following to print the actual character to the screen.

```
PRINT CHR$(PEEK<location>)
```

You can overcome this problem by using the following short program.

```
10 A=PEEK<location>
15 IF A<32 THEN IF A>0 THEN 100
20 IF A>31 THEN IF A<64 THEN 200
25 IF A>63 THEN IF A<96 THEN 300
30 IF A>95 THEN IF A<128 THEN 400
35 IF A=0 THEN PRINT CHR$(64)
100 PRINT CHR$(64+A):GOTO 500
200 PRINT CHR$(A):GOTO 500
300 PRINT CHR$(A+32):GOTO 500
400 PRINT CHR$(A+64)
```

You must define or input the location earlier in the program. Then you may set the program to loop back, as needed, to determine other values of the location.

As you can see, the CHR$ function is a versatile programming tool. You'll probably think of other ways to use it as you go along; discovering better programming methods is part

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of what keeps us all interested in programming.

CHR$ on the C-128

While everything said above also applies to the C-128, this new computer has quite a few additional options that can be programmed by using the CHR$ function. For example, when you use an input statement, you add a CHR$(7) to the end of the prompt string. (This can be typed within quotes as {CTRL G}.) That will cause a bell tone to sound. You'd be surprised just how much a small touch like that can change a program!

You can also turn flash and underline on or off (when using the 80-column screen) with the correct CHR$ code. See pp. 365–367 of the *Commodore 128 System Guide* for a complete list of special CHR$ codes for the C-128. You should note that some of these codes do different things on the C-128 than on the C-64.

Other highly useful C-128 features are the Escape codes. You usually enter these in Direct mode by first pressing the ESC key, then releasing it and pressing another key to indicate the desired sequence. For example, {ESC}-Q will clear text from the cursor position to the end of the current screen line.

A complete list of the Escape codes is shown on page 368 of the system guide, but the functions of two of the codes shown there are incorrect. ESC-C will turn off the Auto Insert mode and ESC-O will turn off Quote, Insert, Underline and Flash modes. The guide has it the other way around.

To send an Escape code from within a program, first print a CHR$(27) and then print the character for the code you want. To clear to the end of a line in a program, you could use a line like this:

```
100 PRINT CHR$(27)"Q";
```

The semi-colon will cause the cursor to remain where it was. You might use this before an input prompt.

Look over the new C-128 CHR$ and Escape codes. These can be very useful both within a program and in Direct mode. I'm sure you'll find you can do a lot with only a few of them. R

Address C-64 questions to William W. Braun, 3164 Wellington Way, Arnold, MO 63010; address C-128 questions to Jim Borden, 641 Adams Road, Carlisle, PA 17013.

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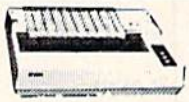

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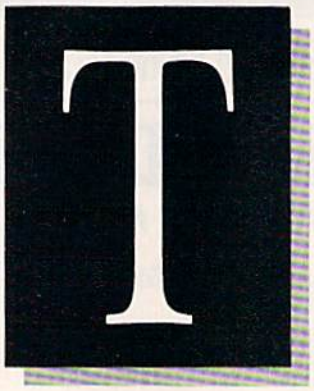

By ROBERT SIMS

Telecomputing Workshop is a monthly column dedicated to the needs of RUN *readers who are using, or intend to use, a Commodore computer for telecommunications. We invite you to submit your questions to:*

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Questions will be selected for publication on the basis of their probable interest to the majority of readers and will be answered only through this column.

I read my modem manual and found this peculiar notice: "Warning: If you are automatically dialing the wrong phone number, you will drive someone nuts, and may have your telephone service suspended." Is this true? And how is it so?

Henry Chin
Address not given

The warning in your manual probably meant to tell you that automatically dailing a wrong number may mean that some poor innocent soul will not only keep getting irritating phone calls, but may be greeted with your computer's high-pitched whine before it hangs up.

To anyone unfamiliar with modems, this repeated occurrence might lead to the conclusion that something is wrong with his phone or that some nut is harassing him. In either case, he might call the phone company, which might monitor the line, catch your call and trace it to you.

Since the phone company frowns upon misuse of the phone system, it might well cut off your service—all because you were careless in entering the phone number of your local BBS.

If you use an automatic-dialing terminal program and never get the number you want, you should first make absolutely certain that you entered the correct number. Once you're sure, dial the number manually and see if you're getting a carrier tone from the computer you're calling. If all this checks out and your computer is still dialing a wrong number, then the dialing feature in the software is not working properly.

I have been using my C-128 successfully to connect to The Source, CompuServe and Delphi. As a physician, I would like to know what other services are available, especially in the areas of medicine and personal investing. Also, what recent low-cost reference books would you recommend?

Dr. Barry Schickman
Houston, TX

For a list of medical-related computer services, look at p. 50 in the February 1986 issue of *RUN*.

The best computer resource for personal investors is the Dow Jones News/Retrieval Service. While there are any number of reference books and technical manuals published each year on the subject of telecomputing, the industry changes so quickly that some sections of the books are obsolete by the time they reach the bookstores. The best way to learn about what's available on-line is to search on-line for the subjects that interest you.

I have a 1660 modem and have no trouble accessing national data services. However, I cannot get through to any local bulletin boards. Even though I have a variety of terminal programs, they all give me the same problem. When I get into Terminal mode and call a local BBS access number, nothing happens.

V. Schenck
Bronx, NY

Since your equipment and software work with the national services, they should work equally well with most local bulletin boards. As you know from accessing the national services, you must type in a special sequence of characters, such as CTRL-C or <return.return> to connect to the service.

The same is often true of local bulletin boards. My best guess is that the boards you are calling do not respond until you press the return key or the space bar. To save yourself a lot of frustration, call the system operator and ask for the log-on sequence.

If you enter the correct log-on sequence and still nothing happens, the chances are that the BBS only works with special software. Again, the system operator can help you with that.

When I call bulletin boards late at night (when they aren't so busy), the

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speaker in the modem wakes up the other family members. I'm thinking that if I could locate the modem inside my desk and run a cable from it to the computer, it would be much quieter. Is there a cable available with the proper connections, and would it interfere with the modem operation?

My second question concerns downloading public domain programs from national services and from friends. I am assuming that when I save a program in the modem buffer, and later save it to disk, it will store on the disk as a sequential, not a program, file. Is there a program available to change the listing from a sequential file to a program file?

Robert Krimwiede Jr.
Burbank, CA

There are cables available in most electronics supply stores that can be used as extensions for RS-232 connections. Before you purchase one, check the connectors into which you will be plugging the extension cable. If the connector is male (it has pins protruding from the connector), then you will need a female connector on that end of the cable. As long as the cable length is less than 50 feet, you should be all right.

There are no guarantees, however. Some modems generate a weak signal, and the extra cable length may affect communications. A simpler solution may be to turn the speaker off. Check your modem manual. Some modems allow you to manually control the speaker volume.

To answer your second question, in its June issue, *RUN* published a program (Easy Disk-File Conversion) that converts program files to sequential files and vice versa.

A lot of modem advertisers claim that their modems handle the "new" Punter and Xmodem protocols. Please explain what these new protocols are with respect to the old ones and how they relate to the older types of modems.

Aside from the Xmodem protocol being slightly faster than the Punter, are there other significant differences between the two?

Also, I have a friend who has the same make of modem that I do. I have no problem downloading files from him using either protocol. He has no trouble receiving files from me using Xmodem, but never receives the full file when he tries to use the Punter protocol. Can you explain what causes this problem?

Tom Trowsdale
Riverview, New Brunswick
Canada

First, your modem has no direct relationship to whichever file transfer protocol you use; this is determined solely by the terminal software. These modem ads undoubtedly are referring to the terminal programs that come with their modems.

Regarding "new" and "old," and Xmodem versus Punter protocols, the original versions of these protocols were written several years ago. Revisions have since been written to speed up file transfers and to improve error-checking techniques.

Since transmission speed depends on several variables outside the control of the protocols, it's not possible to make flat statements about which protocol is faster. Also, not all versions of the protocols are completely compatible with earlier or later versions. That may be the reason for your transfer problems.

Your question as to whether a particular terminal program's transfer routines are compatible with a specific version of Xmodem or Punter protocol is a subject too tangled for anyone but an expert on that particular version. Unfortunately, the authors of the various Xmodem versions are not readily accessible. However, Mr. Punter can be reached for questions at a regular monthly conference on the QuantumLink network.

I recommend that novices look to those with experience. Check with other modem owners to see what works with the services you want to access.

My modem has a very poor instruction manual, written as though the buyer were knowledgeable in all aspects of telecomputing.

I understand that program files cannot be sent unless they're converted to an IMG file and reconverted back to a program file at the receiving end. Why is this? I followed the process and was successful, but I haven't any idea as to why it was necessary.

What is an IMG file and what do the letters mean? The program file consisted of four blocks, but when converted to an IMG file it was expanded to ten blocks! Thus, a large file would appear to require two-and-a-half times the number of original blocks.

The system I access also provides an alternative to IMG, the Punter protocol. I tried uploading by choosing this option, but my C-64 locks up when I attempt to send any type of file. Do I have a faulty program? Do you have any suggestions?

Arthur Blackford
Don Mills, Ontario
Canada

IMG stands for image. In IMG files, each byte in the file is converted to two ASCII characters that form an image of the binary number contained in that byte. IMG transfers are easier to verify than other types of protocols (transfer techniques), but are much slower because two image bytes are transferred for each byte in the original file.

Your computer locks up when you try to use the Punter protocol because your terminal program is not compatible with it. The other computer doesn't understand what your computer is sending, so it doesn't respond correctly. It is as though your computer were transmitting in French to another that understood only English.

Every once in a while, a computer calls me up. I have no idea who is operating the computer, because by the time I load up my terminal program, it has hung up. I've been trying to write a program that I can load up before the other computer hangs up; a program that will send and receive data with no uploading or downloading. I would like it to reside in high memory, so that when I receive an outside call while using my computer, I could enter a SYS num-

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ber and thus prevent interference with my program in Basic memory. Can you help me?

Marty Westra
Sioux Falls, SD

What you are proposing is probably not worth the effort. The simple terminal program you want can be written, but activating it by entering a SYS command while using another program would require you to modify all your software to recognize the SYS command, to save whatever data you are currently working with and then to load and run the terminal program.

Since most automatic-dialing terminal programs only wait a few seconds for a response from the computer they are calling, the mystery computer will probably hang up before you can activate your mutant program, anyway. To achieve the degree of sophistication you propose, you're much better off purchasing a computer that can run more than one program at the same time. The Amiga is one such multitasking computer.

I saw an ad for a modem phone made by Unitech for a close-out price of $39.90 plus $12 for a special connecting cable to hook it up to my C-64. Besides its affordable price, I like the feature of using it as a phone as well. Would there be any disadvantages to this product?

I know the answer to this next question is relative, but if I use a modem, about how much, on the average, would I be spending on phone bills?

Finally, I have two children, ages 5 and 7. Are there any programs appropriate for them?

Frank DiMaio
Hopatcong, NJ

If the modem phone and interface cable are in proper working order, the product should do the job.

The relative answer to your second question is that merely using a modem does not affect your telephone bill. If you dial long-distance to reach a remote computer, the charge will be the same as if you called the number and talked to another person.

Finally, there are a number of services for children in the telecomputing field. Most metropolitan areas have at least one bulletin board run by and for kids. The national services have departments and sections that offer everything from encyclopedias and tutors to help with homework to games kids can play with each other on-line and special chat areas where they can talk with other kids all over the country.

