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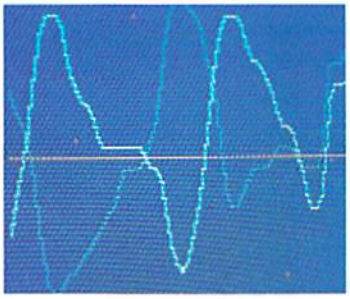
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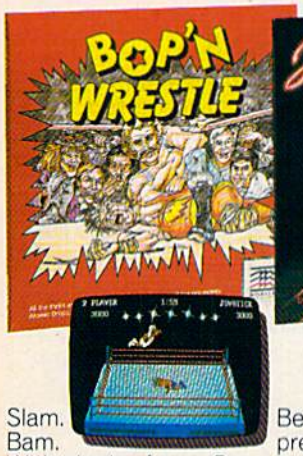


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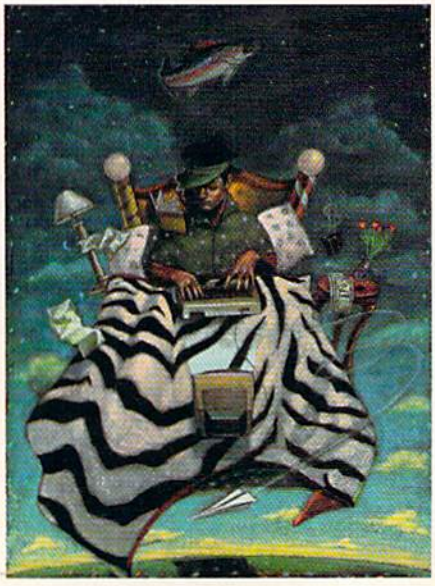
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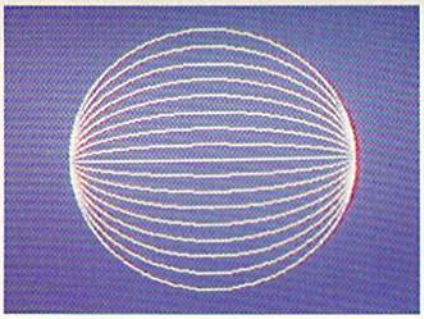
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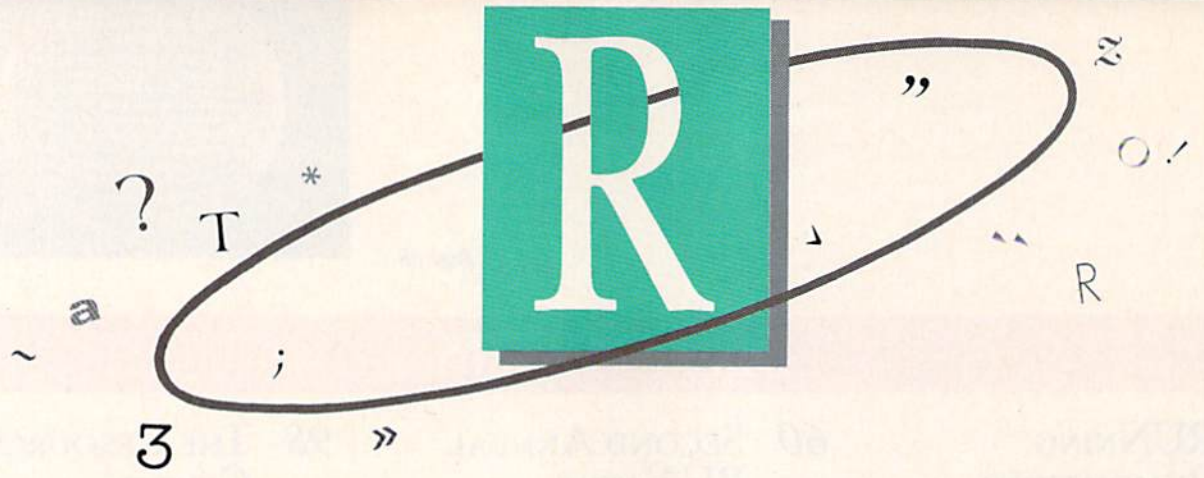
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One of the most important parts of an editor's job is to know his audience. At *RUN*, we keep in touch with our readers in several ways: through correspondence, by telephone, over bulletin boards, via focus groups and at computer shows and conferences. But perhaps the most effective way to reach the most readers is through questionnaires, surveys and research studies.

We've found that *RUN* readers are quite willing to answer questions and tell us what's on their minds—all you have to do is ask them.

We recently queried 1000 *RUN* subscribers with a seven-page questionnaire to find out about their attitudes toward the magazine, their purchasing plans and their computer applications.

One of the questions we asked in the survey was how long our readers have been involved in computing and how much money they have invested in their computing systems. The average reader of *RUN* has a substantial investment in computing—both in terms of time and money. According to the survey results, the average investment is $1139, and the average reader has been involved in computing for over four years.

These figures belie the tendency to think of the personal computing industry, and the people involved, as inexperienced. It's been ten years since the Apple, PET and TRS-80 computers were first introduced. Since that time, we've witnessed high points and low points in the industry. Many companies, systems and key players have come and gone.

But through it all, the industry has matured and learned from its mistakes. It appears that those companies and players who have survived the shakeout of a couple of years ago are here to stay. And the computer user has remained loyal to the industry and his brand of computer. In the meantime, the industry has attracted hundreds of thousands of new users.

The four years average experience among *RUN* readers is testimony to their loyalty and perseverance. This figure is all the more remarkable considering that *RUN* attracts first-time computer users daily.

Over the last year, we've witnessed a change in the home computer market: There is less demand for games and entertainment; users are more interested in applications that have more productivity and utility for the home. To address both the new and experienced audiences, *RUN* will be introducing several new columns in the coming months to meet the needs of C-64 and C-128 users.

Introducing Mega-Magic

Readers of this issue will notice a new column, entitled "Mega-Magic," on page 11. Each month this column will feature a brief, but useful, subroutine or utility.

This column is an extension of *RUN*'s popular Magic column. It features program listings that are too long to fit the format of the regular Magic column, yet are limited to less than a page. Thus, you can type them in at one sitting and add them to your software library.

If you have any programs you'd like to see in this column, let us know. We appreciate your feedback.

Don't Forget the C-128

According to our recent *RUN* Subscriber Survey, when C-64 owners were asked whether they would upgrade to a C-128, two-thirds responded that they either definitely would or were thinking about it.

The C-128 was highly acclaimed when it was first introduced, and it remains a great machine. Commodore has supported this machine with 512K memory expanders and a free subscription to QuantumLink upon purchase. And C-128 GEOS development is in the works. But some of the 600,000 users of this system are beginning to ask, "Where's the software?"

Several major software developers are supporting this system and more programs are planned. Some new C-128 owners who have been waiting for software are complaining that too much attention is being focused on the "born again" C-64 and the Amiga.

The C-128 has too large a user base and is too good a machine to go the way of the C-16 and the Plus/4. With Commodore facing stiff price competition from all sides—Apple, Radio Shack and IBM clones—now is the time to really support this system. Commodore is only tangentially involved in the software marketplace, but it surely could be more energetic in stimulating third-party developers to support the 128.

db

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$333 C-128 function key tips—The function keys can be programmed to save you time when typing in programs in Direct mode. One of my favorites is for loading programs:

```
KEY 2, "DLOAD{3 TAB KEYS}" + CHR$(27) + "@" + CHR$(13)
```

Press the F3 key for the disk directory, then position the cursor on the first character of the line containing the program you want to load. Now press F2 to load the program. If you want the program to run after loading, substitute RUN for DLOAD in the above key definition.

Programmers will appreciate this useful F-key definition that updates a program on disk from a program in memory:

```
KEY5,"SCRATCH" + CHR$(34) + "FILENAME" + CHR$(34) +
":DSAVE" + CHR$(34) + "FILENAME" + CHR$(34) + ":DVERIFY" +
CHR$(34) + "FILENAME" + CHR$(34) + CHR$(13) + "Y" + CHR$(13)
```

Pressing the F5 key will then scratch, save and verify a program!

When defining function keys, be sure to use abbreviations to keep the definitions below 241 bytes in length.

After you have all the function keys set for your use, you may want to save them. Here's how:

```
BSAVE"FILENAME",B0,P4096 TO P4352
```

To load after saving any of these redefined F-keys, type: BLOAD"FILENAME",B0.

G. L. Magus
Glenolden, PA

$334 REM Highlighter program—This program displays reversed REM statements in your Basic listings. As written, REM Highlighter resides at memory location 679 (an unused area of 88 bytes). You may want to use a different RAM location because a reset clears the memory below address 2049. If you use a higher address in RAM, you can reactivate REM Highlighter after a reset by entering a SYS to the starting address. Some suggested starting addresses are 49152 and 53221.

```
1Ø PRINT "{SHFT CLR}64 HIGHLIGHTER - BRUCE
   KARPE
2Ø DEFFN HI(X)=INT(X/256):DEFFN LO(X)=X-FNH
   I(X)*256
3Ø INPUT"STARTING ADDRESS 679{5 CRSR LFs}";
   SA
35 I=Ø:CS=I4
4Ø READX:IFX=256THEN ON-(CS=2643)GOTO6Ø:PRI
   NT"DATA ERROR":END
5Ø POKESA+I,X:CS=CS+X:I=I+1:GOTO4Ø
6Ø POKESA+25,PEEK(774):POKESA+26,PEEK(775)
7Ø POKESA+1,FNLO(SA+11):POKESA+3,FNHI(SA+11
   )
8Ø SYSSA:PRINT"REM HIGHLIGHTER ENABLED":NEW
9Ø DATA 169,178,162,ØØ2,141,ØØ6,ØØ3,142,ØØ7
   ,ØØ3,Ø96,ØØ8,72,2Ø1
1ØØ DATA143,2Ø8,ØØ5,169,Ø18,Ø32,21Ø,255,1Ø4
    ,Ø4Ø,Ø76,Ø26,167,256
```

Bruce S. Karpe
Stroudsburg, PA

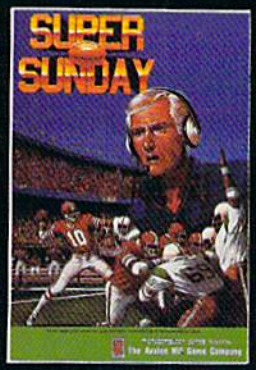
$335 C-64 graph paper—This handy program creates numbered grids for designing sprites. It prints in both standard size and double-size print.

```
1Ø REM TWO-SIZE GRAPH PRINTER- ADAM MILLER
2Ø OPEN4,4
25 INPUT "CHOOSE {CTRL 9}L{CTRL Ø}ARGE OR {
   CTRL 9}S{CTRL Ø}MALL";ES$
3Ø IFES$="L"THEN PRINT#4,CHR$(14):N=14
35 IFES$="S"THEN PRINT#4,CHR$(15):N=15
4Ø FOR I=1TO3:PRINT#4,"ØØØØØØ12";:NEXT I:PR
   INT#4
45 FOR I=1TO3:PRINT#4,"ØØØØ1325";:NEXT I:PR
   INT#4
5Ø FOR I=1TO3:PRINT#4,"12486285";:NEXT I:PR
   INT#4
55 FOR L=1 TO 25
6Ø FOR I=1 TO 24:PRINT#4,CHR$(N);"{SHFT O}"
   ;:NEXT:PRINT#4,"{COMD G}"L;CHR$(8):NEXTL
7Ø FOR I=1 TO 24:PRINT#4,CHR$(N);"{COMD T}"
   ;:NEXT:PRINT#4,;CHR$(8)
```

Adam Miller
Brandon, SD

$336 Printing with C-64 sound effects—Use this routine to enhance your programs. Each time a character is printed, it is preceded by a reversed space cursor and a soft beeping sound. You can start printing at any column by changing the tab variable T in lines 120 and 140.

If you wish to customize the routine, Poking any number



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up to 255 into S + 1 in line 200 will change the sound, and increasing or decreasing the delay loop in line 260 changes the printing speed.

```
1Ø REM PRINT WITH SOUND EFFECTS - JOSEPH R.
   CHARNETSKI
1ØØ A$="{CTRL 2}PRINTING WITH SOUND EFFECTS
   "
11Ø PRINT"{SHFT CLR}{5 CRSR DNs}"
12Ø T=6:GOSUB18Ø:PRINT
13Ø A$="{CTRL 8}BY JOSEPH R. CHARNETSKI"
14Ø T=8:GOSUB18Ø
15Ø REM CONTINUE
16Ø PRINT"{COMD 7}":LIST
17Ø REM SOUND
18Ø S=54272:FORM=STOS+23:POKEM,Ø:NEXT
19Ø POKES+24,1Ø:IFTTHENPRINTTAB(T);
2ØØ FORJ=1TOLEN(A$):POKES+1,23
21Ø IFLEFT$(A$,1)<>"{CTRL 9}"THEN23Ø
22Ø PRINT"{CTRL 9} {CRSR LF}";:GOTO24Ø
23Ø PRINT"{CTRL 9} {CTRL Ø}{CRSR LF}";
24Ø POKES+6,24Ø:POKES+4,23
25Ø PRINTMID$(A$,J,1);
26Ø FORDLAY=1TO1Ø:NEXTDLAY:POKES+6,Ø
27Ø POKES+4,Ø:NEXTJ:T=Ø:PRINT:RETURN
```

Joe Charnetski
Dallas, PA

$337 Hi-res-sketch-128—Here's a program that will let you sketch a hi-res picture on your 128. The table below gives a brief description of each key's function.

Y = up one pixel J = right one pixel
B = down one pixel H = left one pixel
T = move left and up one pixel
U = move right and up one pixel
V = move left and down one pixel
N = move right and down one pixel
P = paint an enclosed area

```
5 REM SIMPLE SKETCH C128 - ANDY BRAILO
1Ø GRAPHIC 1,1: X=15Ø: Y=9Ø: DRAW1,X,Y TO X
   ,Y:CHAR1,11,Ø,"SIMPLE SKETCH"
2Ø CHAR1,Ø,1,"{39 SHFT Ds}"
3Ø GETA$:IFA$=""THEN3Ø
4Ø IFA$="Y" THEN Y=Y-1:GOTO6Ø
42 IFA$="B" THEN Y=Y+1:GOTO6Ø
44 IFA$="H" THEN X=X+1:GOTO6Ø
46 IFA$="G" THEN X=X-1:GOTO6Ø
48 IFA$="N" THEN X=X+1: Y=Y+1:GOTO6Ø
5Ø IFA$="T" THEN X=X-1: Y=Y-1:GOTO6Ø
52 IFA$="V" THEN X=X-1: Y=Y+1:GOTO6Ø
54 IFA$="U" THEN X=X+1: Y=Y-1:GOTO6Ø
56 IFA$="P" THEN PAINT1,X+1,Y,1:GOTO3Ø
58 GOTO3Ø
6Ø IF X>318 THEN X=X-1:GOTO3Ø
65 IF Y>198 THEN Y=Y-1:GOTO3Ø
7Ø IF X<Ø THEN X=X+1:GOTO3Ø
75 IF Y<12 THEN Y=Y+1:GOTO3Ø
8Ø DRAW1,X,Y TO X,Y
85 GOTO3Ø
```

Andy Brailo
Alpha, NJ

$338 Reverse append-ectomy—To combine two or three programs into one larger program takes a lot of work. An easy way is to combine them with an append routine. Load your first program and type, in Direct mode:

```
POKE 43,PEEK(45) – 2 : POKE 44,PEEK(46)
```

Now renumber the lines in the second program, beginning with a number higher than the last number in the first program. Load your second program and type:

```
POKE 43,1 : POKE 44,8
```

When you type LIST and press return, you'll find that the second program has been appended to the first. (Note: If you get an Overflow error, try adding an unnecessary line to the new program, such as 0 REM.)

Adzhar Hamdan
Syracuse, NY

$339 Quick-loading Basic 4.5 a la C-128 mode—To quickly load Basic 4.5 in 128 mode, enter these two lines and run the program. Be sure your monitor is in 40-column mode.

```
10 BLOAD"BASIC 4.5",B0,P32768
20 GO 64
```

Arhn R. Sprinty
Zumbrota, MN

$33A Converting C-64 function keys to C-128—Any C-64 program that uses the function keys can be converted to work on your C-128. This four-liner will do the trick. Just add it early in your program.

```
1Ø REM CONVERTING C128 FUNCTION KEYS - ROBE
   RT H. WADE
2Ø A=132
3Ø FORI=1TO8STEP2:KEYI,CHR$(A+1):A=A+1:NEXT
4Ø A=136
5Ø FORI=2TO8STEP2:KEYI,CHR$(A+1):A=A+1:NEXT
```

Robert H. Wade
San Diego, CA

$33B Pin the tail on the decimal point—Here's a short routine that redefines the decimal point key on the 128's numeric keypad into a comma. The routine can be used to change any key on the keyboard to another ASCII value.

```
1Ø REM COMMA FOR NUMERIC KEYPAD 128 - KEVIN
   MULLIGAN
2Ø FORI=ØTO88:POKE 6912+I,PEEK(64128+I):NEX
   T
3Ø POKE 2757,PEEK(2757) OR 128
4Ø POKE 83Ø,Ø: POKE 831,27
5Ø POKE 6912+82,44
```

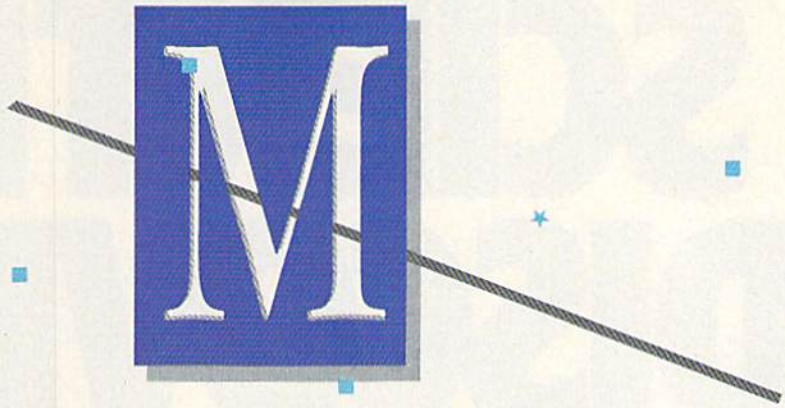
To find the key value, use this program.

```
10 PRINT PEEK(213):GOTO 10
```

Kevin P. Mulligan
Burlington, MA

$33C GET-with-flashing-cursor update—My version of trick $2F0, GET with flashing cursor, works in both 40- and 80-column modes on the C-128.

Continued on p. 100.



Easy-to-use subroutines and utilities

Mega-Magic, an extension of the RUN *Magic column, offers each month a relatively 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.*

Scroll Left, Scroll Right—Scroller is a brief machine-language routine that turns your display into a continuous band running in either direction across the screen. Type in and run Scroller Basic (Listing 1). It automatically saves to disk a machine-language program file called SCROLLERMLA.

To access SCROLLERMLA, type in SYS828. The entire screen will move one column to the left. Type in SYS892 and it'll shoot back to where it started. You can scroll any text screen endlessly this way, using a continuous loop such as: 10 SYS892:GOTO10. If you write a program with a series of Data statements to be printed vertically on the left margin of the screen, SCROLLERMLA will scroll a message as long as the available memory in your computer.

Random Scroller (Listing 2) demonstrates a potentially valuable feature of this scrolling program. By typing lines 30–70 into your program (perhaps as a subroutine) and setting the variables to appropriate values, you can scroll any section of the screen in either direction. Set T equal to the number (0–23) of the top screen line of the section to be scrolled, B to the number (1–24) of the bottom line of the section, R to the right margin and L to the left margin.

Load and run Random Scroller to see what I mean. Enter your own values for T, B, R and L. See if you can scroll different sections of the display in opposite directions at the same time. Experiment and have fun. One note of caution, however: Scrolling lines beyond line 24 will certainly Osterize your Basic program, and setting T to a value greater than B is likely to crash the computer. R

Robert Bixby
Kalamazoo, MI

Listing 1. *Scroller Basic.*

```
10 PRINT"{SHFT CLR}SCROLLER":FORI=828TO938STEP10:FOR
   A=0TO9:READB:C=C+B:POKEI+A,B                    :REM*132
20 IFF=0THENF=1:G=G+B:GOTO30:IFF=1THENF=0:H=H+B
                                                   :REM*250
30 NEXT:E=E+C                                      :REM*144
40 READD:IFC<>DTHENPRINT"ERROR IN DATA STATEMENT "I"
   {CRSR LF}.":END                                 :REM*124
50 C=0:NEXTI                                       :REM*102
60 PRINT"SAVING ML":GOTO190:END                    :REM*170
70 DATA 160,0,169,0,133,251,169,4,133,252,1271
                                                   :REM*130
80 DATA 177,251,141,253,3,165,251,201,232,240,1914
                                                   :REM*182
90 DATA 42,200,177,251,136,145,251,200,192,39,1633
                                                   :REM*80
100 DATA 144,245,173,253,3,145,251,160,0,32,1406
                                                   :REM*56
110 DATA 105,3,76,70,3,165,251,24,105,40,842       :REM*24
120 DATA 133,251,176,1,96,165,252,24,105,1,1204
                                                   :REM*62
130 DATA 133,252,96,96,160,39,169,0,133,251,1329
                                                   :REM*44
140 DATA 169,4,133,252,165,251,201,232,240,239,1886
                                                   :REM*230
150 DATA 177,251,141,253,3,136,177,251,200,145,1734
                                                   :REM*130
160 DATA 251,136,192,0,240,3,76,145,3,173,1219
                                                   :REM*168
170 DATA 253,3,145,251,160,39,32,105,3,76,1067
                                                   :REM*78
180 DATA 134,3,0,0,0,0,0,0,0,0,137                 :REM*20
190 OPEN15,8,15,"S:SCROLLERMLA"                    :REM*56
200 OPEN1,8,1,"0:SCROLLERMLA,P,W":PRINT#1,CHR$(60)CH
    R$(3);                                         :REM*220
210 RESTORE:FORI=828TO947:PRINT#1,CHR$(PEEK(I));:NEX
    T                                              :REM*130
220 CLOSE1:INPUT#15,A$,B$,C$,D$:PRINTA$,B$:CLOSE15:E
    ND                                             :REM*16
```

Listing 2. *Random Scroller.*

```
1 REM RANDOM SCROLLER DEMO                         :REM*127
5 FORI=0TO26:PRINT"{CTRL 2}{COMD @}{COMD P}{COMD I}{
  SHFT F}{SHFT C}{SHFT D}{SHFT C}{SHFT F}{COMD O}{CO
  MD P}{COMD @}{COMD P}{COMD O}{SHFT F}{SHFT C}{SHFT
   D}{SHFT C}{SHFT F}{COMD I}{COMD P}{COMD @}{COMD P
  }{COMD I}{SHFT F}{SHFT C}{SHFT D}{SHFT C}{SHFT F}{
  COMD I}{COMD O}{COMD P}{COMD @}{COMD O}{SHFT C}{SH
  FT D}{SHFT C}{COMD O}";:NEXT                     :REM*47
10 T=0:B=25:L=0:R=39:N=RND(TI):IFN<.5THENGOSUB200
                                                   :REM*60
20 T=1024+T*40:T=T/256:POKE835,T:POKE899,T:T=(T-INT(
   T))*256:POKE831,T:POKE895,T                     :REM*230
30 B=1024+B*40:B=(B/256-INT(B/256))*256:POKE846,B:PO
   KE905,B:POKE829,L:POKE866,L                     :REM*184
40 POKE921,L:POKE857,R:POKE893,R:POKE933,R:GOSUB100:
   GOTO10                                          :REM*110
100 FORI=0TOM:SYS828:NEXT:FORI=0TOM:SYS892:NEXT:RETU
    RN                                             :REM*180
200 T=INT(RND(TI)*12):B=INT(RND(TI)*12+12):M=INT(RND
    (TI)*100)+1                                    :REM*250
210 L=INT(RND(TI)*19):R=INT(RND(TI)*19+20):RETURN
                                                   :REM*216
```

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.

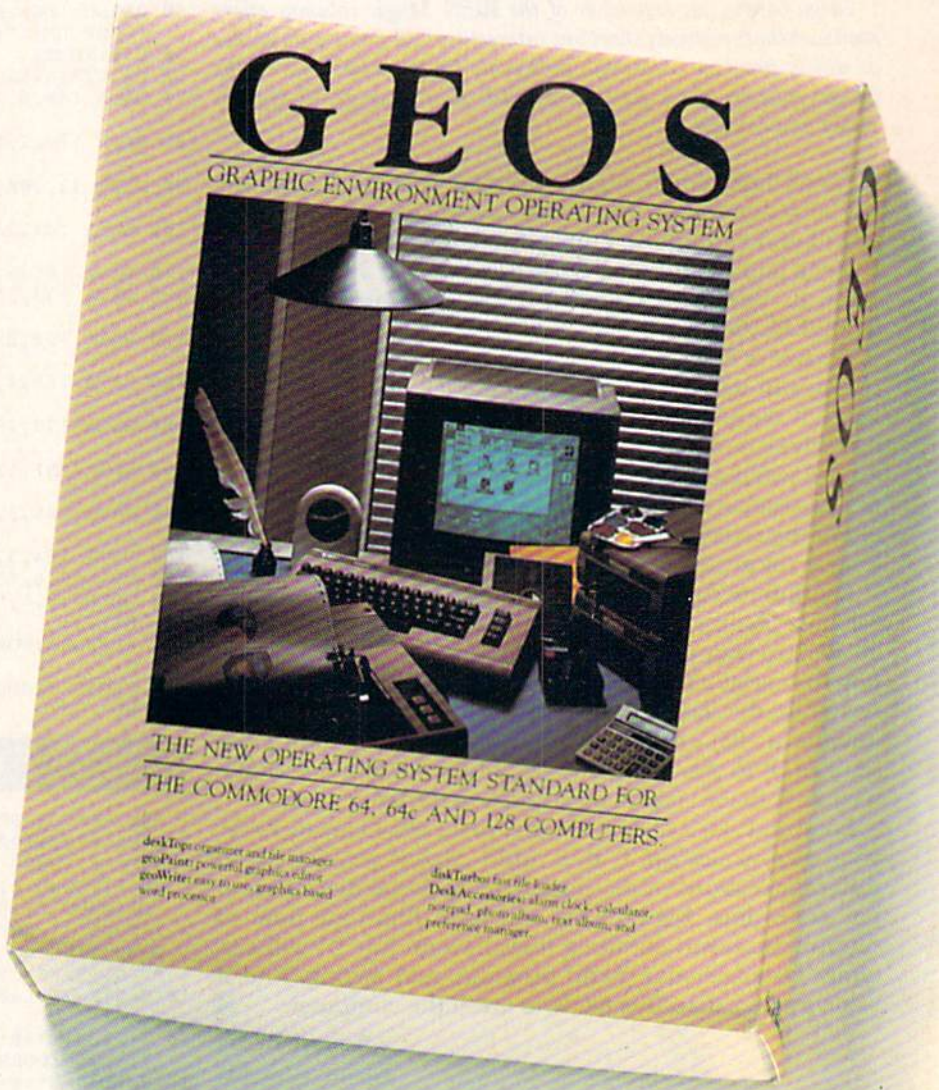
It's called GEOS. And it turns any Commodore into a powerful PC that holds its own against any computer, no matter what kind of fruit it was named after.

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

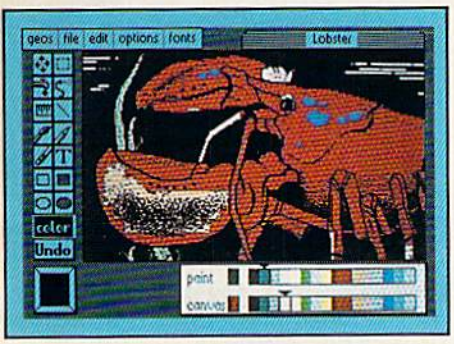
AT BERKELEY
W UNIVERSE.

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.

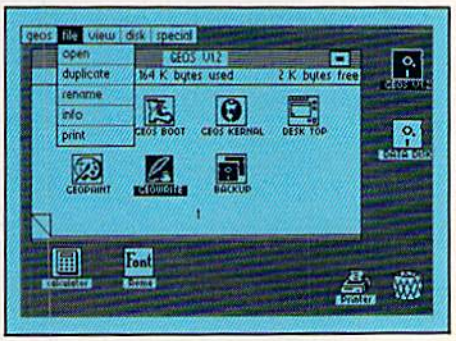
With geoPaint, you become a Michelangelo with a mouse.



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.

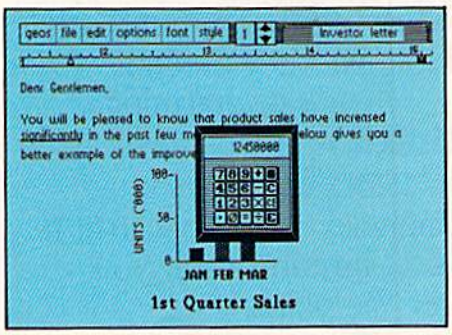
You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

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.

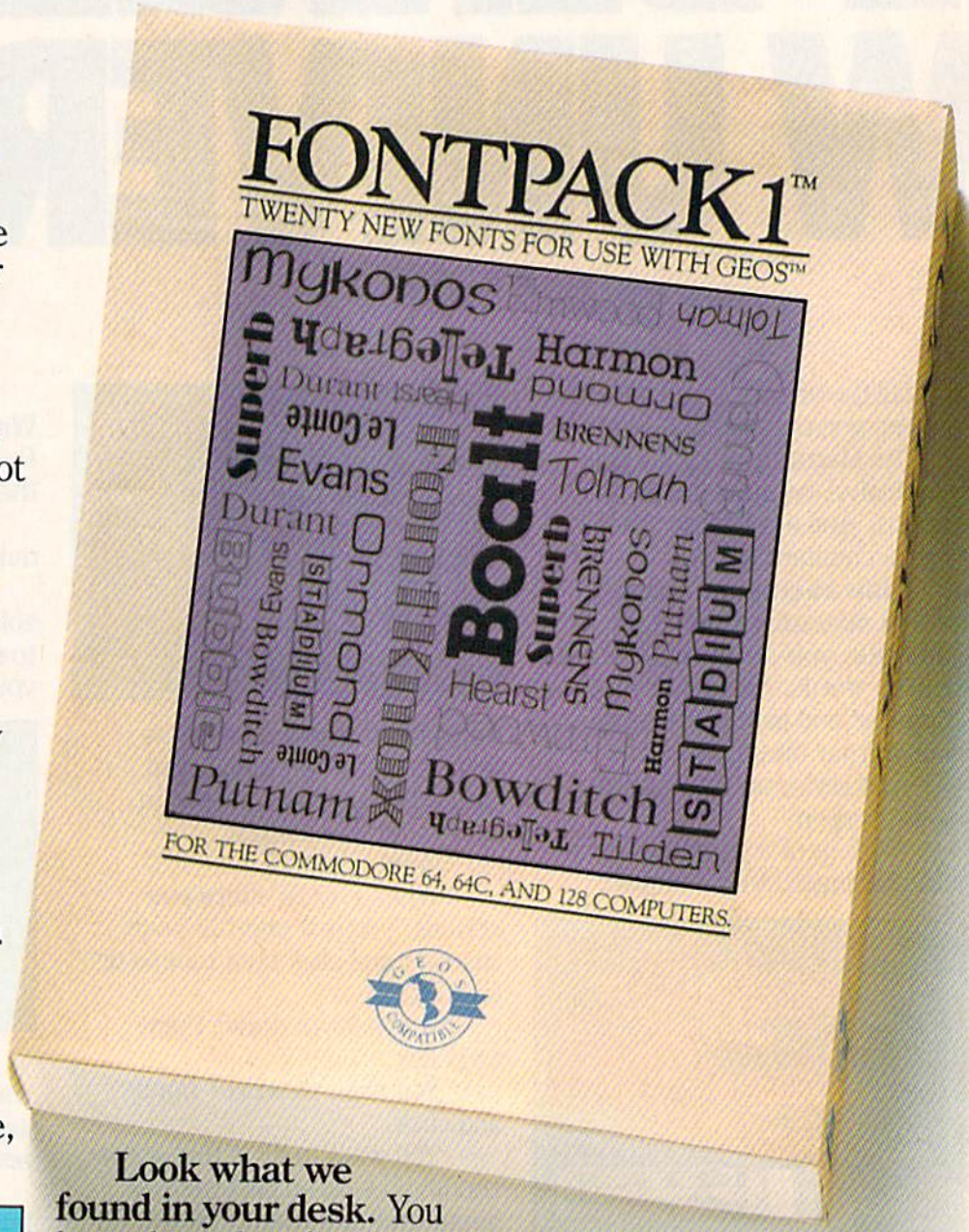
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Berkeley Softworks

Circle 134 on Reader Service card.

The brightest minds are working at Berkeley.

THE UNIVERSE



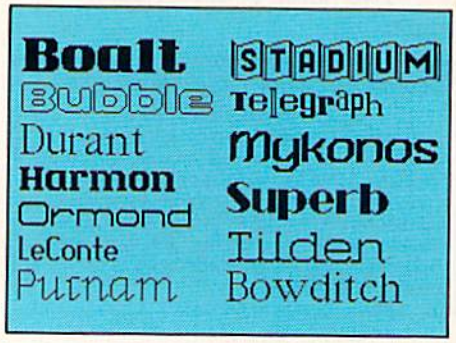
Well, we told you it wouldn't be long until the first GEOS applications were ready. And these are just the first. The number of satellites in the GEOS universe is infinite.

Judge Font Pack on looks alone. Let's face it. People judge your work not only by what it says, but how it looks.

That's why we developed Font Pack. A collection of 20 different type styles that not only say what you mean, but really look like they mean it.

Charming is charming. **Boalt** is all business. FontKnox is financial. And **Telegraph** is ... hmmm, well, you get the point.

When you combine these 20 fonts with the five you get with geoWrite, your work not only reads



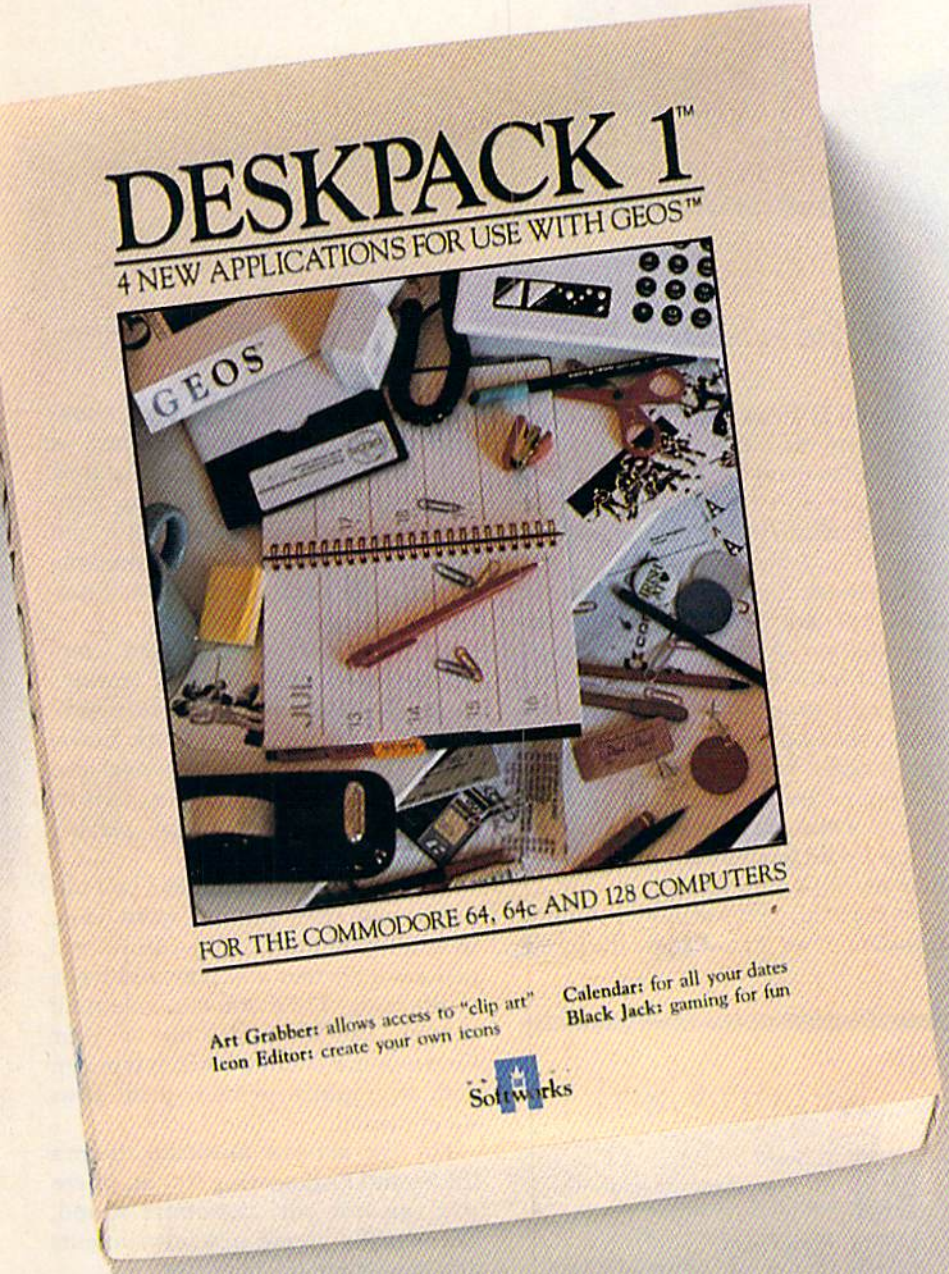
better, it practically speaks for itself.

Look what we found in your desk. You know how there's always one drawer in your desk that's filled with really neat stuff? Well, GEOS has one of those, too.

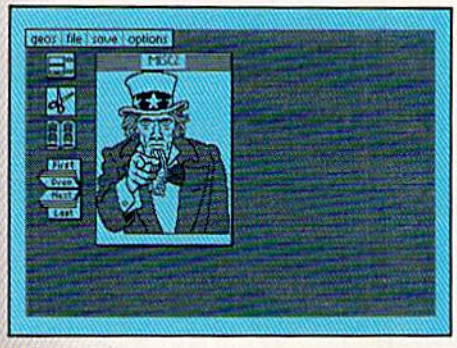
It's called Desk Pack. The ingenious Desk Pack Graphics Grabber copies graphics from clip art galleries like Print Shop, Print Master and Newsroom for use in geoWrite and geoPaint.

The Desk Pack Calendar pops up whenever you need to plan your schedule. And since it's valid until the year 9999, you'll never have to miss one of those swell family

IS EXPANDING.



New discoveries reported. The GEOS universe is expanding. And we'll report each new discovery to you as it occurs.



In the meantime, add Desk Pack and Font Pack to your GEOS system. And see how much you can explore.



reunions ever again.

There's even an Icon Editor, which lets you customize your GEOS file icons with the graphic of your choice.

And when you can't deal with work, Desk Pack deals the sharpest Black Jack game this side of Vegas, complete with graphics and sound effects.

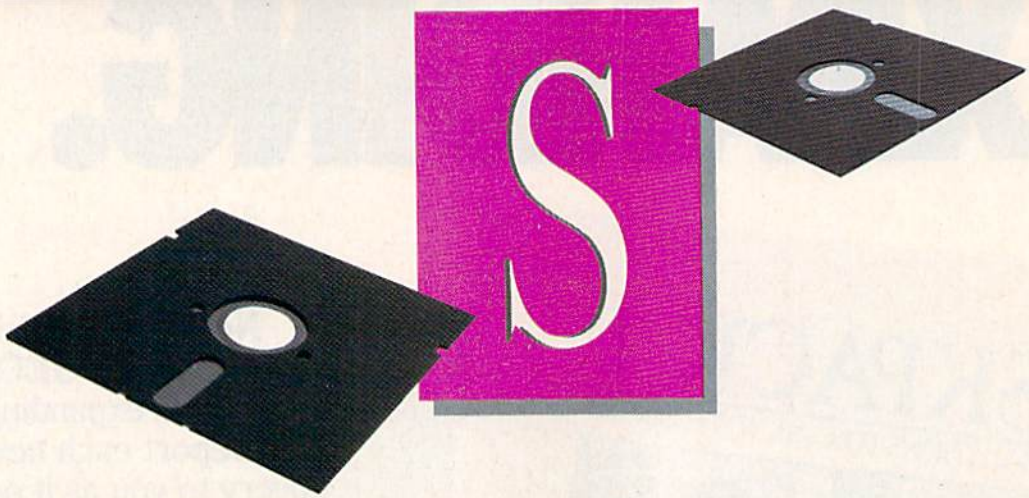
To order, call 1-800-443-0100 ext. 234
Font Pack $29.95 Desk Pack $34.95
(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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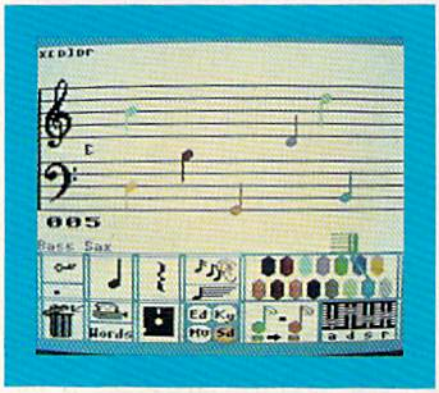
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The brightest minds are working at Berkeley.



Compiled by BETH S. JALA



The Music Studio

A

It's Not the Same Old Song When You Perform With this Music Program

Amid the many music-creation programs for the C-64 computer, there is room for one more. The Music Studio from Activision seems to be it, for this program offers something for everyone without ever becoming bogged down by its own complexity.

Whether you're a heavy metal musician who has been wringing out a synthesizer for years, or a rank beginner who has only mastered the playing of a radio, you can work at your own level, setting down on disk, tape or sheet music the sounds you hear in your head.

Unlike the programs that convert your computer into a piano or synthesizer keyboard and let you play music on a real-time basis, the input to Studio is from your joystick. You must write the music, or load it from a file, before you can play it. You pick up a note or a rest, place it on the Grand Staff, do it again and again and then listen to the playback.

The Music Studio is well-suited for those who are unfamiliar with musical notation. At the beginner level, called Music Paintbox, you do not deal with notes at all. Instead, you have a menu of rectangles, the different lengths representing the durations of notes. You also have a palette of colors and patterns corresponding to the 15 different instrument sounds that are built into Studio.

In the Music Editor mode, you can translate your "painting" into real notes of various values. Here, those who have a knowledge of notes, as well as of sharps, flats, rests, and so on, can do serious composing right to the screen. With Music Editor and Paint mode, you can stop at any time to play your composition and, if necessary, change it.

In the ability to edit your compositions, Studio gives you features normally associated with word processors, such as insert, block move, delete, copy and erase. You may also use it to change the duration of a note or change the instrument playing that note.

With your score complete, you can point and click on the word icon, transforming Studio into a mini word processor so that you may add lyrics to the song. Then you can save it all to disk, use the audio out of your Commodore to transfer it to tape, or, with a graphics printer, print it as sheet music.

For the serious musician, there's the Sound Engineering Room, where you can not only customize sound, but actually create new instruments and save them for later use.

Besides playing through your monitor or stereo, you can use a MIDI interface device that lets you play your compositions through keyboard synthesizers such as those by Yamaha and Casio, thus enhancing the flexibility of the program.

Documentation is excellent, with simple introductions to all areas of music and sound, and the graphics are as sharp and colorful as anyone could wish.

