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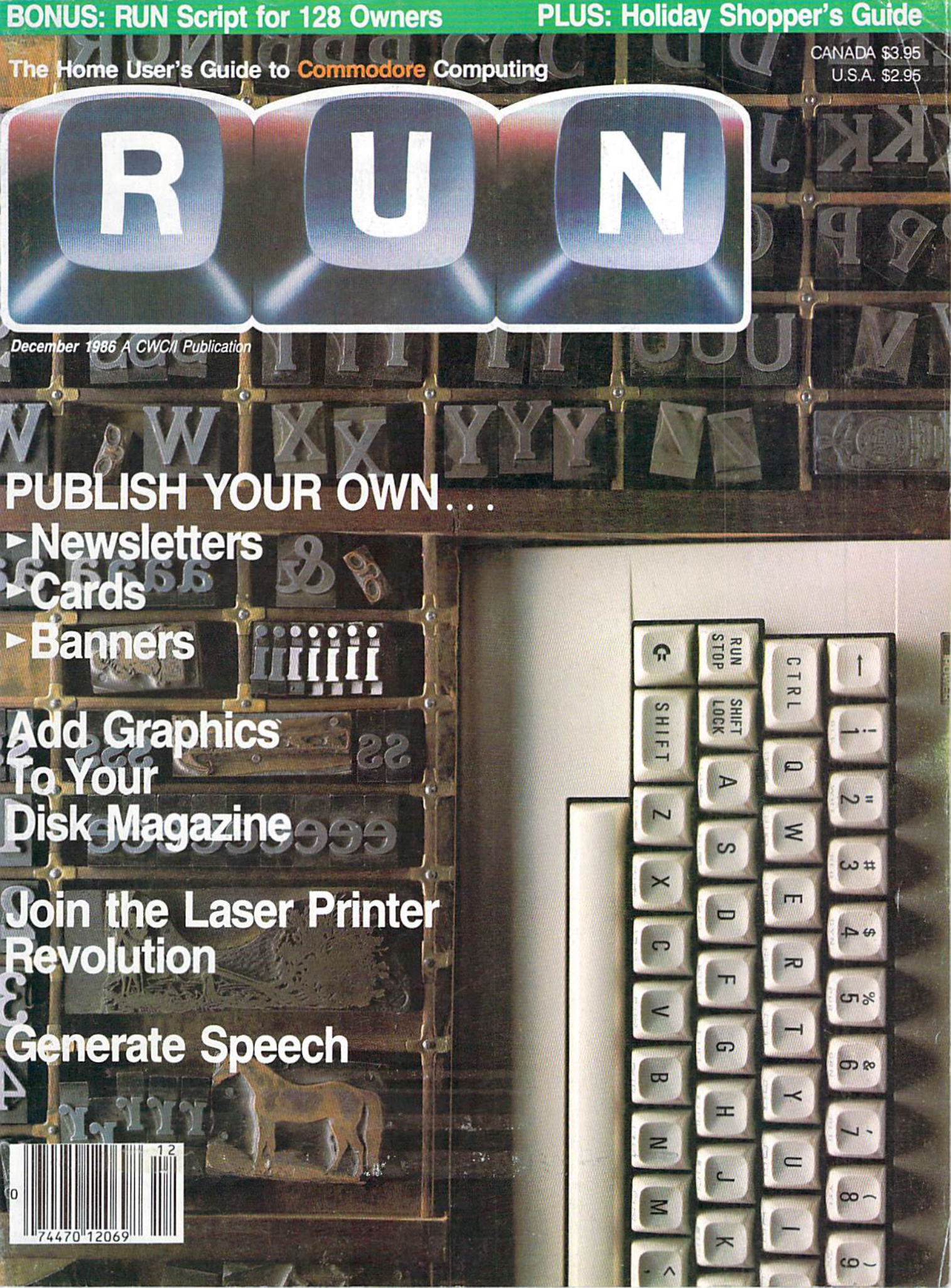
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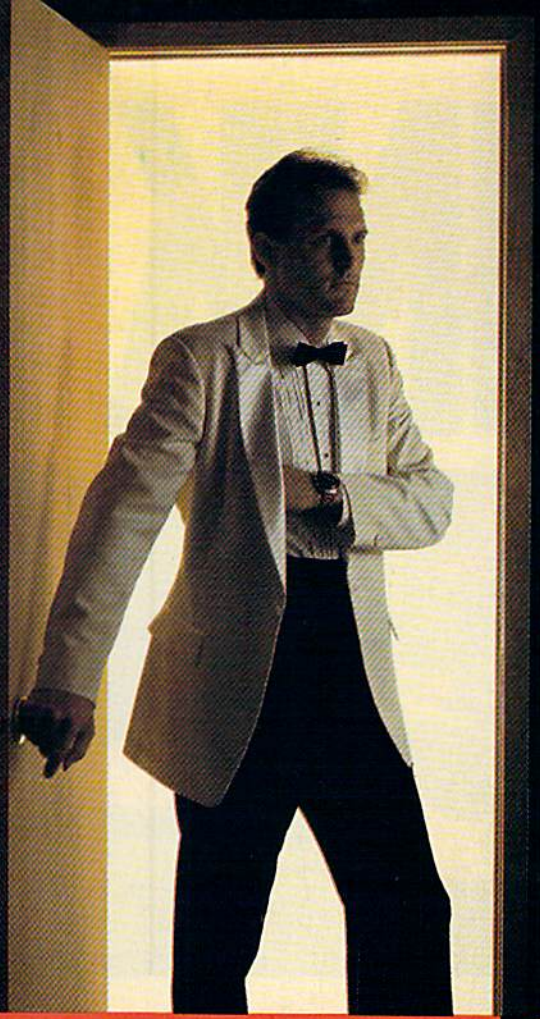
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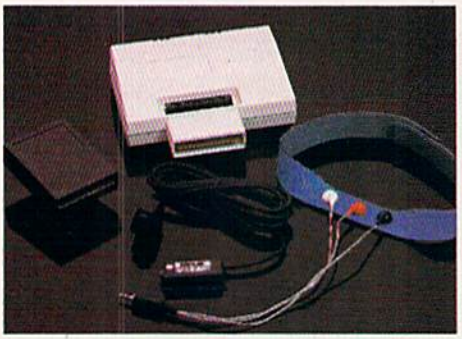
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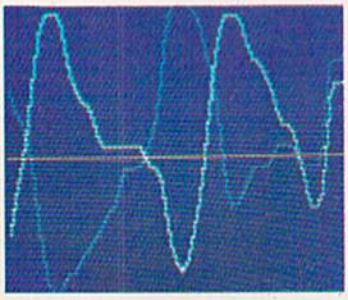
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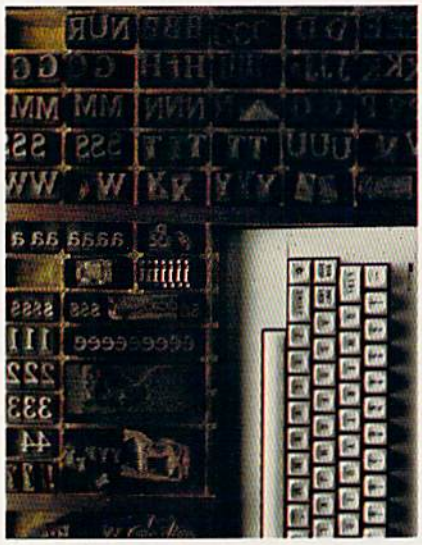
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DECEMBER 1986
VOLUME 3, NUMBER 12

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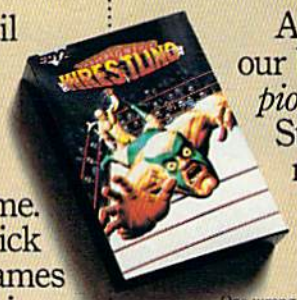
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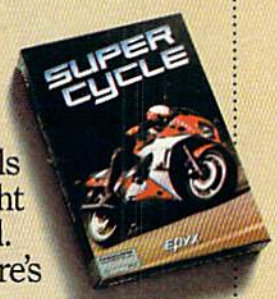


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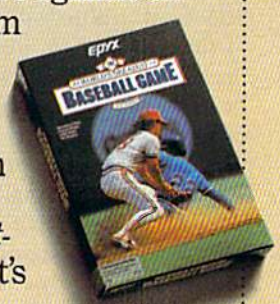
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DESKTOP PUBLISHING FOR EVERYONE?

This year will be recorded in the annals of computing as the year of desktop publishing. Depending on who you talk to, desktop publishing is either the greatest software application since the electronic spreadsheet or a trend that may be as fleeting as a laser beam. But, for now, desktop publishing is one hot topic.

As one evidence of its popularity, books and magazines are being published about this topic, which has spawned a whole new industry of product development.

Desktop publishing has been most closely associated with the Macintosh and IBM markets, but it's not limited to the owners of these two systems. The Commodore market is rapidly catching up and taking advantage of this new application.

Desktop publishing takes word processing one step further. It is no longer enough just to create documents full of text; now you can create professional layouts for this text accompanied with snappy illustrations, borders or other graphic elements. You can become as fancy and artistic as you want, or as simple and direct, depending on the application.

It's not just for business types, either. Desktop publishing spans everything from professional-quality business reports to simple one-page flyers. Other nonbusiness applications appropriate for the average computerist include the generation of newsletters, bulletins, greeting cards, resumes, brochures, certificates, invitations, reports, etc.

Why is there so much hoopla about desktop publishing? Because it allows anyone to become a publisher. Who wouldn't be excited about putting together his own newsletter; spicing up his report, document or resume; creating his own invitation or designing his own holiday greeting card?

This is a new technology that has applications in the home, in business and in the educational environments. It eliminates the need for outside typesetting and graphic services and lets you create elaborate documents that you can be proud to display or send to anyone. And you can produce these documents quickly and easily.

But don't be mistaken that desktop publishing is only for businesses that can afford an expensive laser printer and software to run on an IBM PC. Those of you who don't have professional-quality needs and are satisfied with dot-matrix output can have what you want at an affordable price.

Several Commodore user groups, for instance, publish very readable and entertaining monthly newsletters produced using the Newsroom and a dot-matrix printer. Springboard Software, developers of the Newsroom package, has coined a phrase to describe this latter application: table-top publishing, to differentiate it from the more expensively produced, typeset-quality output.

IN THIS ISSUE

In this December issue we take a look at both desktop and table-top publishing. On page 33, Jim Grubbs surveys the ABCs of software offerings that let you combine graphics with text to create imaginative and useful printouts—everything from advertising flyers to articles, bulletins to banners and cartoons to calendars.

Desktop publishing, which creates typeset-quality documents generated using a laser printer, is an application that is ideally suited for the business environment or for the organization or individual that produces a high volume of correspondence. Matthew Stern (p. 50) examines those laser printers that you can use with your Commodore. The ease of production and time-saving value of a laser printer with your Commodore make it a worthwhile investment.

Also in this issue, *RUN* features an enhancement to the electronic newsletter program published in the July 1986 issue. This update lets you incorporate high-resolution pictures into your computerized magazine.

In keeping with the spirit of the season, *RUN* also features a holiday shopper's guide to interesting, unusual and practical Commodore products. This guide presents *RUN* readers with gift-giving ideas for their computing relatives and friends.

This issue also features RUN Script 128, the latest version of *RUN*'s popular word processor. Owners of the C-128 can now have access to over 100 easy-to-use functions and commands.

The saga of the spreadsheets continues this month with a spreadsheet template that keeps track of your checking account entries and expenses.

The long-awaited hands-on review of the Mimic Apple emulator for the Commodore also appears in this issue.

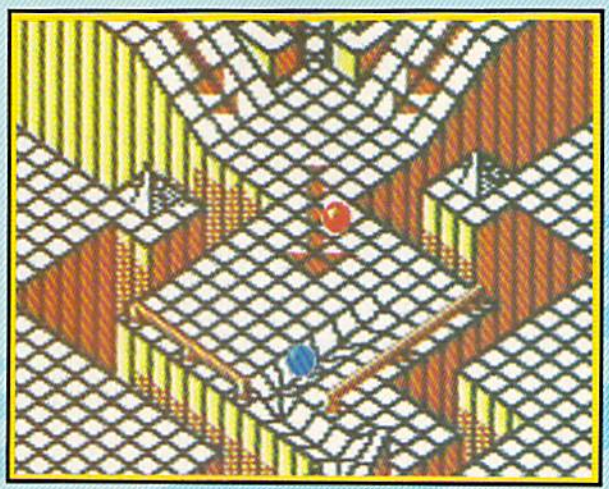
db

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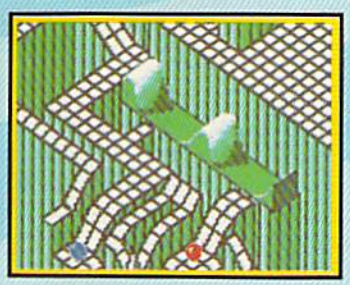
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By JIM BORDEN

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 output easier, faster, more exciting and enjoyable, send it to:*

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If your trick is accepted for publication in the column, you will receive a colorful RUN *Magic T-shirt.*

$368 "Holladay" snowflakes—This program produces a series of snowflakes by drawing triangles in different colors and rotating them through 360 degrees. Run this program on the C-128 in 40-column mode.

```
10 REM SNOWFLAKES - HARMON K. HOLLADAY
20 GRAPHIC 1,1:COLOR Ø,1:COLOR 4,1
30 FORI=1TO5:Z=Z+1
40 IFZ>16ORZ<1THENZ=2
50 COLOR1,Z
60 X=X+10:IF X=>300THENX=10
70 Y=Y+10:IFY=>200THENY=10
80 A=A-10:IFA<=10THENA=300
90 B=B-10:IFB<=10THENB=200
100 FORJ=ØTO360STEP30
110 CIRCLE 1,(X+A)/2,(Y+B)/2,ABS(A-X)/2,ABS
    (B-Y)/2,,,J,120
120 NEXT:NEXT
130 SCNCLR:GOTO30
```

Harmon K. Holladay
Dodge City, KS

$369 Improving 128 Perfect Typist—While typing in a lot of Data statements, using F1 for DATA and F7 for commas, I wondered if the plus, minus and decimal point keys on the keypad could be redefined. This would considerably improve typing speed for Data statements and commands such as Circle. I found that you can copy the keyboard matrix into RAM and change the keys any way you like. My program changes the decimal point key on the keypad to a comma and changes the minus key to duplicate the definition of the F1 key.

The lines are numbered to work with C-128 Perfect Typist. To use my program with it, be sure to remove :NEW from the end of line 60. Then add the lines below and save the program. You can also use this program without 128 Perfect Typist.

```
70 :REM '.'=, '-'=F1 (DATA) - TODD BAILEY
80 KEY1,"DATA ":BASE=3072:PH=INT(BASE/256):
   PL=BASE-PH*256
90 BANK15:FORX=ØTO88:REM COPY OLD MATRIX
100 POKE BASE+X,PEEK(64128+X):NEXT
110 POKE830,PL:POKE831,PH:POKEBASE+82,44:PO
    KEBASE+74,133:NEW
```

Todd Bailey
Sharonville, OH

$36A Ultra hi-res string art—Here's a program I originally typed in from the *VIC-20 Super Expander Programmer's Guide*. I modified it to work with the C-128 Ultra Hi-Res module (*RUN*, February 1986). It draws two ever-changing lines that swirl around on the screen. This program is simply fun to watch, especially if you have an RGBI monitor.

```
10 REM ULTRA HI-RES STRING ART-JEFF GOODE
20 FAST:TRAP230:DIMA%(200,3):@CLR,Ø:FORL=1T
   O5
30 SC=INT(RND(1)*16+1)
40 CH=INT(RND(1)*16+1):IFCH=SCTHEN40
50 @GRAPHIC,SC,CH
60 X=INT(RND(1)*1280/2)
70 Y=INT(RND(1)*400/2)
80 X1=INT(RND(1)+320*2)
90 Y1=INT(RND(1)*100*2)
100 C1=Ø:C2=Ø:FORM=ØTO200
110 IFC1<1THENC1=5+INT(RND(1)*10):RE=INT(RN
    D(1)*3)+1
120 IFC2<1THENDX=INT(RND(1)*41)-20:DY=INT(R
    ND(1)*41)-20:DA=INT(RND(1)*41)-20
```

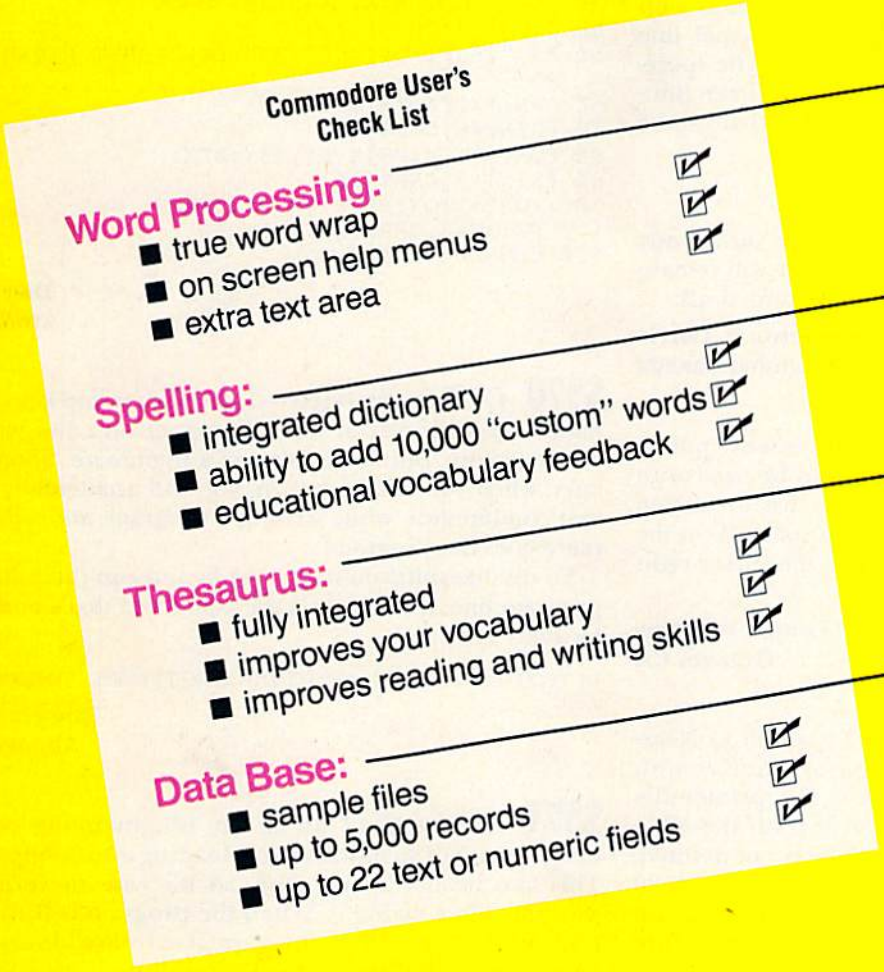
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```
13Ø IFC2<1THENDB=INT(RND(1)*41)-2Ø:C2=15+IN
    T(RND(1)*1Ø)
14Ø X=X+DX:Y=Y+DY:X1=X1+DA:Y1=Y1+DB
15Ø IF(X<Ø)OR(X>639)THENDX=-DX:X=X+DX*2
16Ø IF(Y<Ø)OR(Y>199)THENDY=-DY:Y=Y+DY*2
17Ø IF(X1<Ø)OR(X1>639)THENDA=-DA:X1=X1+DA*2

18Ø IF(Y1<Ø)OR(Y1>199)THENDB=-DB:Y1=Y1+DB*2

19Ø C1=C1-1:C2=C2-1
2ØØ @DRAW,A%(M,Ø),A%(M,1),A%(M,2),A%(M,3),Ø

21Ø @DRAW,X,Y,X1,Y1,1:A%(M,Ø)=X:A%(M,1)=Y:A
    %(M,2)=X1:A%(M,3)=Y1
22Ø NEXT:NEXT:SLEEP5
23Ø @TEXT:HELP:END
```

Jeff Goode
Burlington, CT

$36B Lo-Res screen dumps on the 1526—If you're having problems making low-resolution screen dumps with your 1526, here's a simple solution. With normal line spacing, there's a gap after each line printed. The space-setting feature controls the number of steps between lines of print. The default is six lines per inch, but that can be changed with this line:

```
OPEN6,4,6:PRINT#6,CHR$(21):CLOSE6
```

A value of 21 reduces the number of steps sufficiently to remove the gap between lines. The printer will remain in this step-reduced state until it is reset or turned off.

Cameron E. Currie
Winnipeg, Manitoba, Canada

$36C Kaypro CP/M disks—There are many public domain CP/M programs available that can be used with the C-128 and 1571 drive. While loading a disk formatted for Kaypro II, the prompt KAYPRO IV appeared on the screen. To get the Kaypro II format, press the cursor-right key, and the disk will load correctly.

Lonnie Williams
Orange, CA

$36D NLQ and Paperback Writer—To switch to Near-Letter Quality mode on the Star line of printers with Paperback Writer, select a pitch of 11. The printer file for the Gemini does not allow you to turn off the NLQ mode with a pitch command, but pitch 20 is not defined. So if you wish, you can load the file and define pitch 20 to ESC,"B",5. Then save the file back to disk. This will turn off NLQ and revert to the type you were using before NLQ was selected.

Greg Simpson
Murrayville, IL

$36E Data on side 2 of the 1571—The 1571 double-sided drive allows twice as much storage as a single-sided 1541 disk. However, once you have reached 664 or fewer blocks free, data saves to the disk are quite slow. It appears that the drive writes a block, then checks for the next free block, writes another block, and so on. If you have several long programs on the first side, you can reduce these delays by copying the long programs to the back of the disk and then scratching the original version. The data files will now be written, at normal speed, to the empty blocks on the first side of the disk.

Richard D. Young
Greenwood, N.S., Canada

$36F Variable-size graph paper—There are times when you need graph paper for different applications. This program gives you the number of squares you need. Some applications might include an 8 × 8 grid to create custom characters for your printer, a 24 × 21 grid for sprite design, or maybe you want to make your own crossword puzzle. This program is designed for the 1526 printer, but could easily be adapted to other printers.

```
1Ø REM VARIABLE GRAPH PAPER-DAN PRICE
2Ø INPUT"{SHFT CLR}HOW MANY SQUARES ACROSS"
   ;X:IFX>4ØTHENX=4Ø
3Ø INPUT"HOW MANY SQUARES DOWN";Y
4Ø OPEN4,4:OPEN6,4,6
5Ø A$="{SHFT O}{SHFT P}":B$="{SHFT L}{SHFT
   @}"
6Ø A=A+1:IFA=Y+1GOTO12Ø
7Ø PRINT#6,CHR$(2Ø)
8Ø FORI=1TOX:PRINT#4,A$;:NEXT
9Ø PRINT#6,CHR$(2Ø)
1ØØ FORI=1TOX:PRINT#4,B$;:NEXT
11Ø PRINT#6,CHR$(2Ø):GOTO6Ø
12Ø CLOSE6:CLOSE4:END
```

Dan Price
Athol, MA

$370 C-128 no-run safety—The shift/run-stop key combination will load and run the first program on a disk, which is a nice feature, but it can become a nightmare. Sooner or later, when you least expect it, you will accidentally press that combination while writing a program, and—poof!—there goes the program!

To disable shift/run-stop, type in and run the following program line, which erases the command that's built into location 4104:

```
10 POKE 4104,0:FORI = 4159 TO 4164:POKEI,PEEK(I + 9):NEXT
```

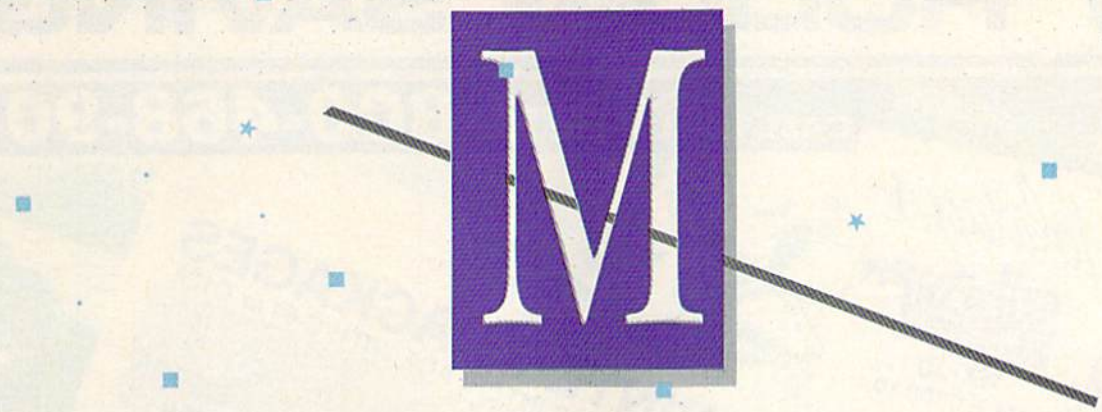
Don Harkness
Andover, KS

$371 One for all—I do all my programming on one disk because of so much saving, loading and saving again. This can be hard on a disk, so it's wise to verify the program after saving it. When the program is finished, I transfer it to the disk in my normal software library. This habit keeps my disks in good condition.

Mike Dryja
Washington, MI

$372 Function key restore—If you want to restore the default function keys on the C-128, just type in this line: BANK15:SYS49425. It will restore the function keys, the

Continued on p. 126.



EASY-TO-USE SUBROUTINES AND UTILITIES

Mega-Magic, an extension of the RUN *Magic column, offers each month a short but interesting and useful subroutine or utility program. Although noticeably longer than those in the Magic column, these listings are still short enough to type in easily and quickly.*

Error Channel Monitor—This vector-driven utility monitors the status of your disk drive's error channel and displays that status on the top line of the screen. It's written for a C-64 with a disk drive.

A vector is a program pointer that resides in a certain location in memory. It stores the two-byte address of another memory location to which a program should jump. It can also include a JMP instruction, for a total of three bytes.

Basic 2.0 contains many vectors in RAM for use as programs run. You can intercept execution and divert it to other assignments by altering these vectors. In this case, the program changes the vector at addresses $302 and $303 (decimal 770 and 771), which usually points to address $A483, to point to address $C000 (decimal 49152), which is where Error Channel Monitor resides.

To use Error Channel Monitor, type it in and save it to disk. *Don't* run it before you save it, because it erases itself when it runs. If you've typed in the listing correctly, when you do run it, the screen will clear, the top line will display the error-channel status, and the word "Activated" will appear.

Error Channel Monitor will continue to monitor and display the disk drive's error-channel status as long as the computer and disk drive are both on. It won't interfere with most Basic programs, so you can use it when you're writing and debugging your own programs. ®

Scott M. Huse and William D. Taylor
Salisbury Center, NY

Listing 1. *Error Channel Monitor.*