As a parent, though, you should remember that children are not always aware of what things cost. Unless you supervise what your children do on-line, you may get an incredible shock when the bill comes for all that connect time. R

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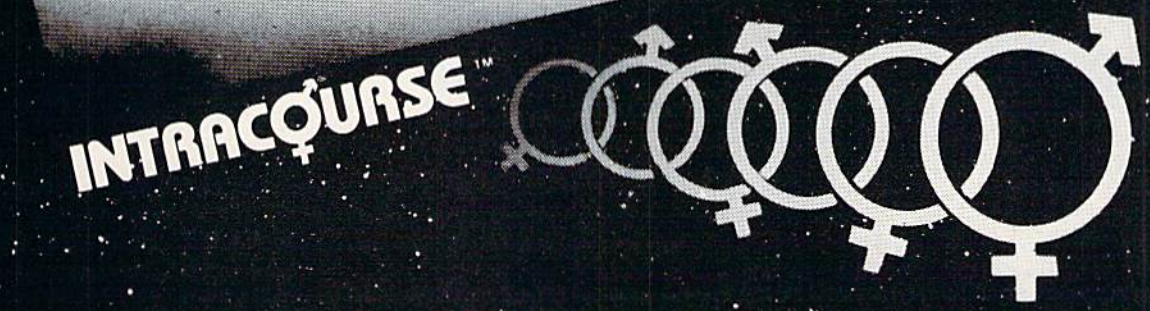

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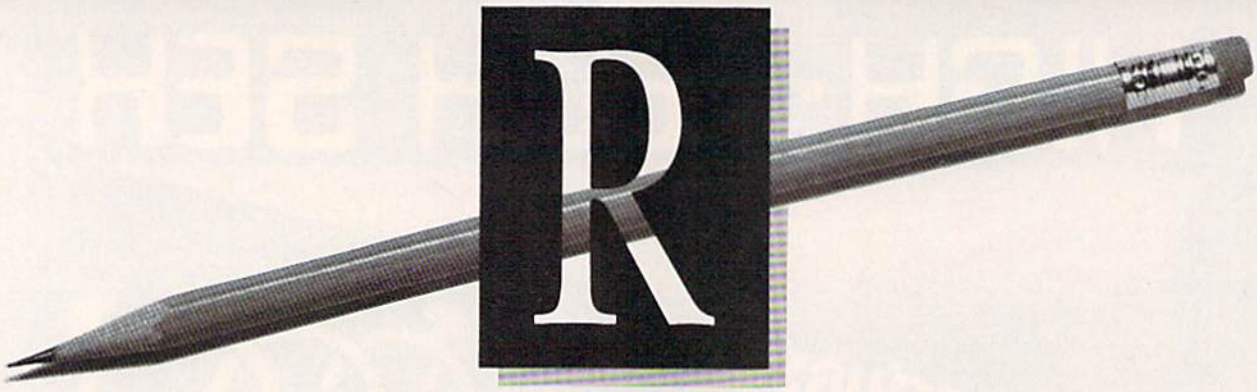

By MARGARET MORABITO

It's a common situation. A school gets a few computers, and then they sit idle while the teachers warily wonder what to do with them. Well, the Prospect Hill Elementary School, in New Berlin, Wisconsin, faced this problem back in 1983 when it was given three C-64s.

Now, three years later, the 350-student school has an active computer lab with confident teachers using it, thanks to the combined efforts of dedicated parent volunteers, interested teachers and the school's administration.

Sometimes, teachers can't do it all by themselves. Parents can then play a critical role in the computer education of students, as happened at one elementary school in Wisconsin.

How It All Began

Bonnie Nebel, a parent in the New Berlin school district, contacted me early this year to tell me the story of how Prospect Hill got started with C-64s.

The parents' organization, called the Parent Advisory Board (PAB), had been interested in getting computers into the school since 1981, but had not made much progress until the 1982–83 school year, when the school board allotted money for computer funding. This went to buy three C-64s. At that time, however, neither the teachers nor the principal knew what to do with the computers, and they had no time or money to learn.

Nebel joined the PAB that year, and when the other parents found out that she was familiar with computers and was willing to share that knowledge, they decided to start a parent volunteer program to help the teachers learn to use the computers. They appointed Nebel as coordinator of this project.

Over the course of two months, Nebel and the PAB implemented the volunteer program, which sent parents into the school to help in the small computer lab, thus making it more readily available and attractive to the teachers. Three years later, the parent volunteers are still at work in this capacity, with eight volunteers currently active in the school.

How They Got Started

Actually locating interested parents was quite easy. Word of the project quickly spread, and Nebel, along with another computer-literate mother, volunteered to hold training sessions for the parents. After a couple of two-hour sessions, they let the volunteer parents go into the computer lab as teacher aides.

These early training sessions focused mainly on fundamental information. A C-64 fact sheet was created. Volunteers were introduced to the keyboard to learn how it both resembled and differed from a traditional typewriter. They discussed floppy disks—how to handle them, how to place one in the drive and how to load a program.

The volunteers had no specific computer background. As Nebel puts it, "They just had to know how to turn on the computer and load a program. Then, it was up to the teachers."

Nebel coordinated the parent volunteer project with the school's principal, Lester Graves, who set up a computer lab schedule for all of the teachers. The first year, every class had a scheduled time period in the computer lab. But not all the teachers took advantage of this. Says Nebel, "It was rough then. We'd have half the class sitting at the computers—three per computer—and the other half sitting at their desks doing other things.

What Did the Parents Do?

The parents' function in the lab was primarily to turn on all of the computers and load in the appropriate software. During the class session, the volunteers would answer students' questions, and at the end of the class would turn off the equipment and put away the software.

Some of the parents with teaching backgrounds would also help the teachers plan classes and sometimes actually teach lessons themselves. Ideally, parents should only monitor the class, not actually teach. However, during the early years, this was the only feasible way to get things done.

Each year, the Prospect Hill teachers have learned more about the computers and how to use them in their classes. Even more important, they have gained confidence. Although the parent volunteers are still used in many computer classes, some teachers now prefer to handle the entire job themselves.

What Are the Advantages?

Nebel is quick to point out that teachers just don't have the time to

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Children at work in Prospect Hill's computer lab.

load up all the machines before their kids arrive for class and then shut off everything afterwards. The parent volunteers arrive before the class begins, so the computers are ready to go when the teacher arrives with the class.

"Now, that's where the parent volunteers are really helping out," says Nebel.

Another advantage is the collaboration of volunteers and teachers in selecting software. The volunteers have the opportunity to test out new software and so can recommend the programs that are likely to work well with the class.

An additional benefit is simply the presence of another adult in the computer lab to answer questions. Says Nebel, "We have 12 computers in there now, and when you have 24 kids on 12 computers, questions do come up. With the older kids, it's a lot easier. They can load their own programs and even tutor others. It's with the younger grades (K–3) that the parent volunteers are most helpful."

What Are the Problems?

Did the parents organization have any problems in getting the computer lab going at Prospect Hill? "Yes," says Nebel. "The biggest problem was convincing the principal and the teachers that they really did want the computers. The first time some of the teachers looked at the C-64s, they thought to themselves, 'Who needs this?' " Nebel is quick to add, though, that there has been a tremendous change over the last three years in the teachers' perceptions of computers.

How did this come about? A turning point came early in 1985, when Susan Copp, a former teacher, became the president of the PAB. Her goal was to get the computer lab moving in Prospect Hill, so she consulted Nebel about what ought to be done. Nebel's answer was direct: "You're not going to be able to do anything until you get the teachers trained."

The teachers needed to be taught how to utilize computers in their courses. In some cases, the parent volunteers were doing so much of the work in the computer lab that the teachers weren't advancing their own computer know-how. Moreover, they didn't have the time to further develop their skills.

Teacher Training

Copp and Nebel decided to team up to provide the needed teacher training themselves. They offered free sessions during the summer of 1985, inviting the teachers and the principal to attend classes one afternoon a week throughout the summer.

Says Nebel, "When Mr. Graves, the principal, took our class and started to understand what this was all about and see what the computers could do, his attitude really changed. That's what really turned things around."

In the 1985–86 school year, a big change is evident. The teachers feel more confident now with the computers, and they are bringing their students into the lab more often. The PAB has contributed by donating money this year specifically for teacher training, rather than for buying more equipment.

Hands-On Computer Training

The training sessions during that first summer were so successful that Copp and Nebel formalized the course and applied for state accreditation. They now have a partnership venture called Hands-On Computer Training, which is an accredited course specifically aimed at teaching teachers how to use computers in the classroom.

Briefly, the Hands-On Computer Training course is a six-unit course covering the keyboard, disks, educational software, LOGO, word processing and programming. All of these topics are addressed with consideration for the specific grade levels taught by the teachers.

Nebel and Copp go to the schools in the district that have computers and do the training right there on the premises. They use both C-64s and Apples, "But," says Nebel, "the C-64 is our main machine, even though we do handle Apples. We think that Commodore is the best tool for education."

It's interesting to note that one-third of a 22-student fourth grade class at Prospect Hill have their own C-64s at home; one has an Apple. Their teacher also has a C-64 at home, as do four others in the school.

Conclusion

These two educators have done an admirable job in promoting the use of computers in education, and they have kindly donated to The Resource Center a list of recommended educational software that they distribute at their Hands-On training sessions. (See Table 1.)

Furthermore, Susan Copp is in the process of evaluating the available Commodore public domain educational software and will share that list with us when she finishes the project.

If you'd like more information about the Prospect Hill computer program, contact the principal, Mr. Lester Graves, at Prospect Hill School, 5330 S. Racine Ave., New Berlin, WI

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Computergarten (P–1)
Rainbow Keyboarding (2–3)
Spell Diver (1–up)
Bank Street Writer (4–up)

Spinnaker
Alphabet Zoo (P–3)
Facemaker (P–3)
Delta Drawing (P–7)
Kids on Keys (P–4)
Rhymes and Riddles (K–5)
Kidwriter (K–4)
Snooper Troops (5–up)

Weekly Reader
Stickybear Math (1–4)
Stickybear Town Builder (1–3)
Other Stickybear titles

The Learning Company
Reader Rabbit (P–2)
Rocky's Boots (4–up)
Addition Magician (1–5)

Sunburst
The Factory (4–9)
The Pond (2–up)
Teasers by Tobbs (4–up)

Broderbund
The Print Shop (3–up)
The Print Shop Graphics Library (3–up)
The Print Shop Companion (3–up)

Simon & Schuster
Kermit's Electronic Storymaker (P–2)

Sierra
Donald Duck's Playground (2–6)

Grolier Electronic Publishing
Friendly Filer (3–9)
Easy Graph (3–9)
EduCalc (5–12)
The Information Connection (5–12)

Koala Technologies
Muppet Learning Keys (P–1)

CBS Software
Webster: The Word Game (1–up)
Coast-to-Coast America (3–up)

Fisher-Price
Alpha Build (P–3)
Logic Levels (2–9)

Springboard Software
Mask Parade (P–5)

Davidson
Math Blaster! (1–6)

DesignWare
States and Traits (6–up)
Remember! (7–up)
Spellagraph (2–9)
The Body Transparent (3–11)

Sight & Sound Music Software
Incredible Musical Keyboard
Kawasaki Synthesizer
Music Processor

Commodore Business Machines
LOGO (P–up)

Table 1. *Starter list of Commodore educational software, with appropriate grade levels. Compiled by Hands-On Computer Training.*

53151. For more information about teacher training and the parent volunteer project, write Bonnie Nebel or Susan Copp at Hands-On Computer Training, 19975 W. Julius Heil Drive, New Berlin, WI 53151. Please include a self-addressed stamped envelope. R

If you are using Commodore computers for educational purposes (at home or in school) and would like to share your experiences through The Resource Center, write me a letter detailing the equipment you're using, the subject areas you're involved in, the grade level or age of your students, software that has been effective and any other information you feel like including. Send letters to:

Margaret Morabito
The Resource Center
c/o RUN *Editorial*
80 Pine St.
Peterborough, NH 03458

You can also leave messages in my on-line mail boxes: CompuServe (70616,714); Delphi (MARGM); and QuantumLink (MARGM). The Resource Center now has its own on-line SIG in the Learning Center on QuantumLink.

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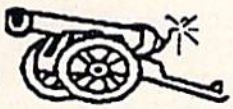

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From p. 10.

$304 C-128 abbreviation—If you've been using P (shift) O as the abbreviation for the Poke command on your C-64 or 128 in 64 mode, then beware! In 128 mode, you must use PO (shift) K.

Mark Porter
Montpelier, VT

**$305 C-128 flasher**—In 80-column mode, you can draw attention to any Print statement by adding a CHR$(15) between the Print statement and the quotation mark.

Dale L. Moore
Dimondale, MI

$306 Toolkit tip—A useful tool not usually found in the electronic toolbox is the jeweler's saw, available in most craft shops. This is something like the more familiar coping saw, except it has a finer blade and will cut metal. It can be used to modify connectors or cut circuit boards, and it's particularly well suited for cutting off small screws and bolts. I recently used mine to cut a shoulder off a dongle so it would fit my new C-128.

Daniel Morris
Waynesburg, PA

Circle 193 on Reader Service card.

$307 Electronics repair—Many failures in the computer, disk drive and associated equipment can be attributed to IC chips failing when subjected to heat. A quick and fairly reliable way to find the culprit is to operate the equipment until the failure occurs, then to spray each chip with component coolant such as Radio Shack #64-2321. Chances are good that when you spray the faulty chip, the machine will resume operation.

Since the chips used in the C-64 and 1541 are now readily available, this technique could save you plenty of time and money.

Joe Grossinger
El Paso, TX

$308 Easier disk commands—Not everyone is aware of this easy way of sending disk commands. Instead of something like

```
OPEN 15,8,15 : PRINT#15,"N0:NAME,ID"
```

it's possible to use

```
OPEN 15,8,15,"N0:NAME,ID"
```

This works because the Open command's syntax allows text to be included after the secondary address, as long as it is separated from the address by a comma. In a slightly different way, you can use

```
OPEN 4,4 : CMD4,"PROGRAM NAME" : LIST
```

to get labels on your printed program listings.

Hillmon W. Ancrum
Orangeburg, SC

$309 Active device finder—Memory location 186 always holds the number of the last device used for input or output, and it's a very useful location to use in programming. (174 is the equivalent location for the Plus/4 and C-16.) If you type PEEK 186 before performing any further input or output, the screen will display the number of the device from which the program was loaded. You can use this information instead of asking the user about disk or tape.

Be careful, though—after you use the printer, this location will contain a 4 until more disk or tape input/output takes place.