This program is not a substitute for musical talent, but a tool that will ease

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!

Make Any Computer Do Exactly What You Want With McGraw-Hill's

Contemporary Programming & Software Design Series



Make no mistake. Almost all books and courses on "programming" teach you only the final 5% of the total programming process—namely, how to code in a specific language . . . information of little value if you don't know how to reach the point in the programming process when you are ready to code.

With the Series, however, you'll learn to create your own programs from scratch, even modify off-the-shelf programs. You'll learn enough BASIC and machine language to get you started on the remaining 5% of the programming process.

From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

That's why McGraw-Hill's new Contemporary Programming and Software Design Series teaches you how to create your own software . . . either from scratch or by making key modifications to existing programs.

There is nothing magical about it. You learn the process of building a computer program step-by-step with McGraw-Hill *Concept Modules* sent to you one at a time, once a month. Each of the ten modules in the Series takes you through an important step in the development of the structure and detailed logic of a program, including testing, debugging, and documentation.



Unique Interactive Hands-On Instruction

Each module includes an easy-to-understand guide PLUS a 5¼" floppy disk containing typical programs and interactive instruction that you can run on Commodore 64 and 128 computers, IBM PCs and PC compatibles for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.



Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.

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The sample programs you work with throughout the Series are excellent learning tools. But they're more than that. By combining the sample programs onto one master disk, you'll have the start of your own personal software library. In addition to the programs you've written and modified throughout the Series, you'll also receive dozens of the most popular public domain and user-supported programs, such as data base manager, word processor, calendar generator, appointments reminder and much, much more.

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If someone has beaten you to the card, write to us for ordering information about the Contemporary Programming and Software Design Series.

The Crucial 95%—Learn the Foundation of Computer Programming

While the Series includes interactive disks that run on specific computers, everything you learn you can apply to any language or machine. Why is this possible? Because McGraw-Hill knows programming is far more than coding a program into the computer using a specific language. In the real world of computers, 95% of the programming process is carried out using design techniques that are independent of specific language or machine. It is this crucial 95% that you thoroughly understand and master in the Series.

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3939 Wisconsin Avenue
Washington, DC 20016

the exercise of those talents, in much the same way that a word processor aids those who work with words. With that as its aim, The Music Studio succeeds very well. *(Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/$29.95 disk.)*

Ervin Bobo
St. Peters, MO



Gato

B

Seek 'n Destroy Enemy Ships in this Submarine Simulation

Gato (a class of World War II submarine) is a submarine simulation with multiple screens, good sound effects and fast action.

Your mission is to seek out—by means of charts and radar—and destroy enemy ships. You must maneuver your sub into position for a torpedo strike while keeping a close watch on your sub's dials and gauges that denote depth, speed, direction and the amounts of oxygen, fuel and battery power remaining. These are featured on the main screen, but you can access other routines on separate screens as needed.

An interesting option of this game is the teleport feature, which lets you speed up real time. If you find yourself so far from the enemy that it may take many minutes before you engage in action, you may type in new coordinates for your sub and teleport to your intercept point.

Be advised, however, that you won't want to get too close. Strategy in a sub involves standing off at a distance and firing torpedoes. Your armament consists of 24 steam torpedoes that may be fired (from the surface or while submerged) from the six forward or four aft torpedo tubes. But use them sparingly, for it may be a long way back to base for repairs, refueling and replenishment of torpedoes.

Gato does a very good job of simulating submarine warfare: Dive below 40 feet and your periscope is useless; come too close to an island and you'll be hung up on the surrounding reef; get hit by enemy depth charges and you suffer real damage that will affect your speed and maneuverability.

Gato delivers all it promises—fast combat adventure, realistic consequences of your actions, good strategy—and more. This makes Gato a game worth playing and a simulation that you wouldn't think could be crammed into a C-64. *(Spectrum Holobyte, 1050 Walnut, Suite 325, Boulder, CO 80302. C-64/$34.95 disk.)*

Ervin Bobo
St. Peters, MO

Party Songs

C

Sing Along with these Oldies but Goodies

If you're having a party, or even just a get-together, Party Songs is an inexpensive way to entertain your guests—provided you all like to sing.

This is a sing-along program that displays the lyrics to the songs it plays. Among the 18 songs included in the package are old favorites like Dixie, Yankee Doodle, My Bonnie Lies Over the Ocean and Auld Lang Syne.

With each song, there is a high-resolution picture, a few of which are animated. Most of the pictures are static, but all are about something in the song.

Documentation, a small pamphlet and a sheet of lyrics, is short, but the program is easy to use.

It begins with a menu. Control functions, some of which you can use as the songs play, allow you to vary the tempo of the music. You can select individual songs or set up a continuous play function.

The music that Party Songs plays is a bit high-pitched for singing, but otherwise it is well arranged. Features like pause and speed options let you control the way the music plays.

One thing I do not like about Party Songs is that you are not authorized to make your own backups, although the company does have a good replacement policy.

Party Songs is a good idea when your party is fading, but not until that point. If you can get your friends to sing along, this program will bring life to a dead party; but with its limited choice of music, it could kill a lively one. *(John Henry Software, 1252 Crestwood Hills Drive, PO Box 745, Vandalia, OH 45377. C-64/$15.95 disk.)*

Mike Hinshaw
Tulsa, OK

Your Personal Financial Planner

A

This C-128 Program Can Help You Achieve Your Financial Goals

With the release of the C-128 version of Your Personal Financial Planner from Sylvia Porter's Personal Finance Series, Timeworks has not only added to the list of software available for the computer, but has also shown just how well-equipped the 128 is for handling a myriad of functions.

The program is divided into six sections that assist you in everything from balancing your checkbook to planning your family's financial future.

The Transaction Manager is the section you will probably use most often. It's designed to let you easily record all types of cash, credit and checking transactions as well as keep track of your account balances.

Once you begin using this section regularly, you'll find it can save you a great deal of time. Transactions that are the same each month can be saved automatically and used repeatedly without having to retype information. Another way the Transaction Manager saves time is with its statement reconciliation function: The program looks at your outstanding

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checks and calculates whether or not your account balances.

The Budget Manager takes information concerning your planned income and expenses, compares it with the actual data in your transaction file and provides you with screen and printed reports showing budgeted versus actual monthly spending. This part produces full-color bar and cross-reference charts on-screen. Unfortunately, there are no built-in provisions for printing these graphics.

A third section of the program lets you generate a detailed income and expense statement, which shows the relationship between your earnings and expenditures. Your net cash flow, which is the bottom line of this report, will tell you whether you're living within or beyond your means.

If you like to keep a close eye on your net worth, you'll appreciate Your Personal Financial Planner's Asset/Liability Manager. You can create a financial inventory record of your liquid and personal assets, marketable and non-marketable investments, and debts such as mortgages, loans and taxes. Once this is complete, you can use the included balance sheet program to produce a detailed statement of your assets and liabilities.

The final section of the package is a financial planning program that helps you determine the feasibility of specific long-term financial goals, based on your current economic situation. The Financial Planner helps you develop a sound plan to assist you in achieving your financial aspirations.

Like other programs in Timeworks' C-128 series, Your Personal Financial Planner features convenient pull-down menus. There are also other nice touches, such as an on-screen calculator and individual reminder pads for each major section.

Finally, an excellent user's manual and a great customer support plan that includes a toll-free help line all make Your Personal Financial Planner a good investment for the C-128. *(Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015. C-128/$69.95 disk.)*

Bob Guerra
Charlestown, MA

Fleet System 3 — B

Enlarge Your Vocabulary with this Updated Replacement

Fleet System 3 from Professional Software, Inc. (PSI), is a new C-128 word processor intended to replace their earlier word processor, Fleet System 2.

Fleet System 3 is a two-disk word

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processor designed to be used exclusively in the C-128's 80-column mode. The first disk has the word processor on one side and a spelling checker containing approximately 90,000 words on the flip side. The second disk contains a thesaurus that includes about 50,000 synonyms and acronyms referencing roughly 10,000 words.

Fleet System 3's thesaurus and word wrap for the text are the only improvements over Fleet System 2, which was reviewed in depth in *RUN* (March 1986). The new package is identical to the earlier version in both operation and command format.

Although the program operates exclusively in the C-128's 80-column mode, a 120-column, horizontally scrolling mode can also be selected.

Fleet System 3 has a unique command design that differs significantly from those found in other word processors intended for Commodores. Examples of its odd design are revealed when saving and loading files to disk.

First, rather than pressing a function key, you have to press the Shift-Clr/Home keys. Doing this calls up a prompt that displays Recall, Insert and Store. You're out of luck if you search through the manual for instructions on loading a file, for the typical terminology used to identify saving and loading files is simply not there.

These are differences that you can adjust to with practice. While the program lacks the user friendliness you might take for granted in other C-128 word processors, it's easy to learn to use. What is disappointing is the fact that Fleet System 3 doesn't take advantage of all of the C-128's features, like autobooting the program disk or activating the 1571's Burst mode.

Fleet System 3's thesaurus is an interesting software development for the C-128. It's easy to use, but, unlike a conventional thesaurus, it doesn't simultaneously display both the synonyms and antonyms of the word referenced. Instead, it references the synonyms and antonyms of words separately.

Using the thesaurus is straightforward and uncomplicated. You simply boot up Fleet System 3 in either 80- or 120-column mode, place the thesaurus disk in the drive, press F1 and a shifted-S to select synonyms or a shifted-A to see antonyms.

Next, enter the word in question, and a window appears containing a list of either the antonyms or the synonyms for that word. You can select one word from the window by using the cursor keys and pressing the return key. The word selected will then be moved to the current cursor position within the document.

It's important to note that if you choose to reference the synonyms and antonyms for a word from your

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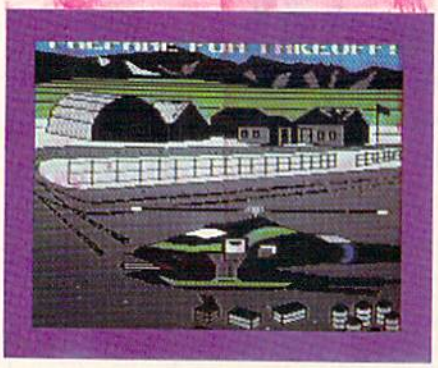


document, the word is automatically replaced. The program removes the word you referenced from the document. You'll discover that using Fleet System 3's thesaurus is noticeably faster than flipping through the pages of a conventional thesaurus.

One of Fleet System 3's strong points is that it's compatible with most printers and files created on earlier Fleet System word processors. When you save files, the Default mode creates user files in a text format unique to Fleet System 3. Creating sequential files with the text converted to either true ASCII or Commodore ASCII for use with telecommunications is also possible.

Overall, Fleet System 3 is a good word processor for the C-128. It falls short of being a top-notch program, due to a manual that's a bit confusing and the fact that the program doesn't utilize all of the C-128's features. Otherwise, it's a good choice for a word processor and one of my personal favorites for the C-128. *(Professional Software, Inc., 51 Fremont Street, Needham, MA 02194. C-128/$79.95 disk.)*

Tim Walsh
***RUN* staff**



Infiltrator

A

Rambo May Have Met His Equal In this Action Adventure

Few games today possess the character of some of the earlier efforts for the C-64—the kind of character that keeps drawing you back to the computer, not necessarily to better your score but to savor anew the overall construction and charm of the game.

Fortunately, Infiltrator has come along, renewing our faith in the survival of the art.

In this action game, you must pilot a state-of-the-art helicopter on three increasingly difficult missions. The first is to penetrate the stronghold of a Gadhafi-like character and steal the secret documents that contain his plans.

This helicopter simulation ranks with the best. Hands in the foreground move to correspond to your joystick moves. Use keyboard control to activate a weapon or system and see the instrument readout change. Bank the chopper and the horizon tilts realistically.

The use of multiple screens aids in accessing the on-board computer, and the screen changes to show only the computer display panel. From that first screen, you can call up specific computer and communications routines on other screens.

You encounter jet aircraft that swoop by and ask for identification. Chances are 50-50 that you'll meet an enemy. If so, you have to use your 'copter's air-to-air missiles or machine gun to fight the foe.

You also have a Whizbang Whomper Turbo Booster that will let you zip along at 900 knots—sometimes it's better to leave the neighborhood than to stay and fight.

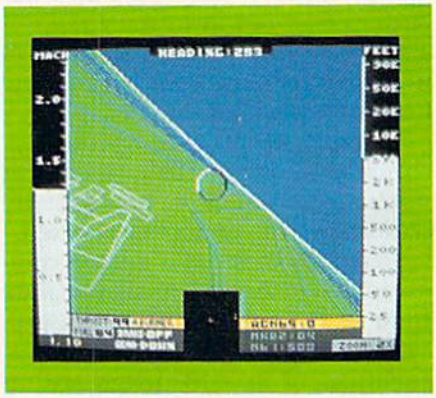
If you survive, the following action takes place on the ground. You must land at the mad dictator's compound (use Whisper mode) and, with the weapons at your disposal, avoid or immobilize the guards, gain entrance to the proper building and photograph the documents.

The level of difficulty is high, for you must pick up, drop or carry objects such as a camera, film and weapons. You must locate the key to unlock the building and you have only 20 minutes of real time to get in and get out. Upon completing this first mission, you can fly the second.

The documentation is entertaining. Like it or not, you must read it, for many controls and strategy tips are woven into what seems a silly scenario. Once you've done this, a quick-reference card will take you the rest of the way.

The graphics and sound are as good as any I've seen. That puts Infiltrator at the top of the new releases list and you in the driver's seat of a high-tech helicopter that is guaranteed not to warp, chip, rust or peel. *(Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062. C-64/$24.95 disk.)*

Ervin Bobo
St. Peters, MO



Jet

C

Jet into Action With this Combat Fighter

Jet, the natural successor to Flight Simulator, is finally here, and it almost lives up to our expectations.

To evaluate any computer work, one must measure what it attempts against what it actually accomplishes. Jet does not aspire to be a real flight simulator, for accuracy is traded off in favor of some arcade action in the combat modes. SubLogic came so close to building an excellent game that one can only wonder, with some dismay, why the extra steps were not taken.

The overall concept is the stuff of which great games are made: You fly a modern jet fighter, either from a ground base or an aircraft carrier; you engage in dog fights or in target strikes over land or water and with a different set of weapons for each mission; you try to return to base for more armament after meeting the enemy; or, should the enemy score a hit on you, you may eject from the cockpit, ride to earth on a parachute, be given a new jet and a chance to fly again.

But somewhere between concept

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The Flying Simulations Chosen by Real Pilots







The toughest evaluators of flying simulations aren't computer buffs. They're actual pilots and flight professionals. And when these flyers talk authenticity and realism, one name comes up again and again: MicroProse Simulation Software. We're used to this kind of stringent comparison; our company president is a former fighter jock with 3,000 flying hours in his logbook.

Take the evaluation of Senior Editor David Martin, in *Private Pilot* magazine's August 1986 issue. Martin, a former Navy aviator who has flown almost everything with wings, reviewed five MicroProse programs, including the bestselling SOLO FLIGHT primary flight simulator. "I'd not have believed it possible..." he wrote, "Pilots of all sorts will be fascinated by these aviation games."

Mr. Martin isn't the only pilot who's spent many of his recent leisure hours with MicroProse simulations. Comparing his experience in training real flyers with the instrument layout found in SOLO FLIGHT, Cessna Flight Instructor Mark Rice told us "the instrument flying segments are very similar to the real thing – you're up in the clouds and using your readings to guide the aircraft."

Concorde pilot and former RAF jet flyer John Hutchinson reviewed Micro Prose' sport flight ACROJET for the British press. His conclusion: "this simulation is one that really does live up to its real-life counterpart... I find ACROJET completely absorbing and very exciting." High praise, from the man who flies the world's fastest airliner...

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and execution, something seems to have gone wrong. We are left with a so-so simulator featuring action too slow to really be called arcade and harboring a few anomalies that are probably best called glitches, if not outright bugs.

Why, then, is Jet not the great game it could have been?

First, it was written for another computer and simply translated to the C-64. A computer-specific version could have used sprite graphics to give a real feeling of moving at jet speed, rather than the sluggish drifting we get here.

Also, the sound could be much better. In Jet, we hear only two sounds—the rasping engine and the tinkling that signifies a kill.

Perhaps it was a rush to market that kept beta-testers from finding the glitches. I'll opt for that idea, because it would be rude to suggest that perhaps nobody cared or thought their removal worth the effort.

Furthermore, the game doesn't play fair. The enemy seems to have countermeasures and evasive tactics that are not available to you. How else can it be explained that, when you are within range, your heat-seeking missiles cannot score a hit?

In spite of its good points, there are enough aberrations in Jet to keep it from being the top rank game it should have been. *(SubLogic Corp., 713 Edgebrook Drive, Champaign, IL 61820. C-64/$39.95 disk.)*

Ervin Bobo
St. Peters, MO

Personal Inventory Personal Accountant Time Manager

B

Cardco Meets a Market Need with CP/M Software For the C-128

You may have noticed that there are few new CP/M programs for your C-128. There is, however, a formidable array of existing CP/M software, and Cardco is taking advantage of this by licensing the rights to three programs intended for personal and small-business use and repackaging them for C-128 owners.

The three programs—Personal Accountant, Personal Inventory and Time Manager—were originally sold under the SilverSoft title and were priced at $199.95. Cardco is selling each program for $39.95, and the software is not copy protected. These programs are easy to use and give you enough latitude to become fairly complex.

Personal Accountant (formerly SilverBudget) is, as its old name implies, a budgeting program. Although the program uses a double-entry system, which makes sure that there is income to account for every expense, it is not really an accounting program. Personal Accountant basically lets you set up and follow your budget categories while helping you see how close you are to your planned budget. The program allows you to enter transactions, reconcile accounts and display or print any of seven different reports.

Personal Inventory (formerly SilverFolio) was designed to help you track and maintain your personal portfolio, including assets (computers, stocks, savings accounts, etc.) and liabilities (mortgage, credit loans, and so on). You can also depreciate your assets and keep a list of serial numbers.

The program allows you to calculate interest payments, determine payment schedules and print out relevant reports. Should you need to generate a net worth statement or file an insurance claim, the files managed by this program can come in handy, if properly maintained.

Time Manager (formerly SilverCalendar) is designed to help sched-

Continued on p. 104.

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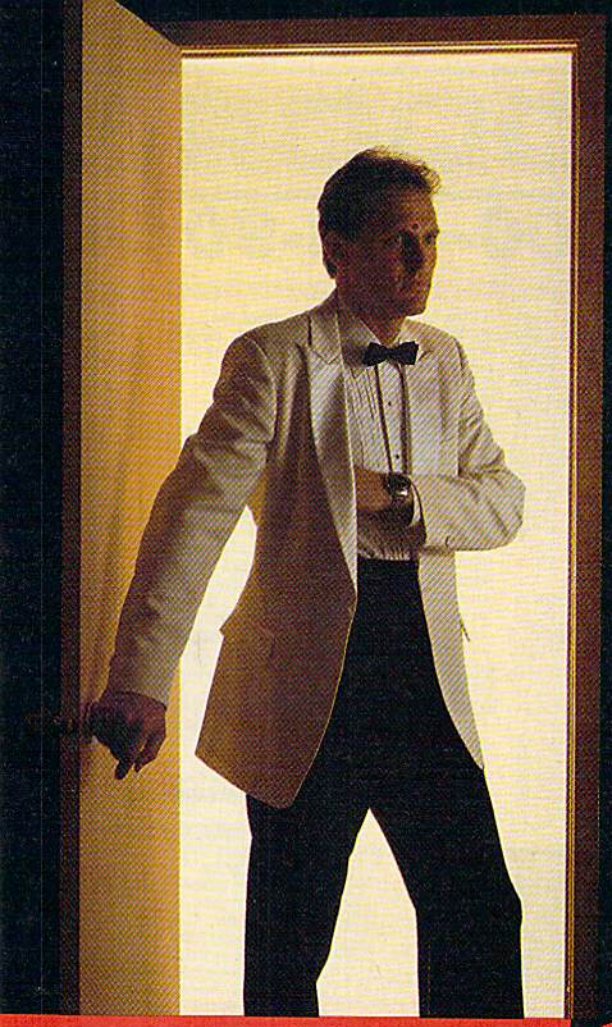
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BIG SOFTWARE FOR SMALL BUSINESS

Business applications continue to grow as an area of interest for C-128 users, and in response to this, we bring you this overview of software that's currently available. Four in-depth reviews are supplemented by a table of other packages, many of which were previously reviewed in RUN.

For C-128 owners who have been wondering where the 128-mode software is, we've concentrated on several of the most recently released small-business applications for this sophisticated computer. These include the powerful Vizawrite and Vizastar series, Superbase 128 (see the August 1986 issue of RUN *for a review of Superscript 128) and the CMS General Accounting System. We look forward to bringing you more reviews of business-related software in upcoming issues.*

Vizawrite and Vizastar

By Louis R. Wallace

The Vizawrite word processing/Vizastar database system for the C-128 has been eagerly awaited. The author is Solid State Software's Kelvin Lacy, the programmer behind Omniwriter and Vizastar for the C-64, both of which are considered to be among the finest software available for the 64. You'd expect that any program that was great on the 64 would be even better on the 128, and that has indeed turned out to be the case.

Vizawrite

Vizawrite Classic for the C-128 is the direct descendant of Solid State's Omniwriter 64. Many of the command keystrokes are the same, and the general feel of the program is similar. However, Vizawrite has been enhanced to offer new and more powerful features that take advantage of the C-128's new capabilities.

Employing the increasingly popular pull-down menu approach, Vizawrite is much more user-friendly than Omniwriter, while at the same time it has more word-processing power. It uses the 128's 80-column RGB display with vivid colors to create a readable and pleasing text screen. Moreover, the special printer modes, like bold text and underlining, appear on the screen exactly as they will on paper when printed.

The program also lets you define ESC commands to turn on and off special functions specific to your printer. You can access these user-defined characters within a document by pressing a single key, making them easy to use.

The pull-down menus make it unnecessary to learn complex keystrokes or cryptic commands in order to perform elementary functions like formatting a disk or copying blocks of text. Also, you control these functions with the cursor keys, so they couldn't be easier to use. Pressing the help key enables you to quickly get information on a number of topics without recourse to the 100-page manual. The help screens are displayed as windows over your text and resemble those you find in far more expensive computer systems.

Vizawrite has many exciting new features, such as the ability to produce text output in columns, like a newspaper or magazine, and even to include columns of data within a document. If your business produces a newsletter, you'll surely enjoy this feature.

The program allows proportionally spaced characters as well as pitch control, and there's a near-letter-quality font built into the software. The package also includes a 30,000-word spelling checker that will help you proofread your documents, and a built-in calculator that can be very helpful for business applications.

Most of the standard and advanced word-processing functions are included in Vizawrite—and the program is constantly being improved. Some of these modifications were to correct bugs, but most offer enhancements. For example, version 1.5, the fifth release and the one I'm using, supports the 1700 and 1750 RAM expansions for the 128 as long as you have the proper extender board so the cartridge and RAM expansion units will work together.

Vizawrite Classic may well be the best word processor

Here's an overview of some Commodore 128 programs that can be mighty helpful in streamlining your small-business operations.

yet created for a Commodore computer. It offers virtually all the features of professional packages designed for other machines, and includes many features that they do not. If your business needs a word processor for advanced text manipulation, and yet you want one that's easy to use, I think Vizawrite is for you.

Vizastar

Vizastar is Solid State's new productivity package for the C-128. Adapted from its C-64 counterpart, it's a greatly enhanced version that, like Vizawrite, requires the 80-column screen and otherwise exploits the power of the newer machine. It's designed for an RGB monitor, but will work with a monochrome system or even a 1702 with an 80-column adapter cable (though this option produces no color).

Vizastar is billed as an information processor, an apt description. It's an integrated spreadsheet, database and graphics system that enables you to define, manipulate and store information about your business.

For those who might be unfamiliar with these terms, a spreadsheet is the computer version of an accountant's paper ledger sheet. You can enter numbers into its columns and rows and then direct the program to use its built-in formulas to calculate whatever additional information those numbers may produce. This arrangement enables you to get answers to "what if?" questions about financial matters.

Suppose, for example, that your business needs a new delivery van, you want to pay for most of it on time, and you're concerned about monthly payments. A spreadsheet calculation can help you compare the monthly payments resulting from any number of combinations of principal amounts, interest rates and time periods. Armed with printouts of this information, you can shop around and tell at a glance whether a dealer's offer falls within your payment requirements.

Of course, numeric data is not the only type of information a businessperson needs to manipulate and store. Textual material, such as item descriptions or inventory data, often must be handled in similar ways. Vizastar's database functions offer this type of information processing. The database is also very useful for storing customer information—names, addresses, orders, purchases, and so on. You can then easily retrieve, sort, amend or delete this data as required.

As far as capacity is concerned, Vizastar offers a fairly large spreadsheet format—64 columns by 1000 rows, for a total of 64,000 cells. Of course, the actual number of spreadsheet cells you can use depends on their contents: each character entered uses additional memory, and it's not unlimited. Each cell can contain up to 120 characters, with a maximum of 75 displayable on the screen at any one time.

Vizastar's database can accommodate up to 2400 records per disk on a 1571 disk drive, and up to 1200 on a 1541 drive. You can have up to 64 fields per record, while the maximum number of records depends on the size of each field within the record (as well as the drive you're using).

The database and the spreadsheet can share data, and, since they reside in memory at the same time, this feature is relatively easy to use. In fact, up to nine windows can be open at once in a worksheet, enabling you to see and use different parts of the spreadsheet and database simultaneously on one screen.

In addition to the spreadsheet and database, Vizastar can produce several types of graphs. These can be simple bar graphs of data from the spreadsheet or database, or the more complex multibar graphs or pie charts that take full advantage of the C-128's 80-column color and high-resolution capabilities.

I suspect Vizastar will become the system with which other integrated C-128 packages are compared. While spreadsheets and databases can be difficult to learn to use, Lacy has made every effort to ease you into his package. The software comes complete with an extensive 100-page manual and a separate 50-page tutorial that allows you to start using the main features right away.

By itself, Vizastar is a powerful data-manipulation system. Combined with Vizawrite, I think it's the equal of any

C-128 Small-Business Software

Business Pro-Pak—A business statistics package for the C-128 (in CP/M mode), this product performs four functions: averaging, regression and future analysis, inventory and determining economic order quantity. Source View Software International, 835 Castro St., Martinez, CA 94553; 415-228-6288; $99.

Chartpak 128—Creates charts and graphics. Abacus Software, 2201 Kalamazoo SE, PO Box 7211, Grand Rapids, MI 49510; 616-241-5510; $39.95.

The Consultant—A C-128 database management package that offers all of the C-64 version's features and makes use of the C-128's enhanced hardware capabilities. See the review in *RUN*, March 1986, p. 30. Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; 416-881-9941; $79.95.

Data Manager 128—A general information storage and retrieval system with report-writing and label-making capabilities. See the reviews in *RUN*, March 1986, p. 34, and October 1985, p. 56. Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015; 312-948-9200; $69.95.

dfile128—A database for inventories, mailing lists, financial reports and calculations. Michaelsoft, 4821 Harvest Court, Colorado Springs, CO 80917; 303-596-4243; $24.95.

Fleet System 3—A word processor, spelling checker and thesaurus. See the review in this month's Software Gallery. Professional Software, Inc., 51 Fremont St., Needham, MA 02194; 617-444-5224; $79.95.

Ghost Writer 128—An 80-column word processor that makes use of the C-128's enhanced hardware features. Human Engineered Software, 390 Swift Ave., South San Francisco, CA 94080; 415-871-0570; $39.95.

Jane 2.0—This package is made up of Janewrite (word processor), Janecalc (spreadsheet) and Janelist (database). Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380; 215-431-9180; $49.95.

Microsoft Multiplan—A productivity tool including templates that allow you to analyze data and plan budgets for your small business. Epyx, 1043 Kiel Court, Sunnyvale, CA 94089; 408-745-0700; $59.95.

Paperback Writer 128; Paperback Planner 128; Paperback Filer 128—This is a line of word processing, database and spreadsheet applications for your C-128. See the review of Paperback Writer 128 on p. 18 in the May 1986 Software Gallery. Digital Solutions, Inc., PO Box 345, Station A, Willowdale, Ontario, Canada M2N 5S9; 416-2221-3225; $49.95.

PaperClip II—This enhanced version of the C-64 program offers an 80-column screen, expanded memory capacity, word wrap and chaptering. See the review article in *RUN*, July 1986, p. 56. Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; 416-881-9941; $89.95.

Partner 128—A cartridge-based desktop accessory package with eight convenient features that work concurrently with most other C-128 programs. Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015; 312-948-9200; $69.95.

Swiftcalc 128, with Sideways—With this system, you can print an entire spreadsheet vertically and have control over margins and spacing. See the reviews in *RUN*, March 1986, p. 34, and October 1985, p. 56. Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015; 312-948-9200; $69.95.

WordPro 128—An 80-column word processing program that takes advantage of the C-128's speed and memory. See the review on p. 14 in the April 1986 Software Gallery. ProLine Software, 755 The Queensway East, Unit 5, Mississauga, Ontario, Canada L4Y 4C5; 416-273-6350; $99.95.

Word Writer 128—This utility program includes an 85,000-word spelling checker, document chaining, form-letter printout, page separations and horizontal/vertical scrolling. See the reviews in *RUN*, March 1986, p. 28, and October 1985, p. 54. Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015; 312-948-9200; $69.95.

productivity software available today. If you're shopping for a good professional system for business or personal use, make sure your dealer shows you these programs.

You can get further information on Vizawrite and Vizastar by writing or calling Solid State Systems, 1125 E. Hillsdale Blvd., Suite 104, Foster City, CA 94404; 415-341-5606. Vizawrite Classic lists for $89.97; Vizastar 128 for $119.97.

Superbase 128

By John Premack

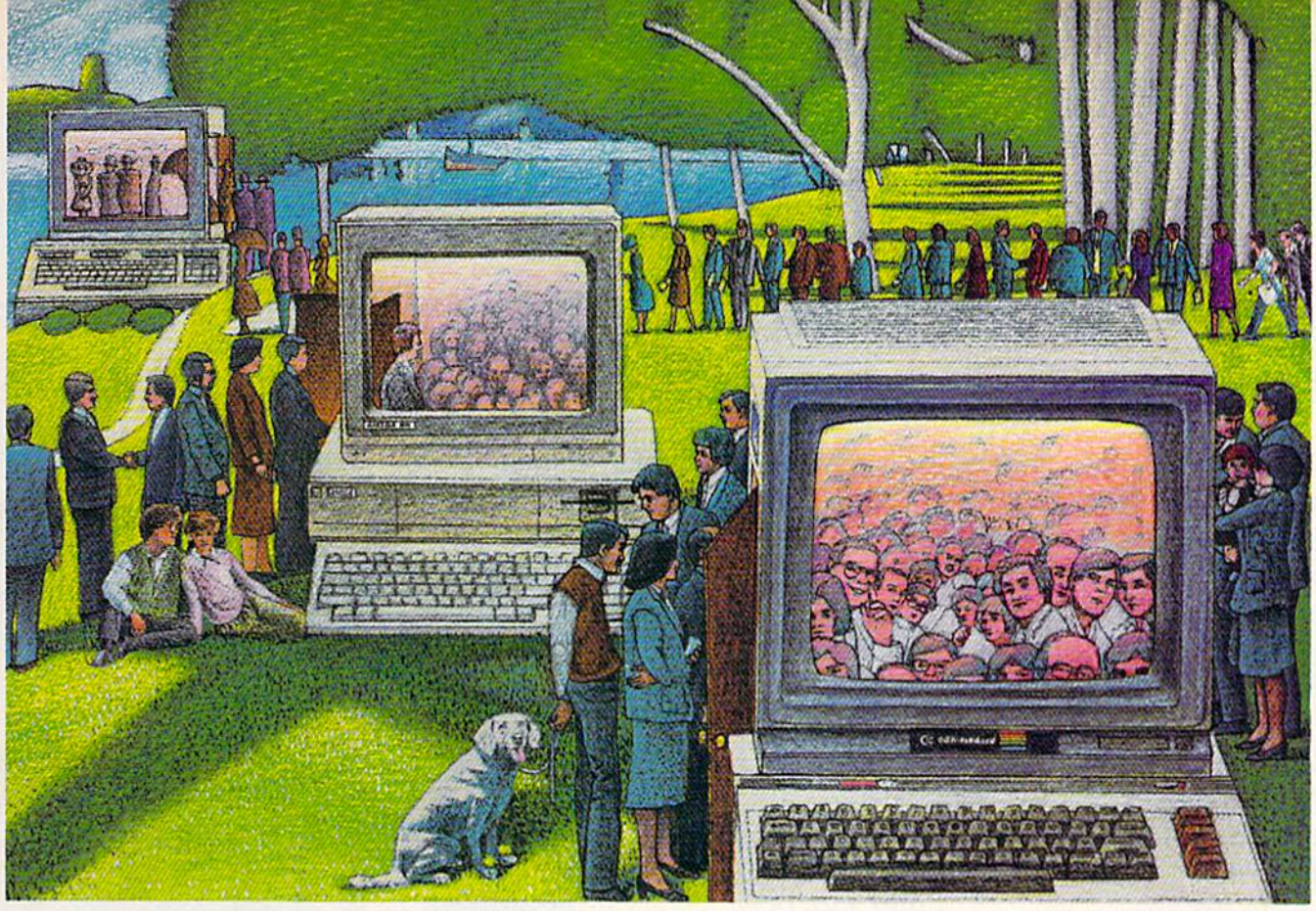
If you're looking for a database program that is easy for a novice to use, yet offers enough power to keep most small-business users happy, Superbase is a candidate.

Long a standard for the C-64, Superbase is now available for the 128. Anyone currently using the 64 version will be happy to know that this latest release has no problem reading datafiles written by its 40-column predecessor. Owners of the 128 can convert files created on the C-64 to an 80-column format and also take advantage of the increased storage capacity and speed of the 1571 disk drive.

Superbase is designed to reside in your 128's memory at the same time as its cousin, Superscript 128. Without rebooting, you can call the word processor from within Superbase in order to merge data into Superscript documents. Data can be exchanged between programs with relative ease by means of previously created lists or ASCII disk files.

A software patch allows Superbase to drive printers equipped with a standard Centronics parallel interface directly from the user port without additional hardware. Superbase also has a built-in calculator and the ability to password-protect files. Results from the calculator can be used to amend individual files.

Aside from all the usual sorts, searches, written reports and sequential disk files, Superbase has extraordinary ability to perform complicated tasks under the control of



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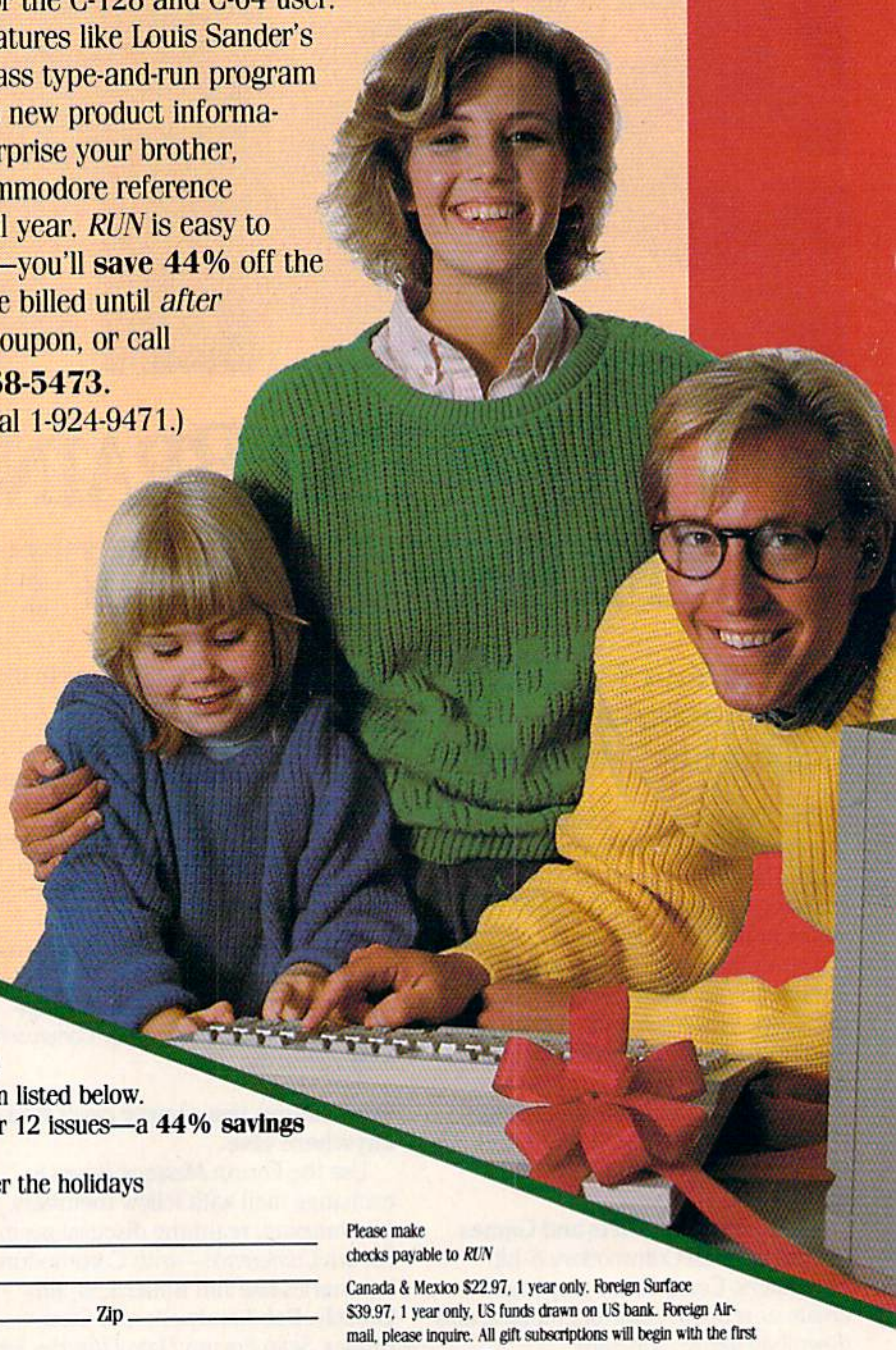
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a program written by the user. Using the built-in program editor, you simply write your own application, much as you'd write a simple Basic program. Utilizing a series of linked commands, Superbase can search, sort, calculate, update, print reports, create lists and essentially put Superbase through its paces automatically, without operator intervention.

Thirty-two Basic commands, such as Loop, Trap, List and End, can be combined with another 32 operators and expressions (including sine, tangent and CHR$) in writing custom applications. Over 50 special commands are also available to direct data entry, file manipulation and output. In fact, advanced users can teach Superbase to do practically anything except type in new data, all at the touch of a key.

While this potential is certainly enough to stimulate the imagination and whet the programming appetite of experienced database users, it shouldn't be allowed to scare off the uninitiated. Superbase can also be easily operated by novices via a series of simple-to-understand menus.

To make things as simple as possible, the program comes with a well-written, spiral-bound instruction manual, one-fourth of which is devoted to a series of tutorials that lead you through the steps of creating a database, designing an empty record form, and entering as well as storing, sorting and recovering data.

Superbase for the 128 can spread individual records over as many as four screen "pages." Each record can contain up to 127 fields with a maximum of 1107 characters. The total number of records for a given file is limited only by the capacity of your disk drive.

If your application requires a large number of entries, you'll be pleased to know that in addition to the 1541 and 1571, Superbase also supports the high-capacity SFD 1001 and dual drives such as the CBM 8050 or 8250 and MSD. On the other hand, users with two single drives will be disappointed to learn that they can use only half of their system, since only device number 8 is supported.

While I experienced no difficulties, some users are apparently having problems accessing records on certain 1571 drives. It appears that 1571s with version 2 DOS contain a ROM problem that is prone to report disk errors when you're sorting an extremely large file, thus crashing the program and trashing the file.

A check with the folks at Progressive Peripherals revealed that the only solution is to replace the original socketed ROM with a new one, put out by Commodore, and available from Progressive Peripherals, Commodore or other authorized service centers.

Aside from this problem, Superbase's biggest flaw may be that few users will ever have the satisfaction of outgrowing its capabilities. (Manufacturer: Precision Software, Ltd.; Distributor: Progressive Peripherals & Software, 464 Kalamath St., Denver, CO 80204. C-128/$99.95 disk.)

CMS General Accounting System

By Joseph A. Bouterse

The CMS General Accounting System for the C-128 is an easy-to-use, full-featured accounting package for small to fairly large businesses. It's an excellent package for the serious businessperson who wants a program that provides full audit trails and who is willing to spend some time learning the system.

The equipment required to operate the General Accounting System includes a C-128, an 80-column Commodore or compatible printer, an 80-column monitor and, to avoid possible problems, two disk drives—either 1541 or 1571 or a combination of the two. The best system would contain a hard disk drive.

The version of CMS General Accounting that I reviewed was written in Basic, so it was rather slow, even running in the C-128's Fast mode. However, future versions will be compiled to overcome this problem. The program is not copy-protected, so you can make backups of your files.

The General Accounting package includes five disks and complete documentation. There's a disk for each module—General Ledger, Accounts Receivable/Billing, Accounts Payable/Job Costing and Payroll—as well as a sample data disk. If you want to handle only one disk when making working copies, you can combine the General Ledger and Payroll programs on a disk using a file copier such as the DOS Shell that comes on the 1571 demo disk.

The sample data disk contains a business accounting system that involves all the modules. The sample will give you a quick feel for the program when you first get it and later help you clarify some of the finer points of program use.

This is a thirteen-month accounting system, which means that you don't have to close one month's books before working on the next. It functions according to the date you enter into the general information file, so you can change the month you're working on by changing this date. The system will automatically group transactions according to month, which is especially handy if you have an employee entering information on a daily or weekly basis and you take care of the monthly closeouts.

The CMS system is totally integrated. At your option, it will automatically post to the general ledger any transactions entered into accounts payable, accounts receivable, job costing or payroll. Also, since you can use one data disk for all the modules (as long as your business isn't too large), you don't have to continually switch disks.

This is another reason to use the 1571 drive with its increased storage capacity. I have a professional portrait photography studio, and I can keep all the data for 256 general ledger accounts and 14 vendors in accounts payable, as well as the payroll, on one 1571 disk.

There are many niceties concerning data entry with the CMS system. For instance, when it prompts you to enter data with a line of asterisks, you needn't press return if your entry takes up all the spaces. Also, it's not necessary to enter trailing zeroes with dollar amounts or account numbers. For example, if the account number is 11300.00, you only have to type 113 and press return.

The escape key returns you to the previous procedure. During the entry procedure, the F1 key saves time and promotes accuracy by recalling the last item you entered in a particular field. The F1 key also means "all" when you're prompted for a range during a printout. Pressing F7 or F8 at almost any time advances the paper in the printer one page and one line, respectively.

Another advantage of the CMS system is its ability to print all reports, except those generated during an update operation, to either the screen or the printer. You can halt the printing at any time by pressing return, then C to

continue or S to stop. These features are handy when you're looking for the balance in a given account, the amount you've ordered from a particular vendor or the balance owed by a certain customer.

The General Ledger

The General Ledger module contains programs that post and maintain general and cash journals, print financial reports and maintain account and general ledger information files. Also included in the package are utilities to back up and recover data files.

The first step in using the General Ledger module is to initialize a data disk with the file utilities option. Since most data is stored in relative files, you must do this before using the program.