```
10Ø REM ERROR CHANNEL BY SMH & WDT  :REM*72
13Ø FORL=49152TO49263:READD:POKEL,D:REM*178
14Ø CK=CK+D:NEXT                   :REM*114
15Ø IFCK<>14986THENPRINT"ERROR":END:REM*1Ø8
16Ø SYS49152:PRINT"{SHFT CLR}{CRSR DN}ACTIV
    ATED.":NEW                     :REM*6Ø
17Ø DATA169,Ø11,141,ØØ2,ØØ3,169    :REM*2Ø2
18Ø DATA192,141,ØØ3,ØØ3,Ø96,Ø56     :REM*8
19Ø DATAØ32,24Ø,255,142,112,192    :REM*2Ø8
2ØØ DATA14Ø,113,192,169,Ø19,Ø32    :REM*112
21Ø DATA21Ø,255,169,Ø18,Ø32,21Ø     :REM*66
22Ø DATA255,16Ø,Ø39,169,16Ø,153    :REM*11Ø
23Ø DATAØØØ,ØØ4,173,134,ØØ2,153     :REM*76
24Ø DATAØØØ,216,136,2Ø8,242,169     :REM*96
25Ø DATAØ62,Ø32,21Ø,255,169,Ø15    :REM*152
26Ø DATA162,ØØ8,16Ø,Ø15,Ø32,186     :REM*99
27Ø DATA255,169,ØØØ,Ø32,189,255    :REM*153
28Ø DATAØ32,192,255,162,Ø15,Ø32    :REM*135
29Ø DATA198,255,Ø32,2Ø7,255,2Ø1    :REM*129
3ØØ DATAØ13,24Ø,ØØ5,Ø32,21Ø,255    :REM*171
31Ø DATA2Ø8,244,174,112,192,172    :REM*1Ø3
32Ø DATA113,192,Ø24,Ø32,24Ø,255    :REM*127
33Ø DATA169,146,Ø32,21Ø,255,169    :REM*159
34Ø DATAØ15,Ø32,195,255,Ø32,2Ø4    :REM*255
35Ø DATA255,Ø76,131,164            :REM*151
```

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Compiled By BETH S. JALA

Partner 128

A

This Handy Package Will Keep You On Time, In Touch, Up to Date and More!

Commodore 128 owners: Let me introduce you to your new Partner. This is the beginning of what will be a wonderful relationship.

Timeworks' Partner 128 is, quite simply, one of the best programs ever created for the C-128. It's unlike anything else available as of this writing, but it's so impressive that there'll probably be plenty of imitators on the market soon.

It's a cartridge-based program that provides you with eight different desk-top functions. In fact, Partner can even automatically suspend another program's operation at any time, then let you return to the point at which you left off.

Unless you're using another cartridge-based program, you can keep Partner plugged into your 128's cartridge slot. Even though its tail must be plugged into joystick port 2, you can use a Y-adapter cable for programs that require the same port.

Partner is almost completely transparent until activated. The exception is that it contains a utility called Swiftload, which will automatically speed up 128 program loading every time one is booted on a 1541 disk drive.

Once activated, Partner presents you with a menu of eight items: Appointment Calendar, Memo Pad, Address/Phone List, Calculator, Print Screen, DOS/Printer Commands, Swiftlock and Setup.

Partner's strength lies not only in what it can do, but in how it does it. Its operation is as logical as any productivity program I've ever used—even its interaction with disk-based information is simple. To load set-up information, for example, you don't need to remember a filename. Press one key, and Partner will find the file containing the information.

In fact, one key is all you need to access most of Partner's features. You always know what those keys are, because they're displayed right on your monitor.

Partner 128 is compatible with just about every printer. The users manual is superb, but the program is so well-designed, you might not even need it.

Since the beginning of the personal computer boom, folks have been saying that what is really needed is a program that anyone can use to perform average, everyday tasks. Partner 128 comes closer to achieving that goal than any other program I've ever used. *(Timeworks, 444 Lake Cook Road, Deerfield, IL 60015. C-128/$69.95 cartridge.)*

Scott Wasser
Wilkes-Barre, PA

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!

Mind Mirror

A⁻

Let This Program Help You Reflect on Your Past, Present and Future Self

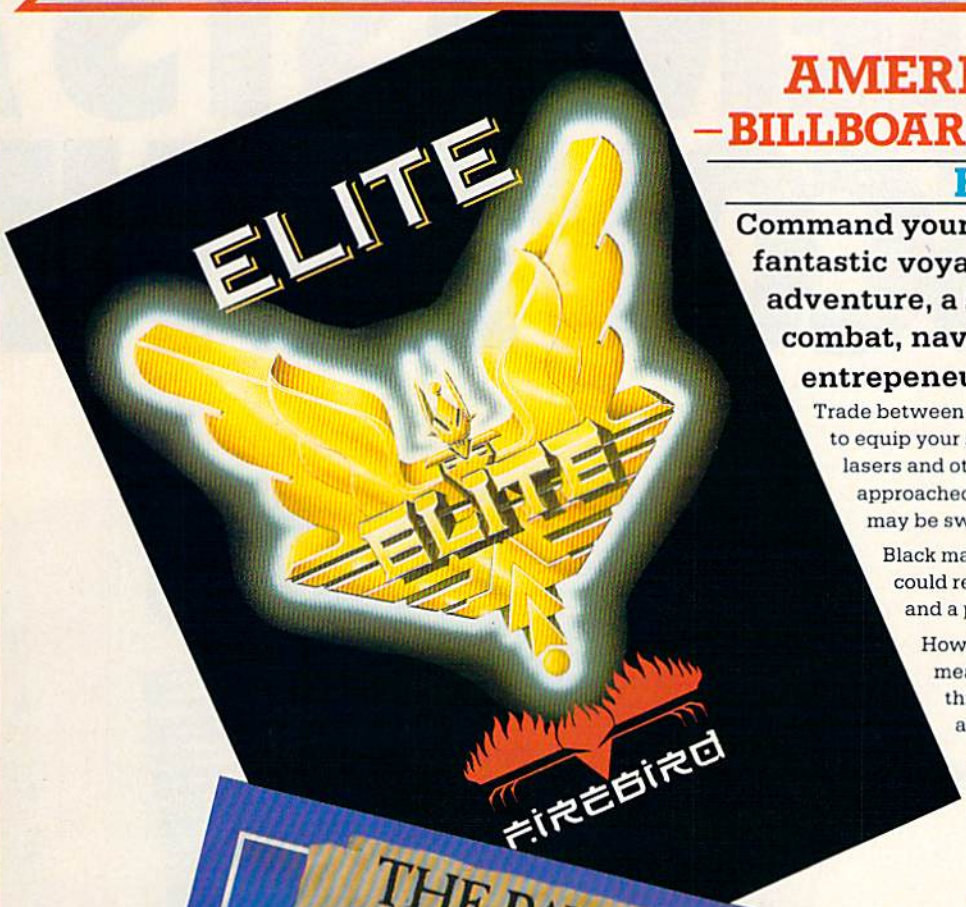
Developed by Dr. Timothy Leary, the object of Mind Mirror is to shake up your perception of yourself and those around you, while introducing you to new ideas.

The program is divided into two sections—Mind Map and Life Simulations. Mind Map presents you with a series of choices to make about yourself: whether or not you are creative, cute, friendly, a social nobody, and so on. Answers, ranging from always to never, are plotted on a pie chart in four different areas—Social Interaction, Bio-Energy, Mental Ability and Emotional Insight.

Utilizing this process, you can determine and compare your real and

Continued on p. 24.

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AMERICA'S Nº1 –BILLBOARD MAGAZINE

ELITE

Command your Cobra space ship in a fantastic voyage of discovery and adventure, a supreme test of your combat, navigational and entrepeneurial skills.

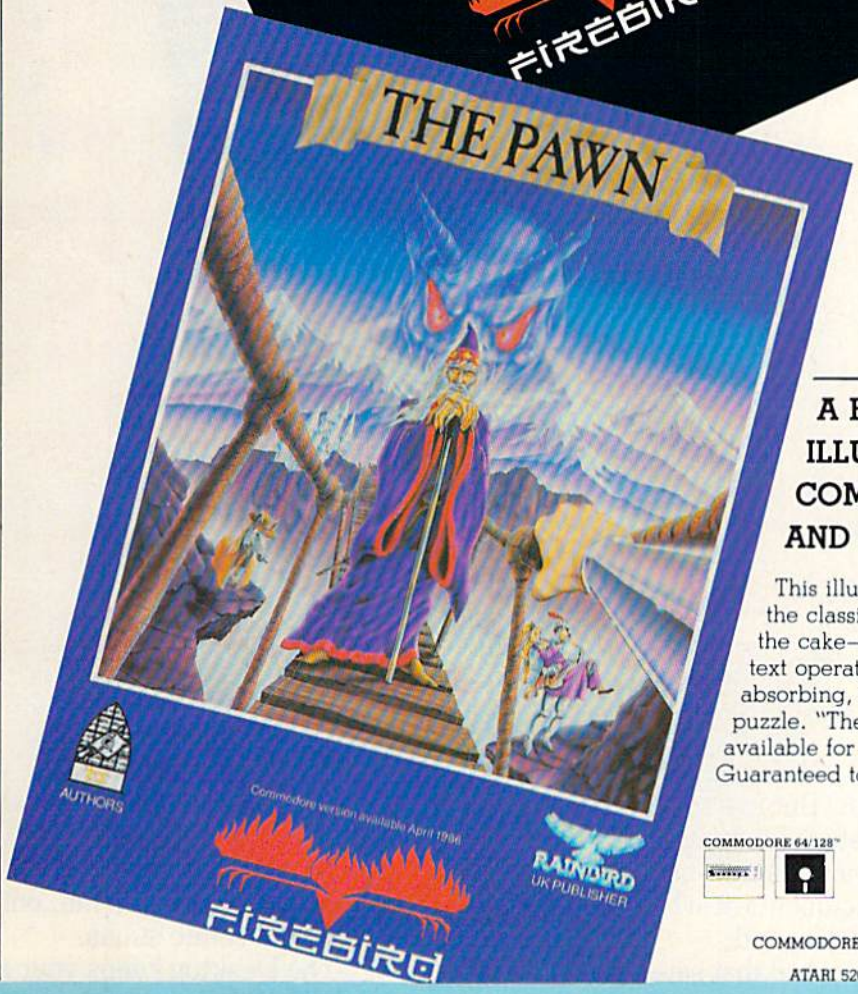
Trade between countless planets, using the proceeds to equip your ship with heat-seeking missiles, beam lasers and other weapons – corporate states can be approached without risk, but unruly anarchies may be swarming with space pirates

Black market trading can be lucrative but could result in skirmishes with local police and a price on your head!

However you make your money, by fair means or foul, you must blast onwards through space annihilating pirate ships and hostile aliens as you strive to earn your reputation –

as one of the Elite!





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SCIENTISTS A
DISCOVER NE

When we started our company on the west coast, people thought we were a little spaced out. So you can imagine their reactions when we announced we'd discovered a new universe.

People laughed. People scoffed. And they really freaked out when we told them where we'd found it:

Inside a Commodore 64.

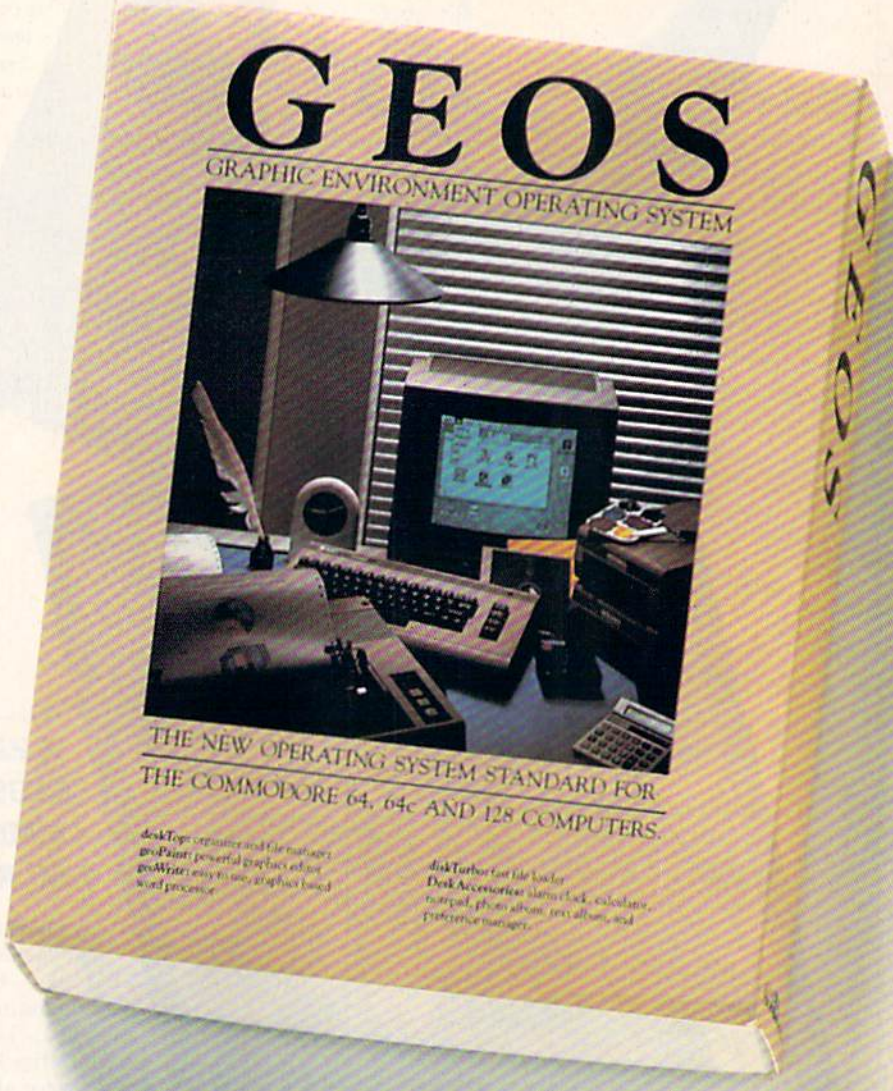
It's called GEOS. And it turns any Commodore into a powerful PC that holds its own against any computer, no matter what kind of fruit it was named after.

GEOS: The superior intelligence. Of course, we always knew Commodores possessed superior brains. It just took GEOS to discover them.

You see, GEOS opens your Commodore to a huge universe that can hold an infinite number of applications. Which means that GEOS can do just about anything the expensive PC's can do, including one thing they can't:

Add even more GEOS applications that are being developed even as you read this.

Increase your speed to warp factor 7. The first thing you notice with GEOS is how its diskTurbo speeds up your Commodore's disk loading and storing time.



Not twice or three times as fast. But five to seven times faster than normal. Which lets you streak through files and documents at what seems like warp speed.

And that saves you endless time.

Every universe comes complete with a desk. The way to keep order in our universe is with the GEOS Desktop. It's just like your desk at home, only without the coffee stains.

The Desktop keeps your art and documents filed, and comes

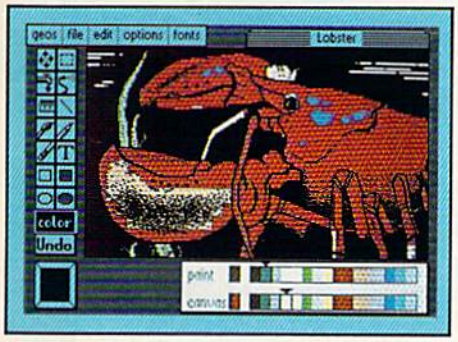
AT BERKELEY
W UNIVERSE.

with all the accessories you need to keep you organized:

An alarm clock keeps you punctual. A notepad keeps your memos. And a calculator keeps your accountant honest.

How to communicate with a new universe. With geoWrite, you can rearrange your written words. Move blocks of copy. Cut and paste. And even display your text in fonts of different styles and sizes, right on the screen.

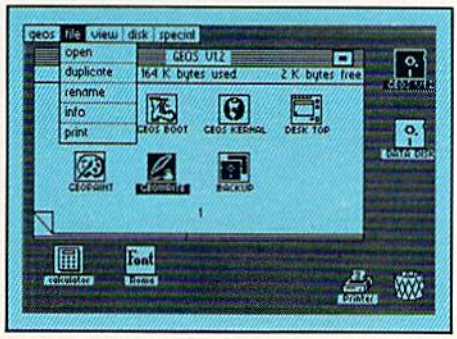
With geoPaint, you become a Michelangelo with a mouse.



Sketching and painting with all kinds of colors, textures and patterns.

You can invert, mirror and rotate images. Insert them into your geoWrite documents. And save them in your GEOS Photo Album for use later.

Finding your way through the universe. The most difficult



thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

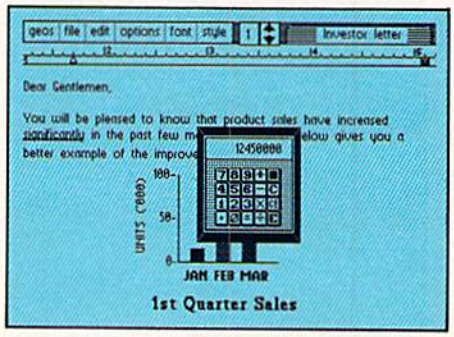
You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

Easy, huh? And in case you ever do make a mistake, GEOS backs you up with an "Undo" feature that undoes the very last command you entered.

Running out of space. With GEOS, that's hardly likely. Because there's endless space in the universe for new applications.

Unfortunately, there's only so much space in this ad.

So zip down to your nearest software dealer. Tell him you want to explore the new universe in your Commodore.



And if he looks at you like you're some kind of alien, well, just tell him Berkeley Softworks sent you.

The name is universally known.

To order, call 1-800-443-0100 ext. 234

GEOS is just $59.95

(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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Berkeley Softworks

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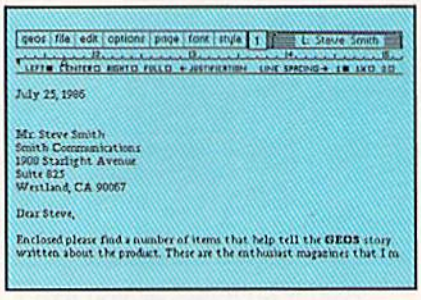
The brightest minds are working at Berkeley.

THE STRON
ARE BUILT WITH

Whether you're building an argument or just hammering out a memo, any project looks better when you put it together in Writer's Workshop. The supercharger that powers your GEOS-equipped Commodore through even the most wrenching assignments.

Sharpen your skills. The first thing to do in the Workshop is plug into geoWrite 2.0, which contains all the brand new tools you need to hone any rough concept into a well-crafted document.

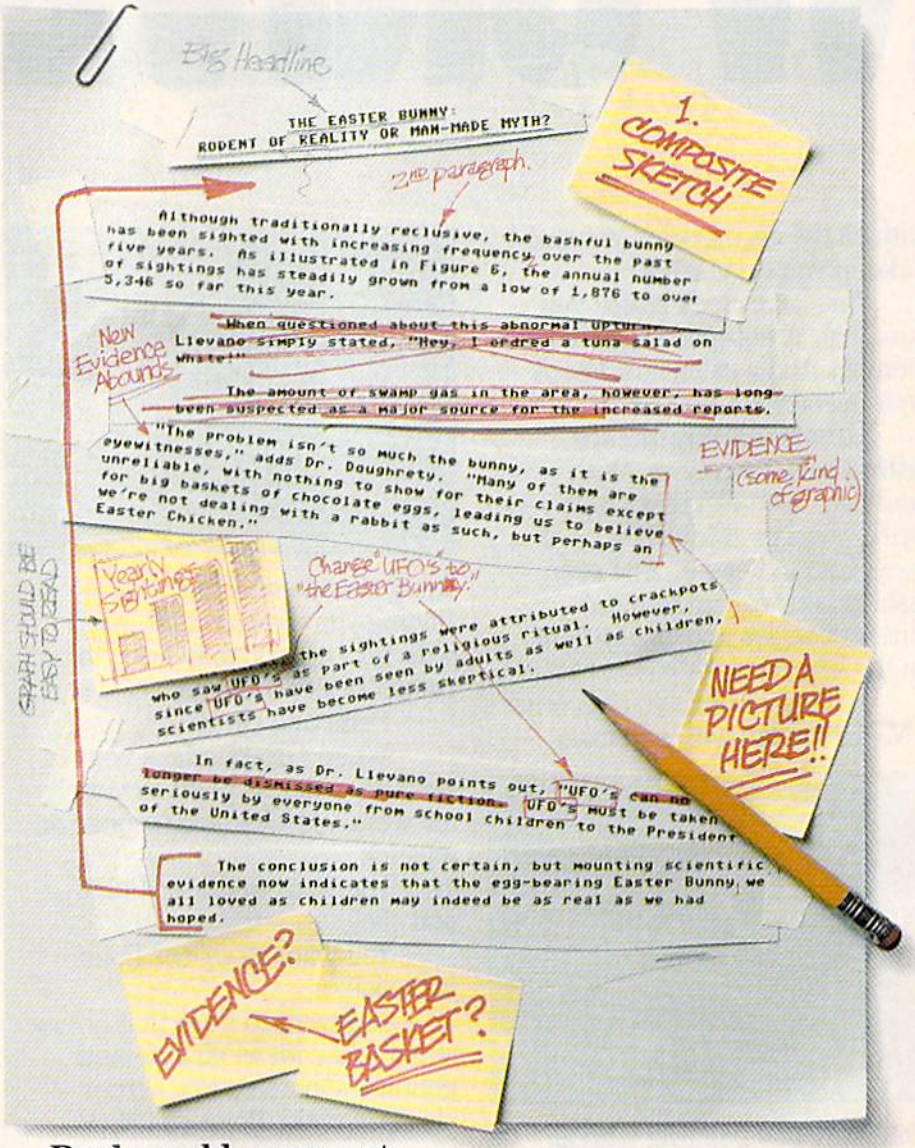
You get headers. Footers. Subscripts and superscripts. You can center your text. Right justify. Full justify. And nail



down formatting problems with variable vertical spacing and adjustable margins.

The Workshop cuts down on your manual labor, too. With one-stroke, "shortcut" keyboard commands. They keep your hands off the mouse so you can keep your mind on your work.

In fact, there's a complete set of heavy-duty accessories that not only strengthen your writing, but reinforce its structure, as well.



Replace old, worn-out parts. You can build anything with Writer's Workshop. And repair old stuff, too. Just decide which parts have to come out and which new ones go in.

Then hit the key and stand back.

Instantly, the "search and replace" drills through your old



Circle 134 on Reader Service card.

GEST CASES
H A WORKSHOP.



THE EASTER BUNNY: Rodent of Reality or Man-Made Myth?

The conclusion is not certain, but mounting scientific evidence now indicates that the egg-bearing Easter Bunny[1] we all loved as children may indeed be as real as we had hoped.

Although traditionally reclusive, the bashful bunny has been sighted with increasing frequency, over the past five years. As illustrated in Figure 6, the annual number of sightings has steadily grown from a low of 1,876 in 1982 to over 5,346 so far this year.

1. The Easter Bunny, depicted by composite sketch.

A+ EXCELLENT!!

1982 1983 1984 1985

Figure 6: Increased sightings, 1982 to present.

NEW EVIDENCE ABOUNDS

"The problem isn't so much the bunny, as it is the eyewitnesses," adds Dr. Dougherty. "Many of them are unreliable, with nothing to show for their claims except for big baskets of chocolate eggs[3], leading us to beleieve we're not dealing with a rabbit as such, but perhaps an Easter Chicken."

At first, the sightings were attributed to crackpots who saw The Easter Bunny as part of a religious ritual. However, since The Easter Bunny has been seen by adults as well as children, scientists have become less skeptical.

In fact, as Dr. Llevano points out, "The Easter Bunny must be taken seriously by everyone from school children to the President of the United States."

Figure 4: Evidence submitted by Dr. Dougherty.

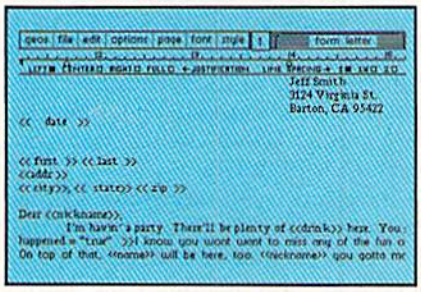
text, replacing worn-out words and phrases with your brand new ones.

For more serious cases, hand the job over to the Workshop's Text Grabber. It takes text from several word processors—like Paper Clip™—and lets you overhaul them with new GEOS fonts, formats and graphics.

A few more built-in features. Every project leaves the Workshop looking beautifully finished, too. Because it not only comes with LaserWriting compatibility, there's even a LaserWriter for you to print on.

You simply upload your files to QuantumLink.™ Then they're printed and mailed back.

Convenient, or what?



Of course, you don't want to keep good-looking documents like this to yourself. So we built in geoMerge. Which customizes your geoWrite form letters to people on your mailing lists.

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WRITER'S WORKSHOP

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Software Gallery

From p. 18.

ideal self. From there, you decide how you want to move to where you want to be, or how to readjust your goals to reflect a more realistic version of your ideal self.

In the beginner and intermediate levels of Mind Map, you can choose between Mind Play and Mind Tools. Mind Play users can enter the realm of Psychological Insight, Career Productivity or Education and plot mind maps for various well-known or historical figures.

In Life Simulations, you can walk through different stages of life either as yourself or as someone else. This section winds up in the Social Interaction arena, where you drop in on various parties at the Death Star Bar or at a welfare soup kitchen. You will score points based on the way you interface with others.

I have only two minor complaints with Mind Mirror. Although simulations and data can be saved to disk, there is no way to dump the information to the printer for a handy future reference. Also, if you accidentally land in the wrong area, there is no way to get back to a submenu.

The scope of Mind Mirror is limited only by the user. This unique program is more than just a game, because it has both practical and professional applications. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$34.95 disk.)*

Robert J. Sodaro
Fairfield, CT

The Riddle Of the Redstone

B

Discover the Deed and Uncover the Mystery In This Adventure

You are summoned to the Redstone one dreary midnight. Once there, you must solve the riddle of this huge mansion, or perish in the attempt.

Presented in the form of a book, The Riddle of the Redstone alternates text and graphics screens. You are taken on a chase, during the course of which you, the hero, find yourself on trails leading to blind alleys, and of course, blind alleys always have serious consequences.



Can you solve the Riddle of the Redstone?

The former owner of Redstone, unable to decide how to divide his estate, decided to create a puzzle. Finding the hidden deed to the mansion results in a winner-takes-all situation. However, because others have tried to solve the riddle, you must do it in less time than those claimants.

You may come away, as I did, with the feeling of being treated unfairly. You are at the mercy of simulated time: It runs at different rates in various parts of the mansion. But it's fun in spite of that; after all, what can you expect from a place that is probably haunted?

Designed with the younger set in mind, the clues will remind you of children's games: A green clue is good and you should continue along that train of deduction; yellow clues mean caution and you're barking up the wrong tree; by the time you find a red clue, it's too late to do anything but accept your fate.

The clues take the form of what might best be described as doggerel, although they are probably considered riddles. Anyway, each one contains enough key words to keep a young mind thinking of possibilities.

I found that the text has more to do with clues than the graphics, although the latter help to set the scene and the mood. There is also a nonstop soundtrack that is quite good and perfectly matched to the scenario.

To make it easier for young readers, options are always reiterated during the game in the form of a multiple-choice menu of key words. Each alternative leads to a different path, and each path contains its own hazards or rewards. Fortunately, no path is very long, so the game should not become confusing.

Games in progress may be saved with a bookmark option that requires a disk to be formatted from within the program. Although the documentation only consists of loading and formatting instructions, there is really no need for more because the on-screen help is extensive.

The Riddle of the Redstone is certainly a good game and should be right on target for its intended age group. *(Software Investments Plus, Inc., PO Box 13, Appleton City, MO 64724. C-64/$24.95 disk.)*

Ervin Bobo
St. Peters, MO

Football

A-

Score Touchdowns, Field Goals And Extra Points with This Computer Simulation

Attention Monday morning quarterbacks: SubLogic Corporation has created a realistic football simulation! From the players down to the marching band, every aspect of this program should bring hours of enjoyment to would-be Super Bowl-ers.

Football takes about three minutes to load into your C-64 and operation is straightforward. The computer becomes your opponent if you are unable to find another football fan to square off against. An authentic scoreboard keeps track of the time, score, downs and yards to go. Typical football rules regarding time-outs and clock stoppage are enforced.

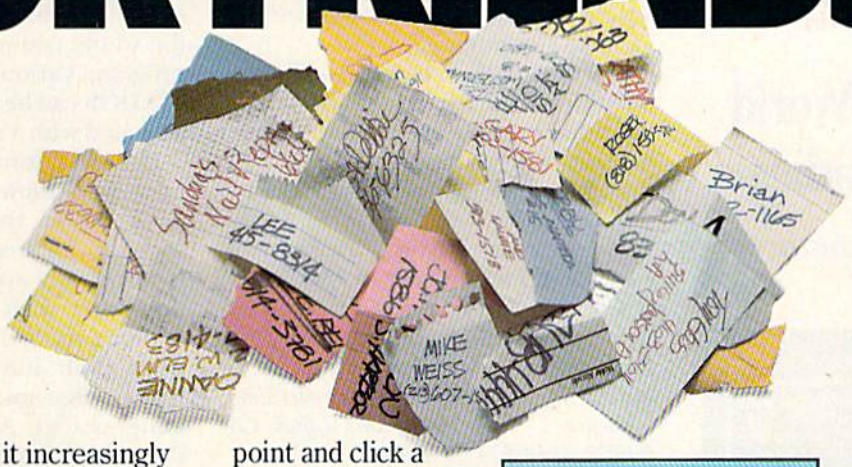
You pick whether the AL Stars or the NL Stars will be the home team. A menu selection process lets you call the plays, including substitutions from the bench.

You'll find some pretty talented ball players on the two teams. Speed, power and catching ability are all assignable before you begin play. Depending on your selections, scoring points can be either very easy or very difficult.

During a head-to-head contest with a friend, the offense options are displayed on the right side of the screen, and the defense on the left. The wide variety of play choices and personnel attributes guarantee that the game won't become old after a few plays.

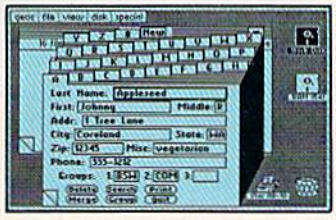
Football doesn't come with an instruction manual. Instead, a 70-page coaches' confidential playbook accompanies the software.

ARE YOU SEARCHING FOR FRIENDS?



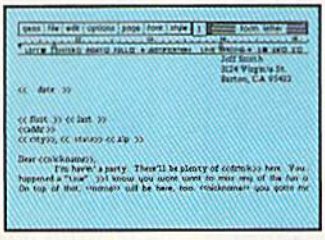
If you're finding it increasingly difficult to find anything at all, maybe it's time you found out about geoDex. The GEOS-compatible directory that generates mailing lists. Prints address labels. And sorts out all sorts of things for your Commodore.

Try directory assistance. With a little help from geoDex, you can call up a directory organized from any three categories you choose. Which means you can list your friends by name, telephone number or almost anything else that can be assigned its own three-character code.



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But no matter how you choose to categorize them, if you can point and click a mouse, you can call up any list of friends with geoDex's easy-to-read graphics.



Our most inviting feature. Of course, once you've gotten your friends organized, the next thing we recommend you do with geoDex is really very simple.

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You see, geoDex comes with geoMerge, a mail merge program that customizes form letters, announcements—even party invitations—with the names and addresses stored in geoDex. First you write the letter with geoWrite. Then you select a list from geoDex.

Put them both together with geoMerge and it's toga time!

The search is over. So if you're tired of looking for friends, waltz right down to your software dealer and ask him for geoDex. We can't guarantee it'll win you more friends, but it'll certainly keep you from losing them.

To order call 1-800-443-0100 ext. 234

geoDex $39.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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GEODEX GEOS COMPATIBLE



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While the graphics are very good, I did have some trouble clearly identifying both the ball and the players on the field. They are easier to spot once you know what you're looking for. I was using a Commodore 1702 color monitor.

While my precomputer age, electric football game was sold long ago to some unsuspecting kid at a garage sale, I think the SubLogic Football disk will be around for many years to come! *(SubLogic Corp., 713 Edgebrook Drive, Champaign, IL 61820. C-64/ $39.95 disk.)*

Jim Grubbs
Springfield, IL

Where in the World Is Carmen Sandiego?

This Graphics Adventure Is Educational Fun!

A



Broderbund's Where in the World is Carmen Sandiego?

It's only fair to warn you that the documentation for Where in the World is Carmen Sandiego? includes the 1986 World Almanac—928 pages in the game edition. If you can get past that hurdle, you'll find yourself involved in one of the cleverest adventures of the year.

If you're new to the game, you'll be assigned the rank of Rookie. The only way to progress is to successfully solve the case. The objective of the Carmen Sandiego gang is to steal national treasures. Because of this, your assignments will take you all over the world. It's more than likely that you've never heard of some of the places you're sent to—that's what the Almanac is for.

Once you receive your assignment, the playing screen divides itself into three parts: A scene typical of the country you're in, a brief description of the country and a menu of possible actions. Because all your moves are always on-screen, the game avoids complications that might otherwise ensue, thus leaving you free to enjoy the chase.

There are ten suspects, 30 cities and almost 1000 clues, so Where in the World is Carmen Sandiego? is capable of generating a new game each time you play. With all this information, Carmen uses both sides of the disk, and you're told when to turn it over. Thankfully, this always comes at a time when it doesn't slow down the game of hot pursuit.

Documentation is good—all you need to get started on a merry chase. In addition, there are dossiers on the suspects you're chasing and a map of the world with major cities marked.

Graphics and sound are very well done, and the animation is both clever and cute. Where in the World is Carmen Sandiego? is the kind of game about which you and your children might say, "I don't care if it is educational, it's still fun!" *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$34.95 disk.)*

Ervin Bobo
St. Peters, MO

Mach 128

B+

Break Out Of Slow Motion With This Cartridge Loader

Working with the Commodore 128 saddled, or, if you prefer, chained, to the 1541 ultralow-speed drive, is no fun at all.

If you take the basic goal of speeding up 128s working with 1541s on program files, throw in a hardware switch that controls whether the 128 functions as a 128 or a 64, add some other DOS support and some speed improvements under certain conditions for 1571 drives, the end result is Mach 128.

Mach 128 is Access Software's follow-up to their successful and well-regarded Mach 5 cartridge loader. Its only major shortcoming is that it ends up improving a lot of things a little bit and lacks the 128/1571 combination speedup of saving and loading that could only come from a more ambitious Kernal and DOS rewrite.

The Mach 128 cartridge will work identically to the Mach 5 cartridge if it's inserted into a 64 with the switch set in 64 mode. It offers a nice option to those who might now want some type of 64 DOS enhancement that they could keep on using when they made the jump to the 128.

Mach 128 supplies a very useful reset switch for 64 owners and many two-keystroke entries for commands such as opening a channel to a printer, getting a directory and loading and saving files.

It also has an invaluable menu, available with two keystrokes, that explains the whole command structure of the program. Various portions of the Mach 128 DOS can be easily activated or deactivated with SYS commands.

However, for those users operating in the 80-column, 2MHz mode and using 1571s, there's not much real speedup for loading files, and there is never any speedup of file-saving, no matter what mode or what drive is being used. There are also limitations built into all cartridge-based loaders that software-patch the operating system. Applications software that does not use standard Kernal routines for loading will not show any speedup, nor will software that overwrites the address space used by the cartridge.

Although the cartridge advertises that all 128/1571 loads are done in the Burst mode, when you type in DLOAD <filename> and are in 80 columns, the drive is already loading in that mode, which gives you a loading speed on program files of about 4K per second. If you are loading from 40 columns in the 128 mode with a 1571, the cartridge blanks the screen and picks up some speed (about 20%) over the normal 40-column DOS loading of program files.

The 1541s interfaced with 128s are going to show the more substantial speedup on all modes—roughly 500%, from .4K per second to about 2K per second on program and sequential files. However, no speedup on random files is supported by the cartridge in any mode with any drive.

Included in this package are a disk organizer database program and a program allowing an additional 4K of Basic memory to be available to

the machine when running as a 64.

This well-conceived, versatile and debugged cartridge loader is especially valuable to C-128 owners running 1541s and using the machine in 64 mode. *(Access Software, Inc., 2561 South 1560 West, Woods Cross, UT 84087. C-128/$49.95 disk.)*

Douglas Watt
Wellesley, MA

Conflict in Vietnam

Here's Your Chance To Refight Five Historic Campaigns In a Controversial War

A-

Although it's only a computer simulation, Conflict in Vietnam may be a tiny first step in helping to disentangle the feelings associated with that controversial war from the facts.

As a part of the Command Series, Conflict shares much with previous WWII-based simulations. But even if you've never used any war-game software before, you'll find it easy to get the hang of this package.



A scene from MicroProse's Conflict in Vietnam.

You begin by selecting a scenario. The lower half of the screen is a terrain map; the upper half is a command and message board. To give a command to a unit, you move the cursor with your joystick or keyboard until the outline surrounds the icon representing the unit.

Although the (real-time) clock is running, you can freeze it to allow yourself an interval to study the situation—an option the real commanders probably wish they'd had. At 6 PM each day, a status report appears in the command area showing which side has gained or lost ground and giving the body count for both sides.

In Conflict, you have at your disposal all the weapons that were available for a particular battle—men, fighter planes, helicopters, bombers, etc. It is up to you to use them strategically and tactically to replay or to rewrite history. The game may be played against either the computer or an opponent, and you can choose to be a U.S. or a Communist commander.

Documentation is excellent, providing not only the rules on how to use the game, but also a capsule history of the conflict, a summation of why some weapons and tactics did not work, and an insight into how command decisions were made.

Considering the amount of information that must be crammed onto the computer screen, the graphics are more than adequate to the task, and, because some battlefields are larger than your monitor, a smooth scrolling action in all four directions lets you survey the total situation.

I used a C-128 with the 1571 disk

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FONTPACK 1 GEOS COMPATIBLE



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drive. Because Conflict seems to want all available memory, I found it necessary to disconnect my printer at the disk drive to make the disk boot.

I don't suppose I could ever call Conflict in Vietnam fun. I think it is a learning experience and a valuable addition to strategic simulations for the computer. I feel that it fills a gap in the continuity of historical war games. With the computer's penchant for stripping a situation of all emotion, it fills a need in allowing us to view the Vietnam experience from a safer and saner distance. *(MicroProse Software, 120 Lakefront Drive, Hunt Valley, MD 21030. C-64/$39.95 disk.)*

Ervin Bobo
St. Peters, MO

Bank Street Speller

This Electronic Dictionary Helps You Produce Error-Free Documents

A

If you use Bank Street Writer, you'll love Broderbund Software's Bank Street Speller.

Because Bank Street Writer is so good, many users would rather not part with it even though it lacks a built-in spelling checker. Broderbund has come up with an alternative: Speller is an electronic dictionary that will enable users to check for and correct spelling errors and typing mistakes in writer-created documents. It works by comparing the words in your document to its own list of 30,000 words and then highlighting those that don't match.

Speller also enables you to easily generate your own supplemental dictionaries. This feature is important, because even correctly spelled words will be highlighted if they're not in Speller's dictionary.

It is designed to look and work like the other Bank Street programs and comes with a backup. Bank Street Writer users will find they're able to use Speller without ever referring to its quick-start instructions, operations manual or on-disk tutorial. The menu-driven Speller is easy to learn and use.

After saving a record created with Writer, you can choose from one of four options: Check Spelling, Search Dictionary, Make New Dictionary and Quit Program.

Speller will compile a list of all the words contained in your document, which you can either view or print out. From there, the program will compare these words to those in its dictionary and any appendix to it you have added. Any words it fails to find are gathered into another list.

If there are misspelled words, you can enter the correcting section. Here, Speller shows you each unmatched word. You can ignore it, replace it, ask for a suggested spelling, search Speller's dictionary for the correct spelling or add the word to your own dictionary. If a correction needs to be made, Speller can amend that word every time it appears in your document.

One of Speller's most interesting elements is contained in its Search option. It has a feature that enables you to look up words you can only partially spell. You can use Speller's wild-card characters in place of single letters or groups of letters, and it will produce all possible matches from its dictionary. This certainly is a handy item for crossword fanatics.

You don't, however, have to be a fanatic to get a lot of use out of Bank Street Speller. You only have to be concerned with turning out mistake-free letters and reports. Broderbund has, with Bank Street Speller, made its outstanding Bank Street Writer even better. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$49.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

World Karate Championship

B

Kick, Spin and Jump Your Way to a Black Belt

World Karate Championship is a contest of martial arts skills that has you trading kicks and chops with opponents in eight international settings. You can fight against a human opponent or a series of increasingly challenging computer foes. With each successful match, you advance through the ranks from white to black belt. There are 16 different punches, kicks and leaps available to you just by moving your joystick in the appropriate direction.

One of the things that makes World Karate Championship so enjoyable is the game's spectacular animation. The movements and facial expressions are realistic and lifelike. With each exchange of blows, the sound effects perfectly complement the animation: World Karate Championship features thuds, grunts and the shuffling of feet.

As a solo contest, World Karate Championship initially seems almost impossible to master. Before long, however, you'll learn to take advantage of your computer opponent's slight predictability and vulnerability. You'll be able to defend successfully against most attacks, and the game will lose much of its appeal as it becomes easier and easier to obtain the black belt.

As a head-to-head battle against another joystick-wielding player, however, World Karate Championship is as much fun the 100th time you play as it is the first. It becomes harder to guess what your attacker's next move will be as he surprises you by changing tactics in the middle of a match.

With the great variety of moves available to both combatants, it's always fun to come up with a new combination to keep your sparring partner on his deadly toes. *(Epyx, 1043 Kiel Court, Sunnyvale, CA 94809. C-64/$29.95 disk.)*

Bob Guerra
Charlestown, MA

Lords of Midnight

Conquer Evil with This Oft-Told Tale from The Middle Ages

C+

The popularity of role-playing computer games has spawned so many different variations on the theme that it's risky to claim any one of them as unique. Lords of Midnight, however, appears to have enough new wrinkles to make it stand out from the crowd. That doesn't necessarily make it any better than its counterparts, just different.

The premise upon which Lords of Midnight is based is not new. It's just another version of a mythical, mysti-

cal, medieval knights-in-armor quest.

The game player controls the Forces of the Free as they battle Doomdark the Witchking and his Forces of the Foul. The computer controls Doomdark and his powerful, crafty allies. The game player's task is to destroy Doomdark and his forces and preserve freedom.

Unlike other role-playing adventures in which there is only one hero, in Lords of Midnight, gamers can portray one or all of four different heroes. To play the complete epic, gamers should control all of the characters.

The package is different from most adventure games of its kind, mainly because graphics are as important as words. There are more than 32,000 screens, each of which depicts a different panorama of Midnight. Although they are primarily colorless line drawings, the screens provide a good perspective of the landscape.

As your character moves or changes the direction he is facing, he—and you—see different things. To see what lies beyond a forest, for example, you must move your character through the trees. Players will quickly learn it's important to be aware of their surroundings at all times.

In another departure from typical adventure games, Lords of Midnight does not require players to type command statements or phrases to make things happen. Instead, role players have four basic options, each of which can be chosen with a single keystroke.

Once you learn the four basic commands, game play proceeds rather smoothly. Some veterans of role-playing adventures may be frustrated at first by their inability to use command phrases to make things happen. Others may find game play on the slow side, since virtually all of the action requires scanning the landscape first.

By far the most annoying aspect of the program, however, is the way it halts play every time night falls. It seems as though nighttime comes after every few moves, and when it does, you lose control of the Forces of the Free. The computer uses these tedious pauses to calculate what has transpired and to plot Doomdark's next moves.

Lords of Midnight's design has its good points. It's a very easy game to get into, thanks to the way it uses graphics. Also, mediocre typists will undoubtedly consider the simple, single-keystroke commands a blessing.

If you're hooked on role-playing games, the new angles Lords of Midnight brings may make the program worth your time and cash. But be forewarned: Those new wrinkles are on a familiar, and somewhat tired, old face. *(Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062. C-64/ $29.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

1541 M.A.S.H.

B

This Software Plus One Screwdriver Equals An Aligned Disk Drive

Statistics seem to indicate that many people either have, or will have, troubles with their 1541 disk drive. This package, 1541 M.A.S.H., could save

ART COLLECTOR, EDITOR, TIMEKEEPER & CARD SHARK FOUND STUFFED IN BOX.

Okay, so maybe we're being a little dramatic. But when you see how much Deskpack 1 adds to your GEOS-equipped Commodore, can you blame us?



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And when work gets too boring, our Black Jack dealer pops up to give you a fast shuffle, complete with sound effects.

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DESKPACK 1

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The IPS allows the operation of one or two printers with independent selection of fonts and printer types. Nearly all families of dot matrix printers are supported thereby allowing the ***Printer Enhancer*** to appear totally transparent to the computer system. This feature is also selectable by software or front panel control.

High Performance Buffer
The internal 64K buffer is microprocessor controlled in a multi-tasking fashion that provides maximum data transfer while holding an average of 30 pages of text.

FULL CONTROL PANEL: The front panel controls include *Clear, Copy, Pause, Select,* and *Font* plus LED indicators for printer and font selections. CLEAR - clears the buffer data; COPY - prints copies of the buffer data; PAUSE - halts operation; SELECT - selects printer; FONT - selects font to be used. Printer types are selected on the rear panel DIP switch.

FRONT PANEL PROGRAMMING: Although control codes may be embedded in text for manipulation of the fonts, an alternative is provided that allows use of the ***control panel*** to select the various features like *Expand, Compress, Boldface, Underline,* etc.

INTERNAL DIAGNOSTICS: The internal diagnostics include a test for the buffer RAM; front panel switches and LEDs; plus set-up helps for various printers.

CERTIFICATION: Certified to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules.

Retail Price $249.95

Xetec Inc. / 2804 Arnold Rd. / Salina, Kansas 67401 / 913-827-0685

Circle 114 on Reader Service card.

Software Gallery

you an expensive alignment bill as long as you are moderately handy with a screwdriver and can follow instructions.

M.A.S.H. is an acronym for Mechanical Alignment Service Handyman. It's a software package that assists in locating mechanical alignment problems on the 1541 and provides a reference disk for bringing the unit into proper tolerance.

Although it is not indicated anywhere in the 20-page instruction manual, this program will work only with a C-64 or C-128 in 64 mode. I couldn't determine quickly if the program was compiled or written in machine code, but it will not load properly on a VIC-20 (bare or with expanded memory), or a Plus/4. It also will not load in 128 mode. The program does appear to function on a 1571 drive however, although alignment procedures were not included in the package I tested.

Several tests are available: From a well laid-out menu, you can choose to check the alignment or speed of the drive, or to check a particular disk, and you can continually access a particular track for fine-tuning if you appear to be having trouble with a particular area of the disk. Additional selections

The actual procedure for aligning a disk drive is not difficult, but it does involve taking the unit apart and making adjustments that will void your warranty. The illustrations provided in the instruction manual are useful in locating the proper adjustments.

The biggest problem I could find with this package is that the print in the manual is small and somewhat difficult to read. While I did ultimately find all of the information I needed, it could have been laid out much better.

If you're having problems with your disk drive, you may want to take a look at how you've been using it. Other than protected software that delights in tearing your drive apart, smoke, dirt, poor-quality disks and heat are natural enemies.

If you have a dead or dying 1541 and would rather invest in a possible cure than invest in your local service shop, 1541 M.A.S.H. will do a good job in assisting you. *(MegaSoft, Ltd., PO Box 1080, Battle Ground, WA 98604. C-64/$19.95 disk.)*

Jim Grubbs
Springfield, IL ■

WAR GAMES





FIREBIRD





IWO JIMA

"In the closing stages of the war in the Pacific, the U.S. Marines fought their costliest and toughest battle of the entire war – the capturing of the island of Iwo Jima.

Some 7000 marines died and more than 17000 were wounded in the 36 days of the battle, whilst only 216 Japanese troops survived of the original 22000.

In this computer simulation, the player commands the American forces, and the computer controls those of the Japanese. The simulation takes place over 32 – 36 days depending on which of the five levels of difficulty is selected.

BATTLE FOR MIDWAY DATE: 4th June 1942,

'Battle For Midway' puts you in command of the US Pacific fleets six months after the attack by the Japanese on Pearl Harbour.

'Battle For Midway' is not a simple game. It has been designed for the person who enjoys a stimulating intellectual game and incorporates every realism to ensure that what- ever the outcome of the game – that is the way it could have happened.

FALKLANDS 82

Falklands 82 is a simulation of the conflict between the Land Forces of the United Kingdom and Argentina over the period 21st May to 15th June 1982, following the invasion of the Falkland Islands by the forces of the Argentinian Junta. The screen map represents the Northern part of the East Falkland Island where the major part of the land combat took place.

The player commands the United Kingdom forces whilst the computer commands those of the Argentine, and the simulation takes place over 25-30 days depending on which level of difficulty is selected





BATTLE OF BRITAIN

The Battle of Britain took place between July and October of 1940, and was the German Luftwaffes attempt to defeat the R.A.F. and gain air superiority prior to Operation Sealion – the invasion of Great Britain scheduled for the summer of that year. The ensuing battle has gone down in history as one of the most courageous of WWII culminating in the defeat of the Luftwaffe and the cancellation of Operation Sea-lion.

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ELECTRONIC EXPRESSIONS



Keep those cards and letters coming with these software packages that combine text and graphics.

By JIM GRUBBS

In the beginning there were word processing programs and there were graphics programs. That was the natural order of things. Then, not long ago, the folks at Broderbund Software introduced The Print Shop, shattering the notion that text and graphics must be separate, and computer users began creating posters, signs, letterheads, greeting cards and more.

Now Print Shop has inspired the creation of a new generation of programs. Some of them emulate Print Shop in almost every detail; others have struck out in bold, new directions.

With the holidays upon us, it's an appropriate time to take a look at several of these packages for the C-64 and see what's new, as well as what's been done to enhance the old. Whether the computer users on your Christmas list design unique greeting cards, publish a club or business newsletter or enjoy creating computerized fireworks displays, they'll surely be pleased to find one of

PHOTOGRAPH BY ED JUDICE

these packages in their stockings on Christmas morning.

The Print Shop

In case you've been off with Rip Van Winkle catching a nap, I'll begin with a look at the program that started it all and remains a bestseller today—The Print Shop from Broderbund Software.

When I was a youngster, I owned a small hand-cranked printing press. It printed on 3-by-5 cards, and I had to set all of the rubber type by hand. The only pictures I could use were images the company sold. In reality, it was little more than a big rubber stamp kit.

Broderbund took the home printing press idea and brought it into the '80s. With Print Shop you can create greeting cards, posters and letterhead stationery by combining type fonts, borders and pictures from an assortment the program provides. An option called Screen Magic generates geometric designs to use as backgrounds for signs, and experimenters have found they can call on Screen Magic to "import" pictures from some other graphics programs.

Another company, MicroAds, features software called Micro.Ad.Magic that converts black and white Print Shop Screen Magic files into color graphics files with a variety of fonts and character sizes.

Broderbund also offers four disks of additional graphics "libraries" to use with Print Shop, the newest having a holiday theme particularly appropriate at this time of year. Print Shop includes a complete graphics editor for creating your own images to augment the selection the program provides. Users have created thousands of them, and many are available in the public domain.

The program's operation is reliable, straightforward and well-documented, and it deserves the many high marks it has received. However, there's room for improvement in anything, and, realizing this and to meet its competition, Broderbund has come out with a new product, The Print Shop Companion.

The Print Shop Companion

To use The Print Shop Companion, you must own an "authorized copy" of Print Shop and must follow an updating procedure the first time that you use it. This initialization "teaches" your Print Shop disk to recognize the additional features of the Companion. If you have an older version of Print Shop, you'll need to cut a notch in the original disk, much as you do to make "flippies" from blank disks. The procedure is well-documented, and Broderbund will even bail you out with a new double-notched Print Shop disk should you somehow destroy your old one.

Print Shop Companion adds a wide variety of new type styles and borders to Print Shop's selection. You can also create calendars with it, and you can use its editor to place text in the graphics you create or to modify almost any hi-res screen—all features the original program lacks. Keep in mind, however, that you can modify only a small portion of a screen, because the program can't resize the original picture.

The Companion will also capture screens from your favorite games and let you create your own borders in a process similar to using the graphics editor. With patience, you can even design your own type fonts.

For fun, there's a Creature Maker included so you can assemble both friendly and ferocious beasts from a set of animal parts. Imagine building a "bunny-maid"—half rabbit, half mermaid!

The only drawback I found to The Print Shop Companion is that it's a totally separate program from Print Shop. While the initialization process does teach Print Shop to recognize the Companion's additional fonts, borders and images, you have to switch disks to access them, and you must load the Companion separately to use its features.

All in all, The Print Shop Companion upgrades an already excellent package. Print Shop owners may well want to hint at what a fine present it would make!

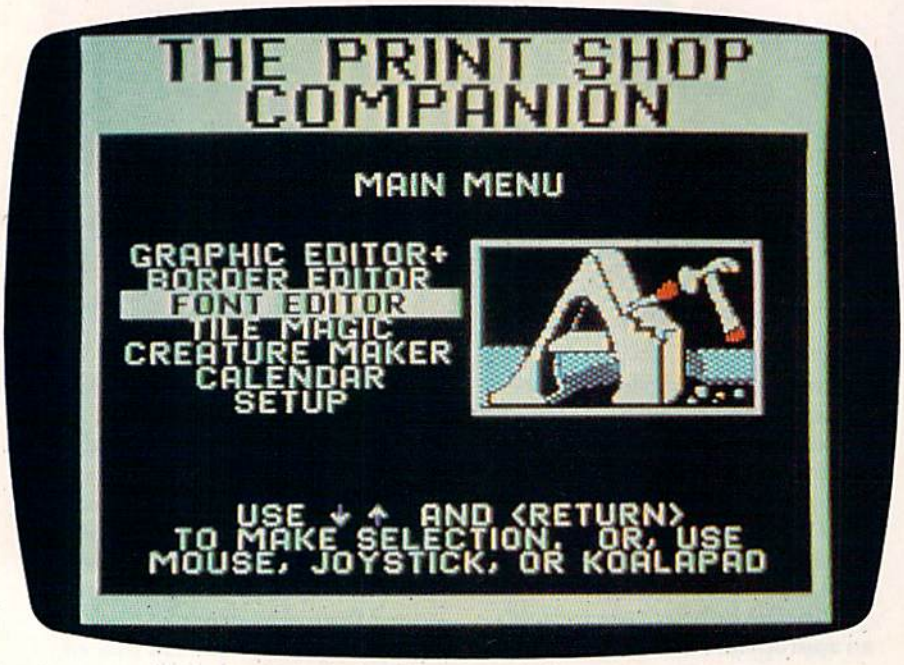
PrintMaster

PrintMaster, from Unison World, resembles Print Shop both in operation and capabilities, but it also incorporates features that you get with Print Shop Companion. For instance, PrintMaster incorporates a calendar maker—one I particularly like because it offers several formats.

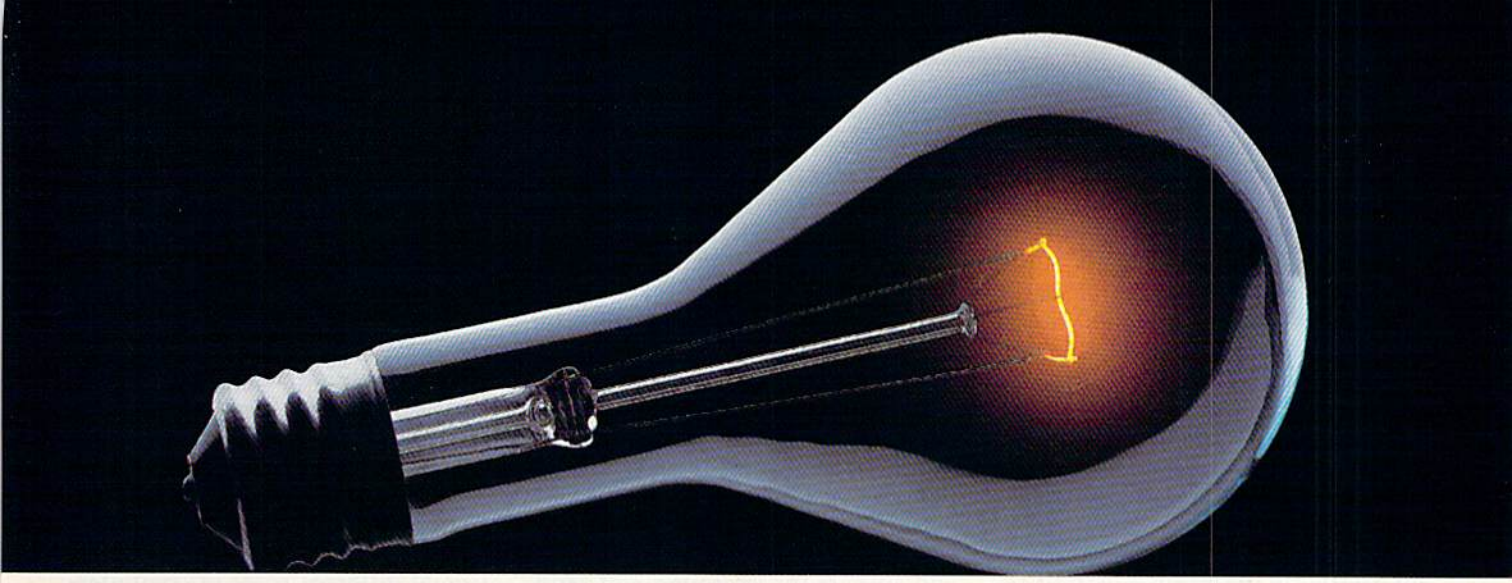
PrintMaster is so completely menu-driven that an instruction manual is more a luxury than a necessity. The program is generally a joy to work with, and Unison World puts out two graphics packages, Art Gallery I and II, each with 140 designs, to supplement those that come with the program. However, there's probably less user-created art available in the public domain for PrintMaster than there is for Print Shop.

CardWare and Friends

Hi Tech Expressions manufactures a series of software packages designed specifically for creating greeting cards, both printable and elec-



Main menu screen, from The Print Shop Companion.



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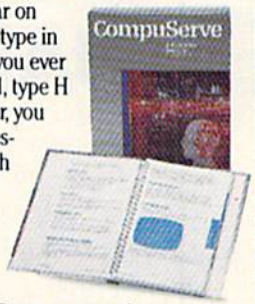
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tronic, and other things you might need for a party. The CardWare package lets you create greeting cards of any kind to print out. It has a more limited selection of graphics than Print Shop or PrintMaster, but it includes a charming electronic story/greeting card with beautiful hi-res graphics and music. The story's one problem is the abrupt end to the music in several places.

Another package in the Hi Tech series is HeartWare. It follows the same general format as CardWare, but is specifically intended for making Valentine cards.

Perhaps the most versatile and useful package in the group is PartyWare. With it, you can do just about everything needed for a top-notch party except prepare the food. You start by drawing up a guest list, then from that create invitations, banners, party hats, placemats, place cards and awards for the games. PartyWare even prints out a preparation checklist and instructions for the games!

The only problem I found with the program arises when you're using it with a 1525 printer. If you own a 1525 or the equivalent, as I do, you'll be in for a long wait while even the simplest party item prints out. For testing purposes, I entered two names on the party list and asked the program to produce a party hat for each of them. Over an hour later the two hats were still not complete! While that's largely the fault of the printer, a warning on the package would be nice.

These Hi Tech programs come with only a single sheet of instructions or none at all. However, the programs are well-designed, so the lack of documentation is not a serious problem.

Hi Tech also offers a special package of decorator paper, envelopes and stickers for wrapping and sending your creations. Known as WareWithAll, this package even includes several disks and special labels for sending electronic greetings.

Newsroom

Taking the mixture of text and graphics a bit more seriously, Springboard Software has produced the highly acclaimed Newsroom program for publishing your own newsletters and bulletins. Newsroom is both a teaching and a productivity tool.

You create a document one page at a time. There are several layouts to choose from, and you can mix text and graphics in a fashion that approaches desktop publishing. The quality of the final product falls short of typeset material, but I've used Newsroom in my own business to create very effective advertising brochures. Additional graphics packages are available for use with the program, one of them aimed specifically at business applications.

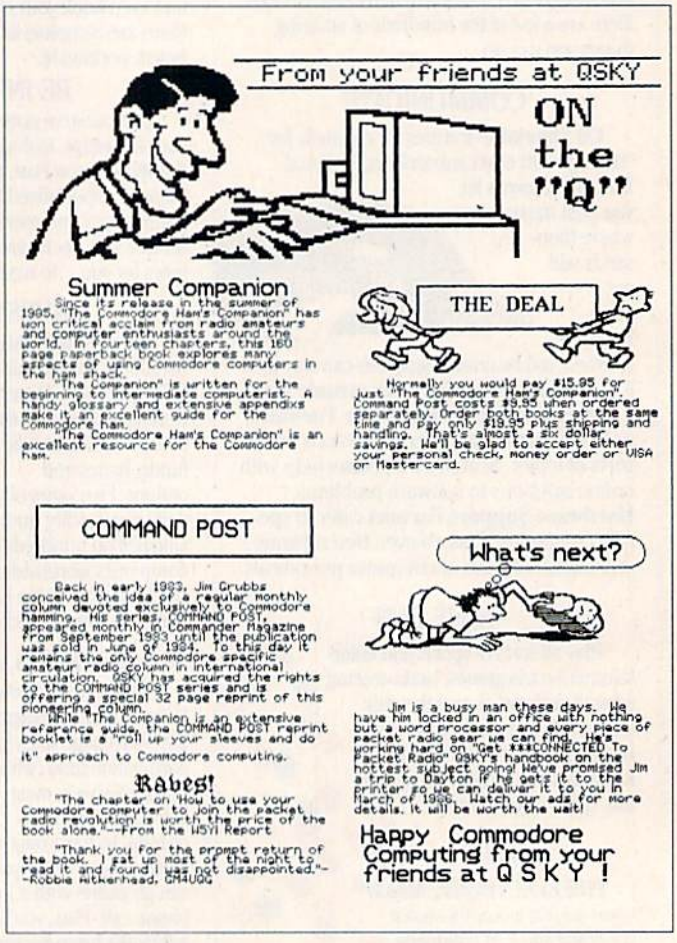
A unique feature of Newsroom is its built-in telecommunications capability. The program is available for several different types of computers, and you can exchange Newsroom files between any of them by using the communications option. This is a nice touch for schools that may want to exchange copy and graphics with one another.

Newsroom, like PrintMaster, is menu-driven to an extent that the instruction manual really isn't needed. All the directions appear in concise and logical fashion on the screen.

This package was reviewed in de-



Calendar created with PrintMaster.



Company newsletter created with Newsroom.

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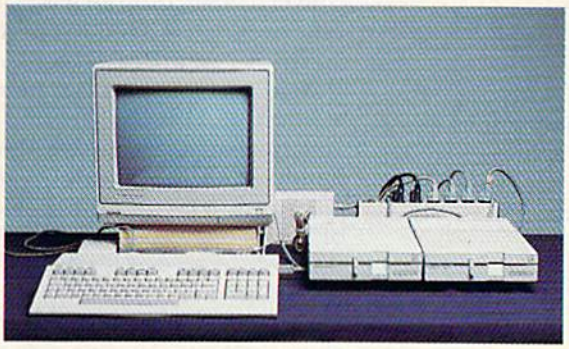
With the Command Center, your system is compact and complete.

Get your workspace back again.

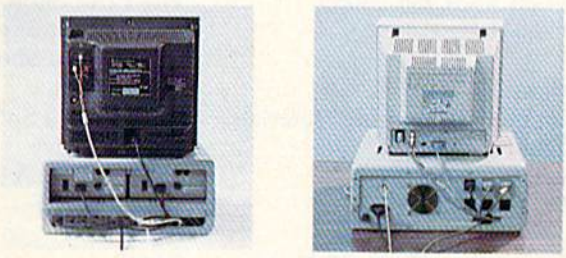
The Command Center will untangle your wires, unclutter your desk and put peripherals at your fingertips. Condensing your whole system into one compact unit, you might consider it the **ultimate** Commodore peripheral. You get Commodore value with the look of a more expensive system.

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tail in the April 1986 issue of *RUN*; refer to that review for more detailed information. I consider Newsroom one of the best serious applications programs available for the C-64 today.

Certificate Maker and Graphics Expander

At the 1986 Summer Consumer Electronics Show, Springboard premiered a new program called Certificate Maker. With this package you can design and print out customized documents for recognizing the achievements of friends, family, the members of your club, and so on. Over 200 predesigned certificates, diplomas and licenses in categories such as sports, academics, business and family come in the package. You select the document you want, a border to surround it and the font and type size for the text you'll type in. The package includes seals and stickers, and lets you create a database for automatically printing a number of documents.

Unfortunately, the Commodore version wasn't available for review as I was preparing this article. However, it certainly looked good at the show on another brand of machine, and I'd expect the Commodore version to work equally well, if not better.

Springboard also has on the market a new enhancement package, called Graphics Expander. It's designed for use with their own Newsroom program as well as Broderbund's Print Shop. Graphics Expander also was unavailable in time to review for this article.

GEOS

Programs like Print Shop and Newsroom are useful for creating cards, banners, flyers and small newsletters like those I used to make with my small hand-cranked printing press. Now, a new generation of text and graphics programs lets you create longer and more sophisticated documents, such as business reports, booklets and term papers.

GEOS is a sophisticated system of this kind. Rather than just combining clip art with short documents, it gives you a complete graphics program, geoPaint, and an easy-to-use word processor, geoWrite.

GEOS' most powerful feature is the ease with which it lets you exchange text and graphics just by cutting and pasting. You cut or copy a portion of your picture or text and save it as a temporary file, called a scrap. Then select the Paste command, and GEOS will insert your most recently saved scrap into your picture or document.

If you want to use a scrap again, you can save it in a desk accessory called a scrapbook. GEOS has two scrapbooks: one for graphics, called the Photo Manager, and a text scrapbook called the Text Manager.

You can add to your graphics right in geoPaint, either by pasting in a scrap from geoWrite, or by just typing it into the picture. The text appears in a box that you can resize or rotate sideways for charts and maps. GEOS offers you a variety of attractive fonts, including an additional 20 with Berkeley Softworks' new Font Pack 1. They come in several sizes and styles, including plain, bold, italic, underline, outline and reversed.

If you prefer to use ready-made clip art, a new desk accessory called Art Grabber can read in Newsroom, Print Shop and PrintMaster graphics and convert them into geoPaint format. This program is included in Berkeley Softworks' new Desk Pack 1.

GeoPaint graphics can be as large as an 8½ × 11-inch sheet of paper, so you can create attractive flyers and handbills. Unfortunately, geoPaint lets you work only with a small area of the screen at one time. About a third of the screen is taken up by the icons and menu bar.

You can create longer documents with geoWrite. Version 2.0, soon to be released, includes many powerful word processing features, such as search and replace, headers and footers and mail merge.

To add a graphics image to geoWrite, you first use geoPaint to select a graphic, and cut or copy it into a graphic scrap file. Then you load geoWrite and paste in the scrap. The graphic will be centered between the margins. Unfortunately, you cannot move it horizontally or type text

Table 1. *Software manufacturers' addresses.*

CardWare, HeartWare, PartyWare, WareWithAll
HiTech Expressions
2699 South Bayshore Drive, Suite 1000A
Coconut Grove, FL 80204
1-800-848-9273

The Complete Computer Fireworks Celebration Kit
Activision, Inc.
PO Box 4286
Mountain View, CA 94039
415-960-0410

Create with Garfield
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Allen, TX 75002
214-248-6300

Newsroom, Certificate Maker, Graphics Expander
Springboard Software, Inc.
7808 Creekridge Circle
Minneapolis, MN 55435
612-944-3915

Picasso's Revenge
Progressive Peripherals & Software
464 Kalamath St.
Denver, CO 80204
303-825-4144

PrintMaster, Art Gallery I and II
Unison World, Inc.
2150 Shattuck Ave., Suite 902
Berkeley, CA 94704
415-848-6666

The Print Shop, The Print Shop Companion, The Print Shop Graphic Libraries
Broderbund Software
17 Paul Drive
San Rafael, CA 94903
415-479-1700

GEOS
Berkeley Softworks
2150 Shattuck Ave.
Berkeley, CA 94704
415-644-0883

Graphic Integrator 2
Inkwell Systems
PO Box 85152, MB 290
7677 Ronson Road
San Diego, CA 92138
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along the side, but you *can* create a geoPaint picture with text and graphics and paste it into geoWrite.

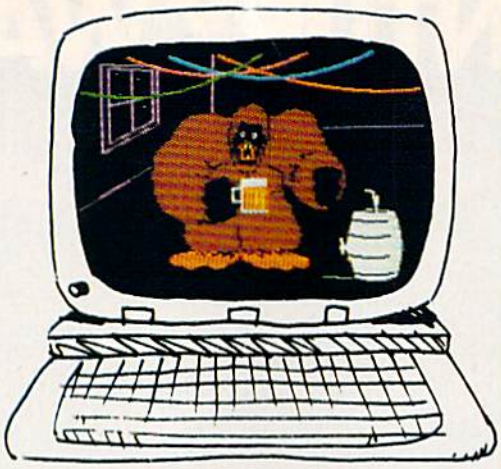
GEOS isn't just for adding graphics to text. Cutting and pasting let you transfer data between any of the GEOS applications. You can insert spreadsheet figures into a geoWrite document or add pictures to a database report. So, not only will GEOS let you add nice pictures to your annual report, but it will also let you add nice profit figures.

Graphic Integrator 2

Suppose you don't want to give up your favorite word processor or graphics program in order to integrate text and graphics as you can with Newsroom or GEOS. With Inkwell Systems' new Graphic Integrator 2, you won't have to.

Graphic Integrator 2 converts pictures from one format to another. With it, you can convert Koala graphics to Doodle!, Flexidraw pictures to GEOS, and so on. The program also converts Print Shop, PrintMaster, Super Sketch, Computereyes, Animation Station, CADPAK 64, Blazing Paddles, Newsroom and Billboard Maker artwork.

More importantly, Graphic Integrator 2 can convert all of these graphics into an external file format usable by many word processors. Programs such as PaperClip and Pocket Writer have a command that sends a file directly to the printer. You won't see the graphics on the screen, but the Graphic Integrator 2 format will print out your black and white graphics image exactly as you drew it.



Hallmark's Color Mail.

You can insert an entire page of graphics or crop a section of it. When you decide on a part of a picture, Graphic Integrator 2 tells you how many text lines it uses, so you can set page breaks on your word processor.

Something Different

The programs I've mentioned so far mainly combine text and graphics for output to a printer. Now I'll describe some programs that let you exchange personal creations with other users electronically. This is where the future lies!

Color Mail

From Hallmark, the folks responsible for much of the traditional greeting card market, comes Color Mail. With this package and a subscription to CompuServe's Information Network, you can enjoy exchanging full-color, partially animated greetings with friends who also have the program.

Color Mail's creations combine text and graphics on the screen, and even add sound if you wish! You select pictures and sounds by paging through the available items and collecting them in a "shopping cart." The number of individual elements you include in a greeting depends on their complexity.

When you finish your design, it's stored to disk, and then you can send it via the U.S. Mail in the traditional way to someone else who has Color Mail, or—more fun—through the electronic mail feature on CompuServe. CompuServe even has a special SIG where Color Mail users can display their work for other folks to see, and you can purchase additional graphics on-line. Hallmark even

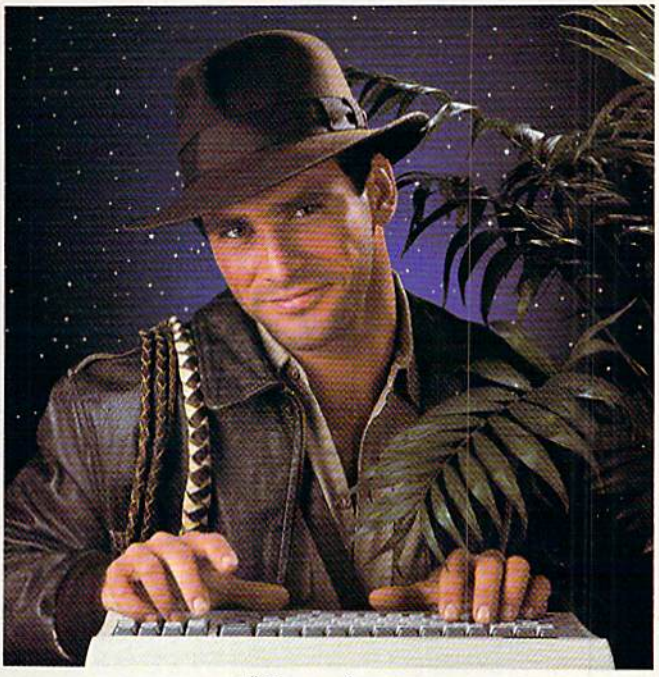
Product	Price	Additional Graphics Available	Uses Files From Other Programs	Number of Text Fonts	Special Features
Cardware	9.95	No	No	1	Includes preprogrammed electronic greeting
Color Mail	30.00 + 50.00 Pal Pak	Yes	No	2	Sends electronic greetings via CompuServe; comes with Vidtex software
Computer Fireworks	34.95	No	Yes	1	Creates electronic greetings
Create with Garfield	29.95	No	Yes	1	Creates cartoon strips
Newsroom	49.95	Yes	No	5	Prints newsletters and brochures
Picasso's Revenge	59.99	No	No	1	Drawing program, using light pen
PrintMaster	34.95	Yes	No	8	Creates banners, cards, stationery signs and calendars
Print Shop	44.95	Yes	No	8	Creates cards, signs, stationery and banners
Print Shop Companion	34.95	Yes	Yes	12	Adds borders, fonts; includes enhanced graphics editor and calendar maker

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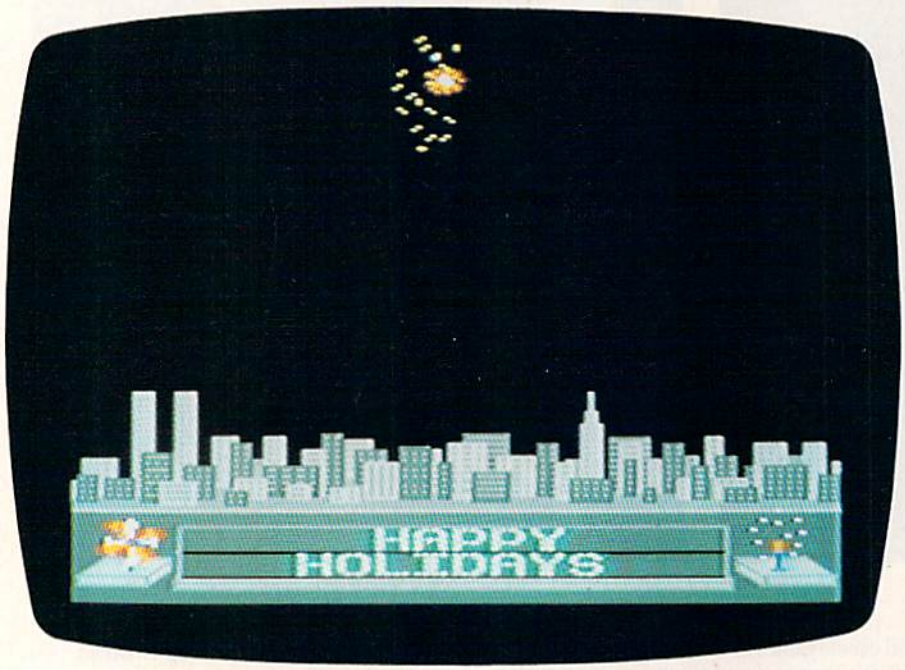
This program is fun. Just be careful with your connect time—it can add up quickly!

For a more comprehensive review of Color Mail, refer to the November 1986 issue of *RUN*.

The Complete Computer Fireworks Celebration Kit

From time to time, a piece of software really captures my imagination, and this package from Activision is one of them. The people responsible for the Fourth of July celebration in New York Harbor last summer would turn green with envy if they saw what Activision's Complete Computer Fireworks Celebration Kit can do!

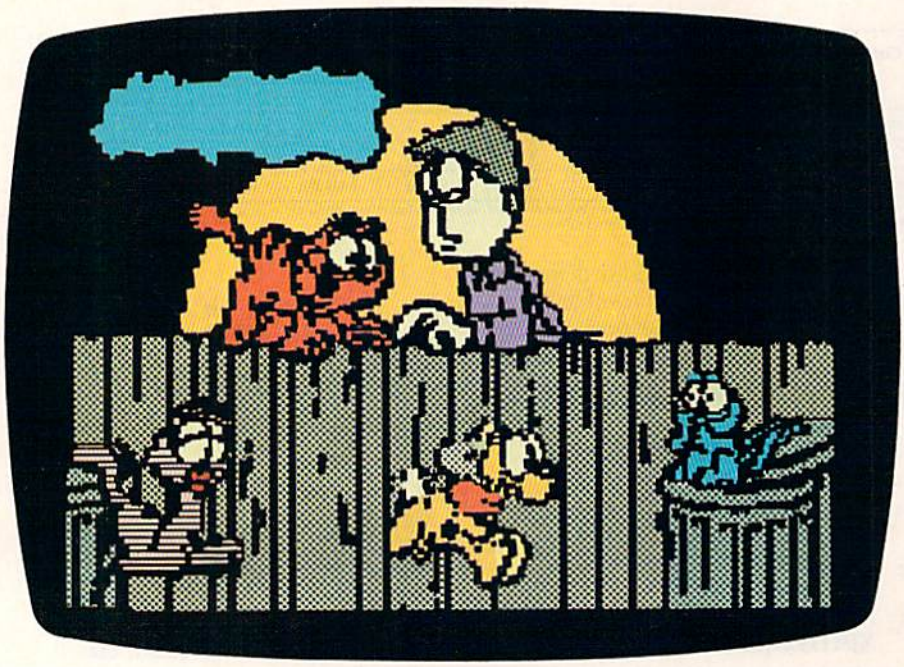
This program lets you create a one-of-a-kind, on-screen fireworks greeting, complete with music and text, to send to a special person. It functions somewhat like a word processor or a music-editing program. You have a multitude of aerial fireworks displays, several background scenes and 20 tunes to choose from, and one show can include up to four tunes and 254 frames—quite a display! The position, the colors, the length of the trail, the height and the fuse lengths of the fireworks are also under your control. The text part of the display is either stationary or scrolls horizontally.



Screen shot from The Complete Computer Fireworks Celebration.

The Complete Fireworks Celebration Kit includes a handful of preprogrammed shows that you can customize to suit your needs, if you don't want to build one from scratch. The quality of the accompanying music is excellent, and you can add other tunes with Activision's Music Studio. It's possible to print out a listing of all the display directions, which is handy when you're editing a lengthy production, and the package even comes with a disk and a mailer.

When you run a Fireworks Kit display, try turning off the lights and focusing your attention on the screen. It may be a bit small, but with a little imagination, you'll think you're at a super-fantastic fireworks show created just for you!



DLM's Create With Garfield.

Create with Garfield

If you've ever wanted to be a cartoonist, now's your chance. Create with Garfield, from Developmental Learning Materials, lets you "draw" your own comics featuring this famous "fat cat" and his friends. You choose a background, characters, props and a "balloon" for the all-important punch line from the assortment the package provides, then insert your own punch line in the balloon. As you're assembling the picture, you "carry" items around the screen with the cursor controls, then drop them into place. If you want to devise your own background for Garfield and his friends, you can even create one on a KoalaPad and transfer it in.

The cartoons can be printed out in black and white or saved on disk to use later, either individually, in small groups as a comic strip or in longer sequences as a cartoon show. The program also offers poster and label options.

The 30-page manual adequately explains how to draw the cartoons. However, one difficulty I occasionally noticed in using the program was a slow computer response when I was typing in a punch line. While this is

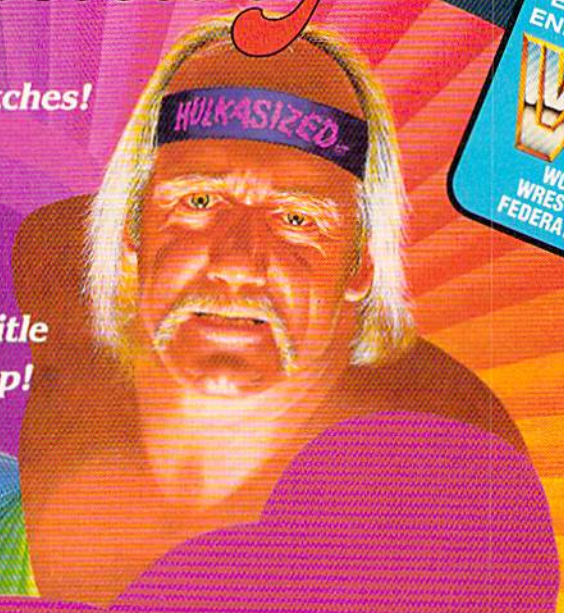
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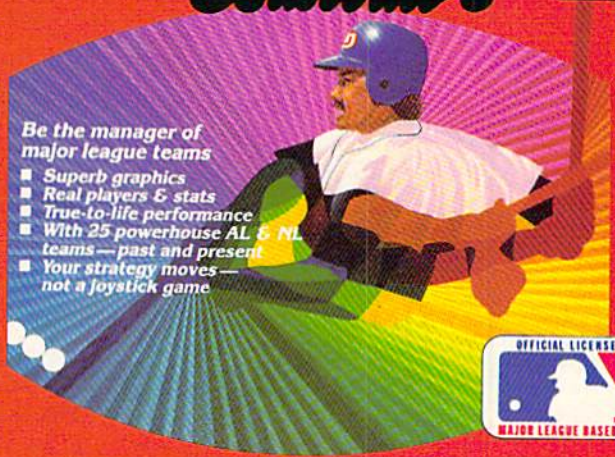
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AVAILABLE IN DECEMBER! Font Master II for the C-128



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A powerful word processing system for the Commodore 64.

Includes: On screen status/help display • 30 Fonts ready to use
Font editor/creator included • BACK-UP DISK INCLUDED

From the author of *FONTMASTER* comes ***FONTMASTER II***. A vastly improved version of the AWARD-WINNING* program *FONTMASTER*. This powerful word processor, with its many different print styles (fonts), turns your dot matrix printer into a more powerful tool. Term papers, newsletters, and foreign languages are just a few of its many applications. Here are some of its capabilities:

Word Processing Features
- Over 65 powerful commands make text editing a breeze
- Headers / footers
- Page numbering in decimal or Roman
- On-screen underlining
- On-screen status display, including pictures of font and special effects selected
- 80-column video preview
- On-screen foreign language capability (creator included)
- Form-letter / data merging
- Reads and writes either PRG or SEQ text files
- Help screens
- Right-to-left editing features for foreign languages (Hebrew, Arabic, etc.)

Word Processing Printing Features
- 47 two-letter format controls (embedded in text files)
- Fractional-character spacing used on word-wrap, justification, centering, and right alignment
- Proportional spacing (user-adjustable)
- Columnar printing (up to 4 columns)
- Overlaying of 2 or more characters (for phonetic markings, diacritics, etc.)
- 27 single-keystroke text modifiers (embedded in text files) Combine any or all of the following effects: underlining (adjustable) — more than 20 pitches — more than 50 line spacing sizes — condensed text — expanded text — boldfacing — inversion (white letters on black) — Superscripts (adjustable) — Subscripts (adjustable) — 3 text heights (micro-normal-tall)

Setup Module
- Two system setups can be made. In each the user can select his preference of colors (screen, text, border), printer interface (18 choices), and printer (over 50 choices)

Font & Character Set Creators
- Disk commands for maintenance of fonts or sets
- Grid for character creation / editing (manipulated with cursor keys, joystick, or light pen)
- Editing commands include: invert, flip, negate, shift, clear, copy
- Grid dump to printer
- Character can be printed while editing (font creator only)

* Outstanding original programming 1985 International Summer Consumer Electronics Show

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Block	Hairpin	**News**	**Split**
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CELTIC	*Italic*	ЧЫДёЮЖЗ	**Tech**
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not likely to be a problem for a child just learning how to type, it could be frustrating for someone skilled at keyboard entry.

Create with Garfield is a lot of fun. No doubt it will be just the first in a series of favorite characters appearing in do-it-yourself cartoon programs.

Picasso's Revenge

One of the newer graphics programs on the market is Picasso's Revenge. A product of Progressive Peripherals & Software, it's much like the earlier Koala and Doodle! packages, but with an important difference—you use a light pen.

The light pen, which works well, comes in the package. Pointing it at the screen to make selections gives you an unusual feeling at first, but becomes natural after a while. I particularly liked the light pen for freehand drawing. Signing my pictures no longer takes forever! The text option in Picasso's Revenge is limited but effective.

I did find a couple of problems with the program. It's irritating that the light pen disables several of the keyboard characters, and the program uses an awkward way of restoring them for use in typing text. It's also unfortunate that Doodle!, Flexidraw and Print Shop pictures can't be used with Picasso's Revenge. This is the result of Progressive's programming choice to use multicolor bit-map pictures for increased color variety, while the other packages use hi-res bit-map pictures.

These problems aside, if you've been frustrated by the limitations of earlier drawing programs and think you'd like to try a light pen, give Picasso's Revenge a try.

More To Come

In many ways, programmers are just beginning to realize the potential of the C-64 computer, and I expect the number and quality of integrated text and graphics programs will continue to increase. Imagine a Print Shop-type of program running under the GEOS operating system! Surely it will come. ■

Jim Grubbs, PO Box 3042, Springfield, IL 62708 is a writer, publisher and lecturer. His books include The Commodore Ham's Companion, Command Post *and* Get***CONNECTED to Packet Radio.

Introducing ActionSoft!

Colonel Jack Declares War to Improve Strategy/Action Software

Colonel Jack Rosenow, President of ActionSoft Corporation, is out to turn the simulation software industry upside down:

"Most current simulations are little more than games," says the Colonel. "They're a far cry from what can be done with modern state-of-the-art graphics technology. They have limited strategic depth and a limited sense of realism. That's why ActionSoft Corporation was created. We're going to redefine the state of the art in simulation software.

"My own area of expertise is military helicopters - their flight characteristics, and their deployment on the battlefield. We've assembled a collection of experts in other fields (combat strategists, fighter pilots, submarine commanders) to help us develop the most realistic strategy/action simulations ever seen.

"ActionSoft puts you at the center of the action. We take you from the depths of the Pacific ocean to the infinite frontiers of space. And with the incredible 3D graphics/animation technology provided by SubLOGIC, our products draw you into the simulation like never before. Up to now this type of realism has been available only on the most expensive military simulators. We're making it available to everyone.

"Our first product is Up Periscope!, a WWII fleet class submarine simulator for Commodore 64/128 and Apple II computers. Up Periscope! is available for the suggested retail price of $29.95.

"Next up is ThunderChopper, a high-performance scout/rescue/attack helicopter simulator. ThunderChopper is also available for the C64/128 and Apple II computers for $29.95."

Colonel Jack Declares War on Inflated Software Prices

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Colonel Jack Rosenow, USAF (Ret)



Captain John Patten's years of US Navy experience provide the realism and submarine combat strategy of Up Periscope!



Colonel Jack's 9000-plus hours of flight time are put to good use in the development of Thunder-Chopper!

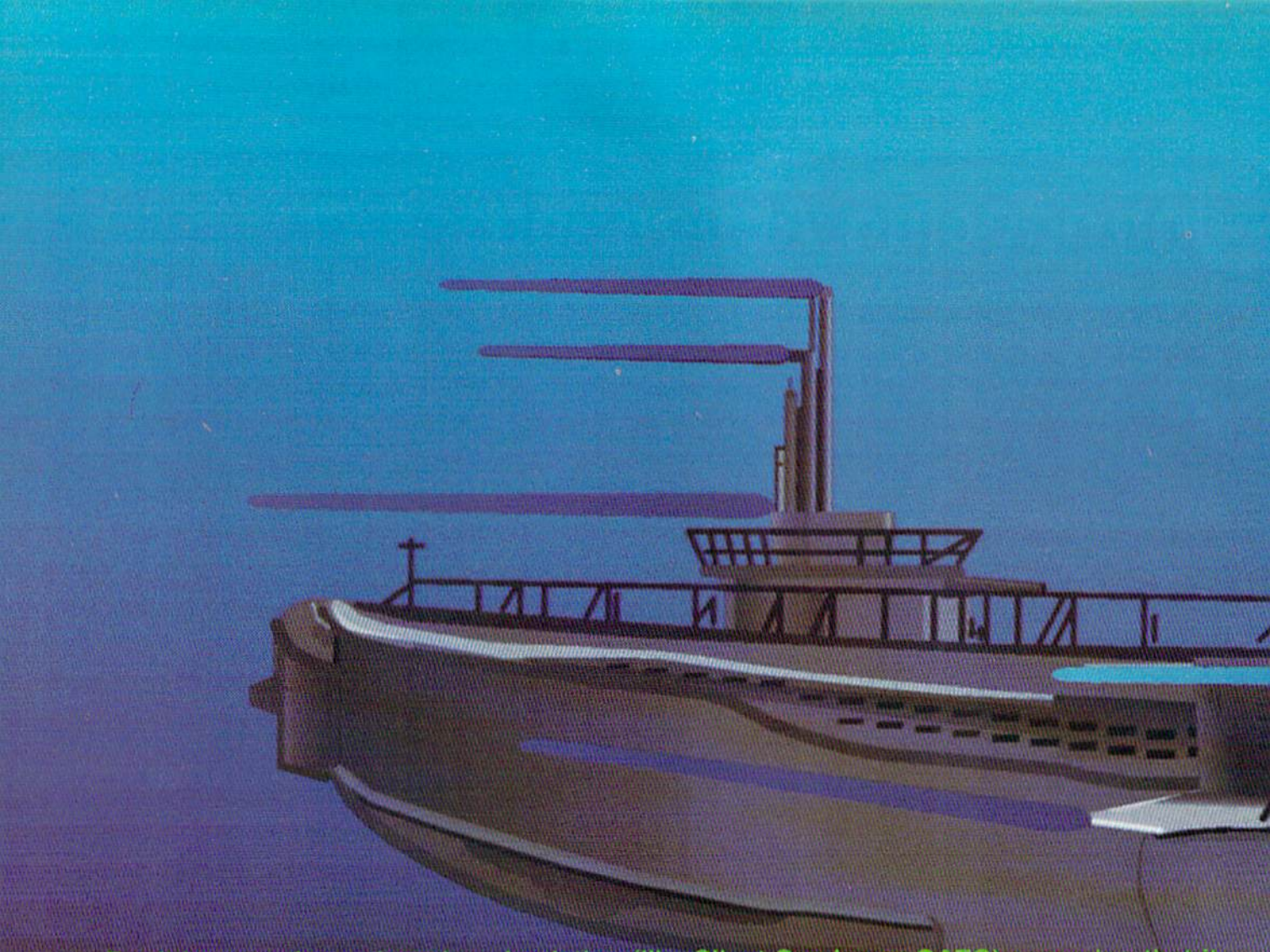
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Don't buy another submarine simulation (like Silent Service or GATO) assuming that it comes close to Up Periscope! We think you'll find that the superior strategic play action and 3D animated graphics of this simulation put it generations ahead of the pack!

Strategy

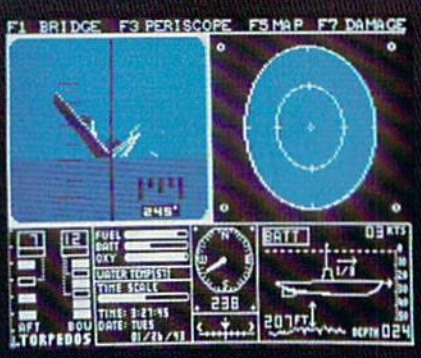
You command a WWII fleet class submarine. Patrol the Atlantic and Pacific theatres of war. Take your orders from COMSUBPAC (Commander Submarine Force Pacific), or go hunting on your own.

Captain John Patten's years of US Navy service provide the submarine combat strategy missing from other sub simulations. Successful enemy engagements are conducted in four separate phases:

1. Contact (Determine direction of target motion)
2. Approach (Close to within effective weapons range)
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Relive eight different historical situations and compare your strategies with those of real submarine commanders. When you master the daytime periscope-depth attack, move on to the dangerous and skill-demanding night surface patrol.

Up Periscope! includes extensive realistic equipment; surface and attack radars, variable-power periscope, torpedo data computer, and much more. Armament supplies include everything from a selection of old reliable Mark 10s to advanced wakeless (but unproven) Mark 18 torpedoes that can be fired from both fore and aft torpedo tubes.



Graphics and Animation

Allied and enemy ships are depicted in truly unprecedented 3D detail, courtesy of SubLOGIC graphics and animation technology. Potential targets include enemy freighters, tankers, troop ships, destroyers, and battleships, plus various friendly forces. A complete instrument panel and split-screen views let you scan all vital information at a glance during the heat of battle.

All major land masses and islands (and even a few minor ones) are properly located. Use detailed Pacific and Atlantic charts to plot your course and navigate right to the action. But be careful not to get rammed or depth-charged by enemy ships. And try to avoid the embarrassment of sinking one of your own Allied ships or running aground on an uncharted Pacific atoll.

For true submarine action and realism, nothing else compares with Up Periscope!

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Up Periscope!

Simulation animation and 3D graphic technologies licensed from SubLOGIC





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Or write or call us for more information. Up Periscope! is available on disk for the Commodore 64/128 and Apple II computers for a suggested retail price of $29.95. For direct orders please specify which computer version you want. Include $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.



Captain John Patten, USN (Ret)

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Strategy

Climb into the pilot's seat of a high-performance scout/rescue/light-attack helicopter! This chopper for the 1990s and beyond, based on the Hughes 530MG Defender, provides the enhanced power and controllability not found in today's helicopters – or helicopter simulations. And with over 9000 flight hours to his credit, Colonel Jack Rosenow has the experience to provide all the helicopter action and strategy you've been looking for.



ThunderChopper's combination of power plus control lets you land on helipads or rooftops with ease. Gain enough experience and you'll be ready to test your skills in a variety of realistic rescue or combat scenarios. Or relive pre-programmed historical situations to see how your strategies and abilities compare to those of real chopper pilots. In attack mode, you can skim right above the treetops in 'nape-of-the-earth' flight and make full use of your chopper's advanced flight controls and avionics.

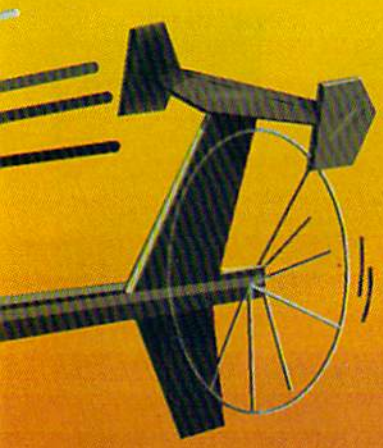
Graphics and Animation

High-speed 3D graphics, courtesy of SubLOGIC, offer superb out-the-windshield views in both day and night flight modes. A complete instrument panel and split-screen view allows you to scan all vital information at a glance while performing combat and rescue operations.

ThunderChopper carries all the standard flight instruments as well as advanced instrumentation (Forward-Looking Infra Red, CO_2 laser radar, zoom television, and ECM) patterned after the equipment now being tested in the US Army's LHX 'helicopter-of-the-future' program. Armament includes TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets – ThunderChopper's 750hp jet turbine and precise controls provide the power and maneuverability to use them all effectively.

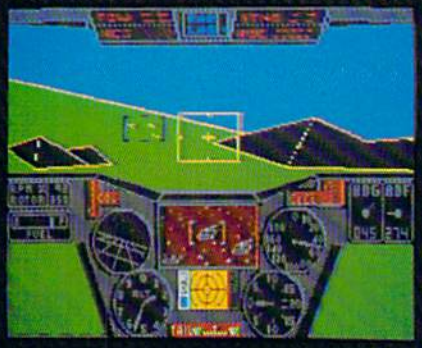
From simple landing practice to the most complicated exploration, rescue, or combat mission, ThunderChopper is the ultimate in helicopter action and realism. No other helicopter simulation even comes close.

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ThunderChopper

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Colonel Jack Rosenow, USAF (Ret)

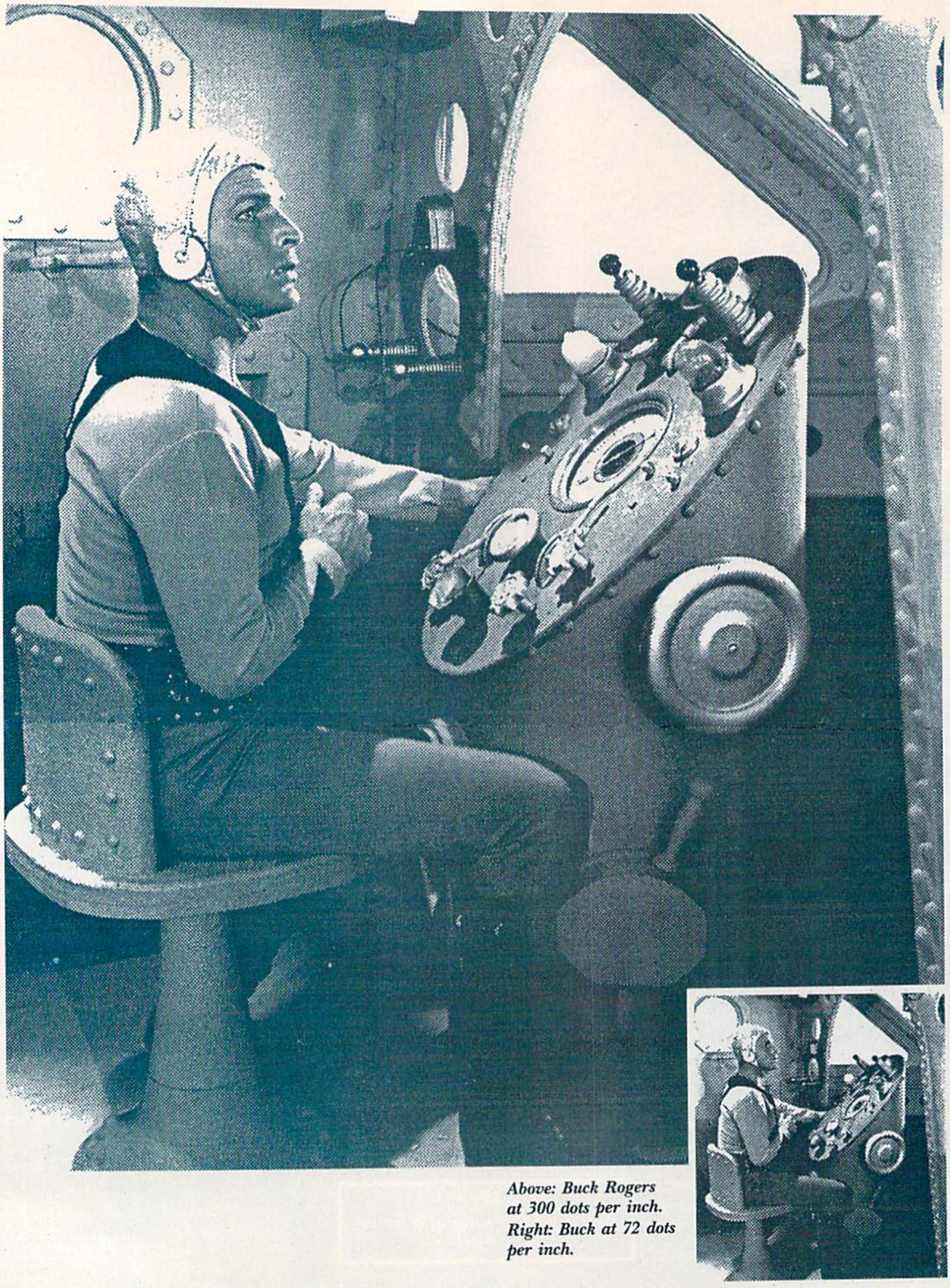
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Above: Buck Rogers at 300 dots per inch. Right: Buck at 72 dots per inch.

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SPOTLIGHT ON LASER PRINTERS

If you need high-volume, professional-quality text and graphics printing, this new technology may be for you.

By MATTHEW STERN

The laser printer is revolutionizing printing. It has turned the computer into an office printing press and opened the whole new field of "desktop publishing."

With your Commodore and a laser printer, you can join this printing revolution. Instead of sending your newsletters, resumes or advertisements to a typesetter, you can use a laser printer to get almost the same typeset quality at your own desktop—and save money in the bargain. You can also make corrections right on your computer and print them out immediately, instead of waiting days for your corrected document to return from the typesetter.

The fine laser beam gives the printer its excellent resolution: 300 dots per inch, compared to just 72 dots per inch for single-density print on your dot matrix printer. This resolution produces clean, readable copy.

Text can be printed in a variety of type styles, or fonts. Some look typewritten, while others are almost indistinguishable from typeset print. All laser printers have resident, or built-in, fonts that you can select by entering printer codes or pressing buttons on the control panel. You can also add more fonts by programming them from the computer or inserting font cartridges.

Laser printers will also produce excellent graphics. With 300-dot-per-inch resolution, you have the potential to print out finely detailed art or digitized pictures. However, most available graphics programs, like Doodle! or Print Shop, print out on a laser printer exactly as they would on a dot matrix machine. Your pictures will still have "staircase" edges, but they'll be darker and much easier to reproduce on a copier.

Speed is another asset. Laser printers can zip out 400 characters per second, four times more than the average dot matrix printer and thirty times more than the average daisy-wheel. If your office churns out a high volume of business correspondence, a laser printer will greatly enhance your productivity.

How Lasers Print

While laser printers use Buck Rogers technology, they are based on the same principles as the traditional offset press. A laser beam is directed at a mirror, which deflects it toward a positively charged, rotating drum. The beam creates negatively charged dots on the drum, with groups of the dots delineating character and graphics images. At this point, the images are reversed. A whole page is set up at once in this way.

Then a positively charged black toner powder, the same substance that's used in some copying machines, is applied to the negative spots and adheres because of the opposite charges. When the drum is rolled

against the paper, the toner is transferred, creating black, nonreversed images on the paper. Then the paper is heated, melting the toner so it sticks permanently. Finally, an electrified bar restores the drum's charge, so it's ready to print the next sheet of paper.

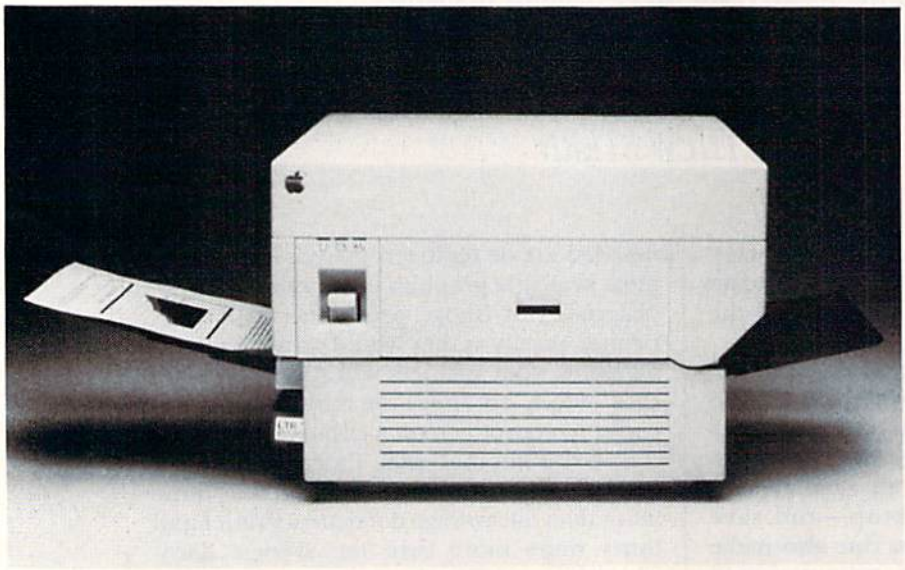
The printing process requires a computer in itself. Most printers have as their brain a Motorola 68000 processor, the same super-fast chip that runs the Macintosh, Amiga and Atari ST. Like computers, laser printers can be programmed.

Instead of the 2K buffer you get with most dot matrix printers, laser printers usually have 256 kilobytes of memory, but some have as much as 1½ megabytes. Laser printers need the additional memory because they print an entire page at a time, rather than only a line. Graphics printing requires even more memory.

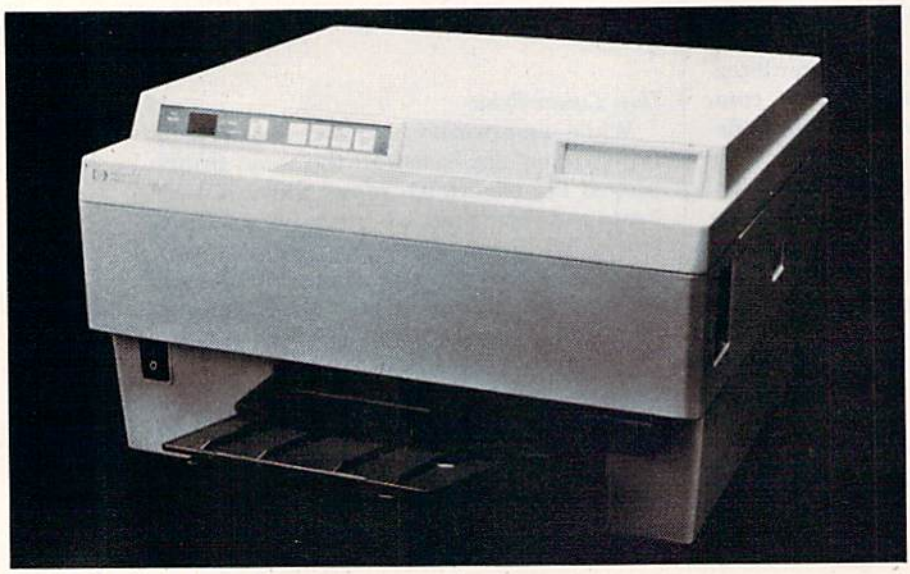
Choosing a Laser Printer

As with any other type of printer, there's a variety of laser printers with different capabilities, features and prices. It's a matter of shopping around for the one that suits your needs.

However, shopping for a laser printer for your Commodore may not be an easy task. I've noticed that some salesmen refuse to believe a laser printer will work on a Commodore at all. In some cases, they're right. Some printers use special interface configurations that won't work with a Commodore. The Cordata printer requires a special bus card that's only available for IBMs. However, there are three laser printers that will work with both the C-64 and C-128.



The QMS KISS laser printer.



The Hewlett-Packard LaserJet.

QMS KISS

At $1995, this is the lowest-priced laser printer on the market—and one of the most versatile. Since it can emulate the popular Epson FX-80 printer and, like the Cardco Cardprint G+, hooks up to your computer with a parallel interface, the KISS is also the easiest one to use with a Commodore.

The KISS will print text in your choice of 12 fonts. Like a dot matrix Epson printer, it supports pica, elite, compressed, bold and italic type. You can also choose to print text down the page (call portrait layout) or across (called landscape). The latter lets you print envelopes or wide spreadsheets.

It isn't hard to set up programs to work with KISS. If your word processor, database or spreadsheet is Epson-compatible, it will work with KISS. With a word processor like Batteries Included's PaperClip, just select the Epson driver and use existing commands for text styles and sizes.

To select a special feature, like a large font or landscape printing, either press the buttons on the printer's control panel or include the print code in your document where you want the style change to begin. KISS lets you mix fonts and print styles on a page, or even in a single line.

The fonts provide characters you normally can't get with a Commodore printer. For example, the Courier 10 font (which comes standard) includes a complete set of Greek characters and math symbols. To print them, just include the corresponding ASCII codes in your document.

When you set your interface to Commodore emulation, KISS works like a VIC-1525 printer. It prints regular text with typeset quality and graphics images of the Commodore graphics characters and reversed text. Therefore, you can use KISS for program listings or for applications that only have Commodore printer drivers.

KISS can also print out Epson graphics. Single-density graphics (like Doodle!'s) print without distortion, since the resolution divides evenly into the laser printer's 300-by-300-dot print grid. Double- or quadruple-density graphics, like those from The Print Shop or GEOS, will distort, since they don't divide evenly. To compensate, KISS reduces the picture to fit. This

effect is pronounced in earlier versions of the printer: a geoWrite document may be squeezed into half its normal size. However, QMS is enhancing the printer software to produce more accurate representations of Epson graphics.

The standard KISS model can produce a full page of single-density graphics or a half page of double-, triple- or quadruple-density graphics. If you plan to print full-page, high-resolution pictures, or need more fonts, you can get the enhanced Big KISS printer.

Big KISS comes with more memory than the standard model, so it can print a full page of graphics regardless of the print density. It gives you more memory to download fonts; or you can plug in optional font cartridges. At $2995, Big KISS costs $1000 more than the standard model, but its features and additional capabilities are worth it.

Hewlett-Packard LaserJet And LaserJet Plus

The LaserJet is one of the most popular and lowest priced laser printers on the IBM market. Its variety of printing features and proportionately spaced fonts makes your documents look as though they were truly typeset, instead of typed.

The LaserJet comes in two models. The standard model retails for $2995; the LaserJet Plus sells for $3995 and has additional memory for fonts and full-page graphics. LaserJet has a serial port only, so you'll need an RS-232 connector, like the Omnitronix Deluxe RS-232 interface or a Viza RS-232 cable. The LaserJet Plus has both parallel and serial connectors. Because it has a parallel port, you can use a standard Commodore parallel interface, like the Cardco G+.

The LaserJet doesn't use a popular printer emulation like the KISS, so it won't be immediately compatible with most Commodore programs. However, there are some products that can take advantage of the LaserJet's special features.

Solid State Software's VizaWrite Classic is a "what you see is what you get" word processor for the C-128. It lets you create, edit and print in multiple columns, so it is perfect for newsletters. VizaWrite also contains a special HP LaserJet profile that takes advantage of the printer's special features, including fonts. *Info*, a Com-

Figure 1. *Sample text printed with VisaWrite and the Hewlett-Packard LaserJet.*