Brian Petroski
Iron River, MI

$30A Printer interface hazard—Most printer interfaces plug into the cassette port for power, leaving their own exposed contacts for connecting the Datassette. This is dangerous, since metal objects can easily touch the exposed contacts, with potentially disastrous results.

You can eliminate the hazard by changing the plug or the socket. If you don't use a Datassette, you can replace the special interface connector with a standard six-position PC edge connector and insulate its smaller exposed contacts with epoxy or other potting material.

As an alternative, you can mount a separate single-conductor connector on the back of your computer, con-

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necting it internally to the +5-volt power bus. Radio Shack #274-721 and the mating #274-725 will do the job for under $2.

If disaster strikes before you take these safety steps, you may not have to take your computer in for service. Examine the fuse on the inside of your computer. If it's blown, replace it with a fuse of equal value and pray that nothing else went up in smoke.

Steven J. Walsh
Seaford, NY

$30B Computer desk—I used a door to make a computer desk. The door sits on two small filing cabinets, but I could easily have used sawhorses or bookshelves. The door-desk is quite large and can easily hold all my computer equipment. An added attraction is that all cables and cords pass neatly through the hole for the lock.

If you don't have any old doors hanging around, you can buy new ones at building supply stores, usually for under $20.

Nigel Horscroft
St. Lucia
West Indies

$30C Blitzing Blitz!—The popular Blitz! compiler executes Goto statements much more quickly than For... Next loops. So you can speed up your Blitzed programs by changing lines like

```
100 FOR J=1 TO 10
110 Other program lines
120 NEXT J
```

to lines like

```
100 J=0
105 J=J+1
110 Other program lines
120 IF J<10 THEN 105
```

Mike Dryja
Washington, MI

$30D KoalaPainter to Print Shop—This bit of magic will change KoalaPainter picture files into Print Shop Screen Magic picture files. Enter your machine language monitor, then type these commands:

```
.L " [COMD 1]PICltr filename",08
.T 6000 7F3F 4000
.S "filename",08,4000,5F3F
```

In the first line, [COMD 1] stands for the Commodore key and the 1 key pressed simultaneously, and ltr stands for any letter between A and O. The filename stands for the name of your KoalaPainter file. There must be fifteen characters between the quotes, including spaces. If your filename isn't long enough, pad it out with spaces.

Your monitor may have slightly different commands from those shown here. Use the necessary syntax to load a file, transfer memory and save the transferred block.

Brian Dressel
Spring Lake, MI

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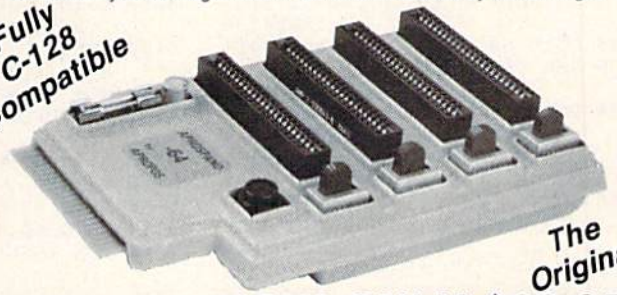

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From p. 31.

```
    FT A)N {SHFT I}SSUE"
                          :REM*135
2Ø1Ø GOSUB 5ØØ            :REM*2Ø3
2Ø3Ø INPUT "{2 CRSR DNs} {SHFT T
    }EXT {SHFT F}ILE:{4 SPACEs}
    *{3 CRSR LFs)"; F2$:REM*123
2Ø4Ø IF F2$="*" GOTO 2Ø3Ø:REM*97
2Ø5Ø INPUT " {SHFT O)N {SHFT D}R
    IVE #:{3 SPACEs}Ø{3 CRSR LF
    s)"; D2$              :REM*1Ø4
2Ø6Ø IF D2$<>"Ø" AND D2$<>"1" GO
    TO 2Ø5Ø               :REM*7Ø
2Ø8Ø IF D2$<>D3$ THEN PRINT#15,
    "I"+D2$: GOSUB 2Ø     :REM*1Ø2
21ØØ OPEN 2, 8, 2, D2$+":"+F2$:
    GOSUB 2Ø              :REM*13Ø
212Ø PRINT "{CRSR DN} {SHFT W}OR
    KING..."              :REM*252
214Ø REM FETCH LINE COUNT
                          :REM*216
215Ø R=1: GOSUB 1Ø        :REM*214
216Ø INPUT#3, N: FL=N     :REM*78
217Ø R=1: GOSUB 1Ø        :REM*234
219Ø REM BUMP COUNT       :REM*114
22ØØ N=N+1                :REM*246
222Ø REM GET TEXT LINE    :REM*2Ø2
223Ø SYS AD: SS=ST        :REM*246
224Ø L=PEEK(142)          :REM*172
226Ø REM WRITE IT TO ISSUE
                          :REM*92
227Ø R=N: GOSUB 1Ø        :REM*3Ø
228Ø PRINT#3, LEFT$(A$,L)
                          :REM*1Ø6
229Ø R=N: GOSUB 1Ø        :REM*5Ø
231Ø GOSUB 2Ø             :REM*219
233Ø REM CHECK END OF FILE
                          :REM*117
234Ø IF SS=Ø GOTO 22ØØ    :REM*41
236Ø REM UPDATE LINE COUNT
                          :REM*215
237Ø R=1: GOSUB 1Ø        :REM*179
238Ø PRINT#3, N: LL=N     :REM*125
239Ø R=1: GOSUB 1Ø        :REM*199
241Ø PRINT "{CRSR DN} {SHFT S}TA
    RT: {SHFT P}AGE"; (FL-1)/LP
    +1                    :REM*1Ø7
242Ø PRINT "{3 SPACEs}{SHFT E}ND
    : {SHFT P}AGE"; (LL-1)/LP
                          :REM*139
244Ø GOTO 5Ø              :REM*1Ø1
2999 REM TABLE OF CONTENTS
                          :REM*25Ø
3ØØØ PRINT "{SHFT CLR}"; TAB(11)
    ; "{SHFT T}ABLE {SHFT O}F {
    SHFT C}ONTENTS"       :REM*35
3Ø1Ø GOSUB 5ØØ            :REM*183
3Ø3Ø INPUT "{2 CRSR DNs} {SHFT C
    }ONTENTS:{5 SPACEs}*{3 CRSR
     LFs}"; F2$           :REM*247
3Ø4Ø IF F2$="*" GOTO 3Ø3Ø:REM*85
3Ø5Ø INPUT " {SHFT O)N {SHFT D}R
    IVE #:{3 SPACEs}Ø{3 CRSR LF
    s}"; D2$              :REM*83
3Ø6Ø IF D2$<>"Ø" AND D2$<>"1" GO
    TO 3Ø5Ø               :REM*81
3Ø8Ø IF D2$<>D3$ THEN PRINT#15,
    "I"+D2$: GOSUB 2Ø     :REM*82
31ØØ OPEN 2, 8, 2, D2$+":"+F2$:
    GOSUB 2Ø              :REM*11Ø
312Ø REM SET TO FIRST LINE
                          :REM*252
313Ø N=1                  :REM*42
315Ø REM BUMP COUNT       :REM*54
316Ø N=N+1                :REM*186
318Ø REM GET TEXT LINE    :REM*142
319Ø SYS AD: SS=ST        :REM*186
32ØØ L=PEEK(142)          :REM*112
322Ø REM WRITE IT TO ISSUE
                          :REM*32
323Ø R=N: GOSUB 1Ø        :REM*226
324Ø PRINT#3, LEFT$(A$,L):REM*46
325Ø R=N: GOSUB 1Ø        :REM*246
327Ø GOSUB 2Ø             :REM*158
329Ø REM CHECK END OF FILE
                          :REM*56
33ØØ IF SS=Ø GOTO 316Ø    :REM*4
332Ø GOTO 5Ø              :REM*216
3999 REM DELETE TEXT FILES
                          :REM*16Ø
4ØØØ PRINT "{SHFT CLR}"; TAB(11)
    ; "{SHFT D}ELETE {SHFT T}EX
    T {SHFT F}ILES"       :REM*65
4Ø1Ø PRINT "{2 CRSR DNs} {SHFT P
    }LACE THE {SHFT T}EXT {SHFT
     F}ILE {SHFT D}ISK IN DRIVE
     #Ø"                  :REM*1
4Ø2Ø INPUT "{2 CRSR DNs} {SHFT T
    }EXT {SHFT F}ILE PREFIX:{3
    SPACEs}P/{4 CRSR LFs}"; PR$
                          :REM*85
4Ø3Ø IF PR$="*" GOTO 4Ø2Ø
                          :REM*113
4Ø5Ø PRINT "{2 CRSR DNs} {SHFT S
    }CRATCH {SHFT F}ILES PREFIX
    ED WITH: "; CHR$(34); PR$;
    CHR$(34)              :REM*59
4Ø6Ø INPUT "{CRSR DN} {SHFT I}S
    THIS {SHFT O}{SHFT K} (Y/N)
    :{2 SPACEs}N{3 CRSR LFs}";
    Z$                    :REM*225
4Ø7Ø IF Z$<>"Y" THEN RETURN
                          :REM*219
4Ø9Ø PRINT "{2 CRSR DNs} {SHFT W
    }ORKING..."           :REM*247
411Ø OPEN 15, 8, 15, "I"+D3$: GO
    SUB 2Ø                :REM*32
413Ø PRINT#15, "SØ:"+PR$+"*": GO
    SUB 2Ø                :REM*86
414Ø PRINT "{CRSR DN} {CTRL 9}";
     DE$;T                :REM*154
416Ø GOTO 5Ø              :REM*36
4999 REM FIX PAGE COUNTER
                          :REM*226
5ØØØ PRINT "{SHFT CLR}"; TAB(12)
    ; "{SHFT F}IX {SHFT P}AGE {
    SHFT C}OUNTER"        :REM*135
5Ø1Ø GOSUB 5ØØ            :REM*143
5Ø3Ø REM FETCH LINE COUNT:REM*45
5Ø4Ø R=1: GOSUB 1Ø        :REM*43
5Ø5Ø INPUT#3, N           :REM*5
5Ø6Ø R=1: GOSUB 1Ø        :REM*63
5Ø8Ø REM OFFER CHANGE     :REM*179
5Ø9Ø PRINT "{CRSR DN}"; TAB(22);
     (N-1)/LP             :REM*127
51ØØ INPUT "{CRSR UP} {SHFT C}HA
    NGE {SHFT E}ND {SHFT P}AGE
    TO: "; N              :REM*199
512Ø REM UPDATE LINE COUNT
                          :REM*17Ø
513Ø R=1: GOSUB1Ø         :REM*134
514Ø PRINT#3, N*LP+1      :REM*1Ø8
515Ø R=1: GOSUB1Ø         :REM*154
517Ø GOTO 5Ø              :REM*26
7ØØØ REM ISSUE NAME, DRIVE #
                          :REM*177
7Ø1Ø DATA "JUL86", Ø      :REM*199
71ØØ REM MAX # OF PAGES   :REM*243
711Ø DATA 6Ø              :REM*165
8ØØØ REM C64 STRING THING DATA (
    FILE 2)               :REM*113
8Ø1Ø DATA 16Ø,2,177,45,153,137,Ø
    ,2ØØ,192,6,2Ø8,246,162,2
                          :REM*97
8Ø2Ø DATA 32,198,255,32,228,255,
    2Ø1,13,24Ø,15,164,142,145,1
    4Ø                    :REM*95
8Ø3Ø DATA 2ØØ,132,142,196,139,24
    Ø,4,165,144,24Ø,234,76,2Ø4,
    255                   :REM*119
```