You can then begin entering your chart of accounts. If you don't have an accounting background, your accountant can help you complete this step. The manual is well-written and will guide you through the process, but your chart of accounts is the backbone of the accounting system and must be carefully thought out.

Once the chart is set up, you can post data to the journals. Thanks to the way the program prompts you for information, this is a straightforward process. After you've entered your data, you can print the journals. Be sure you have either a Commodore printer or an interface that emulates one, because, unfortunately, this program sends Commodore ASCII rather than true ASCII to the printer.

Accounts Payable and Job Costing

The data entry and output procedures for the Accounts Payable module are similar to those of the general ledger. By interfacing the Accounts Payable and Job Costing modules, you can assign each purchase (or portion of each purchase) to as many as 15 jobs during invoice entry. The Job Costing module will then produce a detailed report showing the estimated cost of a job, the cost to date and the purchase record, with invoice numbers and other information.

Job costing and accounts payable can also be used independently of one another. The Accounts Payable module will print checks: CMS can provide these forms or you can get them elsewhere.

Accounts Receivable and Billing

The Accounts Receivable module provides full tracking, including invoices, credit memos and deposits, as well as full, partial and time payments. Like the other modules, you can set this one up to automatically update the general ledger or to operate independently. You can distribute each invoice or credit memo among up to nine general ledger accounts and maintain a journal of sales and cash receipts by invoice and date, with daily subtotals.

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"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

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INFO 64 Magazine, Issue #7

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RUN Magazine, June 1985

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Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

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

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

VIZAWRITE CLASSIC for C128

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

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

PROGRAM SPECIFICATIONS

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

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It's also possible to add a standard minimum or finance charge to invoices. The program will process invoices containing up to 50 line items, with a different sales-tax rate applied to each, if needed, and print these on standard forms from CMS or other vendors. It will also print statements, including a special message if desired.

This module will figure commissions, based on gross sales and receipts, for up to 99 salespersons. When sales commissions are not involved, it will track sales and receipts on up to 99 products, regions or other classifications. The program will also print mailing labels from the customer file.

Payroll

The Payroll module is another example of the General Accounting System's versatility. It's complex, yet flexible. For instance, it will process pay for weekly, bi-weekly, semi-monthly and monthly employees from all 50 states. Employees can be on regular, overtime, holiday or vacation hours, and the program provides for piece-rate pay. This module can stand alone or be interfaced to the general ledger.

You can make up to seven miscellaneous payments and deductions for each pay period, for the following pay period only, or for the first pay period of the month. It will print checks using forms from CMS or elsewhere, as well as all information necessary to complete federal and state quarterly reports and W-2 forms. In the process, you can enter or change withholding rates when needed.

Possible Improvements

The CMS General Accounting System is a comprehensive and logical system for business purposes, but there are a few things I think could be improved upon.

First, the general ledger cash journal contains too much detail for my liking. I realize that more detail is better in accounting, but this turns out to be confusing in the journal's "print across" display format.

There's a different problem in an entry function in the Accounts Payable module. The program prompts you for the invoice date, discount percentage and discount date. When you enter a zero for the discount percentage, the discount date automatically becomes the same as the invoice date. If you want to use the discount date as a payment-due date, you must go back and change that line after you've entered all the data on that record.

Finally, the Payroll module has no way to override the FICA deductions. This is not a problem with normal use of the General Accounting package, but it is if you want to use it to pay independent contractors. Granted, contractors are not technically on the payroll, but it's nice to be able to keep track of their payments, too.

All things considered, the CMS General Accounting System is the finest accounting package I have seen for the C-128. The 128 is capable of being a serious entry-level business computer, and this is one piece of software that allows it to be just that.

The C-128 General Accounting System is available from CMS Software Systems, Inc. (2204 Camp David, Mesquite, TX 75149), for $179.95. The System is also available for the C-64 for the same price. CMS also offers an Inventory module that can either be used alone or with the accounting package. Cost is $79.95. R

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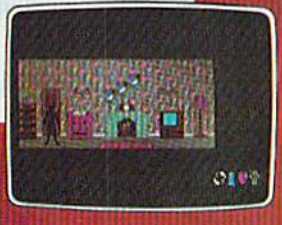
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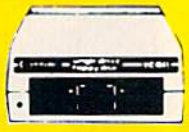


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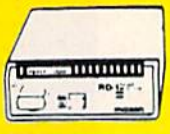
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Software to Improve Your Business Picture

Computer-aided-design programs come with a host of features for processing the images you need to help your business.

By BROOKS H. HUNT

Computer-aided-design (CAD) programs do the same thing for images that word processors do for letters and words, or that spreadsheets do for numbers. With a CAD program you can create and edit images, cut and paste to combine portions of different pictures, save them in whole or in part for later use and make hard copies of them with a dot-matrix printer or a plotter.

CAD software has been around for a long time, used mostly on mini-computers and mainframes for designing everything from furniture to automobiles to computer components. These programs enable designers to make modifications quickly, without having to do a complete new drawing each time. In the last decade, as personal computers have become more powerful, CAD programs have migrated down to the smaller machines. Now there are several CAD programs that run on the C-64.

As distinguished from CAD programs, microcomputer graphics packages have been available since about the time the C-64 appeared. The least sophisticated of them, drawing programs, enable you to draw on the screen using a high-resolution display. Additional features may include saving the images to disk or tape and printing them on paper.

Most commercially available drawing programs go beyond this. Some provide color or instructions for using your drawings in Basic programs. Many include predefined shapes, such as circles and rectangles, to aid in creating a drawing. However, drawing programs are generally recreational in nature. They don't produce a graphics product suitable for business purposes.

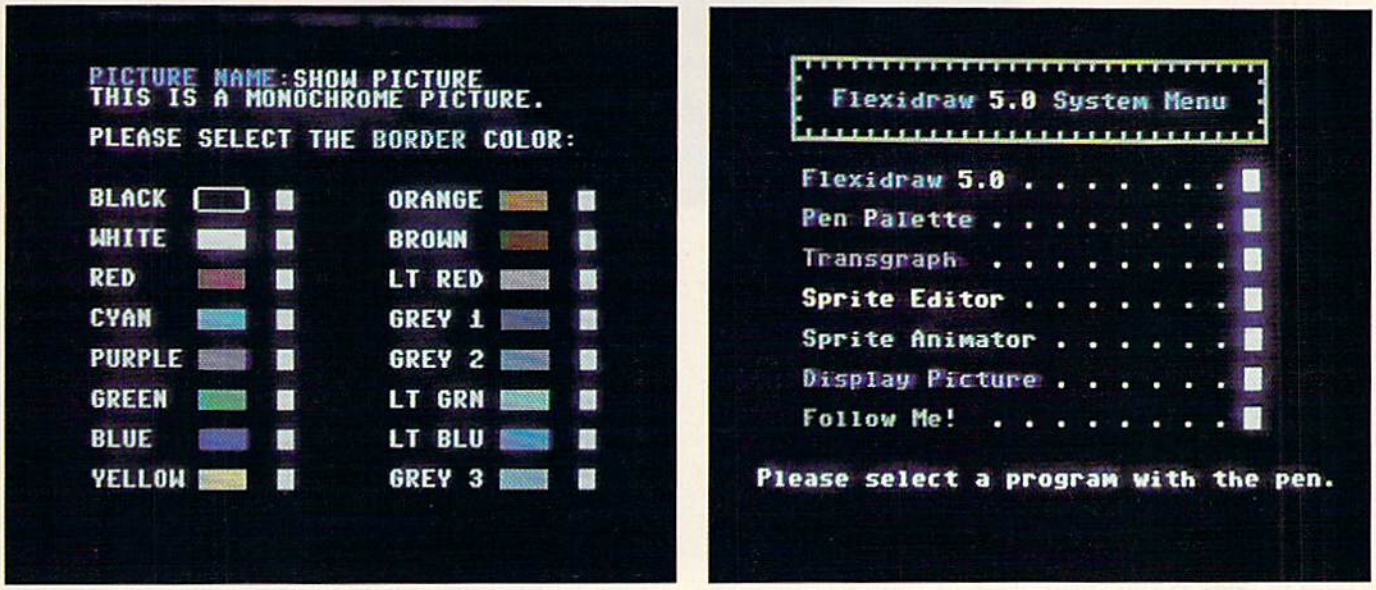
Proportional Precision

CAD programs not only enable you to draw, but also give you the greater degree of precision businesses need. With one of these packages, you can ensure, by using a built-in ruler or grid, that all the parts of a drawing are in correct proportion. You can also size each new addition to the screen accurately in relation to what's already there.

CAD programs are also precise in transferring a display to paper. Most graphics programs can't do this accurately, because a pixel is twice as wide as it is tall. Thus, an oval that appears approximately circular on the screen will print out as an ellipse, unless a correction is written into the printing routine.

CAD programs will save and retrieve portions of drawings, so you can combine them in different ways. This feature makes it possible to create libraries of shapes to use in many different drawings. Each type of business can have its own library of symbols or shapes, such as electrical components for an electronics engineer or architectural symbols for an architect.

With CAD programs, you can include text, often in more than one size, with a drawing. Layouts or blueprints are of no use if there's no printed information to tell the reader the scale and orientation of the drawing, who did the design and when, and so on.



Inkwell Systems' FLEXIDRAW lets you make menu selections with a light pen.

These packages are of greatest use for businesses that need to produce quality graphics, and possibly several versions of the same basic drawing. The versions may represent progressive improvements in a design, or provide several options to a client. Examples of such business users include artists and illustrators, architects, landscape designers, interior decorators, fashion designers, craftspeople, store owners and educators. The list is endless.

Each of these has a special need that can be satisfied by at least one of the CAD programs currently available for the C-64. I'll illustrate with a survey of six of them.

Table 1 lists printers and interfaces that, according to the product literature, are compatible with each program. Table 2 presents product information, including names, addresses and phone numbers of manufacturers, as well as prices.

FLEXIDRAW

FLEXIDRAW is a light-pen-based, menu-driven program that's been available for several years and is currently in its fifth edition. A high-quality precision light pen comes in the package. You make menu selections and draw by pointing this pen at the screen, a process almost as comfortable as using a pencil on paper. Flexidraw is compatible with many printers.

The package's main program features a menu on the right side of the display, next to the high-resolution screen. Menu selections include drawing predefined shapes, filling areas with one of 32 patterns, using one of a dozen type fonts (some in two sizes), and freehand drawing.

FLEXIDRAW offers a convenient two-screen option where you can move images from one to the other with the copy and paste commands. The pasting operation is set up for accurate positioning of the image, and it lets you decide whether the block you're pasting will overwrite the background on the drawing screen.

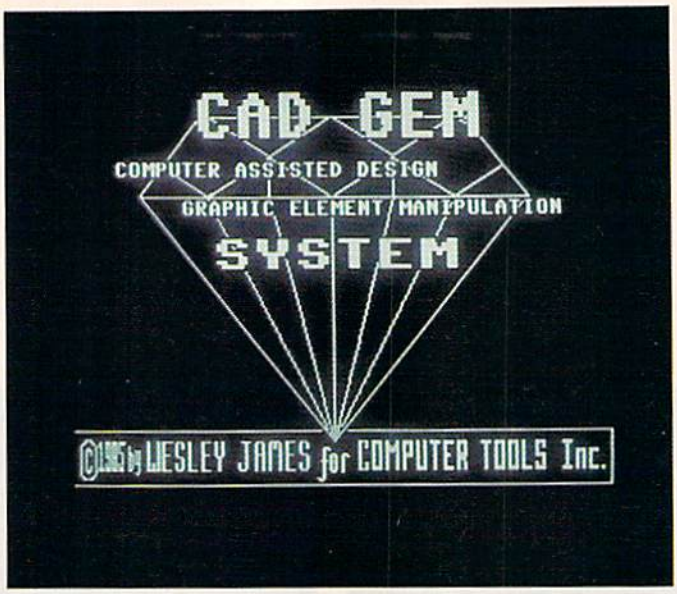
There are two techniques for doing the accurate positioning. The first is based on crosshairs—vertical and horizontal lines of regularly spaced dots that always intersect at the cursor location. You position the crosshairs with either the light pen or cursor keys. The second technique uses a grid that appears as a checkerboard or as dots spaced at the corner of character cells.

FLEXIDRAW comes with several symbol libraries—including pictures and electrical, architectural and mathematical symbols—that you load onto the second screen. You can create as many additional library files as you wish.

The program prints pictures in two sizes: quarter-page or full-page. The printed image is wider than the displayed image, which may be a problem for some applications.

With some printers (see the list in the manual), you can print both screens side by side. This makes it possible to assemble up to six images on an 8½-by-11 page.

FLEXIDRAW seems best suited to those who need to create easy-to-read images where the proportions are not



Title screen from Micronic Interface Technologies' CAD GEM.

critical in the hard-copy form. The documentation is complete and easy to understand, and the program is easy to learn and to use.

CADPAK

CADPAK is a menu-driven program that produces accurately scaled printouts from drawings you create on the screen. Two versions of the program are included in the package. One uses a light pen as the input device, and the other uses the keyboard. The light-pen version also accepts numerical input from the keyboard for specifying the length of lines as you create them. A light pen does not come in the package.

CADPAK's main menu offers a choice of two high-resolution screens. The auxiliary screen is for bringing libraries of objects or specially created fonts into the program, where you can copy them to the drawing screen. The main menu also enables you to create various geometric shapes, freehand drawings and text, to zoom, to erase, to measure the distance between points, to fill an area with a supplied pattern or one you create, to clear the screen, to try again or to print an image.

Accurate printouts are CADPAK's main distinguishing feature. To effect this accuracy, when you first start to use the program, you have to run a sizing routine that writes correction ratios into the main program. You also have to specify the units of measurement and the scale for the final printout, both at the beginning and each time the screen clears. All subsequent measurements and numerical input are in these units.

CADPAK's documentation is complete and clear. In addition to a detailed description of each function, it includes three tutorials that lead you through the basic and the advanced functions of the program.

The program is aimed at those who need to turn out accurate, scaled drawings. The menu makes it easy to learn and to use.

CAD-3D

CAD-3D is a program for drawing three-dimensional "wire-frame" objects that can rotate about an axis. It uses Cartesian coordinates to operate within a display field of 256 × 256 × 256 units. To create an image, you define the end-points of the lines that form its edges. The image can be viewed in perspective or as an orthogonal projection in two dimensions.

CAD-3D is controlled by 56 keyboard commands and a joystick. To draw a line, you use the joystick or the keyboard to position the end-points of the desired line. When the points are properly positioned, as indicated by the coordinates displayed on the command line, you draw the line. You continue this process, drawing each line until the image is complete. The coordinates of all the end-points of the lines in an image are stored in a matrix that defines that image.

CAD-3D has three modes of operation—edit, translate and rotate—all accessed through the keyboard. In translation mode, you can relocate an image that was drawn in edit mode along any combination of axes. In rotation mode, you can rotate the image about a point or axis. One keystroke changes the display between an orthogonal view, which is the default, and a perspective view. You can save all your creations to disk or tape.

After an image is complete, you can merge it with others to make a more complex drawing, or translate or rotate a portion of it independently of the rest. You can place your images in a print file for use in other programs.

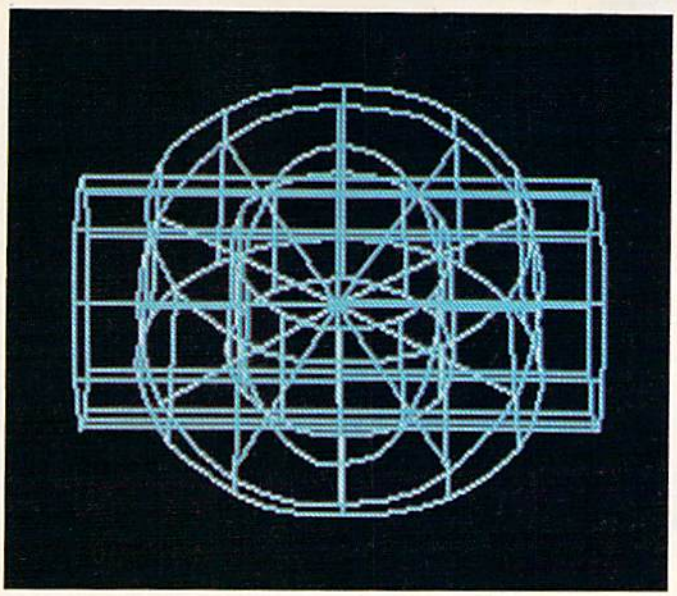
You can produce hard copies directly from CAD-3D or through a program such as Doodle. If you're adding text to the printed image, you must use Doodle or an equivalent, because CAD-3D has no text-creating capability save actually drawing the letters.

CAD-3D should be of interest to anyone who needs to make drawings showing spatial relationships—engineers, draftsmen, inventors and educators, for example. The documentation is brief but readable. A demo program in the package illustrates things you can do with CAD-3D, although it doesn't step you through the various commands. A summary of the 56 commands appears in the back of the manual.

CAD GEM

CAD GEM creates three-dimensional wire-frame designs that can be moved anywhere within a 64K × 64K × 64K virtual screen. (The visual screen is, however, limited to 320 × 200 bits.) You define the images by the lines that make up their edges.

Before you use CAD GEM the first time, you must run



An example of CAD GEM's 3-D wire frame designs.

an installation program that configures it for your preferences. You can set it up to accept input from the keyboard, a joystick, a trackball, a Koala Pad, paddles or a light pen. Once you've made the selection, the program will always expect that input until you change the device designation by running the installation program again. The installation program also configures CAD GEM for your printer.

Like most CAD packages, CAD GEM is menu-driven. The main set of commands includes create, edit, view, disk and restart. Each of these branches to other commands.

The edit menu options are points, lines, list, add and delete. The disk options are load, save, scratch, master and files, the last two of which enable you to copy either the entire disk or individual files.

The view options include rotate, shift, scale, distort and move. This key set of commands enables you to place properly sized images anywhere in a huge graphic area of 65,535 pixels on each edge. With the move command you can move one image at a time or all the images at once.

The view options offer complete freedom in arranging a number of images in a display. Some ready-made images, called primitives, are included on the disk, and additional architectural and electrical primitives are available from the manufacturer.

You can print CAD GEM images from the screen or load the image file into one of the graphics programs listed in the manual. Although the screen print may include text, image files that are exported to other programs cannot. However, you can use the text capabilities of the other program to add the text.

CAD GEM would be an appropriate package for educators, scientists, engineers, architects and landscapers. The documentation is easy to understand and complete, and it includes explanations of the exporting program and techniques for capturing images using a camera or VCR.

Next I'll survey two other graphics programs that don't claim to be CAD programs, but can be useful in the world of business.

GEOS

GEOS is a new icon-based operating system for the C-64. The package includes a number of programs, among them a graphics program called GeoPaint, a word processor called GeoWrite and a program for selecting a mouse, joystick or trackball as the input device.

GeoPaint includes disk commands, built-in shapes and provision for creating a library of shapes. It lets you import shapes into your drawing from its scrapbook, and you can also add text to the graphics screen. In addition, it has a measuring function that displays the distance between two points in pixels or in inches on the final printed page. Although some translation is necessary, you could use either of these scales to make scaled drawings. The same scale is displayed during the line-drawing mode.

You can copy and paste portions of a GeoPaint drawing to different parts of the page, which is important because only about one-eighth of the page is available to work on at any time. The preview command displays a less detailed view of the entire page.

Almost any type of business could make use of GeoPaint, especially those that need to combine large text areas with the graphics in such things as signs, graphs, diagrams, reports or newsletters. The word processor in the package makes this easy.

CADPIC 64

CADPIC 64's manual characterizes it as a computer-assisted drawing program, but it actually consists of two programs—PaintPic, for creating a picture, and PrintaPic, for printing it out. This program has some unusual features.

PaintPic accepts input from a joystick, graphics tablet, paddles, mouse, trackball or the keyboard. Two accessory programs convert Koala, Doodle, Peripheral Vision and Hires pictures to the CADPIC 64 format and display the pictures without loading CADPIC 64.

PrintaPic offers five printout options. The gray-scale option transforms colored screen images into shades of gray. Plot printing produces black-and-white images that are especially good for line drawings, silhouettes and graphs.

"Paint-by-numbers" produces image outlines that can include numbers to show what color to fill in each space. This option produces a double-size 11 × 17 line drawing that is a proportionally accurate reproduction of the screen. Any full picture that PrintaPic displays can be transformed into a paint-by-numbers print.

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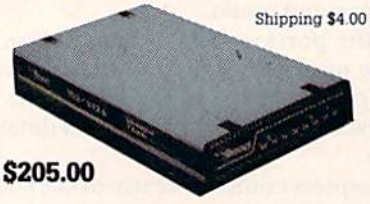
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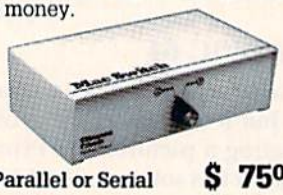
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CAD GEM
C. Itoh 8510; Commodore 1525; Epson; Gemini; Okidata.

CADPAK
Standard printers: C. Itoh Prowriter 8510A; Commodore 1525, 1526 and MPS-801; Epson FX and MX; Okidata Microline; Siemens PT88 and PT89; Star Gemini series.
Color printers: C. Itoh Prowriter 8510SC; Okidata Okimate 10.
Interfaces: Cardco 64 to Centronics model A; ECX Inc C-6401; Microworld Electronics MW-302; MSD Unc CPI.

CADPIC 64
Standard printers: Commodore 1515, 1525, 8023P and MPS-801; Epson; Gemini 10.

CAD-3D
Commodore printers and plotters.

Flexidraw
Standard printers: Commodore 1525, 1526, MPS-801, MPS-802 and MPS-803; C. Itoh Prowriter 1550, 7500 and 8510; Epson FX, MX and RX; Ergo Systems Hush 80; Legend 880; Mannesmann-Tally Spirit 80; Okidata Microline 84, 92 and 93; Panasonic 1091 and KX-P1090; Radix 10; Riteman and BMC; Siekosha GP550; Smith-Corona D100 and D200; Star Gemini 10, 10X and 15X, and Star STX-80.
Color printers: C. Itoh Prowriter 8510SC; Canon PJ-1080A Inkjet; Diablo C150 Inkjet; Okidata Okimate 10; Quadram QJ-9000 Quadjet.
Plotters: Commodore 1520; Enter Computer Sweet-P.
Interfaces: Cardco A, B, G and +G; Data 20; Microworld MW302 and MW350; Orange Micro Grappler; Progressive Peripherals & Software Easy Print; Skyles Electric VicTree; Turbo Print; Uniprint; Xetec.

GEOS
Standard printers: BlueChip M1220; C. Itoh 8510; Commodore MPS-801 and MPS-1000; Commodore compatibles; Epson FX-80 and MX-80.

Table 1. *Printers, plotters and interfaces compatible with the surveyed CAD programs.*

CAD GEM
Micronic Interface Technologies
Computer Tools Division
159 W. 53rd St., Suite 15B
New York, NY 10019
212-245-5718
$89.95

CADPAK
Abacus Software
PO Box 7219
Grand Rapids, MI 49510
616-241-5510
$39.95 for the C-64
$59.95 for the C-128

CADPIC 64
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San Francisco, CA 94123
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$49.95

FLEXIDRAW 5.0
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PO Box 85152, MB290
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San Diego, CA 92138
619-268-8792
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The fourth option produces tapestry and hook-rug designs. The printout is a row-and-column layout of the block or picture that identifies the color of each stitch or piece of yarn. The display includes the number of stitches or pieces of yarn of each color in each row, plus the total amount of thread or yarn of each color that you'll need to complete the project.

The last CADPIC 64 printout option separates a colored picture into its components—red, blue, yellow and black. The result is similar to the separations done for magazine pictures, although the resolution is lower. By printing the four colors separately, or by combining colored acetates of each printout, the complete color picture can be reproduced.

PaintPic, the portion of CADPIC 64 devoted to creating pictures, is a full-featured graphics program with a couple of unusual twists. It includes memory-resident help screens on the various commands that remind you how to draw freehand, enter text on the screen, create primitive graphics shapes, fill areas with colors and patterns, and load or save the entire display or just sections of it.

Another helpful feature of PaintPic is the status screen, which tells you which pixel the cursor is on, the current color of that pixel, the color of the cursor, the four controlling colors in that area, and the brush size and shape. When you're doing extensive detail work, this information can eliminate considerable confusion.

Drawing with PaintPic is one way to provide PrintaPic with pictures to print out. The other is to use a MicronEye camera, sold by Micro Technology of Boise, Idaho. PaintPic converts the gray-scale pictures produced by the MicronEye to PaintPic and PrintaPic format, to be used by either program.

CADPIC 64 should be useful in many types of small businesses, especially those that are craft- or art-oriented or involved in color printing of artwork. The documentation is somewhat lengthy, but complete.

C-128 Versions

A C-128 version of CADPAK is currently on the market, and C-128 versions of Flexidraw and GEOS are being developed and should be available soon. No 128 versions are planned for CAD GEM or CADPIC 64. Information was unavailable for CAD-3D.

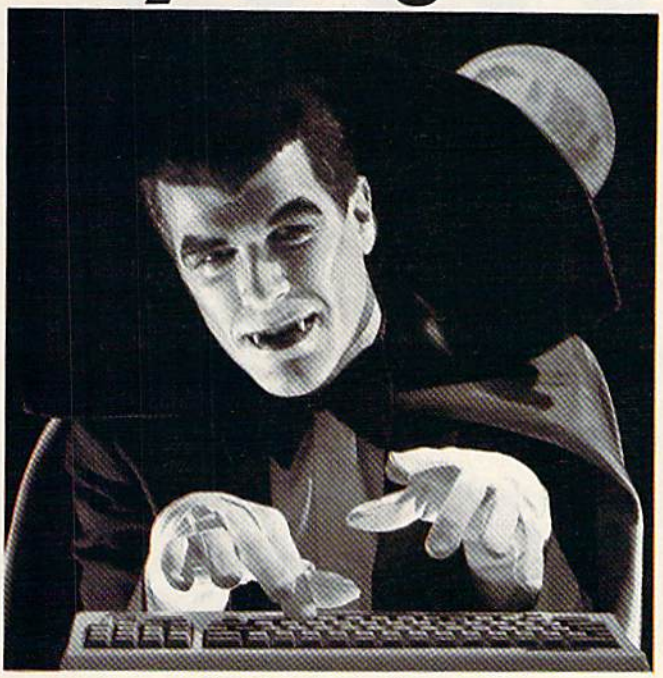
Which Program for You?

Each of these programs offers special features. Which is best for your business? To answer that question, you must analyze your requirements. Do you need a library of shapes to call on? Do you want to work in two dimensions, three dimensions or both. Must your printouts be exactly to scale? Does text have to be included with the graphics? Can you use the program without getting a different printer or interface? Are you comfortable with the input mode the program calls for. How many people will be using the program, and how much time do they have to learn it?

Check the packages out. I think you'll find one to suit your needs. R

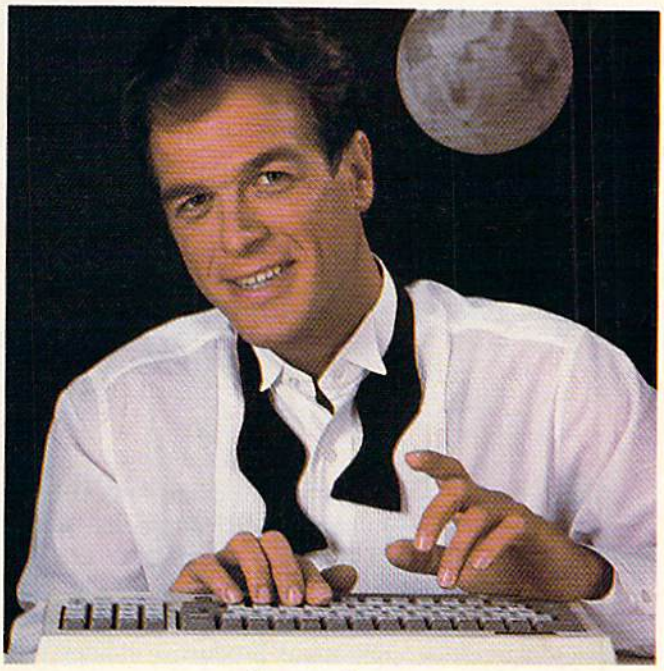
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Computer Creativity

There are creative ways of running a business; and then there are businesses that are creative. This artist-businessman does it all with his C-64 system.

By JEFF KARROW

As a cartoonist trying to sell my work, I also have to be somewhat of a businessman. The bane of every artist running a business is paperwork, financial management and other non-creative pursuits. The trick is not to let the practical aspects sidetrack you too much from your creative work.

When I bought my C-64 in June 1985, I saw it only as a low-budget word processor and a great game-playing machine. I didn't realize that it could not only shoulder the greater burden of running a business, but also enable me to create my comic strips more easily, and then to animate them for promotional purposes.

Within a few weeks of getting my C-64, I added two disk drives (a Commodore 1541 and a Cardco CSD-1), a 1702 color monitor and an Okimate-10 color printer.

To help me with paperwork, I use the Timeworks' Word Writer word processor; it's easy to use and even merges with Timeworks' Sylvia Porter's Your Financial Planner, which I also have. Once a week I enter my records into the program. I have lists of different categories of customers, and I can reach dozens of them at a time with a single letter and the push of a key.

It used to take me three or four days to mail out samples of my work. I'd have to type up several cover letters and press releases, and now I can accomplish this chore in a single evening. I can even save time by printing out mailing labels and return addresses to glue onto the envelopes.

I also had no idea the computer was such a natural for animation. When, late in 1985, Electronic Arts released Movie Maker for the C-64, I found that I suddenly had a way to animate my sales presentations for comic strip ideas.

Since the program makes cartoons that run for 70–75 seconds, I can create short commercials for an incredibly low cost. After videotaping the animation, voice-overs can be dubbed onto the videotape along with the computer's musical sound track. And my target audience does not have to have a C-64—just a video machine—though it's more economical to send out floppy disks.

Computer for Artistic Purposes?

Using a computer to draw has both pluses and minuses. A computer is naturally good at rubber lines, ready-made circles, boxes, fill commands, and so on. There are also functions a computer can perform that no other tool can do, such as resizing a shape, creating mirror shapes, expanding in X or Y directions and zooming.

However, there are some obvious limitations, such as size and resolution. Every art form has its weaknesses and strengths, though, and computer art is still in the birthing stage. I expect it will eventually generate a renaissance of artistic creativity and new markets for its results.

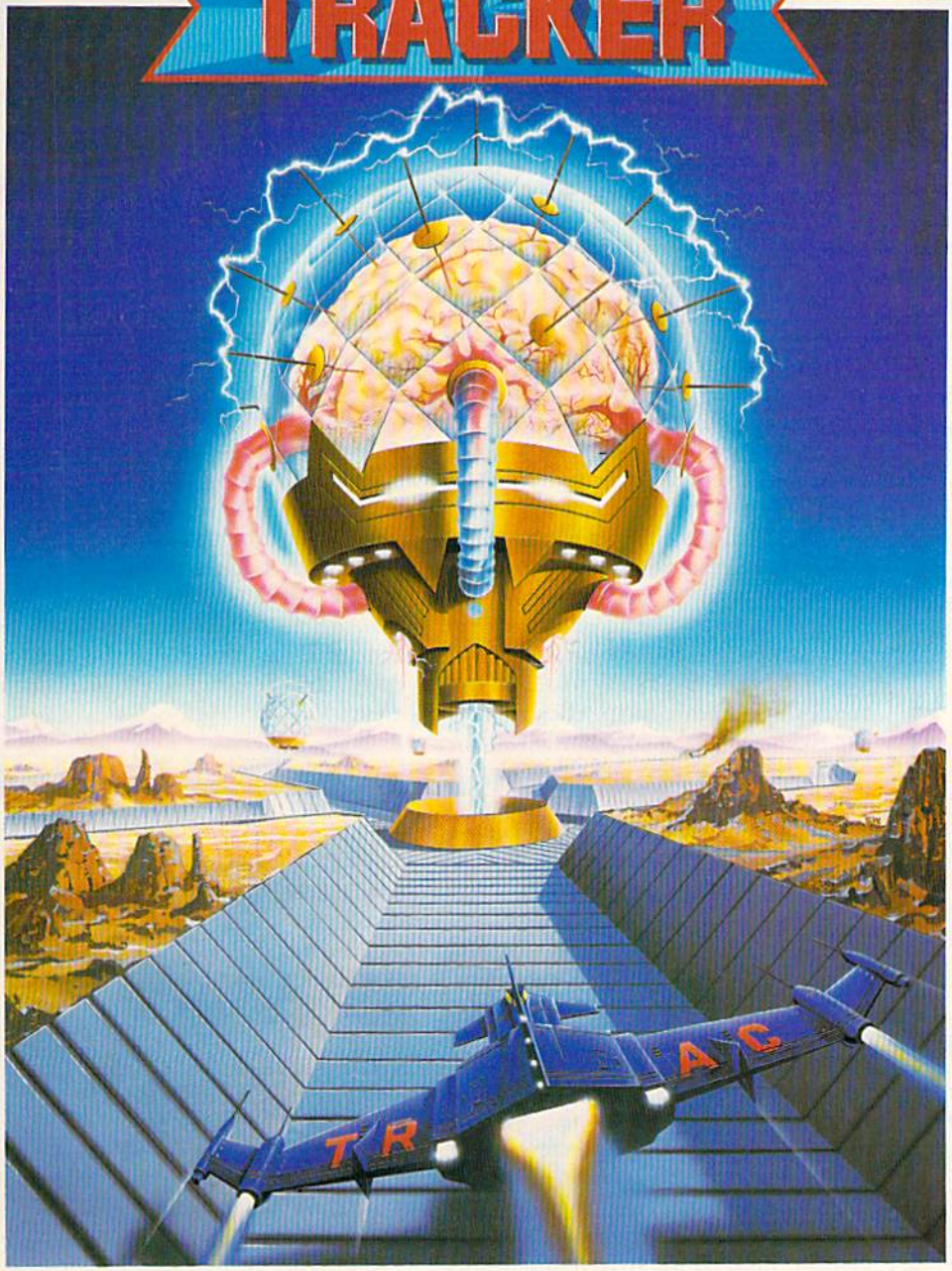
Computer-Generated Comic Strips

When I saw the KoalaPainter pad and cartridge software, I was duly impressed with its power. I was even more excited when I booted up the Design Lab software that came with Suncom's Animation Station. However, I prefer the Koala's harder surface, even though the text and drawing features of Design Lab are more powerful.

Before I load any drawing programs, I sketch out my ideas on paper to resolve any dialogue and space problems. For example, in a comic strip, the character who speaks first has to be positioned to the left, since people read from left to right. I can sometimes resort to trickery by crossing the tails of the dialogue balloons, by allowing only one character to speak in that panel, or by using a top-to-bottom sequence. The major con-

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sideration is that the reader should get the message I intend to convey.

Next, I set up some files with blank panels on them and count the number of pixels that will give me a certain proportion to my panel size. I like to work as large as possible so as to improve the resolution. I draw each panel in two sections, then paste the printouts together before reducing them on my litho camera.

For these reasons, most cartoon art is drawn at twice its final size. To pack in as much detail as possible, I draw my comics at *three* times normal size. I have some ready-made logos, names and comic strip titles to save me from having to constantly redraw them. KoalaPainter lacks a text feature, so I learned to draw my own alphabet and fit it into the available space. One of the reasons I bought Newsroom (from Springboard Software) was to experiment with the text and the higher resolution drawing program that it features.

When I begin drawing, I use the circles, boxes and consecutive-line features to create the basic shapes in each panel. Then I go back and erase pixels where they're in the way or create confusing line intersections.

The next stage involves filling in the shadowed areas with gray and black in various patterns. I draw my Gladys Glaze comic strip in black and white, but I use the Okimate-10 color printer to produce the hard copy that's pasted up.

This means that I use a colored ribbon and a color-print program that creates black by running the red, yellow and blue on top of each other in consecutive passes. I could print the entire strip in red, since the litho camera sees it as black; this would save a little wear and tear on the printer.

When drawing in color, it's best to start with the lighter shades, then add the darker ones. The computer doesn't always cooperate when I'm attempting to use several different colors in a small area.

If I reach a point where I'm not sure what to do next, I save my work to disk. I do this because, generally, I can only erase the last thing drawn. Once returned to the Command menu, the only way I can erase is with different sizes of the cursor pen, one pixel at a time. I occasionally take the liberty of adding a few tiny details to the hard copy with my ink pen, as an afterthought.

Another trick is to draw the fine details on a separate shape page, print them out, reduce them on the litho camera and paste the reduced copy onto the full-sized printout of a cartoon.

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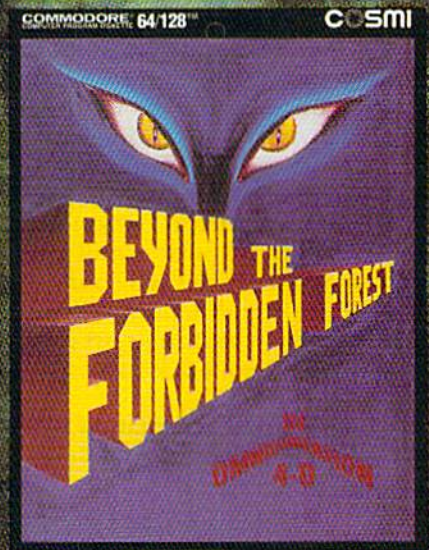
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Table 1. *Manufacturers mentioned in this article.*

Creating animation isn't any more complex than drawing a cartoon. Movie Maker includes a separate shape page and background page on which to draw. The shape page has some useful commands, such as zoom, duplicate, insert color, mirror, trade colors and text. All of the drawing and text functions work on both the shape and background pages.

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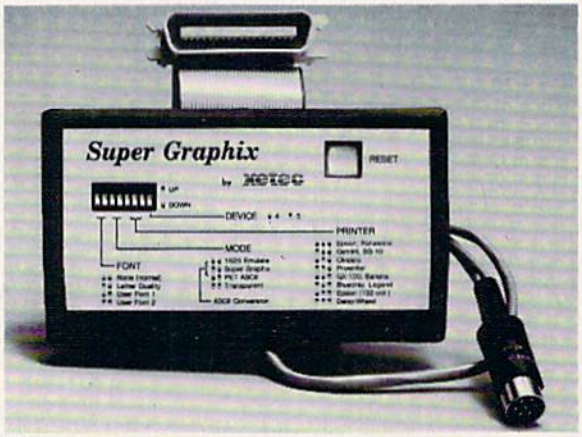
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I draw the shapes in several different positions and sequence them to be shown consecutively. I then record each track separately, until as many as six separate animation tracks are laid down. It's possible to record different characters on any given track so as to create a multi-character effect. I'm limited only by the size of the shape page and my imagination.

My computer is on for about ten to 12 hours a day. I used to worry that it would burn out from excessive use, but after eight months it's still going strong.

The Mind's the Limit

The limits to any creative process are mainly in the mind, and lack of vision is the biggest handicap to an artist or writer. The debate about computers and creativity will continue until everyone understands what the machines are and what they are for.

If you enjoy doing something, the chances are you'll do it often and get better at it. The creative process is not an accident. There are ways to enhance it—by creating a pleasant work environment, having a consistent time when you work, writing down ideas when they occur and eliminating distractions.

I see my C-64 as another tool for creating new art forms, just as the camera, airbrush and Rapidograph technical pens changed the way art is created in the 20th century.

The results of the computer's effect on our social structure may not be apparent until the next century, but its immediate effect on our art, architecture and design is visible already. Someday, electronic art galleries may be commonplace and accessible to all.

Ultimately, experimentation is the key to creating new art forms. It's the key to the future. R

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Commodore Power

The C-64 and VIC-20 are really proving their power in this electric generating plant.

By JOSEPH SHAUGHNESSY

The city of Fort Pierce is located by the Intracoastal Waterway and the Atlantic Ocean, about two-thirds of the way down the Florida coastline. It has an interesting blend of tourism, agriculture and high tech.

Scattered among the marinas, hotels, fruit processing plants and shopping malls, you can find satellite dish stores, electronics shops and the computer stores that are so much a part of the American scene these days. Except for the ever-present palm trees and refreshing sea breeze, this town could be mistaken for any small city in America. It's a nice place to visit, and a nice place to live.

Electric power for the town is provided by the Henry D. King electric generating plant, which is owned and operated by the Fort Pierce Utilities Authority. In the parlance of the electric industry, this type of plant is called a municipal. The plant superintendent is Fred Brock, and he is responsible for both administration and operation.

The view from Brock's office window shows a marina and the wide expanse of the Intracoastal Waterway. In front of the window is a table, and on it a Commodore 64 computer system. Interspersed throughout the plant are eight other C-64 systems. What is our trusty "home computer" doing in this setting?

Commodore 64s are used in this Fort Pierce power plant because they can do the work and have the lowest price tag, considering the performance required. The plant uses nine Commodore systems, which were purchased for about the same price as two or three of the rival systems.

How They're Being Used

The C-64s in this plant are mainly used with both word processors and spreadsheets for recording hundreds of in-plant meter readings and for generating summaries, calculations and reports of plant operations. These reports may be for daily, weekly, monthly or even yearly plant activities and operations.

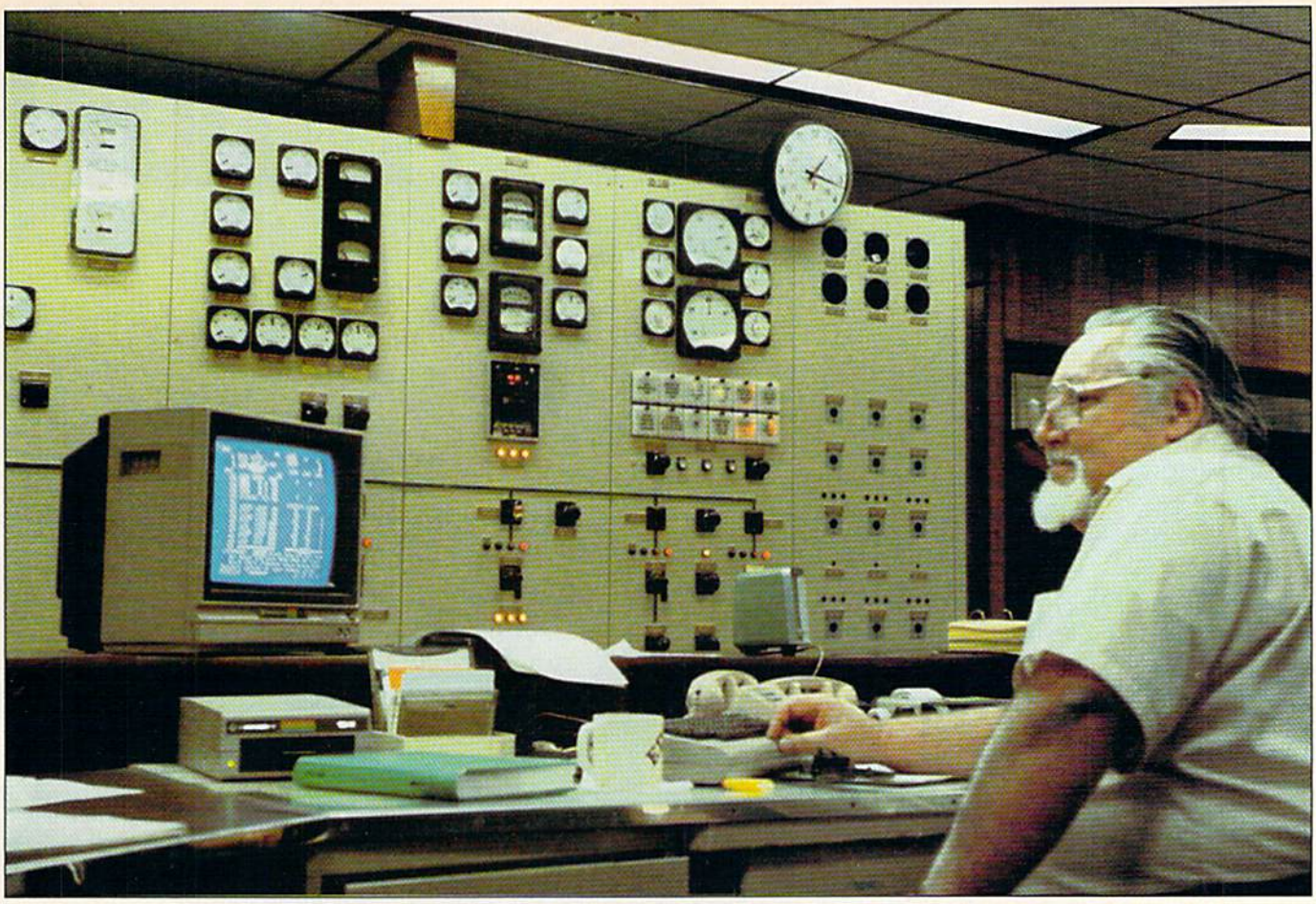
The computers are also used to monitor Fort Pierce's participation in the regional energy grid, an interconnected complex of many different power stations in Florida. The grid is really an exchange where utilities can buy or sell excess power.