```
The £ Pound Sign

VizaWrite prints the English Pound Sign £ on Commodore dot matrix
printers as character code 92. On all other printers, the £ sign is
printed as character code 35. This is the same code as the # hash
sign. If your printer does not print a pound sign in this position
you can specify the character code (or codes) in a printer profile.
This is an additional entry, at the end of all other entries. See the
end of the sample profile supplied on the VizaWrite system disk.

Removing a Format Line That Sets Up Columns

The EDIT DELETE command will not delete a format line that contains
the column format symbols (CONTROL N). So, first delete the column
format symbols using the DEL key, and then EDIT DELETE the format
line.

COPY, MOVE and DELETE on columns

These three major operations can highlight text in the current
column. The highlighted text can then be copied or moved ANYWHERE in
the document.  It is not possible to simultaneously highlight text in
adjacent columns. So you can copy or move one column at a time, but
not more than one, and you can copy text from one column and place it
in another column.
```

Figure 2. *Sample text and graphics printed with the QMS KISS laser printer.*

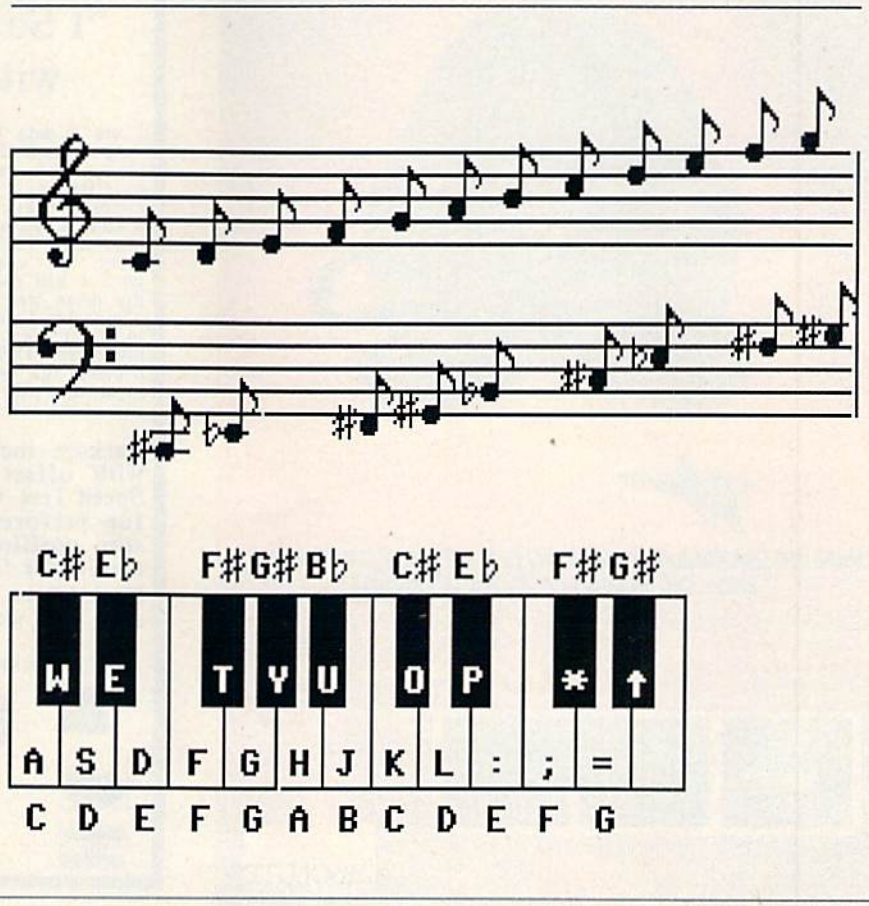


Table 1. *A list of manufacturers whose products are mentioned in this article.*

Kiss printer
QMS
PO Box 81250
Mobile, AL 36689.

LaserJet printer
Hewlett-Packard Company
11820 Embarcadero Road
Palo Alto, Ca 94303.

LaserWriter printer
Apple Computer, Inc.
20525 Mariana Ave.
Cupertino, CA 95014.

VisaWrite software
Solid State Software
1125 E. Hillsdale Drive, Suite 104
Foster City, CA 94404.

Cardco interfaces
Supra Corporation
1133 Commercial Way
Albany, OR 97321.

GEOS
Berkeley Softworks
2150 Shattuck Ave.
Berkeley, CA 94704

modore magazine, is printed with VizaWrite and an HP LaserJet.

Apple LaserWriter

The Apple LaserWriter, a $5000 machine, helped popularize desktop publishing. It uses a text-formatting language called PostScript, also used by advanced typesetting machines. PostScript commands let you change fonts, wrap words around graphics and even embed text within pictures.

Commodore users can also take advantage of those features when they use the LaserWriter. PostScript commands can be programmed in Basic or machine language, or typed into a word processing document.

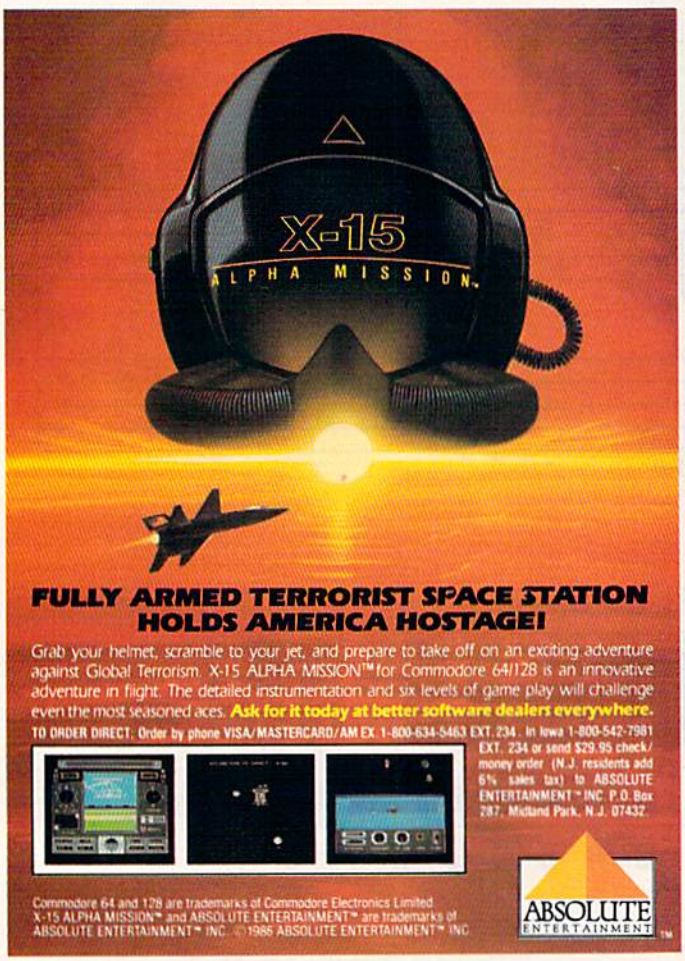
Some software companies have already started to write PostScript-compatible Commodore applications. Berkeley Softworks is developing an Apple LaserWriter driver for GEOS. It uses the LaserWriter's four resident fonts and displays them on the screen. A new version of geoWrite that's in the works will produce headers and footers, center and right-justify text and provide cursor key and keyboard shortcuts. The new driver will print geoPaint graphics along with the typeset-quality text.

Costs of Laser Printing

The laser printing technology comes with a hefty price tag. The least expensive laser printers start at $2000, with some as high as $6000. Furthermore, be prepared to spend extra for supplies and service. Toner cartridges cost between $70 and $90 each.

This may seem a lot to spend on a printer for a $250 computer. If all you print are Christmas card lists, term papers and an occasional letter to Aunt Tiffany, you're better off with your dot matrix printer. However, if you produce newsletters, books or technical manuals, design advertising or turn out a high volume of business letters, a Commodore and a laser printer could be a cost-effective alternative to a more expensive desktop publishing system, to say nothing of conventional printing. ■

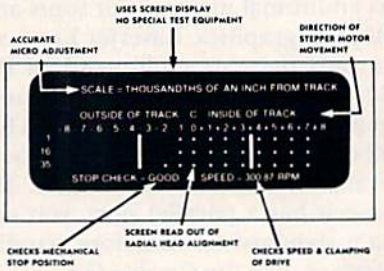
Matthew Stern, 6434 Amigo Ave., Reseda, CA 91335, spends his time writing articles and software manuals. He has had experience with practically every computer commercially available.



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Circle 146 on Reader Service card.

EXTRA! NEWSLETTER GRAPHICS

Now you can illustrate your newsletters with this publishing program update.

By DAVID A. HOOK

The concept of a disk-based magazine was realized by *RUN* with an article entitled "Extra! Extra! Read All About It" in the July 1986 issue. The article presented three programs, Mag Production, Mag Reader and Mag Printer, that create a software newsletter, display it on your screen and even print it out.

The July version (6.4) of Mag Reader lets you include one graphics display, in either Doodle! or Koala format, as the cover of the newsletter. Now, with the update to Mag Reader in this article, you can include several pictures, in Doodle! or Koala format, or both. The pictures appear as separate displays between the text screens.

Perhaps you'd like to give each article its own cover picture or enhance a tutorial article with illustrations. You could also include a "gallery" of graphics displays, and your organization could sell advertising, in the form of Koala or Doodle! screens, as a source of revenue.

Mag Reader 7.0 lets you include pictures anywhere you want in your newsletter. It's totally compatible with Mag reader 6.4, and all you have to do to upgrade is add a few lines to the 6.4 program listing.

Update Design

I wrote Mag Reader 7.0 to accommodate a maximum of ten extra pictures, beyond the cover. I took into account the C-64's memory capacity, as well as the storage requirements for the various kinds of files involved. The relative file storing text for a newsletter will vary in size, depending on the number of pages, but a typical issue,



with one cover picture, should occupy about half a disk. That leaves the other half for the extra graphics, and Doodle! and Koala pictures fill 37 and 40 blocks of disk space, respectively.

The modular nature of the Mag Reader 6.4 program enabled me to make the new code completely compatible with the old. In fact, not a single line of the old version needs to be changed! To upgrade to Mag Reader 7.0, just add the lines in Listing 1 to Mag Reader 6.4.

Type in the new lines and save the finished product, but don't run it yet. You have to fill in the Data statements first.

Customization

As with Mag Reader 6.4, you must customize Mag Reader 7.0 through Data statements each time you use it. The customizing information includes the filename of the text, the filename and type (Doodle! or Koala) of the cover page and title information for the specific issue, such as month or volume number. The steps for entering this information are described in detail in the July article.

Version 7.0 requires information pertaining to the extra graphics, as well. In the Data statement in line 7121, you must indicate how many extra pictures there will be, not including the cover page. Type in 0 if there are no extra pictures.

The Data statements beginning at line 7151 are for specific information on the extra graphics files—one statement per file. The statement must include the number of the text page *before which* the picture will appear, the picture's Doodle! or Koala filename, its type (D or K) and the color of the screen border that will surround it. The filename conventions are the same as those the July article describes for naming the cover picture. If your present copy of Mag Reader includes "extra" data lines, delete them.

Once you've typed this information into the Data statements, save Mag Reader to your newsletter disk. Then use a file copy program to transfer the picture files to the same disk, and your newsletter will be ready for reading.

Technical Tidbits

If there's a picture to be displayed between, for example, pages 3 and 4, the picture appears first when you hit the function key to bring up page 4.

RUN It Right

C64

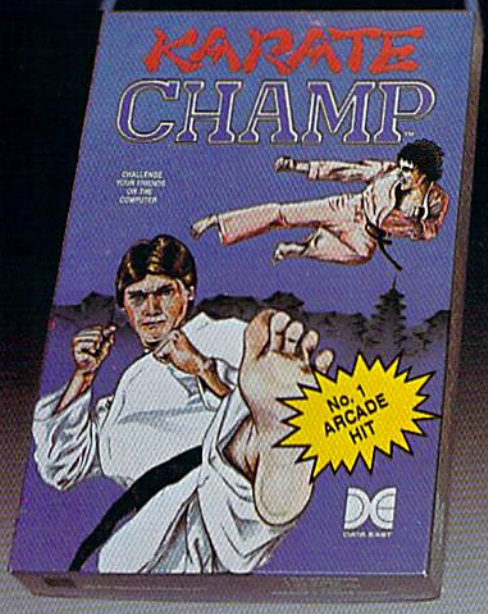
PHOTOGRAPH BY ED JUDICE

NUMBER ONE ARCADE HITS...

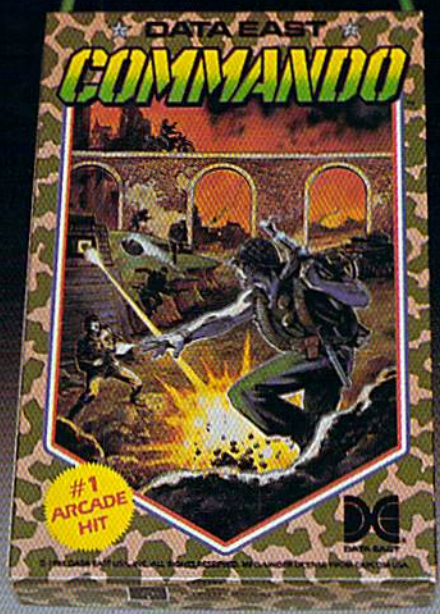


LOOK FOR tag team WRESTLING™ ON C-64™/128

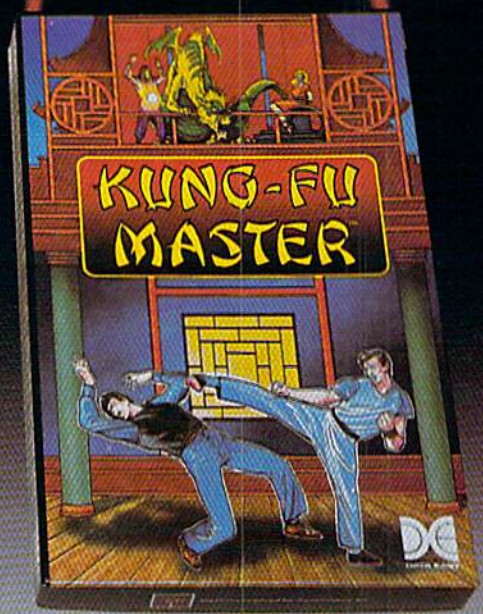
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To get to page 4 when you've finished viewing the graphics, press the *space bar*, not the function key. If you press the function key, the program will probably skip, jumping to page 5. Always exit a picture screen with the space bar, unless, of course, you *want* to skip a page.

There's room for only one picture at a time in the C-64's memory, so whenever a picture is loaded, it replaces one that's already there. Even the cover page is replaced, and you can't get it back until you run the program again. If you back up to page 0, you'll see the picture that was last loaded, not the cover.

Getting the Original Version

If you don't have the July 1986 issue of *RUN* with the original article, you can get it by sending $3.50, plus $1 shipping and handling, to *RUN*, Back Issue Orders, 80 Elm St., Peterborough, NH 03458. If you'd rather not type in the program listings, get them on the July/August ReRUN disk by sending $21.47 to ReRUN, at the same address. The disk also includes eight other programs from the July and August issues of *RUN*, so it's a worthwhile investment. R

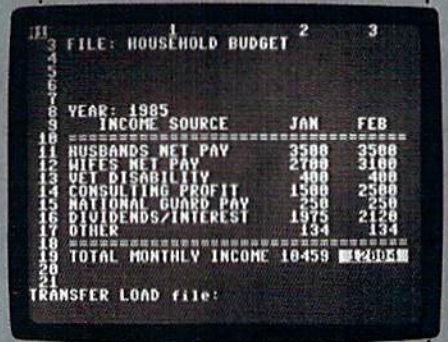
Address all author correspondence to David A. Hook, 215 Anne St. North, Barrie, Ontario, Canada L4N 4T4.

Listing 1.

Program lines for converting Mag Reader 6.4 into Mag Reader 7.0.

```
1 REM MAG READER V7.2                          :REM*63
2Ø2 REM # EXTRA PICTURES                       :REM*94
2Ø3 READ E                                     :REM*19
2Ø5 IF E=Ø GOTO 23Ø                            :REM*1Ø3
2Ø7 DIM P(E), F$(E), T$(E), C(E)               :REM*1Ø1
2Ø8 FOR I=1 TO E: READ P(I), F$(I), T$(I),
    C(I)                                       :REM*16Ø
2Ø9 IF T$(I)="K" THEN F$(I)=CHR$(129)+LEFT$
    (F$(I)+"{8 SPACEs}",14)                    :REM*249
211 IF T$(I)="D" THEN F$(I)="DD"+F$(I)
                                               :REM*119
212 NEXT                                       :REM*222
214 PS=Ø: PL=Ø                                 :REM*12
6Ø1 GOSUB 21ØØ                                 :REM*73
2Ø81 PRINT "{SHFT CLR}{CTRL Ø}{CTRL N}": RE
     TURN                                      :REM*27
4Ø22 IF E=Ø GOTO 4Ø3Ø                          :REM*33
4Ø24 OF=Ø: IF SC<CP THEN OF=-1                 :REM*63
4Ø26 PS=Ø: FOR I=1 TO E: IF P(I)+OF=SC THEN
      PS=I                                     :REM*241
4Ø27 NEXT                                      :REM*212
4Ø28 IF PS THEN GOSUB 45Ø1                     :REM*125
4499 REM LOAD/VIEW EXTRA PICS                  :REM*186
45Ø1 IF PS=PL GOTO 46Ø1                        :REM*124
4521 PL=PS: T$=T$(PS): KF=C(PS)                :REM*254
4531 POKE 2, 2 + 2*(T$="K") + (T$="D")
                                               :REM*188
4551 OPEN 1, 8, 8, F$(PS)                      :REM*22
4561 POKE 78Ø, 1: POKE 781, 8: POKE 782, Ø:
      SYS 65466                                :REM*154
4571 POKE 78Ø, Ø: POKE 781, Ø: POKE 782, 96
      + 4*(T$="D"): SYS 65493                  :REM*14
4581 CLOSE 1                                   :REM*2
46Ø1 GOTO 2ØØØ                                 :REM*216
7119 REM # EXTRA PICS                          :REM*58
7121 DATA 1                                    :REM*132
7149 REM PAGE, NAME, TYPE, BORDER              :REM*114
7151 DATA 1Ø, "MAY 85", "D", 6                 :REM*48
```


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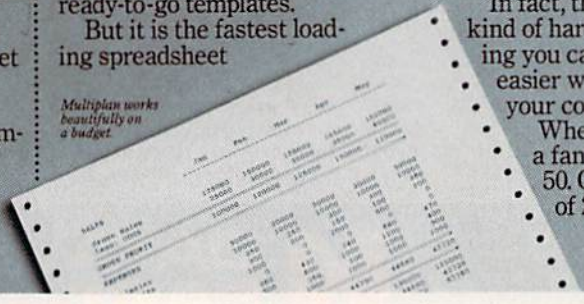
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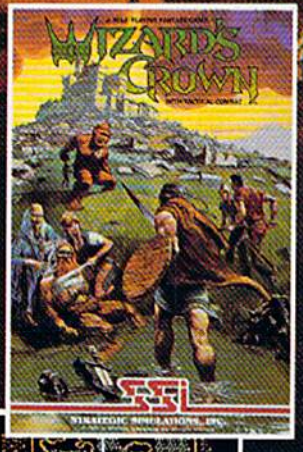
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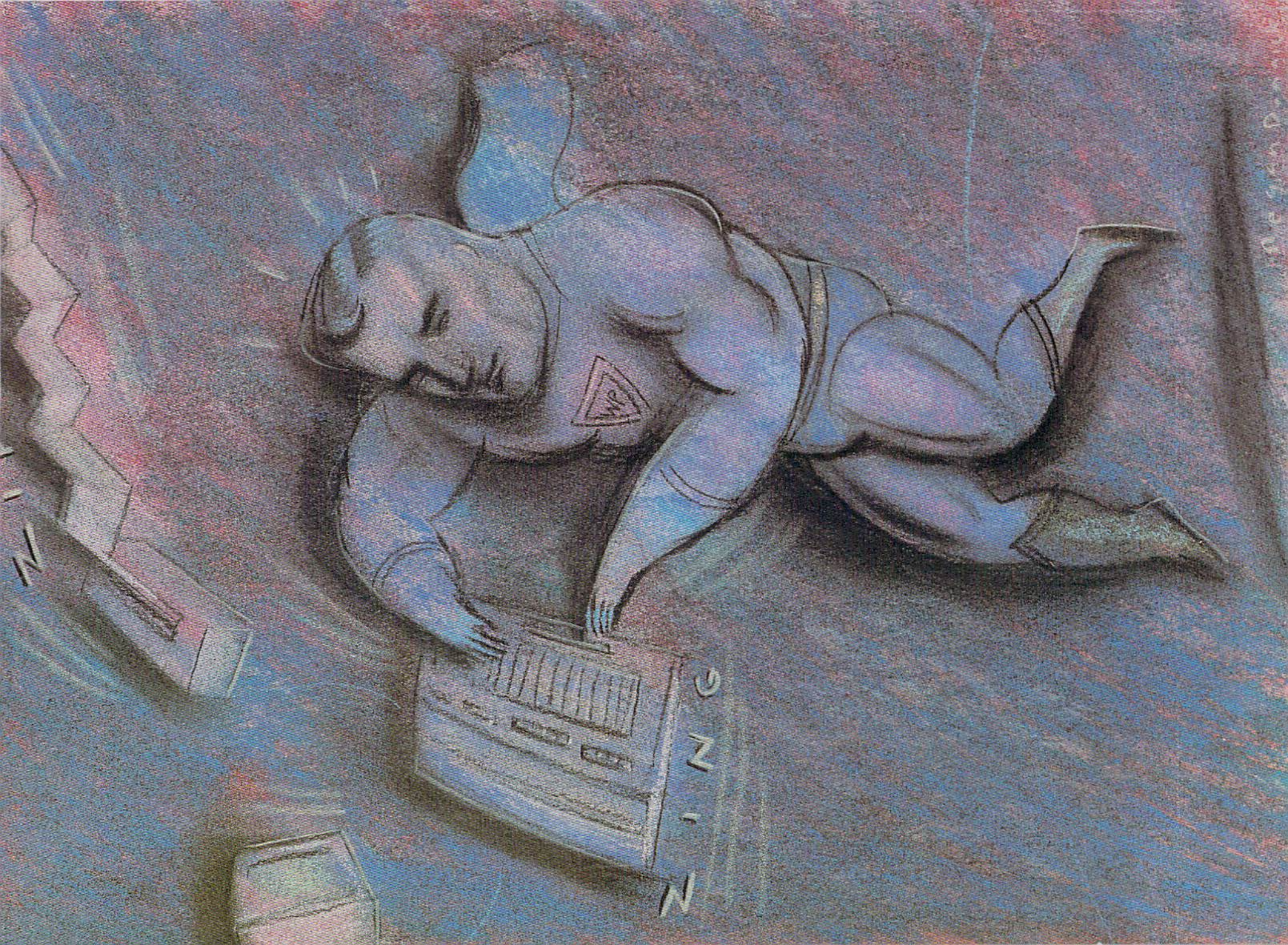




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RINGS OF ZILFIN includes graphics routines from Penguin Software's Graphics Magician.™

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RUN SCRIPT 128

Enjoy the added power, scope and flexibility of the C-128 version of RUN*'s popular word processor.*

By ROBERT ROCKEFELLER

RUN Script 128 Version 2.40 is an 80-column word processor for the C-128. All features that were present in RUN Script 64 Version 1.0 (see the March and April 1986 issues of *RUN*) are still present in this version, but there are many enhancements and additions. There are 18 new dot commands and about 30 additional new features. RUN Script 128 gives you about 68,000 bytes for your documents.

What follows is a rundown of this powerful program's many functions and commands, with brief descriptions to get you going. A slash separating two keys means that you must press the keys simultaneously. Otherwise, press them in the sequence shown.

Cursor Movement
Cursor keys: move cursor in four directions.
Shift/return: moves cursor to start of line.
Home: moves cursor to upper-left corner of screen.
Two homes in succession: move cursor to top of document.
CTRL/back arrow: moves cursor to bottom-left corner of screen.
Two CTRL/back arrows: move cursor to end of document.

Abort Operation
CTRL/Commodore: use to exit most operations.
Restore: to abort and return to Text mode.

Insert Text
Shift/INST: insert one space.
CTRL/i: toggle in and out of Insert mode.
Run-stop: insert block of 200 spaces.
Shift/run-stop: erase leftover spaces from inserted block.

Delete Text
DEL: delete character to left of cursor.
F7: delete character under cursor.
F8: delete block. Position cursor at start of block; press F8; move cursor to end of block; press return. Block is saved in buffer.
Two F6s: retrieve previously deleted block from buffer. Press F6 twice; select insert point; press return.
Two F8s: delete from cursor to end of document.

Move and Copy Text
F5: move block. Use same procedure as for F8, above, but complete the move by placing the cursor at the desired insert position and pressing return.
F6: copy block. Use the same procedure as for F5.

Search and Replace
Note: Unlike version 1.0, you don't need to insert null characters at the beginning and end of your search string.
F2: search for string.
Two F2s: search for multiple occurrences.
F4: replace string that was found in a search.
Two F4s: automatic replacement of string wherever found.

Colors
CTRL/1: text color.
CTRL/2: screen color.
CTRL/3: status line color.

Editing Functions
Return: end a paragraph.

RUN It Right

C-128; 80-column monitor; disk drive; ML Perfect Typist 2.0 program

CTRL/x: interchange the two characters just before the cursor.
CTRL/6: toggle in and out of Capital Lock mode.
CTRL/=: selective replacement of line-padding. Default is dots.
Help: move cursor to another text area.
CTRL/z: five-spaced tab.
CTRL/u: select alternate character for block space insertion.

F1 Command Key

Press F1 to evoke Command mode. Then, press the appropriate letter or symbol and follow on-screen prompts.

d: select device number.
s: save text as program file.
@: save with replace.
l: load program text file.
a: append program text files to end of document. Appended text starts at current cursor location.
t: select true or CBM ASCII.
w: save text as sequential or user file. Enter filename,s,w or filename,u,w.
r: load sequential or user text file.
$: list disk directory.
>: send disk command. Use Basic 2.0 DOS commands.
<: read error channel.
f: free bytes remaining.
x: exit to Basic.
p: print text to screen, printer or disk. Follow screen prompts.
0: load new character set.
1–9: load new print sets.
Cursor-up and cursor-down: fast line scrolling.
Cursor-left and cursor-right: page scrolling.
c: toggle upper- or lowercase.
R: save table of redefined characters. (See also dot command .dc, below.)
o: print document; continuous feed.
Z: swap text areas for banks 1 and 0.
M: select macro characters to be turned off for printing.
m: load macro set, created with Define Macros program. (See next month's issue for macro details and listing.)
g: toggle Special Graphics mode.
G: select printer type.
C: select secondary address for printing dot graphics and sending macro command strings to printer.
S: split text into two areas. Select 1–18 K for area 2.
A: move between two text areas.
T: select secondary address used to print text to printer.
L: enable line-feeds.
q: save RUN Script machine language code and all your current settings to disk.

Dot Commands

RUN Script is a post-formatted word processor. This means that the text is not formatted until it's printed, so your screen display will vary from your printout. To specify output format, RUN Script 2.40 has about 40 dot commands, so called because each command must be preceded by a dot (a period). These commands are embedded in the text to specify margin widths, define headers and footers, and so forth.

A dot command is executed when text is printed, and only text following the dot command is affected. For example, if you don't place the dot commands to set margins until you're halfway through a page of text, the margins in the first half will have the default width when printed.

Four steps must be followed for dot commands to be interpreted correctly. First, the line immediately preceding a line of one or more dot commands must end with a return. Second, the line of dot commands must start in the first screen column. Third, multiple dot commands in a string must not be separated by spaces. Fourth, each string of dot commands must end with a carriage return. Following is an example of a string of dot commands:

```
.pw80.pl66.lm6.rm6.tm4.bm4.lj
```

The dot commands are:

.lj—Left-justifies printed text.

.rj—Right-justifies printed text.

.cn—Centers printed text between the left and right margins. Your text must begin on the next line below the .cn command.

.pl—Sets the page length. This command must be followed by a number from 1–240, indicating the number of lines you want to constitute a full page. For standard-size, 8½-by-11 paper with a printer that prints six lines per inch, the setting would be 66. Therefore, you would enter .pl66.

.pw—Sets the page width, defined as the maximum number of characters that may be printed on one line. Most printers print ten characters per inch, which, using standard-size paper, gives 80 characters per line. If your printer has multiple character sets with different character densities, you'll have to adjust the page width accordingly to use an alternate character set. Example: .pw80.

.lm—Sets the left-margin width. The .lm directive must be followed by a number from 1–240. Example: .lm8.

.rm—Sets the right-margin width. The .rm directive must also be followed by a number from 1 to 240. Example: .rm8. If the sum of the left and right margins is greater than the page width, a margin error will occur.

.tm—Sets the top-margin depth. The .tm directive must be followed by a number from 1 to 240. Example: .tm6.

.bm—Sets the bottom-margin depth. The .bm directive must be followed by a number from 1 to 240. Example: .bm6. The top-margin depth plus the bottom-margin depth must be less than the page length.

.hd—Defines a header to be printed at the top of every page. The command may be followed by up to 255 characters and must end with a carriage return. This means that the carriage-return character cannot be part of the header string and that no dot commands can follow the .hd directive, since they would be interpreted as part of the header string. For this reason, and to enhance readability, I recommend that the .hd and .ft (see below) dot commands appear on lines by themselves. The # character following the .hd (or .ft) has special significance. Entered just once at the beginning of a document, .hd# automatically prints the page number of each page.

The .lj, .rj, .cn, .pw, .lm and .rm dot commands have no effect on the header. The header string is printed exactly as defined, starting in the first column on the page and continuing until it has been printed in its entirety. If, for example, you wish to center a title, the title must be preceded by the correct number of spaces.

You may embed macro characters (see discussion above)

in the header string if you wish. The header will be printed at the line position equal to the .tm setting plus 1. So, if you set the top margin to 6, the header will be printed on the seventh line. Example: .hd RUN Script 2.40.

.ft—Defines a footer to be printed at the bottom of every page. The .ft directive works exactly like that of the header. The footer will be printed at the line position equal to the .pl setting minus the .bm setting minus 1. Example: .ft page number.

.hs—Defines the number of lines to be left between the header and the main body of text. The command must be followed by a number. Example: .hs2.

.fs—Defines the number of lines to be left between the footer and the main body of text. Example: .fs2.

.ls—Sets the line spacing. You can print one or more blank lines between each line of text. For double-spacing (one blank line between lines of text), set .ls to 1. Example: .ls1.

.l+—Indents text from the current left-margin setting. For example, if the left margin is set with .lm8 and you execute .l+3, text will henceforth be indented as though you'd set .lm at 11. To cancel an indent, use .l+0 or .l–0.

.l–—"Outdents" text, such as a subheading, to the left of the left margin. For example, if the left margin setting is .lm8 and .l–3 is executed, text will begin printing at the sixth column, just as though .lm had been set at 5. Outdents are canceled with .l–0 or .l+0.

.fp—Forces a new page. When this command is executed, no more text will be output to the current page. If a footer was defined, the footer and bottom margin will be printed, and then a new page will be started. Example: .fp.

.fl—Links files to be printed. The command must be followed by a device number and a filename, separated by a comma. When the .fl directive is executed, the specified file will be loaded from the specified device and begin printing. The permissible device numbers are 8 or 9 for disk. If two disk drives are used, one document could even slightly exceed 340,000 characters in length. Example: .fl8,next file.

.p#—Sets the page number of the next page to be output. Example: .p#45.

.lf—Prints a line-feed character after every carriage return. Some non-Commodore printers require this. Example: .lf. (In version 2.40, .lf1 enables line feeds; .lf0 disables them.)

.cm—A handy dot command that lets you leave a comment for yourself that won't be printed. For instance, if you're in the habit of keeping all your old letters on disk, you can leave comments to yourself with dates and other information. Example: .cm July 19, 1985 RUN Script 64 article.

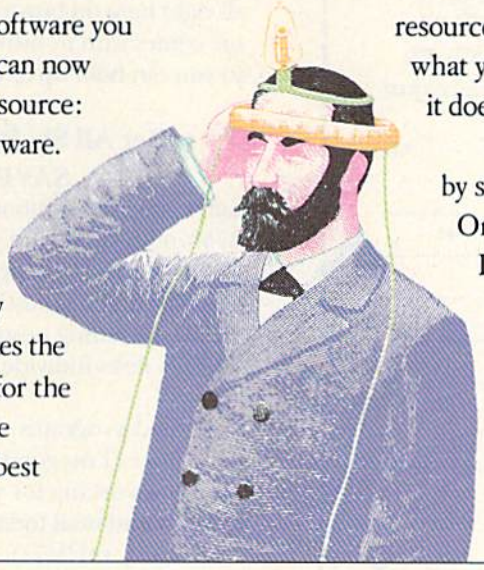
.r+—Indents the right margin. This code must be followed by a number from 0 to 255. For example, if you set the right-margin width to 10 spaces with .rm10, and then execute .r+5, the effect is the same as if you had executed .rm15. A right indent is canceled by executing .r+0 or .r–0. Example: .r+5.

.r–—Makes a right outdent. The command must be followed by a number from 0 to 255. For instance, if you've set the right margin to 10 with .rm10, and then execute .r–5, the effect is the same as if you had originally exe-

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Most dot-matrix printers can print dot-addressed graphics and ordinary text on the same line, and RUN Script 2.40 takes advantage of this feature.

cuted .rm5. A right outdent is canceled by executing .r + 0 or .r – 0. Example: .r – 3.

.bj—Stands for "both justify" and prints the ensuing text with both the left and right margins justified. It does this by inserting extra spaces between words so that each line is flush with the left and right margins. You cancel the .bj command by executing an .lj, .rj or .cn command. Example: .bj.

.pr—Sends a sequence of up to 98 bytes to the printer using a specified secondary address. The secondary address must immediately follow the command; then the bytes to be sent to the printer, separated by commas, must follow after the secondary address.

Example: .pr2,36,36,36,46,57,57. This example will send bytes 36, 36, 36, 46, 57 and 57 to the printer using secondary address 2. On the MPS-1000 printer, this would set up a formatting string.

Example: .pr5,27,69. Here, bytes 27 and 69 will be sent to the printer using secondary address 5.

.ta—Stands for "text address," and must be followed by a number from 0 to 31. The number is the secondary address that will be used to print the ensuing text, and it lasts for only one printout. You can set the default (permanent) text secondary address with the F1,T command. The .ta command is useful with printers, such as the MPS-1000, that have features that can be accessed only through special secondary addresses.

Example: .ta1. This example sets the print secondary address to 1. On the MPS-1000, text printed using secondary address 1 is formatted according to a previously-defined format string (which can be sent to the printer with the .pr command).

.ca—Defines a new, temporary secondary address. This is the secondary address that will be used to send macro strings to the printer and to print dot-graphics characters. You can set the default (permanent) secondary address with the F1,C command. Example: .ca5.

.dc—Stands for "define character." This command takes three forms that enable you to redefine any character on the keyboard except @, to a total of 127 characters, then to undefine them. The total is enough to redefine the entire keyboard if you wish. All redefined characters are erased before each printout.

Example: .dca,66. To define a character, follow the .dc command with the character to be redefined, a comma and the new decimal value of the character. The Commodore ASCII decimal value for the letter "a" is 65. Here, the value has been changed to 66, which is the value for "b." Therefore, at printout time, all the a's in the document will print out as b's.

Example: .dca – . The minus sign following the character undefines that character. This example would undefine the character "a", removing it from the table of redefined characters.

Example: .dc@. This would erase the entire table of redefined characters, effectively undefining all of them.

.lr—Stands for "load redefined characters." This command is used only after you've performed three steps. First, you must define a number of characters with .dc commands. Second, print the current document; third, save the table of redefined characters to disk with the F1,R command. Then you can use .lr to load the saved characters during a later printout. This is useful when you have to redefine many characters—to access special characters on a printer, for example. The .lr command must be followed by a device number, a comma and a filename.

Example: .lr8,filename. This example would load the file of redefined characters named "filename" from device 8, the disk drive.

.lc—Stands for "load characters," and enables you to load a new character set or a new print set during printout. The .lc command must be followed by a number from 0 to 9 (0–6 for a C-64) that specifies the set to be loaded. A 0 loads a new set onto the screen; the numbers 1 through 9 load a new set into the printer. After the number comes a comma, followed by the device number from which the set is to be loaded, then another comma and the filename of the character or print set.

Example: .lc0,8,special set. Here, the new set would go to the screen from device number 8, the disk drive.

.el—Stands for "empty lines," and prints the specified number of carriage returns. If the number of empty lines to be printed is greater than the number of remaining lines on the page, a force page is executed instead.

Example: .el10. Here, ten carriage returns will be printed.

.st—Stands for "stop." This command works only with the printer or the monitor, not the disk drive.

Example: .st. When not followed by any parameters, the .st command terminates Continuous mode during printout and starts Single Sheet mode after the current page is done. The command may be placed anywhere within the text area.

Example: .st5. When followed by a parameter, .st interrupts continuous output at a specified page number, anywhere from 1 to 65535, and enters Single Sheet mode. In this example, if continuous output has been selected with F1,p or F1,o, the first four pages will print in Continuous mode, then at page 5 the "next output (c/p/s) ?" prompt will appear.

.ff—Stands for "form feed." The .ff command must be followed by number 0 or 1. If you select 1, the bottom margin will be printed by sending the form-feed character to the printer. The Default mode, .ff0, prints the bottom margin with carriage returns. Example: .ff1.

.fc—Stands for "force conditionally," and must be followed by a number from 0 to 255. If less than the specified number of lines remain on a page when .fc is executed, no more text will be printed on that page. Instead, a force page will be executed, printing the footer (if any) and bottom margin immediately and resuming text output on the following page.

Example: .fc20. If less than 20 lines remain when .fc20 is executed, the page will be forced.

.dg—Stands for "define graphics character." This com-

Since RUN Script's character set is used to display text on the screen, this mode has the advantage that characters will appear as they will be printed.

mand lets you change any character, in any print set or the screen character set, without resorting to a character-set editor. Example: .dg0,1,255,0,0,255,0,0,255,0.

The command must be followed by ten byte numbers, separated by commas. The first byte number specifies the set in which the character to be changed is situated. As always, 0 specifies the screen character set, 1–9 specify a print character set.

The second byte is the screen-code value of the character to be changed. The 1 in the example selects the "a" character.

The last eight bytes define the character itself. The sample setting would change the "a" into three parallel bars.

.gc—Stands for "graphics characters." The .gc command is followed by two parameters, separated by a comma. The parameter settings are saved within RUN Script, and are permanent until the computer is turned off, or until you execute another .gc command. Example: .gc1,6. This is the default setting, which is correct for the MPS-803 printer.

The first parameter is a number, 0 or 1, that specifies the orientation of dot-graphics characters printed when you select either a print set or Special Graphics mode. Only one setting is correct for any one printer. If you select the wrong setting, all characters printed in Graphics mode will be printed upside down. The only way to determine the correct setting for your printer is by experimentation.

The second parameter sets the width of Graphics-mode characters in dots. Standard Commodore characters are eight dots wide. So, if you set this parameter to 6, only the first six dots of each character will be printed. If you set this parameter to 10, ten dots will be printed—eight dots of character and two dots of space.

Many non-Commodore printers accommodate three dot densities in Dot Graphics mode: single density with 480 dots per line, double density with 960 dots per line and quadruple density with 1920 dots per line. If you wanted to print 80 characters per line, how many dots wide must each character be for each of these densities?

Single Density mode: 480 ÷ 80 = 6 dots wide.
Double Density mode: 960 ÷ 80 = 12 dots wide.
Quadruple Density mode: 1920 ÷ 80 = 24 dots wide.

Obviously, none of these are correct. To use Single Density mode, you need a print set only six dots wide. If you use Double Density mode, you can print all eight dots of each Commodore character, but four dots spacing will remain between each dot-graphics character.

You can use double density with a dot width of ten if you're using the elite (96 characters per line) character set for printing normal text. There'll be two dots of space between each dot-graphics character, but you may find this acceptable.

Quadruple Density mode will not work properly, regardless of characters per line.

To make use of the full eight-dot width of a Commodore character and print 80 characters per line, you need a printer with a dot density of 8 × 80 = 640 dots per line. Use a dot width of eight if you have such a printer.

In general, use the following formula to calculate the correct dot width: dot width = dots per line ÷ characters per line. If the result is a dot width of less than eight, you'll need a print set that uses only that many columns of a Commodore character.

There's a problem with printing dot-graphics characters with MPS-803-compatible printers. As I said, standard Commodore characters are eight dots wide, and they're also eight dots high. Unfortunately, the MPS-803, 1515, 1525, MPS-801 and MPS-1000 (Commodore mode) need characters that are only six dots wide and seven dots high. There's no way around it—they need special print sets that use only the left six dots and the top seven dots of Commodore characters. Hopefully, *RUN* readers who design such print sets will share them with others.

.gb—Stands for "graphics begin," and defines the string of bytes that is sent to the printer to activate Graphics mode. The string is sent before each character is printed in Dot Graphics mode. Example: .gb8.

The MPS-803 and its compatibles require just one character, CHR$(8), to activate graphics mode. This character will put the printer into Graphics mode until it receives a byte value of less than 128, at which point it will return to normal Text mode. Most other printers handle graphics differently, however, and require that more than one character be sent.

Example: .gb27,75,6,0. These four characters will tell the printer to print the next six bytes in Dot Graphics mode. Then RUN Script will send the left six dot columns of a character.

Remember that the string must tell the printer how many bytes of graphics data will be sent. If the dot width is set to 6, six bytes will be sent; if the dot width is set to 10, ten bytes will be sent. On most printers (not the MPS-803), if the dot width is changed, you'll have to redefine .gb also.

Example: .gb27,76,8,0. This example selects the Double Density Graphics mode. With the dot width set to 8, dot-graphics characters will print with a density of 120 characters per line.

.ge—Stands for "graphics end." The string of bytes following the .ge command will be sent to the printer after each dot-graphics character. Some printers require this command to return to Text mode.

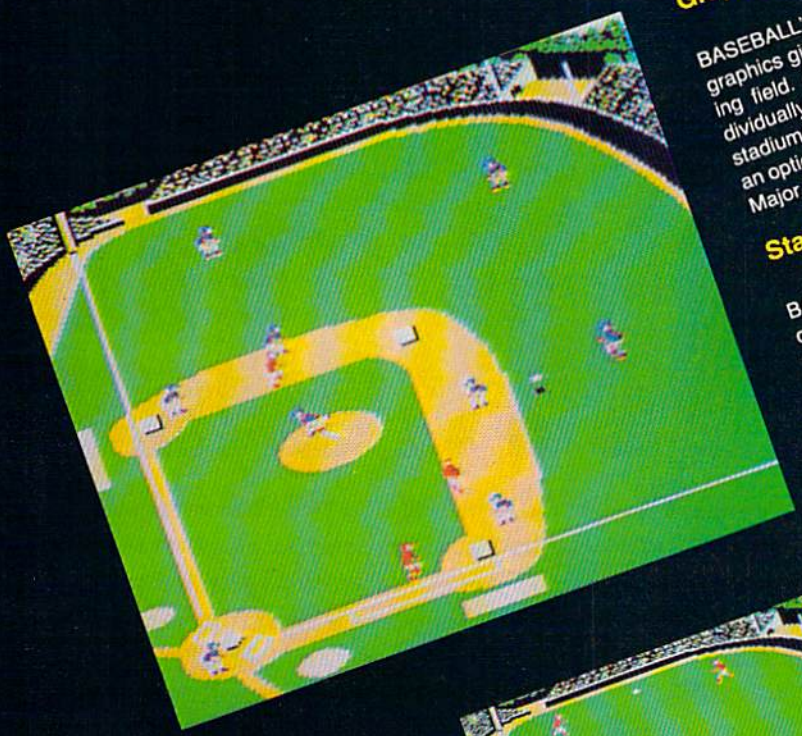
Example: .ge15. This setting, the default, is correct for MPS-803 printers.

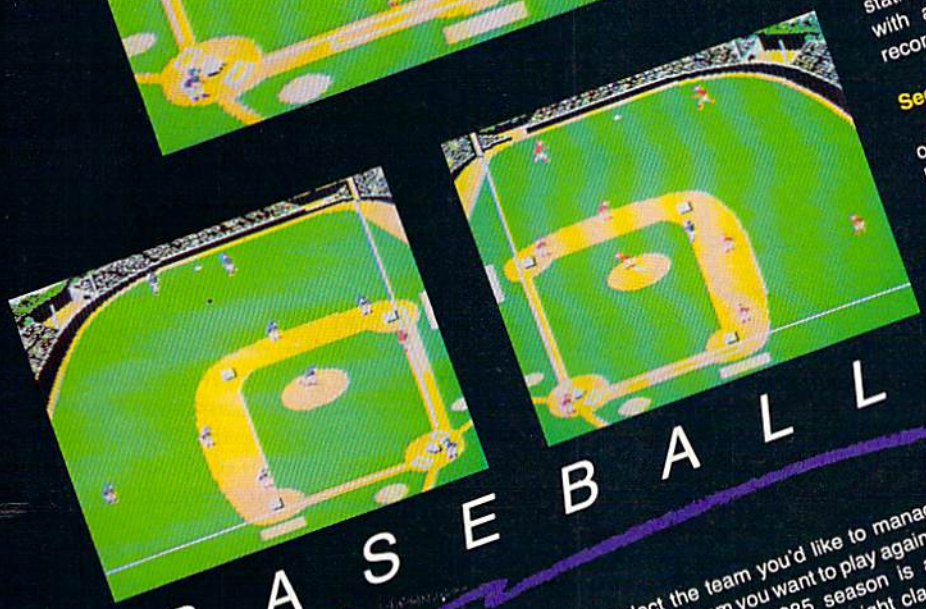
Example: .ge. This is the correct setting for most non-Commodore printers. No bytes will be sent after the graphics bytes.

Error Messages

Macro Not Defined—An undefined macro character has been encountered. This usually means that you made a typing error when entering the macro character. The cursor will rest on the incorrect character.

Macro characters are a means of customizing RUN Script to take advantage of special features of non-Commodore printers. I explain macro definition later in this





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documentation. However, it's not necessary to understand macro characters to use RUN Script.

Illegal Quantity—A dot command's numeric argument is too large or too small. The cursor will appear near the illegal number.

Output Error—A hardware error has occurred during printing. If output is to the printer, the error could mean the printer is out of paper or not turned on.

Syntax Error—RUN Script is unable to recognize a dot command. The cursor will be near the offending command.

Margin Error—The margins have been set to illegal values. Check the dot commands preceding the cursor position.

Text Area Full—The text area is full. At this point, you must save your text and erase what's on the screen to continue.

Device Not Present—The device referenced in the input/output operation does not respond. Check to see if you used the correct device number and make sure the device is turned on.

File Not Found—The file you attempted to load was not found in the load device.

String Not Found—A match was not found during a string search.

Save Error—A status error occurred while the program was attempting to save text.

Load Error—A status error occurred while the program was attempting to load a text file.

Printers

RUN Script is set up to expect a Commodore printer connected to the serial bus. A combination of a non-Commodore printer and an interface that emulates a Commodore printer will also work.

If your system includes neither of these, you can still use RUN Script by putting the printer interface into Lock mode and using the RUN Script F1,t function to output true ASCII. Another method is to use the Define Macros program (see discussion next month) to create a customized set of macros that RUN Script can use to control your printer.

Note that you cannot use an RS-232 printer with RUN Script. If you have such a printer, you must output your text to disk and then use a Basic program to print it.

Daisywheel Printers

RUN Script 2.40 can do underlining and double-strike characters with daisywheel printers that recognize the back-space character. Type F3, then the (character to start underlining; type F3, followed by) to end underlining. Type F3, then [to start double-strike; type F3, followed by] to end double-strike. (See also the .bs command.)

To change the print wheel, type F3, then *. When RUN Script encounters the reversed * character, it will stop until you press a key.

Graphics Mode

Most dot-matrix printers can print dot-addressed graphics and ordinary text on the same line, and RUN Script 2.40 takes advantage of this feature. When you put RUN Script into a graphics mode, instead of outputting normal text, it uses the printer's dot-graphics capability to print each character. This allows printers such as an MPS-803 to print italics, boldface or underlining, and print foreign

character sets such as French, Russian or Greek—in fact, almost any kind of text.

There are two ways to create graphics with RUN Script. One is through a "print set," which is half of a normal character set. A character set contains 256 characters, 128 non-reversed and 128 reversed, so a print set contains 128 characters. How does it work?

You select a print set with the F3 key, the same key that selects macro characters. After you press F3, choose a numeral from 0 to 9. The numeral will appear at the cursor position in the text, in reverse field.

Pressing 0 selects normal Text mode, which is the default; pressing 1–9 enables the Graphics mode. Within that mode, 1 specifies the first print set, 2 specifies the second set, and so on, up to the maximum number of sets your computer can have—nine for the C-128.

For example, say you chose print set 3 and the next character to be printed is an a. The letter a is the second character in the standard Commodore character set (see the *C-64 Programmer's Reference Guide*, page 376, for a listing of the character set), so RUN Script will go to set 3, take the second character of that set, and print it using dot-addressed graphics.

Print sets and the character set are loaded into memory by the boot program, which also loads the RUN Script machine language program and initializes the RUN Script system.

You also can print graphics with the Special Graphics mode. It's activated by the F1 key, then g, then answering y at the prompt "enable special graphics (y/n) ?". You disable the Special Graphics mode by answering n.

When the Special Graphics mode is functioning, the business-graphics characters of the character set, which are accessed by simultaneously pressing the Commodore logo key and any other key, will be printed using the printer's Dot Graphics mode. This occurs only when normal Text mode is selected. All other characters will be printed as normal text characters.

Since RUN Script's character set is used to display text on the screen, this mode has the advantage that characters will appear on the screen exactly as they will be printed. Of course, to get characters other than the Commodore business-graphics characters, you have to alter the relevant characters with the .dg command or with a character-editor program.

Printing RUN Script graphics requires an MPS-803, 1515, 1525, MPS-1000 in Commodore mode, or other compatible printer. RUN Script 2.40 is designed to be used with these printers. However, a 1526 or MPS-802 printer won't work with RUN Script graphics.

If you have a non-Commodore printer that's not compatible with the MPS-803, you'll have to customize RUN Script 2.40 to the printer with the various customization commands available. (See the F1,q command, above.)

For more information about the Graphics mode, see the .gc, .gb, .ge and .dg dot commands I mentioned earlier. R

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

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How To Enter RUN Script 128.

Runscript 128 is composed of the following five listings:

Listing 1: Boot RUN Script 128.
Listing 2: Make C-128 character set.
Listing 3: Create ML.
Listing 4: OB.RS NMI.
Listing 5: RUN Script 128 machine language.

Follow these step-by-step instructions to type in RUN Script 128:

1. Type in and save to disk Listings 1, 2 and 3, using 128 Perfect Typist. (See How To Type in Listings, p. 156 in this issue.) Be sure to save them to the same disk. Then run Listing 2 to create a copy of the C-128 character set on the disk.

2. Type in and save to disk ML Perfect Typist Version 2.0 (see page 98), using 128 Perfect Typist.

3. Load and run ML Perfect Typist Version 2.0; then enter Listing 3. Save it under the filename "OB.RS NMI" on the disk containing Listings 1 and 2.

4. Next, use ML Perfect Typist Version 2.0 to type in Listing 4. When you've finished typing it in, save the completed file under the filename "OB.RS128 2.40" on the disk containing Listings 1, 2 and 3. Be sure to save at least two extra copies of Listing 4 on a second disk, and make a hard copy printout of the code in case a problem should occur.

5. If you have correctly followed the above steps, you'll have the following program files on your RUN Script 128 disk:

RS 128 Boot Program (5 blocks).
C-128 CHAR SET (9 blocks). (This is created by listing 2.)
Create ML (3 blocks).
OB.RS NMI (1 block).
OB.RS 128 2.40 (48 blocks).

Note: The filenames of Listings 2, 4 and 5 need to appear on the directory *exactly* as they appear above. If the filenames do not match, use the rename command to give those files their correct names.

6. At this point, load and run Listing 3, Create ML. This program loads in and modifies Listing 5, OB.RS128 2.40, then automatically re-saves it to disk as a 55-block program.

7. Now the program is ready to run. To boot RUN Script 128, load and run Listing 1. If you discover that one or more features do not operate properly, compare a printout of the OB.RS128 2.40 code listing (before it was modified by Listing 3) with the listing in the magazine. Look to see if two or more bytes are swapped in one line. An example of this would be "00 04" entered as "04 00".

Swapped bytes can be corrected by loading and running ML Perfect Typist Version 2.0, then loading from disk a copy of the OR.RS128 2.40 code that has not been modified by Listing 3. List the line containing the swapped bytes, correct the error, then resave the corrected OB.RS128 2.40 file and run it through the Create ML program. Finally, try the boot program again. It should work accurately after the corrections are made.

Listing 1.

Boot RUN Script 128.

```
10 REM BOOT RUNSCRIPT 128 BY ROBERT ROCKEFE
   LLER                                  :REM*94
20 DEV=8 : REM DEVICE NUMBER            :REM*216
30 HLP$="": REM FILENAME OF HELP FILE
                                         :REM*146
40 SET$="C128 CHAR SET": REM CHARACTER SET
                                         :REM*174
50 DIM PS$(9): REM FILENAMES OF PRINT SETS
                                         :REM*222
60 PS$(1)="": REM PRINT SET 1            :REM*164
70 PS$(2)="": REM PRINT SET 2             :REM*14
80 PS$(3)="": REM PRINT SET 3            :REM*120
90 PS$(4)="": REM PRINT SET 4            :REM*228
100 PS$(5)="": REM PRINT SET 5            :REM*78
110 PS$(6)="": REM PRINT SET 6           :REM*184
120 PS$(7)="": REM PRINT SET 7            :REM*34
130 PS$(8)="": REM PRINT SET 8           :REM*142
140 PS$(9)="": REM PRINT SET 9           :REM*248
150 BANK 0: POKE 2564,PEEK(2564)AND254: REM
    DISABLE BASIC IRQ                    :REM*176
160 POKE 2592,20: REM 20 BYTE KEY BUFFER
                                         :REM*178
170 IF RGR(0)=0 THEN PRINT CHR$(147): CHAR
    1, 0,12, "ENABLE 80 COLUMN MONITOR": PR
    INT: PRINT "THEN PRESS ANY KEY": GETKEY
     A$                                  :REM*8
180 GRAPHIC 5: WINDOW 0,0,79,24,1: FAST
                                         :REM*114
190 IF HLP$<>"" THEN BEGIN               :REM*144
200 FOR J=1 TO LEN(HLP$):POKE DEC("0245")+J
    ,ASC(MID$(HLP$,J,1)):NEXTJ:BEND:REM*202
210 POKE DEC("0245"),LEN(HLP$)           :REM*72
220 ADR=DEC("C800"): REM LOAD ADDRESS OF PR
    INT SET 1                            :REM*140
230 FOR J=1 TO 9:REM PRINT SETS          :REM*222
240 IF PS$(J)<>"" THEN BLOAD (PS$(J)), U(DE
    V), P(ADR), B0:ADR=ADR+DEC("0400"):NEXT
    J                                    :REM*34
250 BLOAD (SET$), U(DEV), P(DEC("C000")), B
    0: REM LOAD CHARACTER SET            :REM*118
260 BLOAD "OB.RS NMI", U(DEV), P(DEC("1300"
    )), B0: REM NMI ROUTINE              :REM*75
270 BLOAD "OB.RS128 2.40", U(DEV), P(DEC("0
    400")), B1: REM LOAD MACHINE LANGUAGE
                                         :REM*149
280 BANK 1:POKE14965,159:POKE14966,32:SYS 1
    024                                  :REM*251
```

Listing 2.

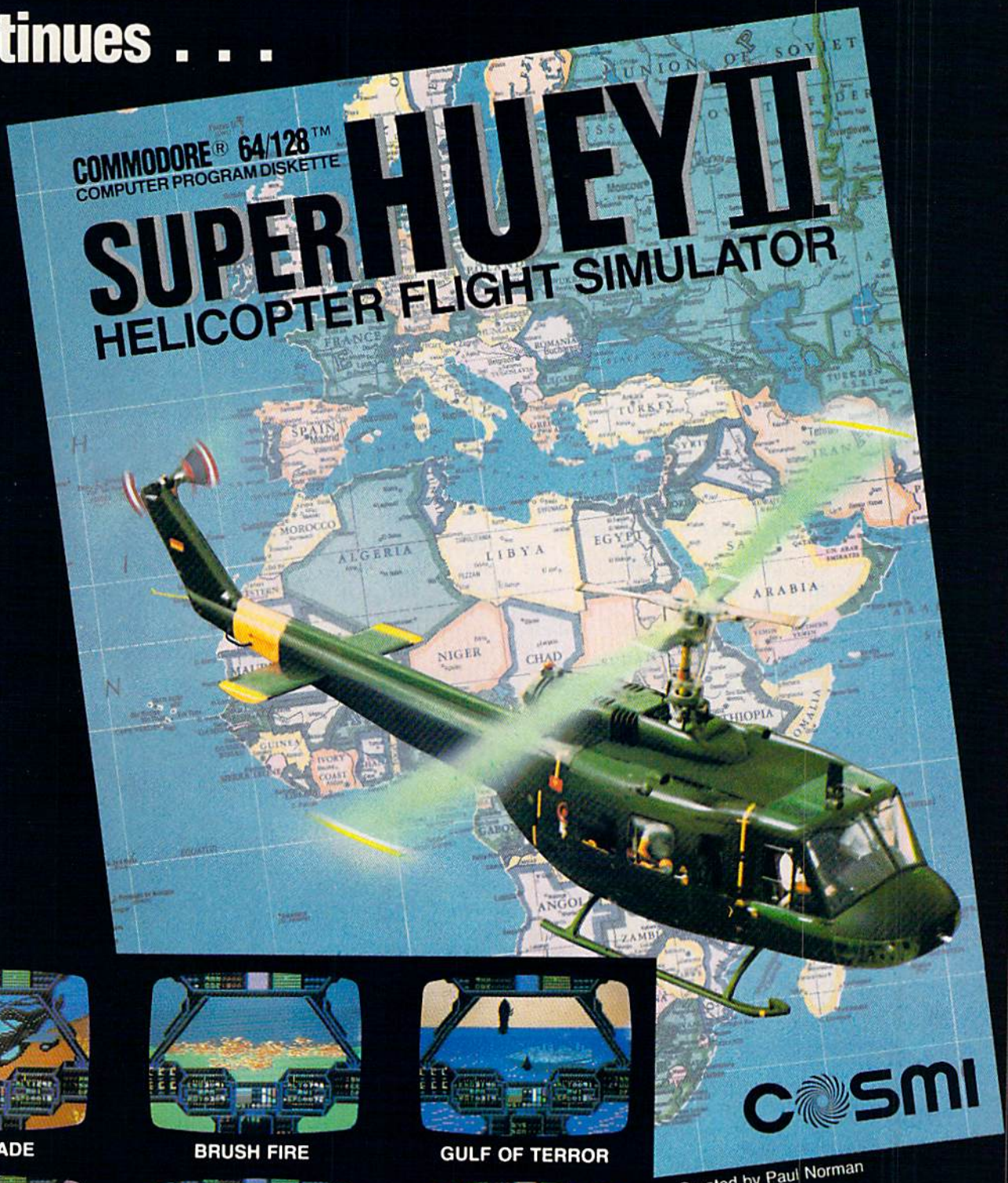
Make C-128 character set.

```
10 REM C128 CHAR SET CREATOR             :REM*172
20 TRAP 120                               :REM*40
30 DATA 10976,0,0,0,8,0,0,0,0            :REM*36
40 DATA 11072,0,3,19,51,127,48,16,0:REM*180
50 DATA 12000,255,255,255,247,255,255,255,2
   55                                    :REM*210
```

→

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Listing 2 continued.

```
6Ø DATA 12Ø96,255,252,236,2Ø4,128,2Ø7,239,2
   55                                    :REM*Ø
7Ø FAST:BANK14:FORX=1Ø24Ø TO 12287 :REM*18Ø
8Ø POKEX,PEEK(X+45Ø56):NEXT:BANKØ  :REM*176
9Ø FORA=1TO4:READX:FORZ=XTOX+7:READX:POKEZ,
   X:NEXTZ,A                             :REM*218
1ØØ BANK15:IF RGR(Ø)<>5THEN SLOW   :REM*13Ø
11Ø BSAVE"C128 CHAR SET",BØ,P1Ø24Ø TO P1228
    8:END                                :REM*2Ø
12Ø BANK15:IF RGR(Ø)<>5THEN SLOW   :REM*15Ø
13Ø PRINT"{CTRL G}";ERR$(ER)" ERROR IN LINE
    "EL:HELP                             :REM*6
```

Listing 3.

Create ML.

```
1Ø REM CREATE ML PROGRAM FOR C128  :REM*23Ø
2Ø REM ADDS BUFFER MEMORY TO OBJECT PROGRAM
                                      :REM*36
3Ø POKE 47,DEC("6ØØØ")AND255: POKE 48,DEC("
   6ØØØ")/256: CLR: REM RAISE START OF VARI
   ABLES                              :REM*94
4Ø PRINT"{SHFT CLR}INSERT THE DISK WITH THE
    PROGRAM "CHR$(34)"OB.RS128 2.4Ø"CHR$(34
   )" ON IT."                         :REM*136
5Ø PRINT"THEN PRESS ANY KEY.": GETKEY A$
                                      :REM*154
6Ø BANK 15: SYS 65424,192: REM TURN ON KERN
   AL MESSAGES                        :REM*124
7Ø BLOAD "OB.RS128 2.4Ø", B1, P1Ø24:REM*24Ø
8Ø PRINT"{3 CRSR DNs}ONE MOMENT PLEASE ...
   ";: B=Ø                            :REM*44
9Ø BANK 1: FOR A=DEC("33CD") TO DEC("3AF2")
   : POKE A,Ø: IF (A AND 255)=Ø THEN B=B+1:
    PRINTB;:NEXT A                    :REM*154
1ØØ BANK 1: POKE DEC("1Ø39"),172:POKE DEC("
    1Ø3A"),16:POKE DEC("3AF3"),159 :REM*224
11Ø PRINT"{3 CRSR DNs}INSERT THE SAVE DISK,
     THEN PRESS ANY KEY.": GETKEY A$
                                      :REM*144
12Ø SCRATCH "OB.RS128 2.4Ø": BSAVE "OB.RS12
    8 2.4Ø", B1, P1Ø24 TO P(DEC("3A76"))
                                      :REM*48
```

Listing 4.

OB.RS NMI.

```
0001 76 3A 20 A8 FF 18 60 A9 01 85 02 21 04
0002 A9 00 85 03 A9 00 85 04 4C 71 FF 21 04
0003 A5 91 C9 DB D0 09 20 CC FF A9 00 4A 06
0004 85 D0 85 D1 60 0F 03
```

Listing 5.

RUN Script 128 machine language.