Listing 2. *Mag Reader program.*

```
Ø GOTO 1ØØ                :REM*186
1 REM MAG READER V6.4     :REM*31
2 REM (C) 1986 DAVID A. HOOK
                          :REM*24Ø
9 REM DISPLAY A SCREEN    :REM*245
1Ø PRINT "{SHFT CLR}{CTRL Ø}";:
    OPEN 2, 8, 2, F$      :REM*18
11 FOR I = FL TO LL       :REM*153
12 PRINT# 15, "P" + CHR$(2) + CH
    R$(I AND 255) + CHR$(I/256) +
     CHR$(1)              :REM*1Ø2
13 SYS AD                 :REM*213
14 L=PEEK(142)            :REM*242
15 PRINT LEFT$(A$,L);     :REM*15
16 IFL<4Ø THEN PRINT CHR$(13);
                          :REM*19Ø
17 POKE 212, Ø: NEXT: CLOSE 2: R
    ETURN                 :REM*189
1ØØ IF LK GOTO 6ØØ: REM AFTER PI
    CTURE LOADS           :REM*254
11Ø POKE 55, Ø: POKE 56, 32: CLR
                          :REM*12
12Ø A$="ABCDEFGHIJKLMNOPQRST": A
    $=A$+A$               :REM*112
14Ø REM BKGD, CHAR COLORS
                          :REM*222
15Ø READ BB, CH           :REM*1ØØ
16Ø POKE 5328Ø, BB: POKE 53281,
    BB: POKE 646, CH      :REM*146
18Ø REM PIC NAME, TYPE, BORDER C
    OLOR                  :REM*1Ø8
19Ø READ PF$, T$, KF      :REM*88
2ØØ POKE 2, 2 + 2*(T$="K") + (T$
    ="D")                 :REM*192
22Ø REM ISSUE FILE NAME   :REM*5Ø
23Ø READ F$               :REM*12Ø
25Ø REM MAG TITLE, ISSUE MONTH
                          :REM*24
26Ø READ MT$, MO$         :REM*161
28Ø CD$="{HOME}{24 CRSR DNs}"
                          :REM*21
29Ø SP$="{38 SPACEs}"     :REM*75
31Ø GOSUB 1ØØØ: REM HELP:REM*2Ø1
33Ø LP=25: AD=896: ML=49152: IF
    PEEK(AD)-16Ø THEN GOSUB 8ØØØ
    : REM READ DATA       :REM*89
35Ø OPEN 15, 8, 15, "IØ":REM*229
37Ø REM GET TOTAL LINE COUNT
                          :REM*25
38Ø OPEN 2, 8, 2, F$      :REM*197
39Ø SYS AD                :REM*79
4ØØ LN=VAL(A$)-1: PG=LN/LP
                          :REM*81
41Ø CLOSE 2               :REM*175
42Ø IF LN<1 OR PG<>INT(PG) THEN
    PRINT: PRINT " {CTRL 9}FILE
    ERROR": CLOSE 15: STOP
                          :REM*63
44Ø REM SKIP THE LOAD IF NO HI-R
    ES PICTURE INCLUDED :REM*131
45Ø LK=1: IF PEEK(2)>1 THEN LK=2
    : GOTO 6ØØ            :REM*57
47Ø REM ADD SPECIAL CHARACTERS T
    O PICTURE FILE NAME :REM*1Ø9
48Ø IF T$="K" THEN PF$=CHR$(129)
    +LEFT$(PF$+"{8 SPACEs}",14)
                          :REM*55
49Ø IF T$="D" THEN PF$="DD"+PF$
                          :REM*193
51Ø LOAD PF$, 8, 1        :REM*1Ø9
53Ø END: REM NEVER GETS HERE
                          :REM*154
599 REM DISPLAY PICTURE :REM*245
6ØØ GOSUB 2ØØØ           :REM*56
799 REM MAIN LOOP         :REM*242
8ØØ GOSUB 5ØØØ: REM SCREEN PROMP
    T                     :REM*179
81Ø GOSUB 3ØØØ: REM GET FN KEY
                           :REM*3
82Ø GOTO 8ØØ              :REM*41
999 REM HELP SCREEN       :REM*18
1ØØØ PRINT "{SHFT CLR}{CTRL 9}{C
    TRL N}"; TAB(14); "{SHFT H}
    ELP {SHFT S}CREEN" :REM*173
1Ø1Ø PRINT TAB(14); "{11 COMD Ts
    }"                    :REM*51
1Ø2Ø PRINT "{3 SPACEs}{SHFT Y}OU
     MAY RETURN HERE BY PRESSIN
    G {CTRL 9}F2{CTRL Ø}."
                          :REM*1Ø5
```

→

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Listing 2 continued.

```
1Ø3Ø PRINT "{CRSR DN} {CTRL 9}F1
     {CTRL Ø} -- {SHFT T}ABLE OF
      {SHFT C}ONTENTS"  :REM*13Ø
1Ø4Ø PRINT " {CTRL 9}F2{CTRL Ø}
     -- {SHFT T}HIS {SHFT H}{SHF
     T E}{SHFT L}{SHFT P} {SHFT
     S}CREEN"          :REM*2Ø4
1Ø5Ø PRINT " {CTRL 9}F3{CTRL Ø}
     -- {SHFT G}O TO A {SHFT S}C
     REEN (BY ITS NUMBER)"
                       :REM*232
1Ø6Ø PRINT " {CTRL 9}F5{CTRL Ø}
     -- {SHFT P}REVIOUS {SHFT S}
     CREEN"            :REM*12Ø
1Ø7Ø PRINT " {CTRL 9}F7{CTRL Ø}
     -- {SHFT N}EXT {SHFT S}CREE
     N"                :REM*2Ø6
1Ø8Ø PRINT " {CTRL 9}F8{CTRL Ø}
     -- {SHFT Q}UIT {SHFT M}AGAZ
     INE"              :REM*216
1Ø9Ø PRINT "{CRSR DN}{3 SPACEs}{
     SHFT T}HESE PROGRAMS WERE D
     EVELOPED BY:"     :REM*56
11ØØ PRINT TAB(13); "{CRSR DN}{C
     TRL 9}{SHFT D}AVID {SHFT A}
     . {SHFT H}OOK"    :REM*17Ø
111Ø PRINT "{CRSR DN}{4 SPACEs}F
     OR THE {SHFT B}{SHFT A}{2 S
     HFT Rs}{SHFT I}{SHFT E} {SH
     FT U}{SHFT S}{SHFT E}{SHFT
     R} {SHFT G}{SHFT R}{SHFT O}
     {SHFT U}{SHFT P} ({SHFT B}{
     SHFT U}{SHFT G})"  :REM*116
112Ø PRINT "{2 CRSR DNs}{3 SPACE
     s}{SHFT E}NTIRE CONTENTS OF
      THIS MAGAZINE ARE" :REM*6Ø
113Ø PRINT " (C) 1986 BY THE {SH
     FT A}UTHORS WITHIN."
                       :REM*198
114Ø IF LK THEN SC=Ø: GOTO 5ØØØ
                       :REM*234
115Ø PRINT "{CRSR DN}{3 SPACEs}{
     SHFT S}TRIKE {SHFT S}{SHFT
     P}{SHFT A}{SHFT C}{SHFT E}
     TO EXIT THE COVER PAGE."
                       :REM*1ØØ
116Ø IF PEEK(2)<>2 THEN M$="({SH
     FT I}T'S NOW LOADING...)":
     GOSUB 52ØØ: PRINT    :REM*9Ø
117Ø M$="{SHFT P}LEASE {SHFT S}T
     AND {SHFT B}Y..."  :REM*184
118Ø GOTO 51ØØ          :REM*15Ø
1999 REM DISPLAY PICTURE:REM*114
2ØØØ IF LK=2 GOTO 2Ø4Ø  :REM*165
2Ø1Ø POKE 5328Ø, KF: SYS ML
                       :REM*223
2Ø3Ø REM WAIT FOR A KEY PRESS
                       :REM*177
2Ø4Ø POKE 198, Ø: WAIT 198, 1
                       :REM*235
2Ø5Ø POKE 53265, PEEK(53265) AND
      223              :REM*1Ø6
2Ø6Ø POKE 5327Ø, PEEK(5327Ø) AND
      239              :REM*88
2Ø7Ø POKE 53272, (PEEK(53272) AN
     D 24Ø) OR 4       :REM*4Ø
2Ø8Ø POKE 5328Ø, BB: POKE 53281,
      BB: POKE 646, CH :REM*26
21ØØ REM MONTHLY ISSUE SCREEN
                       :REM*13Ø
211Ø PRINT "{SHFT CLR}{CTRL Ø}{C
     TRL N}{11 CRSR DNs}";
                       :REM*236
212Ø M$=MT$: GOSUB 52ØØ :REM*1Ø8
213Ø PRINT: PRINT: M$=MO$: GOSUB
      52ØØ             :REM*212
214Ø SC=Ø               :REM*254
216Ø RETURN             :REM*178
2999 REM GET A FUNCTION KEY
                       :REM*222
3ØØØ CP=SC              :REM*185
3Ø1Ø GET K$: IF K$<"{FUNCT 1}" O
     R K$>"{FUNCT 8}" GOTO 3Ø1Ø
                       :REM*39
3Ø2Ø ON ASC(K$)-132 GOSUB 31ØØ,
     33ØØ, 35ØØ, 37ØØ, 32ØØ, 3Ø3
     Ø, 3Ø3Ø, 38ØØ     :REM*25
3Ø3Ø RETURN            :REM*27
31ØØ SC=1: GOSUB 4ØØØ: GOTO 1Ø
                       :REM*7Ø
32ØØ GOTO 1ØØØ         :REM*82
33ØØ M$="{SHFT S}{SHFT C}{SHFT R
     }{2 SHFT Es}{SHFT N} " + ST
     R$(CP)+ "{2 SPACEs}{SHFT E}
     NTER {SHFT P}AGE # ?{CRSR L
     F}": GOSUB 51ØØ   :REM*118
331Ø GOSUB 6ØØØ: IF SC=Ø GOTO 2Ø
     ØØ                :REM*86
332Ø GOSUB 4ØØØ: GOTO 1Ø:REM*188
35ØØ SC=CP-1: GOSUB 4ØØØ: IF SC=
     Ø GOTO 2ØØØ       :REM*145
351Ø GOTO 1Ø            :REM*119
37ØØ SC=CP+1: GOSUB 4ØØØ: GOTO 1
     Ø                 :REM*7Ø
38ØØ CLOSE 15: POKE55, Ø: POKE 5
     6, 16Ø: CLR: END  :REM*84
3999 REM SET PAGE PARAMETERS
                       :REM*6Ø
4ØØØ IF SC>PG THEN SC=PG:REM*121
4Ø1Ø IF SC<1 THEN SC=Ø: GOTO 4Ø3
     Ø                 :REM*1
4Ø2Ø FL=(SC-1)*LP + 2: LL=SC*LP
     + 1               :REM*133
4Ø3Ø RETURN            :REM*7
4999 REM NORMAL SCREEN PROMPT
                       :REM*18Ø
5ØØØ SC$=STR$(SC)      :REM*95
5Ø1Ø M$="{SHFT P}RESS 'F2' FOR {
     SHFT H}{SHFT E}{SHFT L}{SHF
     T P} -- {SHFT S}{SHFT C}{SH
     FT R}{2 SHFT Es}{SHFT N} "
     + SC$             :REM*119
5Ø99 REM MESSAGE ON LAST SCREEN
     LINE              :REM*64
51ØØ PRINT CD$; "{CRSR RT}{CTRL
     9}"; SP$; CD$;    :REM*233
5199 REM CENTER A MESSAGE
                       :REM*159
52ØØ PRINT SPC((4Ø-LEN(M$))/2);
     M$;               :REM*64
521Ø RETURN            :REM*168
5999 REM INPUT UP TO 4 DIGITS
                       :REM*64
6ØØØ SC$="": K=Ø       :REM*61
6Ø1Ø GET K$: IF K$="" GOTO 6Ø1Ø
                       :REM*217
6Ø2Ø IF K$=CHR$(13) AND K>Ø THEN
      PRINT K$: GOTO 6Ø8Ø
                       :REM*141
6Ø3Ø IF K$=CHR$(2Ø) AND K>Ø THEN
      K=K-1: SC$=LEFT$(SC$,K): P
     RINT K$;          :REM*95
6Ø4Ø IF K=4 THEN PRINT: GOTO 6Ø8
     Ø                 :REM*2Ø9
6Ø5Ø IF K$<"Ø" OR K$>"9" GOTO 6Ø
     1Ø                :REM*113
6Ø6Ø SC$=SC$+K$: K=K+1: PRINT K$
     ;                 :REM*41
6Ø7Ø GOTO 6Ø1Ø          :REM*219
6Ø8Ø SC=VAL(SC$): RETURN:REM*193
6999 REM BKGD, CHAR COLORS
                       :REM*196
7ØØØ DATA{2 SPACEs}1, 14  :REM*1
7Ø99 REM PIC NAME, TYPE, BORDER
     COLOR             :REM*142
71ØØ DATA "PIC A", "K", 1
                       :REM*235
7199 REM ISSUE FILE NAME:REM*145
72ØØ DATA "JUL86"      :REM*84
7299 REM MAG TITLE, ISSUE MONTH
                       :REM*189
73ØØ DATA "{SHFT T}HE {SHFT B}{S
     HFT U}{SHFT G} {SHFT N}EWSL
     ETTER", "{SHFT J}ULY 1986"
                       :REM*66
7999 REM READ & STORE ML:REM*174
8ØØØ CK=Ø: FOR I=AD TO AD+41: RE
     AD DA: POKE I,DA: CK=CK+DA:
      NEXT             :REM*17
```