Each plant's dispatch center must keep records, both for comparison with the grid's records and as a tool for evaluating different options for plant operation. Before the computers arrived, report forms were all filled out by hand, and projections and calculations were all done with calculators, a slow and error-prone process.

Now, the meter readings and other information are still gathered by hand, but they are entered into preformatted spreadsheet templates, and the calculations and projections are done automatically. This is all handled by the dispatchers and their Commodore 64s in the plant's dispatch center.

To give you some idea of the amount of paperwork being turned out, Brock handed me 20 separate spreadsheet outputs for various reports and records used by the plant, and he had more. In addition to the records, there were several "what if" analysis-type templates that the management and dispatchers use when making buy-and-sell decisions for power on the grid.

With all this support in the dis-



Dispatcher Ed Giannotti in the dispatch center of the Henry D. King electric generating plant.

patch center, the people in Fort Pierce can be assured that their power plant is always getting the best deal possible on electric power, which in the long term means lower rates for them.

Equipment and Software Used

The typical system consists of a Commodore 64, 1702 color monitor, one or two 1541 disk drives and an Epson printer. Some of the disk drives have the Skyles' 1541 Flash! installed. The most widely used spreadsheet in the plant is Multiplan; VizaStar was recently purchased and is being evaluated. The plant's principal database is Superbase64; the word processor, Speedscript. And I saw some notices posted that I'm sure came from The Print Shop.

Room for the VIC

The VIC-20 is still being used, and in a novel way. The plant's resident hacker, Kent Lawson, is using the VIC's I/O ports to read the gas company's meter and the plant's own Watt meter (using an LED pickup). Basically, this gives the operators the input and the output for two of the plant's generators. By using the appropriate formulas, they can then figure out the heat rate, a measure of fuel-using efficiency, for each generator.

The VIC-20 takes the data from the gas and Watt meters, performs the calculations and displays the output on six different monitors throughout the plant, including Brock's office and the fire room. The information is displayed in large custom characters and shows the heat rate, generator load and station service (electricity used by the plant itself) for two generators.

This monitor display is on continuously, and the information is updated every four seconds. By watching the monitor display to see whether or not the heat rate has improved, an operator can make a fuel or air-flow adjustment and see immediately if that was the right thing to do. He can then fine-tune the generator's performance at any level of capacity. Pretty impressive for a VIC-20!

Other Developments

Besides helping to run the power plant more effectively, the Commodore computers have taken Brock and some other plant personnel out into the community. Brock is the president and treasurer of the St. Lucie (county) User's Group (SLUG). The club started in the plant in March 1984, with about seven people. It was advertised twice in the local paper and now has 136 members. Meetings are held every other Wednesday at Indian River Community College.

The plant does have one IBM-PC in the dispatch center, but it is only used for telecommunications with the grid's mainframe computer. Does Brock see other IBMs in the future? Possibly, but if and when he decides to upgrade, he'll go with the manufacturer that offers the best performance for the price. For now, the Commodore 64s are doing the job just fine. R

Joseph J. Shaughnessy is an engineer with Reynolds, Smith & Hills, Inc. Address all author correspondence to him c/o that company, PO Box 4850, Jacksonville, FL 32201.

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64 Personal Ledger

By PAUL BEDDOWS

Keep a check on your cash flow with this easy-to-use home-finance program.

A program that keeps track of savings accounts or transactions involved with running a small business out of the home can be useful. And if you're the treasurer of a club or organization, it can take a lot of the drudgery out of the bookkeeping.

Balance Sheet (Listing 1) is such a program, and it lets you keep several years' records on a single disk; so if the IRS ever decides you deserve an audit, you should be in good shape.

Before typing in Listing 1, format a blank disk. Balance Sheet should be stored as the first and only program on the disk. It will then create sequential files on the same disk, in which your data will be stored.

The Balance Sheet program is somewhat lengthy, containing many graphics characters, so be especially careful when typing it in. Watch out for blank spaces, as they are quite important in some statements. I suggest you omit line 10 until the entire program has been typed in, run and tested. This statement disables the run/stop and restore keys.

After typing in the program, load and run it. You'll be prompted for a filename—a bank account number or any other filename of ten characters or less. Filenames of more than ten characters will be truncated.

Press the return key and another prompt will appear. If you're establishing a file for the first time, enter * and press the return key again. The main menu will appear. If the file already exists, press the return key without first entering *, and the file should load.

File length, by the way, has been set to 95 entries to shorten loading and saving times. You may change this value by altering the value of X in line 50. Since the program can carry over balances from one file to another, I have found 95 entries to be more than sufficient.

Menu Options

I will now go through the menu options one by one.

F4:Enter Information. There are four fields of data entry: Date, Item, Debit and Credit. The date must be entered in numerical format and mustn't be more than six characters long. An attempt to enter a non-numerical format will default the date to a "--" symbol. Entries of more than six characters will be truncated.

Dates must be entered using the format "year/month/day" or "month/day" in order for the chronological sorting feature to work. Days and months with one-digit numerical equivalents must be preceded by a 0. For example, April 3, 1986 should be entered as 860403 or 04/03.

Starting with the second entry, the previous entry's date is automatically displayed. This makes it easier to enter multiple entries for a single day. Either press the return key to confirm the date or type a new date over it. You may eliminate this feature by deleting D$(N-1) from line 520.

Following the date, you may enter into the Item field a brief description (28 characters maximum) of the entry or just leave it blank by pressing the return key. Don't use punctuation marks that are invalid in Input statements, such as commas or colons.

Next, fill in either the Debit or Credit fields, or both. Both default to 0 if nothing is entered. Don't use dollar signs, commas or negative numbers; the program keeps track of these. Amounts in excess of $100,000 will disrupt the Balance Sheet screen display, although the program will still operate on them.

Once all four data fields have been filled, the balance is automatically updated and displayed. At this point, you have the option of adding another entry, returning to the menu, reentering the last entry or erasing the last entry.

F1/←:Scan Forward/Reverse. Once a file contains entries, you may scan them forwards or backwards by holding down the F1 or the left-arrow key. When an individual entry is displayed, you may modify or erase it by using one of the options displayed at the bottom of the screen. Each time you

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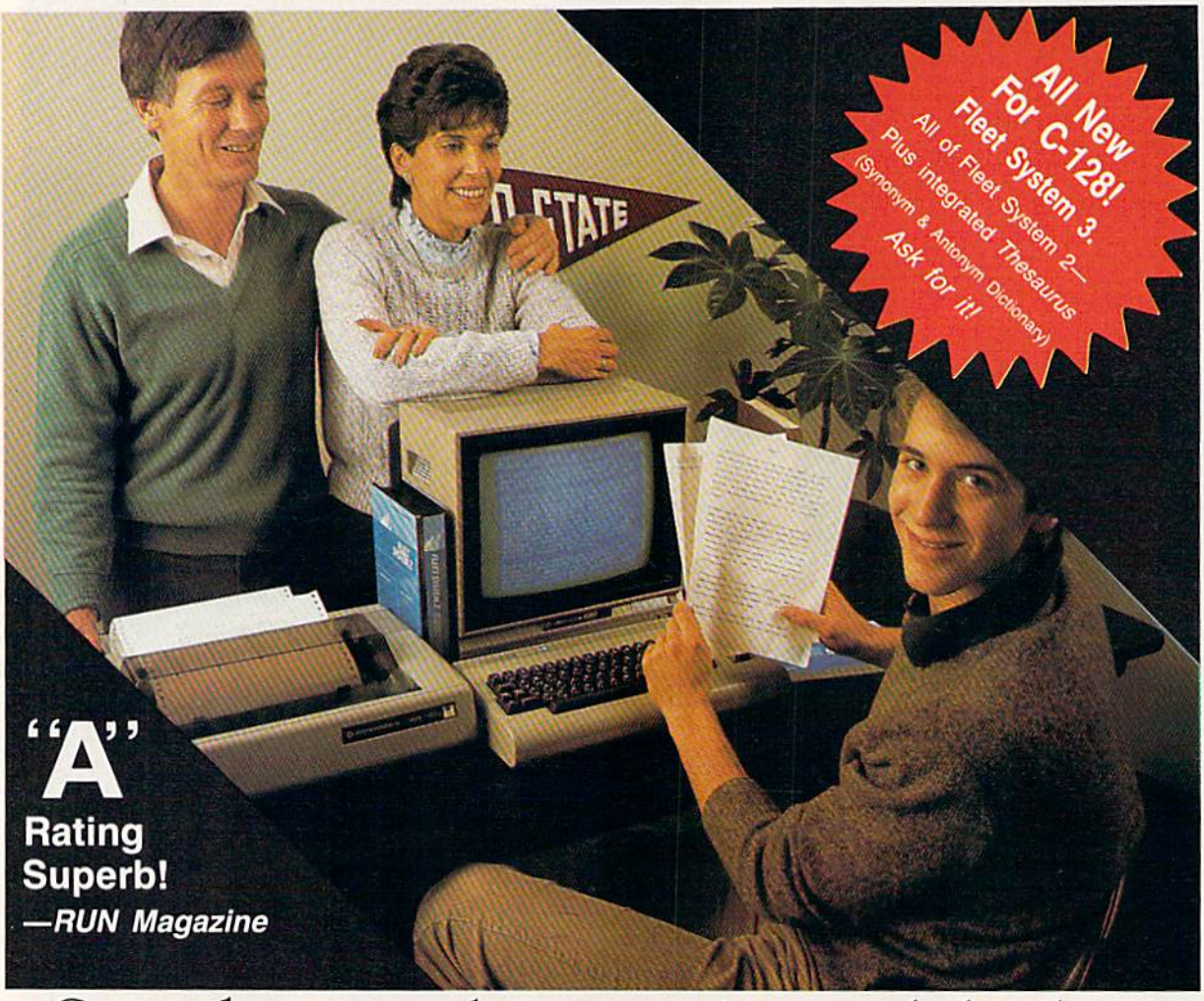
C-64; disk drive; printer optional



Illustration by Earl Keleny

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10	Disable run/stop and restore keys
20	Sets computer into Typewriter mode (upper- & lowercase)
30–100	Introductory screen
110–410	Main-menu screen
420–470	File-information area at bottom of menu screen
480–720	Enter information
730–980	Scan entries
990–1080	Load file from disk
1090–1230	Save file to disk
1240–1410	Change an entry
1420–1490	Erase an entry
1500–1890	Balance Sheet display
1900–2060	Column totals
2070–2160	Rename a file
2170–2250	Chronological sort
2260–2610	Reestablish a file
2620–2930	Print
2940	Calculate balance
9999	Soft reset

Table 1. *Line descriptions for Balance Sheet program.*

erase or change an entry, the balance is automatically recalculated through the subsequent entries.

F5/F6:Balance Sheet. This function displays the entries in column format, with the exception of the Item field, which couldn't be included because of the C-64's 40-column limitation. Pressing the F6 key takes you directly to the last page. You may access individual entries from this screen by pressing the R key, followed by the entry number.

You may also go directly into the Scan, Enter Information or Column Totals modes from the balance sheet display without first returning to the main menu.

Column Totals. Pressing the equals sign will add up the total debits and credits in a file.

S:Save. Following any additions, changes, deletions or chronological sorts, press the S key to resave the file to disk.

↑*:Rename File.* Press the ↑ key to alter the name of a file. You may also use this option to create a backup file under a different filename. To accomplish this, rename the file, but do not execute it to disk when prompted. Press the S key when the main menu reappears.

**:Select New File.* Pressing * clears the file in memory and returns you to the introductory screen.

C:Chronological Sort. After updating a file, you may sort the entries chronologically. This may take a while if a large number of entries is involved. The screen border will flash during the sorting process. Remember to resave to disk to make the change permanent.

P:Print. You may print out a file by pressing the P key. This option works with most printers. However, it won't function properly on printers lacking the tabulator function. The file can be printed partially or in its entirety.

A paging option is also provided for printers that recognize the "advance-to-top-of-form" command (CHR$(12)). The number of entries per page has been set at 56 in line 2880. This allows for a fair degree of error in positioning the paper. If you wish, you may increase this by four or

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five entries. Page 1 automatically has five fewer entries to allow space for the headings.

To accommodate non-Commodore printers and interfaces, you may have to make some alterations to the print routine. Commodore printers perform an automatic linefeed after printing a line, and the Print routine expects this. If your printer is overprinting lines, you'll have to add a linefeed after line 2910. For example:

```
2915 PRINT#,CHR$(10)
```

If the paging option won't work on your printer, try replacing line 2920 with:

```
2920 IF SP = 56 THEN FOR ZZ = 1 TO
     10:PRINT#4,CHR$(10):NEXT:SP = 0
```

With this substitution, your printer should do ten linefeeds at the bottom of each page. If it's doing 20, then your interface is adding an additional linefeed whenever it receives a linefeed command from the program. Solve this by changing "zz = 1to10" to "zz = 1to5".

%:Reestablish File. You use this function when a file is full or if you wish to eliminate the older entries. (The file must contain at least five entries for this function to work.) This is the most confusing and dangerous function of the program. I suggest you create a dummy file and try it out before using it with a real file.

This operation establishes a new file under the same filename as the old one, with the current balance carried forward along with the number of entries you select. If you wish to preserve the old file, you'll be prompted to enter a new filename for it, as the old name is being reused for the new file. (I usually use the old name, preceded by a "-".) Regardless of whether you choose to preserve or erase the old file, you'll be given the option to print a hard copy of it.

After the program loops through the Print routine, you'll be prompted to select the number of entries you wish carried forward into the new file. (Should you change your mind at this point, enter a number outside the given range, and you'll default back to the main menu.) The old file will be erased and replaced by the new one, with the balance forward showing as the first entry. The date on the balance forward will appear as "******" to ensure it always remains as the initial entry in the file, following any subsequent chronological sorts.

To keep the Balance Sheet program as short as possible, I didn't include any REM statements in it. See Table 1 for a breakdown of the program statements. R

Address all author correspondence to Paul Beddows, 1958 134A St., White Rock, BC, Canada V4A 6B6.

Listing 1. *Balance Sheet program.*

```
1Ø POKE8Ø8,234              :REM*248
2Ø PRINTCHR$(14):PRINTCHR$(8):PR
   INT"{SHFT CLR}":POKE5328Ø,11:
   POKE53281,11             :REM*1ØØ
3Ø PRINTTAB(8)"{CTRL 8}{12 CRSR
   DNs}** {SHFT P}RESS {SHFT R}E
   TURN **"                 :REM*19Ø
4Ø INPUT"{4 CRSR UPs}{9 CRSR RTs
   }{SHFT E}NTER {SHFT F}ILE {SH
   FT N}AME";R$:R$=LEFT$(R$,1Ø)
                            :REM*19Ø
5Ø X=96:R=2*X               :REM*198
6Ø DIMD$(R),I$(R),D(R),C(R),B(R)
   ,U(R),H(R):N=Ø           :REM*2ØØ
7Ø INPUT"{8 CRSR DNs}{SHFT I}F {
   SHFT E}STABLISHING {SHFT N}EW
    {SHFT F}ILE,{SHFT I}NSERT (*
   ){CRSR RT}";Y$           :REM*34
8Ø POKE5328Ø,6:POKE53281,15
                            :REM*142
9Ø IFY$="*"THEN11Ø          :REM*76
1ØØ IFY$=""THENGOSUB99Ø     :REM*4
11Ø POKE65Ø,Ø:POKE5328Ø,6:REM*88
12Ø POKE53281,15            :REM*2
13Ø PRINT"{SHFT CLR}{COMD 4}{CTR
   L 9}{SHFT B}ALANCE {SHFT S}H
   EET{CTRL Ø}"             :REM*36
14Ø PRINT"{CRSR RT}{CRSR DN}{SHF
   T F}1 {CTRL 3}{SHFT F}ORWARD
    {SHFT S}CAN{3 SPACEs}{COMD
   4}{LEFT ARROW}{CTRL 3} {SHFT
    R}EVERSE {SHFT S}CAN":REM*6
15Ø PRINT"{CRSR RT}{COMD 4}{SHFT
    F}4 {CTRL 3}{SHFT E}NTER {S
   HFT I}NFORMATION"        :REM*138
16Ø PRINT"{CRSR RT}{COMD 4}{SHFT
    F}5 {CTRL 3}{SHFT B}ALANCE
   {SHFT S}HEET"            :REM*244
17Ø PRINT"{CRSR RT}{COMD 4}{SHFT
    F}6 {CTRL 3}{SHFT L}AST {SH
   FT P}AGE"                :REM*114
18Ø PRINT"{CRSR RT}{COMD 4}{2 CR
   SR DNs}={2 SPACEs}{CTRL 3}{S
   HFT T}OTAL {SHFT D}EBITS/{SH
   FT C}REDITS"             :REM*22Ø
19Ø PRINT"{CRSR RT}{COMD 4}{CRSR
    DN}*{2 SPACEs}{CTRL 3}{SHFT
    S}ELECT {SHFT N}EW {SHFT F}
   ILE"                     :REM*188
2ØØ PRINT"{CRSR RT}{COMD 4}{UP A
   RROW}{2 SPACEs}{CTRL 3}{SHFT
    R}ENAME {SHFT F}ILE":REM*74
21Ø PRINT"{CRSR RT}{COMD 4}%{2 S
   PACEs}{CTRL 3}{SHFT R}E-{SHF
   T E}STABLISH {SHFT F}ILE"
                            :REM*182
22Ø PRINT"{CRSR RT}{COMD 4}{CRSR
    DN}{SHFT S}{2 SPACEs}{CTRL
   3}{SHFT S}AVE"           :REM*246
23Ø PRINT"{CRSR RT}{COMD 4}{SHFT
    C}{2 SPACEs}{CTRL 3}{SHFT C
   }HRONOLOGICAL {SHFT S}ORT"
                            :REM*1Ø6
24Ø PRINT"{CRSR RT}{COMD 4}{SHFT
    P}{2 SPACEs}{CTRL 3}{SHFT P
   }RINT"                   :REM*36
25Ø PRINT"{CRSR RT}{COMD 4}+{2 S
   PACEs}{CTRL 3}{SHFT E}XIT"
                            :REM*232
26Ø GOSUB42Ø                 :REM*7
27Ø GETA$:IFA$=""THEN27Ø:REM*117
28Ø IFA$="{FUNCT 1}"THENAB=1:GOT
   O73Ø                     :REM*191
29Ø IFA$="{LEFT ARROW}"THENAB=N:
   GOTO73Ø                  :REM*91
3ØØ IFA$="{FUNCT 4}"THEN48Ø
                            :REM*211
31Ø IFA$="S"THENGOSUB1Ø9Ø
                            :REM*163
32Ø IFA$="{FUNCT 6}"THEN182Ø
                            :REM*129
33Ø IFA$="{FUNCT 5}"THEN15ØØ
                            :REM*81
34Ø IFA$="="THEN19ØØ        :REM*85
35Ø IFA$="*"THEN CLR:GOTO2Ø
                            :REM*1Ø9
36Ø IFA$="{UP ARROW}"THEN2Ø7Ø
                            :REM*39
37Ø IFA$="C"THENGOSUB217Ø
                            :REM*173
38Ø IFA$="%"THEN226Ø        :REM*157
39Ø IFA$="P"THENGOSUB262Ø
                            :REM*247
4ØØ IFA$="+"THEN9999        :REM*91
41Ø GOTO11Ø                 :REM*1Ø1
42Ø PRINT"{COMD 4}{CRSR DN}-----
   ------------------------
   -------"                 :REM*65
43Ø PRINT"{CRSR RT}{SHFT F}ILE:{
   CTRL 5} ";R$             :REM*167
44Ø PRINTTAB(21)"{COMD 4}{CRSR U
   P}{SHFT E}NTRIES:{CTRL 5}";N
                            :REM*119
45Ø PRINT"{COMD 4}{CRSR DN}{CRSR
    RT}{SHFT B}ALANCE:{CTRL 5}"
   ;B(N)                    :REM*121
46Ø IFD$(N)>"A"THEND$(N)="--"
                            :REM*55
47Ø PRINTTAB(21)"{COMD 4}{CRSR U
   P}{SHFT L}AST {SHFT D}ATE: {
   CTRL 5}";D$(N):RETURN
                            :REM*2Ø7
48Ø POKE5328Ø,6:IFN=X-1THEN72Ø
                            :REM*127
49Ø PRINT"{SHFT CLR}{CTRL 9}{COM
   D 4}{SHFT D}ATA{SHFT SPACE}{
   SHFT E}NTRY"             :REM*33
5ØØ N=N+1:PRINT"{SHFT CLR}{CTRL
   9}{SHFT E}NTER {SHFT I}NFORM
   ATION{CTRL Ø}"           :REM*255
51Ø PRINT"{CRSR DN}{SHFT E}NTRY{
   SHFT SPACE}#";N          :REM*189
52Ø PRINT"{2 CRSR DNs}{CTRL 7}{S
   HFT D}ATE{2 SPACEs}";D$(N-1)
                            :REM*94
53Ø PRINT"{SHFT I}TEM":PRINT"{SH
   FT D}EBIT":PRINT"{SHFT C}RED
   IT":B(N)=D(N)+C(N):B(N)=B(N)
   +B(N-1)                  :REM*162
54Ø PRINT"{2 CRSR DNs}{SHFT B}AL
   ANCE {SHFT I}S:{CTRL 3} ";B(
   N):PRINT"{HOME}{4 CRSR DNs}"
                            :REM*11Ø
55Ø INPUT"{4 CRSR RTs}";D$(N):IF
   D$(N)>="A"ORD$(N)=""THEND$(N
   )="--"                   :REM*68
56Ø D$(N)=LEFT$(D$(N),6):REM*214
57Ø INPUT"{4 CRSR RTs}";I$(N):IF
   I$(N)=""THENI$(N)="--"
                            :REM*232
58Ø I$(N)=LEFT$(I$(N),28)
```

Continued on p. 106.

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HIGH-RESOLUTION REVOLUTION

By HENRIK MARKARIAN

Draw circles around those pesky Pokes and Peeks with this handy C-64 hi-res application.

High-resolution color graphics is one of the C-64's main features, yet C-64 Basic doesn't provide any commands to let you easily take advantage of it. For example, there is no command to clear the high-resolution screen. Instead, you must Poke 8000 memory locations with zeros; in Basic, this takes about 30 seconds. Plotting a single point requires a lot of computation and time.

The accompanying program, 64/Grafix (Listing 1), augments 64 Basic with eight commands that make it easy for you to draw high-resolution pictures.

The 64/Grafix program is written entirely in machine language, although it is in the form of a Basic loader. Be very careful when typing in the data, because a single mistake could halt program execution. Once you've typed in the program, be sure to save it before running it.

64/Grafix Commands

You must precede each command with an exclamation point to let the 64 Basic interpreter know that it is a special command. If the commands follow an If...Then statement, you must precede them with a colon, too, or an error will occur.

!SC,n—This command turns the high-resolution screen on or off, depending on the value of n. If n = 0, then the high-resolution screen is turned off, and the regular text screen displayed. If n = 1, the high-resolution screen is turned on but not cleared. Setting n = 2 will turn on the high-resolution screen and clear it.

!PN,n—This command turns the pen on or off, depending on the value of n. If n = 0, then the pen will be off, and points (pixels) will be erased; if n = 1, the pen will be on, and points (pixels) will be plotted.

!CO,n—This command colors in a background and foreground color on the entire graphics screen. The parameter n must be within the range of 0–255, and it is determined by the following formula:

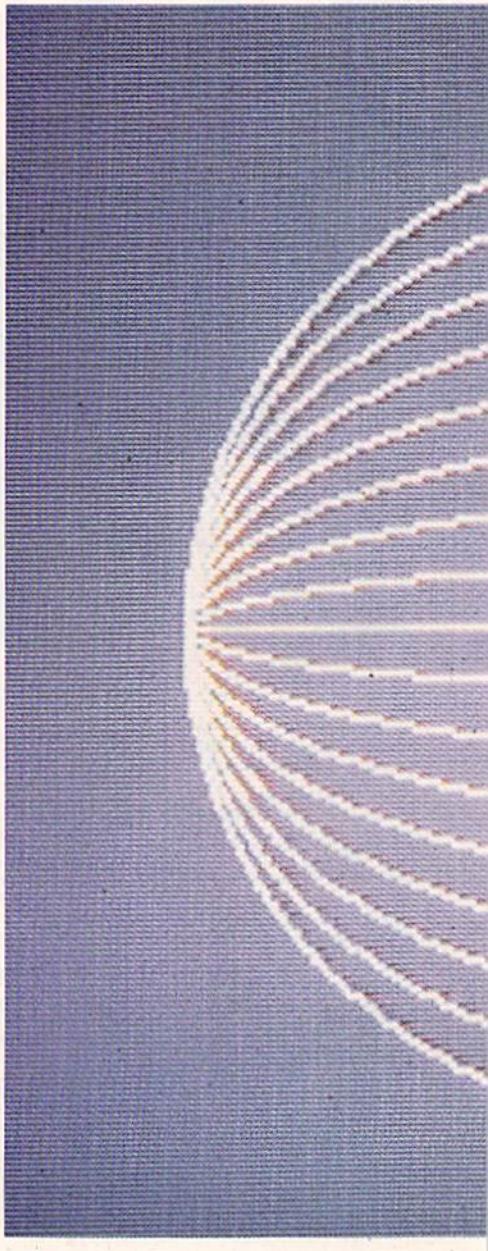
n = (background color) + (foreground color)*16

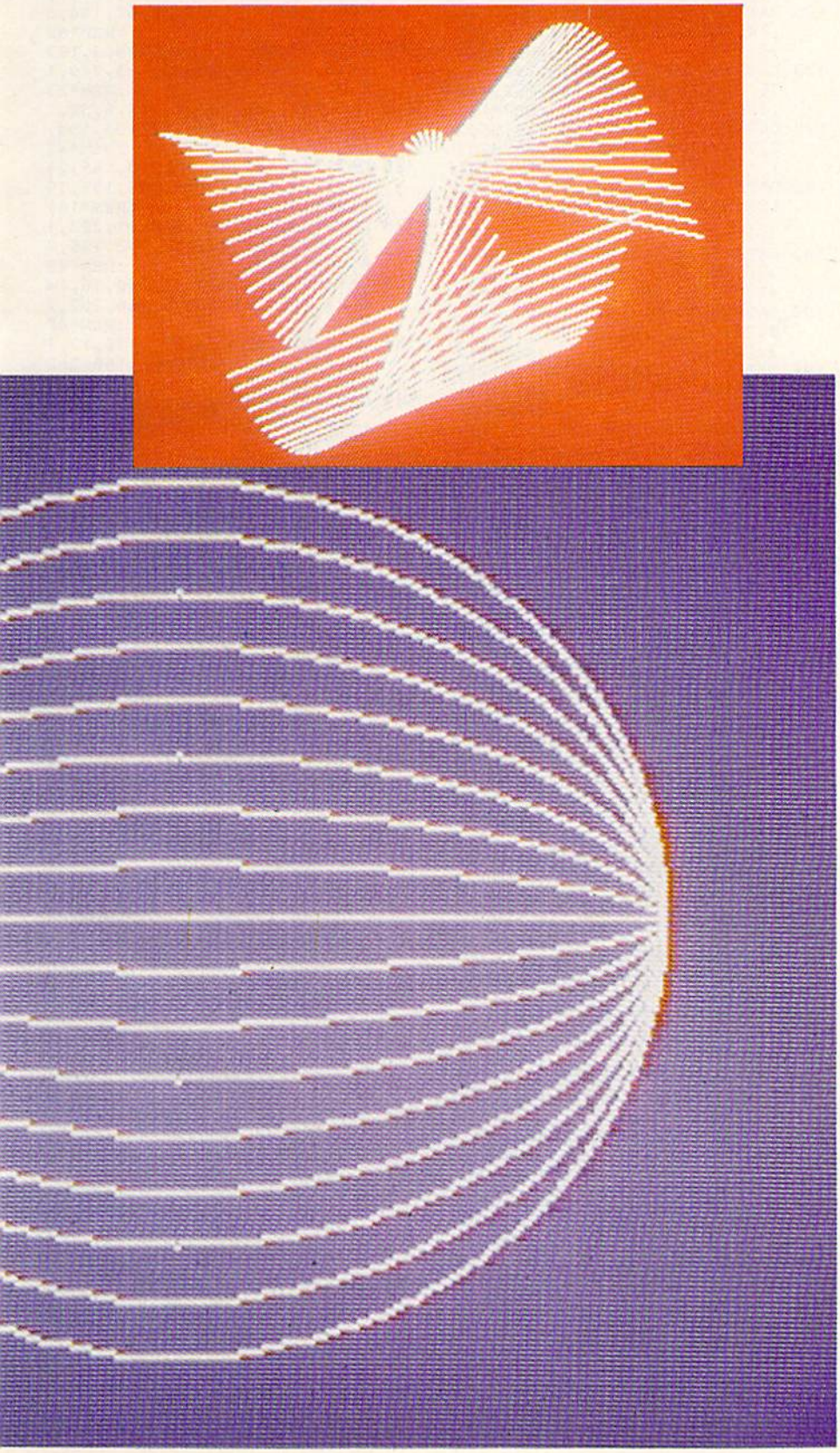
For example, if you wanted the background red and the foreground blue, n would have to equal 2 + 6*16, or 98.

!BL,b,n—The Block command lets you choose the background and foreground color for any 8 × 8 block on the graphics screen. The screen is divided into 1000 blocks, which are numbered from 0 to 999, starting at the top left-hand corner and moving right. The first parameter in this command is the block number (b), and it is determined in the following fashion:

b = (column) + (row)*40

Of course, on the C-64 there are 25 rows and 40 columns. The second parameter for this command (n) sets the





background and foreground colors for the specified block, using the same form as the previous command.

!PL,x,y—This command plots a point at the coordinates x and y, or erases a point at the same coordinates. It all depends whether the pen is on or off (see the !PN,n command). The parameters x and y are offset from the top left corner of the screen and have a range of 0–319 for x and 0–199 for y.

!DR,x_1,y_1,x_2,y_2—This command draws a line from point x_1,y_1 to the point x_2,y_2. As before, the line is plotted or erased depending on whether the pen is on or off.

!CR,x,y,r—This command draws an oval, given the center coordinates x,y and the radius r. The radius must be within the range of 0–255, although, as you'll see in most cases, the largest possible radius will be around 110–130. To make this command more versatile, you may multiply the vertical distance by a fraction, allowing you to draw anything from a wide short oval to a tall narrow one. The following two memory locations are used to input the numerator and denominator for the fraction (N/D):

```
POKE 50243,N
POKE 50251,D
```

The program at this point assigns N/D = $^9/_{11}$. I arrived at this fraction by measuring a few pixels parallel to the x-axis and the same number of pixels parallel to the y-axis. From these measurements, I calculated that the length of nine pixels in the horizontal direction is equal to the length of

11 pixels vertically. Thus, multiplying a given vertical distance by 9/11 will make the ovals appear more like true circles than ellipses.

!EX—This command exits 64/Grafix from the command-processing loop. You can reactivate the program with SYS 49152.

For Your Information

The 64/Grafix program resides in the 4K of RAM from $C000 to $C4D0. The area from $C800 to $CBFF is used as the color screen, and the RAM under the operating system ROM from $E000 to $FFFF is used for the graphics screen. 64/Grafix takes no memory space away from Basic; the area from $0800 to $9FFF remains completely free for Basic programs.

I've included two demo programs to help you further understand and use the 64/Grafix commands. The first demo program (Listing 2) draws several figures on the screen and then waits for a keypress. If you want to exit the program, press F1; otherwise, press any other key to continue.

The second demo (Listing 3) is a joystick-controlled (port #2) drawing program. F1 clears the screen and sets the background and foreground colors; F3 clears the screen; F5 exits the program. R

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Listing 1. *64/Grafix program.*

```
100 PRINT"{SHFT CLR}{4 CRSR DNs}
    !SC,N TYPE OF SCREEN":PRINT"
    !CO,C FOREGROUND & BACKGROUN
    D COLOR"                  :REM*96
105 PRINT"!BL,BLOCK#,COLOR":PRIN
    T"!PN,N (0) PEN OFF; (1) PEN
     ON"                      :REM*1
110 PRINT"!PL,X,Y PLOT A POINT":
    PRINT"!DR,X1,Y1,X2,Y2 CONNEC
    T X1,Y1 TO X2,Y2"    :REM*220
115 PRINT"!CR,X,Y,R DRAW A CIRCL
    E AT X,Y":PRINT"!EX EXIT 64/
    GRAFIX"                   :REM*131
120 PRINT"{HOME}{10 CRSR RTs}{CT
    RL 9}64/GRAFIX IS LOADING";
                              :REM*92
125 FORAD=49152TO50367:READD:POK
    EAD,D:CS=CS+D:NEXT   :REM*123
130 IFCS<>152874THENPRINT"{SHFT
    CLR}{2 CRSR DNs}{CTRL 9}ERRO
    R{CTRL 0} IN THE DATA STATEM
    ENTS":STOP                :REM*120
135 SYS49152:PRINT"{7 CRSR LFs}E
    NGAGED{CTRL 0}":END :REM*169
140 DATA169,11,160,192,141,8,3,1
    40,9,3,96,160,1,177,122,201,
    33                        :REM*166
145 DATA240,3,76,228,167,32,115,
    0,162,7,32,115,0,133,253,32,
    115                       :REM*221
150 DATA0,69,253,221,166,196,240
    ,8,202,16,248,162,11,76,222,
    192,189                   :REM*182
155 DATA174,196,141,66,192,189,1
    82,196,141,67,192,32,115,0,3
    2,113,192                 :REM*23
160 DATA76,174,167,32,253,174,32
    ,158,183,96,32,253,174,32,23
    5,183,165                 :REM*98
165 DATA20,164,21,96,224,200,176
    ,14,166,252,224,1,144,13,208
    ,6,166                    :REM*201
170 DATA251,224,64,144,5,162,14,
    76,216,192,96,32,190,192,169
    ,228,160                  :REM*122
175 DATA167,141,8,3,140,9,3,96,3
    2,71,192,142,190,196,96,32,7
    1                         :REM*141
180 DATA192,224,1,144,49,240,21,
    169,224,133,254,169,0,133,25
    3,162,32                  :REM*2
185 DATA168,145,253,200,208,251,
    230,254,202,208,246,169,59,1
    41,17,208,169             :REM*41
190 DATA40,141,24,208,169,0,141,
    0,221,169,216,141,0,3,169,19
    2,141                     :REM*112
195 DATA1,3,96,169,27,141,17,208
    ,169,21,141,24,208,169,3,141
    ,0                        :REM*201
200 DATA221,169,139,141,0,3,169,
    227,141,1,3,96,32,190,192,10
    8,0                       :REM*222
205 DATA3,32,71,192,169,200,133,
    254,169,0,133,253,168,138,16
    2,4,145                   :REM*159
210 DATA253,200,208,251,230,254,
    202,208,246,96,32,78,192,134
    ,250,133,251              :REM*18
215 DATA132,252,32,89,192,165,25
    0,41,248,168,133,253,169,0,1
    33,254,6                  :REM*225
220 DATA253,38,254,6,253,38,254,
    152,24,101,253,133,253,165,2
    54,105,0                  :REM*38
225 DATA133,254,6,253,38,254,6,2
    53,38,254,6,253,38,254,165,2
    50,41                     :REM*59
230 DATA7,24,101,253,133,253,165
    ,254,105,0,133,254,165,251,4
    1,248,24                  :REM*82
235 DATA101,253,133,253,165,252,
    101,254,133,254,169,0,24,101
    ,253,133,253              :REM*127
240 DATA169,224,101,254,133,254,
    165,251,41,7,73,7,170,169,1,
    202,48                    :REM*228
245 DATA3,10,208,250,160,0,162,5
    2,120,134,1,174,190,196,224,
    1,176                     :REM*135
250 DATA6,73,255,49,253,144,2,17
    ,253,145,253,162,55,134,1,88
    ,96                       :REM*50
255 DATA32,78,192,134,250,133,25
    1,132,252,32,78,192,134,253,
    133,254,132               :REM*75
260 DATA255,160,0,132,3,56,165,2
    53,229,250,133,2,162,1,134,2
    47,176                    :REM*231
265 DATA10,73,255,105,1,133,2,23
    0,247,144,8,201,0,208,4,162,
    0                         :REM*200
270 DATA134,247,56,165,254,229,2
    51,133,4,165,255,229,252,133
    ,5,162,1                  :REM*129
275 DATA134,6,176,22,73,255,133,
    5,165,4,73,255,105,1,133,4,1
    65                        :REM*242
280 DATA5,105,0,133,5,230,6,144,
    12,166,4,208,8,166,5,208,4
                              :REM*209
285 DATA162,0,134,6,165,5,208,17
    ,165,4,197,2,176,11,166,2,13
    3                         :REM*128
290 DATA2,134,4,142,191,196,144,
    5,162,0,142,191,196,166,4,16
    4,5                       :REM*201
295 DATA142,192,196,140,193,196,
    6,2,38,3,56,165,2,229,4,133,
    248                       :REM*166
300 DATA165,3,229,5,133,249,8,6,
    4,38,5,166,250,32,1,193,40
                              :REM*197
305 DATA48,31,173,191,196,201,1,
    176,6,32,171,194,76,67,194,3
    2,135                     :REM*62
310 DATA194,56,165,248,229,4,133
    ,248,165,249,229,5,133,249,1
    6,225,173                 :REM*23
315 DATA191,196,201,1,144,6,32,1
    71,194,76,98,194,32,135,194,
    24,165                    :REM*42
320 DATA248,101,2,133,248,165,24
    9,101,3,133,249,8,174,192,19
    6,208,9                   :REM*161
325 DATA174,193,196,240,11,202,1
    42,193,196,202,142,192,196,7
    6,43,194,40               :REM*48
330 DATA96,165,6,201,1,240,16,14
    4,27,166,251,208,5,166,252,2
    02,134                    :REM*47
335 DATA252,202,134,251,176,13,1
    66,251,232,138,208,5,166,252
    ,232,134,252              :REM*236
340 DATA133,251,96,165,247,201,1
    ,240,6,144,6,198,250,176,2,2
    30,250                    :REM*255
345 DATA96,32,78,192,141,194,196
    ,140,195,196,142,196,196,32,
    71,192,134                :REM*176
350 DATA255,169,0,133,247,165,25
    5,133,6,169,0,133,3,133,4,13
    3,5                       :REM*93
355 DATA56,169,1,229,6,10,133,2,
    8,32,224,195,166,250,32,1,19
    3                         :REM*176
360 DATA165,6,208,3,76,209,195,1
    62,4,181,2,157,197,196,202,1
    6,248                     :REM*37
365 DATA14,197,196,46,198,196,14
    ,199,196,46,200,196,14,201,1
    96,40,240                 :REM*12
370 DATA108,16,35,24,173,197,196
    ,109,201,196,133,248,173,198
    ,196,105,0                :REM*27
375 DATA133,249,56,165,248,233,1
    ,133,248,165,249,233,0,133,2
    49,48,40                  :REM*124
380 DATA240,38,16,71,56,173,197,
    196,237,199,196,133,248,173,
    198,196,237               :REM*23
385 DATA200,196,133,249,56,165,2
    48,233,1,133,248,165,249,233
    ,0,133,249                :REM*222
390 DATA48,39,240,37,16,87,32,10
    6,196,24,165,2,109,199,196,1
    33,2                      :REM*239
395 DATA165,3,109,200,196,133,3,
    24,165,2,105,1,133,2,165,3,1
    05                        :REM*50
400 DATA0,133,3,8,76,228,194,32,
    106,196,32,134,196,24,165,2,
    109                       :REM*191
405 DATA199,196,133,2,165,3,109,
    200,196,133,3,56,165,2,237,2
    01,196                    :REM*208
410 DATA133,2,165,3,233,0,133,3,
    24,165,2,105,2,133,2,165,3
                              :REM*243
415 DATA105,0,133,3,8,76,228,194
    ,32,134,196,56,165,2,237,201
    ,196                      :REM*212
420 DATA133,2,165,3,233,0,133,3,
    24,165,2,105,1,133,2,165,3
                              :REM*253
```

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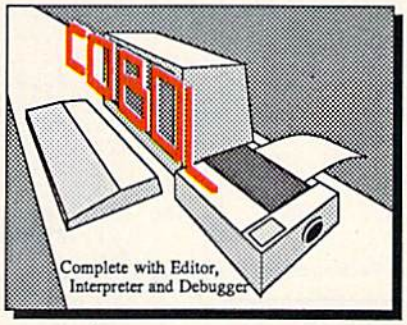
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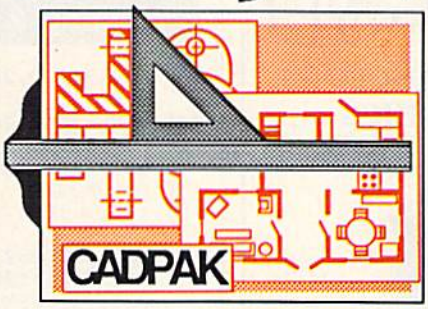
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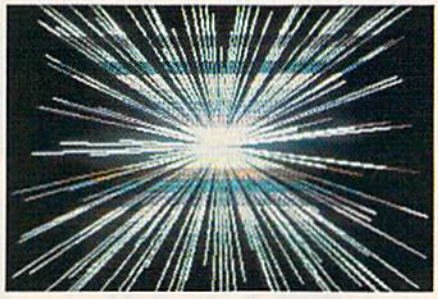
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Listing 1 continued.

```
425 DATA1Ø5,Ø,133,3,8,76,228,194
    ,166,247,224,3,24Ø,7,232,134
    ,247                    :REM*17Ø
43Ø DATA4Ø,76,2Ø7,194,4Ø,96,166,
    247,224,1,24Ø,9,176,14,32,8,
    196                     :REM*2Ø3
435 DATA32,4Ø,196,96,32,24,196,3
    2,4Ø,196,96,224,3,24Ø,7,32,8
                            :REM*2Ø4
44Ø DATA196,32,53,196,96,32,24,1
    96,32,53,196,96,24,173,194,1
    96,1Ø1                  :REM*239
445 DATA4,133,251,173,195,196,1Ø
    1,5,133,252,96,56,173,194,19
    6,229,4                 :REM*158
45Ø DATA133,251,173,195,196,229,
    5,133,252,96,32,66,196,24,17
    3,196,196               :REM*35
455 DATA1Ø9,2Ø2,196,133,25Ø,96,3
    2,66,196,56,173,196,196,237,
    2Ø2,196,133             :REM*116
46Ø DATA25Ø,96,16Ø,9,32,162,179,
    32,12,188,16Ø,11,32,162,179,
    165,97                  :REM*183
465 DATA32,18,187,32,12,188,164,
    6,32,162,179,165,97,32,43,18
    6,32                    :REM*194
47Ø DATA155,188,165,1Ø1,141,2Ø2,
    196,96,24,165,4,1Ø5,1,133,4,
    165,5                   :REM*199
475 DATA1Ø5,Ø,133,5,141,2ØØ,196,
    166,4,142,199,196,14,199,196
    ,46,2ØØ                 :REM*16Ø
48Ø DATA196,96,56,165,6,233,1,13
    3,6,1Ø,141,2Ø1,196,96,32,78,
    192                     :REM*233
485 DATA16Ø,Ø,24,1Ø5,Ø,133,2,165
    ,21,1Ø5,2ØØ,133,3,138,145,2,
    96                      :REM*124
49Ø DATA29,3Ø,16,12,28,22,17,14,
    113,127,134,222,248,135,186,
    146,192                 :REM*117
495 DATA192,192,192,192,193,194,
    196,Ø,Ø                 :REM*184
```