```
0001 00 04 A9 4E 8D 00 FF A2 2D BD A9 BD 04
0002 05 95 0B CA 10 F8 A2 2E A9 00 95 87 04
0003 0B E8 E0 90 90 F9 AD 26 03 8D A4 F6 05
0004 05 AD 27 03 8D A5 05 A9 7F 8D 01 CD 03
0005 D5 A9 4E 8D 02 D5 A9 40 8D 03 D5 83 05
0006 A9 3F 8D 04 D5 A9 60 85 47 A9 05 D7 04
0007 85 48 A9 01 85 49 A2 01 86 4D A0 62 04
0008 01 A9 47 20 80 06 E6 47 D0 02 E6 84 04
0009 48 E6 4D A6 4D E0 0B 90 EB 20 4D 4A 05
0010 23 20 C8 20 20 4D 23 AD 72 05 F0 D9 03
0011 28 AD 45 02 F0 23 20 A9 17 20 8C C6 03
0012 23 20 A7 1D A9 00 AE 6A 05 AC 6B F0 03
0013 05 20 28 07 A9 01 8D 72 05 AD 70 2C 03
0014 05 85 10 AD 71 05 85 11 8D 02 FF EF 03
0015 D8 20 CB 1C AD A7 05 85 F1 A2 1A 79 05
0016 20 78 32 29 F0 0D A6 05 20 6A 32 67 03
0017 20 37 15 20 59 05 20 F0 06 A9 0C C6 02
0018 20 39 06 A9 0E 20 39 06 A9 0B 20 5B 02
0019 39 06 A9 93 20 39 06 20 E9 22 20 38 03
0020 9A 25 A9 00 A2 D7 A0 05 20 82 25 61 04
0021 20 94 26 20 50 23 A9 14 8D 28 03 F7 02
0022 A9 13 8D 29 03 A9 05 85 49 A9 13 C3 03
0023 85 4A A9 49 8D B9 02 A9 04 A2 00 6F 04
0024 A0 05 20 D0 07 A9 95 A2 00 A0 09 3D 04
0025 20 D0 07 A9 05 8D 18 03 A9 13 8D AF 03
0026 19 03 20 1C 05 A2 FF 9A 4C 3F 31 6E 03
0027 A9 00 85 47 A5 11 85 48 A4 10 B1 78 04
0028 47 C9 20 D0 20 88 D0 F7 B1 47 C9 4C 06
0029 20 D0 17 C6 48 88 A5 0F C5 48 90 0B 05
0030 E8 C4 0E F0 0A B1 47 C9 20 D0 04 87 05
0031 88 4C 3E 05 98 18 65 47 85 12 A5 CE 03
0032 48 69 00 85 13 60 A9 00 85 D0 85 4C 04
0033 D1 60 85 89 86 8A 87 8B 88 8C 83 19 06
0034 84 00 00 00 00 00 00 00 00 00 01 A7 00
0035 08 00 00 00 00 00 00 00 00 00 01 2C 00
0036 0F 00 00 00 00 00 00 00 00 00 FF 32 01
0037 FF 06 00 00 08 5F 00 C0 00 C8 00 19 03
0038 CC 00 D0 00 D4 00 D8 00 DC 00 E0 2A 05
0039 00 E4 00 E8 79 EF 82 80 80 08 5C 41 05
0040 20 76 3A FF BE 76 3A 07 07 06 08 81 03
0041 08 06 08 08 42 50 00 00 00 00 01 DA 00
0042 00 00 00 00 01 01 00 01 00 00 00 2D 00
0043 00 FF 00 00 00 00 00 00 00 00 00 2A 01
0044 47 E0 E0 E0 E0 E0 E0 E0 E0 E0 D2 25 09
0045 D5 CE D3 83 92 89 90 94 E0 B2 AE A5 07
0046 B4 B0 E0 82 99 E0 D2 8F 82 85 92 67 07
0047 94 E0 D2 8F 83 8B 85 86 85 8C 8C BA 06
0048 85 92 E0 E0 E0 E0 E0 A8 83 A9 E0 5B 08
0049 B1 B9 B8 B6 E0 D2 D5 CE E0 CD 81 8C 08
0050 87 81 9A 89 8E 85 85 06 86 07 84 0C 05
0051 08 08 68 85 05 BA 86 09 A9 4E 8D 02 04
0052 DE 02 8D 00 FF A9 0F 85 02 60 20 5F 04
0053 1F 06 A9 FF 85 03 A9 D2 85 04 20 AE 04
0054 CD 02 A9 00 8D DE 02 A5 05 48 A6 B3 04
0055 07 A5 06 28 60 18 20 1F 06 A9 FF 76 03
0056 85 03 A9 F0 85 04 4C 44 06 20 1F B7 03
0057 06 A9 FF 85 03 A9 E1 85 04 4C 44 12 05
0058 06 20 1F 06 A9 C0 85 03 A9 06 85 AA 03
0059 04 4C 44 06 20 1F 06 A9 FF 85 03 4A 03
0060 A9 65 85 04 4C 44 06 20 1F 06 A9 57 03
0061 FF 85 03 A9 E4 85 04 4C 44 06 20 90 04
0062 1F 06 A9 FF 85 03 A9 CF 85 04 4C E0 04
0063 44 06 20 1F 06 A9 FF 85 03 A9 C6 6D 04
0064 85 04 4C 44 06 20 1F 06 A9 FF 85 D1 03
0065 03 A9 C9 85 04 4C 44 06 20 1F 06 1A 03
0066 A9 FF 85 03 A9 BD 85 04 4C 44 06 F7 04
0067 20 1F 06 A9 FF 85 03 A9 BA 85 04 A4 04
0068 4C 44 06 20 1F 06 A9 FF 85 03 A9 F8 03
0069 C0 85 04 4C 44 06 20 1F 06 A9 FF 11 04
0070 85 03 A9 90 85 04 4C 44 06 20 1F 65 03
0071 06 A9 FF 85 03 A9 CC 85 04 4C 44 0B 05
0072 06 20 1F 06 A9 FF 85 03 A9 C3 85 B4 04
0073 04 4C 44 06 20 1F 06 A9 FF 85 03 58 03
0074 A9 D8 85 04 4C 44 06 20 1F 06 A9 D8 03
0075 FF 85 03 A9 D5 85 04 4C 44 06 20 8F 04
0076 1F 06 A9 FF 85 03 A9 B7 85 04 4C D6 04
0077 44 06 20 1F 06 A9 FF 85 03 A9 B4 69 04
0078 85 04 4C 44 06 20 1F 06 A9 FF 85 DF 03
0079 03 A9 96 85 04 4C 44 06 20 1F 06 F5 02
0080 A9 FF 85 03 A9 AB 85 04 4C 44 06 F3 04
0081 20 1F 06 A9 FF 85 03 A9 A5 85 04 9D 04
0082 4C 44 06 20 1F 06 A9 FF 85 03 A9 06 04
0083 B1 85 04 4C 44 06 20 1F 06 A9 FF 10 04
0084 85 03 A9 93 85 04 4C 44 06 20 1F 76 03
0085 06 A9 FF 85 03 A9 AE 85 04 4C 44 FB 04
```

Continued on p. 134.

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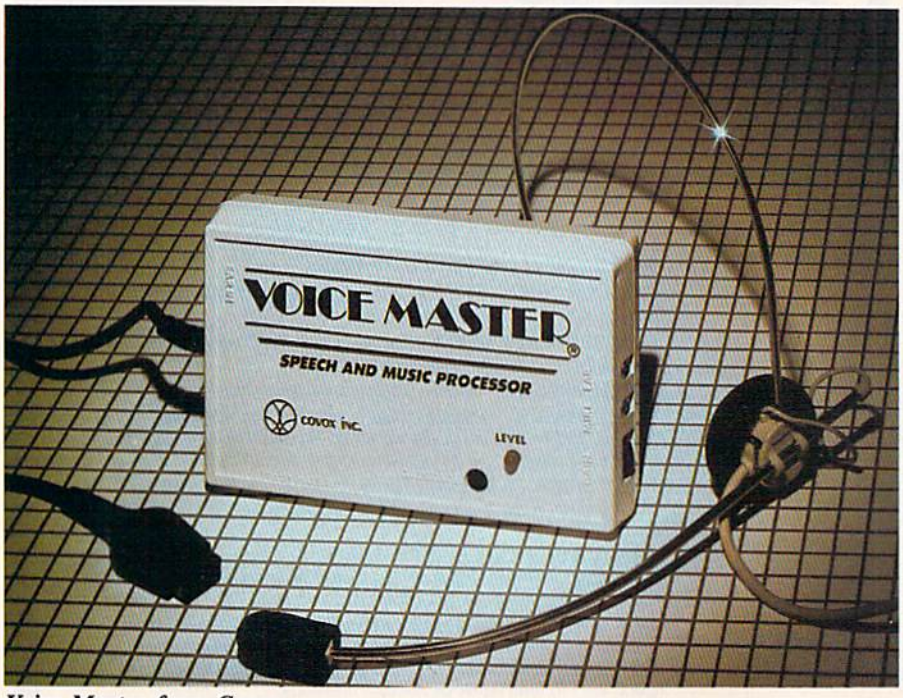
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At one time, a large assortment of speech accessories were available for the C-64. However, many of the manufacturers didn't survive the computer market doldrums of one and two years ago. Today, there are only a few C-64-compatible speech synthesis systems in production, but these incorporate the latest in computer speech technologies.

All computer speech-synthesis systems involve some type of hardware add-on, as well as software that works with it. In most cases the software comes on a disk, although it sometimes resides in a ROM chip in the hardware.

Different computer speech systems are based on different technologies. In one of these, digitized sound, speech is captured through a microphone and converted into digital data (numbers) representing the mathematical shape of the waveforms. Then software converts the data back into sound that is output through the speaker. This technology generates the most understandable speech, with the quality you may have heard emanating from a video game.

However, digitized speech has a notable restriction. Since digitally processed sound takes up a lot of the C-64's relatively small memory, such a speech system has a rather limited vocabulary.

Phoneme Phenomena

A more versatile speech-synthesis technology is based on phonemes, standard sounds that can be strung together to form recognizable words. The software in a phonetic speech synthesizer employs a complex set of rules to phonetically analyze typed-in words and translate them into data that activates the speaker to emit approximations of human speech.

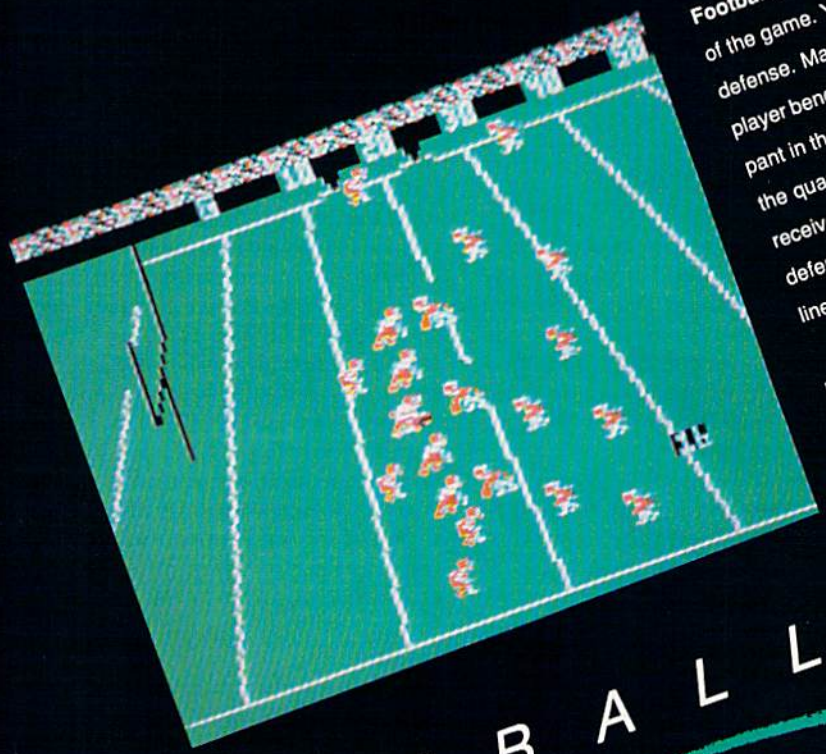
How understandable the words are depends on the quality of the computer's sound hardware and the accuracy of the sound-to-data translation. Different phoneme-based programs use different translation algorithms, and some are more successful than others. However, none of them produce the clarity of a digitized system. The main advantage of the phonetic approach is its capacity for practically unlimited vocabulary while using a minimum of RAM.

As digitized speech synthesis has developed, it has paved the way for another technology—speech recognition. Speech recognition by a computer is based on the fact that the waveform for a specific word remains fairly constant from speaker to speaker and from one occasion to the next. Once the data of a digitized word is stored in memory, it can then be compared with the data of a subsequently digitized word to determine if they are the same.

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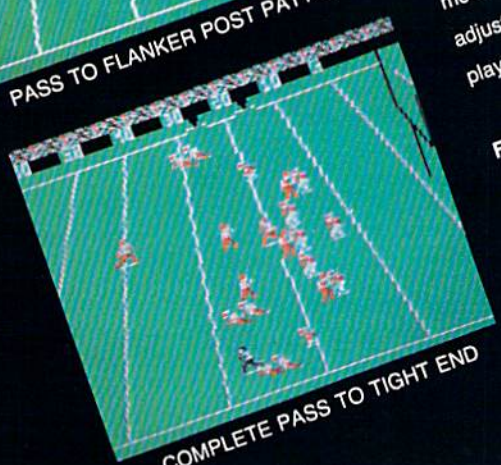
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This is the interface you need to hook your serial printer to your Commodore computer. The Serial Printer Interface connects to the Commodore serial bus, and then to the RS232 connection on your printer. This ensures optimum compatibility with all your software. No other cables are needed. The Serial Printer Interface supports graphics on most popular dot matrix printers. DIP switch settings on the interface allow you to select from 75 to 19200 baud. Also select word, parity, and DTR or XON/XOFF handshaking. Power either from the cassette port or an external supply (not included). Recommended by Brother International, Pansonic, and others.

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Do you need speech recognition? That will call for a digitizer and microphone.

fers a broad range of speech systems for many computers, including the C-64. Their Personal Speech System is one of the best phonetic-based synthesizers you can get, because it produces speech of good quality and includes a 3500-byte buffer to store keyboard input.

The Personal Speech System is connected to the C-64 by way of the RS-232 port, which leaves the expansion port free for other things. It's programmed much like a modem or printer, where a channel is opened and the text strings are printed to the channel. Because the Personal Speech System was designed to work on various computers, it comes with a real-time clock and the capability of producing simple music. However, since the C-64 already offers these features, you might be paying for more than you need.

Votrax also recently purchased the Comvoice System from Genesis Computer Corporation. Comvoice comes as a cartridge that plugs into the computer's expansion port. Since the system is based on Votrax technology, it offers good text-to-speech capability, reinforced by several new commands that let it pronounce any word.

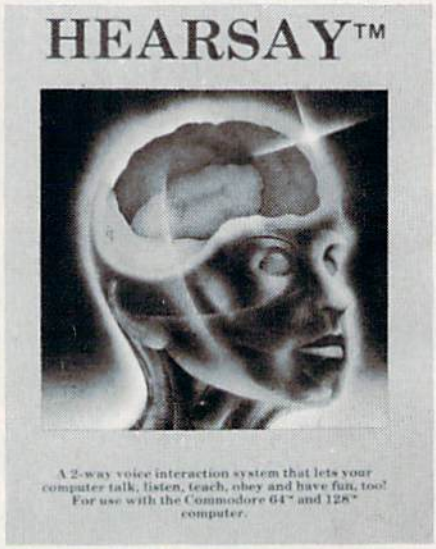
In addition, Votrax has just introduced the Votalker C-64, whose descriptive literature indicates that it can say words as they're being typed in on the keyboard and spell words on command. According to Votrax, Votalker also offers pitch, volume and rate control to better simulate the natural sound of speech. It comes with no software, as the programs, all accessed by one keypress, are in ROM.

Covox

Covox, another company that's been around for a while, manufactures



Votalker C-64 from Votrax.



Hearsay 1000 system.



Personal Speech System from Votrax.

Voice Master, a good-quality digitizing sound synthesizer and speech recognition system that connects to the joystick port of the C-64. Voice Master can store 64 words in memory at one time, and it can fast-load additional sound modules from disk.

Its software includes a program for incorporating digitized sounds into your programs, a sound editor for refining digitized words, a real-time spectrograph for translating sounds into a dynamic bar graph and a "voice harp" that translates singing, humming or whistling into musical notation that you can print out.

Covox is also planning an early release of their Speech Construction Set for the C-64 and C-128. This product will let you edit digitally encoded speech for a better quality of synthesis.

Table 1. *Speech synthesizers and their manufacturers.*

Voice Master; $89
Covox, Inc.
675-D Conger St.
Eugene, OR 97402
503-342-1271

Hearsay 1000; $79.95
Hearsay, Inc.
1825 74th St.
Brooklyn, NY 11204
718-232-7266

Comvoice; $99
Personal Speech System; $395
Votalker; $99.95
Votrax, Inc.
1394 Rankin
Troy, MI 48083
313-588-2050

Hearsay

The newest entry in the C-64 speech market is the Hearsay 1000 system, which includes both phonetic and digital components. The former offers the features of the systems described above, and also can be used with a number of commercial software packages to pronounce text that appears on the screen. The Hearsay 1000 also pronounces the name of any key you press, and it has an editor for refining the way the text-to-speech converter works. With this editor, you can fine-tune the system to the extent of recognizing that "Mr." means "mister."

The Hearsay 1000 phonetic system produces fairly understandable speech. The sound is not robotic, but it is synthetic-sounding and not as clear as Votrax or Comvoice speech.

With the Hearsay 1000 digitizer, as with Voice Master, you can record up to 64 words to use in your own programs. The digitizer also includes a speech-recognition component. An especially interesting feature of the latter is its ability to learn words "on the fly." For example, if you're playing a game and tire of typing the same command over and over, you can "train" the digitizer to recognize the sound of that command and respond accordingly.

Along with the regular support software, the Hearsay 1000 disk includes demos of several upcoming programs that will use the speech system. Three of them, Aqua Circus, Think Bank and Rhyme and Reason, are educational in nature, containing stories, games and puzzles and using digital synthesis and recognition to interact with the child. The fourth program, Intelligent Talking Terminal, is a voice-activated terminal emulator.

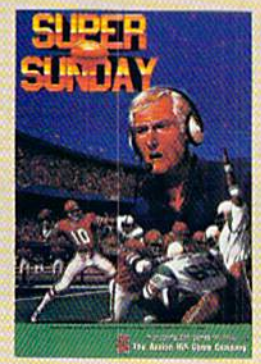
Shopping Tips

There are several considerations to keep in mind when you're thinking about purchasing a computer speech system. First, what are your plans for it? Do you need unlimited text-to-speech capability? If so, a digitizer is out. Do the words need to be crystal clear? This eliminates phonetic systems. Do you need speech recognition? That will call for a digitizer and microphone. Another consideration is cost. How much are you willing to spend to experiment with speech synthesis?

When you get to the store, keep in mind that some speech systems made by defunct manufacturers are still lying around on the shelves. They will work, and can often be purchased at bargain-basement prices. However, if anything goes wrong, you'll probably be out of luck as far as service and repairs is concerned. Unless you're clever with electronics, you'd best stick with current products.■

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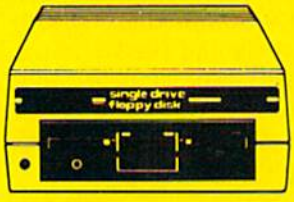


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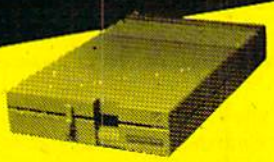


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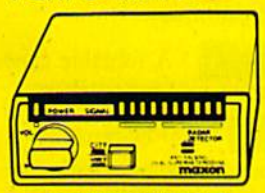


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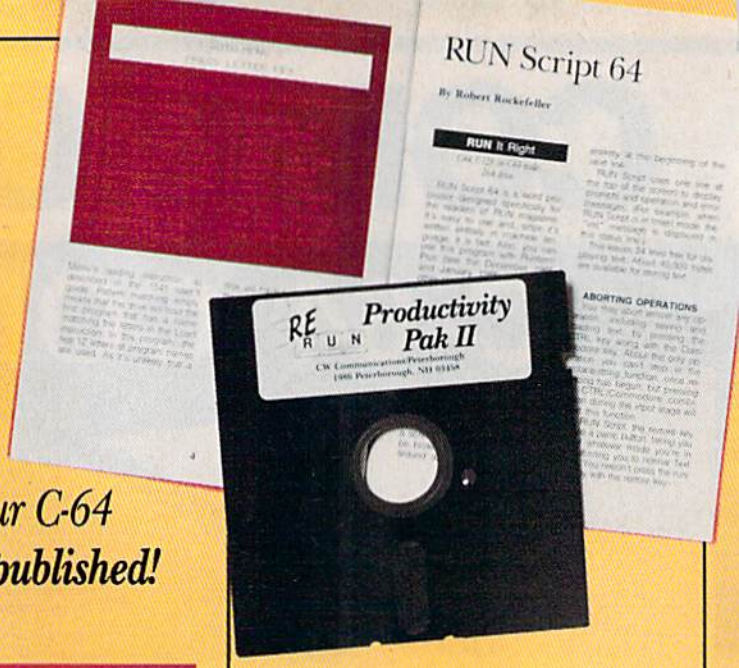
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BANK ON A SPREADSHEET

Structure your spreadsheet with this template that reconciles your checking account with speed and accuracy.

By JOSEPH SHAUGHNESSY

Last month, in the first of this two-article series, I introduced spreadsheets: what they are and what they can do for you. I also explained numerous terms used in spreadsheet work. This month I'll present a spreadsheet template that anyone who has a checking account, a home computer and a spreadsheet program can type in and use.

Ever since the day I discovered that banks can and do make mistakes, I've made a practice of reconciling the balance in my checkbook with the balance shown on the monthly bank statement. Initially I did it by hand with a little calculation form I'd made up. Now I've brought my little form into the computer age by transforming it into a spreadsheet template.

Creating the Template

A printout of a sample filled-in template appears in Figure 1. I created it with the CalcAid 64 spreadsheet program that was published in *RUN* last month. If you'll be using CalcAid 64 as your spreadsheet program, refer to the article for instructions on typing in the data—the labels and the formulas that constitute the "blank" template and the numeric data for a specific spreadsheet run. If you own another spreadsheet, refer to its literature for these instructions.

This template includes only text and formulas that don't change from one month to the next. When you're entering the text and formulas, start with the repeating text, which appears in Table 1. You can use the CalcAid copy command to replicate this text in the various cells. The nonrepeating text appears in Table 2, and the formulas in Table 3.

When you're done typing in the blank template, save it immediately with a unique name such as CHK-TEMPLATE. It would also be a good idea to save a backup. Forever after, to do a reconciliation for a month,

Figure 1. *Checking account template, filled in for December 1986.*

	0	1	2	3	4	5	6
A	CHECK #	DATE	DESCRIPTN	CHCK AMNT	DEPOSITS	TEMPORARY	BALANCE
B							243.74
C	182	12/1/86	TUPPERWAR	12.57		-12.57	231.17
D	183	12/2/86	CASH	100.00		-100.00	131.17
E	184	12/2/86	RUN MAGAZ	19.97		-19.97	111.2
F	DEPOSIT	12/5/86	PAYCHECK		883.61	883.61	994.81
G	185	12/7/86	ELECTRIC	167.85		-167.85	826.96
H	186	12/7/86	WATER/SWR	27.15		-27.15	799.81
I	187	12/7/86	KROER	125.00		-125.00	674.81
J	188	12/7/86	VISA	350.00		-350.00	324.81
K	189	12/10/86	CASH	100.00		-100.00	224.81
L	190	12/11/86	CAR PAYMN	283.75		-283.75	-58.94
M	DEPOSIT	12/11/86	PAYCHECK		302.19	302.19	243.25
N	191	12/11/86	OIL CHNG	16.80		-16.80	226.45
O	192	12/16/86	INSURANCE	95.00		-95.00	131.45
P	193	12/17/86	CASH	100.00		-100.00	31.45
Q	DEPOSIT	12/19/86	PAYCHECK		883.61	883.61	915.06
R	194	12/25/86	CHURCH	100.00		-100.00	815.06
S	DEPOSIT	12/27/86	PAYCHECK		256.45	256.45	1071.51
T	195	12/27/86	MORTGAGE	675.00		-675.00	396.51
U	196	12/30/86	KROGER	150.00		-150.00	246.51
V	197	12/31/86	DR SMITH	75.00		-75.00	171.51
W	DIVIDEND	12/1/86	INTEREST		6.73	6.73	178.24
X						0	178.24
Y							
Z			TOTALS	2398.09	2332.59	-65.50	178.24

you'll first load in your spreadsheet program and then use that program to load the template.

Now, enter the numeric input and run the spreadsheet. If your totals and summations agree with those in the example, then you probably typed in the formulas correctly. If there's a discrepancy, check the formulas for errors until you get a run that produces the correct results.

When you're actually using the template, you'll probably want to save each reconciliation for your records. *Be sure* you don't save it under the same name as the blank template or you'll lose the blank. I saved the reconciliation in the example as DEC86.

Template Capacity

CalcAid 64 provides 26 rows, designated A–Z, and 30 columns, designated 0–29. The top-left cell is called A0 and the bottom-right cell is Z29. Our simple template uses the cells from A0 to Z12, or slightly less than half the sheet—enough room for 22 transactions during a banking period.

There are ways to increase this capacity. CalcAid 64 can handle up to 66 transactions if you move columns 10–12 to the "edge" of the sheet, making them columns 27–29 and leaving columns 9–26 empty. Just repeat the template for cells A0–Z8 in this opened-up area. You'll do it twice, once for area A9–Z17 and again for area A18–Z26.

You'll have to adjust the formulas in these new areas to reflect the changed location of the cells and to carry the totals over from the last (Z) row of the previous block. For example, the Check Amount total at Z2 would be carried over to B12 (replacing the double underline) as a subtotal. The formula for B12 would then be Z2 + 0, and the formula for Z12 would be SUMB12 – Y12. This may seem more complicated than it really is. Play with it a little, and you'll soon get a feel for what's going on.

If you're using a spreadsheet that's more powerful than CalcAid 64, such as one of the commercial packages I mentioned last month, you'll have more than 26 rows available. To make room for additional transactions, just move the bottom line (row Z) to a row further down. You'll have to make sure the formulas in former cells Z3–Z8 are modified to reflect their new locations and that they include the new rows in their summations.

The Formulas

It'll be easier to understand the formulas in Table 3 if I explain what they're doing in the template. First of all, the input in columns 0–4 is pretty straightforward. The dividend item (interest on the checking account) from December 1 was added last because I didn't know what it would be until I got the bank statement.

Column 5, Temporary, automatically indicates whether the amount of a transaction is positive or negative, according to the column into which you entered the transaction amount. That way, you don't have to remember to do the pluses and minuses yourself. The column then holds the figures for further use.

7	8	9	10	11	12
UNRECRDED	ADJUSTMNT				
(0 or 1)			A CHECK	REGISTER	TEMPLATE
	0		*******	*******	*******
	0				
	0		BANK'S	STATEMENT	246.79
	0				
	0		MAKE THE	ADJUSTMNT	-68.55
	0				
	0		RECONCILE	BALANCE	178.24
	0				
	0				
	0		CHECKBOOK	BALANCE	178.24
	0				
	0				
	0			DIFFERNCE	0
	0			(SHOULD	
	0			BE ZERO)	
1	-100.00				
1	256.45				
	0				
1	-150.00				
1	-75.00				
	0				
	0				
	-68.55				

Column 6, Balance, is a running balance, just like you maintain in your checkstub register. Note that cell B6 is the month's opening balance. You must type the ending balance from the last month into B6; it's not a formula result. The final balance (Z6) should be the same as your check register balance *for the same date as the bank statement* (in this case, December 31, 1986). Remember to make any adjustments in your checkbook register for bank service charges or interest payments.

Column 7 is for transactions that don't appear on the bank statement, since the bank works on a time lag of about a week. If the bank statement doesn't show a particular check debit or deposit credit, enter a 1 in column 7 for that check or deposit. Otherwise, leave a blank or enter 0.

Column 8 makes an adjustment for the checks and deposits that don't show on the bank statement. The total at the bottom is how much "out of sync" your check register is with the statement. This is not an error; it's just that the bank's computer didn't know about these transactions on December 31, 1986.

Column 9 is blank, to separate sections, and columns 10 and 11 hold text that describes what's going on in column 12. Column 12 requires one entry by you every month, in cell E12. This is the balance in your account as shown by the bank statement. The adjustment is carried over from cell Z8, placed in G12 and subtracted from E12, then the adjusted (reconciled) balance appears in cell J12. Your checkbook balance shown in cell L12 (moved over from Z6) is then compared with the reconciled balance, by subtracting from J12. The difference (in O12) should be zero, or else someone has made a mistake.

There's one case that's a little awkward to handle. Suppose you write a check to someone and they forget to cash it for a few months. You'll find that your difference will no longer be zero, but the amount of that check. Make a note to yourself of what happened. When the person does cash the check, the discrepancy will clear up automatically in the next month's reconciliation. Until then, the same amount will just carry over from month to month.

There are templates available for just about any kind of financial program you might want to use or any number-juggling you might want to perform. If you're interested in other templates, there are books available that present many template models for the various spreadsheet programs in use. You should be able to decipher any of these templates, since all spreadsheets are based on a matrix of rows and columns. The books can be found in most computer stores and bookstores. ■

Address all author correspondence to Joseph J. Shaughnessy, Reynolds, Smith & Hills, PO Box 4850, Jacksonville, FL 32201.

Table 1. *Repeating text.*

CELLS B0–B5, B8, H12 AND M12	==========
CELLS Y0–Y8	----------
CELLS C10–C12	* * * * * * * * *

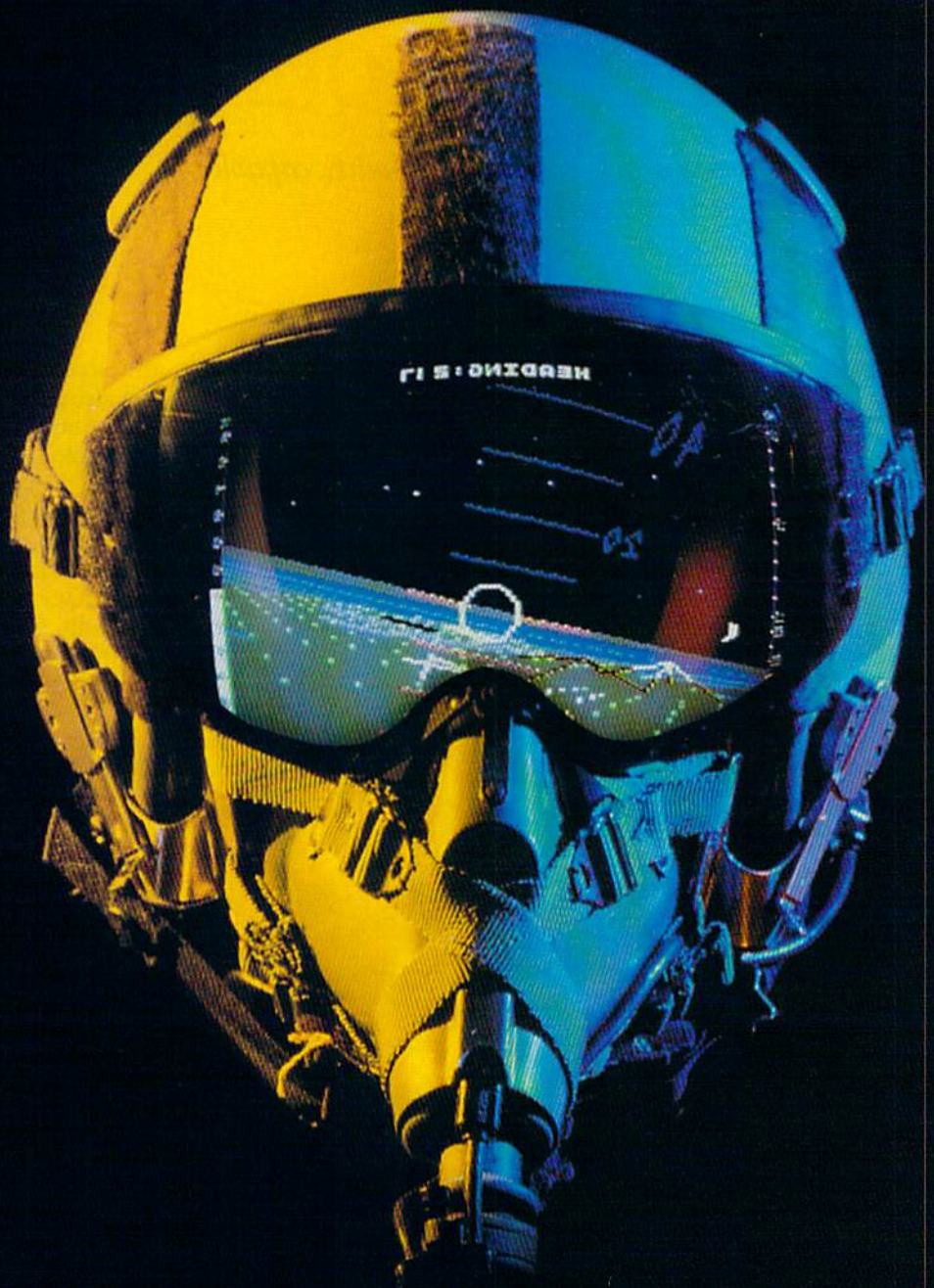
Table 2. *Nonrepeating text.*

CELL	TEXT	CELL	TEXT
A0	CHECK #	A1	DATE
A2	DESCRIPTN	A3	CHCK AMNT
A4	DEPOSITS	A5	TEMPORARY
A6	BALANCE	A7	UNRECRDED
A8	ADJUSTMNT	B7	(0 OR 1)
Z2	TOTALS	B10	A CHECK
B11	REGISTER	B12	TEMPLATE
E10	BANK'S	E11	STATEMENT
G10	MAKE THE	G11	ADJUSTMNT
I10	RECONCILE	I11	BALANCE
L10	CHECKBOOK	L11	BALANCE
O11	DIFFERNCE	P11	(SHOULD
Q11	BE ZERO)		

Table 3. *Formulas.*

CELL	FORMULA	CELL	FORMULA	CELL	FORMULA
C5	C4 – C3	J12	E12 + G12	R6	Q6 + R5
C6	B6 + C5	K5	K4 – K3	R8	R7*R5
C8	C7*C5	K6	J6 + K5	S5	S4 – S3
D5	D4 – D3	K8	K7*K5	S6	R6 + S5
D6	C6 + D5	L5	L4 – L3	S8	S7*S5
D8	D7*D5	L6	K6 + L5	T5	T4 – T3
E5	E4 – E3	L8	L7*L5	T6	S6 + T5
E6	D6 + E5	L12	Z6 + 0	T8	T7*T5
E8	E7*E5	M5	M4 – M3	U5	U4 – U3
F5	F4 – F3	M6	L6 + M5	U6	T6 + U5
F6	E6 + F5	M8	M7*M5	U8	U7*U5
F8	F7*F5	N5	N4 – N3	V5	V4 – V3
G5	G4 – G3	N6	M6 + N5	V6	U6 + V5
G6	F6 + G5	N8	N7*N5	V8	V7*V5
G8	G7*G5	O5	O4 – O3	W5	W4 – W3
G12	Z8 + 0	O6	N6 + O5	W6	V6 + W5
H5	H4 – H3	O8	O7*O5	W8	W7*W5
H6	G6 + H5	O12	J12 – L12	X5	X4 – X3
H8	H7*H5	P5	P4 – P3	X6	W6 + X5
I5	I4 – I3	P6	O6 + P5	X8	X7*X5
I6	H6 + I5	P8	P7*P5	Z3	SUMC3 – Y3
I8	I7*I5	Q5	Q4 – Q3	Z4	SUMC4 – Y4
J5	J4 – J3	Q6	P6 + Q5	Z5	Z4 – Z3
J6	I6 + J5	Q8	Q7*Q5	Z6	B6 + Z5
J8	J7*J5	R5	R4 – R3	Z8	SUMC8 – Y8

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By MARGARET MORABITO



The Spartan system unit fits conveniently under the video monitor.

When Mimic Systems began promoting their Spartan several years ago, the C-64 was selling like hotcakes, and its software base was still rather slim. It was a perfect time to introduce an add-on that would let the C-64 utilize the large reservoir of software then available for the Apple II and II+ computers.

Now, in 1986, Mimic Systems has finally started shipping its product; but times have changed. The II+ was discontinued several years ago, to be replaced by the IIe, and there is now a huge software base for the C-64. Despite these developments, the Spartan is a new product on the market that might prove useful for a specialized group of C-64 owners.

Adding an Apple

The Spartan I is basically an Apple II+ computer that you plug into the back of your C-64. For $299, you get the Spartan BUS card with a system box that houses the Spartan motherboard; a CPU card (with 64K RAM) that emulates an Apple II+; a DOS board for changing your 1541 disk drive into a dual-mode drive that will handle both Apple and Commodore disks; necessary cables and connectors; and accompanying documentation. You also get an Apple utility disk and a book about Basic programming with the Apple II.

What can this setup do? With the Spartan hooked to your C-64, and with your 1541 disk drive correctly converted into a dual-functioning drive, you have a unique computer system: a fully functioning C-64 and a fully functioning Apple II+. You can toggle between these two computers whenever you wish, and you can run software on both systems simultaneously.

Who Is It For?

The Spartan is a complex piece of hardware. On one hand, it's aimed at the general computerist who wants to run packaged commercial software for both the Apple II+ and C-64. On the other hand, it can be used by the hardcore computer programmer who wants to dive into the internal workings of this device.

The Spartan has provision for you to program it, through machine language, to allow shared memory access. Thus, you could create some interesting combinations by borrowing memory locations from one mode and using them in the other. In fact, Mimic refers to the Spartan I as the "Hacker Version." The accompanying documentation appears sufficiently detailed to acquaint advanced programmers with the internal mapping of the system.

Performance as an Apple II+

The Spartan works well as an Apple II+ emulator: You can run Apple DOS and ProDos programs. I tested it with about a dozen Apple II+ software products made by major producers, ranging from applications to education and game programs, and they all ran.

PHOTOGRAPHED BY LARRY DUNN

BBS 64 or 128 — $39.95

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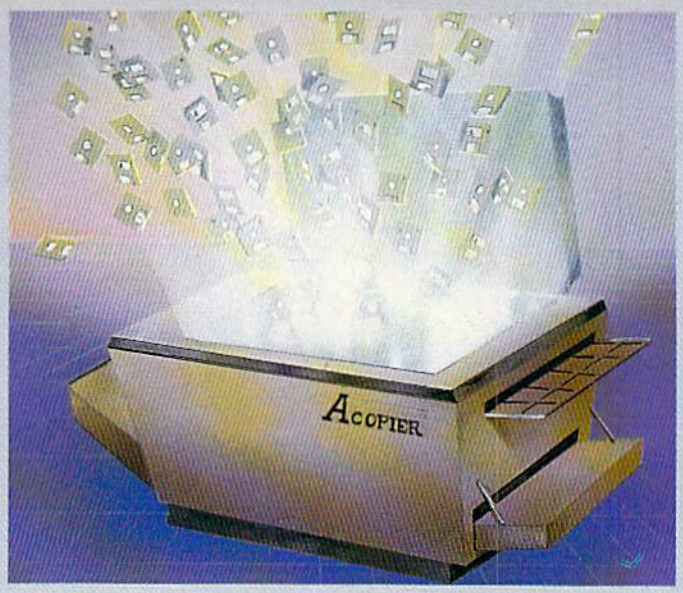
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Drive Monitor	Repair a Track

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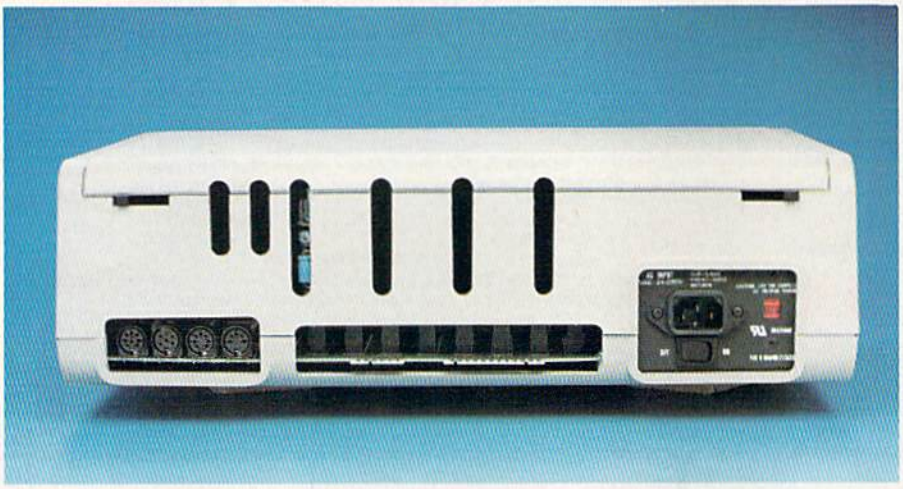
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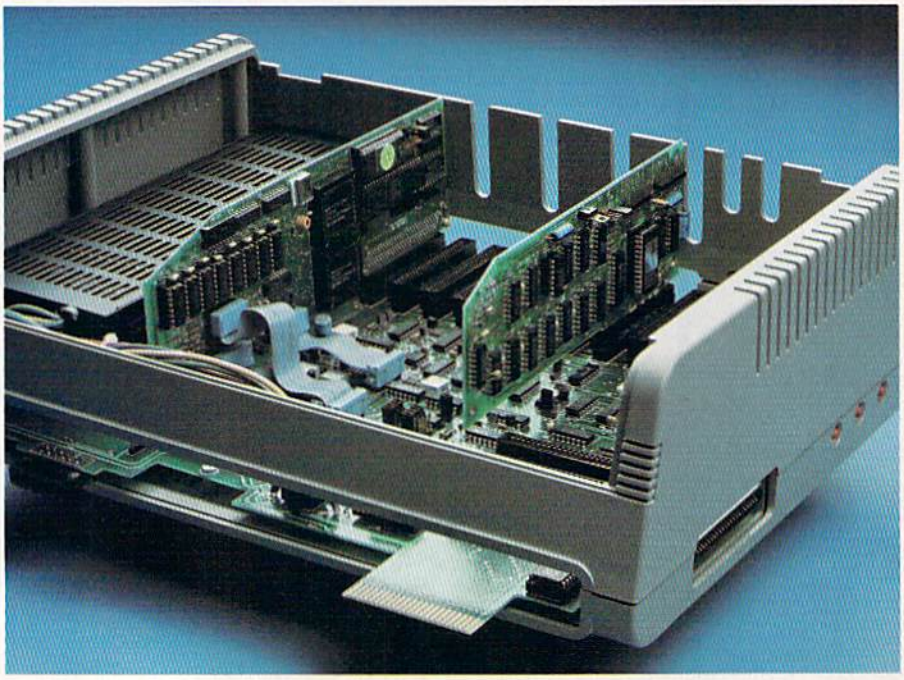
Circle 189 on Reader Service card.



The Spartan has front connectors that mate with the ports on the C-64.



All C-64 peripherals connect to the back ports of the Spartan unit.



Mimic supplies the Apple II+ CPU and DOS cards for the Spartan.

The Spartan Apple mode enhances the C-64 keyboard so you can use the commands necessary for much of the Apple software. For example, the left-arrow key has been reconfigured as the Apple escape key, the function keys have been assigned special tasks, and 28 added commands are achieved through Commodore-key combinations. Furthermore, three reset switches on the Spartan are used for resetting the Spartan mode, the Commodore mode and a Commodore cartridge.

The Spartan also has nine slots for cards. One of these contains the Spartan CPU card, leaving eight slots free for other Apple-compatible cards. Mimic packages a free disk drive card for slot 6, to which you can connect either a Commodore 1541 or an Apple drive.

The Spartan gave me no problems using Apple cards. I tried out a variety, including a disk drive card for the Apple dual disk drive, a Roland MIDI interface card and a Grappler printer card. All worked well.

During the testing of the Spartan, I was glad to have access to cards from one of our sister publications, *inCider* magazine. The average Commodore owner won't have any of these cards and should consider the additional cost when figuring the overall price for the Spartan.

At a minimum, you'll have to buy your own printer card to get hard copies in Apple mode. You'll probably want to get an 80-column card, too, and maybe a serial card for hooking up an Apple modem. Also, slot 0 has been reserved for extra RAM, up to 256K, if you can find software to support it. In general, cards like these cost anywhere from $40 to $100 each through mail order.

As for printers, the Apple mode can't use the serially interfaced Commodore printers; instead, it uses those with parallel interfaces, such as Epson and Star, among others. The Spartan does, however, let you use a Commodore video monitor, joysticks and cassette recorder in Apple mode.

Differences Between the II+ and IIe

The fact that the Apple II+ has been discontinued for several years makes one wonder why Mimic didn't opt for duplicating an Apple IIe. When I posed this question to a Mimic technician, he replied that when they began their initial research

several years ago, the IIe was newly released, so they decided to go ahead with emulating the well-tested II+.

They did have the foresight to put an extra 16K in their CPU, so the Spartan Apple II+ has 64K, rather than the 48K of the original II+ computers.

In general, you'll find that much of the educational and game software written when the Apple IIe line first appeared will run on the II+. However, there aren't many business and productivity programs for the II+ because the system can't meet the different demands they make. This is also true of many of the new software releases for the IIe and IIc.

Some of the features lacking in the II+ are an auxiliary slot to support bank switching of 64K memory units, open-Apple and close-Apple keys, lowercase characters and double hires graphics. While you can fix the lack of Apple keys and upper/lowercase through hardware add-ons and software-specific patches, nothing can be done about the lack of an auxiliary slot and graphics capabilities.

These differences are important only in terms of the end user's needs. If you don't need to run the new software, but are interested in running earlier educational and game programs, then a II+ clone is fine.

Turning Your 1541 Into an Apple Drive

Mimic assumes that Spartan owners will want to implant the Apple DOS card into their 1541 disk drives, thus minimizing the need to buy an Apple drive. However, this aspect of the Spartan system is a sore spot that Mimic has to face. In theory, it's an excellent idea; in practice, it's very iffy.

I've taken apart Commodore disk drives several times for realigning, so when I first discovered that I had to rip open a 1541 drive to convert it to read Apple disks, it didn't faze me. Little did I know! Mimic gives you all the hardware needed for the conversion: a large board full of chips, a bunch of wires with plugs, and four sticky squares to glue the board onto the inside cover of the drive. But the wretched documentation initially supplied led me astray. I expect Mimic will receive quite a few calls like the one I made when I finished following their instructions and my 1541 no longer functioned at all.

I must say, though, that the company has improved its documentation since I first tried to perform this operation, so new buyers should not encounter as many inconsistencies and misdirections as I did. The operation is still quite complicated, however, and you can permanently mess up your drive if it's not done properly. To the average C-64 owner, the investment in a disk drive is too important to take its demise lightly. So, be careful!

You do have the option of buying a separate Apple disk drive (at a cost of about $100 to $150). The Spartan will work with a 1541 while in C-64 mode and an Apple drive while in Apple mode, and both drives can be connected to the Spartan at the same time. After I ruined my 1541 drive, I decided to opt for a two-drive setup. I would recommend, if you can only afford one drive, that you take it to a service dealer to perform the conversion.

Performance as a C-64

Mimic claims that in C-64 mode, the Spartan acts just like your regular 64, but with extra features. The system mates with the C-64's back ports, and it duplicates all but the channel selector and RF output port. All the ports except the user port can be employed while you're in Apple mode. A problem occurs, however, with the user port. Although you can use it for telecommunications with a Commodore modem, the Spartan mode can't operate while you're doing so.

As for video options, you can run both the 64 and the Apple mode from one monitor. I successfully tested the Spartan with a 1702 monitor and a Zenith monochrome, but I did not try a television. Additional features in the 64 mode include four cartridge slots that you can access individually with a simple command, 15 additional commands from Basic and a machine language monitor.

When evaluating the Spartan for software compatibility, I was initially more concerned with its Apple emulation, and I was satisfied that it holds up to its promise of II+ capability.

When I started to examine the C-64 side and test out commercial software in that mode, I was surprised to run into difficulties. Using a 1541 drive, I was able to load and run all the public domain and noncopy-protected software I tried. But out of 14 commercial programs I tested (made by different producers), nine loaded and ran perfectly, two wouldn't load at all and locked up the computer, and three loaded but jumped back into Apple mode while they were running.

When questioned about this, the Mimic technician said the problem stems from the fact that the Spartan occupies 8K of the C-64's memory for its own special ROM. As a result, loading a long program that takes up all available memory creates a conflict that affects the video output and jumps the computer back to Apple mode. Consequently, while there's a lot of compatibility in C-64 mode, there's also the possibility that some C-64 software may not work.

Conclusion

Two major questions have to be asked about this product: Does it work? and Who needs it?

Overall, I would say that the Spartan works quite well, but it's a rather complicated device to install and use, it's not 100 percent compatible with C-64 software, and it places more technical demands on the user than is reasonable in these days of easy-to-handle computers.

The answer to the second question is, "It all depends." If you're a C-64 owner who happens to have access to a lot of Apple II+ software and some Apple cards, and you need to use that software, then, for an investment of $300, the Spartan may fill the bill. However, there are probably few users who fall into this category, and those who don't will find the Spartan an expensive gadget.

You should also know that most software that runs on an Apple II+ has already been converted over to the C-64, so you can get just about all you want without looking into the Apple orchard. Furthermore, if you have a C-64 and want to access more sophisticated applications and business software than the II+ or C-64 can handle, you might look into buying a C-128 or an inexpensive IIe/IIc clone for about the same cost as the Spartan with add-on cards.

For more information about the Spartan I, contact Mimic Systems at 1609B Fort St., Victoria, B.C., Canada V8R 1H8. 800-663-8527. ■

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

According to a company spokesman, Mimic has plans to package the Spartan with a disk drive, for about $30 extra.
—Eds.

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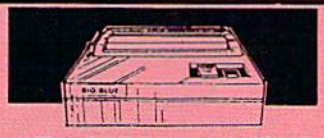
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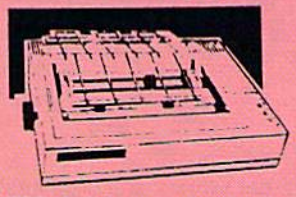
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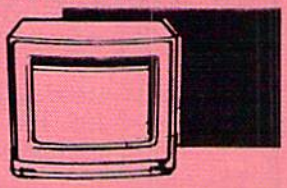
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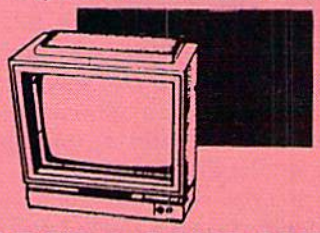
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SUM FUN

Low score adds up to a win in this educational game that's a challenge to all ages.

By MYRON B. ACHTMAN

Shut the Boxes is a dice game for the C-64 and C-128 that challenges the wits of both adults and children. The objective of the game, which can be played by one to four people, is to close the lids of nine boxes according to the "roll of the dice" and to accumulate the *lowest* possible score in the process. The program, written entirely in Basic, includes sound effects and some simple animation techniques.

Each round starts with all nine boxes open. The boxes are numbered 1–9, and after each roll you choose a box or combination of boxes to close whose numbers add up to the face value on the dice.

With a roll of 10, for example, you could select boxes 3 and 7; 1 and 9; 1, 4 and 5; 1, 2, 3 and 4; or any other combination that totals 10. If things are going well and the total value of the boxes you have left to close is 6 or less, the program rolls only one die.

Don't worry if you make a mistake when selecting the numbers. The program will let you know you've made an error and let you correct it. When choosing numbers, it's not necessary to press return after each selection.

The program prompts you for another choice when you haven't selected enough boxes yet, and it prints "that's a match" when your choices equal the face value on the dice.

At any time in the game when there's no box or combination of boxes left whose value equals the roll of the dice, you must press the F1 key. This terminates the round and displays your cumulative score. Each participant has three rounds of play to a turn.



Scoring

Your score is a concatenation, in ascending order, of the numbers of the boxes left uncovered. For example, if boxes 1, 5 and 8 remain uncovered, then your score is 158, not 14! You cannot cheat at Shut the Boxes, because the program constantly checks the choices you make against what is available on the screen.

There's no need to panic if your score starts getting high. At any time during the game, you may be lucky enough to close all nine boxes, and then your score will automatically go back to 0!

At the end of your turn, your score is displayed. If it's the "best low score so far," the bell tone sounds and your score remains in the upper-left corner of the screen. The best low score is always visible in this position, as a reminder of the score to beat.

The Strategy

As simple as Shut the Boxes may sound, there are strategies to keep in mind. For example, avoid choosing the number 2 box early in a round. If you select 2 during the first roll and your next roll comes up "snake eyes" (a pair of 1s), you'll be stuck with a very high score!

In general, it's best to match the dice with single boxes early in the round. For example, if you roll an 8, you're better off selecting box 8 than 1, 3 and 4. The time to choose multiple boxes is after you've closed about half the lids.

Remember, the more boxes that you leave uncovered, the higher your score. If you leave boxes 5, 6 and 9 open, 569 points will be added to your score; if you leave boxes 3, 4, 5 and 8 open, your score increases by a disastrous 3458 points!

Adult players usually are convinced they can combine their intuition and skill with a little help from Lady Luck to win Shut the Boxes. Young players learn from relating numbers to the patterns on the dice and from recognizing numerical combinations that will achieve a desired result. All in all, the game is an enjoyable combination of strategy and luck. R

Address all author correspondence to Myron B. Achtman, 116 Bermondsey Way, N.W., Calgary, Alberta, Canada T3K 1V4.

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Listing 1. *The Shut the Boxes program.*

```
10 XX=RND(-TI):U=37037036 7:PRINT
   CHR$(142)CHR$(8):GOTO110
                              :REM*56
20 GETNU$                     :REM*230
30 IFNU$="1"ORNU$="2"ORNU$="3"OR
   NU$="4"ORNU$="5"THEN100
                              :REM*14
40 IFNU$="6"ORNU$="7"ORNU$="8"OR
   NU$="9"ORNU$=CHR$(133)THEN100
                              :REM*92
50 PRINTCHR$(18)CHR$(32)CHR$(146
   )CHR$(157);:T2=TI+15       :REM*200
60 IFTI<T2THEN60              :REM*26
70 PRINTCHR$(32)CHR$(157);:T2=TI
   +15                        :REM*242
80 IFTI<T2THEN80              :REM*50
90 GOTO20                     :REM*220
100 RETURN                    :REM*158
110 GOSUB1880:GOSUB1660:POKE5328
    0,1:POKE53281,1           :REM*114
120 PRINT"{SHFT CLR}{4 CRSR DNs}
    {CTRL 3}{12 SPACEs}SHUT THE
    BOXES":FORT=1TO2000:NEXT
                              :REM*234
130 PRINT"{COMD 7}{3 CRSR DNs}{2
    5 COMD @s}"               :REM*122
140 PRINT"{CTRL 9} * IMPORTANT R
    EMINDER... "              :REM*202
150 PRINT"{38 COMD @s}"       :REM*222
160 PRINT"{CTRL 9} * PRESS F1 WH
    EN NONE OF THE BOXES{4 SPACE
    s}"                       :REM*160
170 PRINT"{38 COMD @s}"       :REM*242
180 PRINT"{CTRL 9} * MATCH THE R
    OLL OF YOUR DICE{8 SPACEs}":
    FORT=1TO400:NEXT          :REM*70
190 IFU=37037036 7THEN210:REM*234
200 PRINT"{CTRL 8}{SHFT CLR}"U:P
    RINT"{HOME}{CRSR DN}{CTRL 3}
    {13 SPACEs}SHUT THE BOXES{CT
    RL 7}{CRSR DN}":GOTO220
                              :REM*46
210 PRINT"{SHFT CLR}{CRSR DN}{CT
    RL 3}{13 SPACEs}SHUT THE BOX
    ES{CTRL 7}{CRSR DN}":REM*208
220 PRINTBX$(1):PRINTBX$(2):PRIN
    TBX$(3)+"{CTRL 6}":PRINTBX$(
    4):PRINTBX$(4):PRINTBX$(4)
                              :REM*238
230 DC=45                     :REM*18
240 IFDC<7THENGOSUB1550:GOTO260
                              :REM*88
250 GOSUB1370                 :REM*224
260 PRINT"{CTRL 7}"SQ$"{CRSR UP}
     SELECT YOUR BOX(ES)"
                              :REM*137
270 PRINTL$(1):PRINTL$(2):PRINTL
    $(3):PRINTL$(4):PRINTL$(5):P
    RINTL$(6)                 :REM*173
280 DU=0:PCH=0:C=1            :REM*45
290 PRINT"{CTRL 6}"SQ$" SHUT BOX
     NUMBER ? ";              :REM*211
300 GOSUB20                   :REM*249
310 PRINTNU$:IFNU$=CHR$(133)THEN
    1000                      :REM*135
320 NU=VAL(NU$):SU=NU:GOSUB970
                              :REM*71
330 IFPCH=1THENGOSUB1330:REM*217
340 IFDU=1THENGOSUB1320:GOTO260
                              :REM*29
350 IFNU>TTTHENPRINT"{CTRL 5} CH
    OICE TOO LARGE!!!":DU=1:GOSU
    B1860:GOTO340             :REM*181
360 IFNU<TTTHEN380            :REM*133
370 UV=NU:GOTO730             :REM*43
380 GOSUB1340                 :REM*3
390 PRINT"{3 SPACEs}AND WHAT ELS
    E ? ";                    :REM*37
400 GOSUB20                   :REM*93
410 PRINTNU$:IFNU$=CHR$(133)THEN
    1000                      :REM*235
420 EL=VAL(NU$):SU=EL:GOSUB970
                              :REM*175
430 IFPCH=1THENGOSUB1330 :REM*61
440 IFDU=1THENGOSUB1320:GOTO260
                              :REM*129
450 IFEL=NUTHENGOSUB1350:GOTO440
                              :REM*157
460 UV=EL+NU                  :REM*11
470 IFUV>TTTHENGOSUB1360:GOTO440
                              :REM*197
480 IFUV<TTTHEN500            :REM*41
490 GOTO730                   :REM*5
500 GOSUB1340                 :REM*123
510 PRINT"{2 SPACEs}CHOOSE ANOTH
    ER ? ";                   :REM*9
520 GOSUB20                   :REM*214
530 PRINTNU$:IFNU$=CHR$(133)THEN
    1000                      :REM*100
540 CA=VAL(NU$):SU=CA:GOSUB970
                              :REM*190
550 IFPCH=1THENGOSUB1330:REM*182
560 IFDU=1THENGOSUB1320:GOTO260
                              :REM*250
570 IFCA=NUORCA=ELTHENGOSUB1350:
    GOTO560                   :REM*234
580 UV=UV+CA                  :REM*214
590 IFUV>TTTHENGOSUB1360:GOTO560
                              :REM*68
600 IFUV<TTTHEN620            :REM*172
610 GOTO730                   :REM*126
620 GOSUB1340                 :REM*244
630 PRINT"YOUR LAST CHOICE ? ";
                              :REM*224
640 GOSUB20                   :REM*78
650 PRINTNU$:IFNU$=CHR$(133)THEN
    1000                      :REM*220
660 LC=VAL(NU$):SU=LC:GOSUB970
                              :REM*240
670 IFPCH=1THENGOSUB1330 :REM*46
680 IFDU=1THENGOSUB1320:GOTO260
                              :REM*114
690 IFLC=NUORLC=ELORLC=CATHENGOS
    UB1350:GOTO680            :REM*62
700 UV=UV+LC                  :REM*90
710 IFUV>TTTHENGOSUB1360:GOTO680
                              :REM*192
720 IFUV<TTTHENPRINT"{CTRL 3} ON
    LY 4 CHOICES ARE ALLOWED!":C
    =C-1:DU=1:GOSUB1860:GOTO680
                              :REM*134
730 PRINT"{CTRL 5} THAT'S A MATC
    H!"                       :REM*228
740 DC=DC-UV                  :REM*110
750 ONCGOTO790,780,770,760
                              :REM*178
760 LETW=LC:GOTO800           :REM*182
770 LETW=CA:GOTO800           :REM*31
780 LETW=EL:GOTO800           :REM*45
790 LETW=NU:GOTO800           :REM*155
800 GOSUB850                  :REM*117
810 IFC>0THEN750              :REM*179
820 IFDC=0THENGOSUB1820:GOTO1000
                              :REM*233
830 FORT=1TO1000:NEXT         :REM*71
840 GOTO240                   :REM*77
850 C=C-1                     :REM*239
860 R=(W-1)*4                 :REM*129
870 READX,Y,A,B               :REM*147
880 IFX=-1THENRESTORE:RETURN
                              :REM*95
890 IFX=9THENGOSUB1800:GOTO870
                              :REM*5
900 POKE1024+(X+R)+40*(Y),A
                              :REM*213
910 POKE55296+(X+R)+40*(Y),B
                              :REM*251
920 GOTO870                   :REM*253
930 DATA2,5,160,5,2,8,76,6,3,5,1
    60,5,3,8,111,6,4,5,160,5,4,8
    ,122,6,9,9,9,9            :REM*149
940 DATA4,4,160,5,4,7,106,6,3,4,
    160,5,3,7,160,1,2,4,160,5,2,
    7,116,6,9,9,9,9           :REM*83
950 DATA2,3,160,5,2,6,116,6,3,3,
    160,5,3,6,160,1,4,3,160,5,4,
    6,106,6,9,9,9,9           :REM*19
960 DATA-1,-1,-1,-1           :REM*93
970 IFPEEK(1187+(SU-1)*4)=160THE
    N990                      :REM*9
980 RETURN                    :REM*17
990 PCH=1:RETURN              :REM*15
1000 B$(1)="":B$(2)="":B$(3)="":
     B$(4)="":B$(5)="":B$(6)="":
     B$(7)="":B$(8)=""        :REM*119
1010 B$(9)=""                 :REM*213
1020 PRINTL$(1):PRINTL$(2):PRINT
     L$(3):PRINTL$(4):PRINTL$(5)
                              :REM*103
1030 PRINTSQ$+"{CRSR DN}"
                              :REM*182
1040 PRINT"{CTRL 8}{10 SPACEs}**
     ** SCOREBOARD ****":REM*114
1050 FORPK=1TO9               :REM*136
1060 IFPEEK(1187+(PK-1)*4)<>160T
     HENB$(PK)=CHR$(48+PK)
                              :REM*74
1070 NEXTPK                   :REM*114
1080 Q=Q+1                    :REM*208
1090 SK$=B$(1)+B$(2)+B$(3)+B$(4)
     +B$(5)+B$(6)+B$(7)+B$(8)+B$
     (9)                      :REM*196
1100 P1=VAL(SK$)              :REM*236
1110 FS=FS+P1:IFDC=0THENFS=0
                              :REM*174
1120 IFQ=3THENPRINT"{CTRL 7}{CRS
     R DN} YOUR FINAL SCORE IS";
     FS:GOTO1160              :REM*68
1130 PRINT"{CTRL 7}{CRSR DN} YOU
     R SCORE SO FAR IS";FS
                              :REM*132
1140 FORI=1TO3000:NEXT        :REM*40
1150 GOTO190                  :REM*204
1160 PRINT"{CTRL 3}{CRSR DN} GAM
     E OVER...PLAY AGAIN <Y/N> ?
     "                        :REM*154
1170 IFFS<=UTHENPRINT"{HOME}{10
     SPACEs}"                 :REM*130
1180 IFFS<=UTHENPRINT"{HOME}{CTR
     L 8}"FS"{2 SPACEs}BEST LOW
     SCORE SO FAR!{CTRL 3}":GOSU
     B1820                    :REM*194
1190 POKE781,23:POKE782,32:POKE7
     83,0:SYS6552             :REM*46
1200 GETYN$:IFYN$="Y"ORYN$="N"TH
     EN1260                   :REM*94
1210 PRINTCHR$(18)CHR$(32)CHR$(1
     46)CHR$(157);:T2=TI+15
                              :REM*160
1220 IFTI<T2THEN1220          :REM*58
1230 PRINTCHR$(32)CHR$(157);:T2=
     TI+15                    :REM*126
1240 IFTI<T2THEN1240          :REM*94
1250 GOTO1200                 :REM*204
1260 PRINTYN$:IFYN$="Y"THENCLR:G
     OSUB1280:GOTO110         :REM*250
1270 PRINT"{CTRL 3}{SHFT CLR}{4
     CRSR DNs}{16 SPACEs}THE END
     !":END                   :REM*244
1280 FORH=1024TO1033          :REM*35
1290 U$=U$+CHR$(PEEK(H))      :REM*23
1300 NEXT                     :REM*35
1310 U=VAL(U$):RETURN         :REM*177
1320 PRINT"{CTRL 8} LET'S START
     OVER AGAIN.{CTRL 7}":FORT=1
     TO2000:NEXT:RETURN       :REM*167
1330 PRINT"{CTRL 3} YOU ALREADY
     PICKED THAT BOX!{CTRL 7}":C
     =C-1:DU=1:GOSUB1860:RETURN
                              :REM*129
1340 C=C+1:DU=0:PCH=0:RETURN
```

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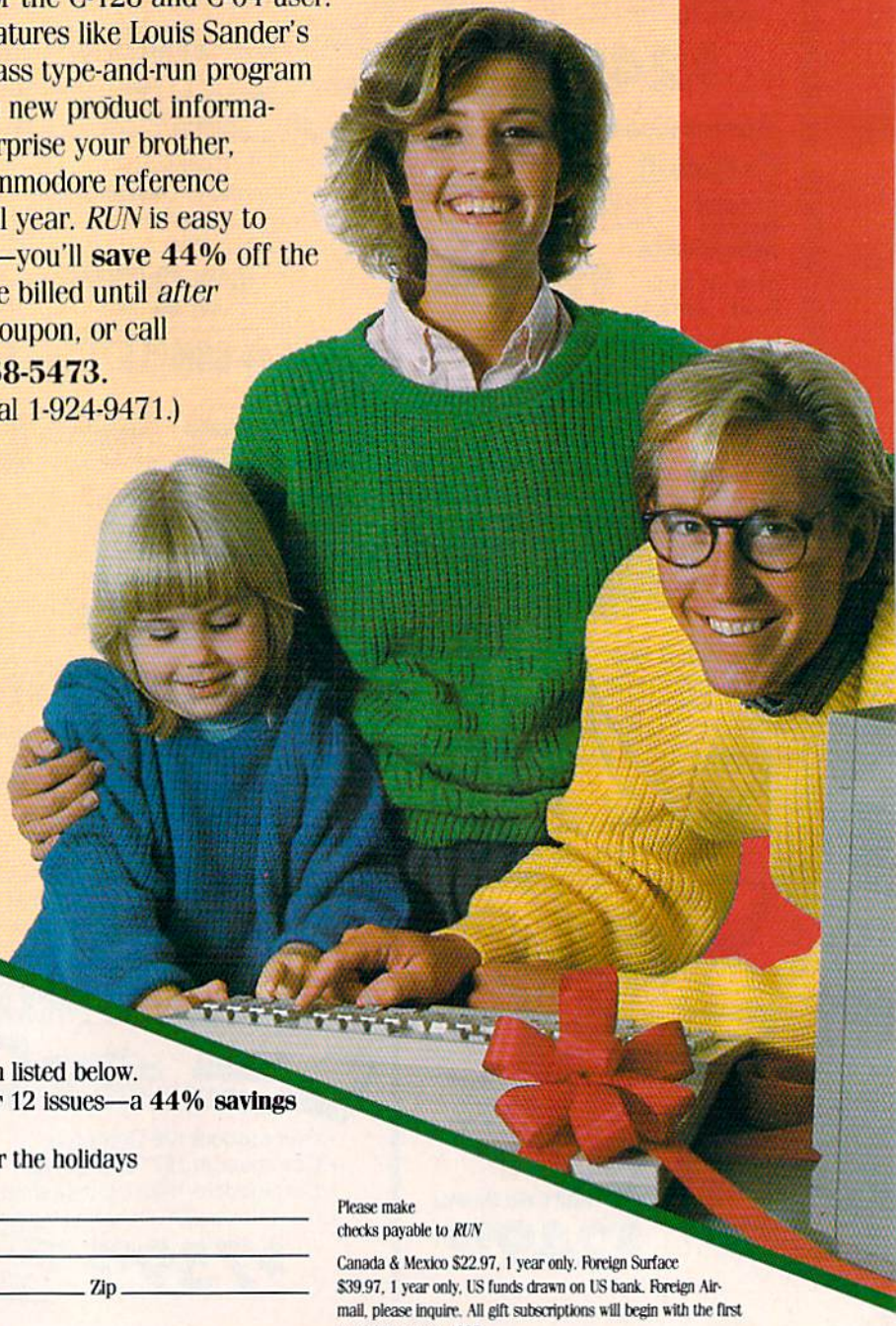
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Listing 1 continued.