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Listing 2 continued.

```
8Ø1Ø IF CK<>6121 THEN PRINT "ERR
     OR IN DATA": STOP  :REM*2Ø9
8Ø3Ø CK=Ø: FOR I=ML TO ML+127: R
     EAD DA: POKE I,DA: CK=CK+DA
     : NEXT             :REM*131
8Ø4Ø IF CK<>17262 THEN PRINT "ER
     ROR IN DATA": STOP  :REM*33
8Ø6Ø RETURN             :REM*213
8Ø8Ø REM C64 STRING THING DATA (
     FILE 2)            :REM*193
8Ø9Ø DATA 16Ø,2,177,45,153,137,Ø
     ,2ØØ,192,6,2Ø8,246,162,2
                        :REM*177
81ØØ DATA 32,198,255,32,228,255,
     2Ø1,13,24Ø,15,164,142,145,1
     4Ø                 :REM*175
811Ø DATA 2ØØ,132,142,196,139,24
     Ø,4,165,144,24Ø,234,76,2Ø4,
     255                :REM*199
813Ø REM ML DATA FOR MAG DISPLAY
                        :REM*177
814Ø DATA 173,17,2Ø8,41,239,141,
     17,2Ø8,164,2,2Ø8,43,169,4Ø,
     133,251            :REM*245
815Ø DATA 162,131,134,252,162,4,
     169,216,16Ø,Ø,32,1Ø9,192,17
     3,22,2Ø8           :REM*113
816Ø DATA 41,191,9,16,141,22,2Ø8
     ,173,16,135,141,33,2Ø8,169,
     64,133             :REM*129
817Ø DATA 251,162,127,134,252,2Ø
     8,8,169,Ø,133,251,162,92,13
     4,252,169          :REM*33
818Ø DATA 4,17Ø,16Ø,Ø,32,1Ø9,192
     ,132,251,162,96,134,252,162
     ,32,169            :REM*53
819Ø DATA 32,32,1Ø9,192,173,17,2
     Ø8,9,34,141,17,2Ø8,173,24,2
     Ø8,9               :REM*85
82ØØ DATA 8,141,24,2Ø8,173,17,2Ø
     8,9,16,141,17,2Ø8,96,132,25
     3,133              :REM*196
821Ø DATA 254,177,251,145,253,2Ø
     Ø,2Ø8,249,23Ø,252,23Ø,254,2
     Ø2,2Ø8,242,96      :REM*56
```

Listing 3. *Mag Printer program.*

```
1 REM MAG PRINTER V3.4   :REM*77
2 REM (C) 1986 DAVID A. HOOK
                         :REM*24Ø
1Ø A$="ABCDEFGHIJKLMNOPQRST": A$
   =A$+A$                :REM*2
3Ø REM ISSUE FILE NAME   :REM*116
4Ø READ F$               :REM*186
6Ø PRINT "{SHFT CLR}{CTRL N}"; T
   AB(12); "{SHFT M}{SHFT A}{SHF
   T G}{SHFT A}{SHFT Z}{SHFT I}{
   SHFT N}{SHFT E} {SHFT P}{SHFT
    R}{SHFT I}{SHFT N}{SHFT T}{S
   HFT E}{SHFT R}"       :REM*218
7Ø PRINT TAB(9); "(C) 1986 {SHFT
    D}AVID {SHFT A}. {SHFT H}OOK
   "                     :REM*118
8Ø PRINT"{CRSR DN}{2 SPACEs}{SHF
   T S}END THE {SHFT M}AGAZINE {
   SHFT I}SSUE TO A {SHFT P}RINT
   ER{2 SPACEs}OR THE {SHFT S}CR
   EEN."                 :REM*1Ø6
9Ø PRINT "{CRSR DN}{2 SPACEs}{SH
   FT O}NCE STARTED, {SHFT P}AUS
   E BY STRIKING A KEY" :REM*246
1ØØ PRINT " {SHFT R}ESUME/{SHFT
    Q}UIT BY STRIKING ANOTHER KE
   Y."                   :REM*28
12Ø LP=25: PP=66: AD=896: IF PEE
   K(AD)-16Ø THEN GOSUB 1ØØØ: R
   EM READ DATA          :REM*34
14Ø PRINT "{CRSR DN}"; TAB(16);
   F$                    :REM*254
15Ø INPUT "{CRSR UP}{SHFT N}AME
   OF ISSUE:"; F$        :REM*168
17Ø DV=4: INPUT "{CRSR DN}{SHFT
   P}RINTER {SHFT D}EVICE #:{2
   SPACEs}4{3 CRSR LFs}"; DV
                         :REM*214
18Ø IF DV<3 OR DV>5 GOTO 17Ø
                         :REM*8
19Ø IF DV=3 GOTO 23Ø     :REM*178
21Ø SA=Ø: INPUT "{CRSR DN}{SHFT
   S}ECONDARY {SHFT A}DDRESS (L
   OWER CASE):{2 SPACEs}7{3 CRS
   R LFs}"; SA           :REM*192
23Ø OPEN 15, 8, 15, "IØ":REM*1Ø8
25Ø REM GET TOTAL LINE COUNT
                         :REM*16Ø
26Ø OPEN 2, 8, 2, F$      :REM*77
27Ø SYS AD               :REM*215
28Ø LN=VAL(A$)-1: PG=LN/LP
                         :REM*217
29Ø CLOSE 2              :REM*55
3ØØ IF LN<1 OR PG<>INT(PG) THEN
   PRINT "{CTRL 9}FILE ERROR":
   CLOSE 15: STOP        :REM*231
32Ø INPUT "{CRSR DN}{SHFT F}IRST
    {SHFT P}AGE TO PRINT:{2 SPA
   CEs}1{3 CRSR LFs}"; P$
                         :REM*41
33Ø PF=INT(VAL(P$)): IF PF<1 THE
   N PF=1                :REM*213
34Ø IF PF>PG THEN PF=PG  :REM*61
```


Circle 74 on Reader Service card.

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```
35Ø FL=(PF-1)*LP + 2     :REM*239
37Ø PRINT TAB(21); PG    :REM*7
38Ø INPUT "{CRSR UP}{SHFT F}INAL
    {SHFT P}AGE TO PRINT:"; P$
                         :REM*127
39Ø PL=INT(VAL(P$)): IF PL<1 THE
    N PL=1               :REM*9
4ØØ IF PL>PG THEN PL=PG :REM*241
41Ø IF PL<PF THEN PL=PF :REM*155
42Ø LL=PL*LP + 1         :REM*249
44Ø REM FETCH & PRINT THE LINES
                         :REM*49
45Ø OPEN 2, 8, 2, F$     :REM*11
47Ø OPEN 4, DV, SA       :REM*195
49Ø LC=Ø                 :REM*1Ø5
5ØØ LM=1: CR=Ø           :REM*139
52Ø FOR I = FL TO LL     :REM*152
54Ø PRINT# 15, "P" + CHR$(2) + C
    HR$(I AND 255) + CHR$(I/256)
     + CHR$(1)           :REM*12Ø
55Ø SYS AD               :REM*24Ø
56Ø L=PEEK(142)          :REM*22
58Ø IF L THEN LM=1-LM: CR=Ø: GOT
    O 63Ø                :REM*94
6ØØ CR=CR+1: IF CR<3 OR LM GOTO
    71Ø                  :REM*6
61Ø LM=1: GOTO 67Ø       :REM*8
63Ø IF L=1 AND LEFT$(A$,L)=CHR$(
    32) THEN LM=1        :REM*68
65Ø PRINT#4, LEFT$(A$,L);
                         :REM*194
67Ø IF LM THEN PRINT#4: LC=LC+1
                         :REM*28
69Ø IF LC>PP-7 THEN LC=Ø: FOR J=
    1 TO 6: PRINT#4: NEXT
                         :REM*19Ø
71Ø GET Z$: IF Z$="" GOTO 78Ø
                         :REM*13Ø
73Ø PRINT: PRINT "{CTRL 9}{SHFT
    P}RESS 'Q' TO QUIT, OTHER TO
     RESUME:{CTRL Ø} ?{CRSR LF}"
    ;                    :REM*98
74Ø GET Z$: IF Z$="" GOTO 74Ø
                         :REM*16Ø
75Ø IF Z$="Q" THEN PRINT "{SHFT
    Q}UIT";: I=LL        :REM*122
76Ø PRINT                :REM*96
78Ø NEXT                 :REM*25
8ØØ CLOSE 2              :REM*55
81Ø FOR I=1 TO PP-LC: PRINT#4: N
    EXT                  :REM*123
82Ø CLOSE4               :REM*91
83Ø END                  :REM*67
899 REM ISSUE FILE NAME  :REM*22Ø
9ØØ DATA "JUL86"         :REM*159
999 REM READ & STORE ML  :REM*58
1ØØØ CK=Ø: FOR I=AD TO AD+41: RE
     AD DA: POKE I,DA: CK=CK+DA:
      NEXT               :REM*157
1Ø1Ø IF CK<>6121 THEN PRINT "ERR
     OR IN DATA": STOP   :REM*93
1Ø3Ø RETURN              :REM*68
1Ø5Ø REM C64 STRING THING DATA (
     FILE 2)             :REM*48
1Ø6Ø DATA 16Ø,2,177,45,153,137,Ø
     ,2ØØ,192,6,2Ø8,246,162,2
                         :REM*32
1Ø7Ø DATA 32,198,255,32,228,255,
     2Ø1,13,24Ø,15,164,142,145,1
     4Ø                  :REM*3Ø
1Ø8Ø DATA 2ØØ,132,142,196,139,24
     Ø,4,165,144,24Ø,234,76,2Ø4,
     255                 :REM*54
```

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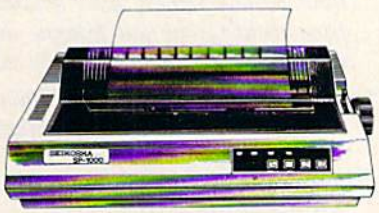

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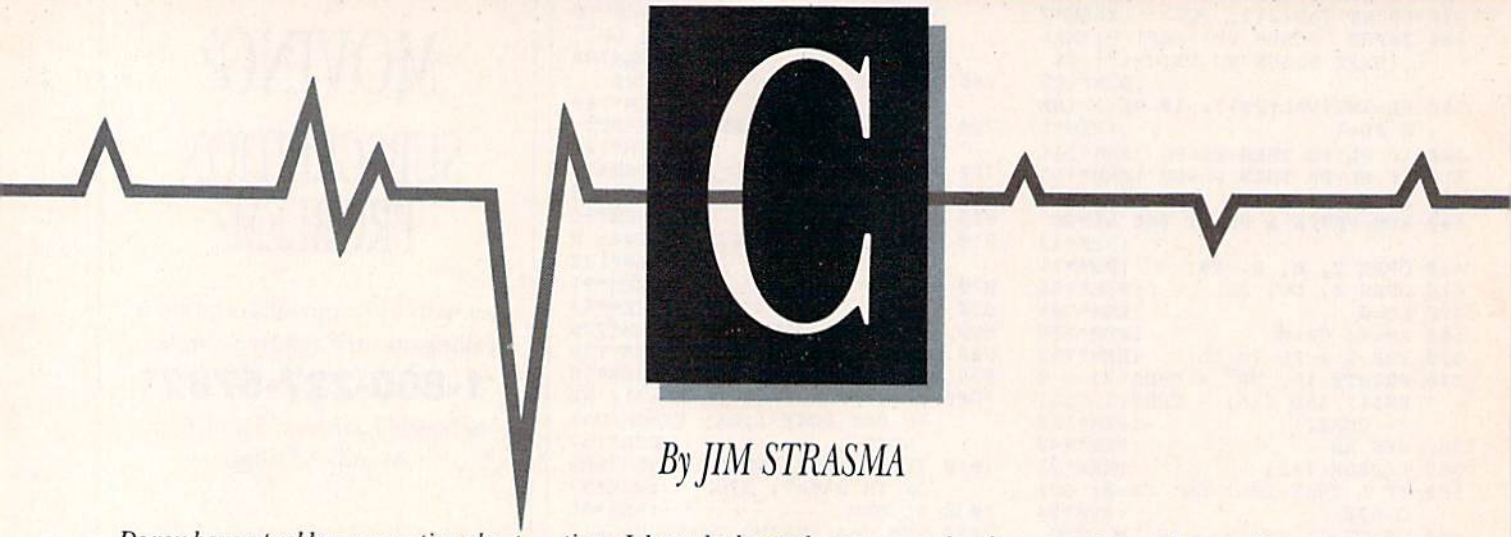

By JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard *(limit one per card) to:*

Jim Strasma
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PO Box 6100
Macomb, IL 61455

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.

HARDWARE

***Q:** What's the difference between the 1902 monitor and the 1902A?*

David Britt
Madison, MS

A: These monitors were made for the C-128. The 1902 came out first. It was somewhat upgraded, necessitating at least a slight change in the model number—hence the 1902A.

The most obvious change is a real improvement; the 1902A includes a push-button switch to toggle between RGB and Composite modes, instead of the slide switch on the 1902.

The 1902A also has a push-button Green Screen mode, which emulates a monochrome monitor, and a switchable comb filter. On the other hand, the sample I tested today had far less color saturation than the 1902, and no obvious separated video (chrominance/luminance) option. You might miss that in C-64 mode.

***Q:** I am a 61-year-old man with an MBA and an EE degree, so you might say I have at least average intelligence. For almost three years I have had a C-64, with disk drive, printer and monitor. During that time, I have had exactly zero seconds of useful work out of the machine, simply because everyone wants me to learn how to program in order to put the machine to work. All the computer jargon is confusing, and I haven't found a dictionary to tell me what it all means.*

I don't really want to be a hacker (whatever that is), but I would like to have a machine I can use to do a specific job. Is there a way I can learn the machine, or should I just throw it in the trash barrel (because so far that's all it's been good for)?

George Blume
Wichita, KS

A: First off, thanks for writing, and you're not alone. Although computers are advertised as "easy to use," they aren't yet—at least not compared to a toaster, thermostat or automobile. The problem is, as you have said, that computers need to be programmed before they can do anything useful. Fortunately, you can buy commercial programs that already know how to do what you need done.

When my wife's father was similarly frustrated with his C-64, we solved the problem with a Write Now cartridge (a pre-written program in a box), made and sold by Cardco, Inc., in Wichita.

To use it, my father-in-law only had to plug it into the back of the computer and then turn on the computer. The rest was automatic. Briefly, it turned his C-64 into a fancy typewriter, something that almost anyone would find useful.

Since you already have several hundred dollars invested in your system, I recommend you ask or hire someone who's familiar with the Write Now program to come over to your house for an hour, set up your system to use the program and show you how to get started. Cardco can sell you the cartridge and recommend someone to help you begin using it, perhaps from a local computer user's group.

You needn't throw out your computer; you only need to spend a bit on a specialist, just as if you had car trouble.

***Q:** I recently purchased a C-64 and have found some limitations I would like to overcome: memory not big enough; 80-column display needed; faster loading needed from disk. Could you provide any information about products to help me?*

Dave Pearce
Southington, OH

A: Yes; choose one, and I can help. All three limitations have been overcome on the C-64, but not simultaneously; you can typically only solve one of them at a time, and even then not under all conditions. This is because all of the solutions involve using the cartridge port, and some of the solutions are incompatible with expansion motherboards and certain programs.

If you can live with the limitations, here are some solutions:

1. Added memory on the C-64 will have to be bank-selected, but is available. Though not in stores at this writing, Commodore's memory expander for the C-128 and C-64 seems likely to become the eventual standard.

2. Batteries Included still offers a good 80-column video board for the C-64.

3. Several plug-in cartridges speed up disk access, including Fast Load,

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from Epyx, and Mach 5, from Access Software.

If you can't accept the one-at-a-time idea, I suggest looking at a C-128 instead; it includes all your requests. Since your purchase was recent, perhaps your dealer will accept the C-64 in trade.

Q: I have an MSD dual drive. Is there an MSD user's group, and are there any listings of software designed to use the full capabilities of the SD-2?

Peter Clemenko
Ahlhorn AFB
West Germany

A: In the same week that your letter arrived, fellow reader Paul Eckler wrote to announce an MSD Information Exchange, with its first project being a database of compatible software. The group will also maintain files on parts, service, manuals, memory maps and such, since Micro Systems Development is no longer in business.

For a self-addressed stamped envelope, the exchange offers *RUN* readers a printout of information in a selected category. For a blank disk with mailer and return postage, it offers a copy of the exchange data disk in Superbase data format.

The address of the group is MSD Information Exchange, 2705 Hulman St., Terre Haute, IN 47803.

PROGRAMMING

Q: I wrote some programs that input data from my C-64's keyboard and then print the data on my 802 printer. Even though I close the file and device, I cannot regain use of the keyboard without pressing the restore key at the end of the program. The same thing happens when I list a program to the printer. What can I do?'

Wendel Hans
Goleta, CA

A: Assuming that you opened your file to the printer with