Listing 2. *Demo 1 program.*

```
1ØØ !SC,2:!CO,2Ø8:!PN,1:POKE5328
    Ø,Ø                     :REM*128
1Ø5 FORX=ØTO319STEP5:!DR,X,1ØØ-C
    OS(X/5Ø)*6Ø,319-X,1ØØ+COS(X/
    5Ø)*1ØØ:NEXT            :REM*51
11Ø GOSUB23Ø                :REM*112
115 !SC,2:!CO,18:POKE5328Ø,2
                            :REM*239
12Ø FORX=ØTO28ØSTEP4:!DR,X,1ØØ+S
    IN(X/5Ø)*1ØØ,319-X,1ØØ+COS(X
    /25)*5Ø:NEXT            :REM*1Ø6
125 GOSUB23Ø                :REM*127
13Ø !SC,2:!CO,97:POKE5328Ø,1
                            :REM*28
135 FORX=ØTO315STEP4:!DR,X,1ØØ+S
    IN(X/5Ø)*4Ø,319-X,1ØØ+SIN(X/
    5Ø)*1ØØ:NEXT            :REM*143
14Ø GOSUB23Ø                :REM*142
145 !SC,2:!CO,16:POKE5328Ø,Ø
                            :REM*75
15Ø FORI=ØTO319STEP2:!DR,16Ø,1ØØ
    ,I,1ØØ+COS(I)*1ØØ:NEXT
                            :REM*7Ø
155 GOSUB23Ø                :REM*157
16Ø FORI=ØTO24               :REM*154
165 C=INT(RND(Ø)*16)*16:IFC=ØTHE
    N165                    :REM*255
17Ø FORJ=ØTO4Ø:!BL,J+I*4Ø,C:NEXT
    :NEXT                   :REM*2Ø
175 GOSUB23Ø                :REM*177
18Ø !SC,2:!CO,219:POKE5328Ø,11
                            :REM*244
185 FORI=ØTO315STEP4:!DR,I,13Ø+A
    BS(SIN(I/5Ø)*5Ø),319-I,9+ABS
    (SIN(I/5Ø)*5Ø):NEXT     :REM*171
19Ø GOSUB23Ø                :REM*192
195 !SC,2:!CO,114:POKE5328Ø,2
                            :REM*3
2ØØ POKE5Ø251,11:FORN=ØTO8:POKE5
    Ø243,N:!CR,16Ø,1ØØ,122:NEXT
                            :REM*146
2Ø5 GOSUB23Ø                :REM*2Ø7
21Ø !SC,2:!CO,11Ø:POKE5328Ø,14
                            :REM*194
215 FORI=ØTO315STEP4        :REM*1
216 !DR,319-I,1ØØ-ABS(SIN(I/5Ø)*
    1ØØ),I,1ØØ+ABS(SIN(I/5Ø)*1ØØ
    ):NEXT                  :REM*174
22Ø GOSUB23Ø                :REM*222
225 !SC,Ø:POKE5328Ø,14:END
                            :REM*27
23Ø GETA$:IFA$=""THEN23Ø    :REM*74
235 IFA$="{FUNCT 1}"THEN225
                            :REM*37
24Ø RETURN                  :REM*42
```



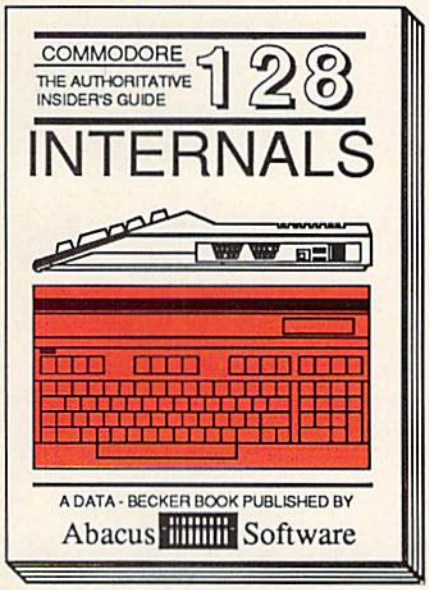
Listing 3. *Demo 2 program.*

```
1ØØ V=53248:FORI=ØTO63:READD:POK
    E5Ø432+I,D:NEXT:GOSUB165
                            :REM*2Ø6
1Ø5 GETA$:IFA$="{FUNCT 1}"THENGO
    SUB165                  :REM*245
11Ø IFA$="{FUNCT 3}"THENGOSUB175
                            :REM*86
115 IFA$="{FUNCT 5}"THEN185
                            :REM*219
12Ø J=PEEK(5632Ø)           :REM*118
125 IF(JAND16)=ØTHEN:!PN,Ø
                            :REM*13
13Ø DX=SGN(JAND4)-SGN(JAND8):DY=
    SGN(JAND1)-SGN(JAND2):X=X+DX
    :Y=Y+DY                 :REM*14
135 IFX<ØTHENX=319           :REM*117
14Ø IFX>319THENX=Ø           :REM*138
145 IFY<ØTHENY=199           :REM*35
15Ø IFY>199THENY=Ø           :REM*96
155 X1=X+13:Y1=Y+4Ø:S=(X1>255):P
    OKEV,X1+S*256:POKEV+16,-1*S:
    POKEV+1,Y1              :REM*13
16Ø !PL,X,Y:!PN,1:GOTO1Ø5:REM*26
165 !SC,Ø:POKEV+21,Ø         :REM*2Ø5
17Ø PRINT"{SHFT CLR}{CRSR DN}ENT
    ER BACKGROUND AND FOREGROUND
     COLORS":INPUTB,F:B=BAND15:F
    =FAND15                 :REM*Ø
175 X=16Ø:Y=1ØØ:POKEV+39,F:POKEV
    ,X+13:POKEV+1,Y+4Ø:POKEV+21,
    1                       :REM*7
18Ø !SC,2:!CO,B+F*16:POKE52216,2
    Ø:!PN,1:RETURN          :REM*166
185 !SC,Ø:PRINT"{SHFT CLR}":POKE
    V+21,Ø:END              :REM*245
19Ø DATAØ,126,Ø,1,129,128,6,Ø,96
    ,8,Ø,16,16,Ø,8,32,Ø,4,64,Ø,2
    ,64                     :REM*2Ø8
195 DATAØ,2,128,Ø,1,128,Ø,1,128,
    16,1,128,Ø,1,128,Ø,1,64,Ø,2,
    64,Ø                    :REM*187
2ØØ DATA2,32,Ø,4,16,Ø,8,8,Ø,16,6
    ,Ø,96,1,129,128,Ø,126,Ø,13
                            :REM*54
```

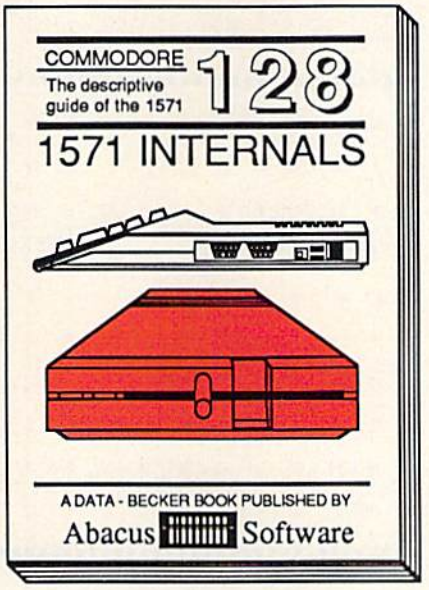
end R

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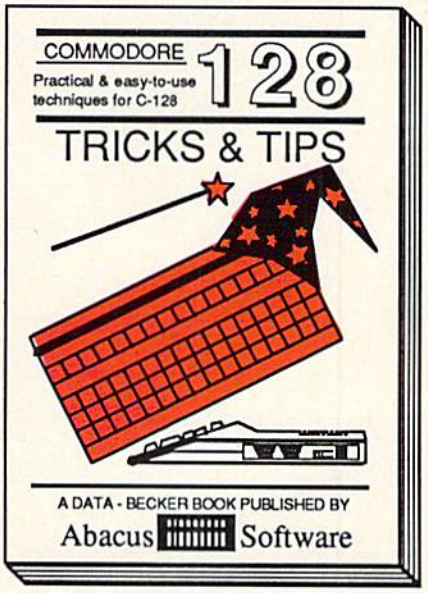
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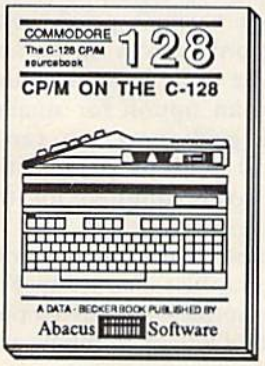


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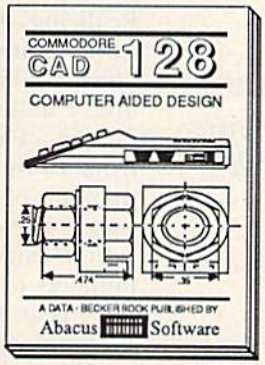


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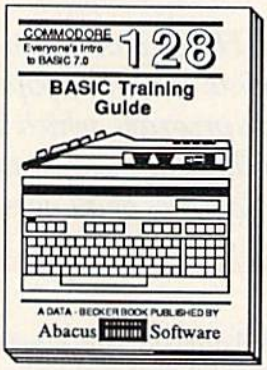
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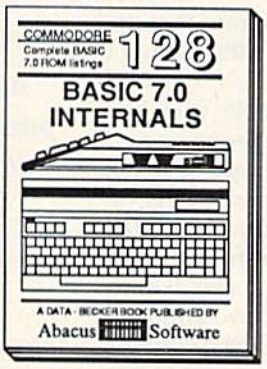
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By GERALD CARON

Here's a versatile update of RUN*'s popular puzzle program, which is sure to challenge word-search fanatics of all ages.*

Find the Word 3.0 is a revision of my Find the Word program that appeared in the October 1984 issue of *RUN*. After it appeared, I received many letters from people who had been looking for such a program, and many fellow teachers wrote to thank me for my efforts. Some writers offered suggestions; others wished the program had additional functions.

One of the most requested functions was the ability to save and load puzzles to avoid having to type all the words in again. I have provided this by using sequential files. With this feature, the puzzle also prints out immediately after loading, and there's no waiting for set-up or placements.

I have added disk error trapping, as well, to help prevent crashes, and now include a .WS in the name of the puzzle file so you can spot it more easily in the directory. You don't have to add the .WS when you load a puzzle because the program does it automatically.

The routines for these procedures are located after line 1000 in the program listing. They store the grid and the word direction and puzzle size options that I'll discuss shortly.

Another feature I've added is an option to have the same words in a different grid. If you ask for a new grid, all the arrays except the word array have to be reinitialized. This is taken care of starting at line 1200. Now you can use the same words over and over, but get entirely different puzzles.

A word-direction option was something I wanted to add after a teacher at my school told me the reversed and slanted words were too difficult for younger children. Then I received a letter from a reader who had added that option plus one for puzzle size. Realizing that a small puzzle with words going only across or up and down could be done by almost anyone, I added an option for smaller puzzles. The grids now can range from 10 by 10 to 20 by 20, with the number of words adjusted for the puzzle size.

You can also make puzzles with numbers or graphics characters. Figure 1 is an example—a 10-by-10 puzzle composed of letters, numbers and graphics characters.

Many people wrote saying they were using the puzzles for everything from church bulletins to TV fact magazines. At my school, we always put one in our monthly school newspaper. If you are using the puzzles in an interesting way, I'd like to hear about it. I'd also welcome any ideas you have for further enhancements to the program. R

Address all author correspondence to Gerald Caron, 706 Berkley St., Berkley, MA 02780.

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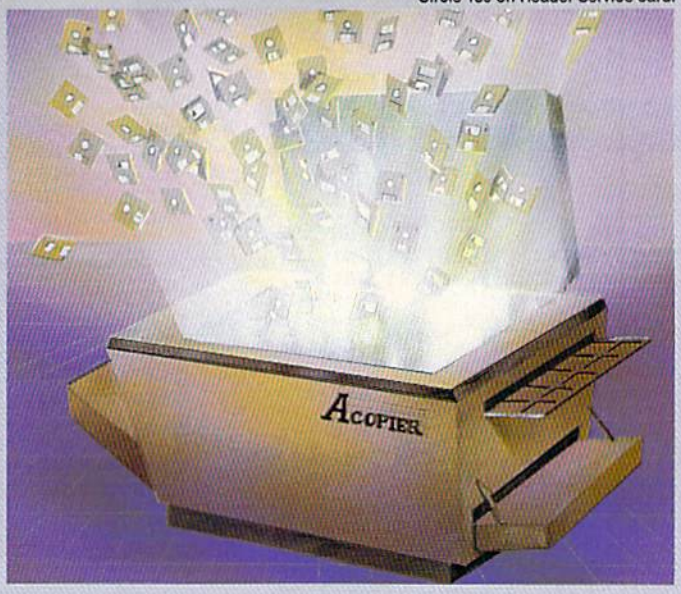
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Listing 1. *Find the Word 3.0.*

```
2 GOTO1Ø                        :REM*182
5 DIME$(2Ø,22),D$(2Ø),ZX(2Ø),ZY(
  2Ø),QA(8),QB(8),TW(2Ø),H$(2Ø,2
  2):RETURN                     :REM*51
1Ø REM JERRY CARON              :REM*23Ø
12 REM BERKLEY ST.              :REM*188
14 REM BERKLEY,MA.              :REM*224
2Ø REM INITIALIZE               :REM*138
3Ø PRINT"{SHFT CLR}{5 CRSR DNs}{
   3 SPACEs}FIND A WORD":REM*124
4Ø PRINT"{2 CRSR DNs}{2 CRSR RTs
   }ARE YOU USING":PRINT"{2 CRSR
    RTs}A VIC {CTRL 9}2Ø{CTRL Ø}
    OR A {CTRL 9}64{CTRL Ø}"
                                :REM*218
42 INPUT"{CRSR DN}{2 CRSR RTs}EN
   TER 2Ø OR 64{2 SPACEs}64{4 CR
   SR LFs}";MA:IFMA<>2ØAND MA<>6
   4THEN42                      :REM*1Ø
44 INPUT"{2 CRSR DNs}{CRSR RT}LO
   AD A PREVIOUS PUZZLE (Y OR N)
   ";LP$                        :REM*78
45 IFLP$<>"Y"ANDLP$<>"N"THENPRIN
   T"{4 CRSR UPs}":GOTO44
                                :REM*227
46 IFLP$="Y"THENGOSUB1ØØØ
                                :REM*236
55 IFMA=2ØTHENPOKE36879,8:REM*57
56 PRINT:PRINT                  :REM*1Ø
57 INPUT" PUZZLE SIZE (1Ø-2Ø){2
   SPACEs}2Ø{4 CRSR LFs}";MS
                                :REM*215
58 IFMS<1ØORMS>2ØTHEN57         :REM*238
59 GOSUB95Ø                     :REM*149
6Ø PRINT"{SHFT CLR}{CRSR DN} SET
   TING UP PLEASE WAIT..."
                                :REM*224
7Ø IFSW$<>"Y"THENGOSUB5         :REM*228
8Ø FORI=1TOMS:FORJ=1TOMS:E$(I,J)
   ="":NEXT:NEXT                :REM*2Ø8
9Ø RESTORE:FORJ=1TOOP:FORI=1TO8
   : READQA(I),QB(I):NEXT:NEXT
                                :REM*242
1ØØ DATA.,-1,1,-1,1,.,1,1,.,1,-1
   ,1,-1,.,-1,-1,.,1,1,-1,1,1,1
   ,.,.,1,1,-1,1,1,1,.          :REM*5Ø
1Ø3 DATA.,1,1,.,.,-1,-1,.,.,1,1,
   .,.,-1,-1,.,.,1,1,.,.,1,1,.,
   .,1,1,.,.,1,1,.              :REM*191
1Ø8 IFSW$="Y"THEN31Ø            :REM*22Ø
11Ø FORI=1TOMS:D$(I)="":ZX(I)=Ø:
   ZY(I)=Ø:NEXT                 :REM*26
2ØØ REM INPUT WORDS             :REM*86
2Ø5 IFLP$="Y"THEN31Ø            :REM*149
21Ø PRINT"{SHFT CLR}{CRSR DN}{2
   CRSR RTs}{CTRL 2}HOW MANY WO
   RDS (MAX ";MS-OP+1;"){CRSR D
   N}"                          :REM*1Ø2
22Ø INPUT ND$                   :REM*44
23Ø PRINT:NW=VAL(ND$):IFNW<1ORNW
   >MS-OP+1THEN21Ø              :REM*18
24Ø PRINT"{SHFT CLR} NOW TYPE IN
    THE WORDS{CRSR DN}":REM*186
25Ø PRINT"EACH MUST BE BETWEEN 3
    AND ";INT(.76*MS);" LETTERS
   {CRSR DN}"                   :REM*28
26Ø FORI=1TONW                  :REM*81
27Ø PRINTI"{CRSR LF}) ";:REM*135
28Ø INPUT"{CRSR LF}";D$(I)
                                :REM*51
29Ø IF LEN(D$(I))<3 OR{2 SPACEs}
   LEN(D$(I))>INT(.76*MS)THENPR
   INTCHR$(13)"{3 CRSR UPs}":GO
   TO27Ø                        :REM*117
3ØØ PRINT:NEXT                  :REM*141
31Ø OPEN4,4                     :REM*159
315 PRINT#4,SPC(MS-5);CHR$(14)+"
   FIND THE WORDS"+CHR$(15):PRI
   NT#4:PRINT#4                 :REM*68
316 IFLP$="Y"THENPRINT#4,"PUZZLE
    NAME : ";NP$:PRINT#4
                                :REM*223
317 FORR=1TO3*MS+4:PRINT#4,"*";:
   NEXTR:PRINT#4:PRINT#4
                                :REM*176
32Ø FORI=1TONW                  :REM*141
33Ø PRINT#4,D$(I);SPC(MS-LEN(D$(
   I)));:IFI=4ORI=8ORI=12ORI=16
   THENPRINT#4,:                :REM*185
34Ø NEXT                        :REM*95
35Ø PRINT#4,:PRINT#4,:FORR=1TO3*
   MS+4 :PRINT#4,"*";:NEXTR:PRI
   NT#4,:PRINT#4,"*";           :REM*243
```

```
- A M I G A - - - -
- W O R D C - 6 4 -
- - ♠ ♠ ♠ ♠ ♠ - S -
- - - - - - 8 - E -
- - - - - 2 - - A -
- - - - 1 - - - R C
- - - - - - N - C H
- O R C I M - U H I
- - F L O P P Y R P
- - - - - - - - - -
```

Figure 1. *Solution to word-search puzzle.*

```
36Ø PRINT#4," ";SPC(3*MS+1);"*"
                                :REM*1Ø1
37Ø CLOSE4:IFLP$="Y"THEN7ØØ
                                :REM*241
38Ø IFEP$="Y"THEN7ØØ            :REM*29
4ØØ REM PLACE                   :REM*175
41Ø PRINT"{SHFT CLR}{2 SPACEs}MA
   KING GRID "                  :REM*71
42Ø PRINT"{4 SPACEs}PLEASE WAIT"
                                :REM*13
43Ø PW=Ø:FORAB=1TONW:PW=PW+1
                                :REM*175
44Ø ZX(PW)=INT(MS*RND(1)+1)
                                :REM*27
45Ø ZY(PW)=INT(MS*RND(1)+1)
                                :REM*45
46Ø DR=INT(8*RND(1)+1):TW(PW)=DR
                                :REM*141
47Ø CX=ZX(PW)+LEN(D$(PW))*QA(DR)
   :CY=ZY(PW)+LEN(D$(PW))*QB(DR
   )                            :REM*75
48Ø IFCX<1ORCX>MSORCY<1ORCY>MSTH
   EN44Ø                        :REM*211
49Ø F=Ø:FORCK=ØTOLEN(D$(PW))-1
                                :REM*171
5ØØ Z1$=MID$(D$(PW),CK+1,1):Z2$=
   E$(ZX(PW)+CK*QA(DR),ZY(PW)+C
   K*QB(DR))                    :REM*69
51Ø IFZ2$<>""ANDZ1$<>Z2$THENF=1
                                :REM*79
52Ø NEXT:IFF=1THEN44Ø           :REM*12
53Ø FORCK=ØTOLEN({2 SPACEs}D$(PW
   ))-1                         :REM*32
54Ø Z1$=MID$(D$(PW),CK+1,1):E$(Z
   X(PW)+CK*QA(DR),ZY(PW)+CK*QB
   (DR))=Z1$                    :REM*12
55Ø NEXT                        :REM*5Ø
56Ø NEXT AB                     :REM*1Ø6
6ØØ REM PRINT SEARCH MATRIX
                                :REM*176
61Ø PRINT"{SHFT CLR}"           :REM*9Ø
62Ø PRINT"{HOME}":FORY=1TOMS:FOR
   X=1TOMS                      :REM*198
621 IFMS<2ØANDDX=1THENPRINT
                                :REM*245
622 H$(X,Y)=E$(X,Y):IFE$(X,Y)=""
   THENH$(X,Y)="-"              :REM*174
625 IFE$(X,Y)=""THENE$(X,Y)=MID$
   (D$(NW*RND(1)+1),3*RND(1)+1,
   1)                           :REM*151
64Ø IFMA=64THENPRINTE$(X,Y);" ";
   :GOTO66Ø                     :REM*238
65Ø IFMA=2ØTHENPRINTE$(X,Y);
                                :REM*44
66Ø NEXT                        :REM*16Ø
67Ø IFMA=2ØTHENPRINT            :REM*34
69Ø C=Ø:NEXT                    :REM*68
7ØØ OPEN4,4                     :REM*38
71Ø FORY=1TOMS:PRINT#4,"*{2 SPAC
   Es}";:FORX=1TOMS             :REM*6Ø
72Ø PRINT#4,E$(X,Y);"{2 SPACEs}"
   ;                            :REM*1Ø2
73Ø NEXT:PRINT#4,"*":PRINT#4,"*"
   ;SPC(3*MS+2);"*":NEXT:REM*1Ø
74Ø FORR=1TO3*MS+4:PRINT#4,"*";:
   NEXTR:PRINT#4,:PRINT#4:CLOSE
   4                            :REM*196
8ØØ PRINT"{SHFT CLR}":LP$="":GS$
   ="":SP$="":S$="" :EP$="":SW$
   =""                          :REM*255
8Ø5 INPUT"{CRSR DN}{CRSR RT}WANT
    THE ANSWERS{2 SPACEs}Y OR N
   {2 SPACEs}Y{3 CRSR LFs}";GS$
                                :REM*252
8Ø7 IFGS$="Y"THENPRINT" DON'T PE
   EK!":GOSUB9ØØ                :REM*232
8Ø8 PRINT"{2 CRSR DNs} SAVE THE
   PUZZLE (Y OR N)";            :REM*2Ø5
8Ø9 INPUTSP$:IFSP$="Y"THENINPUT"
   {CRSR DN} NAME OF PUZZLE";NP
   $:NP$=NP$+".WS":GOSUB11ØØ
                                :REM*188
81Ø INPUT"{2 CRSR DNs}{CRSR RT}{
   CTRL 9}Y{CTRL Ø}ES TO RUN AG
   AIN{2 SPACEs}Y{3 CRSR LFs}";
   S$:IFS$<>"Y"THENEND :REM*197
82Ø INPUT"{2 CRSR DNs}{CRSR RT}W
   ANT EXACT SAME PUZZLE (Y OR
   N)";EP$:IFEP$="Y"THEN31Ø
                                :REM*65
83Ø INPUT"{2 CRSR DNs}{CRSR RT}W
   ANT THE SAME WORDS (Y OR N)"
   ;SW$:IFSW$="Y" THEN12ØØ
                                :REM*73
84Ø IFEP$="N"THENCLR:GOTO44
                                :REM*253
86Ø PRINT"{SHFT CLR} PROGRAM OVE
   R":END                       :REM*169
9ØØ OPEN4,4                     :REM*239
9Ø3 FORI=1TO1Ø-2*MS:PRINT#4:NEXT
                                :REM*11Ø
91Ø FORY=1TOMS :FORX=1TOMS
                                :REM*137
911 PRINT#4,H$(X,Y);" "; :REM*46
92Ø NEXT:PRINT#4:NEXT           :REM*87
93Ø PRINT#4:CLOSE4:RETURN:REM*27
94Ø REM{2 SPACEs}DIRECTION OPTIO
   N MENU                       :REM*9
95Ø PRINT"{SHFT CLR}{2 CRSR DNs}
   {5 CRSR RTs}{CTRL 9} WORD DI
   RECTION OPTIONS {CTRL Ø}{2 C
   RSR DNs}"                    :REM*195
96Ø PRINT"{3 SPACEs}1. EVERY DIR
   ECTION{CRSR DN}"             :REM*21
```

→

```
965 PRINT"{3 SPACEs}2. NO REVERS
    ED WORDS{CRSR DN}"    :REM*78
970 PRINT"{3 SPACEs}3. NO DIAGON
    AL WORDS{CRSR DN}"   :REM*205
975 PRINT"{3 SPACEs}4. NO DIAGON
    AL OR REVERSED WORDS{CRSR DN
    }"                    :REM*40
980 INPUT"{CRSR DN}{5 CRSR RTs}{
    CTRL 9}CHOOSE OPTION{CTRL 0}
     (1-4){2 SPACEs}1{3 CRSR LFs
    }";OP                 :REM*89
982 IFOP<1OROP>4THENPRINT"{3 CRS
    R UPs}":GOTO980       :REM*237
985 RETURN                :REM*22
1000 REM LOAD ROUTINE**********
    ******                :REM*143
1005 OPEN15,8,15:PRINT#15,"I0"
                          :REM*72
1010 PRINT"{CRSR DN}{CRSR RT}NAM
     E OF PUZZLE";:INPUTNP$:NP$=
     NP$+".WS"            :REM*147
1020 OPEN1,8,8,NP$+",S,R":REM*33
1025 INPUT#15,E,E$,E1,E2 :REM*81
1027 IFETHENPRINT"{CRSR DN}{CRSR
      RT}{CTRL 9}PROGRAM ABORTED
      *ERROR* ";E$:CLOSE1:CLOSE1
     5:END                :REM*147
1030 INPUT#1,MS           :REM*230
1031 INPUT#1,NW             :REM*9
1032 INPUT#1,OP           :REM*104
1035 GOSUB5               :REM*239
1040 FORY=1TOMS:FORX=1TOMS
                          :REM*12
1050 INPUT#1,E$(X,Y)      :REM*162
1060 NEXT:NEXT            :REM*44
1065 FORI=1TONW:INPUT#1,D$(I):NE
     XT                   :REM*137
1066 FORY=1TOMS:FORX=1TOMS
                          :REM*38
1067 INPUT#1,H$(X,Y)      :REM*21
1068 NEXT:NEXT            :REM*52
1070 CLOSE1:CLOSE15       :REM*220
1080 GOTO310              :REM*22
1100 REM SAVE ROUTINE**********
    ******                :REM*46
1101 PRINT"{CRSR DN}{CRSR RT}SAV
     ING PUZZLE"          :REM*249
1103 OPEN15,8,15:PRINT#15,"I0"
                          :REM*171
1110 OPEN1,8,8,"0:"+NP$+",S,W"
                          :REM*146
1115 INPUT#15,E,E$,E1,E2:IFETHEN
     PRINT"{CRSR DN}{CRSR RT}{CT
     RL 9}PRG. ABORTED *ERROR* "
     ;E$:CLOSE15:END       :REM*9
1120 PRINT#1,MS           :REM*144
1121 PRINT#1,NW           :REM*179
1125 PRINT#1,OP           :REM*21
1130 FORY=1TOMS:FORX=1TOMS
                          :REM*102
1140 PRINT#1,E$(X,Y)      :REM*76
1150 NEXT:NEXT            :REM*134
1155 FORI=1TONW:PRINT#1,D$(I):NE
     XT                   :REM*51
1158 FORY=1TOMS:FORX=1TOMS
                          :REM*130
1159 PRINT#1,H$(X,Y)      :REM*193
1160 NEXT:NEXT            :REM*144
1165 CLOSE1:CLOSE15       :REM*59
1170 RETURN               :REM*208
1200 PRINT"{CRSR DN}{CRSR RT}PLE
     ASE WAIT":FORX=1TO20:FORY=1
     TO22:E$(X,Y)="":H$(X,Y)="":
     NEXT:NEXT            :REM*148
1210 FORX=1TO20:ZX(X)=0:ZY(X)=0:
     TW(X)=0:NEXT:FORX=1TO8:QA(X
     )=0:QB(X)=0:NEXT     :REM*162
1220 GOTO59               :REM*44
```

end R

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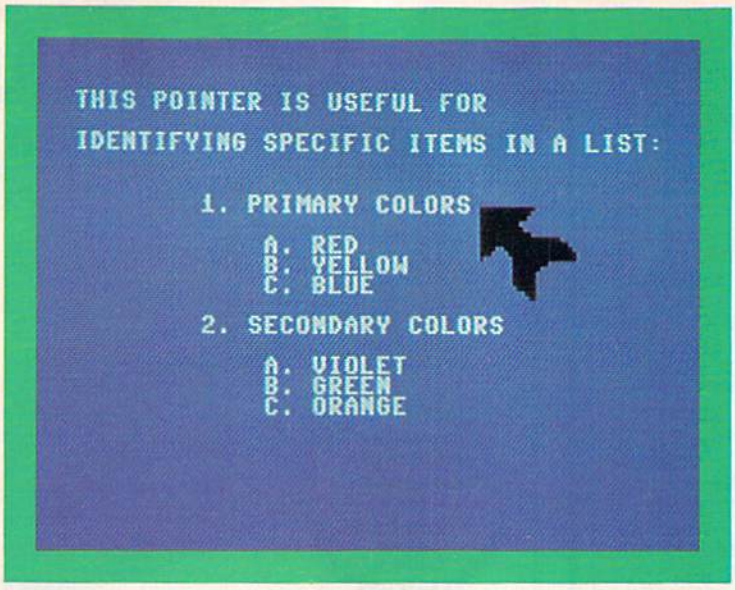
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Making a Pointer

By JOHN M. CAMPBELL

Why smear your monitor screen with fingerprints when you can use this joystick-controlled arrow to emphasize portions of your screen display.

Demo Pointer, written in Basic, places on the screen a pointer in the form of an arrow. You control the pointer's movement with a joystick plugged into port 2.

You can use Demo Pointer with other Basic programs to point to locations in text or charts on the screen. This is especially helpful at club meetings or in the classroom.

Before typing in Demo Pointer (Listing 1), plug your joystick into port 2. Pushing the fire-button once turns the pointer off, and pushing it again turns it back on. If you move the pointer off one side of the screen, it will reappear immediately on the other.

After you type in Listing 1, save it before running it. Once you run it, you'll be prompted to select the size and color of the pointer. The program will then Poke into memory a short machine language program that controls the pointer's movement independently of whatever else you've loaded into the computer's memory.

The C-64 allows you to define up to seven sprites for display on the screen. The pointer arrow is just such a sprite. The pattern of bits that compose it are contained in the Data statements in lines 300–360. You may alter the form of the sprite from an arrow to a hand or a turtle simply by changing the numbers in those lines. *The Commodore 64 Programmer's Reference Guide* describes in detail how to define your own sprite.

Program Limitations

Demo Pointer was written to be as flexible as possible, but it has a few limitations.

It will run with just about any Basic program except those containing sprites or using a joystick in port 2. Demo Pointer uses locations 679–767 to hold the sprite and perform other housekeeping chores, so it can't coexist with other programs that use those addresses.

The actual machine language program is 175 bytes long and is loaded at address 49200. If you want to run Demo Pointer with another program that uses that section of memory, you may load the Demo Pointer machine language routine into a different part of memory simply by changing the address in line 370.

You can't move the arrow while either the disk drive or Datassette is active, as the computer is too busy to accept the clock interrupts. Moving the pointer while typing can cause entry errors; this is because the joystick and keyboard share a register in the complex interface adapter (CIA). R

Address all author correspondence to John M. Campbell, 5203 Garnet St., Torrance, CA 90503.

RUN It Right

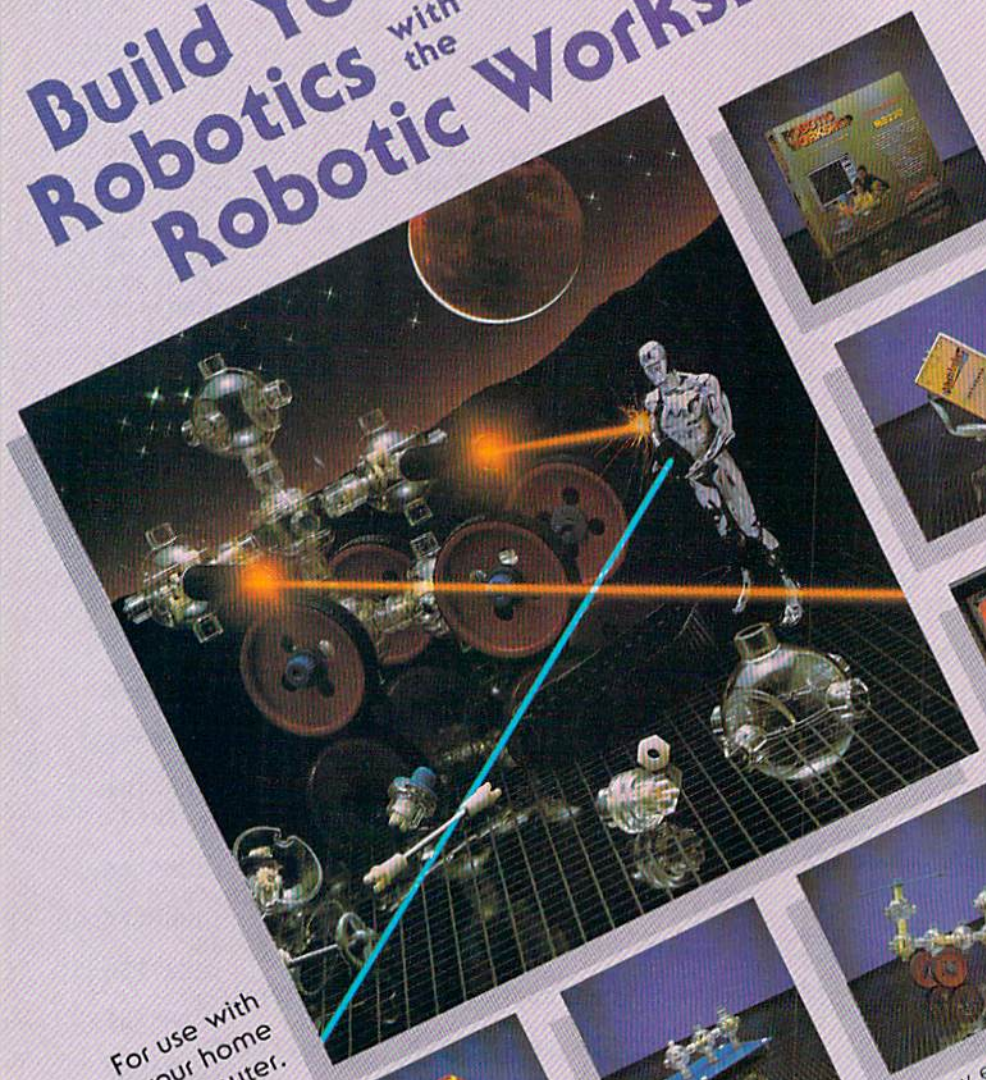
C-64; joystick in port 2

Listing 1. *Demo Pointer program.*

```
1Ø REM DEMO POINTER BY JOHN M. CAMPBELL
                                        :REM*242
2Ø PRINT CHR$(147);CHR$(17);CHR$(17);TAB(13
   )"DEMO POINTER"                      :REM*42
3Ø FOR I=1TO12:PRINT:NEXTI              :REM*178
4Ø V=53248                              :REM*176
5Ø FOR N=Ø TO 63:READ Q:POKE 7Ø3+N,Q:NEXT N
                                        :REM*58
6Ø POKE 2Ø47,11:REM SPRITE 7 DATA IN 11TH B
   LOCK                                 :REM*24Ø
7Ø POKE 53294,Ø:REM SET SPRITE 7 COLOR TO B
   LACK                                 :REM*2Ø4
8Ø SZ=Ø:POKE V+23,SZ:POKE V+29,SZ       :REM*134
9Ø POKE V+14,17Ø:REM X POSITION OF SPRITE
                                        :REM*254
1ØØ POKE V+15,1ØØ:REM Y POSITION OF SPRITE
                                        :REM*9Ø
11Ø POKE V+21,128:REM ENABLE SPRITE 7
                                        :REM*246
12Ø PRINT " {CTRL 8}PRESS SPACE BAR TO CHAN
   GE ARROW'S SIZE{COMD 7}"             :REM*68
13Ø PRINTTAB(7)"{CRSR DN}<PRESS RETURN TO C
   ONTINUE>"                            :REM*156
14Ø GET A$                              :REM*94
15Ø IF A$=CHR$(13) GOTO 21Ø             :REM*74
16Ø IF A$<>" " GOTO 14Ø                 :REM*1Ø8
17Ø IF SZ=Ø THEN SZ=128:GOTO 19Ø        :REM*14Ø
18Ø SZ=Ø                                :REM*6
19Ø POKE V+23,SZ:POKE V+29,SZ:REM SET SPRIT
   E SIZE                               :REM*238
2ØØ GOTO 14Ø                            :REM*194
21Ø PRINT "{3 CRSR UPs}{CTRL 2} PRESS SPACE
    BAR TO CHANGE ARROW'S COLOR{COMD 7}"
                                        :REM*156
22Ø PRINTTAB(7)"<PRESS RETURN TO CONTINUE>"
                                        :REM*116
23Ø GET A$                              :REM*184
24Ø IF A$=CHR$(13) GOTO 29Ø             :REM*166
25Ø IF A$<>" " GOTO 23Ø                 :REM*19Ø
26Ø CL=CL+1:IF CL=16 THEN CL=Ø          :REM*221
27Ø POKE 53294,CL:REM SET SPRITE 7 COLOR
                                        :REM*43
28Ø GOTO 23Ø                            :REM*11
29Ø REM SPRITE DATA                     :REM*81
3ØØ DATA Ø,Ø,Ø,Ø,255,252,Ø,255,248,Ø:REM*61
31Ø DATA 255,24Ø,Ø,255,192,Ø,255,224,Ø
                                        :REM*79
32Ø DATA 255,248,Ø,255,255,24Ø,255,255,252
                                        :REM*247
33Ø DATA 243,255,254,225,255,255,128,255,25
   5                                    :REM*163
34Ø DATA Ø,255,128,Ø,254,Ø,Ø,252,Ø      :REM*1Ø1
35Ø DATA Ø,252,Ø,Ø,252,Ø,Ø,124,Ø        :REM*1Ø1
36Ø DATA Ø,28,Ø,Ø,12,Ø,Ø,Ø,Ø           :REM*211
37Ø AD=492ØØ:REM LOAD ADDRESS           :REM*2Ø1
38Ø AA=AD                               :REM*243
39Ø PRINT"LOADING HANDLER"              :REM*185
4ØØ READ D:PRINTD:PRINT"{CTRL 2}{2 CRSR UPs
   }                                    :REM*113
41Ø IF D<Ø THEN 45Ø                     :REM*199
42Ø POKE AA,D                           :REM*185
43Ø AA=AA+1                             :REM*235
44Ø GOTO 4ØØ                            :REM*139
45Ø PRINT"{COMD 7}{SHFT CLR}HANDLER LOADED"
                                        :REM*69
46Ø FOR I=Ø TO 12                       :REM*67
47Ø READ D:POKE 679+I,D                 :REM*51
48Ø NEXT I                              :REM*53
49Ø A1=INT(AD/256):POKE 686,A1          :REM*23
5ØØ AØ=AD-A1*256:POKE 681,AØ            :REM*251
51Ø SYS 679                             :REM*199
52Ø END                                 :REM*12
53Ø DATA 169,16,45,Ø,22Ø,2Ø8,11,173,191
                                        :REM*5Ø
54Ø DATA 2,48,53,56,11Ø,191,2,48,47,169
                                        :REM*21Ø
55Ø DATA 128,2Ø5,191,2,2Ø8,13,77,21,2Ø8
                                        :REM*Ø
56Ø DATA 141,21,2Ø8,169,2,141,191,2,16
                                        :REM*52
57Ø DATA 89,169,129,2Ø5,191,2,2Ø8,13,77
                                        :REM*186
58Ø DATA 21,2Ø8,141,21,2Ø8,169,Ø,141:REM*44
59Ø DATA 191,2,24Ø,7,169,2,2Ø5,191,2
                                        :REM*146
6ØØ DATA 24Ø,1Ø8,169,1,45,Ø,22Ø,2Ø8,15
                                        :REM*174
61Ø DATA 2Ø6,15,2Ø8,169,29,2Ø5,15,2Ø8
                                        :REM*138
62Ø DATA 2Ø8,22,169,249,141,15,2Ø8,169
                                        :REM*156
63Ø DATA 2,45,Ø,22Ø,2Ø8,1Ø,238,15,2Ø8
                                        :REM*15Ø
64Ø DATA 2Ø8,5,169,34,141,15,2Ø8,169:REM*86
65Ø DATA 4,45,Ø,22Ø,2Ø8,25,2Ø6,14,2Ø8
                                        :REM*34
66Ø DATA 2Ø8,57,2Ø6,14,2Ø8,169,128,77
                                        :REM*196
67Ø DATA 16,2Ø8,141,16,2Ø8,16,44,169,87
                                        :REM*3Ø
68Ø DATA 141,14,2Ø8,16,37,169,8,45,Ø
                                        :REM*12Ø
69Ø DATA 22Ø,2Ø8,3Ø,238,14,2Ø8,24Ø,17
                                        :REM*252
7ØØ DATA 169,128,45,16,2Ø8,24Ø,18,169
                                        :REM*244
71Ø DATA 88,77,14,2Ø8,2Ø8,11,141,14,2Ø8
                                        :REM*66
72Ø DATA 169,128,77,16,2Ø8,141,16,2Ø8
                                        :REM*168
73Ø DATA 76,49,234,-1                   :REM*234
74Ø DATA 12Ø,169,Ø,141,2Ø,3             :REM*154
75Ø DATA 169,192,141,21,3,88,96         :REM*66
```

end R

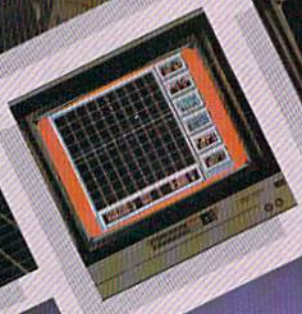
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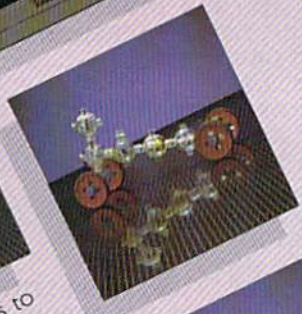
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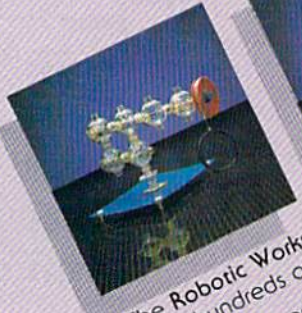




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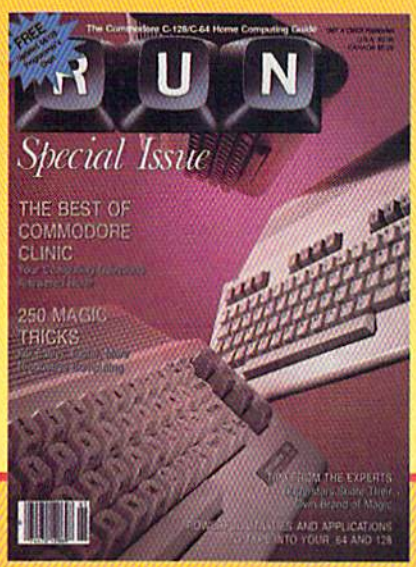
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Jim Butterfield: The Guru of Commodore Computing

An interview with the widely known and renowned programmer and writer who has devoted years to the support of Commodore computers and those who use them.