```
                              :REM*35
1350 PRINT"{CTRL 3} YOU CAN'T PI
     CK SAME BOX TWICE!{CTRL 7}"
     :C=C-1:DU=1:GOSUB1860:RETUR
     N                        :REM*47
1360 PRINT"{CTRL 3} YOUR LAST CH
     OICE WAS TOO LARGE.{CTRL 7}
     ":C=C-1:DU=1:GOSUB1860:RETU
     RN                       :REM*93
1370 PRINTSQ$"{CRSR UP}"BK$"{CTR
     L 1}"                    :REM*251
1380 FORI=1TO8                :REM*81
1390 D1=INT(6*RND(1)+1)       :REM*45
1400 D2=INT(6*RND(1)+1)       :REM*63
1410 PRINTRQ$SPC(14);         :REM*205
1420 OND1GOSUB1490,1500,1510,152
     0,1530,1540              :REM*217
1430 PRINTRQ$SPC(20);         :REM*95
1440 OND2GOSUB1490,1500,1510,152
     0,1530,1540              :REM*253
1450 GOSUB1780                :REM*247
1460 NEXTI                    :REM*13
1470 TT=D1+D2                 :REM*181
1480 RETURN                   :REM*7
1490 PRINTD$(1);:PRINTD$(2);:PRI
     NTD$(3);:PRINTD$(2);:PRINTD
     $(4):RETURN              :REM*33
1500 PRINTD$(1);:PRINTD$(5);:PRI
     NTD$(2);:PRINTD$(6);:PRINTD
     $(4):RETURN              :REM*175
1510 PRINTD$(1);:PRINTD$(5);:PRI
     NTD$(3);:PRINTD$(6);:PRINTD
     $(4):RETURN              :REM*249
1520 PRINTD$(1);:PRINTD$(7);:PRI
     NTD$(2);:PRINTD$(7);:PRINTD
     $(4):RETURN              :REM*131
1530 PRINTD$(1);:PRINTD$(7);:PRI
     NTD$(3);:PRINTD$(7);:PRINTD
     $(4):RETURN              :REM*205
1540 PRINTD$(1);:PRINTD$(8);:PRI
     NTD$(2);:PRINTD$(8);:PRINTD
     $(4):RETURN              :REM*24
1550 PRINTRQ$+BK$:PRINTRQ$+"{CRS
     R DN}"+BK$:PRINTRQ$+"{2 CRS
     R DNs}"+BK$:PRINTRQ$+"{3 CR
     SR DNs}"+BK$             :REM*246
1560 PRINTRQ$+"{4 CRSR DNs}"+BK$
     :PRINTRQ$+"{5 CRSR DNs}"+BK
     $:PRINT"{HOME}{CTRL 1}"
                              :REM*36
1570 FORI=1TO8                :REM*16
1580 D1(I)=INT(6*RND(1)+1)
                              :REM*180
1590 IFD1(I)=D1(I-1)THEN1580
                              :REM*90
1600 PRINTRQ$SPC(17);         :REM*144
1610 OND1(I)GOSUB1490,1500,1510,
     1520,1530,1540           :REM*14
1620 GOSUB1780                :REM*162
1630 NEXTI                    :REM*184
1640 TT=D1(8)                 :REM*0
1650 RETURN                   :REM*178
1660 BX$(1)="{2 SPACEs}{SHFT O}{
     COMD Y}{SHFT P} {SHFT O}{CO
     MD Y}{SHFT P} {SHFT O}{COMD
      Y}{SHFT P} {SHFT O}{COMD Y
     }{SHFT P} {SHFT O}{COMD Y}{
     SHFT P} {SHFT O}{COMD Y}{SH
     FT P} {SHFT O}{COMD Y}{SHFT
      P} {SHFT O}{COMD Y}{SHFT P
     } {SHFT O}{COMD Y}{SHFT P}"
                              :REM*22
1670 BX$(2)="{2 SPACEs}{COMD H}1
     {COMD N} {COMD H}2{COMD N}
     {COMD H}3{COMD N} {COMD H}4
     {COMD N} {COMD H}5{COMD N}
     {COMD H}6{COMD N} {COMD H}7
     {COMD N} {COMD H}8{COMD N}
     {COMD H}9{COMD N}" :REM*192
1680 BX$(3)="{2 SPACEs}{COMD H}
     {COMD N} {COMD H} {COMD N}
     {COMD H} {COMD N} {COMD H}
     {COMD N} {COMD H} {COMD N}
     {COMD H} {COMD N} {COMD H}
     {COMD N}"  :REM*54
1690 BX$(4)="{2 SPACEs}{CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0} {CTRL 9}{
     3 SPACEs}{CTRL 0}" :REM*142
1700 RQ$="{HOME}{10 CRSR DNs}":S
     Q$="{HOME}{17 CRSR DNs}"
                              :REM*24
1710 BK$="{39 SPACEs}"  :REM*184
1720 L$(1)=SQ$+BK$:L$(2)=SQ$+"{C
     RSR DN}"+BK$:L$(3)=SQ$+"{2
     CRSR DNs}"+BK$:L$(4)=SQ$+"{
     3 CRSR DNs}"+BK$    :REM*170
1730 L$(5)=SQ$+"{4 CRSR DNs}"+BK
     $:L$(6)=SQ$+"{5 CRSR DNs}"+
     BK$                      :REM*38
1740 D$(1)="{SHFT O}{3 COMD Ys}{
     SHFT P}{5 CRSR LFs}{CRSR DN
     }":D$(2)="{COMD H}{3 SPACEs
     }{COMD N}{5 CRSR LFs}{CRSR
     DN}":D$(3)="{COMD H} {SHFT
     Q} {COMD N}{5 CRSR LFs}{CRS
     R DN}"                   :REM*70
1750 D$(4)="{SHFT L}{3 COMD Ps}{
     SHFT @}":D$(5)="{COMD H}{SH
     FT Q}{2 SPACEs}{COMD N}{5 C
     RSR LFs}{CRSR DN}":D$(6)="{
     COMD H}{2 SPACEs}{SHFT Q}{C
     OMD N}{5 CRSR LFs}{CRSR DN}
     ":D$(7)="{COMD H}{SHFT Q} {
     SHFT Q}{COMD N}{5 CRSR LFs}
     {CRSR DN}"               :REM*216
1760 D$(8)="{COMD H}{3 SHFT Qs}{
     COMD N}{5 CRSR LFs}{CRSR DN
     }"                       :REM*78
1770 RETURN                   :REM*42
1780 V=54296:W=54276:A=54277:H=5
     4273:L=54272:FORX=5TO0STEP-
     1:POKEV,X:POKEW,129 :REM*20
1790 POKEA,15:POKEH,200:POKEL,20
     0:NEXT:POKEW,0:POKEA,0:RETU
     RN                       :REM*216
1800 V=54296:W=54276:A=54277:H=5
     4273:L=54272:PH=54275:POKEV
     ,5:POKEW,65:POKEA,15
                              :REM*175
1810 POKEPH,15:FORM=20TO5STEP-2:
     POKEH,40:POKEL,M:NEXT:POKEW
     ,0:RETURN                :REM*225
1820 FORL=1TO10STEP1:POKE54296,1
     5:POKE54273,40:POKE54277,9:
     POKE54278,0              :REM*33
1830 POKE54276,17:FORT=1TO100:NE
     XT:POKE54276,16:NEXTL:POKE5
     4296,15:POKE54273,40
                              :REM*189
1840 POKE54277,9:POKE54278,0:POK
     E54276,17:FORT=1TO200:NEXT:
     POKE54276,16             :REM*67
1850 POKE54296,00:GOSUB1880:RETU
     RN                       :REM*97
1860 POKE54296,5:POKE54273,5:POK
     E54277,0:POKE54278,240:POKE
     54276,33                 :REM*1
1870 FORT=1TO1000:NEXT:POKE54276
     ,32:POKE54296,0:RETURN
                              :REM*85
1880 POKE54296,0:POKE54273,5:POK
     E54277,0:POKE54278,240:POKE
     54276,33                 :REM*11
1890 FORT=1TO10:NEXT:POKE54276,3
     2:POKE54296,0:RETURN
                              :REM*147
```

■

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ML Perfect Typist Version 2.0

This revised version of RUN*'s ML Perfect Typist is required whenever you have machine language programs to enter.*

By JIM BORDEN

The C-128 machine language listings in *RUN* consist of a series of program lines, each of which begins with a four-digit line number, followed by 13 pairs of hexadecimal characters (letters or numbers, refered to herein as digits). ML Perfect Typist is provided for accurate and easy entry of these listings.

In an ML listing line, the first eleven pairs of numbers after the line number constitute the program's machine code. The last two pairs are checksum values used by ML Perfect Typist. You cannot type in line numbers or spaces; these are automatically entered. Only the 0–9, A–F, insert, delete, cursor-right, cursor-left, and return keys are active during ML line data input. To speed your typing, the C-128's keypad has been modified so that function keys 1, 3, 5 and 7 and the + and − keys produce, respectively, the letters A through F, needed for entering hexadecimal code. You can use the keypad, the normal keys or any combination of the two for entering lines.

Entering New Lines

To type in a machine language listing, first load and run ML Perfect Typist, which can be typed in using 128 Perfect Typist (see p. 157) in 128 mode. Be sure to save it to disk after you've typed it in. ML Perfect Typist will automatically go into Line Entry mode and display 0001. You can then begin to enter your ML program. Several keys require some explanation.

The cursor-right key will move the cursor only one space past the last digit you've typed in. Also, if you try to use the insert key to enter a space, a question mark will fill the inserted space. You must then type a digit over the question mark in order for the cursor keys and the return key to work. You can delete the question mark or any other digit with the delete key. This all sounds more complicated than it is.

When you type the second digit of the 13th pair, an automatic return enters the line for you. If the line is correct, you hear a bell, and the next line number is displayed. If the line contains an error, you hear a buzz, and the cursor moves to the first column. In that case, you can move across the line with the cursor keys and correct the error. When you're satisfied with the line, press the return key. The line is then checked, and you'll hear a bell (correct) or a buzz (error).

The delete key has a special function if the cursor is in the first column of the line. Pressing the delete key in that case will pull all the digits to the right of the cursor back one space to the left. This is used mainly to delete an entire line and start over. When the cursor's in any column but column one, the delete key operates normally.

Short Lines

The last line of an ML program is the *only* line that can be a short one, so it's impossible to enter any subsequent line unless the current line is a full one. If you enter a short (last) line, and it has the correct checksum, you'll hear both a bell *and* a buzz. So, if the last line of the program is a short one, be *sure* you hear the bell and buzz combination; if you do not, the code of that line will not be added to the ML code you have entered.

The Menu

While editing a line, you can call up the following menu of six available options by pressing CTRL/e:

1) Load—Use this option to load either a finished program or one you are working on. The program will load any ML code—complete files, incomplete files, even complete files created by the original ML Perfect Typist. Be sure that your disk drive is on before attempting to load a file.

2) Save—This option allows you to save what you've entered so far. Unlike the original ML Perfect Typist, ML Perfect Typist Version 2.0 always uses exactly the same method for saving programs, whether they're partial or complete. Again, be sure that your disk drive is on before entering a filename.

3) List—This option will produce a hard-copy listing like those published in *RUN*. You'll be prompted to list to the screen or to the printer. If you list to the screen, the line number will appear one line above the data. If you list to the printer, be sure your printer is on-line before selecting the printer option. Printer output prints the entire line in a format identical to the one in *RUN*. The printer output also sends a form-feed (CHR$(12)) after every 60 lines.

You can pause a listing to the screen with the shift key or exit it with the stop key. If the printer is off, you'll hear a buzz, and the screen will display the last line.

4) Edit Old Line—Although it's an unlikely occurrence, it is possible to get a correct checksum by inadvertently swapping the positions of two or more digits in a line. If you finish the ML program, yet it does not work properly, load it into ML Perfect Typist and list it with the List option. When you find the line with the swapped digits or other error, select the Edit Old Line option and enter the four-digit line number (e.g., 0025, not 25). The line will be displayed for you to edit. After you correct it and press the return key, you'll hear the bell and will automatically be returned to the Enter New Lines option. Be sure you resave the corrected program with a new filename.

5) Enter New Lines—This is the option you'll use most of the time. Edit mode works as explained above. ML Perfect Typist automatically returns you to this mode after you choose any option but Exit.

6) Exit—This option returns you to Basic. You'll get a prompt to ensure that you save the program you've entered before you exit to Basic.

In all options except those involved in entering program lines (options 4 and 5), you are in the Basic screen editor. All keys, including the color keys, for example, are active during input, so be careful what keys you press. The function keys on the C-128 that were defined as A, B, C and D will return to your definitions when you exit to Basic. Finally, you can employ either the 40- or 80-column display, but only the left half of the 80-column screen is used, so it's easier to read if you use 40-column mode. R

Address all author correspondence to Jim Borden, 641 Adams Road, Carlisle, PA 17013.

Listing 1. *ML Perfect Typist Version 2.0.*

```
1 REM ML PERFECT TYPIST 64/128 V
  2.Ø                          :REM*199
2 REM BY JAMES E. BORDEN :REM*66
3 REM 641 ADAMS ROAD     :REM*185
4 REM CARLISLE, PA 17Ø13 :REM*74
5 REM                          :REM*67
1Ø IFPEEK(65333)=ØTHENGRAPHIC CL
  R:BANKØ                      :REM*18
11 FORX=17884TO2Ø394:READD:POKEX
  ,D:PRINT".";:NEXT:SYS17884:NE
  W                            :REM*153
12 DATA 169,38,133,252,169,7Ø,13
  3,254,169,Ø,133,251,133,253,1
  6Ø,Ø,177,253                 :REM*24Ø
13 DATA 145,251,136,2Ø8,249,23Ø,
  252,23Ø,254,165,252,2Ø1,48,2Ø
  8,237,76,Ø,38                :REM*1Ø5
14 DATA 162,Ø,142,Ø,255,173,53,2
  55,2Ø8,5Ø,189,2Ø2,46,157,226,
  46,232,224,16                :REM*16
15 DATA 2Ø8,245,169,43,141,24Ø,4
  6,169,45,141,241,46,162,Ø,189
  ,Ø,16,157,Ø,17               :REM*141
16 DATA 189,25Ø,46,157,Ø,16,232,
  224,16,2Ø8,239,169,Ø,141,92,4
  2,169,211,141                :REM*9Ø
17 DATA 91,42,32,125,45,162,Ø,14
  2,247,47,142,233,47,32,52,45,
  76,5,39,162,Ø                :REM*3
18 DATA 189,8,47,24Ø,11,32,21Ø,2
  55,232,2Ø8,245,162,4,32,221,4
  4,169,63,32                  :REM*Ø
19 DATA 21Ø,255,169,32,32,21Ø,25
  5,32,2Ø7,255,2Ø1,13,2Ø8,11,32
  ,21Ø,255,169                 :REM*2Ø9
2Ø DATA 145,32,21Ø,255,76,9Ø,38,
  72,169,13,32,21Ø,255,1Ø4,2Ø1,
  53,2Ø8,24,32,5               :REM*96
21 DATA 45,32,151,45,169,Ø,141,2
  33,47,56,32,24Ø,255,142,221,4
  7,14Ø,222,47                 :REM*169
22 DATA 76,57,39,2Ø1,54,2Ø8,35,1
  62,Ø,189,153,47,24Ø,6,32,21Ø,
  255,232,2Ø8                  :REM*234
23 DATA 245,32,2Ø7,255,2Ø1,78,24
  Ø,12,2Ø1,89,2Ø8,245,169,255,1
  41,249,47,32                 :REM*221
24 DATA 146,42,76,238,38,2Ø1,52,
  2Ø8,3,76,217,4Ø,2Ø1,51,2Ø8,3,
  76,165,41,2Ø1                :REM*52
25 DATA 5Ø,2Ø8,8,169,1,141,249,4
  7,76,146,42,2Ø1,49,24Ø,3,76,9
  Ø,38,169,Ø,141               :REM*191
26 DATA 249,47,76,146,42,173,53,
  255,2Ø8,13,162,Ø,189,Ø,17,157
  ,Ø,16,232,224                :REM*18
27 DATA 16,2Ø8,245,169,147,76,21
  Ø,255,162,Ø,189,229,47,32,21Ø
  ,255,232,224,4               :REM*121
28 DATA 2Ø8,245,169,13,32,21Ø,25
  5,32,21Ø,255,56,32,24Ø,255,14
  2,221,47,14Ø                 :REM*134
29 DATA 222,47,169,Ø,141,171,47,
  141,172,47,141,223,47,169,128
  ,162,31,157                  :REM*229
3Ø DATA 173,47,2Ø2,16,25Ø,169,45
  ,32,21Ø,255,169,157,32,21Ø,25
  5,172,171,47                 :REM*118
31 DATA 192,26,2Ø8,3,76,19,4Ø,32
  ,228,255,24Ø,251,162,21,221,2
  Ø2,46,24Ø,1Ø                 :REM*73
32 DATA 221,226,46,24Ø,5,2Ø2,16,
  243,48,234,224,16,176,24,138,
  174,171,47,157               :REM*196
33 DATA 173,47,32,1Ø9,44,32,158,
  44,173,223,47,24Ø,3,2Ø6,223,4
  7,24,144,196                 :REM*251
34 DATA 224,16,2Ø8,19,173,171,47
  ,2Ø5,172,47,176,241,173,223,4
  7,2Ø8,236,32                 :REM*158
35 DATA 1Ø9,44,24,144,173,224,17
  ,2Ø8,16,173,171,47,24Ø,221,17
  3,223,47,2Ø8                 :REM*129
36 DATA 216,32,14Ø,44,24,144,21Ø
  ,224,18,2Ø8,52,173,172,47,24Ø
  ,244,173,223                 :REM*112
37 DATA 47,2Ø8,5,173,171,47,2Ø8,
  3,32,1Ø9,44,174,171,47,189,17
  3,47,157,172                 :REM*187
38 DATA 47,232,224,27,2Ø8,245,32
  ,14Ø,44,2Ø6,172,47,32,158,44,
  173,223,47,24Ø               :REM*248
39 DATA 3,2Ø6,223,47,24,144,197,
  224,19,2Ø8,38,173,172,47,2Ø1,
  26,24Ø,242,162               :REM*99
4Ø DATA 27,2Ø2,189,173,47,157,17
  4,47,236,171,47,2Ø8,244,169,2
  3,157,173,47                 :REM*86
41 DATA 238,172,47,238,223,47,32
  ,158,44,24,144,211,224,2Ø,24Ø
  ,3,76,2Ø9,4Ø                 :REM*61
42 DATA 173,223,47,2Ø8,199,173,1
  71,47,24Ø,5,169,2Ø,32,21Ø,255
  ,16Ø,Ø,14Ø,171               :REM*13Ø
43 DATA 47,14Ø,222,47,32,2Ø1,44,
  169,5,2Ø5,172,47,176,77,162,Ø
  ,16Ø,Ø,189,173               :REM*187
44 DATA 47,1Ø,1Ø,1Ø,1Ø,232,29,17
  3,47,153,2Ø5,47,236,172,47,24
  Ø,9,232,236                  :REM*1Ø2
45 DATA 172,47,24Ø,3,2ØØ,2Ø8,228
  ,173,172,47,74,176,39,185,2Ø5
  ,47,141,225,47               :REM*67
46 DATA 136,185,2Ø5,47,14Ø,224,4
  7,136,56,249,2Ø5,47,176,3,2Ø6
  ,225,47,136,16               :REM*144
47 DATA 244,2Ø5,227,47,2Ø8,8,173
  ,225,47,2Ø5,228,47,24Ø,8,162,
  4,32,221,44,76               :REM*19
48 DATA 57,39,162,48,32,221,44,1
  62,Ø,189,2Ø5,47,16Ø,63,14Ø,Ø,
  255,16Ø,Ø,145                :REM*88
49 DATA 253,16Ø,Ø,14Ø,Ø,255,23Ø,
  253,2Ø8,2,23Ø,254,232,236,224
  ,47,2Ø8,227                  :REM*185
5Ø DATA 173,172,47,74,17Ø,2Ø2,2Ø
  2,224,11,2Ø8,11,173,233,47,2Ø
  8,17,32,52,45                :REM*52
51 DATA 76,5,39,32,16,45,162,4,3
  2,221,44,76,57,39,76,134,38,1
  69,Ø,141,233                 :REM*199
52 DATA 47,76,77,38,32,8,45,169,
  35,32,21Ø,255,32,11,45,162,Ø,
  142,234,47,142               :REM*24
53 DATA 235,47,32,2Ø7,255,2Ø1,13
  ,24Ø,52,141,224,47,2Ø1,48,144
  ,49,2Ø1,58,176               :REM*79
54 DATA 45,173,234,47,141,236,47
  ,173,235,47,141,237,47,32,118
  ,46,173,224,47               :REM*3Ø
55 DATA 157,229,47,41,15,24,1Ø9,
  234,47,141,234,47,169,Ø,1Ø9,2
  35,47,141,235                :REM*33
56 DATA 47,232,2Ø8,197,224,4,24Ø
  ,8,162,4,32,221,44,76,217,4Ø,
  173,234,47,141               :REM*4
57 DATA 227,47,173,235,47,141,22
  8,47,56,173,227,47,237,242,47
  ,173,228,47                  :REM*67
58 DATA 237,243,47,144,6,32,5,45
  ,76,134,38,173,227,47,13,228,
  47,24Ø,242,173               :REM*16Ø
59 DATA 227,47,141,236,47,173,22
  8,47,141,237,47,173,236,47,2Ø
  8,3,2Ø6,237,47               :REM*149
6Ø DATA 2Ø6,236,47,32,1Ø3,46,24,
  173,234,47,133,253,173,235,47
  ,1Ø5,48,133                  :REM*238
61 DATA 254,169,1,141,233,47,169
  ,11,141,248,47,169,26,141,172
  ,47,32,5,45,32               :REM*175
62 DATA 2Ø4,45,56,32,24Ø,255,142
  ,221,47,14Ø,222,47,76,57,39,1
  62,Ø,189,96,47               :REM*5Ø
63 DATA 24Ø,6,32,21Ø,255,232,2Ø8
  ,245,32,2Ø7,255,72,32,8,45,1Ø
  4,2Ø1,49,24Ø                 :REM*5
64 DATA 6Ø,2Ø1,5Ø,2Ø8,24Ø,169,4,
  141,247,47,169,Ø,17Ø,168,32,1
  89,255,173,53                :REM*1Ø6
65 DATA 255,2Ø8,5,162,Ø,32,1Ø4,2
```

→

Listing 1 continued.

```
    55,169,4,17Ø,16Ø,Ø,32,186,255
    ,32,192,255             :REM*217
66  DATA 162,4,32,2Ø1,255,32,183,
    255,24Ø,8,162,4,32,221,44,76,
    122,42,169,6Ø           :REM*234
67  DATA 141,221,47,162,255,142,2
    33,47,232,134,253,169,48,133,
    254,157,229,47          :REM*175
68  DATA 232,224,4,2Ø8,248,238,23
    2,47,162,Ø,142,228,47,232,142
    ,227,47,169,11          :REM*118
69  DATA 141,248,47,173,228,47,2Ø
    5,243,47,2Ø8,11,173,227,47,2Ø
    5,242,47,2Ø8,3          :REM*141
7Ø  DATA 76,1Ø6,42,32,2Ø4,45,173,
    247,47,24Ø,15,2Ø6,221,47,2Ø8,
    1Ø,169,12,32            :REM*52
71  DATA 21Ø,255,169,6Ø,141,221,4
    7,32,52,45,24,173,248,47,1Ø1,
    253,133,253             :REM*63
72  DATA 169,Ø,1Ø1,254,133,254,17
    3,141,2,41,1,2Ø8,249,32,228,2
    55,2Ø1,3,2Ø8            :REM*126
73  DATA 183,24Ø,16,32,151,45,173
    ,247,47,2Ø8,8,162,48,32,221,4
    4,32,183,46             :REM*47
74  DATA 173,247,47,24Ø,8,32,2Ø4,
    255,169,4,32,195,255,169,Ø,14
    1,247,47,141            :REM*12Ø
75  DATA 233,47,76,134,38,162,Ø,1
    89,119,47,24Ø,6,32,21Ø,255,23
    2,2Ø8,245,169            :REM*3
76  DATA 15,162,8,168,32,186,255,
    169,Ø,32,189,255,32,192,255,1
    69,48,141,173           :REM*12
77  DATA 47,169,58,141,174,47,162
    ,2,32,2Ø7,255,157,173,47,232,
    2Ø1,13,2Ø8,245          :REM*45
78  DATA 2Ø2,169,44,157,173,47,23
    2,169,8Ø,157,173,47,232,169,4
    4,157,173,47            :REM*232
79  DATA 232,173,249,47,2Ø8,3,169
    ,82,44,169,87,157,173,47,232,
    138,162,173              :REM*11
8Ø  DATA 16Ø,47,32,189,255,32,8,4
    5,173,53,255,2Ø8,6,169,Ø,17Ø,
    32,1Ø4,255,169          :REM*25Ø
81  DATA 8,17Ø,168,32,186,255,32,
    192,255,32,161,46,173,173,47,
    2Ø1,48,24Ø,3            :REM*77
82  DATA 76,55,44,169,Ø,133,253,1
    69,48,133,254,173,249,47,2Ø8,
    3,76,99,43,24           :REM*19Ø
83  DATA 173,244,47,1Ø9,246,47,14
    1,225,47,173,245,47,1Ø5,Ø,141
    ,226,47,162,8            :REM*5
84  DATA 32,2Ø1,255,16Ø,Ø,162,63,
    142,Ø,255,177,253,162,Ø,142,Ø
    ,255,32,21Ø             :REM*192
85  DATA 255,23Ø,253,2Ø8,2,23Ø,25
    4,165,253,2Ø5,225,47,2Ø8,226,
    165,254,2Ø5             :REM*147
86  DATA 226,47,2Ø8,219,76,55,44,
    169,Ø,141,228,47,141,248,47,1
    69,1,141,227            :REM*18
87  DATA 47,169,48,141,229,47,141
    ,23Ø,47,141,231,47,169,49,141
    ,232,47,162,8           :REM*171
88  DATA 32,198,255,32,2Ø7,255,16
    2,63,142,Ø,255,16Ø,Ø,145,253,
    14Ø,Ø,255,23Ø           :REM*176
89  DATA 253,2Ø8,2,23Ø,254,238,24
    8,47,32,183,255,2Ø8,17,173,24
    8,47,2Ø1,11             :REM*229
9Ø  DATA 2Ø8,22Ø,169,Ø,141,248,47
    ,32,52,45,24Ø,21Ø,2Ø1,64,24Ø,
    21,169,132,141          :REM*56
91  DATA 191,43,162,Ø,189,132,47,
    157,173,47,24Ø,3,232,2Ø8,245,
    76,55,44,56             :REM*33
92  DATA 165,253,233,6,141,222,43
    ,165,254,233,Ø,141,223,43,162
    ,Ø,189,Ø,2,2Ø1          :REM*218
93  DATA 47,144,77,2Ø1,58,176,73,
    232,224,4,2Ø8,24Ø,56,173,248,
    47,233,6,176,3          :REM*193
94  DATA 1Ø5,11,24,141,248,47,176
    ,52,162,3,189,229,47,2Ø1,48,2
    Ø8,8,169,57             :REM*176
95  DATA 157,229,47,2Ø2,2Ø8,241,2
    22,229,47,162,3,189,229,47,15
    7,238,47,2Ø2            :REM*75
96  DATA 16,247,173,227,47,2Ø8,3,
    2Ø6,228,47,2Ø6,227,47,173,222
    ,43,133,253             :REM*9Ø
97  DATA 173,223,43,133,254,174,2
    48,47,32,16,45,32,2Ø4,255,169
    ,8,32,195,255           :REM*159
98  DATA 169,15,32,195,255,162,Ø,
    189,173,47,32,21Ø,255,2Ø1,13,
    24Ø,3,232,2Ø8           :REM*2ØØ
99  DATA 243,162,4,173,173,47,2Ø1
    ,48,2Ø8,2,162,48,32,221,44,32
    ,183,46,173             :REM*197
1ØØ DATA 249,47,16,1,96,76,134,3
    8,32,129,44,238,171,47,173,1
    71,47,2Ø5,172           :REM*9Ø
1Ø1 DATA 47,144,3,141,172,47,74,
    176,1Ø,169,148,32,21Ø,255,16
    9,32,32,21Ø             :REM*121
1Ø2 DATA 255,96,32,152,44,2Ø6,17
    1,47,173,171,47,74,144,5,169
    ,2Ø,32,21Ø,255          :REM*164
1Ø3 DATA 96,56,32,24Ø,255,142,22
    1,47,14Ø,222,47,2Ø2,16Ø,Ø,24
    ,32,24Ø,255             :REM*217
1Ø4 DATA 16Ø,Ø,185,173,47,48,19,
    17Ø,189,2Ø2,46,32,21Ø,255,15
    2,74,144,5,169          :REM*58
1Ø5 DATA 32,32,21Ø,255,2ØØ,2Ø8,2
    32,192,26,24Ø,2,169,32,32,21
    Ø,255,174,221           :REM*175
1Ø6 DATA 47,172,222,47,24,32,24Ø
    ,255,96,169,9,141,5,212,169,
    Ø,141,6,212             :REM*138
1Ø7 DATA 141,Ø,212,142,1,212,169
    ,15,141,24,212,169,33,141,4,
    212,162,Ø,16Ø           :REM*235
1Ø8 DATA Ø,136,2Ø8,253,2Ø2,2Ø8,2
    5Ø,142,4,212,96,169,147,44,1
    69,13,44,169            :REM*24
1Ø9 DATA 32,76,21Ø,255,142,246,4
    7,173,227,47,141,242,47,173,
    228,47,141,243          :REM*121
11Ø DATA 47,56,165,253,237,246,4
    7,141,244,47,133,253,165,254
    ,233,Ø,141,245          :REM*178
111 DATA 47,133,254,96,238,227,4
    7,2Ø8,3,238,228,47,162,3,254
    ,229,47,169,58          :REM*59
112 DATA 221,229,47,2Ø8,8,169,48
    ,157,229,47,2Ø2,16,238,174,2
    33,47,24Ø,1,96          :REM*3Ø
113 DATA 162,3,189,229,47,157,23
    8,47,2Ø2,16,247,173,227,47,1
    41,242,47,173           :REM*89
114 DATA 228,47,141,243,47,165,2
    53,141,244,47,165,254,141,24
    5,47,162,Ø,142          :REM*164
115 DATA 246,47,96,32,5,45,162,Ø
    ,142,227,47,142,228,47,134,2
    53,169,48,133           :REM*23
116 DATA 254,157,229,47,232,224,
    4,2Ø8,248,96,173,244,47,133,
    253,173,245,47          :REM*5Ø
117 DATA 133,254,173,242,47,141,
    227,47,173,243,47,141,228,47
    ,162,3,189,238          :REM*51
118 DATA 47,157,229,47,2Ø2,16,24
    7,173,246,47,141,248,47,24Ø,
    4,24,1Ø5,2,1Ø           :REM*92
119 DATA 141,172,47,169,Ø,141,17
    1,47,173,227,47,141,225,47,1
    73,228,47,141           :REM*3
12Ø DATA 226,47,162,63,142,Ø,255
    ,162,Ø,16Ø,Ø,173,248,47,24Ø,
    25,177,253,32           :REM*68
121 DATA 69,46,2ØØ,2Ø4,248,47,2Ø
    8,245,173,226,47,72,173,225,
    47,32,69,46             :REM*53
122 DATA 1Ø4,32,69,46,169,128,15
    7,173,47,232,224,32,2Ø8,246,
    169,Ø,141,Ø             :REM*84
123 DATA 255,162,Ø,189,229,47,32
    ,21Ø,255,232,224,4,2Ø8,245,1
    69,32,32,21Ø            :REM*39
124 DATA 255,16Ø,Ø,173,247,47,2Ø
    8,3,32,8,45,185,173,47,48,18
    ,17Ø,189,2Ø2            :REM*25Ø
125 DATA 46,32,21Ø,255,152,41,1,
    24Ø,3,32,11,45,2ØØ,2Ø8,233,3
    2,8,45,96,72            :REM*2Ø3
126 DATA 74,74,74,74,157,173,47,
    232,1Ø4,72,41,15,157,173,47,
    1Ø4,24,1Ø9,225          :REM*11Ø
127 DATA 47,141,225,47,169,Ø,1Ø9
    ,226,47,141,226,47,232,96,17
    3,236,47,141            :REM*173
128 DATA 234,47,173,237,47,141,2
    35,47,24,144,8,169,Ø,141,234
    ,47,141,235,47          :REM*176
129 DATA 32,135,46,32,135,46,76,
    141,46,14,236,47,46,237,47,2
    4,173,236,47            :REM*161
13Ø DATA 1Ø9,234,47,141,234,47,1
    73,237,47,1Ø9,235,47,141,235
    ,47,96,162,15           :REM*1Ø6
131 DATA 32,198,255,162,Ø,32,228
    ,255,157,173,47,232,2Ø1,13,2
    Ø8,245,32,2Ø4            :REM*59
132 DATA 255,96,162,Ø,189,14Ø,47
    ,24Ø,6,32,21Ø,255,232,2Ø8,24
    5,32,228,255            :REM*1ØØ
133 DATA 24Ø,251,96,48,49,5Ø,51,
    52,53,54,55,56,57,65,66,67,6
    8,69,7Ø,29,157          :REM*189
134 DATA 2Ø,148,13,5,1,63,77,74,
    75,76,85,73,79,55,56,57,8Ø,6
    4,42,58,59,61           :REM*21Ø
135 DATA 29,157,2Ø,148,13,5,1,63
    ,1,Ø,1,Ø,1,Ø,1,Ø,Ø,Ø,65,66,6
    7,68,147,13,13          :REM*73
136 DATA 13,49,32,76,79,65,68,32
    ,8Ø,82,79,71,82,65,77,13,5Ø,
    32,83,65,86,69          :REM*1Ø2
137 DATA 32,8Ø,82,79,71,82,65,77
    ,13,51,32,76,73,83,84,32,67,
    79,68,69,13,52          :REM*95
138 DATA 32,69,68,73,84,32,79,76
    ,68,32,76,73,78,69,13,53,32,
    69,78,84,69,82          :REM*236
139 DATA 32,78,69,87,32,76,73,78
    ,69,83,13,54,32,69,88,73,84,
    13,Ø,13,49,32           :REM*189
14Ø DATA 83,67,82,69,69,78,13,5Ø
    ,32,8Ø,82,73,78,84,69,82,13,
    63,32,Ø,13,7Ø           :REM*232
141 DATA 73,76,69,78,65,77,69,32
    ,63,32,Ø,69,82,82,79,82,32,6
    3,13,72,73,84           :REM*177
142 DATA 32,65,78,89,32,75,69,89
    ,13,Ø,13,83,65,86,69,32,7Ø,7
    3,76,69,32,89           :REM*222
143 DATA 47,78,32,63,32,Ø
                            :REM*153
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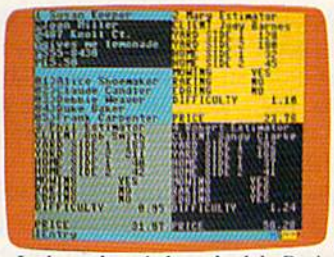
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COMPARING TWO PROGRAMS

This utility shows you the differences between two versions of a program.

By DAVID HOOK

There's an adage in the computer world that no program is ever finished; it's merely abandoned. In my case that's certainly true, as version number 20 might not even be the "final" one. I'll admit that not all those changes are improvements, and often I need to go back to an earlier version to fix something that used to work, but no longer does.

To determine what changes have been made so that I can figure out what to fix, I usually have to compare listings from various stages in the program's evolution—a tedious and frustrating task if I did it by hand. However, I have a program that does it for me.

A Little Background

In the early days of the Commodore PET, I read *Cursor* magazine, and in its September 1980 issue, there was a program by Glen Fisher called Compare. As the name suggests, the program compared two Basic programs in memory.

While I've found the original Compare very useful, its speed leaves something to be desired. So I've recoded the key functions into machine language to increase speed and optimize performance. My version, called Compare Basic, appears in Listing 1.

Running the Program

Type in Listing 1, then save it before you run it. When you do run it, you'll be prompted to enter the filenames of the programs you want to compare. Default answers are provided at the prompts for designating the device and drive numbers of your disk drive.

Before it starts the comparison, the program makes a disk error check and also checks to make sure the programs to be compared are written in Basic. The algorithm for doing this is based on the fact that the C-64 and the C-128 store the value 1, which represents the "low" byte of the start of Basic, as the first character in the disk file. If Compare Basic doesn't find a 1 at the start of the file, execution aborts.

You can choose whether to send the results of the comparison to the screen or a printer. If you opt for the screen, you can press any key to pause and resume the output.

As the program works, near the bottom of the display you'll see the lines being scanned. The two line numbers appear side by side with a separating colon. The comparison continues until the lines in both programs have been exhausted.

How It Works

The program compares the two subject programs on a line-by-line basis. For example, if each program has a line 10, then both line 10s are read into memory and compared character by character. If they match exactly, then Compare Basic continues on to the next pair of lines. If two lines differ only by nonessential spaces outside of quotation marks, they are treated as identical. Since spaces outside quotes are ignored by Basic, they're ignored by Compare Basic, too.

If one or more significant characters differ, both lines are printed in full. A minus sign will precede the line from program 1, and a plus sign will precede the line from program 2. Compare Basic removes all optional spaces from both lines to facilitate spotting the differences. This has the side effect of merging words together in REM statements.

If a line appears in one program but not the other, that line is output to the screen or printer. Again, a minus or plus sign precedes it.

Performance and Limitations

The comparison of a 90-block program takes less than five minutes—an eight-fold improvement over the original Compare. Of course, shorter programs will process more quickly.

Keep in mind that, although Compare Basic can work with Basic 7.0 programs written on the C-128, it won't decipher any instructions, such as Color, Window and Dload, that don't appear in Basic 2.0. Also, if you've renumbered either of the subject listings, the comparison won't work; line numbers must match.

Compare Basic's speed will enable you to compare two programs faster than you could print out a hard copy of just one of them! The results are certain to be more helpful, too. ®

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

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C-64

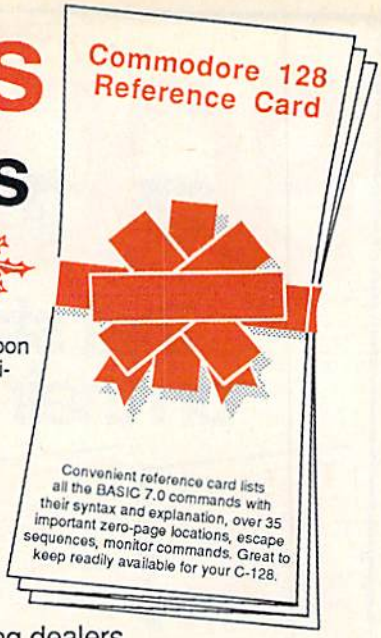
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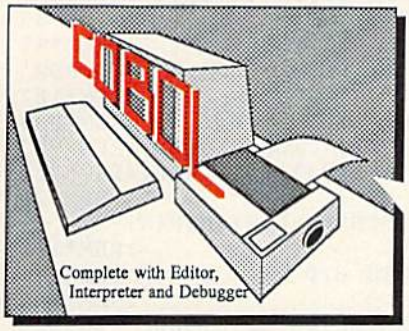


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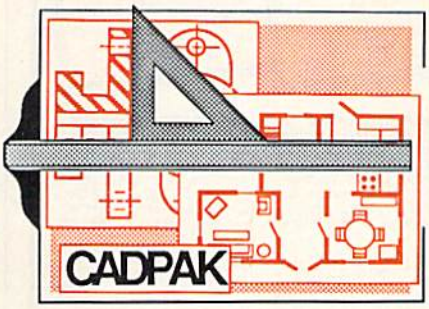
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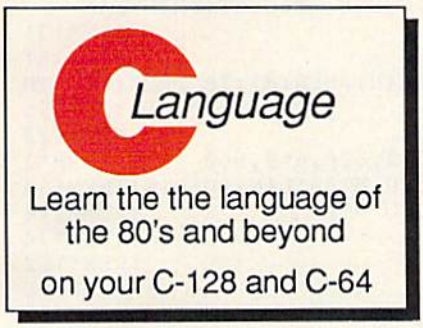
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Listing 1. *Compare Basic program.*

```
Ø GOTO 1ØØ                                        :REM*186
1Ø PRINT#4,T$(N);L(N);:POKE WH,N:SYS OUT
                                                  :REM*9Ø
2Ø IF DV=3 THEN IF POS(Ø)<15 THEN PRINT B$;
                                                  :REM*14Ø
3Ø PRINT#4:RETURN                                 :REM*152
98 REM COMPARE BASIC V3.Ø                         :REM*168
99 REM (C) 1986 DAVID A. HOOK, 215 ANNE ST.
   N., BARRIE, ONT., L4N 4T4                      :REM*95
1ØØ IN=4992Ø:OUT=IN+3:CMP=IN+6:SB=49152:WH=
   2                                              :REM*2Ø
11Ø N$=CHR$(Ø)                                    :REM*58
12Ø B$="{15 SPACEs}"                              :REM*84
13Ø HY$="----------------------------------
   -----"                                         :REM*2Ø2
14Ø T$(1)="-": T$(2)="+"                          :REM*164
16Ø IF PEEK(IN)-76 THEN GOSUB 4ØØØ                :REM*154
2ØØ GOSUB 1ØØØ: REM OPEN FILES                    :REM*1Ø2
3ØØ SYS IN                                        :REM*213
31Ø FOR N=1 TO 2:L(N)=USR(N):NEXT                 :REM*175
32Ø PRINT#4,"- ";F1$;"{4 SPACEs}+ ";F2$:PRI
   NT#4, HY$: PRINT#4                             :REM*225
33Ø PRINTL(1);"{CRSR LF} :";L(2);"{CRSR UP}
   ":IF DV=4 GOTO 38Ø                             :REM*185
34Ø GET T$:IF T$="" GOTO 38Ø                      :REM*91
35Ø PRINTTAB(15);"{CTRL 9}PRESS A KEY{CRSR
   UP}"                                           :REM*1Ø7
36Ø GET T$: IF T$="" GOTO 36Ø                     :REM*239
37Ø PRINT TAB(15); B$; "{CRSR UP}" :REM*127
38Ø ON 2 + SGN(L(1)-L(2)) GOTO 4ØØ,45Ø,57Ø
                                                  :REM*23
4ØØ N=1:GOSUB 1Ø:PRINT#4:L(N)=USR(N)
                                                  :REM*123
41Ø IF PEEK(SB) GOTO 62Ø                          :REM*47
42Ø GOTO 33Ø                                      :REM*159
45Ø SYS CMP:IF PEEK(SB)=Ø GOTO 5ØØ   :REM*9
47Ø FOR N=1 TO 2:GOSUB 1Ø:NEXT:PRINT#4
                                                  :REM*131
5ØØ D=Ø                                           :REM*161
51Ø FOR N=1 TO 2:L(N)=USR(N):IF PEEK(SB) TH
   EN D=D+N                                       :REM*55
52Ø NEXT                                          :REM*2Ø
55Ø ON D+1 GOTO 33Ø,62Ø,61Ø,66Ø                   :REM*2
57Ø N=2:GOSUB 1Ø:PRINT#4:L(N)=USR(N):REM*54
58Ø IF PEEK(SB)GOTO 61Ø                           :REM*214
59Ø GOTO 33Ø                                      :REM*74
61Ø N=1:GOTO 64Ø                                  :REM*162
62Ø N=2                                           :REM*98
64Ø GOSUB 1Ø:PRINT#4:L(N)=USR(N)                  :REM*6Ø
65Ø IF PEEK(SB)=Ø GOTO 64Ø                        :REM*2Ø
66Ø PRINT                                         :REM*252
68Ø PRINT#4, HY$: PRINT#4, "- "; F1$; "{4 S
   PACEs}+ "; F2$                                 :REM*136
7ØØ CLOSE 4:CLOSE 2:CLOSE 1:CLOSE 15:CLOSE
   16:END                                         :REM*86
999 REM OPEN FILES                                :REM*154
1ØØØ INPUT"{2 SPACEs}FILE #1:{3 SPACEs}*{3
   CRSR LFs}"; F1$: IF F1$="*"GOTO 1ØØØ
                                                  :REM*77
1Ø1Ø INPUT" DEVICE #:{3 SPACEs}8{3 CRSR LFs
   }"; U1                                         :REM*89
1Ø2Ø INPUT"{2 SPACEs}DRIVE #:{3 SPACEs}Ø{3
   CRSR LFs}"; D1$                                :REM*115
1Ø4Ø PRINT                                        :REM*122
1Ø5Ø INPUT"{2 SPACEs}FILE #2:{3 SPACEs}*{3
   CRSR LFs}"; F2$: IF F2$="*"GOTO 1Ø5Ø
                                                  :REM*242
1Ø6Ø INPUT" DEVICE #:{3 SPACEs}8{3 CRSR LFs
   }"; U2                                         :REM*14Ø
1Ø7Ø INPUT"{2 SPACEs}DRIVE #:{3 SPACEs}Ø{3
   CRSR LFs}"; D2$                                :REM*166
```

→

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Listing 1 continued.

```
1Ø9Ø CLOSE 15: OPEN15,U1,15,"I"+D1$ :REM*46
11ØØ CLOSE 16: OPEN16,U2,15,"I"+D2$:REM*112
111Ø :                                :REM*66
112Ø CLOSE 1: OPEN 1,U1,8,D1$+ ":" + F1$:GO
     SUB 3ØØØ                         :REM*162
113Ø IF E THEN PRINT" {CTRL 9}DISK ERROR:{C
     TRL Ø} ";E$:GOTO 1ØØØ            :REM*25Ø
115Ø GET#1,L$,H$:L=ASC(L$+N$)         :REM*248
116Ø IF L<>1 THEN PRINT"{CTRL 9}NOT BASIC P
     ROGRAM":GOTO1ØØØ                 :REM*11Ø
118Ø CLOSE 2: OPEN 2,U2,9,D2$+":"+F2$:GOSUB
      3Ø1Ø                            :REM*192
119Ø IF E THEN PRINT" {CTRL 9}DISK ERROR:{C
     TRL Ø} ";E$:GOTO 1Ø5Ø            :REM*12Ø
121Ø GET#2,L$,H$:L=ASC(L$+N$)         :REM*68
122Ø IF L<>1 THEN PRINT" {CTRL 9}NOT BASIC
     PROGRAM":GOTO 1Ø5Ø               :REM*34
124Ø PRINT:INPUT" PRINTER (Y/N):{3 SPACEs}N
     {3 CRSR LFs}"; DV$               :REM*46
125Ø PRINT                            :REM*76
126Ø DV=3:IF DV$="Y"THEN DV=4         :REM*182
127Ø OPEN4,DV,7                       :REM*72
129Ø RETURN                           :REM*73
2999 REM DISK ERROR CHECK             :REM*216
3ØØØ INPUT#15,E,E$,T,S:RETURN         :REM*131
3Ø1Ø INPUT#16,E,E$,T,S:RETURN         :REM*157
4ØØØ FOR I=IN TO IN+282:READ A:POKE I,A:CK=
     CK+A:NEXT                        :REM*173
4Ø1Ø IF CK=37123 THEN RETURN          :REM*251
4Ø2Ø PRINT "{CTRL 9}DATA ERROR"       :REM*63
4992Ø DATA 76,91,195,76,154,195,76,236,195,
      32,161,183,134,2,32,117         :REM*217
49936 DATA 195,133,253,32,117,195,5,253,2Ø8
      ,3,76,4,196,32,117,195          :REM*229
49952 DATA 133,99,32,117,195,133,98,162,144
      ,56,32,73,188,32,15,196         :REM*161
49968 DATA 162,1,134,253,32,117,195,72,2Ø1,
      34,2Ø8,6,165,253,73,255         :REM*21
49984 DATA 133,253,1Ø4,2Ø1,32,2Ø8,4,36,253,
      16,233,145,251,2Ø1,Ø,24Ø        :REM*175
5ØØØØ DATA 3,2ØØ,2Ø8,224,166,2,152,157,2,19
      2,96,169,9,141,17,3             :REM*197
5ØØ16 DATA 169,195,141,18,3,169,Ø,16Ø,192,1
      33,251,132,252,16Ø,4,145        :REM*223
5ØØ32 DATA 251,136,16,251,96,166,2,189,Ø,19
      2,141,Ø,192,2Ø8,24,32           :REM*17
5ØØ48 DATA 198,255,32,2Ø7,255,72,32,183,255
      ,24Ø,3,32,4,196,32,2Ø4          :REM*57
5ØØ64 DATA 255,1Ø4,174,Ø,192,24Ø,2,169,Ø,96
      ,32,15,196,162,1,134            :REM*2Ø1
5ØØ8Ø DATA 15,136,132,73,162,4,32,2Ø1,255,1
      69,32,164,73,41,127,32          :REM*123
5ØØ96 DATA 21Ø,255,2Ø1,34,2Ø8,6,165,15,73,2
      55,133,15,2ØØ,177,251,2Ø8       :REM*199
5Ø112 DATA 3,76,2Ø4,255,16,233,2Ø1,255,24Ø,
      229,36,15,48,225,56,233         :REM*211
5Ø128 DATA 127,17Ø,132,73,16Ø,255,2Ø2,24Ø,8
      ,2ØØ,185,158,16Ø,16,25Ø,48      :REM*159
5Ø144 DATA 245,2ØØ,185,158,16Ø,48,196,32,21
      Ø,255,2Ø8,245,172,3,192,2Ø4     :REM*3
5Ø16Ø DATA 4,192,2Ø8,12,2ØØ,185,255,192,217
      ,255,193,2Ø8,3,136,2Ø8,245      :REM*25
5Ø176 DATA 14Ø,Ø,192,96,169,1,141,Ø,192,166
      ,2,157,Ø,192,96,16Ø             :REM*12
5Ø192 DATA Ø,132,251,169,192,24,1Ø1,2,133,2
      52,96                           :REM*188
```

■

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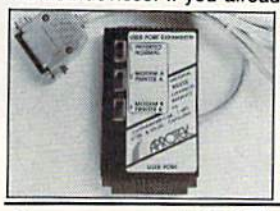
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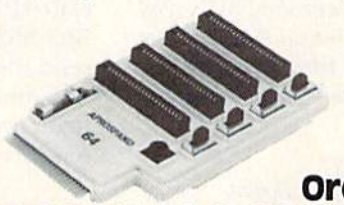
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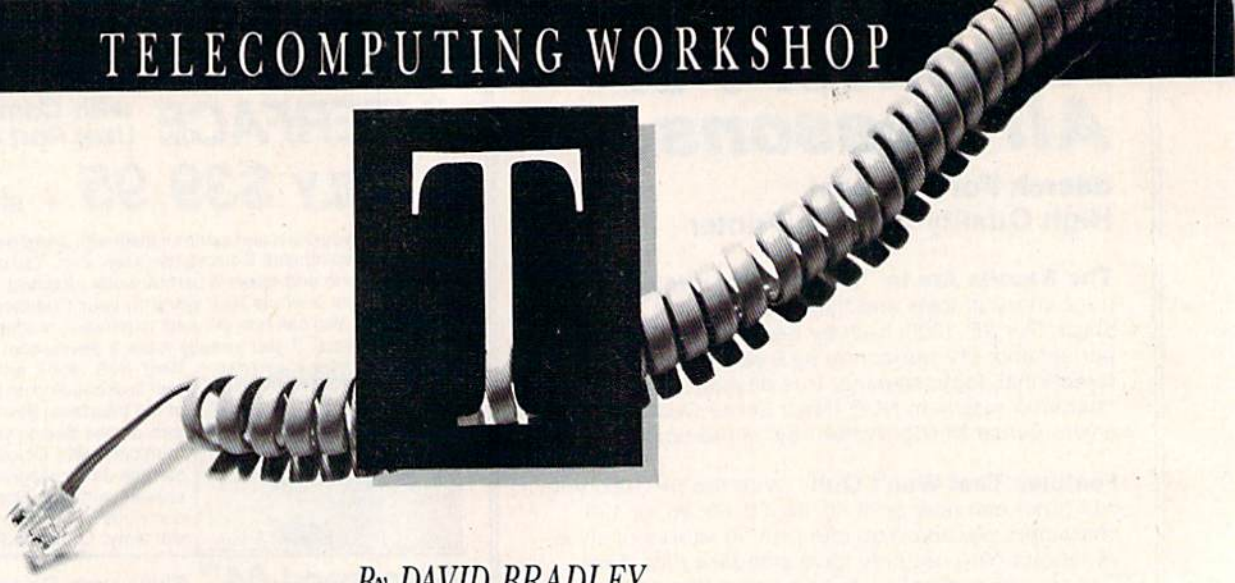
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TELECOMPUTING WORKSHOP



By DAVID BRADLEY

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 or comments to:*

David Bradley
Telecomputing Workshop
c/o RUN *magazine*
80 Elm St.
Peterborough, NH 03458

I have a computer system consisting of a C-64, a monitor, a 1541 disk drive, an Olivetti printer and a Total Telecommunications modem, and a friend of mine has similar equipment. When I'm connected by phone to my friend's computer, what procedure should I use to get information from his disk to mine? I believe I'm speaking of uploading and downloading.

Walter L. West
Kearneysville, WV

You're right, this transfer of information from disk to disk over the phone lines is called uploading and downloading. To upload and download files, you need a terminal program that provides that capability, as most do. For best results, you and your friend should have the same terminal program.

A terminal program called Thirdterm, which is available in the public domain, will let you and your friend transfer files using either the Punter or XModem protocol. I mentioned Thirdterm in the September column, but didn't know at that time where to get it. Now I have a source—an outfit called Public Domain Solutions at PO Box 832, Tallevast, FL 34270. If you send them $5 and tell them you want Thirdterm (or any other public domain program they have, for that matter), they'll send it to you.

I downloaded some files from Delphi recently, but they won't run. Their filenames all end in .lbr. Is there some special way to run these programs, files or whatever they are?

Lisa Secord
Atlanta, GA

Files whose names end in .lbr are actually combined files called libraries. A library file won't run as a whole, but if you get the library program that was used to create it, you can take it apart again and use the individual files.

Most library files consist of a program and a number of other files that go with it. Combining them is a good way to make sure anyone who downloads the program will get everything they need, and not be forever seeking that one little file to make the program work. Library files also save system time, because you only have to give the system instructions and start the download once. This can be important when you're paying for online time.

As part of my subscription to Q-Link, I received a modem. It's labeled a "64 Modem," but the back describes it as a 6003A. There's no indication of the name of the manufacturer. It would appear I have a generic clone and that a manual from Telelearning would be applicable. Can you give me their address so I can send for one?

Edward P. Young
Zelienople, PA

Jane Parris, a *RUN* reader and TPUG member who has a C-64 and a Telelearning modem, tells me that the address for Telelearning Systems is 505 Beach St., San Francisco, CA 94133.

I have a C-128 and a Volks 6420 modem—300 baud with Com IV software. I'd like to join QuantumLink. Could you tell me how to do this?

Bea Scribner
South Gate, CA

To access Q-Link, you need to have special Q-Link software. You can't just call up with your modem as you can with local BBSs and systems like Delphi and CompuServe.

To get this software, call Q-Link at 1-800-392-8200 (toll-free) in the United States or 1-703-883-0788 in Canada, and they'll send you a disk. You also get a Q-Link disk free in the package when you buy a Commodore modem. If you have a Plus/4, you're out of luck for the moment; Q-Link doesn't have software for that machine yet.

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A QUICK CONCLUSION.

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Telecomputing Workshop

I have a Mitey Mo modem and am writing a program in which I'd like to use the modem's autodial feature. The problem is, I can't figure out how to make it dial. The manual tells me all sorts of things about how to pick up the phone, how to set the data direction register and more, but it doesn't tell me how to make it dial.

Brad Lunsford
Oak Ridge, TN

The following program will make your Mitey Mo modem dial the phone number 123-4567. You should be able to insert it into just about any program you're writing or modifying. Just replace the 123-4567 in the listing with the number you want.

```
10 POKE 56577,32
20 POKE 56579,36
30 POKE 56577,0
40 T = 1000
50 T = T - 1 : IF T <> 0 THEN 50
60 NU$ = "123-4567"
70 L = LEN (NU$)
80 FOR I = 1 to L
90 N$ = MID$ (NU$,I,L)
100  IF N$ = "-" THEN 140
110 N = VAL (N$)
120 IF N = 0 THEN N = 10
130 GOSUB 160
140 NEXT I
150 PRINT "DIAL COMPLETE!" : END
160 FOR NL = 1 to N
170 POKE 56577,32
180 T = 6
190 T = T - 1 : IF T <> 0 THEN 190
200 POKE 56577,0
210 T = 4
220 T = T - 1 : IF T <> 0 THEN 220
230 NEXT NL
240 T = 70
250 T = T - 1 : IF T <> 0 THEN 250
260 RETURN
```

Update

In the September Telecomputing Workshop, Richard Miller asked if equipment connected to the phone line could be damaged by a power surge. As part of my answer, I told him I would try to track down a device to protect equipment against such occurrences.

Well, it took a long time, but I finally found one. It's called Telephone Line Protector, it costs $34.95, and it's available from Kalglo Electronics Co., Inc., Colony Drive Industrial Park, 6584 Ruch Road, Bethlehem, PA 18017. There are undoubtedly other such devices out there; I just haven't been able to find them.

Telecomputing Tip of the Month

With public domain terminal programs getting better and better, there's one thing you should be *very* careful about. A lot of these programs include files for saving your terminal settings (such as baud rate, stop bits, parity, word length), function key values (like user codes and passwords) and all sorts of other useful information. This is great and saves everybody a lot of time.

However, when a friend wants a copy of your terminal program, be careful not to include these private codes. If they get out, you'll have to go around to every system you connect to and change them. *Be sure* to copy only the terminal program and any files that it needs.■

Q-Link Happenings

Things To Do with CitiLink

QuantumLink's array of information services now includes an arts and entertainment feature called CitiLink. This service is designed to tell Q-Link members about things to do and places to go in their own areas and to assist them in making travel plans.

Compiled by on-the-scene Q-Link reporters, CitiLink's listings include such things as concerts, fairs, festivals, restaurants, museums and more. Each city has its own database, so finding information for a specific locale is easy and fast.

CitiLink also lets Q-Link members submit items for their own area, such as restaurant reviews and announcements of community plays and celebrations.

For more information about CitiLink, or other Q-Link services, contact Quantum Computer Services, Inc., 8620 Westwood Center Drive, Vienna, VA 22180; 703-448-8700.

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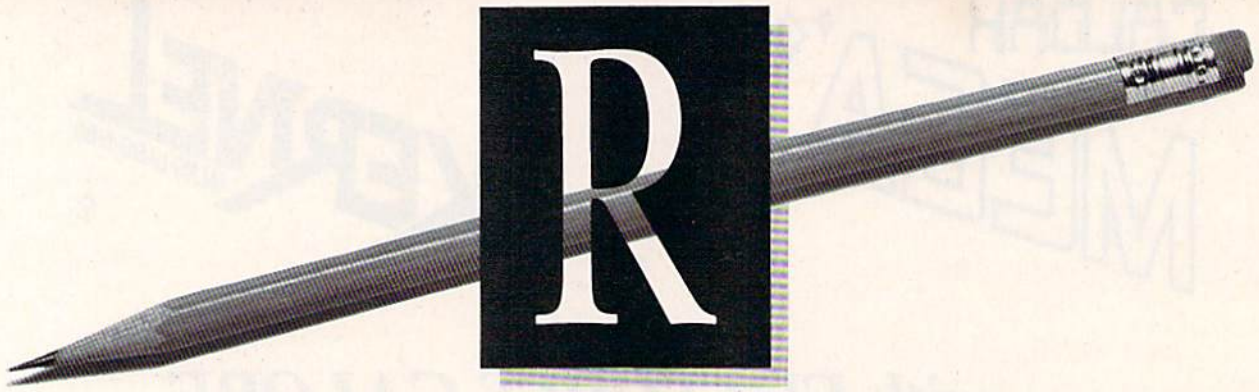
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By MARGARET MORABITO

This month The Resource Center answers an assortment of reader questions.

While hundreds of readers have written to me relating their interests and experiences in using Commodore computers for education, many have also written with questions. This month, I'll share some of these questions with you.

Q. How can I, as a parent, obtain information and programs that will coincide with the subjects my children are studying in school? I'd appreciate some sort of curriculum guide listing subjects, grades and corresponding software to assist in their education. **—Roderick T. Bell, Jr., Lusby, MD.**

A. That's a good question. You should first contact your child's teachers to find out what specific material is being taught. Next, you can start writing away for educational software catalogs. In March, I listed eight sources to contact for educational software and reviews. For even more sources, see Table 1 in this article.

Educational catalogs usually list the grade or age level the software is intended for, so you can match your child's curriculum to the appropriate products. My column in last July's issue listed 44 programs with recommended age levels.

Q. Our Physics Department at New Mexico State University has established a Commodore Corner in its computational physics laboratory. The Corner will be open to students of NMSU, campus faculty and staff and teachers throughout the state who teach science in grades 7–12.

We're on a limited budget for the initial procurement of hardware and would like to find a source of serviceable equipment at reduced cost. Is there a way we can get help in procuring hardware for the project through Commodore Business Machines? **—Hal Cottrell, Physics Support Specialist, New Mexico State University.**

A. In the past, Commodore did have a matching grant program for hardware purchases, but that has ended. Commodore does have over 100 authorized education dealers that can provide school discounts on hardware. See my column in last June's issue for a list of these dealers.

Beyond this, you should contact your state board of education for guidelines on grants for computer equipment. Many of the teachers I've heard from have taken this approach to getting their equipment.

An even easier route is to shop around for discounted equipment. You'll find good deals at some of the mail order houses and liquidators.

Q. I teach English composition and literature at a local community college and am deeply involved in a remedial program for adult learners, many of whom are ESL (English as a Second Language) students.

I'd like to start using computers with my students. The commercial software I've previewed is too elementary in content for adult learners, so I need to find software I can personally convert to a more adult level—programs that will let me incorporate my students' own sentences, and then lead them through corrective exercises. **—Meredith Wilson, Vacaville, CA.**

A. Your question hits home. I was a college English composition and ESL instructor, and we, too, had a writing skills lab that could have benefited from computerization.

Your options for obtaining software that you can modify include nationally available public domain programs and teacher- or student-written programs coming directly out of individual schools.

For public domain software, try contacting the following groups: Toronto Pet User Group, 1912-A Avenue Road, Suite #1, Toronto, Ontario M5M 4A1; 64 Gold, 3219 Folsom St., San Francisco, CA 94110; National Public Domain Software Rental Center, 1533 Avohill Drive, Vista, CA 92084.