```
OPEN 4,4
```

what you have left out in both cases is the command

```
PRINT#4
```

before closing your files. In the case of listings, it is necessary to use the CMD 4 command, but even that causes trouble; it would be much better if you rewrote your keyboard program so as not to need it. Here's how.

Presumably, your keyboard program now looks something like this:

```
10 OPEN 4,4
15 CMD 4
20 GET A$: IF A$="" THEN 20
30 IF A$="@" THEN 60
40 PRINT A$;
50 GOTO 30
60 CLOSE 4
70 END
```

A cleaner and otherwise equivalent program would be:

```
10 OPEN 4,4
20 GET A$: IF A$="" THEN 20
30 IF A$="@" THEN 60
40 PRINT#4,A$;
50 GOTO 30
60 CLOSE 4
70 END
```

Q: I am writing 20 fields to one relative record, each ten characters long. The Print# statement should look like this:

100 PRINT#2,ACHR(13)BCHR(13)...T$

However, because of the two-line limit in a C-64 statement, I cannot fit the whole list in one statement. And when I break the statement into two line numbers, the fields are printed in two separate records, even when a semicolon ends the first line. I have also tried printing two strings with the information in them, but they are read literally and printed all into one field. Does anyone know the solution?

Richard Wolf
Oneonta, NY

A: When you built two strings, you were close to the solution. Briefly, a relative record must be entirely written out with a single Print# statement, but there is no rule against building a very long string in earlier lines for that one line to print out. What you probably didn't realize was that you needed the code CHR$(13) in your strings, not the letters *C*, then *H*, then *R*, etc.

Here's a version that shows the needed technique:

```
100 A$ = ""
110 FOR I = 0 TO 19
120 : A$ = A$ + F$(I) + CHR$(13)
130 NEXT I
140 PRINT#2,A$;
```

It usually works best to store data fields in memory as elements in an array, F$(0) through F$(19) in this case.

Q: In my Commodore 64 Programmer's Reference Guide, *I've noticed one memory configuration that I don't understand. It sets aside everything and gives the 64 its true 64K of RAM. But without I/O or the Kernal, would this be usable? Does the 6510 still read op codes with everything else wiped out?*

Albert Sun
La Mirada, CA

A: Yes, the C-64 can be programmed to work without a Kernal ROM or I/O addresses. This mode is primarily of value to experienced programmers who want to gain speed in designing time-critical applications. However, as you've pointed out, once the Kernal is switched out, *everything* it took care of becomes the programmer's own responsibility.

In practice, this means that you wouldn't switch out the Kernal until you had loaded an alternative operating system into high RAM behind the Kernal. When the Kernal is then switched out, your new program would be in place to capture and handle the Reset, NMI and IRQ hardware interrupts of the 65xx microprocessor. Then, when it became necessary to either receive or output data from your new operating system, you'd have to switch I/O back on temporarily to do it.

All told, it would be a major pain, but still worthwhile if it allowed the C-64 to handle a chore too large or too time-critical for its usual operating system.

Q: When counting down in seconds, my C-64 goes from 10 seconds to 90 seconds. How do I correct this so it will read 09 seconds?

Jim Smith
Sterling, KS

A: The problem is that 9 is one character shorter than 10. As a result, when it is printed after a 10, there is nothing to erase the 0. A simple way to get the display you want is to no-

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tice when the counter drops below 10 and print a 0 before the counter value from then on, as shown below:

```
10 FOR I=99 TO 0 STEP -1
20 : PRINT CHR$(19) : REM HOME
   CURSOR
30 : IF I<10 THEN PRINT "0";
40 : PRINT I
50 NEXT I
60 END
```

REPAIRS

Q: Sometimes when I write a program, after I have typed three lines, the C-64 accepts only two. When I notice this, I press the delete key several times to erase the last line. When I do this, the program runs itself, and the computer freezes. Could you please explain why this happens?

Carlos Centeno
Lares, PR

A: Ah yes, the old "push wrap crash." Yours is one of the older C-64s, and has a bug in its Kernal ROM. The easiest way to avoid the problem is to change your cursor color to white before typing anything that could inadvertently extend onto a third line.

A more permanent solution would be to upgrade your Kernal to the current – 03 ROM. A custom version with your choice of sign-on colors and message is available from JSR Enterprises, 10035 White Pine Lane, Santee, CA 92071; 619-449-9748.

Q: I recently purchased Commodore's 1670 modem to use with my C-128, and, as RUN *stated in the December 1985 issue, it does come up in Auto-answer mode. It has already answered the phone several times when I didn't want it to, and I am desperate for a solution. U.S. Robotics (who manufactured it) says they can't discuss it, due to contractual agreements, and I've had no luck getting technical information directly from Commodore. Can you help?*

Steven Woodroof
Columbus, IN

A: The U.S. Robotics manual for the essentially similar Password 1200-baud modem suggests you turn off Auto-answer with the modem attention command:

```
ATS0=0
```

Unfortunately, you'd have to write a small program to do this every time you turn on or reset the computer, so you'll probably be happier in the long run with a hardware solution.

What you'll need is a way to keep the phone from ringing at the modem. One solution is to unplug the phone line from the modem when the modem is not in use; or you could splice a small switch into the phone line (just make sure it doesn't affect the other phones in the house).

SOFTWARE

Q: Is there a CAD (computer-aided drafting) program for the C-64 that would be close to, say, VersaCad on an IBM PC?

John Wardell
Bushnell, IL

A: I haven't seen VersaCad, but I found a recent review of it that convinced me it does (and costs) a good deal more than CAD programs available for the C-64, though not as much as AutoCad, the dominant PC CAD program.

For the 64, Abacus Software offers two interesting introductions to CAD. One is CADPAK-64, a two-dimensional CAD program that manages up to 104 objects in a 320- by 200-pixel drawing surface, uses a light pen or the keyboard for input and a dot-matrix graphics printer for output. Abacus also publishes *Commodore 128 CAD*, a book that includes listings that C-128 owners can type in to develop a simple CAD system. C-64 owners with Simons' Basic can also use the programs.

Q: The Easy Script manual indicates that to abort printing you should press the stop key. I have tried both holding down the stop key and pressing it quickly when material is in the buffer of my Commodore 6400 printer, but aborting does not take place. Do you know a way to abort printing?

Robert Smolich
Canton, IL

A: My 6400 has a 2K buffer, which works out to about half a page of text in practice. Once your printout reaches the buffer, it is no longer under Easy Script's control. Pressing the stop key at that point, whether quickly or at length, can only prevent Easy Script from sending any more of your document to the printer, not cancel the printing of the 2K of material already there.

One solution is patience—having pressed the stop key, sit back and wait for the buffer to empty, in 30 seconds or so. Another solution is to press the stop key and then turn the printer's power switch off and on for about five seconds. That will definitely flush the buffer, for a net gain of 25 seconds and a half sheet of paper. A more radical solution would be to remove the buffer chip (a 6116 RAM chip) from the 6400, causing it to revert to a one-line buffer.

Q: I have Cardco's Card?/+G interface and Alphacom's Aero printer (Epson- and Gemini-compatible). Do you know the interface and printer settings when using Print Shop? I have tried several, and nothing works. I get a linefeed when printing out a card and a banner.

Ellen Pierce
Lewistown, IL

A: If your printer is truly Epson-compatible, you should be able to use Print Shop in either of two ways—by setting your +G interface to emulate a Commodore 1525 printer on an Epson printer, in which case you will use the Commodore printer side of the Print Shop disk; or by setting your interface for Transparent mode (no emulation) and using the Epson option of the non-Commodore printer side of the Print Shop disk.

Perhaps you've been trying to combine the two options, by setting the interface to emulate on an Epson, and using the Epson option in Print Shop as well. When you do this, the program and the interface end up fighting each other—both trying to do the same emulation chores—and nothing works.

The other problem you mention—double-spacing due to an unwanted linefeed—can probably be controlled by a switch in your printer labeled something like "linefeed," or "CR+LF." If you don't have a switch in the printer, the +G interface also includes a switch to lock out unwanted linefeeds. R

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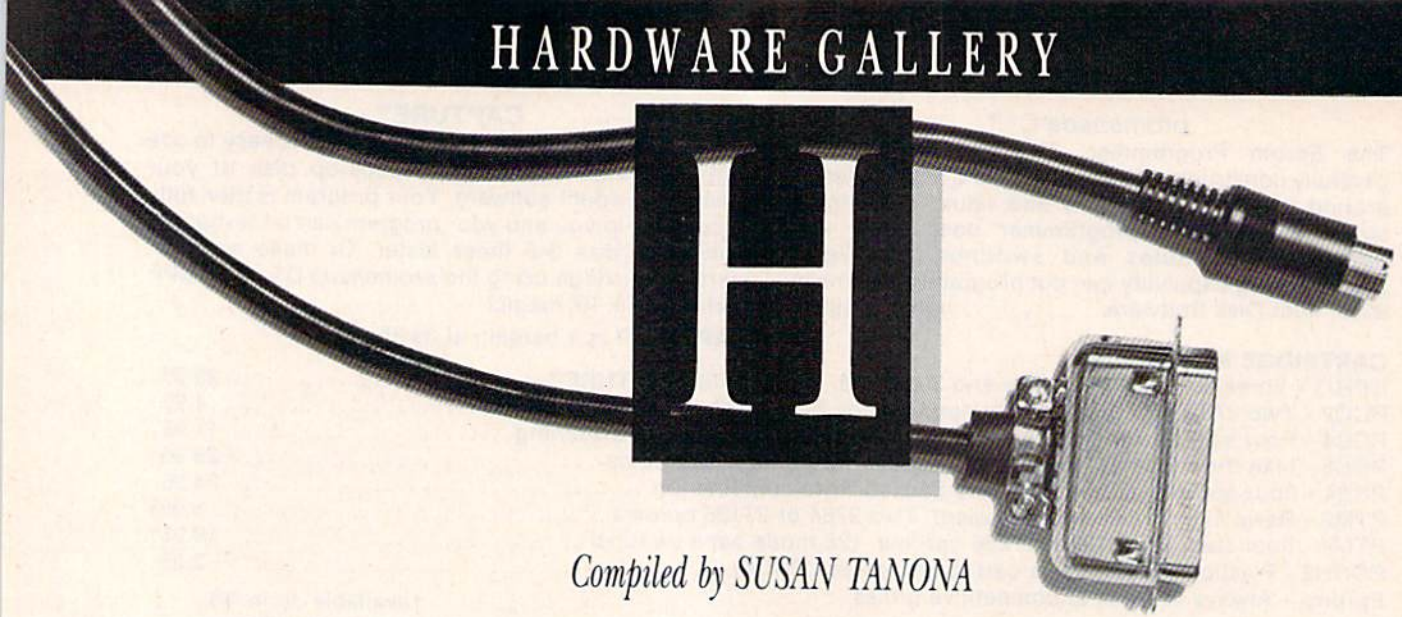

Compiled by SUSAN TANONA

Quick Brown Box

This Cartridge Provides More Versatility For Your C-64

The name of this device may provoke a smile, but the Quick Brown Box is one of the handiest accessories I've ever seen for the C-64. This cartridge is actually a byte-size chameleon, capable of assuming different roles for different people.

The Quick Brown Box provides a means of equipping your C-64 with a series of built-in utilities that are available at any time without loading from a disk. For the programmer, the Quick Brown Box sets up two or more separate workspaces where programs can be stored. Advanced computerists will find it to be an inexpensive and convenient alternative to other methods of placing programs in a ROM cartridge.

Best of all, it's virtually impossible to lose a program once it's in memory. System crashes, cold resets and even power failures won't change a single byte. Unlike the memory in your computer, the Quick Brown Box's memory is non-volatile RAM that retains its contents when the computer is turned off. The Quick Brown Box's memory chip simply substitutes itself for one inside your C-64. The computer doesn't even need to know it's there.

Except for two small switches on the top, the Quick Brown Box resembles any other C-64 cartridge. One of these switches disables the write line, thus protecting the cartridge's memory from accidentally being erased. The other is a reset button that returns your computer to start-up status. When connected to the computer, the device replaces 8K of memory at the top of Basic.

The Quick Brown Box comes with several utility programs. The first thing you should do after connecting the cartridge is dump the contents of its memory to a disk. Next, you'll want to delete most of the utilities in order to make more space available for your programs.

The number of potential applications for this device is virtually endless. Aside from storing your favorite utilities for instant access, you can program the Quick Brown Box to hold your telephone directory, a game for your child or a series of Basic subroutines to be listed and inserted into a program by using the 64's screen editor.

With a little effort, you can program the cartridge to autoboot and take command of the computer on power-up. It's possible to change the screen colors or start-up message and modify the Kernal. Although you must know how to write machine code to accomplish these tricks, it's not too difficult.

If Basic is more your style, you can toggle between two workspaces at the touch of a key. Almost 7.5K is available for your program. You can use the memory outside the cartridge to test portions of the program or search for subroutines. It's almost like having two computers.

Of course, it's unlikely that every program you have will work with this device. All Basic programs will work, unless they're too large. Machine language programs that employ a Basic loader to Poke the code into place can be stored in the Quick Brown Box and executed without loading from disk. Other machine language programs that automatically locate themselves at the top of Basic should work as well.

The Quick Brown Box is certain to have an immediate appeal to advanced computerists. It can enhance many different kinds of computer operations. One thing is certain: The longer you use it, the more you'll wonder how you ever got along without it. *(Brown Boxes, Inc., 26 Concord Road, Bedford, MA 01730. C-64/$39.95.)*

John Premack
Lexington, MA

MW-350 Interface

This Updated Version Offers a 10K Buffer And Added Power

The Micrographix MW-350 interface, from Micro R & D, is a high-performance graphics interface that connects a Centronics printer to the Commodore serial port. As a graphics interface, the MW-350 provides total emulation of the Commodore 1525 printer (and the MPS-801/803), including reproduction of the Com-

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modore character sets and unique graphics characters.

Of course, differences in the graphics capabilities of various printers must be considered for the best results, and the MW-350 also does a proper job in this respect.

The MW-350 devotes three of its six setting switches to printer selection. Five categories of graphics printers are directly supported, covering all of the major printer brands. In addition, a Universal mode is provided for letter-quality and non-graphics printers.

The remaining three switches provide for hardware selection of key operating conditions. One switch selects device number 4 or 5, allowing for the presence of a second printer. Another switch controls the sending of a linefeed with every carriage return. The remaining switch sets the interface for Transparent mode, allowing data to be sent to the printer without any alteration. This lets you get the maximum performance out of those applications that directly support your particular printer.

Another seldom-seen hardware feature is a reset button. This actually performs two operating functions. First, the reset switch clears the 10K buffer in order to avoid the printing of any stored text. The reset switch also reads the setting switches and implements any changes. Thus, you don't have to power-down the interface after changing the operating mode.

The MW-350 is an intelligent interface with its own 6502 microprocessor, an 8K operating system and a 10K buffer. This computer power has been employed to extend the interface's features beyond simple emulation, providing a secondary address that places the interface into a "total text" listing mode. This mode translates all those peculiar Commodore graphics control codes into readable mnemonics. The remaining graphics characters are listed by their respective keystroke sequences.

The MW-350 operating system also recognizes a number of commands of its own. It can set margins and form length for neater program listings. A software secondary-address lock fixes the operating mode until the interface is reset. The MW-350's Monitor mode dumps all characters as their decimal ASCII equivalents. This feature is helpful when you're debugging printer routines.

The latest version of the MW-350 incorporates several notable hardware improvements, as well as some minor operating system updates. The 10K buffer is now a standard part of the interface. The unit's cables are now fully shielded, and foil shield has been incorporated inside the plastic case. Micro R & D made these additions in order to have the interface FCC-certified. The resulting reduction in radio-frequency emission should be of some benefit if you are using a color television set as your monitor.

All eight possible combinations of the three printer-selection switches are now in use. Earlier versions of the MW-350 only recognized five combinations. The new settings include the Thinkjet printers and the Epson clones with eight-bit character matrices.

Two new features have been added to the MW-350's setting switches. Its ASCII Translate, or CP/M-128, mode is transparent to all printer control codes. Only the Commodore character set is translated into standard ASCII. Another addition is a seven-bit transparent mode that sends all data but the eighth data bit to the printer without alteration. This feature solves some of the problems that have arisen when certain applications programs could not properly handle the eighth bit.

The MW-350 is a solid performer. The built-in 10K buffer and 8K operating system ensure optimum performance with all supported printers. *(Micro R & D, 3333 S. Wadsworth Blvd. #A104, Lakewood, CO 80227. VIC-20, C-64, C-128/$89.)*

Morton Kevelson
Brooklyn, NY

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The RUNning Board

RUN invites you to contact its bulletin board (RUNning Board). In addition to up-to-date information about *RUN* and the Commodore industry, the RUNning Board now presents useful computing hints and tips, corrections and updates to published articles, user's group information, an up-to-date list of selections for ReRUN and sneak previews of upcoming articles.

The RUNning Board also features a menu format that makes it easier and faster for you to select a specific section of the bulletin board. We use a standard protocol, 300 baud, one stop-bit, no parity, full duplex and a word length of eight bits.

The RUNning Board is definitely worth a call. You can get on-line anytime, 24 hours a day, seven days a week, by dialing our new number: 603-924-9704.

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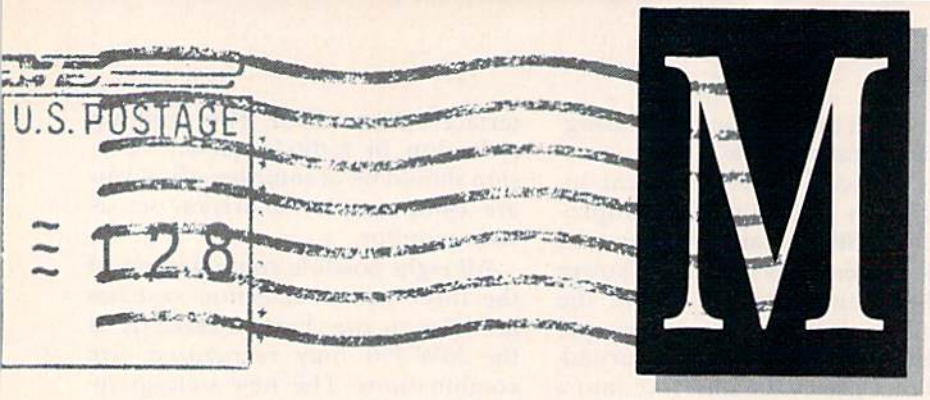

Clearing the FOG About CP/M

Someone hand me a towel—I just got my feet wet.

Hello Commodore CP/M. Whew! I think I got it working. Got a new C-128, 1571 disk drive and Okidata 120 (very nice printer), and I'm in hog heaven.

After slam-dancing with the Commodore CP/M disk and accompanying manual for several hours, I resorted to every *RUN* article I could find for help. Sure enough, I found it—"CP/M Treasure Trove," by Cheryl Peterson (January 1986), which referred me to FOG (First Osborne Group).

Fortunately for me, the group is only a mile or so down the road. A quick visit to their office—very professional, I might add—and $32 later I was a member with a starter disk and three others I selected. Let's hear it for FOG. Finally, something to do!

On the starter disk you'll find NSWEEP, the group's handy file utility program. You can swap, view, print files, etc. It works nicely with two drives. I'm using the 1571 for Drive A and the 1541 for Drive B. Osborne disks are SS/DD 1024 bytes, and the 1571 handles them just fine. I had to use PIP to recopy to 1541 format, file by file, because of file space on the 1541.

By the way, 1541-formatted CP/M disks can be copied using Fast Hackem. I found it easier to reformat the 1541 Commodore CP/M disk to C-128 SS format (1571). Then all the files are available all the time.

Another tip is to use CTRL-P for the printer, type "help help" and then read the printout. This makes using the system much easier.

I haven't tried FOG's BBS yet, as I only have the VIC modem and am not too handy with that. FOG LIGHT BBS is for those with PC DOS systems.

The folks at FOG are very nice and helpful, especially Gale Rhoades, Executive Director. My feeling is that they'll empty a desk to answer your questions.

John Elliott
Pacifica, CA

Help for Disabled

Some people think the Commodore 64 is a mere toy that's only good for playing games, but they're wrong. It has changed the lives of many disabled people, like myself.

My C-64 is my workhorse: It is a typewriter, a word processor, a research guide and a heck of a chess player. Most important, it allows me to be more independent. I strongly believe it is allowing other disabled people to do things that they could not, or thought they couldn't, do before.

In my own case, writing letters or articles is much easier with my 64 and the WordPro 3 Plus/64 word processor. I type letters or articles, though I only type four words per minute because of limited hand use, then edit my mistakes and print out my material on my printer. If I had to use a typewriter, somebody else would have to edit my mistakes and retype my material, as it would be too time-consuming for me to keep redoing everything.

If I can speak for disabled people in general: We will gladly accept help when needed, but if we can do something without help, we want to do it alone. With devices like the C-64, we can live an easier life.

For the critics who think this computer is just for games, I can only say that I believe even games are helpful to the disabled. Games that use the joystick and fire-button help to improve hand-eye coordination. Besides, where else can a person in a wheelchair fly a fighter jet (Flyerfox) or ride a bike in a race (Summer Games II)?

Peter Aviles
Caldwell, ID

We Stand Corrected

In regard to "Your Guide to Printer Interfaces," by Morton Kevelson (*RUN*, May 1986) some information on the MW-350 by Micro R&D Inc. was incorrect, and the interface in general was unfairly portrayed.

First, the interface is commonly available at $89 instead of $129. Second, the standard buffer size is 10K instead of 4K. Third, the interface has eight printer categories, which is sufficient to be compatible with most dot-matrix printers.

A special feature not listed was the power source for the MW-350; this is a joystick power cable, which gives the option of getting power from the printer, if available, or from the Commodore joystick port, if no printer power is available.

Another feature that was not listed in the Guide was a special printout (status report) that's available by

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pressing the reset button on the interface. This causes it to list the current setup parameters (i.e., printer selected, linefeed, device, Emulation mode, left/right margin, form length and buffer size).

One of the most important features incorporated into the MW-350 is the special C-128 CP/M mode. As far as we know, the MW-350 is the *only* interface that addresses all of the features of the CP/M mode. This was done because the CP/M operating system outputs some special codes not normally handled by regular Commodore-emulation techniques.

James A. Kaehler, President
Micro R&D, Inc.
Lakewood, CO

Looking Good

I never see letters about the design of your magazine, so I thought I'd say a few words.

RUN is neat, clean and easy to read. Your covers are always varied and never crowded with tasteless cartoons or too much text. It's refreshing to see.

Jennifer Whitney
Somerville, MA

Thank you. Our October 1985 cover recently earned second prize in a national magazine cover competition.

Editors

There's No Place Like Home

Our thanks to Christine and John Adamec for their article, "Home Sweet Home Control" (*RUN*, April 1986). This is one of the very few articles that points to some of the benefits of using a computer/environment interface.

We at Proteus Electronics sense that there is only the most hazy knowledge within the personal computing community that this capability exists with the inexpensive home computer. It will take articles like the Adamecs' to demonstrate the almost unlimited capability housed within a unit thought by many to be useful only for playing games or, at most, word processing.

We hope that you continue to publish articles of this nature because we feel that the "real world" monitoring and control interface is an understated benefit to the personal computer user.

Tom Clabaugh
Proteus Electronics, Inc.
Bellville, OH

How to Perfectly Type AutoNum

I just finished typing in the excellent AutoNum program by Michael Broussard (*RUN*, April 1986), and it works perfectly.

However, I couldn't use it with your checksum program, 64 Perfect Typist, because of the placement of the checksum window—right where the next AutoNum line number should appear.

Could you or Mr. Borden supply us readers with some Pokes to place the checksum window in the second line, below the line just typed, or in the home position, completely out of the way of the AutoNum line number? It would make the combination of the two programs much handier for those of us who like to type in *RUN*'s programs.

Carl Pottenger
Naples, FL

The following changes will enable you to use 64 Perfect Typist in conjunction with AutoNum or any other auto-numbering program.

Line 40: Change 16251 to 16250.
Line 280: Change third data number from 003 to 002.
Line 290: Change last data number from 145 to 013.
Line 300: Change contents of line to 032, 032, 145.

Editors

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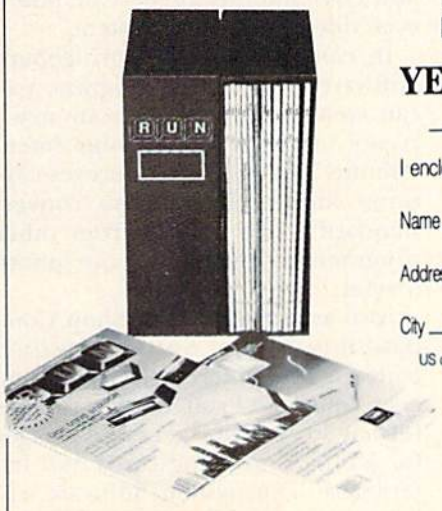

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Compiled by HAROLD R. BJORNSEN

Electronic Word Book

CBS Software (One Fawcett Place, Greenwich, CT 06836) has released Richard Scarry's Best Electronic Word Book Ever!, a reading-readiness adventure designed for children of ages five and up for both school and home use.

The tutorial provides activities that help your child practice and develop fundamental reading skills such as word identification, vocabulary building, object recognition and word/object association.

Travelling with Lowly Worm, a storybook character, your child visits a town, farm, park, harbor, railroad yard and construction site. Within each environment, he or she identifies objects and associates each with its printed name. Four skill levels allow the child to progress from simple explorations of words and objects to scavenger hunts in which he or she must locate objects selected by the computer. Animated graphics, sound effects and music enhance the program. Available on disk for the C-64 for $19.95.

Check Reader Service number 400.

Advanced 3-D Program

IHT Software (2269 Chestnut St., Suite 162, San Francisco, CA 94123) has released CAD-3-D, a graphics program on disk for the C-64.

With this program you can draw three-dimensional objects and rotate them on three axes. The designs can be saved and loaded on disk or tape and be graphed on paper with either a printer or a plotter. CAD-3-D is available for $49.95.

Check Reader Service number 412.

Printout of photo of unidentified gentleman, using Digital Vision's Newsroom Compatibility System Software.

For Your Computereyes Only

Digital Vision (14 Oak St., Suite 2, Needham, MA 02192) has released its Newsroom Compatibility System Software to enhance the performance and compatibility of its Computereyes video acquisition system.

In conjunction with Springboard Software's Newsroom program, you can create and print in your newspaper, newsletter or announcement "photos" from Computereyes-captured images. It will also convert standard hi-res images from other programs to the Newsroom photo format.

Also available is Print Shop Compatibility System Software, which converts Computereyes-captured images into the Print Shop graphics format so you can generate images for banners, greeting cards and letterheads. The System Software enhancement programs are available on disks for the C-64 to owners of Computereyes for $15 each.

Check Reader Service number 402.

Freeze Frame

Cardco (300 S. Topeka, Wichita, KS 67202) has released Freeze Frame, the first in its series of transparent utilities for your computer.

Freeze Frame is a totally transparent screen dump utility. With a couple of keystrokes, it will send whatever is on the screen to your computer's printer. It works with all programs and all programming languages and supports any printer or printer interface that emulates the Commodore 1525.

The utility is available on cartridge and is tentatively priced at $49.95.

Check Reader Service number 401.

MOBility

Moveable Object Block (MOB) Master II is an advanced machine language sprite-making utility for the beginning and experienced programmer.

Its features include: joystick control to draw sprites on screen in hi-res or multi-color, sprite animation, saving and loading of sprite data, incorporating sprites into Basic or machine language programs, the ability to expand sprites horizontally and vertically, and selecting sprite and background colors.

MOB Master II is available on disk for the C-64 for $12 ($15 Canadian) from Tidal Bore Software, 230 Pleasant St., Truro, Nova Scotia, Canada B2N 3S8.

Check Reader Service number 403.

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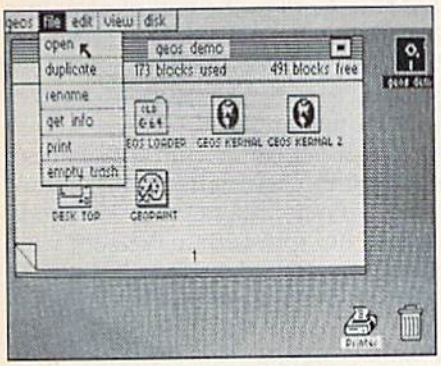
Basic-128 Compiler

This is a complete development system for your C-128 that changes your slow 128 Basic programs into fast-running compiled programs. It can increase the speed of your programs from five to 35 times. Basic-128 compiles to either 8510 machine code, compact P-code or a combination of the two.

Basic-128 also has faster and higher-precision math functions. It uses integer and formula optimizing techniques and is compatible with Basic 7.0. An 80-page programmer's guide is included. Available on disk for $59.95 from Abacus Software, 2201 Kalamazoo SE, PO Box 7211, Grand Rapids, MI 49510.

Check Reader Service number 404.



Screenshot of Berkeley Software's GEOS program.

The Great Imposter

Berkeley Softworks (2150 Shattuck Ave., Berkeley, CA 94704) introduces GEOS (Graphic Environment Operating System), which transforms your C-64 into a multitasking desktop operating system.

GEOS lets you manipulate icons, windows and pull-down menus—just as on the Apple Macintosh and the Commodore Amiga. Special disk "turbo" routines provide five to seven times the normal disk-transfer speed rate, which increases your computer's ability to run more sophisticated applications.

The package also includes geoWrite, a word processor that allows you to compose documents in an exact image of the way the printed page will appear; and geoPaint, a graphics editor that gives you a wide array of painting tools for creating graphics documents. GEOS is available on disk for $59.95.

Check Reader Service number 406.

"Accessive" Information

Information Access (11 Davis Drive, Belmont, CA 94002) announced that its Trade & Industry ASAP III full-text database is now available on BRS Information Technologies computer on-line search and retrieval service and on Dialog Information Services.

Trade & Industry ASAP III covers the full editorial content of major articles from more than 130 business publications dating back to January 1983. Available to BRS subscribers for about $63 plus telecommunications or BRS charges.

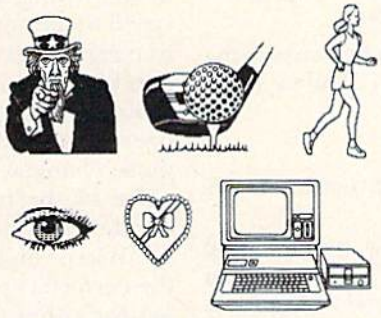
Check Reader Service number 407.

Ally Gato

Spectrum HoloByte (1050 Walnut, Suite 325, Boulder, CO 80302) has released the C-64 version of Gato, a World War II submarine-simulation game in which you, as captain of a submarine, must defend yourself and your crew against the computer-controlled enemy, which is programmed for strategic play.

The game includes eight missions, five difficulty levels and three ships, and it utilizes the 64's sound capabilities. Mission assignments are received over your sub's radio, using digitized voice. Gato is available on disk for $29.95.

Check Reader Service number 408.



Sampling of business illustrations using Clip Art Collection, Volume 2, from Springboard Software.

Signs of Good Business

Clip Art Collection, Volume 2, a collection of over 800 business illustrations for use with The Newsroom newsletter program, features illustrations in a variety of categories, including medicine, accounting, photography, audio, money, computers, symbols, realty, industry and office. Clip Art is available on disk for the C-64 for $39.95 from Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435.

Check Reader Service number 410.

A financial planner and manager for your C-128, from Timeworks.

Personal Finance 128

Sylvia Porter's Personal Financial Planner for the C-128 helps you manage your money daily and plan your financial future.

The program leads you step by step through a series of questions to help you develop comprehensive financial plans to determine the best financial moves for your career, marital status, children, savings, life insurance, investments, life-style and retirement, and to plan ahead for protection against major medical expenses, prolonged disability and other adversities.

The program includes electronic check-writing, budget preparation, tax aids, financial statement preparation and financial inventory tracking. Available on disk for $69.95. Timeworks, 444 Lake Cook Road, Deerfield, IL 60015.

Check Reader Service number 411.

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Learn to Walk Before You RUN

We receive many letters from new Commodore owners who want to learn the first steps in using their computers. For these first-time users, we present the following step-by-step list of things that all beginners should be aware of as they start typing in programs.

1. Before you can use a fresh disk, you have to format it. First turn on your disk drive, then insert the disk, close the latch and type:

```
OPEN15,8,15 <Press Return>
PRINT#15,"N0:NAME,##" <Press Return>
```

The ## is a two-character identification number that can be any combination of letters and/or digits. "NAME" can be any title for your disk that you choose, but it must not exceed 16 characters. Wait for a few minutes while the disk spins inside the drive, being formatted. When the disk stops spinning, type:

```
CLOSE15 <Press Return>
```

C-128 owners can shorten this procedure by simply typing:

```
HEADER "NAME,##" <Press Return>
```

Caution: The formatting process erases all material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to save. See item 7, below, on reading the disk directory.

2. As a beginner, you should start entering short Basic programs. Avoid machine language listings and very lengthy Basic programs until you get the hang of what you're doing. We have a checksum program (Perfect Typist) which actually proofreads your typing and tells you when you make a mistake. You should type in Perfect Typist before you enter any programs. See directions below.

3. Remember to press the return key after each programming line you type in.

4. As you are typing in a program, you are likely to make typographical errors. To check what you have typed in, you'll need to list your program's lines on the screen. You can specify the exact lines that you want to see. Typing LIST 10–50 will list lines 10 through 50. LIST 20 will list only line 20. If you see an error in one of your listed lines, you can fix it by using the INST/DEL key and retyping the incorrect section of the line. Always press the return key after you have fixed a line.

5. Be sure to save what you have typed in before turning off your computer. To save any partial or complete Basic program listing to your disk, type:

```
SAVE "NAME",8 <Press Return>
```

C-128 owners can press F5, type in the program name, and press the return key.

Note: As you save subsequent versions of the same program, you need to make a slight change in the program name each time. You might simply add version numbers to the end of the program name (PROGRAM.1, PROGRAM.2, etc.).

6. While working on a program, you may develop several versions before you're satisfied that you have it in final form. After you *do* achieve that final version, you might want to go back and erase the old, incomplete versions from your disk. Erasing unwanted programs is called scratching. (Be sure not to erase your final version!) To scratch a program, type:

```
OPEN15,8,15 <Press Return>
PRINT#15,"S0:prog.name" <Press Return and wait a few seconds>
CLOSE15 <Press Return>
```

7. After you have saved several programs to your disk, you will need to see their names so that you can load the one you want. To get the complete list (the disk directory) of all the program names on your disk, type:

```
LOAD "$",8 <Press Return>
```

Then type LIST to actually see the directory. C-128 owners simply press F3.

8. When you know what program you want to load into your computer, type:

```
LOAD "NAME",8 <Press Return>
```

C-128 owners can just press F2, type in the program name, and press the return key.

9. After you have loaded a program, type RUN to actually use the program.

How to Type 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 incompleted pro-

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gram 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
```

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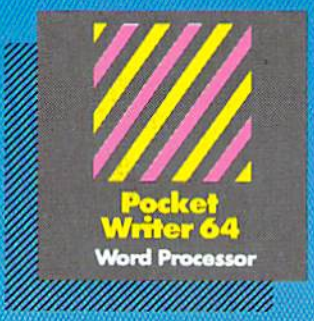

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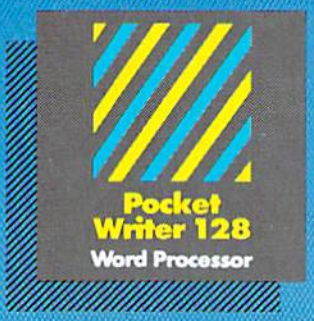

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