By GAIL HOOK

For five years, Jim Butterfield has been living a computer-enthusiast's dream. In February 1981, he gave up a 25-year career with CN/CP Telecommunications and turned his microcomputer hobby into a full-time job. Since then, working from the home near downtown Toronto that he shares with his wife, Vicki, several cats and lots of computer equipment, he has continued to build an international reputation as a Commodore computer expert. A lecturer and consultant, as well as a writer of a wide range of computer programs, magazine articles and books, he reaches audiences around the world.

Butterfield, a self-styled "Commodore watcher," represented Commodore at shows in San Francisco and London, England, last spring. He came home convinced that microcomputers are still generating a lot of interest and energy. "Both shows were closed several times," he notes, "because there were too many people to admit at once. That is quite promising and generally unexpected."

While the Amiga is drawing crowds who want to see its new features, Butterfield feels the Commodore 64 is still "very much alive. People who try to write its obituary will have a hard time calling it expired when Commodore is at the point of bringing out a brand new model." [See a preview of the new C-64 product line in the July 1986 issue of *RUN*.—Editors] The restyling will include a new keyboard, and, he adds, "there seems to be a very strong indication that all Commodore machines will soon make the transition to new, smaller 3 ¼-inch disks."

In San Francisco, Butterfield was most interested in the demonstrations of GEOS, "a windowing package that makes the 64 appear somewhat comparable to newer machines such as the Amiga." GEOS is being packaged with the updated 64, and Commodore is also planning a C-128 version.

The 64's Continuing Popularity

In England, Butterfield observed "a real mob scene where the old traditional software for the Commodore 64 was being sold." What qualities continue to draw people to the Commodore 64, which has already sold over 6 million machines and survived several predictions of its demise?

Butterfield believes there are two main reasons. First, "The price is the best it's ever been. It's a bargain." Second, "It's now a mature machine. There are many books, software packages and peripherals on the market that support it. It's not perfect—it has a disk drive that some call less than fast, and a 40-column limitation—but most of the pieces people want are in place."

In turn, the 64 seems to be fueling sales of the Commodore 128. Butterfield notes that "the 64 and 128 have the advantage of being kissing cousins. People can upgrade to the 128 without abandoning all the software and utilities they used on the 64.

In addition, even first-time buyers "who don't come from the Commodore 64 have that machine in the back of their minds. They are aware of the thousands of programs for the C-64 that will run on the 128."

On Copy Protection

The negative side of the C-64's immense popularity is the theft of its software. Butterfield feels that the major reason so many programs have been unprotected lies in the incli-

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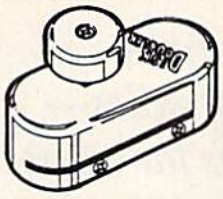
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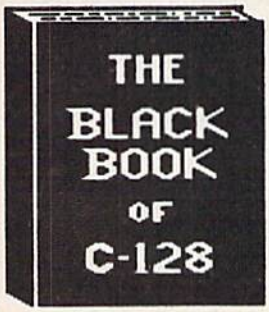
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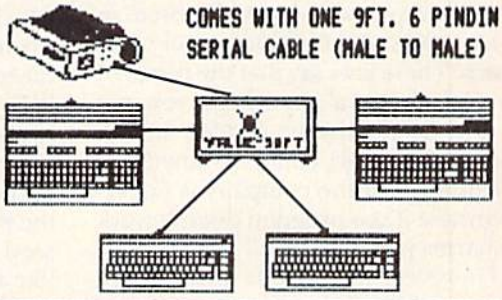
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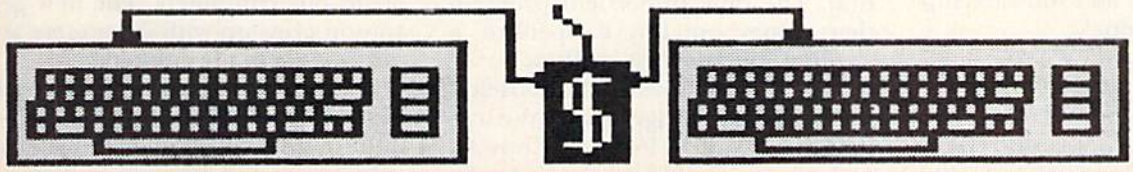


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nation of some 64 users to want to investigate the innards of their machines, including the methods by which software has been protected.

"That is not a great concern," Jim says, "until they start proving how smart they are by passing around copies. Then it becomes a problem. Also related to this is that Commodore machines have a built-in language and disk operating system. Within that fixed framework, the options for protection are fewer."

Butterfield points out that many users make the strong argument that "the fault does not lie entirely with the people breaking protection." He has always believed that when you sell software, "you acquire an obligation to support it with upgrades, warranty and documentation—all of the things that make a computer feel warm and supported and cuddled. People don't buy just objects when they buy software. They also buy a service."

According to Butterfield, users who have been stung when they could not replace a damaged disk—perhaps because the software company isn't interested or no longer has an employee who knows how it works—feel they must make back-up copies to protect their investment.

This is different from organized copying for profit. "When somebody takes a program and duplicates even the documentation," says Jim, "certainly one would hope there would be some legal precedent to prosecute them. These people are obviously not just helping out their friends. They're in it to make money."

Solutions to the copying problem are difficult, Butterfield admits, "but shrink-wrap laws being discussed in some states do not please me very much. These laws say that the moment you break open a package you are bound by a contract hidden inside. But that contract could say anything, including that the company is not responsible if the program doesn't work or harms your machine."

However, Jim points out, "more rigorous laws and more complex protection schemes don't help the end user. Somewhere along the line we have to depend less on mechanical protection and more on personal ethics from the buyer and software support from the vendor."

Butterfield and TPUG

Software protection was not a problem with Butterfield's first microcomputer, a KIM 1. It was an 8-by-11-inch board with a 6502 microchip in it. All programming had to be done in machine language—a far cry from the classy styling and user-friendly features of today's machines. But it represented an important step in the evolution of home computers because, "with a factory-manufactured Kim, everybody had the same computer. There was almost an explosion in terms of community of interest. Suddenly people built a social life around microcomputers."

People drove hundreds of miles—some from as far away as Connecticut—to early TPUG meetings, largely because of Jim Butterfield.

In Toronto, much of the interest in microcomputers is centered around the Toronto Pet Users Group (TPUG), which now boasts 15,000 members world-wide. Butterfield was at its first meeting, which was attended by eight PET owners and held at founder Lyman Duggan's apartment.

Motivated by a desire to share his knowledge, Butterfield wrote 20 of the 80-odd programs that became the seed of the TPUG library. "I would like to foster an environment where people pass out their software with reasonable generosity," he says. "I think that by showing a good example, I might lead the way." He continues to back his philosophy with action. The only Butterfield program that money can buy is SpellPro, a spelling checker for WordPro.

The most famous of Butterfield's public domain programs are the utilities SuperMon, TinyMon, Copy-All and UniCopy. When asked why he didn't market this software, he laughs and says it saves him a lot of trouble. "If someone complains, I offer to give him his money back!"

Butterfield also has made a major contribution to exploring the innards of Commodore machines. His thorough and accurate memory maps, for example, are invaluable guides for programmers.

However, he is important in the Commodore world mainly because he's been there from the beginning, when the PET manual was one photocopied page and microcomputers were still objects of wonder. He provided facts and data, but above all he communicated his curiosity and delight in discovery.

People drove hundreds of miles—some from as far away as Connecticut—to early TPUG meetings, largely because of Jim Butterfield. By speaking at meetings, teaching his famous machine-language course and writing for TPUG publications, he has been friend and technical expert for club members around the world.

Like smaller user's groups, TPUG is constantly faced with accommodating the expanding equipment and interests of its members. Butterfield's formula for meeting presentations is an excellent guideline for any club meeting. He says, "There are always many newcomers who show up to find out what it's all about. I have great sympathy for these people, because there's always a danger they won't understand one word that is said. So I always try to have material for them. For veteran members, I share discoveries—wow! There are still new things happening and interesting things to do! But you can't get so high-tech that you leave the beginners behind."

What the Future Holds

Butterfield has observed and participated in many changes in the world of microcomputers over the past five years, and the changes continue. He believes that now "we're at a crossroads. There will be new activity and a new thrust. We are dealing with a generation that is much more computer literate than the first people to buy computers. The new generation grew up with computers and can take them for granted."

Computers are reaching more and more elementary school children. Butterfield believes that "this is probably very sound. The young have an

advantage over grown-ups. They're not afraid of computers. If you put an adult in front of a computer and say, 'Go ahead, play,' they often say, 'Tell me what I'm allowed to do.' Children never say that; they wait to be told what's forbidden. They understand that a computer is simply a tool to help you whenever you feel like grabbing it. As many hobbyists know, the computer is a creativity tool."

A great many innovative machines are being developed for today's more knowledgeable users. The thrust by Commodore to put the 128 and the Amiga on the market is creating new directions for Jim Butterfield. He's awaiting publication of the revised edition of his book, *Machine Language for the Commodore 64 and Other Commodore Computers* (published by Brady).

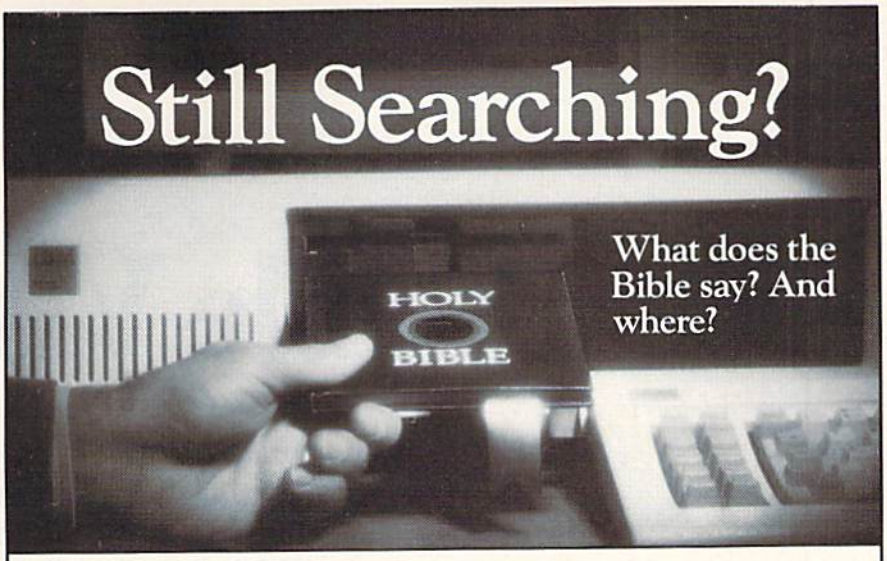
"When I wrote the first version, I carefully chose methods and programs that would work on all Commodore computers. It was a bit of a shock when Commodore came out with the 128, because the area in memory I used is very sensitive on the 128. Try to put programs there and everything will go wrong. You could switch to 64 mode, but you lose the advantages of the 128 such as the built-in machine language monitor. Besides, people want to learn about the new architecture. So I beefed up the book to cover the 128."

Greater challenges lie ahead. "All Commodore machines up through the 128 have a common thread. Suddenly we have the Amiga, which is an entirely new concept." The Amiga, Atari ST and Apple Macintosh "represent a brand new approach to the whole question of how computers and people can work together to do a job. What amazes me is that the manufacturers are spending all their time throwing bricks at each other."

Companies and users, Butterfield believes, need to develop a new set of attitudes to help these machines reach their potential. "They should realize that those three machines are on a voyage together. If you try to sink the others, they may drag you down. The smart thing for them to do is to link arms and say, 'The three of us are going to bring a new age of computing. Follow us. We'll lead you into the future.' " R

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By LARRY COTTON

Mirror, Mirror is an excellent first program to type into your Commodore 64. When you draw a pattern with the joystick, a mirror image is drawn simultaneously. This, complemented by randomness and color, yields beautiful, magical surprises, arising from the symmetry of the mirror image. All the while, a mellow "bipping" sound tracks the cursors, rising and falling in pitch as they move.

The liberal use of constants, which are defined early on, and a minimum number of If...Then statements ensure quick response to joystick movements, even though the program is written entirely in Basic.

A very short menu at the beginning of the program allows you to change patterns and colors. To erase drawing, press the space bar, which brings you the simple menu again.

To use the program, type it in and save it. Turn up the volume on your TV or monitor. Plug the joystick into port 2 (next to the power cord) and run the program. Try pressing the joystick to the right. Both characters will move. You're controlling the *right-hand* one, unless they cross. If they do cross and continue past the right and left borders, the cursors will get out of sync vertically. You can bring them back into sync by backing up and retracing your pattern.

To avoid using a lot of If...Then statements, which slow down the program, there are only minimum top and bottom border checks. You may go *to* these borders, but if you keep pushing the joystick, the program will end. Press the space bar for a new start.

Now press the space bar and answer the questions differently. You'll be amazed at the results!

About the Program

Lines 5–75 set up the screen and border colors, gather your input and clear and Poke constants to the sound chip. Lines 80–90 define more constants, which are sprinkled liberally throughout the program. The main program loop starts at line 95, which defines A, the value Peeked from joystick port 2.

Lines 100–110 determine what characters and colors will be Poked to the screen. If CH is 160, you'll paint with blocks (reversed spaces); you may also make CH any screen code of your choosing. If CH is allowed to be any value from 0 to 255 (line 105), you'll draw some very interesting random-character tracks. If CH is limited to the first 26 screen codes (line 110), you'll paint with randomly chosen letters of the alphabet. Some really fascinating results are likely!

Lines 115–120 detect whether you've asked for automatic or manual (fire-button) control over character color. Line 125 makes sure you're not pressing the stick and the fire-button at the same time. Line 130 checks to see if you've pressed the space bar, which runs the program from the beginning.

Lines 135–145 check for maximums—color and top and bottom screen borders. Line 150 Pokes to the screen the character and its mirror image and color, then turns on voice 1 with a square wave. Depending on which way the joystick is pressed, line 155 sends control to the appropriate line, moving the cursor vertically, horizontally or diagonally. Note that the On...Goto statement causes the values that are "skipped" when reading the joystick to send the program back to line 95 for another Peek.

Line 200 turns the sound off after a short delay and sends control back to the start of the loop. In lines 205 and 210, note the REM statements, which give a rather awkward emergency alternative to the joystick. R

Address all author correspondence to Larry Cotton, 3513 Canterbury Road, New Bern, NC 28560.

RUN It Right

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

Listing 1. *Mirror, Mirror program.*

```
5 PRINTCHR$(147):POKE5328Ø,15:POKE53281,1:P
  RINTCHR$(151)                          :REM*215
1Ø POKE214,7:PRINT:PRINT" RANDOM CHARACTERS
   , LETTERS, OR BLOCKS?                 :REM*94
15 POKE214,9:PRINT:POKE211,17:PRINT"(R/L/B)
   "                                     :REM*199
2Ø GETA$:IFA$<>"R"THENIFA$<>"B"THENIFA$<>"L
   "THEN2Ø                               :REM*1Ø4
25 IFA$="B"THENFL=Ø:GOTO4Ø               :REM*153
3Ø IFA$="R"THENFL=1:GOTO4Ø               :REM*198
35 FL=2                                  :REM*17
4Ø PRINT:PRINT" AUTOMATIC OR FIREBUTTON COL
   OR CHANGE?                            :REM*244
45 PRINT:POKE211,18:PRINT"(A/F)          :REM*49
5Ø GETA$:IFA$<>"A"THENIFA$<>"F"THEN5Ø
                                         :REM*252
55 IFA$="A"THENGL=1:GOTO65               :REM*1Ø1
6Ø GL=Ø                                  :REM*238
65 PRINTCHR$(147)                        :REM*97
7Ø FORZ=54272TO54295:POKEZ,Ø:NEXT        :REM*132
75 POKE54272,1Ø:POKE54275,8:POKE54277,4:POK
   E54296,15                             :REM*141
8Ø R1=54273:VR=54276:RR=54:RX=255:RN=5:VN=6
   5:VF=64:PC=4                          :REM*192
85 Z=1523:ZM=1524:C=54272:CC=2:MC=16:MX=2Ø2
   3:MN=1Ø24:VT=4Ø:HZ=1:DG=39:DH=41      :REM*43
9Ø JS=5632Ø:B=116:FB=-5:KB=197:SP=6Ø:REM*36
95 A=PEEK(JS)-B                          :REM*245
1ØØ IFFL=ØTHENCH=16Ø:GOTO115             :REM*1Ø
1Ø5 IFFL=1THENCH=INT(255*RND(1))+1:GOTO115
                                         :REM*55
11Ø CH=INT(26*RND(1))+1                  :REM*144
115 IFGL=ØTHENIFA=FBTHENCC=CC+1:A=12:GOTO13
    Ø                                    :REM*91
12Ø IFGL=1THENCC=CC+1                    :REM*158
125 IFA<ØTHEN95                          :REM*179
13Ø IFPEEK(KB)=SPTHENRUN                 :REM*86
135 IFCC>16THENCC=Ø                      :REM*119
14Ø IFZ>MXORZM>MXTHEN13Ø                 :REM*116
145 IFZ<MNORZM<MNTHEN13Ø                 :REM*125
15Ø POKEZ,CH:POKEZ+C,CC:POKEZM,CH:POKEZM+C,
    CC:POKER1,RR:POKEVR,VN               :REM*Ø
155 ONAGOTO185,18Ø,165,95,19Ø,195,175,95,17
    Ø,16Ø,95,2ØØ                         :REM*117
16Ø Z=Z-VT:ZM=ZM-VT:RR=RR+PC:GOTO2ØØ
                                         :REM*224
165 Z=Z+HZ:ZM=ZM-HZ:GOTO2ØØ              :REM*137
17Ø Z=Z+VT:ZM=ZM+VT:RR=RR-PC:GOTO2ØØ:REM*1Ø
175 Z=Z-HZ:ZM=ZM+HZ:GOTO2ØØ              :REM*115
18Ø Z=Z-DG:ZM=ZM-DH:RR=RR+PC:GOTO2ØØ
                                         :REM*212
185 Z=Z+DH:ZM=ZM+DG:RR=RR-PC:GOTO2ØØ
                                         :REM*121
19Ø Z=Z+DG:ZM=ZM+DH:RR=RR-PC:GOTO2ØØ
                                         :REM*254
195 Z=Z-DH:ZM=ZM-DG:RR=RR+PC:GOTO2ØØ:REM*99
2ØØ FORT=1TO2Ø:NEXT:POKEVR,VF:GOTO95
                                         :REM*196
2Ø5 REM COMMODORE (LOGO) KEY PRESSED WITH T
    HE FOLLOWING KEYS SIMULATES JOYSTICK
                                         :REM*239
21Ø REM F3 KEY FOR UP, S FOR DOWN, H FOR LE
    FT, F FOR RIGHT, K FOR FIREBUTTON
                                         :REM*198
```

end R

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Chain Your Programs

By MICHAEL BROUSSARD

When memory runs short, use this program-chaining technique to load one program from another.

A friend of mine who is relatively new to programming is working on his most ambitious project to date—an all-text adventure game written in Basic for the Commodore 64. After a week or so, he discovered that the 38K of memory available for a single program would not be enough. "Now what do I do?" he asked me the other day. "I'm out of memory!"

"Well," I replied, "you'll have to use program chaining." I explained the fundamentals of chaining using Commodore Basic. It's quite simple, really. All you have to do is employ the Load command from inside a program. This reads in the new program specified from disk (or tape). When it's loaded, it wipes out the program currently in memory and then runs automatically. As long as the "chained" program is shorter than the original, all the variables will be available to the chained program as well. I even wrote an example program to show him how it works:

```
10 PRINT"THIS IS THE MAIN PROGRAM.
   NOW LET'S"
20 PRINT"CHAIN TO THE SUB
   PROGRAM."
30 LOAD"SUBPROG",8
```

When you run this short program, it executes the PRINT statements shown and then loads a new program called SUBPROG from the disk. SUBPROG then runs automatically.

Armed with his new knowledge, my friend went back to programming, confident his memory problems were solved. But, within an hour he was back. "I've figured out how to break my game up into parts," he said, "but there's about 10K of code that's exactly the same for each part. Do I have to include that code as part of *every* chained program?"

Uh oh. Now the problem was getting harder. The fastest way out was to tell him that, yes, he had to include the 10K in every program. But it would take longer to load each part, not to mention the extra disk space each would occupy. Plus, for every change he might want to make to the "common" part of the code, he would have to change *every* program. Keeping all the parts in sync could turn into a time-consuming nightmare.

After a couple of hours of experimentation, I came up with a way to solve this dilemma. It's a pair of subroutines (one written in Basic, one in machine language) that enables you to do program chaining while protecting a portion of the program already in memory. Throughout the rest of this article I'll refer to this utility as Overlay.

The only restrictions involved in using Overlay are that the area of memory to be protected (I'll refer to it as the common code) must be the first part of the program, and all the overlays must begin with the same line number.

My friend decided to keep all the common code in lines numbered less than 1000. He uses two overlays I'll call MAIN and SUB1, both of which start with line 1000. Overlay's utility subroutines are part of the common code included in the lower-numbered lines. When the code in MAIN or SUB1 is needed, Overlay chains the appropriate program into memory starting at line 1000, leaving the beginning of the program (the common code) intact. First let's look at Overlay and how to use it—then I'll explain how it works.

Overlay Sample Programs

The best way to explain how to use Overlay is through an example. Type in the short program in Listing 1 and save it to disk with the name OVERLAY.BOOT.

This program "boots" an overlay application. The common code is in lines 1 through 999. Lines 10 and 20 are the Basic part of Overlay. The important variables in these two lines are ZL, which specifies the starting line number of the overlay code, and P$, which specifies the overlay program to be loaded.

The code from lines 1000 on is ex-

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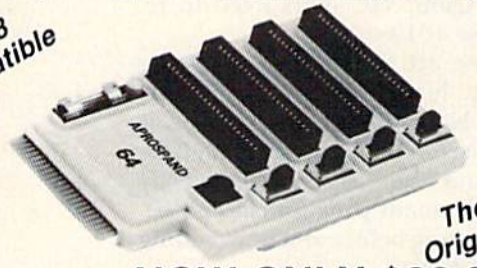


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ecuted only once. Line 1010 Pokes the machine language part of Overlay into the cassette buffer. Line 1030 arbitrarily sets a Basic pointer so that 22K of the 38K Basic memory area is available for program text, and 16K is available for variables. (On the VIC 20, the available memory is divided equally between program text and variables.) VIC-20 users need to replace lines 1030 and 2000 as indicated in the listing.

This should be adequate for most applications, but if you use very long overlays, or have a lot of variables, you may need to adjust this pointer (how to do it is explained later). Once the common code is in place and the Overlay subroutine has been poked in, line 1050 loads the main program overlay in Listing 2 into memory starting at line 1000. Type in Listing 2 and save it to disk with the name MAIN. VIC users should use the alternative version of line 1010.

Finally, type in and save a second sample overlay, Listing 3, and call it SUB1. Again, VIC users need to replace line 1010.

To see all the pieces working together, load and run OVERLAY-.BOOT. Notice how the variable Z is initially set in the boot program (line 1050) and then is used to specify where the main program should begin executing before and after calling up an overlay.

After you see how these examples work, you'll be able to use overlays in your own programs with a minimum of hassle. Modify the boot program to suit your own applications. If you wish to start your overlays with another line number besides 1000, all you have to do is change line 1 of the boot program and the value assigned to the variable ZL in line 10.

How Overlay Works

To understand how Overlay works, it's helpful to understand how the 65536 (64K) bytes of memory in the C-64 are used when you're programming in Basic. (The concepts are essentially the same on the VIC-20, but the specific RAM locations are different.)

When you first turn on or reset the 64, you see the familiar power-on message that tells you there are 38911 Basic bytes free. What happened to the other 26625 bytes? They're there, but just not available for use by a Basic program. Look at the diagram in Figure 1.

If you think of the memory in the C-64 as a string of bytes numbered from 0 to 65535, your Basic program typically resides at the beginning of the area that starts at location 2048 and extends up to 40959. The "lower" part of RAM, from location 0 to 2047, is used by the Basic operating system to do housekeeping. This space includes memory for screen management, the cassette buffer, important Basic pointers, and so forth.

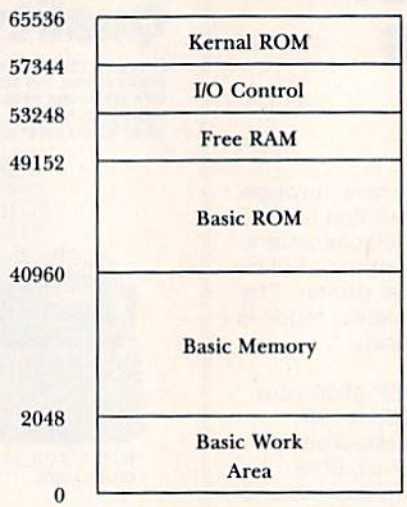


Figure 1. *Typical memory allotment in the C-64.*

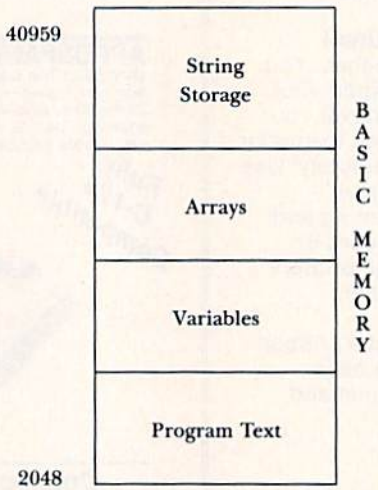


Figure 2. *Basic memory areas in the C-64.*

The Basic language and operating system program is stored on special ROM (Read Only Memory) chips, taking up 8K of memory in locations 40960 to 49151. Next comes a 4K chunk of memory from 49152 to 53247 that's free to be used for whatever you like—perhaps for machine language programs that must coexist with Basic.

Locations 53248 to 57343 are used for input/output and for sprite and sound control. Finally, at the very "end" of memory (57344 to 65535) is the Kernal ROM, a set of special machine language routines used by Basic for input/output, timer and memory management and other useful tasks.

This is, in a slightly simplified manner, how all the memory in the 64 typically is configured. Now let's turn our attention to the 38000 or so bytes reserved for your Basic program, which I'll refer to as Basic memory.

Basic memory contains not only your program, but also the values of all the variables and arrays the program needs as it runs. When you run a program, all variables are reset, and Basic creates space for each variable and array the first time it's referenced. Variables occupy memory just past the end of the program text, and arrays are just past the variables.

String variables are handled in a special way. Since strings can vary in length up to 255 characters, the string values go at the top of Basic memory, and only descriptive information about the variable (its name, length and where it's actually stored) is found with all the other variables. The diagram in Figure 2 summarizes this information.

Special pointers in lower RAM keep track of the dividing lines between the various portions of Basic memory. RAM locations 43 and 44 contain the address where program text is to be loaded (the start-of-Basic pointer). As you can see in Figure 2, this is usually set to 2048 on the 64.

Overlay works by scanning the program until it finds line 1000. Then it stores the address of line 1000 in the start-of-Basic pointer and loads in the specified overlay program, starting at *that* address instead of the default location of 2048. This leaves the part of the program numbered less than 1000 (the common code) intact.

The overlay program begins executing at line 1000, because that's where Basic thinks the program starts. The first line of the overlay resets the start-of-Basic pointer to include lines 1–999 again, so those important Pokes must be executed before you try to reference any of the common code.

When a program is loaded, Basic also sets another pointer at locations 45 and 46 to point two bytes past the program end. This is where the variables will be stored when the program

is run initially. When you use Overlay, however, this may present a problem. As you can see, if you load an overlay that's long enough to extend past where this pointer points, you'll destroy some of the program variables. To get around this, the boot program sets the beginning-of-variables pointer to a spot about two-thirds of the way into Basic memory, leaving 22K for the common code and the longest overlay, and 16K for the variables, arrays and string storage.

If the common code plus the longest overlay is longer than about 24 disk blocks, you must adjust the pointer by increasing (on line 1030 of the boot program) the value Poked into location 46. If your program produces an Out of Memory error when it runs, the pointer must be adjusted downward to increase the amount of space available for variable storage. (Out of Memory errors can also occur if your program uses too many nested For loops or too many nested GOSUBs, but this sort of error is not related to this pointer setting.)

Ideally, the pointer should be set to 8 plus the size of the common code plus the size of the longest overlay (code sizes are in disk blocks). This reserves the right amount of Basic space for the program text while leaving the maximum amount of space free for variables.

Setting this pointer on the VIC-20 is trickier, because the program starts at different locations depending on the amount of expansion RAM installed. Use the formula explained above, but instead of adding 8 to the code sizes, add the value that is stored in RAM location 44 when you first turn on your VIC (type PRINT PEEK(44) to see what this value is).

One other detail to keep in mind when using Overlay on the VIC is that it uses RAM location 784 for temporary storage. To avoid conflicts, don't use this address in any of your machine language subroutines.

I'll be happy to answer any questions you have about Overlay. Please enclose a self-addressed stamped envelope with your inquiry. R

Address all author correspondence to Michael Broussard, 13136 Lazy Glen Court, Herndon, VA 22071.

Listing 1. *The OVERLAY.BOOT program.*

```
1 GOTO 1000                              :REM*199
5 REM HERE IS THE CODE THAT LOADS AN OVERLA
  Y.                                     :REM*221
10 ZL=1000:Z2=INT(ZL/256):Z1=ZL-256*Z2:POKE
   251,Z1:POKE252,Z2                     :REM*26
20 SYS828:POKE43,PEEK(251):POKE44,PEEK(252)
   :LOADP$,8                             :REM*150
30 REM PUT CODE COMMON TO ALL OVERLAYS
                                         :REM*54
40 REM{5 SPACEs}BETWEEN HERE AND LINE 999.
                                         :REM*74
50 REM BETWEEN HERE AND LINE 999         :REM*38
1000 REM POKE IN ML PART OF OVERLAY.
                                         :REM*249
1010 FOR K=828 TO 847:READ N:POKE K,N:NEXT
                                         :REM*89
1020 REM SET BEGINNING OF VARIABLES.
                                         :REM*229
1030 POKE 45,1 : POKE 46,24 : CLR        :REM*14
1040 REM NOW LOAD MAIN OVERLAY.          :REM*72
1050 Z=0 : P$="MAIN" : GOTO 10           :REM*118
2000 DATA 165,251,133,20,165,252,133,21,32,
     19,166                              :REM*51
2010 DATA 165,95,133,251,165,96,133,252,96
                                         :REM*21
```

VIC-20 users need to replace lines 1030 and 2000 with the following:

```
1030 POKE45,1 : POKE46, (PEEK(44)+PEEK(56))
     /2 : CLR : POKE784, PEEK(44)
2000 DATA 165,251,133,20,165,252,133,21,32,
     19,198
```

Listing 2. *MAIN, the main program overlay.*

```
1000 REM *** MAIN OVERLAY ***            :REM*39
1010 POKE 43,1 : POKE 44,8 : REM MUST BE FI
     RST LINE OF OVERLAY!                :REM*11
1020 IF Z=2 THEN 2000 : REM THIS WAS SETBY
     THE OVERLAY SUB1.                   :REM*223
1030 PRINT"THIS IS AN EXAMPLE OF A MAIN"
                                         :REM*44
1040 PRINT"PROGRAM."                     :REM*242
1050 PRINT:PRINT"PRESS ANY KEY TO LOAD IN"
                                         :REM*90
1060 PRINT"THE OVERLAY."                 :REM*114
1070 GETA$ : IF A$="" THEN 1070          :REM*106
1080 P$="SUB1" : GOTO 10 : REM LOAD OVERLAY
     .                                   :REM*230
2000 PRINT:PRINT"AND HERE WE ARE BACK IN TH
     E"                                  :REM*173
2010 PRINT"MAIN PROGRAM."                :REM*121
2020 END                                 :REM*237
```

VIC-20 users need to replace line 1010 with the following:

```
1010 POKE43,1 : POKE44, PEEK(784)
```

Listing 3. *SUB1, the second program overlay.*

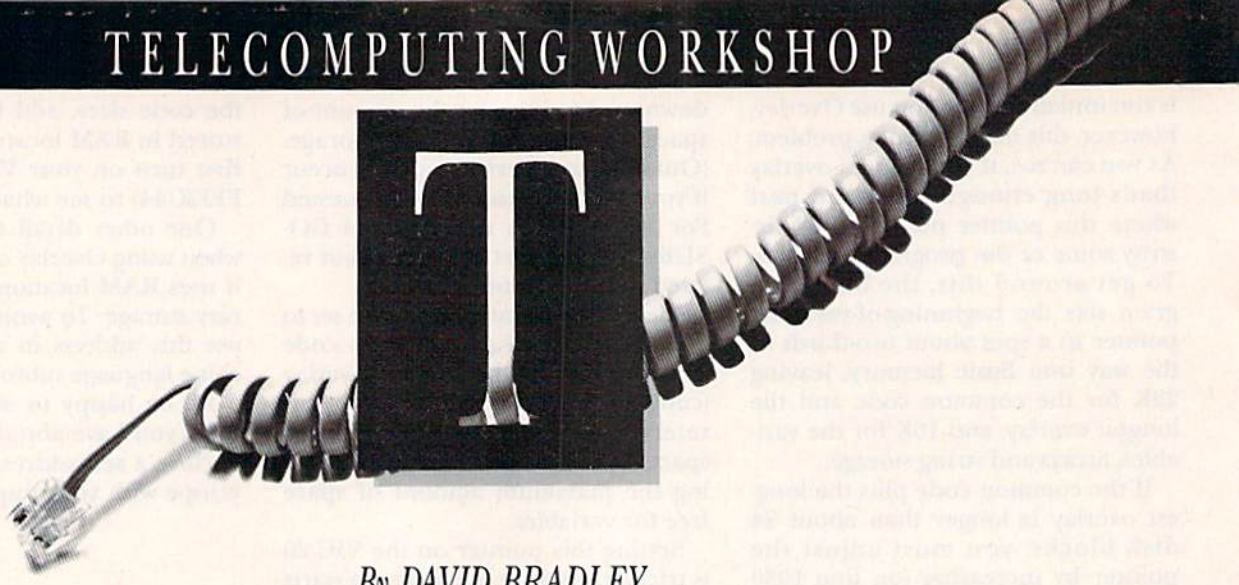
```
1000 REM *** SAMPLE OVERLAY SUB1 ***
                                         :REM*167
1010 POKE 43,1 : POKE 44,8 : REM MUST BE FI
     RST LINE.                           :REM*41
1020 PRINT:PRINT"THIS IS THE OVERLAY."
                                         :REM*131
1030 PRINT:PRINT"PRESS ANY KEY TO RETURN TO
     "                                   :REM*28
1040 PRINT"THE MAIN PROGRAM."            :REM*112
1050 GETA$ : IF A$="" THEN 1050          :REM*84
1060 Z=2:REM Z TELLS MAIN PROGRAM WHERE TO
     RESUME EXECUTION                    :REM*102
1070 P$="MAIN" : GOTO 10 : REM LOAD MAIN AG
     AIN.                                :REM*86
```

VIC-20 users need to replace line 1010 with the following:

```
1010 POKE43,1 : POKE44, PEEK(784)
```

end R

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 Pine St.
Peterborough, NH 03458

I'd like to know what modems, if any, are compatible with my Commodore Plus/4? I'd also like to know if I can connect to CompuServe and QuantumLink with a Plus/4. If so, would I have to buy any special software or hardware?

Ron Dunbar, Jr.
Templeton, PA

I have a Plus/4, but had never used it as a terminal before receiving your letter. According to the Plus/4 manual, the computer will work with the Commodore 1660 modem. However, I wanted to try it with a 1670. The 1670 manual says, on page 69 in the section on troubleshooting, that the third dip switch on the modem must be up for the Plus/4 to achieve successful data transmission. I flipped the dip switch and connected the modem to the computer. Then I had to find a terminal program.

I thought Higgyterm, the terminal program packaged with the 1660 modem, might do the trick. Written by Paul Higginbottom and updated by David Berezowski, Higgyterm comes in versions for both the C-64 and Plus/4 and operates at various baud rates, including 1200. I tested it with the 1670-Plus/4 combination on Delphi and various BBS's in and around Toronto and had no trouble at all.

If you purchase a 1660, Higgyterm will come with it, but if you opt for the 1670, you'll have to dig up the program yourself. It's available from the Toronto Pet Users Group on a disk called (C)C4 TPUG Commodore 64 Telecommunications Disk #4. Write to TPUG's general manager, Bruce Hamsen, at 101 Duncan Mill Road, Suite G7, Don Mills, Ontario, Canada M3B 1Z3.

This is the only terminal program I've found for the Plus/4 to date, but I'll continue to look for others.

I've had my C-64 system for about 2½ years, and now I want to add a modem. I've learned a lot about modems, but I'm not sure which brand to purchase. Could you please recommend a modem and terminal program?

Terry Cramer
Bridgewater, NJ

There are many factors to consider in shopping for a modem and terminal program. I won't recommend any particular products, because everybody's needs are different and what I suggested might disappoint you. However, I will try to point you in the right direction and leave you with fewer questions than you had at the beginning.

Before you buy your first modem, think about what you'll be doing with it. Try to anticipate which systems you'll be calling and then find out what baud rates (300, 1200 or whatever) they use and what transfer protocols (such as Punter, Xmodem or Kermit) they support. Then find a terminal program that will support those baud rates and protocols and buy a modem appropriate to the program.

Buying the program first and then the modem may seem backwards, but I've talked to many people who picked up a modem without finding out what programs were available for it and then discovered they couldn't do everything they wanted. They often ended up selling their first modem (at a loss) and getting another one.

There's an exception to this approach if you contemplate moving to another computer. If that's a possibility, get a modem that will work with various machines (even though the price may be a bit higher); then choose your terminal program from those that are compatible with it.

By the way, don't limit your terminal-program search to commercial software. There are lots of excellent public domain and freeware terminal programs out there.

One of the most reliable sources of help when you want to get into telecommunications is a person who's already involved. Check at your local user's group; you'll probably find someone who can help you there.

I have a C-128 but have been unable to find any terminal software specifically for 128 mode. Any help would be appreciated.

Harold A. Taylor
Greenwood, SC

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So far, I've seen only one terminal program for the C-128 in 128, 80-column mode. It's called MULTITERM128 2.7 and it does a lot of things, supports a lot of modems and generally looks good. It's a freeware program written by Steve Thompson, 12 218th Place SW, Bothell, WA 98021. Write to Steve, and I imagine he'll tell you how to get it.

There may be other terminal programs for the 128 that I haven't seen. However, it'll probably be a while before there are many of them. Watch this column; if any other good ones come to my attention, I will mention them.

Can you tell me about PunterNet, and how I can get on it as a user and then become a SYSOP?

Phelps Nightingale
Utah

PunterNet is a network of local Commodore bulletin board systems (BBSs). Each BBS is a self-contained entity, with all the standard Punter BBS features like a message section, a bulletin section and an upload/download section using the Punter protocol and, in most cases, 300 and 1200 baud. Through a BBS you can also communicate with users of other BBSs associated with PunterNet.

Each BBS is known as a "node" and is assigned a node number when it joins the network. Generally, anyone who wants to send messages over the network forwards a little money (usually less than $10) to cover the long-distance charges. Then the actual charges are deducted until the money is gone.

You can get involved in PunterNet by loading your favorite terminal program and calling one of the many nodes all over North America. At the time of this writing, there are 43 registered nodes. We haven't room to list them all, but you could start with Steve Punter's own node (#1) in Ontario, Canada; the number is 416-896-1446. You can get the phone numbers of other nodes from there.

If you want to run a node, you'll have to be prepared to make a substantial commitment of time, as well as some money. It takes quite a while to get the system running and to get comfortable with the BBS program, and you'll probably need to purchase additional hardware, along with the BBS program.

If you do decide to establish a PunterNet node, write to Steve Punter for the BBS program. He charges $100 (U.S. funds) for it and supplies updates for a nominal fee every time he improves the system. Steve's address is 4342 Forest Fire Lane, Mississauga, Ontario, Canada L4W 3P4.

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Q-Link Happenings

QuantumLink has recently expanded its services to include a revised software library, casino-style games and an area devoted to the latest rock 'n' roll events and news.

Free Software Library

The Software Libraries now feature a format of directories, with listings that can be downloaded and reviewed offline, thereby eliminating the expense and hurry of reading program descriptions online. The program descriptions have also been revised to include estimated download times, block size and whether or not additional software is needed prior to downloading.

Subscribers can now choose from more than 3000 Commodore programs, paying only for the time needed to transfer the file from the Q-Link system to their disks.

Casino

QuantumLink has recently introduced a new series of casino games, including slots, poker, bingo and blackjack. Three-wheeled slot machines have progressive jackpots; five-card stud poker allows Q-Link members to bet against one another; and bingo can be played with a group of online friends.

Game designer and developer Rob Fulop notes that "this is the first casino game in which players can compete from home with full-color graphics and audio."

RockLink

Located in QuantumLink's Just For Fun department, RockLink offers the latest news and information on all aspects of the rock music industry. Top musicians, writers and producers appear monthly for online discussions in the Auditorium. Computer jockeys and radio reporters key in the latest music news, backstage gossip, concert dates and vinyl and video releases.

RockLink also offers a library of historical hits, digitized photos of rock stars that can be downloaded and printed, a music review board where users can post their own opinions, a daily music trivia question and a message board.