I do know that many school districts have written their own programs, but trying to make contact with these schools is difficult because of poor communication among school districts. The Resource Center helps.

I was recently contacted by Jerry Caron, Computer Coordinator at the H. T. Healy School (726 Hicks St., Fall River, MA 02724), who said that his school has a library of about 300 public domain educational programs, 90 percent of which were acquired in trades with other schools or are teacher-written or revised public domain programs. He would be happy to trade and share them.

Another option is to get a lesson-

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ADD $2.00 S & H. Visa and MC gladly.

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CARTRIDGE PORT CONVERTER
CUSTOMED DESIGNED FOR
COMMODORE 64 & 128 COMPUTERS



- BUILT-IN "WARM RESET" BUTTON WILL ELIMINATE TURNING POWER OFF/ON TO RESET
- PARALLEL EXPANSION PORT ON L'BOW'S BACKSIDE ALLOWS SIMULTANEOUS HARDWARE & SOFTWARE ACCESS.
- VERTICAL CARTRIDGE PORT MAKES CARTRIDGE USE MUCH EASIER.
- NO MORE STRESS ON THE COMPUTER'S PRINTED CIRCUIT BOARD FROM THE PRESSURE OF PLUGGING IN CARTRIDGES SINCE 'LBOW PUTS IT ALL ON THE TABLE TOP.

'LBow™ DELUXE $29.95

AS SHOWN IN INFO-64, THE SWITCHABLE L'BOW. TWO CARTRIDGES PLUGGED IN AT THE SAME TIME, SWITCH FROM ONE TO THE OTHER PLUS A BUILT-IN 'WARM RESET' BUTTON. FOR THE C128 OR C64.

DISK DOUBLER'

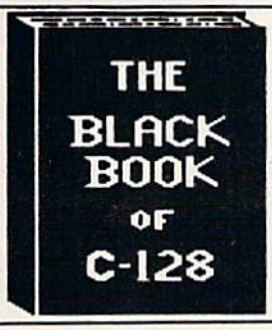


CUTS A PRECISION SQUARE NOTCH IN THE DISKETTE AT EXACTLY THE RIGHT SPOT SO THE "FLIPSIDE" CAN BE USED.

128 CABLE

WHY BUY A NEW MONITOR ? 40 OR 80 COLUMNS ON THE C128. MONOCHROME OUTPUT WITH SOUND. PLUGS IN.

$9.95



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THE BEST FRIEND A C128 OWNER EVER HAD. COVERS THE C64, 128, CPM 3.0 1541 AND 1571 DISK DRIVE.

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6 FT. RS232, 25 PIN, MALE/MALE	PART # G625	$14.95
9 FT. 6 PINDIN, MALE RIGHT ANGLE/MALE	PART # R69	$9.95
100 SILVER WRITE PROTECT TABS	PART # TAB	$1.49
100 WHITE DISK SLEEVES	PART # DS1	$5.95
6 PIECE JEWELERS SCREW DRIVER SET	PART # SC6	$4.95

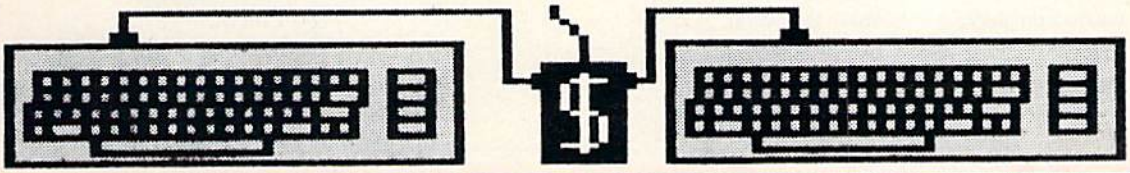
$ - SAVER SWITCH

$29.95

THE $ SAVER SWITCH CONNECTS TWO COMPUTERS TO ONE PRINTER OR DISK DRIVE. BETTER YET, SHARE YOUR DRIVE AND PRINTER BETWEEN TWO COMPUTERS, LINK 2 PRINTERS TO ONE COMPUTER. FLIP A SWITCH FROM ONE DEVICE TO ANOTHER. NO ALTERATIONS OR EXTRAS NEEDED, PLUGS IN IN SECONDS.

MODEL 1...COMES WITH TWO 6 PINDIN FEMALE SOCKETS AND ONE 4 FT. 6 PINDIN MALE CABLE

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MONITOR SWITCH



THIS IS THE SWITCH YOU HAVE ASK FOR !!!! SHARE ONE MONITOR BETWEEN TWO COMPUTERS. FLIP THE KNOB ANY TIME AND CHANGE OUTPUT THE BOX HAS 2, 8 PIN CABLES, ONE TO EACH COMPUTER PLUS A 8 PIN SOCKET FOR MONITOR FOR THE C64 OR C128.

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LIGHTED ROCKER SWITCHES
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INCLUDES A SWITCH FOR COMPUTER, MONITOR, PRINTER, AUX. 1 AND 2. PLEASE INCLUDE $5.00 SHIPPING FOR THIS ITEM.

PROTECTION REVEALED $19.95

SOLVE THE PUZZLES OF SOFTWARE PROTECTION. FOR AUTHOR OR NEW USER. BECOME A MASTER OF ILLUSION. LEARN HOW TO PROTECT OR UN-PROTECT YOUR SOFTWARE. INCLUDES BASIC PROGRAM SECURITY. LEARN HOW COMPILERS, HALF TRACKS ETC, EFFECT A DISK.REVEALS MYSTICAL SECRETS OF THE C-64.BOOK IS 141 PAGES. A FREE DISK OF 21 UTILITY PROGRAMS ARE INCLUDED. THE BOOK IS WRITTEN AT A LEVEL A BEGINNER CAN UNDERSTAND.

BRAND X $19.95

BRAND X IS A DISK CATALOGER. 4,000 FILES OR 100 DISKS. ADD SAVE, ETC. IDENTIFIES 14 FILE TYPES, PRINT LISTS IN 1 2 OR 3 COLUMNS, PLUS LABELS. END DISK CONFUSION WITH BRAND X.

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PARALLEL A/B SWITCH

36 PINS SWITCHED, FEMALE CONNECTORS, GOLD CONTACTS, HIGH QUALITY PUSH BUTTON SWITCH

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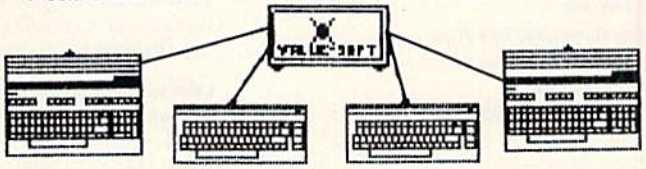
RS 232 A/B SWITCH

25 PINS SWITCHED, DB 25 CONNECTORS, HIGH QUALITY PUSH BUTTON SWITCH

$44.95

SUPER SWITCH $79.95

4 COMPUTERS TO 1 DEVICE — FOR SCHOOL OR BUSINESS



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authoring system and write your own computerized lessons. I'm aware of three of these for the C-64. One is a 1984 release—Dialog, from Code-Writer Corporation, 7847 North Caldwell Ave., Niles, IL 60648. Another is a brand new product that two teachers in West Virginia have just finished developing. It's called Lesson Master and is available from Courseware Authoring System, 150 Chapman Drive, Wellsburg, WV 26070; 304-737-2891. A third authoring system for the C-64 is CLAS, from Touch Technologies, 609 S. Escondido Blvd., Escondido, CA 92025. CLAS was reviewed in the May 1985 issue of *RUN*.

Q. Are there any programs available for recording grades and computing averages for high school classes? **—James Badeaux, Covington, LA.**

A. Smoky Mountain Software, PO Box 1710, Brevard, NC 28712, puts out a C-64 gradebook program called Grade Manager III. Several teachers have recommended this as a good grade management system. For the C-128, there is Gradebook 128, which is available on the Productivity Pak II ReRUN disk.

Q. I have access to VIC-20 computers for my classroom teaching and would like to use them for students to do writing on. My problem is that I don't have a word processor for the VIC. I've written to Commodore about this, but I get no answer from them. **—Stephen Staples, St. Johns, MI.**

A. It's hard to get VIC-20 software nowadays, but it is around. I'd try contacting some of your local user groups. The Toronto Pet User Group has a VIC-20 library of disks, and they do have a word processor for that computer. See the address above.

Q. I'm a graduate student in the Doctorate of Adult Education program at the University of Georgia. Due to the increasing illiteracy rate in the U.S., I'd like to plan my dissertation around the use of the computer in teaching illiterates to read. As part of the project, I would develop a computer program using a speech synthesizer to familiarize the adult student with the phonetics of the English language, and I'd like to use the C-64 for this. Is there a C-64 speech synthesizer capable of normal speech, and do you know of any phonics programs? **—Jerry Cockrev, Grovetown, GA.**

A. I've had quite a few requests from educators who want speech synthesizers for the C-64. Four now on the market are Votalker and the Personal Speech System (from Votrax), Voicemaster (from Covox) and Hearsay 1000 (from Hearsay, Inc.). See the article on speech systems for the C-64 elsewhere in this issue for details on these products.■

If you're 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, subject areas being taught, grade level or age of your students, software that you're using and any other information you feel like including.

Also, if you'd like to donate public domain educational programs to The Resource Center for sharing with other educators and parents, please send along a disk with a brief description of the programs. Send correspondence and disks to:

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

You can also leave mail in my on-line mailboxes: CompuServe (70616,714) and QuantumLink (MARGM).

Table 1. *Sources to contact for Commodore educational software.*

Soft-Kat
Educational Software Catalog
16130 Stagg St.
Van Nuys, CA 91406
800-641-1057

Science Software
7952 W. Quarto Drive
Littleton, CO 80123
303-972-4020

AC3L Software
PO Box 7
New Derry, PA 15671

Blue Chip Software
6744 Eton Ave.
Canoga Park, CA 91303
818-346-0730

Weekly Reader Family Software
4343 Equity Drive
Columbus, OH 43216

Learning Technologies
4255 LBJ Freeway, Suite 131
Dallas, TX 75244
800-238-4277

Springboard Software
7807 Creekridge Circle
Minneapolis, MN 55435
612-944-3915

Scholastic
Educational Software Report
(biweekly software-review newsletter)
730 Broadway
New York, NY 10003
212-505-3000

Simon & Schuster Software
Gulf + Western Building
1 Gulf + Western Plaza
New York, NY 10023
212-333-5800

Grolier Electronic Publishing
Across the Curriculum (curriculum guide)
Sherman Turnpike
Danbury, CT 06816
800-858-8858

DLM Educational Software
One DLM Park
PO Box 4000
Allen, TX 75002
800-527-4747

Fisher-Price Learning Software
PO Box 1327
Cambridge, MA 02238
617-494-1222

Mindscape
3444 Dundee Road
Northbrook, IL 60062
312-480-7667

Educational Activities
PO Box 392
Freeport, NY 11520

Microcomputer Workshops Courseware
225 Westchester Ave.
Port Chester, NY 10573
914-937-5440

Gamco Industries
Teaching Materials
Box 310P5
Big Springs, TX 79721
800-351-1404

Educational Software Buyer's Guide
MENU
1520 South College Ave.
Fort Collins, CO 80524
303-482-5000

Educational Products Information Exchange Institute
PO Box 839
Water Mill, NY 11976

CBS Interactive Learning Catalog
One Fawcett Place
Greenwich, CT 06836
203-622-2771

GCS Software
Music Education
PO Box 193
4100 S. Parker Road
Aurora, CO 80014

"Jack's my name, hacking's my game."

I'm Hacker Jack, modern day digital explorer. I've searched the world over from Silicon Valley to Singapore to bring you the best family programs around. Exciting. Creative. Educational. My new line of innovative software is the best of the best. I'd stake my reputation on it.

There's my friend Ted and his games for kids. A trip to Vegas without leaving home. Even hi-tech hot licks for you guitarists! They're all great, if I do say so myself. So call me now, and order yours right away.

Hacker Jack

Introduce your kids to a new pal: Ted Bear.

Ted Bear is (I hate to admit it) cute. With a capital "C." Smart, too. He plays "Concentration," "Old Maid" and "Go Fish" with my new program made just for him, *Ted Bear's Rainy Day Games.* Ted plays fair, and shows your little hackers how to be good winners *and* good losers (a dilemma I never face). Trust me – your kids want Ted Bear. Pay a little money (it's a great value) and bring Ted home. Please. I mean, even a sharp guy like me is partial to bears and kids.



The best Vegas package deal ever!



Try my new four-in-one game package, *Video Vegas.* It's great casino fun for Mom and Dad! Challenge the one-armed bandit with Slots. Beat the odds with Keno. Nail down your strategy with Blackjack and Draw Poker. It's Vegas excitement without the crowds. Authentic casino action whenever you want it. And at my low price, it's the cheapest thrills you've had in a long time!

Fine-tune your guitar playing.

With my *Guitar Wizard* program, you music-makers (MTV to classical) can locate fingerings and fretboard patterns for chords and scales in any key – in a snap! Music theory and technique, scales, and enhanced improvisational skills are right at your fingertips. So let me put *Guitar Wizard* right in your hands for a low, sweet-sounding price!



Call me, Hacker Jack, to order these incredible programs now. Dial 1-616-957-3036!

My many fine dealers all over the country can sell you these programs at my low prices.

Or call me direct (a chance to talk to the famous Hacker himself!) at 1-616-957-3036. Ask for Jack. Or hack off this coupon and send it to me with a check or money order.

Listen, I know all about that sense of adventure lurking around inside your brain. That's why I've dedicated this software to the hacker in all of us. Who is Hacker Jack? He might be *you.*

I'm Hacker Jack, saying "hack on."

	Apple //	C64	Atari 800	Amiga	IBM	Atari ST	Macintosh
Video Vegas	$29.95	$29.95	$29.95	$34.95	$34.95	$34.95	$34.95
Rainy Day Games	$29.95	$29.95	$29.95	—	$34.95	$34.95	—
Guitar Wizard	$29.95	$29.95	$29.95	—	$34.95	$34.95	$34.95

Hack this off and send it in.

Yes, Hacker Jack, I want your best programs at low, low prices.
14-day money-back guarantee*

Send me:
Quantity ___ Rainy Day Games $_____
___ Video Vegas $_____
___ Guitar Wizard $_____
Postage & handling $ 3.50
Total amount enclosed $_____

Method of payment:
☐ Check or Money Order ☐ VISA ☐ MasterCard
Card No. _____ Exp. date _____

Signature _____
Name _____
Address _____
City/State/Zip _____
Daytime phone (____) _____
Computer Model _____

*Yes, within 14 days of purchase, if you're not delighted with the program, please call us and we'll gladly arrange a refund.

BAUDVILLE™

1001 Medical Park Drive, S.E., Grand Rapids, MI 49506

Please give us up to three weeks to deliver your programs. And hey – thanks.

Circle 30 on Reader Service card.

A Buyer's Guide for Holiday Shoppers

CHRISTMAS

Over six million Commodore computer users have visions of software and hardware dancing in their heads this holiday season, and RUN's editors have compiled a small catalog of gifts to help you in your gift selections. Most of the items herein are not likely to have occurred to anyone wanting computer gifts. Some of the items are practical, others are luxury gifts, still others are fun; all are guaranteed to surprise and please someone on Christmas morning.



COMPUTER COMICS

Computerists of all ages will find *Vector*, a bi-monthly mystery/adventure comic book featuring computer/video-generated graphics, intriguing. Henry Vector, mystery writer, enters the world of hi-tech when his new computer, a birthday gift from his user-friendly girlfriend, gives him strange powers. A continuing story. Available for $1.50 per issue wherever comics are sold. Now Comics, PO Box 8042, Chicago, IL 60680; phone 312-786-9013.

Check Reader Service number 420.



COMPUTER WHEELIES

Anyone squeezed for computer space will appreciate receiving the SpaceMizer Vertical Work Station, which can house a computer, monitor, disk drive, printer and printer paper in just four square feet of floor space. The mobil work station features easy access to printed forms and adjustable shelves. The unit is 26 × 20 × 32 inches and is available in light oak or walnut finishes for $339.

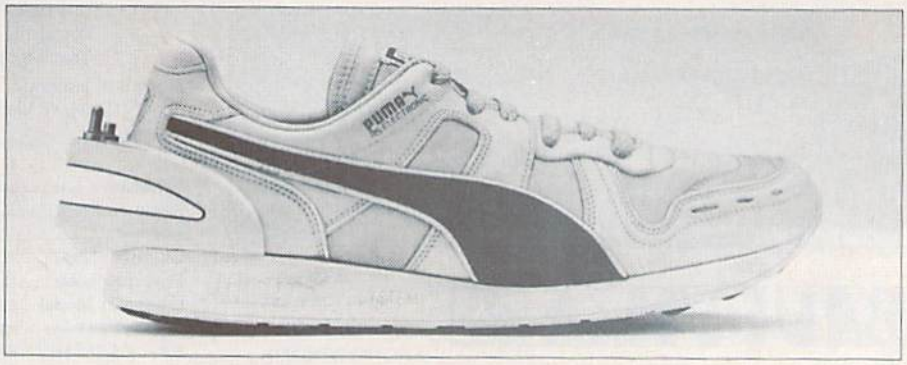
Grolen, Inc., PO Box 132, Glenside, PA 19038; phone 215-825-7213.

Check Reader Service number 428.

COMPUTERIZED PUMAS

You can never go too far with the uses you can find for computer chips. Puma's RS Computer Shoe has one built into its heel, which records your run, then communicates the results to your C-64. A program included with the shoe calculates your time, distance run and calories expended, then graphically compares them to past performances and future goals. Available for $199.95. Puma U.S.A., Inc., 492 Old Connecticut Path, Framingham, MA 01701; 617-875-0660.

Check Reader Service number 432.

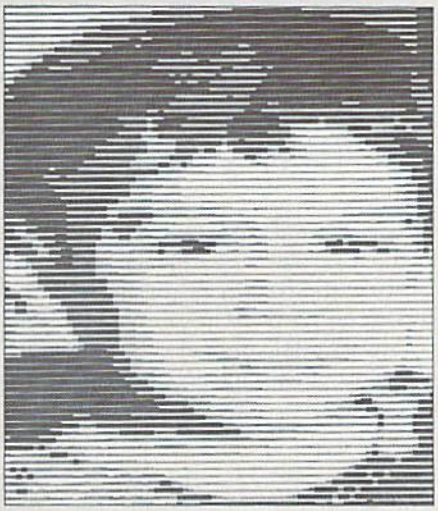


WISH LIST



MUG SHOTS

Using your C-64, dot matrix printer and any typewriter, along with the Scammodore program and scanhead, your favorite photographer can create computerized pictures from photographs. The Scammodore program features 80-column by 112-line capacity for legal-page-size pictures, eight type fonts, seven tone levels and exposure and contrast adjustments. If you include photos of yourself with your gift, your photographer/friend can have fun enlarging, reducing, caricaturizing, distorting and/or combining your features with features of other objects or people, and then creating posters of the results to pass on to friends for the upcoming New Year's Eve party. The Scammodore program disk and scanhead are available for $54.95 from Kaltek Labs, Adjuntas, PR 00601; phone 809-829-4220.



Check Reader Service number 434.

HOLIDAY GRAPHICS

Friends who already own The Print Shop graphics program and love sending holiday greetings all year round will appreciate receiving the all-seasons Holiday Edition of The Print Shop Graphics Library for the C-64. It's a collection of new graphics, fonts and borders that can be used with The Print Shop to create cards, banners, signs and letterheads for more than 15 different holidays. The Holiday Edition is available on disk for $24.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903; 415-479-1170.

Check Reader Service number 437.

HI-TECH GREETINGS

Buy yourself a gift of JingleDisk, Holiday PrinterPaper, or Holiday Graphics Disk to spice up your Christmas greetings this holiday season.

The JingleDisk, a holiday card-maker and animated greeting disk, features graphics to print cards and a holiday story on disk that unfolds with traditional Yuletide carols. The story can be personalized and copied onto another disk to send as holiday greetings ($9.95).

The Holiday PrinterPaper comes in three patterns of fifty sheets each—Christmas trees, holly berries and snowflakes. The package also includes 24 stickers of candy canes, Christmas trees, snowflakes and snowmen ($9.95).

If you already have the PartyWare package, a card- and party-design kit, you can get the free Holiday Graphics Disk (a $7.95 value), which provides Channukah, Christmas and New Years Graphics to decorate holiday banners, cards, hats and other party trimmings created with PartyWare.

The Holiday PrinterPaper, JingleDisk and Holiday Graphics Disk are available for the C-64 from Hi-Tech Expressions, 2699 South Bayshore Drive, Suite 1000A, Coconut Grove, FL 33133; phone 1-800-848-9273.

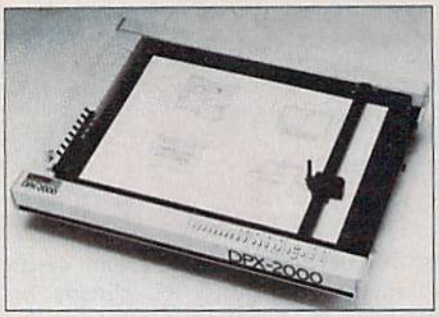
Check Reader Service number 435.

A BETTER MOUSETOP

Of course, during the cold winter months, mouses can get cold when no one is holding them. The MouseTop mouse cover fits the Commodore 1350 mouse and other popular mouses to keep them snuggly warm. Made of silver-gray fur, MouseTop comes in two varieties: with or without granny glasses. The washable MouseTop protects your mouse from dirt and grime. MouseTop is available for $5.95 with glasses, or $5.49 without, from H&H Enterprises, PO Box 2672, Corona, CA 91718; phone 714-737-1376.



Check Reader Service number 423.



Etch-A-Sketch for Grownups

If you've got an architect or drafting engineer in the family, surprise him or her with the DPX-2000, an intelligent X-Y plotter that features serial and parallel interfaces, .0005-inch resolution, 16 inches-per-second plotting speed, automatic pen-capping, multispeed digitizer and a 3K buffer. The DPX-2000 8-Pen Plotter is available for the C-64 and C-128 computers for $4795. Roland DG, 7200 Dominion Circle, Los Angeles, CA 90040; phone 213-685-5141.

Check Reader Service number 424.

3-D Tic-Tac-Toe

Nearly every family has a relative who likes playing games that have new twists. For them, there's Cubic Tic-Tac-Toe, from Brown-Wagh Publishing (100 Verona Court, Los Gatos, CA 95030; phone 408-395-3838). Played like traditional tic-tac-toe, but in three dimensions, it's a game of skill with six different game levels and three levels of difficulty. Players use strategy to score double and triple tic-tac-toes with just a keystroke. Children as young as five can begin playing immediately, while adults may go crazy playing a timed game against the computer. Cubic Tic-Tac-Toe is available on disk for the C-64 for $29.95.

Check Reader Service number 433.

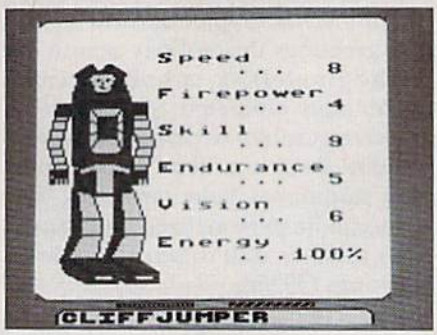
Cover Me

Using the same urethane-coated packcloth used by mountaineers to haul equipment up Himalayan peaks, Abcom (2333A North Sierra Highway, Bishop, CA 93514; phone 619-872-1946) has created dustcovers for peripherals and Commodore computers. Available in three colors—silver, brown and navy—they are light and flexible, won't rip, and are water-resistant and maintenance-free. Prices for the dustcovers range from $10.45 for keyboards and disk drives to $21.65 for printers and monitors.

Check Reader Service number 418.

Transform the Holidays Into an Adventure

You probably know at least one young child who owns Transformers, the best-selling series of transformable robot toys. He or she would *love* Transformers—Battle to Save the Earth, which features Autobot and Decepticon characters who come face to face in this strategy/action-adventure game from Activision (PO Box 7286, Mountain View, CA 94039; phone 415-960-0410). In this game the evil Decepticons have a new plan that threatens the world. Working with the



Autobots, your little friend must unravel the Decepticon scheme and prevent them from stealing enough energy to destroy Earth. That should keep him or her busy for months. Transformers—Battle to Save the Earth is available on disk for the C-64 for $34.95.

Check Reader Service number 436.

Computer Trivia Game

Computer-trivia buffs will enjoy playing King Chip, a computer-trivia board game from Directline (110 Torbay Road, Markham, Ontario, Canada L3R 1G6; phone 416-494-9494). The game contains more than 4050 questions, with answers and explanations to expand your knowledge of computers. The object of King Chip is to gain the throne of King Chip and hold it for as long as possible while one to five other players try to dethrone the king by answering questions correctly. Topics relating to computers include social issues, software, hardware, history, current events, television shows, movies, arcade games, applications, the arts and literature. King Chip is set up so that computer novices can compete with industry professionals. Available for $39.95.

Check Reader Service number 426.

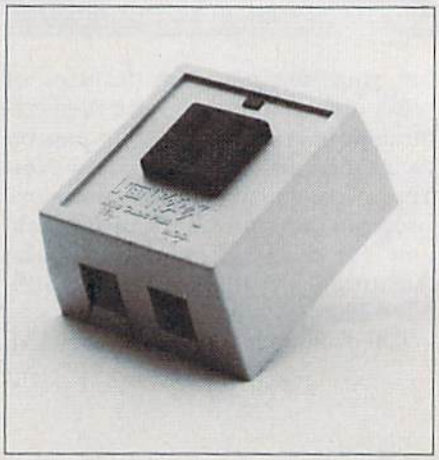
Transfer Paper

With a graphics program, hand-iron and Print 'n Wear 8½- × 11-inch transfer paper, your favorite young computerist can create and print out on dot-matrix or thermal-ribbon printers any message or graphics and then iron the transfer sheet onto a T-shirt. And if your friend is prone to entrepreneurialism, he can sell custom-made T-shirts to make the money needed for all those nice peripherals and software packages he has his mind on acquiring. Print 'n Wear paper is available in 4-pak ($8.95) and 8-pak ($15.95) from Foto-Wear!, Inc., 62 Herbert Drive, East Brunswick, NJ 08816; phone 201-257-6549.

Check Reader Service number 415.

Purge the Urge To Surge

The computer's memory is subject to occasional surges and spikes in electrical power, which can alter or destroy the data residing in memory. The recipient of The Wire Cube Plus, a single-outlet surge and spike protector, will get a charge out of finding such a gift in his or her Christmas stocking. It comes with a telephone



cable and is covered by a five-year warranty. Available from Networx (203 Harrison Place, Brooklyn, NY 11237; phone 718-821-7555) for $39.95.

Check Reader Service number 417.

NOW, FOR ONLY $44.95, YOU CAN EXPAND YOUR COMMODORE TO PERFORM LIKE NEVER BEFORE. JUST PLUG IN THE FINAL CARTRIDGE®

Does NOT use existing memory

Newly redesigned and upgraded, THE FINAL CARTRIDGE is a completely-external operating system created specifically for the Commodore 64, 64C, and 128...simply plug it into your computer. It does *not* reside in RAM or take up any working memory, yet it's always standing by to assist, improve and speed-up the functioning of your hardware and software.

Upgrades hardware and software

This single, multifunctional cartridge takes the place of at least 6 separate devices, and it's compatible with almost *any* software package and printer you can run with your Commodore: **1)** Disk Turbo–*5 times faster* loading and saving; Tape Turbo–*10 times faster* tape access; **2)** Preprogrammed Function Keys–eliminate long, tedious command sequences for RUN, LOAD, SAVE, CATALOG, DISK commands, LIST (removes all protections); **3)** Extended Machine Language Monitor–with relocated load-scrolling up and down, bankswitching, and more; **4)** Printer Interface–compatible with all well-known centronics printers, prints all Commodore graphics and control codes with screendump utility; **5)** Basic Tool Kit–*Automatic Line Numbering* when program typing, *Delete* to eliminate large program blocks with one touch, *Old* recovers accidentally-deleted programs, *Renumbering* to clean up or respace lines, *Find* to pinpoint specific lines, even in large programs, *Help* debugs system, *Disk Append* adds new programs to existing files with one touch; **6)** Backup Capability–make backup copies of any software program.



Other Convenient features

Freezer–Menu driven •16 sub menus • color changes • 4 resets • centronics/serial screendumps • print vector setting • reverse printing • stops and continues almost every program • allows total backup to disk or tape automatically • creates one file on disk or tape • freezes 4 to 6 times faster than dedicated freezers • game killer kills sprite-to-sprite or sprite-to-background collision

Screendump Capability–Prints low-res, high-res and multicolor • prints full page • prints from games and paint programs like Doodle, Koala Pad and more • searches automatically from memory address of picture

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Dust Drive

Many computer hobbyists never remember to clean the dust and debris that accumulates on computers and peripherals. If they had Mini-Vac, a lightweight vacuum cleaner that removes dust and debris from hidden and hard-to-reach areas, they would look forward to the fun they'd have cleaning up with this little gadget. It's equipped with two interchangeable wands, two fine-bristle brushes and a cloth vacuum bag. It's available for $19.95 from Mini-Vac, 217 South Orange St., Suite 4, Glendale, CA 91204; phone 818-244-6777.

Check Reader Service number 422.

A Special Joystick

If last year you gave loved ones copies of SubLogic's Flight Simulator II programs, then this Christmas you'll want to give them MicroFlyte ATC joysticks, because your flight cadets can then issue commands to their Commodore computers much faster than they can with keyboards, resulting in better flight performance. Joystick controls include: throttle up/down, brakes, guns, flaps up/down, elevators up/down and aileron, rudder left/right. MicroFlyte ATC joysticks are available for $59.95 each, from Microcube Corp., PO Box 488, Leesburg, VA 22075; phone 703-777-7157.

Check Reader Service number 429.

Help Wanted

According to U.S. Department of Labor statistics, by 1995, employment opportunities in data processing will have skyrocketed by 70–90 percent from present levels. *Computers: How to Break Into the Field*, by L. Peter Carron, Jr., a programmer for nearly 20 years, explains, in layman's terms, what various data processing jobs entail, what know-how is required for them, and how to go about finding work. Chapters include: Don't Be Intimidated!, How to Get Started, Getting Your Data-Processing Education and Key Information Sources. Hardcover, 152 pp., $6.95. Liberty Publishing Co., 50 Scott Adam Road, Cockeysville, MD 21030; phone 301-667-6680.

Check Reader Service number 431.

Designer Mouse Pad

If someone you know likes to keep a mouse around the house, then Mouse-Hide, a leather pad for the Commodore 1350 Mouse, is for him. It has a rubber backing to prevent slipping on any surface. The pad measures 8½ × 7 × ¼ inches and is available for $15 from Pilot Enterprises, Inc., 5699 Kanan Road, Agoura Hills, CA 91301; phone 818-706-1818.

Check Reader Service number 416.

Floppy Disk Index

Help computer infomaniacs manage the proliferation of information about the world of computers with Vantage Point Article Index, from Columbia Research Group (1500 Columbia Plaza, 250 East Fifth St., Cincinnati, OH 45202; phone 513-762-7860). The Article Index provides a catalog of all the articles, reviews, new-product announcements, letters to the editor, departments and columns that are published in over 50 computer magazines and journals, including *RUN* magazine. The Vantage Point Article Index monthly is available on disk by subscription only for $75 per year.

Check Reader Service number 427.

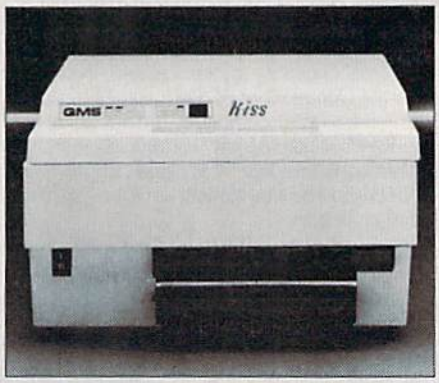
Joe Cool's Monitor Madness

Eyes get tired flitting across the monitor screen for hours, even days, on end. Protect a friend's baby blues from monitor glare with Tech-Specs protective eyeglasses, available from The Pine Cone (Dept. RU-106, PO Box 1378, Gilroy, CA 95021; phone 408-842-7597). The top portion of the lenses are polarized to reduce glare and increase contrast of the text on the screen. The bottom portion is clear for easy keyboard operation. The glasses also magnify text so you can work from 14 to 41 inches away. The glasses are available in frames and in clip-on versions for $67.95 each. Glass cases are available in green, gray, tan and rose.

Check Reader Service number 421.

Give Her a KISS

KISS, a laser printer from QMS (PO Box 81250, Mobile, AL 36689; phone 1-800-245-KISS), will help show off a giftee's text printouts in near-typeset quality print. It prints up



to 400 characters per second—ten times faster than daisywheel and dot-matrix printers—in any of nine resident fonts, and the fonts can be mixed for a lively, personal style. A KISS is available for $1995.

Check Reader Service number 419.

No Christmas is Complete Without a Book.

I Didn't Know You Could Do That *with a Computer!*, a book by Dan Gutman, presents over 120 practical and unusual programs—"weirdware"—you can use to enhance your life. Programs described include: Design your own house, plan your retirement, learn how to mix drinks, calculate biorhythms, get an aerobic workout, build your muscles, quit smoking, hypnotize yourself, learn to play guitar, make a rock video, improve your memory, and more. Published by Compute! Books (PO Box 5406, Greensboro, NC 27403) at $14.95; to order, phone 1-800-ALL-BOOK.

Check Reader Service number 430. ■

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Magic

From p. 12.

tab settings and clear the screen. It also changes 40-/80-column modes, so you'll have to use ESC X to get back to the screen on which you typed the SYS.

Ron Sardo
Sugarloaf, PA

$373 Saving function keys—I program the C-128 function keys constantly while I'm programming in order to perform short routines. Of course, when I power down, I'm back to the default values and, until lately, I've had to type my redefined values back in again.

The C-128 uses memory locations 4096–4351 for the function keys. Preprogramming my function keys, saving that memory block to disk and having it autoboot frees me from typing them over again.

To save the programmed-key work area to disk, type:

```
BSAVE"filename",B0,P4096 TO P4352
```

Load it back in with BLOAD"filename".

Daniel M. Bickford
FPO San Francisco, CA

$374 Back-side bonus—While using a C-64 word processor, I found that my data disk was getting full. After trying the mode-selection program found in the 1571 manual, which enables you to lock the drive into 1571 Double-sided mode, I found that loading the word processor would unlock the drive, or, in some cases, refuse to load. To overcome this, load and run the word processor, go into Disk mode and type U0>M1. The word processor will now be able to access the back side of the disk, provided that it has been formatted as a double-sided disk.

This trick works on Easy Script, RUN Script and Fontmaster II. It will probably work with any word processor that allows you to send commands to your disk drive.

Barry Estes
Westbrook, ME

$375 C-128 Beethoven—Here's a program that creates a C-128 version of a piece of music actually written by Beethoven.

```
10 REM 128 BEETHOVEN-JESSE B BROWN
20 TEMPO16:ENVELOPE 6,3,8,5,9,2
30 A$="V1O3T6V15XØHGIAIGIAIBQGO4IGIDIDO3IBI
   BIGO4HCO3IBIAIB"
40 B$="O4ICO3QAO4IDIEIDO3IBO4ICO3IAHGIAIGIA
   IBO4HCIEIDIE#IFIGIDIEIC"
50 C$="O3IBO4ICO3IAHAQGQRHAO4ICO3IBIBO4ICIA
   IG#IFIEIDICO3HBO4IDICO3IBO4ICIEIDIBIAIG#
   IFIEIDIC"
60 D$="O3QBO4IG#IFIGIAIBQCIBO4ICIDICO3IAIBO
   4HDQDQDHDQDQBO5HDQDQDO4HBHRHDQDQDHDQGO5Q
   DQR"
70 E$="O4#QFQRQGQRØ3QGHGHGWG"
80 PLAY A$:PLAY B$:PLAY C$:PLAY D$:PLAY E$
```

Jesse B. Brown
Eunice, LA

$376 Random 3-D shapes—This program draws and erases several 3-D shapes in random sizes on the C-128.

```
1 REM 3D SHAPES-M. N. CARSWELL
2 COLORØ,1:COLOR1,2:COLOR4,1:GRAPHIC1,1:DO
3 FORJ=1TO15:X=16Ø:Y=1ØØ
4 XR=INT(RND(1)*3Ø)+8Ø:YR=INT(RND(1)*3Ø)+6Ø

5 IFD=ØTHEND=15:ELSEIFD=15THEND=45:ELSEIFD=
  45THEND=6Ø:ELSEIFD=6ØTHEND=9Ø:ELSEIFD=9ØT
  HEND=15
1Ø COLOR1,3:FORI=XRTOØSTEP-(XR/6):CIRCLE1,X
   ,Y,I,YR,,,,D:NEXT
11 COLOR1,8:FORI=YRTOØSTEP-(YR/6):CIRCLE1,X
   ,Y,XR,I,,,,D:NEXT
12 FORI=YRTOØSTEP(-YR/6):CIRCLEØ,X,Y,XR,I,,
   ,,D:NEXT
13 FORI=XRTOØSTEP-(XR/6):CIRCLEØ,X,Y,I,YR,,
   ,,D:NEXT:NEXT:LOOP
```

M. N. Carswell
Eatonton, GA

$377 Mechanical safety—Have you ever accidentally hit a key you did not want? The solution is to cover the key with a small box that's a bit taller than the key. Any heavy paper or light cardboard will do.

Mary E. Wilson
Clearwater, FL

**$378 C-128 GETspeed**—Using GET$ in a Do Loop is an easy way to check a sequential file. It can be slow, however, if the file is a long one. Here's a version of a Do Loop read that speeds things up considerably. Enter the name of the file when prompted. You can pause the printing with the no-scroll key. By changing the value of B in line 20, this program should run on any Commodore computer. Of course, you won't be able to stop the listing with the no-scroll key.

```
1Ø REM GETSPEED - EDWARD B. SULLIVAN
2Ø B=2816:FORI=BTOB+54:READT:POKEI,T:CK=CK+
   T:NEXT
3Ø IFCK<>75Ø3THENPRINT"ERROR"
4Ø DATA 16Ø,Ø,185,Ø,2,24Ø,3,2ØØ
5Ø DATA 2Ø8,248,152,162,Ø,16Ø,2,32
6Ø DATA 189,255,169,5,168,162,8,32
7Ø DATA 186,255,32,192,255,162,5,32
8Ø DATA 198,255,32,2Ø7,255,32,21Ø,255
9Ø DATA 32,183,255,24Ø,245,32,2Ø4,255
1ØØ DATA 169,5,32,195,255,96,ØØ
11Ø INPUT "FILENAME";F$:SYS B
```

Edward B. Sullivan
Branson, MO

$379 Terminal garbage—In calling 1200-baud bulletin boards, I was usually plagued with all sorts of garbage when communicating with a system that supported the higher speed. I was always told that it was "line noise," and that there was not much I could do about it. I discovered that the problem only occurred during a long scroll, such as a main menu or a long message. The conclusion? Well, to put it simply, in a Commodore there is a memory buffer in the channel the modem uses. At 300 baud, most programs can empty this buffer as fast as it's filled. At 1200 baud you're communicating four

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times as fast. If your terminal program isn't emptying the buffer as fast as it's filling up, it eventually overflows, and garbage results. My solution is to use a terminal program that runs fast enough to handle the speed. Some programs I recommend are: VIP Term XL, AutoCom III and a public domain program by Chris Kaiser called XMoBuf.7.31.

James R. Carson
The Woodlands, TX

$37A C-128 graphs—The following short program will show how easy it is to create graphs in your programs. As set up, the height is determined by a random number. In your own program, this will be determined by your statistics.

To save you the trouble of dividing the scale, I used the variable that determines the height of each graph to tell it's magnitude. Placing it atop the appropriate bar identifies it nicely. The headings will be correlated to these also.

```
Ø REM 7.Ø GRAPHS - G. L. PENROSE
1Ø PRINT"{SHFT CLR}":GOSUB1ØØ:COLORØ,1:CHAR
   1,4,23:E$="{COMD M}":F$="{COMD @}"
2Ø FORI=1TO22:PRINTE$"{CRSR UP}{CRSR LF}";:
   NEXT:CHAR1,5,23
3Ø FORI=1TO88STEP4:PRINTF$"{CRSR UP}{CRSR L
   F}";:NEXT:CHAR1,6,23:G$=F$:FORI=1TO3Ø:PR
   INTG$;:NEXT
4Ø CHAR1,12,1,"CYAN":CHAR1,18,1,"GRN":CHAR1
   ,24,1,"YEL":CHAR1,3Ø,1,"RED"
5Ø CHAR1,12,24:A$="{CTRL 9}{CTRL 4}{CRSR UP
   }{2 SPACEs}{2 CRSR LFs}":FORI=1TOX:PRINT
   A$;:NEXT:PRINT"{CTRL 2}{CRSR LF}{CRSR UP
   }{CTRL Ø}"X;
6Ø CHAR1,18,24:B$="{CTRL 9}{CTRL 6}{CRSR UP
   }{2 SPACEs}{2 CRSR LFs}":FORI=1TOY:PRINT
   B$;:NEXT:PRINT"{CTRL 2}{CRSR LF}{CRSR UP
   }{CTRL Ø}"Y;
7Ø CHAR1,24,24:C$="{CTRL 9}{CTRL 8}{CRSR UP
   }{2 SPACEs}{2 CRSR LFs}":FORI=1TOZ:PRINT
   C$;:NEXT:PRINT"{CTRL 2}{CRSR LF}{CRSR UP
   }{CTRL Ø}"Z;
8Ø CHAR1,3Ø,24:D$="{CTRL 9}{CTRL 3}{CRSR UP
   }{2 SPACEs}{2 CRSR LFs}":FORI=1TOW:PRINT
   D$;:NEXT:PRINT"{CTRL 2}{CRSR LF}{CRSR UP
   }{CTRL Ø}"W;
9Ø COLOR5,2:CHAR1,1,1:GETKEYK$:RUN
1ØØ X=INT(RND(1)*21)+1:Y=INT(RND(1)*21)+1
11Ø Z=INT(RND(1)*21)+1:W=INT(RND(1)*21)+1:R
    ETURN
```

G. L. Penrose
Oakville, Ontario, Canada

$37B More snow—Here's another snowmaker for the C-128. The technique used here is the same as that used to draw a star. The program will run until you press the stop key.

```
1Ø REM MORE SNOW - JIM BORDEN
2Ø COLORØ,1:COLOR1,2:X=RND(-TI):DIM X%(5Ø),
   Y%(5Ø)
3Ø DO:R=INT(RND(1)*9Ø)+1Ø:NS=INT(RND(1)*1Ø)
   *2+5:GRAPHIC 1,1:Z=Ø
4Ø AN=2*{PI}/NS:FORX=AN TO 2*{PI}+.1 STEP A
   N :Z=Z+1
5Ø X%(Z)=R*SIN(X)+16Ø.5:Y%(Z)=R*COS(X)+1ØØ.
   5:NEXT
6Ø LOCATE X%(NS),Y%(NS):S=INT(NS/2)-INT(RND
   (1)*4):N=S:IFS=ØTHEN6Ø
7Ø WIDTH2:IFNS/S=INT(NS/S)THEN6Ø
8Ø FORX=1TONS:DRAW 1,RDOT(Ø),RDOT(1) TO X%(
   N),Y%(N)
9Ø N=N+S:IFN>NSTHENN=N-NS
1ØØ NEXT:SLEEP2:COLOR1,RND(1)*15+2:LOOP
```

Jim Borden
Carlisle, PA

$37C Space Caverns—One day, while piloting your mining cruiser back home, your ship begins to tremble and shake. Your cruiser has entered the dreaded Space Caverns!

When you run this C-64 program, the number you see in the upper-left corner of the screen is the cavern width. To make your journey more difficult, use the F1 key to decrease the width and then press any other key to begin.

To pilot your ship, press the cursor-down key to go left or cursor-right to go right. The game is over if you hit the cavern wall, and your score will be displayed. For every cavern width less than nine, you get 150 points, and for every star you pass, you get one point.

Good luck, space cadets!

```
Ø REM SPACE CAVERNS 64 - MIKE GEBIS
1 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,128,
  Ø,1,192,Ø,3,231,Ø,1,199,128,8,134,144
2 DATA 5,255,16Ø,3,6Ø,192,7,6Ø,224,7,6Ø,224
  ,3,255,192,1,255,128,3,153,192,4,24
3 DATA 32,8,24,16,16,24,8,12Ø,6Ø,3Ø,Ø
4 V=53248:POKEV+21,255:POKE2Ø42,13:K=9:POKE
  198,Ø
5 FORN=832TON+62:READQ:POKEN,Q:NEXT:POKE532
  8Ø,Ø:POKE53281,Ø:PRINT"{SHFT CLR}{CTRL 2}
  "K;:H=1984
6 POKEV+5,17Ø:POKEV+41,1:PRINTTAB(16)"SPACE
   CAVERN":WAIT 198,1:GETA$:Z=15
7 FORD=1TO23:PRINT:NEXT:IFA$="{FUNCT 1}"THE
  NK=K-1:S=S+15Ø:PRINT"{SHFT CLR}"K;:GOTO6
8 X=16Ø:F=PEEK(V+31)
9 S=S+1:GETA$:IFA$="{CRSR RT}"THENX=X+5
1Ø J=26:IFA$="{CRSR DN}"THENX=X-5
11 U=INT(3*RND(1)+1):IFX>255THENX=255
12 C=42:IFU=1THENZ=Z+1:IFZ>JTHENZ=J
13 IFU=3THENZ=Z-1:IFZ<1THENZ=1
14 POKEV+4,X:POKEH+Z+K,C:POKEH+Z,C
15 PRINT:IFPEEK(V+31)=.GOTO9
16 PRINT"{SHFT CLR}YOU HAVE DIED! SCORE="S:
   PRINT"PRESS [SHIFT] TO CONT":WAIT653,1:R
   UN
```

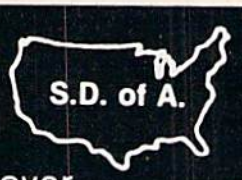
Mike Gebis
Bloomingdale, IL

$37D Unicorn/Pegasus—The following C-64 program will produce an interesting sprite. Its magical appearance certainly fits this column!

```
1Ø REM UNICORN/PEGASUS - RAY PEREZ
2Ø POKE5328Ø,Ø:POKE53281,Ø:PRINT"{SHFT CLR}
   "
3Ø FORS=832TO894:READT:POKES,T:NEXT
4Ø V=53248:POKE2Ø4Ø,13:POKEV+21,1
```

→

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Magic

Listing continued.

```
5Ø POKEV+39,12:POKEV+1,15Ø:POKEV,16Ø
61 DATA ØØ3,243,224,ØØ1,Ø25,Ø16,ØØØ,14Ø
62 DATA 2ØØ,Ø56,Ø98,Ø72,1Ø8,Ø26,136,196
63 DATA Ø1Ø,144,143,233,Ø96,Ø31,255,224
64 DATA Ø31,255,24Ø,Ø31,255,249,Ø31,255
65 DATA 25Ø,Ø31,255,254,Ø27,Ø15,22Ø,Ø25
66 DATA ØØ6,Ø92,Ø17,ØØ2,Ø84,Ø17,ØØ2,Ø92
67 DATA Ø17,ØØ1,Ø76,Ø17,ØØ2,Ø64,Ø17,Ø12
68 DATA Ø64,ØØ8,136,Ø32,Ø12,192,Ø48,ØØØ
```

Ray Perez
Henderson, NV

$37E C-128 spirals—The program listed below will draw randomly shaped spirals.

```
1Ø REM MAGIC SPIRALS - MICHAEL E RANDELL
2Ø GRAPHIC1,1
3Ø BG=INT(RND(1)*15)+1
4Ø BC=INT(RND(1)*15)+1
5Ø FG=INT(RND(1)*15)+1:IFFG=BGTHEN5Ø
6Ø COLOR1,FG:COLORØ,BG:COLOR4,BC
7Ø IN=INT(RND(1)*25Ø)+1
8Ø AN=INT(RND(1)*359)+1
9Ø R=INT(RND(1)*9)+2:T=INT(RND(1)*15)
1ØØ DO UNTIL XR>1ØØ
11Ø XR=XR+R:AN=AN+T
12Ø CIRCLE 1,16Ø,1ØØ,XR,,,,AN,IN
13Ø LOOP:SLEEP2:CLR:GOTO2Ø
```

Mike Randell
Coloma, MI

$37F 50-Hz clocks—While the C-64 Magic clock (trick $2E6, May 1986) will keep time in the United States, it loses ten seconds per minute in countries where the electrical frequency is 50 Hz. To get the correct time in such countries, the following command is necessary:

```
POKE 56334,PEEK(56334) OR 128
```

This command can be entered in Direct mode before loading Magic Clock or in a line before line 200.

The same command must be included in any program using the T.O.D. clock timing (e.g., VIP terminal).

Harry Getliffe
Durban, South Africa

$380 A better wait—C-64 programmers often use a Get loop in their programs to give the user time to select a key. A shorter and easier way is to wait for the shift, Commodore or control key by using the statement

```
WAIT 653,X
```

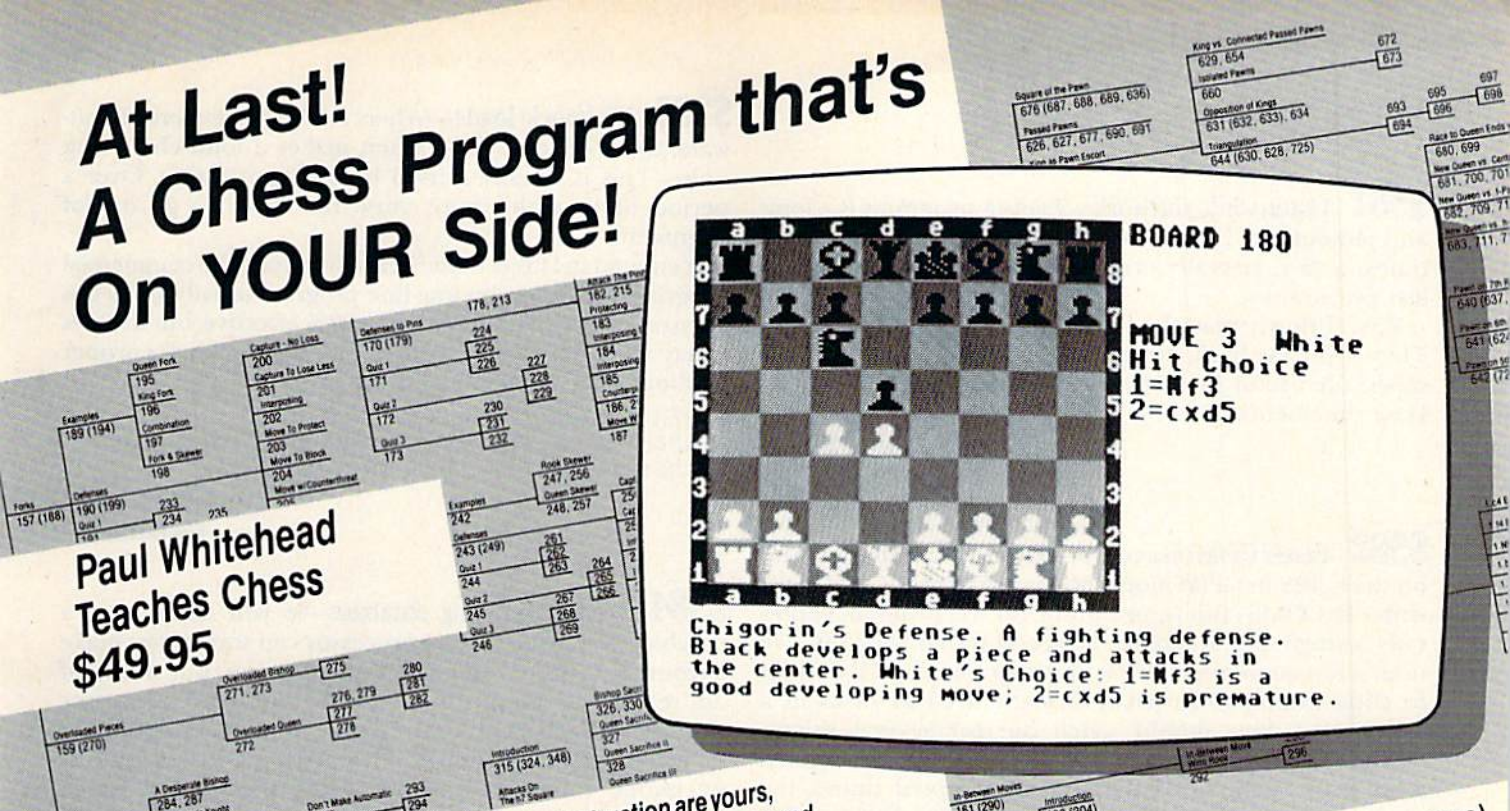
where X is replaced with 1 for the shift key, 2 for the Commodore key and 4 for the control key. The numbers can be added together to wait for one of several keys to be pressed. For example, to wait for the shift or control key to be pressed, use a value of 5 for X. Be sure to tell the user which key to press.

Also note that the run-stop key has no effect on the Wait statement, but will incur a Break error with Get.

Denis Boisvert
Saint John, N.B., Canada

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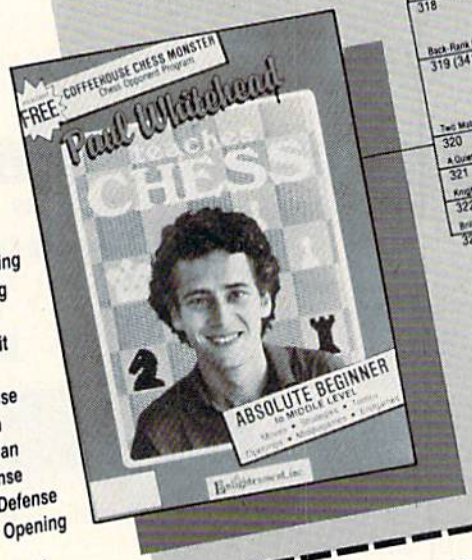
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- Center Counter
- English Opening
- Bird's Opening
- Larsen Attack
- Sokolsky's Opening
- Benko's Opening
- Grob's Attack
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$381 Listen while you work—Typing programs is a long and tedious job. I've found a way to enter programs four times as fast, virtually error free and with considerably less eye strain.

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Kenneth S. Ascher
Virginia Beach, VA

$382 Faster CP/M disk copies—Here's a useful tip to use on the C-128 in CP/M mode. Making copies of CP/M disks with PIP.COM is time-consuming, for the program copies only a single file at a time. To speed things up a bit, I've used a fast commercial back-up program (Copy II 64/128) to copy Commodore (GCR-formatted) CP/M disks in a short time. You should watch out for several things, though. Only Commodore-formatted disks can be copied. Also, only single-sided disks can be copied unless the program you use specifies it is designed for double-sided disks. If your program offers a "whole disk" copy, select it instead of a "BAM" copy, since CP/M puts its directory in a place where Commodore computers won't find it!

Joe Malloy
Clinton, NY

$383 No-knock loads—When loading commercial software, the 1541 disk drive often makes a loud chattering noise. This is usually caused by copy-protecting. Over a period of time this may cause the drive to go out of alignment.