Heard on QuantumLink

Commodore 128 engineer, Jeff Porter, says that Commodore will introduce a new 512K RAM expansion, the 1764, for the C-64 this fall. Identical in appearance to the 1750, it will have a deluxe C-64 power supply to handle the extra load. It will function with the latest version of GEOS for super-fast responses. R

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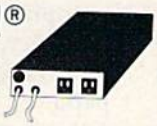
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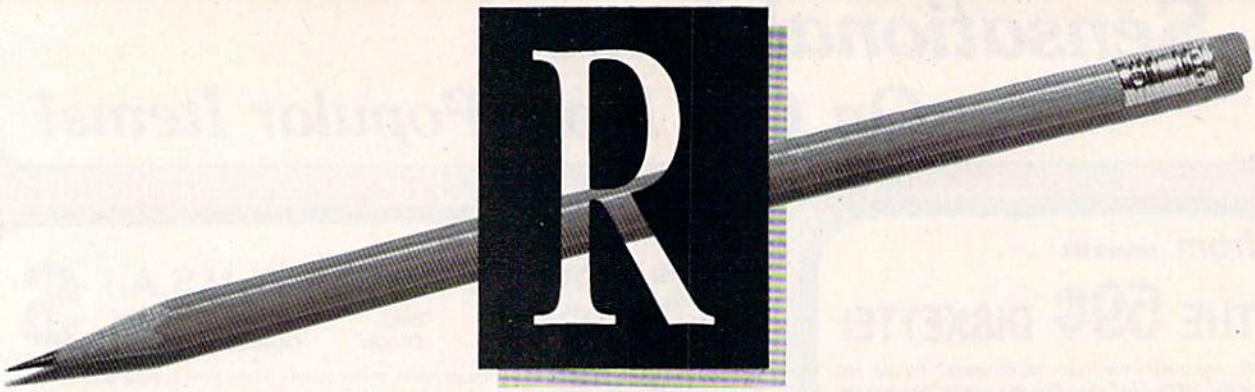
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By MARGARET MORABITO

The sight of a personal computer in a public library with a group of excited kids crowded around is eye-opening. It's even more impressive when you realize that this may be the only computer these kids can access whenever they want. A public library can be the perfect location for encouraging computer literacy in the community.

The Winchendon, Massachusetts public library and a Commodore 64 system teamed up three years ago in what has turned out to be a very economical arrangement for offering computer usage to hundreds of community members. It was a windfall for the library, initiated by a philanthropic citizen who anonymously donated the system.

Says Julia White, the Winchendon town librarian, "At the time, this was the only place where kids and adults could work with a computer at their leisure and for free. Things are a bit different now, with the schools having several computers, but back then neither the teachers nor the parents could afford a computer. Even with the computers in schools, we still have students coming in after school to use our C-64."

The Equipment

The Winchendon library has a C-64, a 1541 disk drive, a color monitor and a growing public domain software collection. The entire project has been a bare-bones operation, with the donated equipment, free software and the library staff tutoring the patrons.

As a matter of fact, the library doesn't have even one commercial program. The patrons don't get exposed to the newest software on the market, but they can become familiar with the basics of computer usage.

A public library can enable an entire community to use a computer.

Some users are regular customers, coming back to learn more and to practice new skills. Some appear a few times, but then don't come back. In many cases, the ones who disappear have decided to purchase their own home computers. In other cases, the initial curiosity has worn off and VCRs have moved in.

Regardless of the long-term outcome, the important point is that this is one method of providing free access to a personal computer for people of any age or economic level.

The Winchendon library is small in comparison to many public libraries, with only about 25,000 volumes, and its budget is limited. White says, "Being able to provide a personal computer in a library this size was unusual when we first got ours, and it still is. Even some of the bigger libraries have no computer for patron use; many have one only for staff use."

White continues, "I would like to get another computer sometime, when we get funding for it. This would be used strictly by the staff for word processing, cataloging books and handling the desk chores, such as overdue notices, which are especially time-consuming."

Individual Attention

There are three staff members to handle the 35 hours per week the library is open, and one of them is only half-time. Ms. White is the head of the computer operation, and her four years of experience as a Commodore user place her in the veteran category. However, she is quick to point out that the other staff members are capable of helping patrons with computer questions when she's otherwise occupied.

The small number of patrons using the computer at any one time has kept supervision of the project within reasonable bounds. The demand has been continuous, but it has not called for formal classes. Training is handled on the spot, and users can either drop in unannounced or make an advance reservation. If a patron comes in and wants to learn how to use the computer, the librarian will take the time to show him or her the proper procedure for turning on the equipment, how to handle a disk, how to load and list a directory, and how to load and run a program.

"Actually, this individualized instruction is rarely found today," says White. "We can do it because we are so small—and the people appreciate it."

Supplementary Materials

The *Commodore 64 Programmer's Reference Guide* stands beside the monitor as a reference for technical questions that the librarians cannot answer. Other books have become popular with the patrons as well. A big hit is

The Computer Playground, by M. J. Winter (Datamost, 1983), which contains examples and short programs that students can type into their C-64s or VIC-20s.

Game books are also favorites, notably *The A to Z Book of Computer Games*, by T. McIntire (TAB Books, 1979), and *Commodore 64 Games*, from Compute! Publications (1981). The latter has been used so much that the library had to have it rebound! Games, of course, can be quite instructive for someone wanting to learn about programming. They also tend to be lively, and they prompt the user to interact with the computer.

All of these books provide short programs to type in. White points out that what people need most are very short programs that actually do something they can watch, listen to or use for a practical purpose. Programs they can type in at one sitting are the most popular. These give the user a feeling of accomplishment at having completed a project, and they provide enough programming routines to demonstrate at least one aspect of programming, whether it's how a GOTO works or the function of a Print statement.

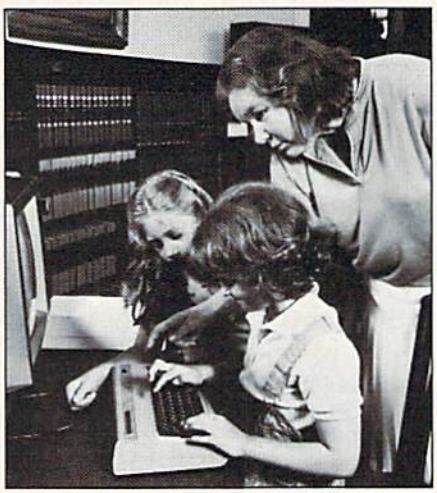
Software

As for software, the library has only public domain programs, primarily from Commodore. "When we first got started, public domain software was the only route to go. Commodore was very helpful then in providing disks that we could copy and return." Now, most Commodore public domain software is available for a minimal price in the same stores that sell C-64s and from mail-order houses.

The library hasn't purchased any commercial programs or any peripherals, such as a much-needed printer, because the trustees haven't allotted the necessary money. Even so, the public domain software has kept the project going, and the more advanced patrons write their own programs and share them.

Which programs are worthwhile? Well, there are some that are used over and over again. Of these, some are strictly educational and some are games. White doesn't feel it's wise to stock up on too many games. "We don't want this place turning into an arcade parlor, but supplying a few games is useful because it gets the kids interested in using the computer quickly; it breaks the ice."

Over the years, some public domain programs have become hits with the Winchendon patrons. Madlibs is an educational program that teaches parts of speech. The student is prompted to provide his or her own words to match up with a particular part of speech. When asked for an adjective, the child needs to know what an adjective is. "Every so often I'll get someone racing up to ask me what an adverb is," laughs White.



Librarian Julia White and young patrons.

After the student supplies the words, the program incorporates them into a silly story. The child selects which one of a collection of stock stories the program should use.

Another popular educational program is the traditional game Concentration. The user has to remember where certain graphic designs, letters or words are hidden behind blocks on the screen. The task is to uncover matching pairs.

Snoopy Number Line is a math program that provides practice in identifying positive and negative numbers. A number line is displayed, and the student has to identify where the cursor lies on the line; too many incorrect answers and the game is lost. Other popular programs at the library are games such as Duck Shoot, Westward Ho and Dam Busters.

Maintenance

The library's Commodore system has not required much maintenance or repair in four years. Once, the power supply had to be repaired. The main source of problems has been the disk drive. It has gone out of alignment a few times. "Whenever a piece of equipment is used by many different people, you'll find that it breaks down more quickly than with one user. That's just the way it is," says White. The computer itself has not required any work.

Additional costs for the library have been minimal. They had to install an electrical outlet for the computer system, and they purchased a large computer table. "I recommend that any library thinking of getting a computer should be sure to get a large table also," White said. "Patrons need to be able to spread out their papers, books and disks."

This kind of computer project offers invaluable benefits to all members of the community, young and old, and the expenses to the library are small. Those of you who have just purchased a new 64C or C-128 might consider donating your little-used VIC-20 or C-64 to your local library. It might be the perfect second home for your old computer. R

If you're using Commodore computers for educational purposes (at home or at 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 you are 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 or parents, please send along a disk with a brief description of the programs. Send correspondence and disks to:

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From p. 10.

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2Ø OPEN3,3
3Ø GOSUB6Ø
4Ø B$=B$+A$:IFA$=CHR$(13)THENPRINT"{2 CRSR
   DNs}";B$:B$=""
5Ø GOTO3Ø
6Ø GET#3,Z$:PRINT"{CRSR LF}";
7Ø GET#3,Z$:PRINT"{CRSR LF}";
8Ø PRINT"{CTRL 9} {CTRL Ø}{CRSR LF}";:GETA$
   :PRINTZ$"{CRSR LF}";:IFA$=""THEN8Ø
9Ø PRINTA$;:RETURN
```

Charles Kluepfel
Bloomfield, NJ

$33D Son of Burrow—I've added color and sound to Magic's first published trick ($00, January 1984). My little toddler enjoys watching it, but hey, so do I!

```
Ø REM SON OF BURROW - DOUGLAS BURR
1 A$="{CRSR UP}{CRSR DN}{CRSR RT}{CRSR LF}"
  :B$="{CTRL 1}{CTRL 2}{CTRL 3}{CTRL 4}{CTR
  L 5}{CTRL 6}{CTRL 7}{CTRL 8}{COMD 1}{COMD
   2}{COMD 3}{COMD 4}{COMD 5}{COMD 6}{COMD
  7}{COMD 8}":DIMH(16):FORI=1TO16:READH(I):
  NEXT:W=54276
2 F=54273:DATA39,37,42,44,47,5Ø,53,56,59,63
  ,67,71,75,79,84,89:FORS=54273TO54296
3 POKES,Ø:NEXT:POKE54296,15:POKE54277,1ØØ:P
  OKE54278,1ØØ:POKEW,33
4 D=INT(1+(16-1+1)*RND(.)):PRINTMID$(A$,RND
  (.)*4+1,1)"*{CRSR LF}";
5 PRINTMID$(B$,RND(.)*16+1,1)"{CTRL 9} {CRS
  R LF}";:POKEF,H(D)/3.5:GOTO4
```

Douglas Burr
White Plains, NY

$33E Typing for toddlers—Children will have fun printing short messages they've typed on the screen, without having to load a word processor. Type in this little program.

```
Ø REM SIMPLE TEXT PRINTING - JERALD BROWN
1Ø OPEN 4,4,7
2Ø INPUT"TYPE IN WORDS:";A$
3Ø PRINT#4,A$
4Ø GOTO 2Ø
```

Youngsters can type in words or short messages, which will print out on hard copy when they press the return key.

Jerald Brown
Erlanger, KY

$33F Catch the wave—I had a problem with wavy lines scrolling up my monitor screen. I discovered that the fluorescent light on my computer desk was the culprit. Switching to incandescent lights solved the problem.

Jerald Brown
Erlanger, KY

$340 Decimal fractions = common fractions—I've written a program that converts decimal fractions into their equivalent common fractions.

```
Ø REM DECIMALS TO FRACTIONS - ED DARACK
1Ø PRINT"{SHFT CLR}{COMD 4}":POKE 5328Ø,Ø:P
   OKE 53281,Ø
2Ø INPUT "INPUT A DECIMAL NUMBER";X
3Ø X$=STR$(X):T=LEN(X$)
4Ø PRINT "{CRSR DN}{CTRL 6}WORKING{CRSR DN}
   "
5Ø FOR Y=1 TO 256
6Ø FOR Z=256 TO 1 STEP-1
7Ø E=(Y/Z):E$=STR$(E):IF LEFT$(E$,T+1)=X$ T
   HEN 1ØØ
8Ø IF Y=256 THEN PRINT"{3 CRSR DNs}{CTRL 8}
   {CTRL 9}NUMBER TOO LARGE{CRSR RT}{CTRL Ø
   }"
9Ø PRINTZ,Y"{3 CRSR LFs}{CRSR UP}":NEXT:NEX
   T
1ØØ PRINT "{CRSR DN}{CTRL 5}THE FRACTION FO
    RM OF";X;"IS{CTRL 8}";Y;"/";Z
11Ø PRINT "{CRSR DN}{CTRL 3}ANOTHER (Y/N)"
12Ø GET A$:IF A$=""THEN 12Ø
13Ø IF A$<>"N"THEN 1Ø
14Ø END
```

Ed Darack
Lompoc, CA

$341 Heads or tails?—This one-liner simulates 100 coin tosses. Teachers and students of Basic programming may find the program of interest. It demonstrates important concepts, including For...Next looping, the RND function, Boolean expressions and subscripted variables. That's a lot of programming knowledge in a small package!

```
1Ø REM COIN TOSS SIMULATOR - S. SANDER
2Ø PRINT"{SHFT CLR}":FORX=1TO1ØØ:T=(RND(Ø)>
   .5)+1:S(T)=S(T)+1
3Ø PRINT"{HOME}HEADS:"S(Ø)TAB(18)"TAILS:"S(
   1):NEXT:CLR: INPUT"AGAIN(Y/N)";N$
4Ø IFN$="Y"GOTO1Ø:END
```

Stephen Sander
Kennett Square, PA

$342 3.14159C64C128—This program gives you successively more accurate approximations of pi, and they are correct to eight decimal places after only ten passes.

```
10 A=1:B=1:C=1
20 A=A+2:B=B*(A-2):C=C*(A-1):D=2↑A*A:E=E+B/C
   /D:PRINT(E+.5)*6:GOTO20
```

Dana A. Berry
Provincetown, MA

$343 Byte-size sequential files—If you've ever tried to load an important sequential file into a word processor, only to find that it was too long to fit into its text buffer, then my program is for you.

The program asks you for the filename of that long file and the desired size, in bytes, of your new, smaller files. It then splits your large file into several smaller files with filenames beginning with 1, 2, and so on.

```
Ø REM SPLITTING SEQ FILES - JIM BRANBERG
1 INPUT"{SHFT CLR}{CRSR DN} FILENAME";N$:IN
  PUT"{CRSR DN} SIZE OF NEW FILES (IN BYTES
  )";B$:CK%=VAL(B$)
```

→

```
2 ST%=64:N=49:OPEN 2,8,2,N$+",R"
3 AA$=CHR$(N)+CHR$(16Ø)+N$:X=Ø:Q%=Ø:OPEN 3,
  8,3,AA$+",W"
4 GET#2,A$:Z=ASC(A$+CHR$(Ø)):IF Q%=1 THEN 6
5 IFZ=44 OR Z=59 OR Z=58 THEN A$=CHR$(34)+A
  $:Q%=1
6 IF A$=CHR$(13) GOTO 9
7 IF STATUS AND ST% THEN PRINT#3,B$:PRINT#3
  :CLOSE 3:CLOSE 2:END
8 B$=B$+A$:GOTO 4
9 X=X+1EN(B$)
1Ø PRINT#3,B$:IFX>CK% THEN N=N+1:PRINT#3:CL
  OSE 3:GOTO 3
11 B$="":GOTO 4
```

Jim Branberg
Los Angeles, CA

$344 Number formatting—You can format and accurately round numbers to any desired number of decimal places. The resulting string will contain zeros to fill places having no digit, including an initial zero for numbers between zero and one.

```
1Ø REM NUMBER FORMATTER - ROBERT FLETCHER
2Ø K=4:REM # OF DECIMAL SPACES
3Ø PRINT"{SHFT CLR}{3 CRSR DNs} "N,N$
4Ø PRINT"{2 CRSR DNs} INPUT N {CRSR DN}":IN
  PUTN
5Ø X=INT(N*1Ø{UP ARROW}(K+1)):X$=STR$(X)
6Ø IFVAL(RIGHT$(X$,1))>4THENX=X+1Ø
7Ø X$=STR$(X):L=LEN(X$):IFL>K+2THEN11Ø
8Ø N$="Ø.":IFL=K+2THEN1ØØ
9Ø FORJ=1TO(K+2-L):N$=N$+"Ø":NEXT
1ØØ N$=N$+MID$(X$,2,L-2):GOTO12Ø
11Ø N$=MID$(X$,2,L-K-2)+"."+MID$(X$,L-K,K)
12Ø PRINT"{2 CRSR DNs} "N,"*"N$"*"
13Ø GETKEY RPT$
14Ø GOTO1Ø
```

Robert Fletcher
Annandale, VA

$345 SFD 1001 disk renamer—Luke Mester's Disk Name Changer (trick $2DD) is a useful program, and I've made these line changes so that owners of SFD 1001 disk drives can change disk names, too.

```
1Ø REM SFD 1ØØ1 RENAMER - DAVE ENGLISH
15Ø PRINT#15,"U1:2,Ø,39,Ø"
16Ø PRINT#15,"B-P:2,6"
2ØØ PRINT#15,"B-P:2,6":PRINT#2,DN$;
21Ø PRINT#15,"U2:2,Ø,39,Ø":CLOSE2
```

Also, a user-friendly code should give you the opportunity to check and correct input. Here's a code for that check. It works with any drive.

```
174 :
191 PRINT"VERIFY: "DN$
192 PRINT"OK (Y/N) ?"
193 GETA$:IFA$<>"N"AND A$<>"Y"GOTO193
194 IFA$="N"GOTO175
```

Dave English
Orange, CA

$346 Quick directory C-64—The Safe Directory program Pokes a short machine language routine into memory, beginning at location 830. The routine reads and displays the directory of the current disk, without harming a Basic program. To use it, type SYS 830 and press return. The directory will then be displayed as it is read from the disk. Press the shift or shift/lock key to pause the output, and the run/stop key to stop output.

Append the Basic loader to the end of your routine, and use the Gosub command to access it.

```
1Ø PRINT"{SHFT CLR}QUICK DIRECTORY C-64 BY
  D. MORRIS
15 FORA=83ØTO945:READB:POKEA,B:C=C+B:NEXT
2Ø IFC<>16387THENPRINT:PRINT"ERROR IN DATA"
  :STOP
25 PRINT:PRINT"'SYS83Ø' TO ACTIVATE - 'SHIF
  T' TO PAUSE"
3Ø SYS83Ø
35 DATA169,2,162,176,16Ø,3,32,189,255,169,1
  ,162,8,16Ø,Ø,32,186,255,32,192
4Ø DATA255,24,162,1,32,198,255,176,75,32,2Ø
  7,255,32,2Ø7,255,169,13,32,21Ø,255
45 DATA32,2Ø7,255,32,2Ø7,255,32,2Ø7,255,133
  ,252,32,2Ø7,255,133,251,165,144
5Ø DATA2Ø8,44,165,251,166,252,32,2Ø5,189,16
  9,32,32,21Ø,255,32,2Ø7,255,32,21Ø
55 DATA255,174,141,2,2Ø8,251,166,145,224,12
  7,24Ø,15,32,2Ø7,255,1Ø5,Ø,2Ø8,235
6Ø DATA169,13,32,21Ø,255,76,1Ø2,3,24,169,1,
  32,195,255,32,2Ø4,255,96,36,48
```

David W. Morris
Atmore, AL

$347 Instant reset button—Transform your C-64's restore key into a reset button with this two-line program.

```
Ø FORA=4Ø7Ø4TO4Ø7Ø6:READB:POKEA,B:NEXT:FORA
  =3277ØTO32776:READB:POKEA,B:NEXT:NEW
2 DATA32,248,252,Ø,159,195,194,2Ø5,56,48
```

Chris Mansfield
Poplar Bluff, MO

$348 Time machine 64/128—Convert improper times into correct form. For example, 1 hour, 71 minutes becomes 2 hours, 11 minutes.

```
1Ø PRINT"{SHFT CLR}TIME MACHINE 64/128 - MI
  KE DANIEL
11 INPUT" {3 CRSR DNs}HOW MANY ENTRIES";EN:
  IFEN<11THEN19
12 DIM M(EN)
19 PRINT "{SHFT CLR}":FOR E=1 TO EN
2Ø PRINT"#"E:INPUT "HOURS";H(E):INPUT"MINUT
  ES";M(E):PRINT "{SHFT CLR}":NEXTE
3Ø FORE=1TOEN:TH=TH+H(E):NEXT
4Ø FORE=1TOEN:TM=TM+M(E):NEXT
5Ø IF TM<6Ø THEN 1ØØØØ
6Ø IFTM=6ØTHENTH=TH+1:TM=Ø:GOTO1ØØØØ
7Ø D=TM-6Ø:TM=D:D=Ø:TH=TH+1:IFTM<6ØTHEN1ØØØ
  Ø
9999 GOTO 7Ø
```

→

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```
10000 PRINT"HOURS....."TH:PRINT"MINUTES..."
      TM:END
```

Mike Daniel
Fountain Valley, CA

$349 Datafile punctuation—In Mike Konshak's Datafile program (*RUN*, November and December 1984), you cannot include commas, colons or semicolons in data you are entering. But you can if you enclose such data in quotes, for example, "Anucci, Mary Lynn: unemployed." The quotes aren't counted as characters, and they won't appear in any printouts.

David M. Palo
Escanaba, MI

$34A Protect your writes—It's always a good idea to use write protects to safeguard the information on your disks, and when they wear out, black electrical tape is an inexpensive replacement. Use tape that's from one-half to three-quarters of an inch wide, and cut it about an inch long. It works great!

John Chong
Syracuse, NY

$34B Printer grease—After I ran nearly 7000 sheets of paper through my Panasonic KXP-1091 printer, the paper bail pivot arms on the square tractor drive shaft had had a lot of wear and started jumping, causing the platen to jam. Replacing the damaged parts can be expensive. Apply a dab of white grease such as Lubriplate to the pivot arms where the square shaft passes through them. If I'd done this when I purchased my printer, I'd've saved myself a lot of grief.

Jay H. Graff
Bossier City, LA

$34C Easier loading 1571—When running unprotected C-128 programs in a 1571 disk drive, you may have noticed that the disk drive sometimes has trouble finding the program you want to run. The problem is that in 128 mode, the 1571 has difficulty reading programs written in single-sided format. If you make a copy of your unprotected software onto a 1571 double-sided format, you will have much smoother and faster loads. This works great with the autobooters, too. Try copying your 1571 test/demo disk using the double-sided format and watch how fast DOS shell loads.

Jay H. Graff
Bossier City, LA

Compiled by RUN *staff members Harold R. Bjornsen, Margaret Morabito and Tim Walsh. Send your trick submissions to Magic,* RUN *magazine, 80 Pine St., Peterborough, NH 03458.*

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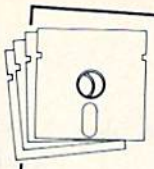
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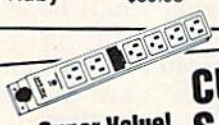


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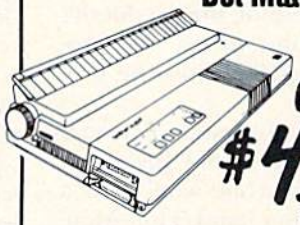
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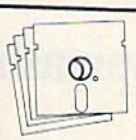


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From p. 24.

ule events and deadlines for people and things.

Of the three programs, Time Manager is the only one that is suitable for use by a small business. In my opinion, Personal Accountant and Personal Inventory are for private use only.

You'll need a 1571 disk drive as well as an 80-column monitor to run this software. If you don't own two disk drives, you'll also need separate program and data disks.

Cardco's manual is extensive, but not particularly useful, since it doesn't really tell you how to use the program; it only describes how the program works.

Of the three programs, Personal Accountant and Personal Inventory can be used by anyone who owns a C-128. On the other hand, Time Manager has too much power for casual personal use, unless you have many things to keep track of.

While these programs may not be the newest in the computing world, they get the job done. If this initial offering is successful, Cardco and others will undoubtedly be marketing other rehabilitated CP/M programs, which is good news for C-128 owners.

At $39.95, these programs offer fair value for the money and a way for the average personal computer owner to accomplish a valuable goal: Keeping track of time and money. *(Cardco, Inc., 300 S. Topeka, Wichita, KS 67202. C-128/$39.95 disk.)*

Alex Lane
Jacksonville, FL

Solo Flight

A

Your C-64 Talks You Through Your First Solo Flight

The new version of Solo Flight may not be the first simulation to incorporate software speech, but never before has a program used speech so effectively. Even Kennedy Approach, MicroProse's air traffic controller simulation, used speech only to duplicate, in voice, the instructions that were already entered via joystick.

With Solo Flight, however, the realistic voices you hear during flying practice can literally guide you from take-off at one airport to landing at another. In between, you'll be instructed to "increase throttle" or "raise nose" when your altitude is too low, "turn to 270 degrees" when you should head west, and "extend landing gear" as you make your final approach.

When you complete your first successful airport-to-airport flight, the flight instructor proclaims, "You're ready to solo," and signs off.

In addition to spoken commands, all instructions are duplicated on the instrument panel display along with weather updates and occasional words of encouragement. The instrumentation also includes gauges for airspeed, throttle setting, altitude and vertical velocity, as well as a compass, fuel gauge, artificial horizon, and indicators to show the status of flaps and landing gear. Your plane is even equipped with dual VORs and an ILS glideslope indicator.

The VORs display your plane's position relative to radio transmitters located at ground stations near some of the airports. By knowing the coordinates of specific airports, the VORs can be used as navigational aids, especially when flying through cloud banks. Similarly, the ILS indicator shows the position of your plane relative to the "perfect" approach as you descend toward the runway.

In all, there are 42 different airports that you can fly in and out of. These are spread out among Kansas, Washington, Colorado and three states that are new to this version of Solo Flight—Michigan, Massachusetts and Texas.

In each state, characteristics of the terrain, such as mountains, lakes and coastline, have been duplicated as accurately as possible. While the scenery can't exactly be called "detailed," it does give you some sense of what it would actually be like to fly over certain areas of the country.

Another element that adds realism and a certain regional flavor to some of the flights is the climate. In Massachusetts, for example, you'll often encounter strong crosswinds when flying down to Hyannis, and fog-banks around Lake Michigan can force you to rely on your instruments for guidance. To help you keep up with changing flying conditions, the weather updates that appear at the bottom of the screen include wind direction and speed, the cloud ceiling in feet, and the visibility in miles.

Other options available in the C-64 version of Solo Flight include landing practice with a contest mode for cross-wind landings, night flying and instrument flight rules. There is even a Mail Run game that requires you to fly mail deliveries from airfield to airfield under a variety of weather conditions. At the higher skill levels, there is also the possibility of mechanical failure.

Although Solo Flight gives you no enemy planes to shoot down or ground targets to bomb, its realism makes even short flights between nearby airports thrilling. This realism, combined with playability, makes Solo Flight the type of simulator that will keep most computer pilots happily airborne for quite some time. *(MicroProse Software, Inc., 120 Lakefront Drive, Hunt Valley, MD 21030. C-64/$34.95 disk.)*

Bob Guerra
Charlestown, MA

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B

Dribble, Pass and Score Like the Pros

Real basketball players do more than just shoot and dribble; they box out when they rebound, set screens for teammates and try to hit the open man with their passes.

Activision touts Two-on-Two as real basketball, and it does incorporate nearly all of the maneuvers and tactics of true-to-life basketball.

The only major differences between GBA Basketball and the actual sport is that the computer version is a half-court rather than full-court contest, and there are two players, rather than five, on each side. Also, though a

minor point, you can't fast-break after collecting a defensive rebound.

These departures from reality shouldn't detract too much from the fact that GBA raises the level of computer basketball one step higher than ever before. This program enables you to do two things in particular that are impossible in a one-on-one game—passing and being able to set picks and run plays off screens.

One of the most impressive characteristics of GBA Basketball is its many options. You start out by choosing between a practice session or regular game.

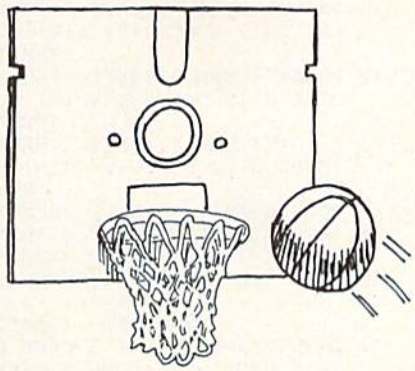
If you decide to play a regular game, your options are to have one or two players against the computer or one player versus another. Then you select one of four divisions to determine the level of competition.

Next, you must define the skills of the joystick-controlled players. Computer-controlled teammates are selected from a list of 10 superstars whose styles and abilities are patterned after NBA players. Offensive selections help you position your teammate in relation to the basket; defensive selections help you coordinate man-to-man or zone coverage with your teammate.

Game action is simple but elegant, and graphics and animation are fantastic. You view half the basketball court from directly above midcourt, and crowded stands are visible at the sides. At the top of the screen is a scoreboard that displays the period, score, offensive and defensive fouls, time remaining and a pair of 24-second clocks.

When two players compete against a computer-controlled team, each moves his on-screen character with a joystick, just as in the actual game, where the key to offensive success is constant movement, cutting toward the basket, setting screens for a teammate, passing to him when he's open and taking the shot when you're open.

You'll quickly learn to avoid mistakes, like getting caught out of position, when you realize that GBA Basketball demands as much precision and quick thinking as playing in the NBA. Unfortunately, just like real basketball, it takes a while to master. The time it takes to find the right



shooting touch can be particularly frustrating.

But all of those frustrations can quickly be erased the first time you execute a perfect pick-and-roll, hit your teammate with a pinpoint pass to send him in for an easy layup or nail a 30-foot jumpshot off a screen. GBA Championship Basketball: Two-on-Two makes it possible for you to do all that without ever moving from in front of your computer.

As has been said, this program takes computer basketball one step higher, but not quite to the top. There's still room up there for a computer version that permits full-court play. *(Activision Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/ $34.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

Super Boulder Dash



This Super Version Of the Popular Original Won't Disappoint You

If you're familiar with the original Boulder Dash, you know it featured Rockford, a cute little spelunker, who, with your help, had the unenviable job of digging his way through 16 caves in search of diamonds.

Not only did each cave have five different skill levels and its own construction and color scheme, but each one also had a unique problem, obstacle or enemy for Rockford to overcome.

In some caves, the diamonds were protected by deadly fireflies that had to be avoided or destroyed. In other caves, you had to make your own diamonds by dropping boulders through enchanted walls or by leading butterflies to a quickly expanding amoeba that turned winged insects into shimmering gems.

Super Boulder Dash features 16 new caves that will challenge even seasoned Boulder Dash veterans. You will encounter the familiar obstacles—butterflies, amoebas, boulders and fireflies—in exciting variations that require the development of entirely new strategies.

Super Boulder Dash adds no new game elements, however, and the object remains the same. You must recover the required number of diamonds before running out of time.

Another aspect of Super Boulder Dash that remains unchanged is the way boulders and diamonds are affected by the force of gravity. When on solid ground, both boulders and the boulder-sized diamonds are perfectly stable. As you tunnel through some tight spots in the earth to reach buried diamonds, however, boulders are often inadvertently freed, and massive avalanches can come crashing down on Rockford.

Fortunately, Rockford can run as fast as the boulders and diamonds can fall, but a moment's hesitation can prove fatal.

Besides being quick on his feet, Rockford is incredibly strong. He can push single boulders and diamonds indefinitely. It's putting the stack down when he decides to move on that can be tricky.

Like the original, Super Boulder Dash requires both a sharp mind and a dextrous joystick hand. It's often as aggravating as it is enjoyable and may bring words to your lips that you haven't used since the last time you stubbed your toe!

It's the type of game that can keep you up late at night trying to get by "just one more screen." Even when you do get to sleep, Super Boulder Dash is the sort of game that tends to invade your dreams. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$22.95 disk.)*

Bob Guerra
Charlestown, MA

From p. 66.

Listing 1 continued.

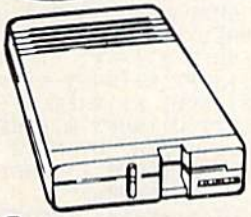
```
                                :REM*208
590 INPUT"{5 CRSR RTs}";D(N):D(N
    )=-D(N)                     :REM*104
600 INPUT"{6 CRSR RTs}";C(N)
                                :REM*234
610 B(N)=D(N)+C(N):B(N)=B(N)+B(N
    -1):B(N)=INT(B(N)/Ø.Ø1+Ø.5)*
    Ø.Ø1                        :REM*142
620 PRINT"{CTRL 7}{2 CRSR DNs}{S
    HFT B}ALANCE {SHFT I}S:{COMD
     8}{15 SPACEs}"             :REM*248
630 PRINT"{CTRL 7}{CRSR UP}{SHFT
     B}ALANCE {SHFT I}S:{CTRL 3}
    ";B(N)                      :REM*86
640 PRINTTAB(9)"{4 CRSR DNs}{COM
    D 4}{CTRL 9}{SHFT A}NOTHER {
    SHFT E}NTRY?{CTRL Ø} {CTRL 3
    }{SHFT Y}/{SHFT N}"          :REM*216
650 PRINTTAB(9)"{2 CRSR DNs}{COM
    D 4}{CTRL 9}{SHFT A}BORT{CTR
    L Ø} {CTRL 3}{SHFT A} {COMD
    4}{CTRL 9}{SHFT R}E-{SHFT E}
    NTER{CTRL Ø} {CTRL 3}{SHFT R
    }{COMD 4}"                  :REM*232
660 GETA$:IFA$<>"Y"ANDA$<>"N"AND
    A$<>"R"ANDA$<>"A"THEN66Ø
                                :REM*198
670 IFA$="N"THEN11Ø             :REM*228
680 IFA$="R"THENM=N:GOSUB148Ø
                                :REM*246
690 IFA$="A"THENM=N:GOSUB148Ø:GO
    TO11Ø                       :REM*106
700 IFN=X-1THEN72Ø              :REM*120
710 GOTO5ØØ                     :REM*162
720 PRINT"{SHFT CLR}":PRINTTAB(1
    5)"{11 CRSR DNs}{COMD 4}{SHF
    T F}{SHFT I}{SHFT L}{SHFT E}
    {SHFT SPACE}{SHFT F}{SHFT U}
    {2 SHFT Ls}":FORZZ=1TO2ØØØ:N
    EXT:GOTO11Ø                 :REM*106
730 POKE5328Ø,6:IFN=ØTHEN11Ø
                                :REM*206
740 FORM=ABTON                  :REM*218
750 POKE65Ø,128:GOSUB9ØØ:REM*154
760 PRINT"{CRSR DN}{COMD 4}{3 CR
    SR RTs}{CTRL 9}{SHFT F}1{CTR
    L Ø} {SHFT F}ORWARD {SHFT S}
    CAN{2 SPACEs}{CTRL 9}{LEFT A
    RROW}{CTRL Ø} {SHFT R}EVERSE
     {SHFT S}CAN"               :REM*26
770 IFM>NTHEN11Ø                :REM*151
780 PRINT"{CRSR DN}{3 CRSR RTs}{
    CTRL 9}{SHFT F}5{CTRL Ø} {SH
    FT B}ALANCE {SHFT S}HEET"
                                :REM*167
790 PRINT"{CRSR DN}{3 CRSR RTs}{
    CTRL 9}{SHFT F}7{CTRL Ø} {SH
    FT R}ETURN TO {SHFT M}AIN {S
    HFT M}ENU"                  :REM*77
800 PRINT"{CTRL 3}{2 CRSR DNs}{3
     CRSR RTs}{CTRL 9}{SHFT F}2{
    CTRL Ø} {SHFT M}AKE A {SHFT
    C}HANGE"                    :REM*239
810 PRINT"{CRSR DN}{3 CRSR RTs}{
    CTRL 9}{SHFT F}8{CTRL Ø} {SH
    FT E}RASE THIS {SHFT E}NTRY"
                                :REM*229
820 GETA$:IFA$=""THEN82Ø :REM*29
830 IFA$="{LEFT ARROW}"THENM=M-2
    :IFM<ØTHEN11Ø               :REM*245
840 IFA$="{FUNCT 5}"THENPOKE65Ø,
    Ø:GOTO15ØØ                  :REM*45
850 IFA$="{FUNCT 6}"THENPOKE65Ø,
    Ø:GOTO182Ø                  :REM*113
860 IFA$="{FUNCT 7}"THEN11Ø
                                :REM*191
870 IFA$="{FUNCT 2}"THENGOSUB124
    Ø                           :REM*109
880 IFA$="{FUNCT 8}"THENGOSUB142
    Ø:A=M:GOSUB184Ø:M=A         :REM*81
890 NEXT:GOTO11Ø                :REM*123
900 IFM>NTHENRETURN             :REM*55
910 PRINT"{SHFT CLR}{COMD 4}{SHF
    T E}NTRY #";M               :REM*25
920 PRINT"{CTRL 7}{CRSR DN}{SHFT
     D}ATE:{CTRL 3}{5 SPACEs}";D
    $(M)                        :REM*95
930 PRINT"{CTRL 7}{SHFT I}TEM:{C
    TRL 3}{5 SPACEs}";I$(M)
                                :REM*169
940 PRINT"{CTRL 7}{SHFT D}EBIT:{
    CTRL 3}{3 SPACEs}";D(M)
                                :REM*95
950 PRINT"{CTRL 7}{SHFT C}REDIT:
    {CTRL 3}{2 SPACEs}";C(M)
                                :REM*9
960 GOSUB294Ø                   :REM*177
970 PRINT"{CTRL 7}{SHFT B}ALANCE
    :{CTRL 3} ";B(M)            :REM*185
980 PRINT"{2 CRSR DNs}{COMD 4}--
    ----------------------------
    ----------":RETURN         :REM*211
990 PRINT"{SHFT CLR}{12 CRSR DNs
    }{11 CRSR RTs}{COMD 4}{SHFT
    L}OADING{2 CRSR RTs}{CTRL 5}
    ";R$                        :REM*27
1000 OPEN15,8,3,"Ø:"+R$+",SEQ"
                                :REM*235
1010 INPUT#15,N                 :REM*255
1020 FORM=1TON                  :REM*19
1030 INPUT#15,D$(M)             :REM*10
1040 INPUT#15,I$(M)             :REM*84
1050 INPUT#15,D(M)              :REM*90
1060 INPUT#15,C(M)              :REM*34
1070 INPUT#15,B(M)              :REM*236
1080 NEXT:CLOSE15:RETURN        :REM*66
1090 IFN=ØTHENRETURN            :REM*74
1100 PRINT"{SHFT CLR}{10 CRSR DN
     s}{3 CRSR RTs}{COMD 4}{SHFT
     Y}OU SELECTED {SHFT S}AVE.
     {SHFT A}RE YOU SURE?"
                                :REM*106
1110 PRINTTAB(16)"{CRSR DN}{CTRL
     3}{SHFT Y}/{SHFT N}"
                                :REM*112
1120 GETA$:IFA$<>"Y"ANDA$<>"N"TH
    EN112Ø                      :REM*46
1130 IFA$="N"THENRETURN         :REM*154
1140 PRINT"{SHFT CLR}{11 CRSR DN
     s}{12 CRSR RTs}{COMD 4}{SHF
     T S}AVING{2 CRSR RTs}{CTRL
     5}";R$                     :REM*78
1150 OPEN15,8,4,"@Ø:"+R$+",S,W"
                                :REM*36
1160 PRINT#15,N                 :REM*230
1170 FORM=1TON                  :REM*170
1180 PRINT#15,D$(M)             :REM*240
1190 PRINT#15,I$(M)             :REM*58
1200 PRINT#15,D(M)              :REM*64
1210 PRINT#15,C(M)              :REM*8
1220 PRINT#15,B(M)              :REM*210
1230 NEXT:CLOSE15:RETURN:REM*216
1240 POKE65Ø,Ø:IFN=ØTHENRETURN
                                :REM*40
1250 GOSUB9ØØ:PRINTTAB(12)"{CRSR
     DN}{CTRL 5}** {SHFT C}HANG
     E **{2 CRSR DNs}{COMD 4}"
                                :REM*34
1260 PRINT"{CRSR RT}1-{SHFT D}AT
    E","2-{SHFT I}TEM","3-{SHFT
     D}EBIT","4-{SHFT C}REDIT"
                                :REM*24
1270 PRINTTAB(9)"{2 CRSR DNs}{CT
    RL 5}{SHFT E}NTER (1,2,3, O
    R 4){COMD 4}{CRSR DN}"
                                :REM*176
1280 FORZZ=1TO4ØØ:NEXT          :REM*197
1290 GETA$:IFA$=""THEN135Ø:REM*5
1300 IFA$="1"THENGOSUB137Ø
                                :REM*97
1310 IFA$="2"THENGOSUB138Ø
                                :REM*15
1320 IFA$="3"THENGOSUB139Ø
                                :REM*185
1330 IFA$="4"THENGOSUB141Ø
                                :REM*81
1340 RETURN                     :REM*123
1350 PRINT"{2 CRSR UPs}{28 SPACE
    s}"                         :REM*15
1360 FORZZ=1TO75:NEXT:PRINT"{4 C
    RSR UPs}":GOTO127Ø          :REM*111
1370 JJ$="--":PRINT:INPUT"{CRSR
    RT}{SHFT N}EW {SHFT D}ATE";
    JJ$:D$(M)=JJ$:M=M-1:RETURN
                                :REM*33
1380 JJ$="--":PRINT:INPUT"{CRSR
    RT}{SHFT N}EW {SHFT I}NFORM
    ATION";JJ$:I$(M)=JJ$:M=M-1:
    RETURN                      :REM*85
1390 JJ=Ø:PRINT:INPUT"{CRSR RT}{
    SHFT N}EW {SHFT D}EBIT (POS
    .ONLY)";JJ:D(M)=-JJ:M=M-1:A
    =M:GOSUB184Ø                :REM*241
1400 M=A:RETURN                 :REM*73
1410 JJ=Ø:PRINT:INPUT"{CRSR RT}{
    SHFT N}EW {SHFT C}REDIT";JJ
    :C(M)=JJ:M=M-1:A=M:GOSUB184
    Ø:M=A:RETURN                :REM*153
1420 IFN=ØTHENRETURN            :REM*149
1430 PRINT"{SHFT CLR}{10 CRSR DN
    s}{2 CRSR RTs}{COMD 4}{SHFT
     A}RE YOU SURE YOU WANT TO
    ERASE THIS?"                :REM*1
1440 PRINTTAB(18)"{CRSR DN}{CTRL
     3}{SHFT Y}/{SHFT N}"
                                :REM*253
1450 GETA$:IFA$<>"N"ANDA$<>"Y"TH
    EN145Ø                      :REM*129
1460 IFA$="N"THENM=M-1:RETURN
                                :REM*185
1470 PRINT"{SHFT CLR}{11 CRSR DN
    s}{12 CRSR RTs}{COMD 4}{SHF
    T U}PDATING{SHFT SPACE}{SHF
    T F}ILE"                    :REM*63
1480 FORV=MTON:D$(V)=D$(V+1):I$(
    V)=I$(V+1):D(V)=D(V+1):C(V)
    =C(V+1):NEXT                :REM*223
1490 N=N-1:M=M-1:RETURN         :REM*179
1500 IFN=ØTHEN11Ø               :REM*199
1510 GOSUB186Ø:XX=1:YY=19
                                :REM*159
1520 IFYY>NTHENYY=N              :REM*105
1530 FORM=XXTOYY:IFM>X-1THEN11Ø
                                :REM*41
1540 PRINT"{COMD 4}";M:PRINT"{CR
    SR UP}{CTRL 7}{4 CRSR RTs}"
    D$(M)                       :REM*174
1550 D(M)=-D(M):IFD(M)=ØTHEN18ØØ
                                :REM*22
1560 PRINTTAB(1Ø)"{CRSR UP}{CTRL
     3}"D(M)                    :REM*2
1570 D(M)=-D(M):IFC(M)=ØTHEN181Ø
                                :REM*104
1580 PRINTTAB(19)"{CRSR UP}{COMD
     4}"C(M)                    :REM*40
1590 IFD(M)=ØANDC(M)=ØTHEN178Ø
                                :REM*166
1600 PRINTTAB(29)"{CRSR UP}{CTRL
     7}"B(M)                    :REM*82
1610 NEXT                       :REM*90
1620 GETA$:IFA$="{FUNCT 5}"THEN1
    71Ø                         :REM*212
1630 IFA$="{FUNCT 7}"THEN11Ø
                                :REM*196
1640 IFA$="{FUNCT 6}"THEN182Ø
                                :REM*174
1650 IFA$="R"THENGOTO175Ø:REM*66
1660 IFA$="{FUNCT 1}"THENAB=1:GO
    TO73Ø                       :REM*40
1670 IFA$="{LEFT ARROW}"THENAB=N
    :GOTO73Ø                    :REM*196
1680 IFA$="{FUNCT 4}"THEN48Ø
                                :REM*60
1690 IFA$="="THEN19ØØ           :REM*160
1700 GOTO162Ø                   :REM*16
```