If entered in Direct mode before you load the commercial program, the following one-line program usually stops this from occurring. This line is about 90% effective, but in cases where it does not work, it will not interfere with the proper loading of the commercial program.

```
Ø REM NO KNOCK - RUSSELL MCCRORY
1 OPEN1,8,15:PRINT#1,"M-W"CHR$(1Ø6)CHR$(Ø)C
  HR$(1)CHR$(133):CLOSE1
```

Russell McCrory
Gallatin, TN

$384 Word-processing database—If you don't have a database program, a word processor can sometimes make a good substitute. For example, you can put a list of addresses and phone numbers in one word processor document. Each name, address and phone number should be listed together. When you need to look for an address or phone number, use your word processor's search function to locate the person's name. You'll automatically find the address and telephone number too. If you don't find the person's name, you'll know that you should add the information to the file and resave the document.

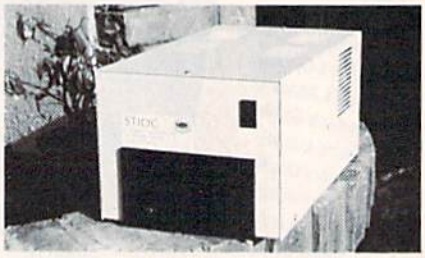
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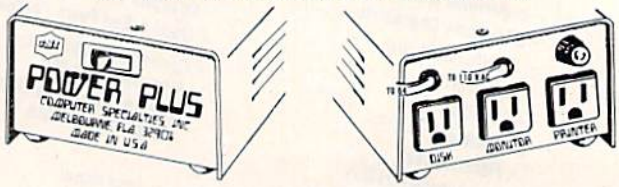


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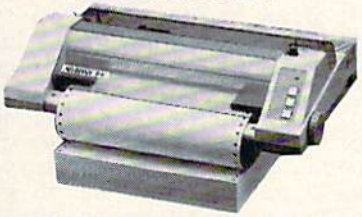
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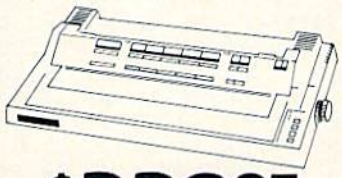
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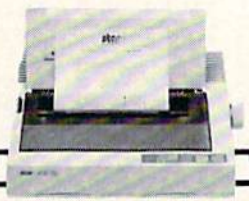
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ROCKEFELLER *From p. 72.*

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0288 8D 81 83 92 8F E0 8E 8F 94 E0 84 C7 07
0289 85 86 89 8E 85 84 0F 93 94 92 89 9D 06
0290 8E 87 E0 94 8F 8F E0 8C 8F 8E 87 D9 07
0291 10 89 8C 8C 85 87 8C E0 91 95 81 F3 06
0292 8E 94 89 94 99 0F 86 89 8E 89 93 C4 06
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0296 0A A0 00 98 18 65 76 85 78 A5 77 76 05
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0299 A9 93 20 39 06 20 9A 25 20 59 05 23 04
0300 A5 0E 8D B3 36 A5 0F 8D B4 36 68 E8 05
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0302 20 82 25 20 E9 22 20 94 26 A5 0E AD 04
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0362 19 E6 70 A0 00 68 99 4E 3A C8 C0 8A 06
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0365 B1 11 4C AA 13 20 47 0E C8 D0 D1 16 06
0366 A2 35 A0 33 A9 4F 20 50 13 A6 20 59 05
0367 F0 08 20 DC 23 E6 70 CA D0 F8 60 CE 07
0368 A2 36 A0 34 A9 4F 4C 50 13 A2 0D 72 05
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0370 5B 3A 86 4F 20 F4 0E A4 73 A6 4F 0A 06
0371 E8 C8 C0 0D 90 E9 60 48 A5 D3 C9 52 08
0372 06 D0 05 A2 06 4C AE 10 68 48 20 D1 04
0373 39 06 B0 08 A5 90 29 BF D0 02 68 C3 05
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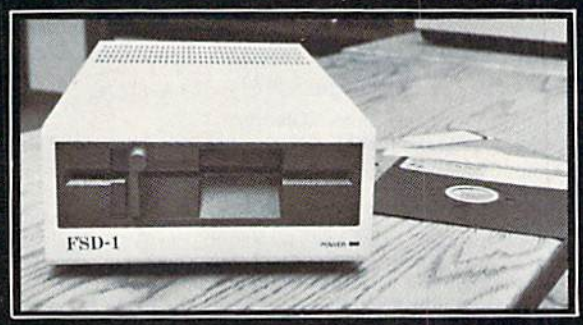
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0387 DD A5 2E F0 10 20 C2 0D A8 C8 88 1A 07
0388 F0 CD A9 20 20 EB 13 4C 9E 14 A5 CB 06
0389 31 F0 07 20 C6 0D 4A 4C 9C 14 A5 8B 05
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0408 05 41 90 0F 08 A5 27 18 65 28 85 7B 04
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0418 C9 50 D0 F7 A5 85 C9 06 B0 B0 C9 A4 08
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0518 C9 40 F0 03 4C DF 1A 8D 02 FF 20 F5 06
0519 C6 23 AD 45 02 48 AA AD 47 02 C9 95 06
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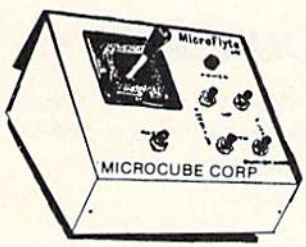
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0520 3A D0 0D A9 53 8D 45 02 E8 8A A0 01 07
0521 02 A2 45 D0 17 E8 E8 E8 A9 3A 8D 01 08
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0571 9A 25 A2 33 A0 2F A9 00 20 82 25 0E 06
0572 68 AA A4 EC 20 55 06 A9 00 85 D0 57 07
0573 4C 94 26 09 90 81 87 85 E0 8D 8F 65 07
0574 84 85 C9 1D D0 15 A5 EB 48 A4 EC 7A 08
0575 A2 18 86 6A 20 55 06 20 2B 28 C6 9D 05
0576 6A D0 F9 F0 9C C9 30 D0 4F AD 90 54 09
0577 05 AC 91 05 20 15 1D 20 CB 1C 4C 2D 05
0578 18 24 AD 90 05 85 47 AD 91 05 85 54 06
0579 48 A0 30 A9 00 20 78 25 A0 00 A2 03 06
0580 00 A9 47 20 DE 07 20 68 32 C8 C0 7B 06
0581 08 90 F1 A9 00 20 68 32 88 D0 FA 83 07
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0588 05 D0 DB C9 34 D0 08 AD 98 05 AC C7 07
0589 99 05 D0 CF C9 35 D0 08 AD 9A 05 AC 07
0590 AC 9B 05 D0 C3 C9 36 D0 08 AD 9C 4D 08
0591 05 AC 9D 05 D0 B7 C9 37 D0 08 AD AE 07
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0593 AD A0 05 AC A1 05 D0 9F C9 39 D0 36 08
0594 08 AD A2 05 AC A3 05 D0 93 C9 4D 7B 07
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0603 89 81 8C E0 87 92 81 90 88 89 83 8F 08
0604 93 E0 A8 99 AF 8E A9 E0 BF E0 C9 3E 0A
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0617 46 02 29 0F 60 0F 94 85 98 94 E0 7D 06
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0647 8D 71 05 A9 FF 8D 70 05 85 10 A5 6E 07
0648 0E 8D 6E 05 85 12 A5 0F 8D 6F 05 E2 05
0649 85 13 A9 01 8D 72 05 20 50 23 4C AE 05
0650 18 24 AD 72 05 F0 F8 A9 02 A0 03 20 07
0651 20 A7 20 C6 0E 20 4D 23 A2 05 BD 3A 06
0652 AC 05 95 0E CA 10 F8 A9 00 F0 D8 23 08
0653 C9 C1 F0 03 4C F7 20 AD 72 05 D0 61 08
0654 0F 20 9A 25 A9 00 A2 01 A0 21 20 A9 05
0655 82 25 4C 94 26 A2 15 A0 21 20 63 37 06
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0663 18 24 AD 72 05 A2 00 BD B3 36 99 D8 06
0664 E5 36 C8 E8 E0 32 90 F4 A5 3F 99 76 09
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0667 B9 E5 36 85 3F B9 E6 36 85 40 60 2D 08
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0685 46 02 C9 E0 D0 03 4C 18 24 AE 45 EC 06
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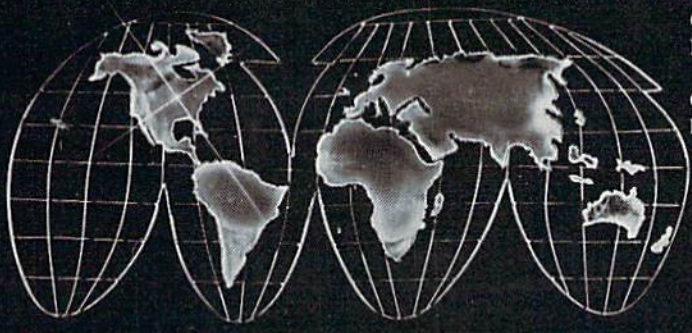
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Listing 5 continued.

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0954 36 A5 5C ED B4 36 B0 03 20 50 23 0E 08
0955 A5 5B 85 3F A5 5C 85 40 20 28 29 B6 07
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0956 20 0D 33 4C 18 24 4C F8 2F 0D 82 A6 06
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1095 A2 00 81 3F E6 3F D0 02 E6 40 20 E6 08
1096 3B 33 20 8B 31 20 E1 31 4C 96 32 D8 07
1097 A6 EB 8A 0A AA BD B2 36 85 40 BD 3F 0A
1098 B1 36 85 3F BD B3 36 38 FD B1 36 B7 09
1099 C5 EC 90 02 A5 EC 18 65 3F 85 3F 9F 09
1100 90 02 E6 40 A5 3F 38 E5 12 A5 40 FC 08
1101 E5 13 90 08 A5 3F 85 12 A5 40 85 C2 08
1102 13 60 00 00 C1 04 ■
```

RUN AMOK

Item: Here's a short enhancement to RUN Basic 1.0 (September 1986, p. 50) that corrects three problems. The first concerns string functions and occurs due to a problem in RUN Basic 1.0's branching. A second problem can arise because local variables and arrays share the same memory locations ($4000–$5FFF). The final bug is that the NOTE command is interpreted by Basic 1.0 as NOT (E). The NOTE command has therefore been replaced with the BEEP command, which operates just like the NOTE command and accepts the same parameters.

To implement these corrections, load RUN Basic 1.0, then activate it with a SYS 64738. Next, type in the following program and save it to disk. Before running it, be sure that a disk is in your drive and that the drive is turned on. The program will automatically save a copy of RUN Basic 1.1 to disk.

```
1Ø ' FIX BUGS IN RUN BASIC 1.Ø
2Ø POKE $7D41,$6Ø: POKE $7FØ7,$6Ø:POKE$7F2D
   ,$6Ø
3Ø POKE $7F7F,$6F
4Ø POKE $7FØ8,$BØ
5Ø POKE $7FA8,$6Ø: POKE $7FAD,$6Ø
6Ø POKE $81B7,$31: ' PATCH VERSION NUMBER
7Ø POKE $8ØD2,66:POKE $8ØD3,69:POKE$8ØD4,69
   :POKE $8ØD5,8Ø+128
8Ø INPUT"SAVE DEVICE #";DEV
9Ø PRINT:PRINT"INSERT DISK OR TAPE"
1ØØ PRINT"THEN PRESS ANY KEY"
11Ø GETA$:IFA$=""THEN11Ø
12Ø IF DEV<>1 AND DEV<>8 THEN 11Ø: ELSE IF
    DEV=8 THEN SCRATCH "RUN BASIC 1.1"
13Ø BSAVE"RUN BASIC 1.1",U(DEV), P$7ØØØ TO
    P$AØØØ
14Ø PRINT"RUN BASIC 1.1 IS SAVED."
```

Item: In the program for 64 Personal Ledger (October 1986, p. 62), an error will occur if either 64.04 or 65.04 is entered as a debit or credit. Addition or substitution of the following lines will cure the problem:

```
6Ø5 D(N)=INT(D(N)/.Ø1+.5)*.Ø1:C(N)=INT(C(N)
    /.Ø1+.5)*.Ø1                    :REM*193
1Ø75 GOSUB2945                      :REM*1Ø3
294Ø B(M)=C(M)+D(M):B(M)=B(M)+B(M-1)
                                    :REM*145
2945 D(M)=INT(D(M)/.Ø1+.5)*.Ø1      :REM*238
2946 C(M)=INT(C(M)/.Ø1+.5)*.Ø1      :REM*233
2947 B(M)=INT(B(M)/.Ø1+.5)*.Ø1:RETURN
                                    :REM*146
```

Also in the same article, under the Print instructions on p. 65, the reference should be to line 2920, *not* line 2880.

Item: Line 9 of October's Magic trick $343 (p. 101) was incorrectly listed as: 9 X = X + 1EN(B$). It should read: 9 X = X + LEN(B$).

Item: In October's Mega-Magic (p. 11), the second sentence of the third paragraph is partially incorrect. It should be changed to read: "By typing lines 20, 30 and 40 into your program, but omitting the GOSUB 100:GOTO10 from the end of line 40, and setting the variables. . . etc."

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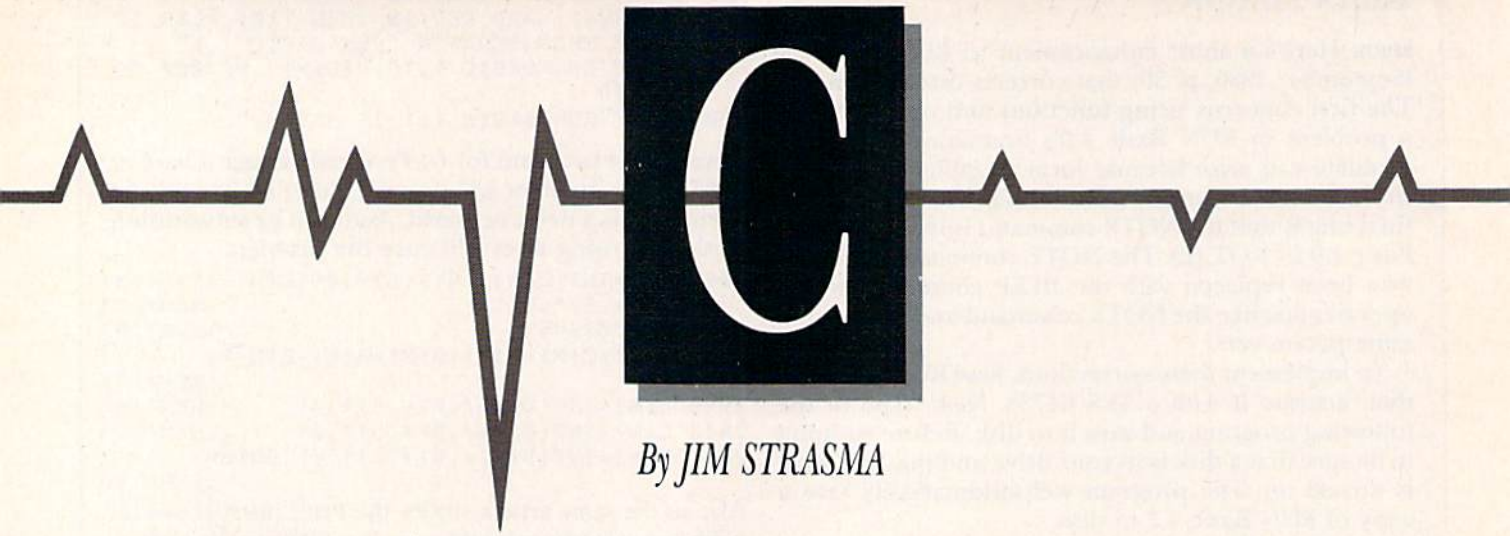
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By JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard to:

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Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

HARDWARE

***Q:** There are 3-MHz versions of the 6510 and 6502 chips available now. Is there any way to use these chips to increase the speed of my C-64 or 1541?*

Brian Jedrick
Nutley, NJ

A: Not yet, because you'd also need faster versions of all the supporting chips. For example, the C-128 won't run at 2 MHz in 40-column mode because the Commodore's 40-column color chip can't run at higher speeds.

***Q:** I want to use both my C-64 and a VCR with my TV. To set this up, I purchased a Radio Shack #1501628 splitter to go from the computer to the VCR, then connected the 75-ohm output and the signal coming from the cable company to the splitter.*

The problem is that while the TV and VCR work correctly, the picture is snowy or cross-hatched when I use my word processor. Am I doing something wrong? Is the splitter malfunctioning? Or do I need a monitor because I'm asking too much from my equipment?

Jeremy A. Michele
Big Timber, MT

A: Video interference is often a problem when you're using a TV as a display, but it's probably not the fault of the splitter. Before you give up and get a monitor, here's an alternative connection scheme to try.

First, connect the cable-TV wire directly into the VCR. Second, connect a 300-ohm TV wire from the VCR to the antenna terminals of the video switch you got with your C-64. Third, run the wire Commodore included with the switch from the computer to the switch. Fourth, feed the output connectors from the switch into the antenna terminals on your TV.

***Q:** Are the C-64 chips plug-ins or soldered? If they're soldered, would it be feasible to install sockets?*

Richard Stephens
Yonkers, NY

A: The C-64's chips are soldered in, and I've had considerable success removing soldered chips with an inexpensive desoldering iron from Radio Shack. However, I must warn you that it's a lengthy and frustrating project, and it could destroy your circuit board. If you do remove soldered-in chips, you can install sockets for the replacements. In fact, that's the only way I do it.

***Q:** I saw an ad in* RUN *that mentions a PC10 and a PC20 as new IBM PC-compatible computers from Commodore. Could you give me some information about them?*

Brian Jedrick
Nutley, NJ

A: The PC10 and PC20 are well-made German PC clones. They are sold in Canada and Europe, and I've heard that they may come to the U.S. as well. If you want one now, you can order it from a Canadian dealer, but the price is liable to be out of line for U.S. readers.

***Q:** I have a C-64 and use my TV for a display. I would like to buy a monitor, but am also considering upgrading to a C-128. Could I use a 1902 or 1902A monitor with my C-64 now and with a C-128 later, and, if so, would I need any special cables?*

Greg Diehl
Lawrence, KS

A: Yes, the 1902 and 1902A should work just fine with your C-64, as long as it's new enough to have eight holes in its monitor jack (early C-64s had only five holes). The monitor will need one cable to work with the 64, then an additional one for 80-column color when you get your 128. Both cables come with the monitor.

Q: I have a VCR, and the article called "Making the Video Connection" in the January 1986 issue of RUN *really interested me. However, in trying to set up my system to add screen displays to a videotape, I've run into one problem. The article included instructions for using a 1702 monitor, but not a 1902, such as I have. I've figured out how to hook the monitor up, but the picture appears only in black and white. How can I get color? Also, is this setup also supposed to record sound?*

Matt Linden
LaGrange, OH

A: Using a Y connector from Radio Shack to tie together the chrominance and luminance signals from the computer should give you color. Connect the cable that came with your 1902 from the video-out port on your computer to the VCR via a Y connector fitted with two female RCA phono jacks and one male RCA phono plug. The chrominance and luminance plugs from the computer go into the two jacks, and the plug from the Y connector goes into the VCR's video-in connector.

Then run an ordinary hi-fi cable with male RCA phono plugs at each end from the VCR's video-out jack to the female jack of another Y connector, one whose other two ends are male plugs. These go into the chrominance and luminance connectors on the back of the 1902. The result won't be perfect, especially compared to the clarity of running chrominance and luminance signals directly from the computer to the monitor, but it will be far superior to the luminance-only signal you have now.

As for audio, just run a second hi-fi cable from the VCR's audio-out jack to the audio jack on the 1902.

SOFTWARE

Q: I have a number of C-64 Multiplan files that I'd like to keep and use if I buy a C-128 and the new Epyx Multiplan. Could I use them without retyping all the information? How about on the Amiga?

J. J. Shawcroft
Seattle, WA

A: Microsoft's Multiplan, like many spreadsheets, supports a standard way to export data to other programs and import it from them as well. In Multiplan, this feature is called SYLK files. They can be used to send data to any version of Multiplan via a terminal program and modem, or straight through the RS-232 port in cases where the disks are not directly compatible, as in moving C-64 files to an Amiga.

Q: I have the Wordcraft 20 word processor on cartridge for my VIC. Is there any way I can use it on a C-64?

Joan Ramos
New York, NY

A: You can't use Wordcraft 20 on a C-64, but there is a Wordcraft 64 as well—a British product from Peter L. Dowson of Dataview, Ltd. Hugh de Glanville, editor of the ICPUG user's group newsletter, is listed in its January 1986 issue as the contact for ICPUG members wanting Wordcraft. His address is 45 Woodland Grove, Weybridge, Surrey KT13 9EQ, England.

Although UMI, the original U.S. distributor of Wordcraft 20, is no longer in business, I seem to recall that another U.S. distributor took the program on later. I can't recall what company it was. Does anyone know?

Q: I've just purchased a C-128. What version of WordStar will work in its CP/M mode?

Jim Kalin
Matherville, IL

A: Commodore used WordStar 3.3 in prerelease testing of the C-128, and as far as I can tell in brief testing of my own, it works well. It seems to differ from other versions of WordStar only in adding the words "Commodore 128" to the configuration description on the second screen.

Q: I've looked and looked for a program that will let me enter genealogical data into a C-128 in a format similar to a standard genealogical work sheet. Is there such a program?

Fred Goldsmith
Phoenix, AZ

A: You might try Family Roots, from Quinsept, Inc., PO Box 216, Lexing-

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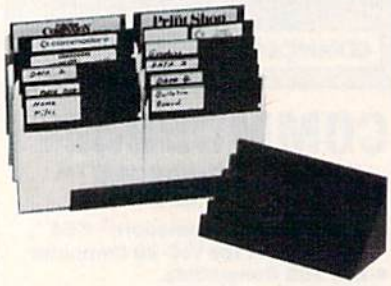
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ton, MA 02173; 617-641-2930. It's available in a Commodore version.

Also, don't forget about the CP/M mode on your 128. With that, you can run many programs written for such machines as the Kaypro and Osborne.

Q: I have a C-128 with a 1571 disk drive, and I can't Dload locked files. My 1571 is an early unit. Do all 1571s have this bug?

W. Anthony Marsh
Somerville, MA

A: I, too, have a C-128 and an early 1571, and, yes, they refuse to load locked files via the Dload command, the Load command or even the monitor in 128 mode. They will, however, happily load such files in 64 mode, meaning that locked files should be a problem only for programs that run in 128 mode. This also suggests that the "bug" could be in the C-128 Kernal ROM, instead of the 1571.

For those unfamiliar with the term, a locked file is one that cannot be erased with the usual Scratch command. A locked file is created by setting bit 6 of the file-type byte in the file's directory entry. A good way to set this bit is with a disk utility, such as Disk Keeper (*RUN*, August 1986). There's also a Basic routine that will do the trick on page 70 of the edition of the *Commodore 1541 Disk Drive User's Guide* that I wrote (Commodore part #1540031-03). A locked file can be unlocked by clearing the same bit.

PROGRAMMING

Q: I have a C-64 and plan to get a C-128 in the future. If I type in and save programs (Basic and machine language) for the C-128 on my C-64, can I load and run them later on the C-128?

Michael Chimchusky
Hernando, MS

A: Sure, no problem. Machine language programs for the C-64 and the C-128 tend to be different, but you can easily enter them in Data statement form on either computer for the other computer to load and run. Similarly, although the starting address of

Basic programs on the two machines is different, it's automatically adjusted at load time. Just be sure to type in the C-128 version of a program when it differs from the C-64 version.

When you get your C-128, load the program into it and list each line that uses the new Basic 7.0 commands. You'll need to move the cursor to such lines and press the return key to properly store them in Basic 7.0 form. When you've taken care of them all, resave the program.

Q: I'm considering buying a C-128, but I've discovered that the 10-key numeric pad functions only in 128 mode, not in 64 mode. Do you know if Commodore has plans to change this, or if there's any software on the market that makes using the keypad in 64 mode possible?

Keane Foster
Schofield, WI

A: Some commercial programs, such as Grade Manager III from Smoky Mountain Software, already use the numeric keypad in 64 mode on the C-128. You can too, thanks to a hint from the new Abacus book, *128 Tricks and Tips*. First, type in the command POKE 53295,248 to turn on the added lines K0–K2 in the C-128's keyboard matrix. Then you have to decode the matrix to make sense out of it. One simple, but limited, way to do this is with a Basic Get loop like the following:

```
100 POKE 53295,248
110 PRINT "PRESS A KEY ON THE
    KEYPAD"
120 GET A$
130 A = ASC(A$ + CHR$(0))
140 IF A = 95 THEN PRINT "0 OR 8 OR +"
150 IF A = 29 THEN PRINT "5 OR . OR –"
160 IF A = 160 THEN PRINT "2 OR
    ENTER"
170 IF A = 131 THEN PRINT "1 OR 3"
180 IF A = 61 THEN PRINT "4 OR 6"
190 IF A = 81 THEN PRINT "7 OR 9"
200 GOTO 120
```

A better solution would be to write your own keyboard scan routine in machine language, with the help of the C-128 keyboard table on page 642 of the *Commodore C-128 Programmer's Reference Guide.*

Q: I have a machine language monitor program called Micromon, but no longer have the instructions for it. Can you tell me how to save programs with this monitor?

John Guillory
West Lake, LA

A: Saving programs with most versions of Micromon is fairly simple. The statement .S"0:NAME",1000,2000 will save the contents of memory addresses $1000–$1FFF to disk. If you have a cassette, use .S"0:NAME", 1000,2000,01 instead. (Micromon defaults to disk.) Note that, in both cases, the final address is one location beyond the actual last address you want saved. By now, most Commodore user's group libraries should have both Micromon and an instruction file for it.

Q: Is there any way to get the C-64 to keep time with millisecond accuracy?

David A. Washburn
Atlanta, GA

A: Yes, using machine language. You'll need to set up a timing loop and add together the number of clock cycles used by each command in the loop. Just bear in mind that when a branch is taken, it requires one or two (depending on the distance of the destination address) more cycles than when it's skipped. The clock cycles needed for various commands are shown in nearly all machine language guides.

As an example of a timing loop, the subroutine

```
WAIT  LDX #199
LOOP  DEX
      BNE LOOP
      RTS
```

uses two cycles one time for the load, two cycles 198 times for the decrement, three cycles 198 times and two cycles one time for the branch (assuming the whole sequence is within the same 256-byte page of memory) and six cycles for the return. Adding these up, the subroutine takes a total of 1000 clock cycles, of which ten are needed regardless of the value in the X register, and the rest are used at the rate of five per loop iteration.

On a C-64, with its approximately 1-MHz clock, a WAIT would execute in very close to one millisecond. For longer delays, just call WAIT repeatedly, also taking into account the clock cycles used by the calling program. ■

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Compiled By BETH S. JALA

Okimate 20 Printer

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Until recently, the Okimate 20 color printer from Okidata had been in production for nearly a year without a Commodore-compatible version. One would think a C-64/C-128 adaptation of the printer would have been available sooner, given the popularity of Okidata's earlier Okimate 10 printer among Commodore users.

The Okimate 20 printing system consists of the printer and an Okidata Plug 'n Print kit used for interfacing the printer to your computer. The Plug 'n Print kit comes with both black and color ribbon cartridges, a user's manual and a disk that contains C-64 software for printing the screens created with CAD programs and popular hi-res graphics programs like Doodle! and KoalaPad.

Like the Okimate 10 that preceded it, the Okimate 20 is better suited for light-duty work, such as in a home environment. Using the printer in a heavy-duty office application would undoubtedly shorten its lifespan. Continuous usage would also require a stockpile of ribbon cartridges. The black and color cartridges will print about 75 and 15 pages, respectively.

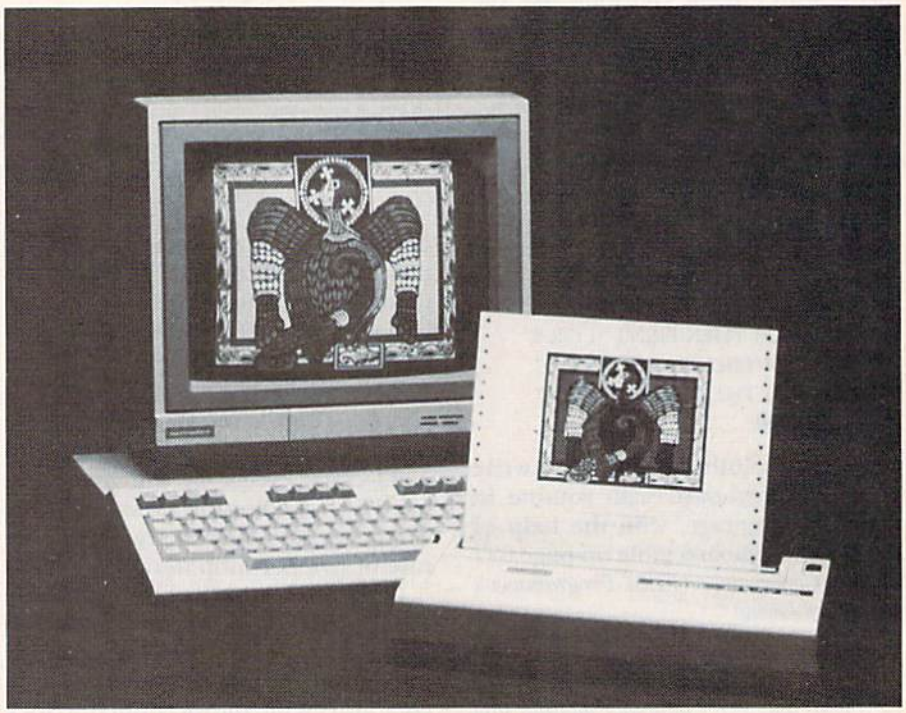
The Okimate 20 offers Commodore users a degree of versatility matched by few low-end printers. It can be used with the black ribbon for printing text on standard paper, and the color ribbon can be used with special gloss paper or laminated film for transparencies. Since the Okimate 20's 24-pin print head creates images with heat, not pin impacts, a third alternative is to use thermal paper without a ribbon cartridge.

My use of the printer did not reveal any glaring incompatibility with commercial software, and programming it is easy. Some of the print features have to be accessed with a CHR$(27) used as an escape character at the beginning of the command. Other commands use Basic syntax without an escape character, similar to that used on Commodore-dedicated printers.

The user's manual contains a complete and easy-to-read tutorial for learning to program the printer and accessing the print options. Instructions are also included for using the printer with the word processing programs Easy Script, PaperClip and WordPro 3 Plus.

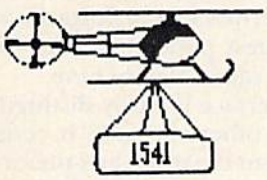
The Okimate 20 has some impressive options like an italics character set, super- and subscripts, underlining and, of course, colored text. It also possesses most of the print features found on dot matrix printers, such as NLQ, pica (10 cpi), elite (12 cpi) and compressed (17 cpi) characters.

Double-width characters are available in each print mode. The quality of the print in any of these modes doesn't set any new standards. The compressed characters are somewhat blurred, with lowercase m's



The Okimate 20 printer.

1541 MASH V2.0



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that, at a glance, can be mistaken for smudges.

The print speed of the Okimate 20 is 80 characters per second in Draft mode and 40 characters per second in NLQ mode. Unlike most dot matrix printers, the NLQ mode is the default mode upon start-up. The NLQ characters, formed from a 14 × 18 dot matrix, are clear and readable, but they don't match the quality of some of the better low-end dot matrix printers. When printing characters with either a black or color ribbon cartridge, all of the print modes appear to suffer from varying degrees of inconsistency in the characters.

The Okimate 20's true potential is realized when it's used to print the color hi-res screens you create with the software of your choice. The software that accompanies the Plug 'n Print kit reproduces a nice quality of high-resolution color screen in about 20 minutes on the C-64. The color ribbon is capable of producing roughly 100 different shades. Hi-res screens are printed with bright colors that, for the most part, match those that appear on the screen.

The printer has a switch that allows you to adjust the print intensity in five levels of brightness or darkness. Whether printing a hi-res color screen or lo-res black characters, the best print quality is achieved with the switch set halfway between the lightest and darkest levels.

Overall, the Okimate 20 is impressive for a low-priced color printer. While it lends itself to conventional uses, printing text is not its forte. Most of my printing time is spent printing characters, not performing hi-res screen dumps. If the bulk of your printer usage resembles mine, I would recommend the purchase of a good-quality dot matrix impact printer, since they tend to be better suited for printing characters.

However, the Okimate 20 is almost a must item for those engineers, artists, students and hobbyists who use color graphics or CAD software and have a need to produce hard copies of their work.

By targeting the Okimate 20 at the home market, Okidata has successfully juggled a fine balance of components and technology. The result



of their efforts is a good-quality color printer priced well within the reach of most Commodore computerists. *(Okidata, 532 Fellowship Road, Mt. Laurel, NJ 08054. $268, including Plug 'n Print kit.)*

Tim Walsh
***RUN* Staff**

Device One

This Interface Should Accommodate Almost All Your Printing Needs

Most of us who monitor the computer marketplace know that, for some time now, it has been overflowing with parallel printer interfaces for Commodore computers. With this in mind, I wasn't very excited when Progressive Peripherals & Software sent us their latest parallel printer interface, aptly called Device One.

This interface is easily distinguishable from others because it consists of more than the usual box plus a few cables. The package includes the interface itself, a small ac power supply, a disk and a user's manual. The disk contains C-64 software, hi-res picture screens and fonts for use with the interface.

The interface contains a multifunction 16K data buffer. A reset button mounted on the interface box can be used for clearing the buffer contents and printing buffer-resident instructions. A bank of DIP switches provides for both tailoring the interface to your printer and selecting print functions.

Print options offered by Device One include an NLQ mode for printers lacking that feature. The manual does not state the dot density of the NLQ mode, but the mode is of marginal quality at best. When using Device One with a printer lacking NLQ characters, the only way to produce good-quality NLQ characters is to activate the printer's Emphasized mode.

Device One allows you to produce both hex and decimal data dumps. It also provides Commodore MPS-803/1525 emulation, an ASCII mode and



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The Device One Interface.

a transparent mode. A semitransparent mode permits you to access both the interface's features and those of your printer.

The disk that accompanies the unit has a program for printing a monthly calendar, beginning with the year 1583. Besides providing extra print fonts, this disk contains several programs, including a font editor and a program called the Printerizer. The Printerizer is used to convert and save to disk screens created by ten of the most popular commercial hi-res drawing programs, including Doodle! and KoalaPad.

Once a hi-res screen is converted by the Printerizer, it can be downloaded and stored in the interface's buffer until you're ready to print it. I did not encounter problems with scrambling text output or interference with the hi-res screen contents in the buffer. However, I did have to seek some assistance from Progressive Peripherals in order to successfully access and print hi-res screens from within a word processor.

If you want to print a Doodle! screen within, for instance, the fourth page of a word processing document, you need lots of practice and a few printer codes. The task is confusing, because no software-specific examples are given in the user's guide.

First, you have to determine the size and desired position of the image on the page. Next, you have to make the appropriate left- or right-margin adjustment to position the text alongside the printed image. Then you have to place the proper printer code within the document to begin printing the image.

Commercial software compatibility is of primary concern to most people who invest in parallel printer interfaces. Using Device One with a variety of both commercial software and Basic lo- and hi-res screen dumps did not uncover any hidden incompatibility problems. The interface's good 1525 emulation provides a standard that ensures a minimum of such difficulties.

Unfortunately, commercial software is superficially treated in the Device One user's manual. The only references to third-party software appear in two paragraphs composed of brief instructions for using the interface with the Paperback Writer and Superscript word processors. Device One's many print options and commands deserve more instructions in the user's guide for accessing both its features and those of your printer.

In summary, nonprogrammers and software users are likely to find Device One in need of better documentation and more software support before they can consider it truly suitable to their needs. However, Device One allows you to accomplish a remarkable range of printing feats that few other printer interfaces can match. It is entertaining to use and contains many features that I did not have space to mention here. *(Progressive Peripherals & Software, 464 Kalamath St., Denver, CO. 80204. $119.95.)*

Tim Walsh
***RUN* Staff**

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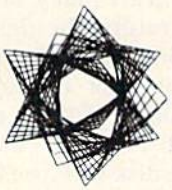
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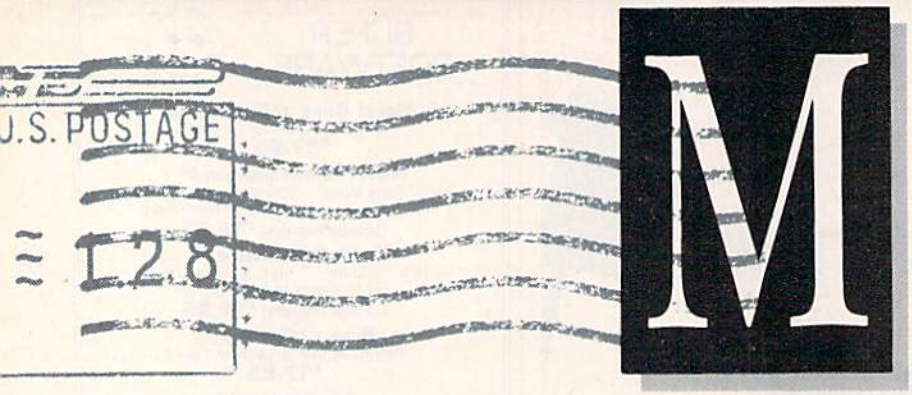
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Software Shenanigans

This is a letter of protest! I recently purchased a copy of GEOS at the local outlet of a popular chain of stores. I intended to use it at the school where I teach. When I opened the package, which was tightly wrapped in cellophane, I found that GEOS was not among the programs on the disk.

The reason turned out to be simple. Someone had purchased GEOS, made a backup copy, carefully transferred the GEOS label to the backup disk, and returned it as defective. But, if that's bad, consider the fact that the store carefully rewrapped the package and sold it as new merchandise. What a pathetic commentary on the computer marketplace!

The losers are many. I lost the time it took to return the defective disk; Berkeley Software, the producer of GEOS, may lose business because faulty versions of their product are being sold; and the chain where I bought the disk will lose business because of poor credibility.

The cost of this fine software ($39.95) is low enough that no one needs to cheat. I hope people wake up and realize the consequences of their foolish actions.

Allen Holmes
South St. Paul, MN

Double-Drive Superbase

I'd like to correct an error in the Superbase 128 review in *RUN*'s October 1986 "Big Software for Small Business" article. The author, John Premack, stated that the program supports only drive 8, but this isn't true. In fact, both Superbase 128 and Superbase 64 support at least drives 8 and 9, and probably drives 10 and 11 as well, because the active drive number is set in a variable within the program. The start-up program sets it as number 8, but the start-up program can be altered with the program editor to set drive 9 as the active drive.

Since all of Superbase (with the exception of the help screens) resides in memory, and since the start-up program must be on the disk in drive 8, switching to drive 9 is the practical solution when you want to use two databases that reside on different disks or when you want to access a drive designated as device 9. In the latter case, either you must save the altered start-up program to a separate disk that you swap in when the program prompts you to change disks, or you must make the program disk writable and save the program to it, in which case no swap at the prompt is necessary.

I've written numerous programs for Superbase that use both drives 8 and 9. The Database command can be used either in a program or on the command line to redefine the drive and the database to be used. The full command is DATABASE "dbname", <unit number> (8 to 11), <drive number> (0 or 1).

I've found Superbase a powerful and easy database to use, and I prefer it over Dbase II in the CP/M version. Because it's a programmable, relational database program, I've been able to perform tasks that the Superbase manual says can't be done. For example, with a little programming, any data field can be lengthened or shortened. However, to be practical, this operation should be done on two drives.

As a final note, I've found that my SFD 1001 works fine with my 64 version of Superbase, but I can't get that drive to work with my 128 version. Since Mr. Premack states that this is possible, would you please supply me with the name of the serial bus-IEEE interface with which it will work?

Stephan R. Kage
Berkeley, IL

You and one other reader, Robert Overman of Aiken, SC, caught my error on the number of drives Superbase 128 will support. I thank you both for writing in. It's true: The Database command will let you designate another device besides device 8 as the active drive. By modifying the start program you can even have the program disk on device 8 automatically load a database from another device. However, unless you transfer help files and memo screens to each disk, or are backing up data disks, Superbase 128 still requires you to swap disks.

Concerning your inability to get Superbase 128 to work with your SFD 1001 drive, I checked with Progressive Peripherals (464 Kalamath St., Denver, CO 80204) and was told they don't know what the problem could be. They said any interface designed for the 128 should be all right.

Perhaps you're trying to use your C-64 interface, which won't work. If that's your problem, and you need to buy an interface specifically for your 128, Progressive Peripherals sells one called E-Link. I'd also

suggest considering the Quicksilver 128 from Skyles Electric Works, 231E S. Whisman Road, Mountain View, CA 94041.

John Premack

Olivetti Programs Needed

I own a C-128, a 1541 disk drive and an Olivetti PR-2300 ink-jet printer. I'm glad there are a few programs available for this printer, such as Ultra Hi-Res Graphics in the February 1986 issue of *RUN*. However, I would like to see more companies adapt their programs to the Olivetti—programs such as the Print Shop, Newsroom and GEOS. I'd also like to see other Olivetti owners speak out about this, by writing to the companies or to publications such as *RUN*.

Michael W. Jones
Ottawa, KS

The Perfect Processor

I was recently in the market for a word processor for my C-64. Being confused over what seemed like hundreds of available programs, I consulted my *RUN* library. When I got to the March 1985 issue, there it was: Bill Gates' "One Little Word After Another." After reading the article, I ordered the word processor—WordPro 64—that I felt would best suit my needs. It did indeed turn out to be exactly what I wanted. Thank you, Bill Gates and *RUN*, for this great article. Also, for the future, I'd like to see reviews on spreadsheets and databases for the C-64.

David Hinkle
Nanty Glo, PA

We're glad to hear that RUN *was so helpful. As for reviews of spreadsheets and databases for the C-64, check the June, July, August and November 1985 issues, as well as February and August 1986. As you've probably discovered by now, last month's issue featured an overview of spreadsheets entitled "Spreadsheets Revisited," which included a list of available packages.*

Editors

We Threw a Curve

I'd like to make a correction to Scott Wasser's review of MicroLeague Baseball in the September 1986 issue of *RUN*. His statement that ". . . there is only one computer baseball game that lets you run the show from the front office" is untrue.

Our C-64 Statis Pro Baseball, on the market for over a year, enables you to create teams either of your own design or by drafting players from existing team disks. It also lets you evaluate the ratings for all players (second-guessing the designer is a favorite game pastime), as well as list rosters, statistics and box scores to the printer. Statis Pro Baseball does it all in one product for $35.

Bill Peschel
Microcomputer Games, Inc.
Baltimore, MD

Clinic Kudos

I'd like to congratulate the *RUN* staff for an excellent magazine. It's plain to see you care about the problems your subscribers have in using their Commodore computers. I've sent questions to Jim Strasma, the Commodore Clinic columnist, and, sure enough, answers have appeared in subsequent issues. I also particularly enjoy your Magic column. I look forward to many more exciting issues of *RUN*.

Jim Smith
Sterling, KS

Pen Pal in England?

I'm a C-64 user and soon hope to have a C-128, and I'd like to be a pen pal with another person who uses these machines. I belong to a computer club in Liverpool, which has members of ages 10 to 50 with interests in computing ranging from programming to games.

Chris Lewis,
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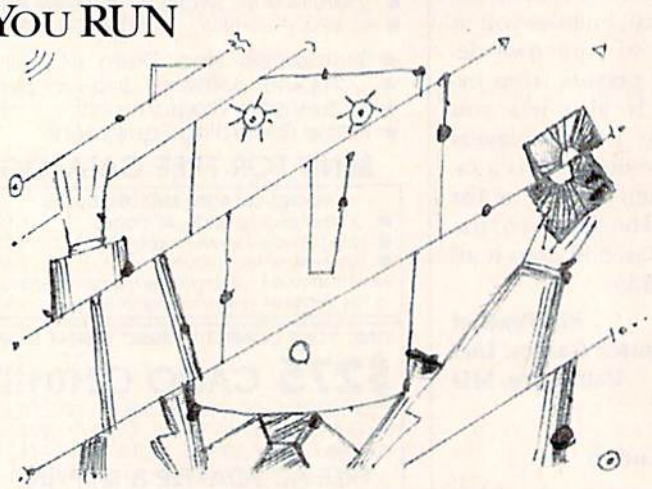
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Learn to Walk Before You RUN



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 program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
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 C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 FORX=5120TO5379:READ:T=T+D:POKEX,D
20 NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}ER
   ROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{20 SPACEs}"
30 PRINT"{SHFT CLR}"A$" ****************
   ****************"
40 PRINTA$" ** 128 PERFECT TYPIST IS NOW AC
   TIVE **"
50 PRINTA$" **{2 SPACEs}SYS 5120=ON{7 SPACE
   s}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$" ****************************
   *******":SYS5120:NEW
70 DATA 173,5,3,201,20,208,1,96,141,45,20,1
   73,4,3,141,44,20,162,43,160,20
80 DATA 142,4,3,140,5,3,96,234,234,173,44,2
   0,141,4,3,173,45,20,141,5,3,96
90 DATA 32,13,67,140,255,19,162,0,142,252,1
   9,142,253,19,142,254,19,189,0,2
100 DATA 201,32,240,8,201,48,144,7,201,58,1
    76,3,232,208,238,189,0,2,240,54
110 DATA 201,32,208,5,172,254,19,240,42,201
    ,34,208,10,72,173,254,19,73,1
120 DATA 141,254,19,104,72,238,253,19,173,2
    53,19,41,7,168,104,24,72,24,104
130 DATA 16,1,56,42,136,16,246,109,252,19,1
    41,252,19,232,208,197,173,252
140 DATA 19,24,101,22,24,101,23,141,252,19,
    169,42,32,241,20,32,188,20,160
150 DATA 2,185,185,20,32,241,20,136,16,247,
    165,116,208,9,165,117,208,5,169
160 DATA 145,32,241,20,172,255,19,96,13,32,
    32,162,0,173,252,19,232,56,233
170 DATA 100,176,250,105,100,202,240,3,32,2
    32,20,201,10,176,5,205,252,19
180 DATA 240,15,162,0,232,56,233,10,16,250,
    24,105,10,202,32,232,20,170,72
190 DATA 138,9,48,32,241,20,104,96,170,173,
    0,255,72,169,0,141,0,255,138,32
200 DATA 210,255,104,141,0,255,96
```

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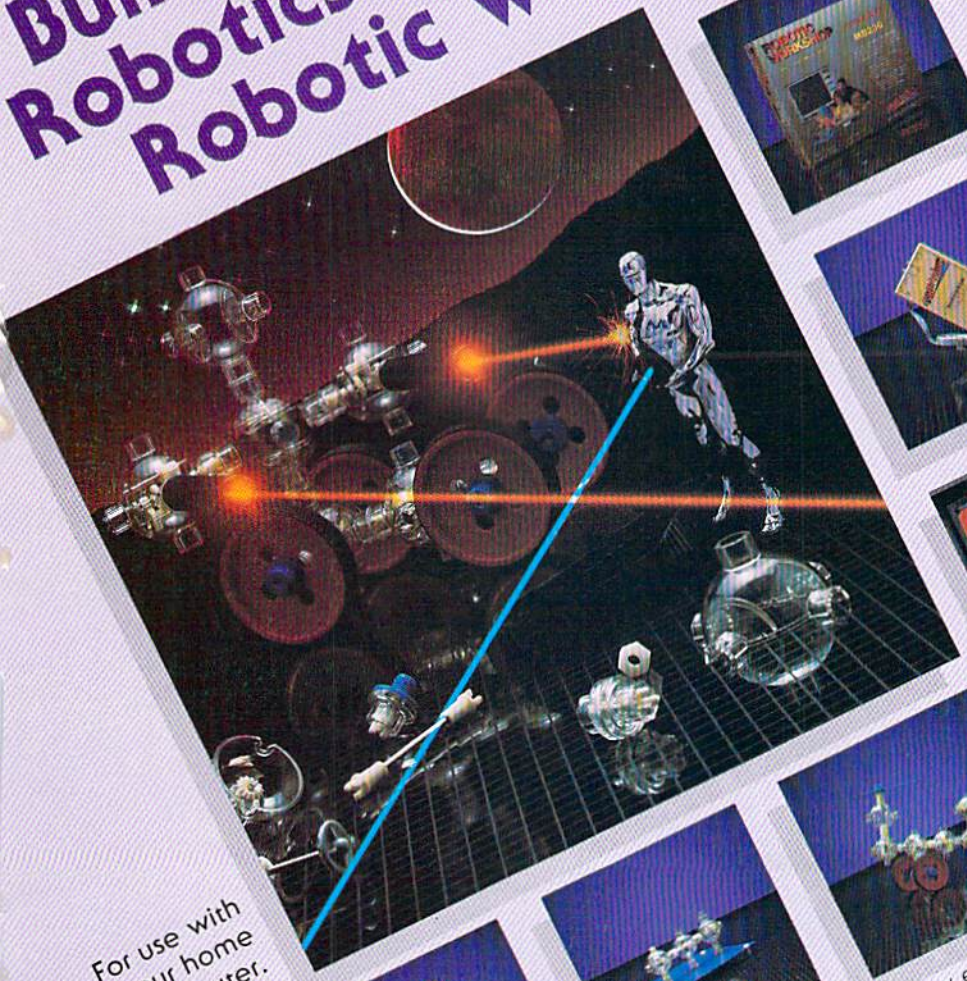
As a service to its readers, *RUN* will periodically publish the names of companies who are having difficulties meeting their customer obligations or who have gone out of business. Readers are advised to contact *RUN* before dealing with these companies: **Software Dimensions**
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If readers have any questions or concerns about any other advertisers in *RUN*, please contact: **Barbara Harris, Business Manager**
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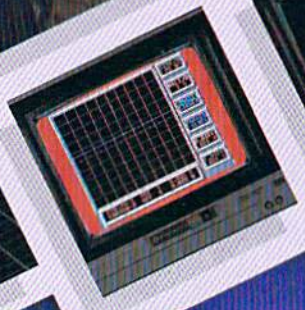
Build Your Own Robotics with the Robotic Workshop

For Ages 10 years old and up.
$149.95 List Price (C64/128)
Coming for Apple, Atari, and IBM.



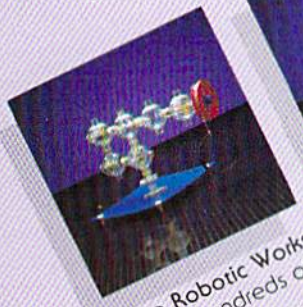














For use with your home computer.

The **Robotic Workshop** is the ultimate high-tech construction set. Discover how easy it is to build hundreds of **Robotic Projects** and control them with your home computer.

Simple and easy to use
(For the Beginner)

- Parts just snap together
- No knowledge of programming needed
- 50 Tutorial projects
- Over 50 components (2 motors, gears, wheels, sensors, etc.)
- Electronic control unit
- Full instruction manual
- Joystick or keyboard control
- Teaches principles of science/engineering
- Includes **CAPSELA**® motorized parts

Advanced Features
(For the Programmer/Hobbiest)

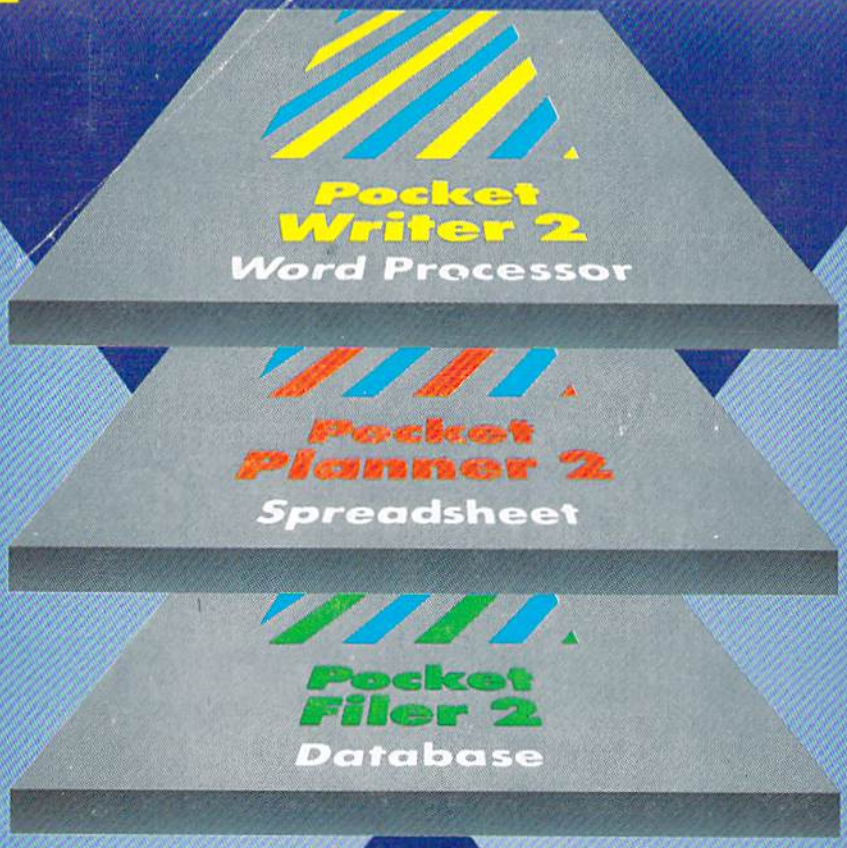
- Speed/direction control of 3 motors at once
- Robotic Operating Software (R.O.S.)
- 25 additional "**BASIC**" commands
- Programming instructions
- Advanced commands and techniques
- Precise timing, counting and switching
- Digital Voltmeter
- Digital Oscilloscope
- Digital Speech Storage
- Technical information
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Super Solutions 2



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Introducing...Pocket Writer 2/word processor **Pocket Planner 2**/spreadsheet **Pocket Filer 2**/database

Our new Pocket 2 series offers features usually found only in much more sophisticated applications software. Features that include: compatability with the new GEOS operating system†, ability to work with the Commodore RAM expander to allow a RAM disk, mouse support with pull down menus, 1571 burst mode for faster file loading, increased support for two single disk drives, automatic configuration for screen color, format and printer selection†.

Sophisticated software, yes, and still easy to use. You can be up and running in under 30 minutes even if you haven't operated a computer before.

Now, when you upgrade your Commodore™ 64 to a 128, Pocket software helps make it a breeze. The new Pocket 2 software has both 128 and 64 applications on the same disk. So when you buy one you are actually buying two software packages. The cost only $59.95 (U.S.).

Serious Software That's Simple to Use

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For those of you who have already discovered the many benefits of owning Pocket software; we offer all registered owners upgrade Pocket 2 software for only $19.95 (U.S.) plus 3.00 (U.S.) shipping and handling! Available only by writing to Digital Solutions Inc.

*Commodore's Micro-computers Magazine, independent reviewers, rated the original Pocket Writer 128/64 and Pocket Planner 128/64 software the "Annual Best of 1986" in the productivity category.

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