→

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Listing 1 continued.

```
171Ø XX=XX+19:YY=YY+19   :REM*176
172Ø GOSUB186Ø:IFXX>=X-1THEN11Ø
                         :REM*4Ø
173Ø IFYY-19>=NTHEN11Ø   :REM*138
174Ø GOTO152Ø            :REM*4Ø
175Ø INPUT"{HOME}{COMD 4}{24 CRS
     R DNs}{4 CRSR RTs}{CTRL 9}M
     ATCH WHICH ITEM NUMBER";K
                         :REM*216
176Ø IFK<1THEN11Ø        :REM*228
177Ø PRINT"{SHFT CLR}":POKE5328Ø
     ,6:FORM=KTON:GOTO75Ø
                         :REM*164
178Ø IFM<=NTHENPRINTTAB(29)"{CRS
     R UP}{CTRL 7}"B(M)  :REM*12
179Ø PRINTTAB(31)"{CRSR UP}":GOT
     O161Ø               :REM*134
18ØØ PRINTTAB(11)"{CRSR UP}":GOT
     O157Ø               :REM*211
181Ø PRINTTAB(21)"{CRSR UP}":GOT
     O159Ø               :REM*1Ø9
182Ø PRINT"{SHFT CLR}":POKE5328Ø
     ,9:IFN<19THEN15ØØ   :REM*13
183Ø XX=N-13:YY=N+5:GOTO172Ø
                         :REM*2Ø9
184Ø PRINT"{SHFT CLR}{11 CRSR DN
     s}{12 CRSR RTs}{COMD 4}{SHF
     T U}PDATING{SHFT SPACE}{SHF
     T B}ALANCE"         :REM*9
185Ø FORM=1TON:GOSUB294Ø:NEXT:RE
     TURN                :REM*175
186Ø PRINT"{SHFT CLR}":POKE5328Ø
     ,9:POKE53281,15     :REM*155
187Ø PRINT"{CTRL 7}{2 CRSR RTs}{
     SHFT C}ONTINUE-({SHFT F}5){
     3 SPACEs}{SHFT R}EAD-({SHFT
      R}){3 SPACEs}{SHFT M}ENU-(
     {SHFT F}7)"         :REM*235
188Ø PRINT"{CRSR DN}{4 CRSR RTs}
     {CTRL 5}{SHFT D}{SHFT A}{SH
     FT T}{SHFT E}{3 CRSR RTs}{S
     HFT D}{SHFT E}{SHFT B}{SHFT
      I}{SHFT T}{4 CRSR RTs}{SHF
     T C}{SHFT R}{SHFT E}{SHFT D
     }{SHFT I}{SHFT T}{4 CRSR RT
     s}{SHFT B}{SHFT A}{SHFT L}{
     SHFT A}{SHFT N}{SHFT C}{SHF
     T E}{CRSR DN}"      :REM*173
189Ø RETURN              :REM*163
19ØØ POKE5328Ø,6:IFN=ØTHEN11Ø
                         :REM*1Ø1
191Ø PRINT"{SHFT CLR}{COMD 4}{CT
     RL 9}{SHFT D}EBITS/{SHFT C}
     REDITS{CTRL Ø}"     :REM*117
192Ø PRINT"{16 CRSR DNs}":GOSUB4
     2Ø                  :REM*121
193Ø PRINT"{HOME}{9 CRSR DNs}":F
     ORM=1TON:U(M)=C(M)+Ø
                         :REM*231
194Ø PRINTTAB(8)"{COMD 4}{CRSR U
     P}{SHFT T}OTAL {SHFT C}REDI
     TS{SHFT SPACE}ARE:" :REM*71
195Ø PRINT"{CRSR UP}{CTRL 3}{3 C
     RSR RTs}"M          :REM*41
196Ø U(M)=U(M)+U(M-1):NEXT
                         :REM*89
197Ø PRINTTAB(27)"{CRSR UP}{CTRL
      3}";U(N            :REM*83
198Ø PRINT"{2 CRSR DNs}":FORM=1T
     ON:U(M)=D(M)+Ø      :REM*9
199Ø FORM=1TON:U(M)=D(M)+Ø:U(M)=
     D(M)+Ø              :REM*71
2ØØØ PRINTTAB(8)"{COMD 4}{CRSR U
     P}{SHFT T}OTAL {SHFT D}EBIT
     S ARE:"             :REM*5
2Ø1Ø PRINT"{CTRL 3}{CRSR UP}{3 C
     RSR RTs}"M          :REM*187
2Ø2Ø U(M)=U(M)+U(M-1):NEXT
                         :REM*149
2Ø3Ø PRINTTAB(27)"{CRSR UP}{CTRL
      3}";U(N)           :REM*143
2Ø4Ø PRINT"{HOME}{CTRL 9}{CTRL 7
     }{SHFT P}{SHFT R}{SHFT E}{2
      SHFT Ss} {SHFT A}{SHFT N}{
     SHFT Y}{SHFT SPACE}{SHFT K}
     {SHFT E}{SHFT Y}{SHFT SPACE
     }{SHFT T}{SHFT O}{SHFT SPAC
     E}{SHFT R}{SHFT E}{SHFT T}{
     SHFT U}{SHFT R}{SHFT N} {SH
     FT T}{SHFT O}{SHFT SPACE}{S
     HFT M}{SHFT E}{SHFT N}{SHFT
      U}{9 SPACEs}"      :REM*89
2Ø5Ø GETA$:IFA$=""THEN2Ø5Ø
                         :REM*96
2Ø6Ø GOTO11Ø              :REM*222
2Ø7Ø PRINT"{SHFT CLR}{1Ø CRSR DN
     s}{4 CRSR RTs}{COMD 4}{SHFT
      A}RE YOU SURE YOU WANT TO
     {SHFT R}ENAME"      :REM*21Ø
2Ø8Ø PRINTTAB(13)"THIS FILE?":PR
     INTTAB(17)"{2 CRSR DNs}{CTR
     L 3}{SHFT Y}/{SHFT N}"
                         :REM*1Ø
2Ø9Ø GETA$:IFA$<>"Y"ANDA$<>"N"TH
     EN2Ø9Ø              :REM*138
21ØØ IFA$="N"THEN11Ø     :REM*128
211Ø INPUT"{4 CRSR RTs}{2 CRSR D
     Ns}{COMD 4}{SHFT E}NTER {SH
     FT N}EW {SHFT F}ILE {SHFT N
     }AME{CTRL 5}";V$    :REM*62
212Ø V$=LEFT$(V$,1Ø)     :REM*156
213Ø PRINT"{SHFT CLR}{COMD 4}{CR
     SR RT}{12 CRSR DNs}{SHFT D}
     O YOU WANT THIS EXECUTED ON
      DISK? {CTRL 3}{SHFT Y}/{SH
     FT N}"              :REM*4
214Ø GETA$:IFA$<>"Y"ANDA$<>"N"TH
     EN214Ø              :REM*18Ø
215Ø IFA$="N"THENR$=V$:GOTO11Ø
                         :REM*28
216Ø OPEN15,8,15:PRINT#15,"RØ:"+
     V$"="+R$"":R$=V$:CLOSE15:GO
     TO13Ø               :REM*184
217Ø IFN<=1THENRETURN    :REM*98
218Ø PRINT"{SHFT CLR}{11 CRSR DN
     s}{COMD 4}{5 CRSR RTs}{SHFT
      P}LACING {SHFT I}TEMS IN O
     RDER BY {SHFT D}ATE"
                         :REM*242
219Ø PRINTTAB(12)"{CRSR DN}"
                         :REM*38
22ØØ EX=Ø:FORQ=1TON-1:POKE5328Ø,
     5:IFD$(Q)>D$(Q+1)THEN223Ø
                         :REM*2Ø2
221Ø NEXT:IFEX<>ØTHEN22ØØ:REM*78
222Ø GOSUB184Ø:RETURN    :REM*54
223Ø G$=D$(Q):H$=I$(Q):J=D(Q):T=
     C(Q)                :REM*152
224Ø D$(Q)=D$(Q+1):I$(Q)=I$(Q+1)
     :D(Q)=D(Q+1):C(Q)=C(Q+1):PO
     KE5328Ø,14          :REM*126
225Ø D$(Q+1)=G$:I$(Q+1)=H$:D(Q+1
     )=J:C(Q+1)=T:EX=1:GOTO221Ø
                         :REM*126
226Ø IFN<5THEN11Ø        :REM*114
227Ø PRINT"{SHFT CLR}{COMD 4}{CT
     RL 9}{SHFT R}E-{SHFT E}STAB
     LISH {SHFT F}ILE{CTRL Ø}"
                         :REM*36
228Ø PRINTTAB(12)"{CTRL 3}{9 CRS
     R DNs}{SHFT A} {COMD 4}{SHF
     T A}BORT"           :REM*222
229Ø PRINTTAB(12)"{CTRL 3}{CRSR
     DN}{SHFT P} {COMD 4}{SHFT P
```


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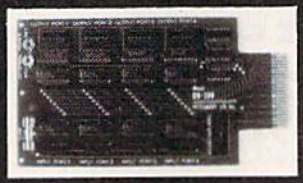
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Listing 1 continued.

```
    }RESERVE OLD {SHFT F}ILE"
                              :REM*140
2300 PRINTTAB(12)"{CTRL 3}{CRSR
    DN}{SHFT E} {COMD 4}{SHFT E
    }RASE OLD {SHFT F}ILE"
                              :REM*150
2310 GETA$:IFA$=""THEN2310
                              :REM*35
2320 IFA$="A"THEN1100         :REM*213
2330 IFA$="P"THEN2540         :REM*209
2340 IFA$="E"THEN2360         :REM*101
2350 GOTO2310                 :REM*85
2360 GOSUB2580                :REM*113
2370 PRINT"{SHFT CLR}{COMD 4}{CT
    RL 9}{SHFT R}E-{SHFT E}STAB
    LISH {SHFT F}ILE{CTRL 0}"
                              :REM*137
2380 PRINT"{10 CRSR DNs}{COMD 4}
    {CRSR RT}{SHFT C}URRENT {SH
    FT N}O. OF {SHFT E}NTRIES:{
    CTRL 5} ";N               :REM*181
2390 PRINTTAB(7)"{COMD 4}{4 CRSR
     DNs}( {SHFT M}IN: 0 ";"{SH
    FT M}AX:";N-5;")"         :REM*113
2400 INPUT"{3 CRSR UPs}{CRSR RT}
    {COMD 4}{SHFT H}OW {SHFT M}
    ANY {SHFT E}NTRIES {SHFT P}
    RESERVED{CTRL 5} ";GG
                              :REM*71
2410 PRINTTAB(10)"{COMD 4}{8 CRS
    R DNs}{CTRL 9}{SHFT E}RASIN
    G {SHFT E}NTRY:{CTRL 0}"
                              :REM*183
2420 IFGG>N-5ORGG<0THEN2260
                              :REM*141
2430 BB=B(N-GG)               :REM*235
2440 FORM=1TON                :REM*165
2450 D$(M)=D$(M+(N-GG)):I$(M)=I$
    (M+(N-GG))                :REM*53
2460 D(M)=D(M+(N-GG)):C(M)=C(M+(
    N-GG)):B(M)=B(M+(N-GG))
                              :REM*199
2470 IFM>N-GGTHEN2490         :REM*87
2480 PRINTTAB(25)"{CRSR UP}{CTRL
     5}";M                    :REM*101
2490 NEXT                     :REM*205
2500 N=GG+1:IFGG=0THENB(N)=BB
                              :REM*141
2510 IFBB<0THEND(N)=BB        :REM*173
2520 IFBB>=0THENC(N)=BB       :REM*25
2530 D$(N)="******":I$(N)="{SHFT
     B}ALANCE {SHFT F}ORWARD":G
    OSUB2170:GOSUB1140:GOTO110
                              :REM*199
2540 GOSUB2580:V$=R$          :REM*127
2550 INPUT"{SHFT CLR}{CRSR RT}{1
    2 CRSR DNs}{SHFT E}NTER {SH
    FT N}EW {SHFT N}AME FOR OLD
     {SHFT F}ILE";R$          :REM*107
2560 R$=LEFT$(R$,10)          :REM*68
2570 GOSUB1140:R$=V$:GOTO2370
                              :REM*22
2580 PRINT"{SHFT CLR}{11 CRSR DN
    s}{4 CRSR RTs}{SHFT P}RINT
    THE OLD {SHFT F}ILE ?{CTRL
    3} {SHFT Y}/{SHFT N}
                              :REM*230
2590 GETA$:IFA$<>"Y"ANDA$<>"N"TH
    EN2590                    :REM*134
2600 IFA$="Y"THENGOSUB2620
                              :REM*38
2610 RETURN                   :REM*118
2620 IFN=0THENRETURN          :REM*74
2630 PRINT"{SHFT CLR}{COMD 4}{CT
    RL 9}{SHFT P}RINT{CTRL 0}"
                              :REM*14
2640 PRINTTAB(14)"{CTRL 3}{9 CRS
    R DNs}{SHFT C}{2 SPACEs}{CO
    MD 4}{SHFT C}ONTINUE"
                              :REM*196
2650 PRINTTAB(14)"{CTRL 3}{CRSR
    DN}{SHFT A}{2 SPACEs}{COMD
    4}{SHFT A}BORT"           :REM*4
2660 GETA$:IFA$=""THEN2660
                              :REM*200
2670 IFA$<>"C"THENRETURN:REM*128
2680 PRINT"{SHFT CLR}{13 CRSR DN
    s}{CRSR RT}{SHFT P}RESS {SH
    FT R}{SHFT E}{SHFT T}{SHFT
    U}{SHFT R}{SHFT N} FOR A {S
    HFT F}ULL {SHFT P}RINT"
                              :REM*90
2690 INPUT"{4 CRSR UPs}{CRSR RT}
    {SHFT P}RINT {SHFT F}ROM {S
    HFT W}HAT {SHFT D}ATE ";SD$
                              :REM*192
2700 OPEN4,4,7:PRINT"{5 CRSR DNs
    }{CRSR RT}{SHFT P}AGING {SH
    FT O}N ?{2 SPACEs}{SHFT Y}/
    {SHFT N}"                 :REM*112
2710 GETA$:IFA$<>"Y"ANDA$<>"N"TH
    EN2710                    :REM*240
2720 IFA$="N"THENSP=0.5:GOTO2740
                              :REM*222
2730 SP=5                     :REM*86
2740 PRINT"{SHFT CLR}":PRINTTAB(
    9)"{10 CRSR DNs}{SHFT P}RIN
    TING, {SHFT P}LEASE{SHFT SP
    ACE}{SHFT W}AIT"          :REM*136
2750 PRINT#4,CHR$(16)"27";"{SHFT
     F}{SHFT I}{SHFT L}{SHFT E}
    {SHFT N}{SHFT A}{SHFT M}{SH
    FT E}: ";R$               :REM*30
2760 PRINT#4,CHR$(10)         :REM*180
2770 PRINT#4,CHR$(16)"00";"{SHFT
     D}{SHFT A}{SHFT T}{SHFT E}
    ";CHR$(16)"10";"{SHFT I}{SH
    FT T}{SHFT E}{SHFT M}";CHR$
    (16)"46";"{SHFT D}{SHFT E}{
    SHFT B}{SHFT I}{SHFT T}";
                              :REM*142
2780 PRINT#4,CHR$(16)"58";"{SHFT
     C}{SHFT R}{SHFT E}{SHFT D}
    {SHFT I}{SHFT T}";CHR$(16)"
    70";"{SHFT B}{SHFT A}{SHFT
    L}{SHFT A}{SHFT N}{SHFT C}{
    SHFT E}"                  :REM*146
2790 PRINT#4,CHR$(10)         :REM*210
2800 FORM=1TON                :REM*14
2810 IFD$(M)>=SD$THENSP=SP+1:GOS
    UB2860                    :REM*108
2820 IFSD$="CHR$(13)"THENSD$="**
    ***"                      :REM*87
2830 NEXT                     :REM*35
2840 PRINT#4,CHR$(12):CLOSE4
                              :REM*57
2850 SD$="*****":RETURN       :REM*89
2860 PRINT#4,CHR$(16)"00";D$(M);
    CHR$(16)"10";I$(M);:REM*159
2870 IFD(M)=0THEN2890         :REM*5
2880 PRINT#4,CHR$(16)"45"D(M);
                              :REM*167
2890 IFC(M)=0THEN2910         :REM*153
2900 PRINT#4,CHR$(16)"57";C(M);
                              :REM*225
2910 PRINT#4,CHR$(16)"69";B(M)
                              :REM*185
2920 IFSP=56THENPRINT#4,CHR$(12)
    :SP=0                     :REM*149
2930 RETURN                   :REM*183
2940 B(M)=C(M)+D(M):B(M)=B(M)+B(
    M-1):B(M)=INT(B(M)/0.01+0.0
    5)*0.01:RETURN            :REM*193
9999 SYS2048                  :REM*218
```

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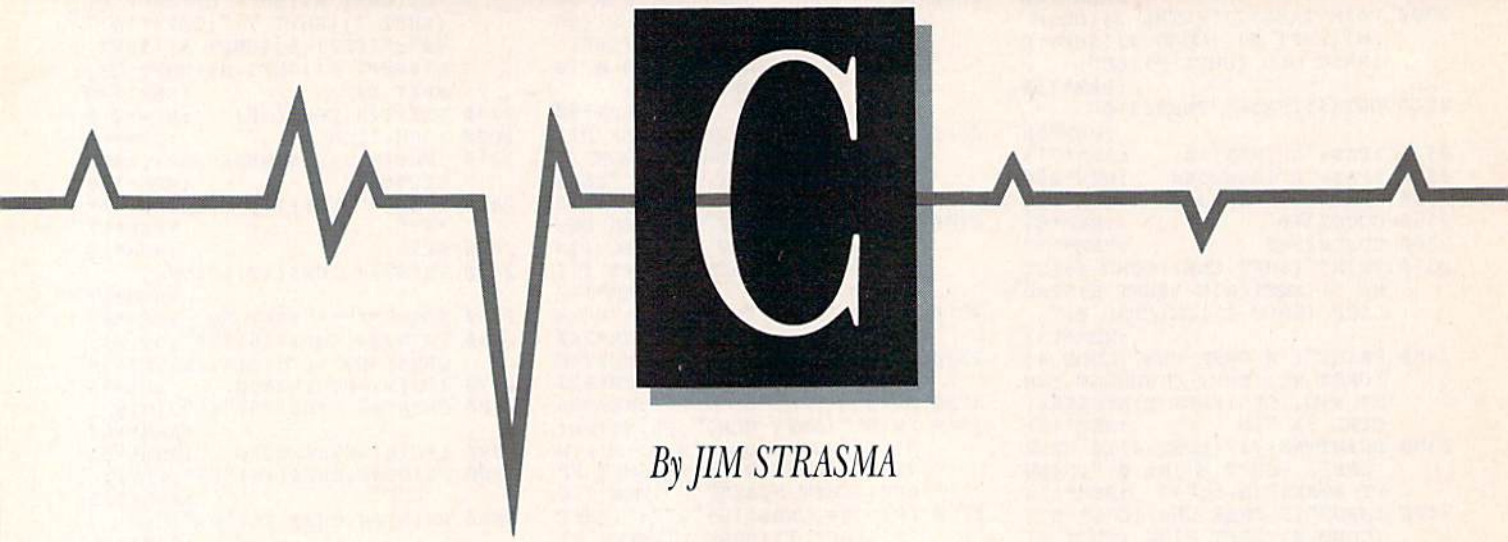
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COMMODORE CLINIC



By JIM STRASMA

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Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

HARDWARE

Q: *Is it possible to build a computer for telecommunications only? And when the computer is built, will it have more buffer space, or would you have to buy something to add the extra buffer space?*

Dave Niederhelman
North Bend, OH

A: Yes, RCA advertises computers designed strictly for use in telecommunications. However, they are no cheaper than a Commodore computer complete with disk drive and telecommunications package, so I'm not sure who uses them.

A better approach might be to add a telecommunications cartridge to your Commodore. Eastern House Software of Winston-Salem, North Carolina, has a suitable ROM-based terminal program, and others may have one, too.

As for adding buffer space, your best bet at the moment may be to buy an RS-232-type modem and connect it to your computer via a separate buffer. D. C. Hayes sells a suitable buffer (Transet 1000) to go with their Smartmodem series. I also expect eventually to see new terminal programs that will take advantage of the larger memory of the C-128 and its new add-on memory cartridges.

Q: *I do a weekly bulletin for a service club. I have a DPS-1101 printer. Is there anything like Broderbund's Print Shop that I can use with my equipment?*

Thomas Reese
Kihei, HI

A: If you want a program to print high-resolution drawings on your daisywheel printer, the practical answer is no. Although such programs have been written, and one company actually has sold interfaces designed to automate the needed translations, the net result is unworkable. The problem is that the only way to generate high-resolution graphics with a daisywheel is with the period character. This has two consequences: a drawing takes an impossibly long time to complete, and the period on the printwheel wears out almost immediately.

With dot-matrix printers now available for well under $200, it would be much more practical for you to buy a second printer to use with Print Shop and other graphics programs.

Q: *I have a C-128 at home and use an IBM-PC at work. I would like to take work home, but can't find an interface to run IBM software on my C-128. Can you help?*

Vincent Hughes
Wappingers Falls, NY

A: There are two ways I know of to run the same software directly on both machines. One is via the CP/M operating system. Microsolutions, of DeKalb, Illinois, sells UniDOS, an emulation program that enables the PC to run many CP/M programs that also work on the C-128 in 80-column mode. They also sell Uniform, a well-known and excellent program that enables the PC to format and use CP/M disks in formats compatible with the C-128 (and about 50 other formats as well). However, this is not the same as running the programs normally used on the PC under its usual operating system, MS-DOS.

To make the C-128 compatible with MS-DOS, I suggest another approach. When you go home after work, leave your PC turned on with a modem connected, and running a terminal program that allows remote operation of the PC (Remote, from Infostuff, of Roswell, Georgia, for example). Then dial into the PC via a modem on your C-128, using any 80-column terminal program. Once connected, it will be just as though your C-128 were transformed into an IBM PC, and you'll be able to run most MS-DOS programs normally.

The other way is to use the Big Blue Reader (S.O.G.W.A.P. Software, Venice, CA), which allows you to use your 1571 disk drive to convert word processing and ASCII files generated on most IBM-compatible software to Commodore DOS files, and vice versa.

Q: *My question involves the compatibility of the 1541 and 1571 drives when used together. I thought I'd be able to keep both*

drives as device number 8 and simply specify drive 0 or 1 when using them. When I attempt it, however, sometimes both drives activate, and sometimes the lights come on in both drives, the computer locks and the drives don't activate at all. Can you give me any advice?

James Baker
Flaxcombe, Saskatchewan
Canada

A: It's quite easy to use a 1541 and 1571 together, but you have to do it with one as device 8 and the other as device 9. Commodore makes this easy by including a pair of small switches on the back of the 1571 to set its device number.

If you really do need a dual disk, with drives 0 and 1, MSD's SD-2 and Commodore's CBM 4040 are both format-compatible with current 1541's. Neither is still in production, but they are available used.

Q: To reduce dust in the house, I just got an electronic air filter to go with my heat pump. Since then, I've heard from a friend that the filter ionizes dust particles it doesn't catch and disk drives attract them like a magnet. My friend suggested that I keep the drives covered at all times, especially during operation. However, I'm reluctant to do so because of the heat problem. Do I have a problem?

Ed White
Sacramento, CA

A: In a word, no. A whole-house electronic air cleaner is one of the nicest presents you can give a computer for keeping its environment clean. It greatly reduces the number of particulates in the air, although it can take up to a week to do a complete job when first installed. We've used them for years, and we almost never have to clean dust out of our systems, not even the equipment with fans.

You are also correct in assuming that the heat from running your system under a cover would be much worse for it than any amount of dust. If worse comes to worst, and you do accumulate enough dust inside your system to need cleaning, five seconds with a compressed-air camera-cleaning spray will do the job.

SOFTWARE

Q: At home I have a C-64 and 1541. At work we use two Commodore 8032s with MSD and 2031 disk drives and an 8300P printer. How can I use PaperClip 64 at home to put such things as letters and tests on a disk, then run them off on the office printer. Similarly, how can I use WordPro at the office to make a disk that I can bring home to correct? Am I trying to mix apples and oranges, with no hope other than fruit soup?

Ronald Ladwig
Ogden, UT

A: Since both of the disk drives at the office are compatible with your 1541 at home, and PaperClip is able to load files from WordPro easily, your only problem is saving PaperClip files in a form WordPro will accept. The problem is that PaperClip normally starts each file with a header line of non-visible information that WordPro interprets as garbage. Fortunately, recent versions of PaperClip include an option to omit the header line when saving a file.

Q: I have a C-64 with a 1541 drive as device 9 and a 1571 drive as device 8. With this combination I've had trouble using Electronic Arts' Adventure Construction Set. When I load it from the 1571, the 1541 starts making noise and its red light comes on. What gives?

Bob Hartz
Alton, IL

A: Most likely your trouble is due to a fast-load routine that's used with many recent programs. Most such routines require that all devices other than your first disk be turned off during the load.

Another possibility is that Electronic Arts' copy protection is objecting to your combination of equipment, and your problem is the symptom of the program's refusal to load from a 1571.

Q: I purchased Commodore's Easy Calc, but have not been able to get hardcopy printout from it because it says you have to change the printer's device number to 5. I have a Gemini 10X printer interfaced via a Cardprint A interface, and I don't know how to change my printer's device number, if in fact that is the trouble.

Harold King
Winter Springs, FL

A: Yes, that's the trouble all right. Easy Calc is the only program I've ever encountered that couldn't print to device 4. Fortunately, Cardco printer interfaces all have a switch to go from device 4 to device 5. On the Cardprint A it's hidden underneath the cover of the interface, but it's accessible by removing four small Phillips screws. The Cardco manual should tell which switch to flip for device 5. Since you'll need to flip it every time you switch between Easy Calc and other programs that use the printer, you may want to cut an access hole in the cover of the interface so you can reach the switches easily.

Q: Do you know of anyone who has put the King James version of Strong's concordance of the Bible on disk for the SX-64?

James E. Weaver
Shasta, CA

A: Your best bet may be Midwest Software, Box 214, Farmington, MI 48024; 313-477-0897. They recently sent me a review copy of their concordance of the King James version of the New Testament. It includes one program disk and three data disks, and it's complete, although not specifically advertised as based on Strong's work.

As with any concordance, you select a word you'd like to study, and the program finds all occurrences of the word in the original text and then displays or prints each occurrence in context. You also can refine your search to exclude occurrences in certain books, find verses containing combinations of two or more words, and exclude verses that contain certain words. These added features make the program more powerful than a printed concordance, and they anticipate the power of similar tools that will eventually be available on videodisks.

Q: We are looking for a program that will enable us to enter a musical score (melody only) and have the computer transpose it, add a simple four-part harmony and print the result on a dot-matrix printer. Actually playing the music is not that important. Any suggestions?

George Murray
Washington, NC

A: Several music programs for the C-64 allow you to play music through an accessory keyboard or type it in at the computer keyboard, store it, edit it, and print it out. A few also are able to transpose music automatically from one key to another. However, I have yet to hear of a program that can compose harmony to go with an entered melody, although I too would love to see one. Perhaps another reader knows of one and will tell us about it.

While we wait for that, the June 1985 issue of *RUN* includes reviews of over a dozen good music programs, at least one of which should get you started.

Q: I'll be traveling to England and the continent soon. If I buy Commodore software overseas, will it work back here in the U.S.? What is the safest way to get it home, past airport scanners or via mail?

Marilyn Buck
Piscataway, NJ

A: Yes, European software for Commodore computers will work just as well here. You should have no problems as long as you buy programs for your specific model only. This won't always be easy, as Commodore sells a few computer models in Europe that aren't available in the States, and has also changed the names of a few computers there. (The word *vic*, for example, is offensive in German.)

As for getting programs safely through customs, you should either mail the programs home in the center of a thick box or hand the disks to customs officials so that they can inspect the disks visually, rather than with a scanner. I use both methods myself, carrying one copy and mailing the other.

Opinions vary as to the value of wrapping the disks in aluminum foil or packing them in a lead bag before shipping. Both methods give some protection against electromagnetic fields, but may also make the disks look suspicious, causing them to be scanned more often and at higher power levels.

Q: I am working towards a degree in Computer Science, and our university uses the AT&T 6300 PC with Borland's Turbo Pascal. I currently have a C-64 and 1541 disk drive, but want to get Turbo Pascal and a C-128, so I can do my programming at home. However, I'm afraid there are going to be major differences in the two versions of Turbo. Do they work the same?

Thomas Kirkley
Hamlet, NC

A: Students here at Western Illinois University use both PC and CP/M versions of Turbo and find them comparable, as long as both are the same release number (3.0 is current now).

However, I'd think carefully before trading in your C-64 just to get Turbo. Special student prices on some PC compatibles are actually below that of a C-128 with a 1571 disk and 1902 monitor. With one of those machines, you'd have a system that is far more compatible with your university's 6300s. I just bought a new C-128 myself, but in addition to, not instead of, my own 6300.

On the other hand, if any of your departmental computers have dial-up lines, your C-64 and a modem may be all you need to use Turbo. Just write your programs as word processing files, send them to the 6300 via modem, then use the 6300's copy of Turbo to compile them.

Another possibility is to use one of various versions of Pascal available

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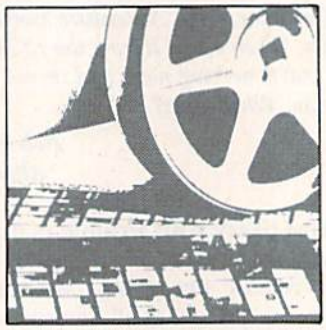
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for the C-64. Abacus Software recently sent me Super Pascal, for example, and it's good enough to rival Turbo. We don't mind our students using other versions of programming languages, as long as they are complete enough to accomplish the assignments.

PROGRAMMING

Q: I need to find a way to get rid of keyboard input. In a program I'm writing, when it's time to roll dice I hold the program with GETKEY. Then, the player presses the space bar that executes a Gosub to get a random number. But if the player presses the space bar twice, the game is ruined, because the C-128 remembers keypresses made while it's executing the subroutine.

Robert Perillo
Garfield, NJ

A: I suggest this cure, which will work on all Commodore systems:

```
1000 GET A$
1010 IF A$ <> " " THEN 1000
1020 GOSUB 2000
1030 GET B$
1040 IF B$ > "" THEN 1030
```

Naturally, it won't work unless you have a subroutine at line 2000. The key lines are 1030 and 1040, which throw away any keystrokes entered during the subroutine.

REPAIRS

Q: I own a C-128 and I'd like to know how good its joystick-port chips are. I've had the machine only six months and I've blown four chips already. Am I doing something wrong?

Mike Douglass
Rochester, NY

A: Commodore's 6526 CIA chip controls the joysticks on the C-128, as it does on the C-64. As chips go, it's powerful, and it's more reliable than the earlier 6522 chip that does the same chore on the VIC. However, both chips have a definite weak spot as used in Commodore computers. They are directly connected to the joysticks, without any buffer chips in between. This makes them very sensitive to accidental shorts when you plug in the joystick, as well as to static shocks when the port is touched.

The most likely cure for your problem is never to plug anything into your system when it's turned on, and to protect your system from shocks even when it's turned off.

Q: Is there any help you can recommend for a C-64 that loads but doesn't run cer-

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tain programs (e.g., Beachhead). I've gone to three technicians, all of whom say, "It's the nature of the beast. Some C-64's just act that way." The disk is good, and so is the 1541 drive.

A: I'd be suspicious of the Kernal ROM in your C-64. Most likely it's the older Rev 1 or Rev 2 type, and some programs work only with the current Rev 3 chip. Similarly, your 1541 may have an older ROM and need the current –05 ROM.

UPDATES

Update: Regarding Evan McNish's question in the June 1986 issue about interfacing an Armatron robot arm to a C-128, an excellent article in the May 1985 *Radio-Electronics* describes completely how to do it with a VIC-20, including interface electronics and a program to drive it.

Mark Longquist
Watanga, TX

A: Thanks to all the readers who wrote suggesting that article. It's good to know the Armatron can be properly interfaced after all, and it sounds like a fine project, especially for VIC owners in need of a new challenge.

Update: The "bug" in Save with Replace (@SAVE) is still present in ROM release 3 of the 1571, the only one released to the public thus far. ROM 4 is being tested by Commodore, and it fixes this bug under most conditions. Meanwhile, the drive should be reset (by being turned off, or by sending it the command UI), no other files should be opened to the drive during an @Save and no fast-load programs should be used with it. Under those circumstances, @Save works.

Phil Slaymaker
West Palm Beach, FL

A: Another preventative is always to include the drive number in disk commands. As the article you wrote and thoughtfully enclosed reminds us, the 1541 DOS is based on one used in dual drives, and it still needs the drive number specified. R

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Checksums for *RUN* 1985 Programs

Last February, in response to many reader inquiries, we began a series of checksum listings for programs published in 1985 before our C-64 checksum program, 64 Perfect Typist, appeared last September. Working backwards, we have so far covered August, July and June. Below, you will find the May programs' checksum listings.

To use the checksums, you must first load and run 64 Perfect Typist (see How to Type Listings, on page 110); then get out your May issue and begin typing in any program you find in the listings below. Every time you hit the return key, a number from 0 to 255 will appear. If you enter a line correctly, the number following the ":REM" next to the line number will appear.*

If you have already entered one of the programs from May and desire to check it for accuracy, simply enter 64 Perfect Typist, list lines individually or in small groups and position the cursor on the line you want to check. Next, press the return key, and, if you've entered the line correctly, the number that appears below the line will match the number following the ":REM" in the listings.*

You can look forward to seeing more of these listings of 1985 programs in subsequent 1986 issues of RUN.

Home Inventory, by William Braun; May, p. 28.

```
1      :REM*3
2      :REM*22Ø
3      :REM*143
32     :REM*252
33     :REM*179
34     :REM*242
35     :REM*2Ø1
36     :REM*232
4Ø     :REM*234
45     :REM*193
46     :REM*248
47     :REM*85
48     :REM*198
49     :REM*51
6Ø     :REM*34
65     :REM*229
67     :REM*83
68     :REM*6
1ØØ    :REM*56
1Ø5    :REM*85
11Ø    :REM*13Ø
111    :REM*85
112    :REM*76
115    :REM*71
12Ø    :REM*54
121    :REM*125
125    :REM*1Ø3
126    :REM*22Ø
13Ø    :REM*82
133    :REM*7
137    :REM*1Ø1
138    :REM*212
17Ø    :REM*94
185    :REM*61
191    :REM*29
192    :REM*7Ø
194    :REM*164
197    :REM*51
198    :REM*118
2ØØ    :REM*6Ø
2Ø5    :REM*217
215    :REM*225
235    :REM*179
236    :REM*2Ø
24Ø    :REM*14
25Ø    :REM*172
26Ø    :REM*93
27Ø    :REM*195
4ØØ    :REM*1Ø5
4Ø5    :REM*1Ø6
41Ø    :REM*117
415    :REM*92
416    :REM*117
42Ø    :REM*251
435    :REM*6
436    :REM*77
437    :REM*196
438    :REM*2Ø9
45Ø    :REM*227
451    :REM*238
46Ø    :REM*239
465    :REM*112
466    :REM*215
47Ø    :REM*9
48Ø    :REM*249
485    :REM*144
5ØØ    :REM*59
5Ø5    :REM*212
5Ø7    :REM*1Ø2
51Ø    :REM*35
515    :REM*221
52Ø    :REM*32
525    :REM*117
53Ø    :REM*168
535    :REM*59
54Ø    :REM*11Ø
545    :REM*169
55Ø    :REM*248
56Ø    :REM*44
57Ø    :REM*54
575    :REM*219
576    :REM*98
58Ø    :REM*156
6ØØ    :REM*56
6Ø5    :REM*1Ø1
6Ø6    :REM*64
7ØØ    :REM*2
71Ø    :REM*4
715    :REM*13
72Ø    :REM*2Ø4
8ØØ    :REM*67
6ØØØ   :REM*1
```

Bargain-Hunter's Delight, by Robert Wallace; May, p. 38.

```
1      :REM*1Ø5
1ØØ    :REM*4
1Ø5    :REM*93
11Ø    :REM*11Ø
115    :REM*67
12Ø    :REM*7Ø
125    :REM*93
13Ø    :REM*54
135    :REM*249
14Ø    :REM*198
145    :REM*171
15Ø    :REM*44
155    :REM*155
16Ø    :REM*5Ø
165    :REM*71
17Ø    :REM*62
175    :REM*211
18Ø    :REM*2Ø4
185    :REM*65
19Ø    :REM*1Ø6
195    :REM*151
2ØØ    :REM*46
2Ø5    :REM*79
21Ø    :REM*134
215    :REM*119
22Ø    :REM*18Ø
225    :REM*83
23Ø    :REM*88
235    :REM*95
24Ø    :REM*18
245    :REM*229
25Ø    :REM*24
255    :REM*3
26Ø    :REM*29
265    :REM*182
27Ø    :REM*5
275    :REM*138
28Ø    :REM*161
285    :REM*24Ø
29Ø    :REM*1Ø9
295    :REM*46
3ØØ    :REM*211
3Ø5    :REM*17Ø
31Ø    :REM*55
315    :REM*158
32Ø    :REM*11
325    :REM*234
33Ø    :REM*95
335    :REM*152
34Ø    :REM*1Ø5
345    :REM*218
35Ø    :REM*83
355    :REM*1Ø4
36Ø    :REM*95
365    :REM*11Ø
37Ø    :REM*15
375    :REM*5Ø
38Ø    :REM*29
385    :REM*2Ø8
39Ø    :REM*11
395    :REM*98
4ØØ    :REM*11
4Ø5    :REM*148
41Ø    :REM*245
415    :REM*56
42Ø    :REM*199
425    :REM*28
43Ø    :REM*213
435    :REM*242
44Ø    :REM*237
445    :REM*24
45Ø    :REM*251
455    :REM*248
46Ø    :REM*2Ø7
465    :REM*1Ø2
47Ø    :REM*23
475    :REM*248
48Ø    :REM*2Ø3
485    :REM*88
49Ø    :REM*3
495    :REM*192
5ØØ    :REM*171
5Ø5    :REM*116
51Ø    :REM*225
515    :REM*91
52Ø    :REM*118
525    :REM*73
53Ø    :REM*228
535    :REM*19
54Ø    :REM*228
545    :REM*21
55Ø    :REM*86
555    :REM*241
56Ø    :REM*172
565    :REM*177
57Ø    :REM*112
575    :REM*97
58Ø    :REM*1Ø8
585    :REM*61
59Ø    :REM*24
595    :REM*253
6ØØ    :REM*114
6Ø5    :REM*9
61Ø    :REM*19Ø
615    :REM*1Ø7
62Ø    :REM*188
625    :REM*137
63Ø    :REM*176
635    :REM*2Ø1
64Ø    :REM*48
645    :REM*55
65Ø    :REM*84
655    :REM*245
66Ø    :REM*122
665    :REM*253
67Ø    :REM*114
675    :REM*163
68Ø    :REM*17Ø
685    :REM*79
69Ø    :REM*52
695    :REM*177
7ØØ    :REM*3Ø
7Ø5    :REM*235
1ØØØ   :REM*117
1ØØ5   :REM*116
5ØØØØ  :REM*183
```

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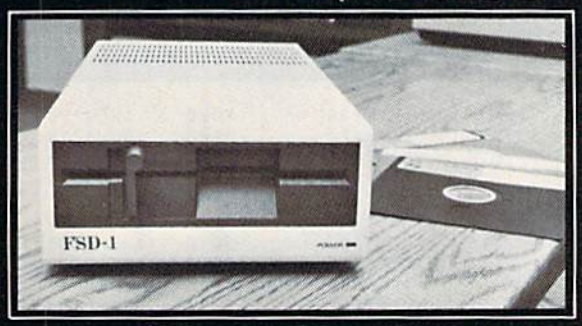
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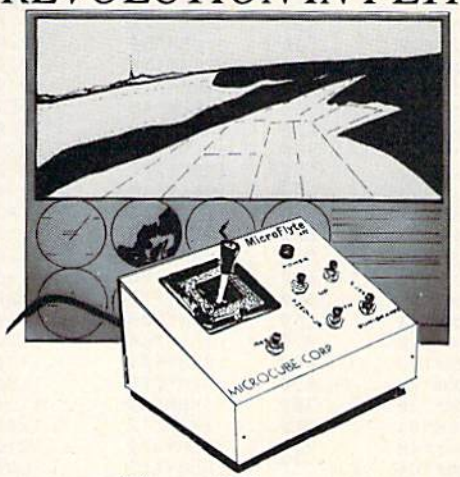
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Shopper's Companion, by Joseph Shaughnessy; May, p. 34.

```
1Ø      :REM*96
2Ø      :REM*76
3Ø     :REM*156
4Ø      :REM*22
5Ø     :REM*198
6Ø      :REM*64
7Ø     :REM*192
8Ø     :REM*1Ø8
9Ø      :REM*7Ø
1ØØ     :REM*54
11Ø     :REM*7Ø
12Ø    :REM*25Ø
13Ø    :REM*154
14Ø     :REM*42
15Ø    :REM*138
16Ø    :REM*156
17Ø    :REM*144
18Ø    :REM*24Ø
19Ø    :REM*196
2ØØ     :REM*28
21Ø    :REM*138
22Ø     :REM*44
23Ø    :REM*148
24Ø    :REM*164
25Ø      :REM*4
26Ø     :REM*55
27Ø     :REM*69
28Ø    :REM*231
29Ø    :REM*189
3ØØ     :REM*75
31Ø    :REM*145
32Ø     :REM*29
33Ø     :REM*27
34Ø    :REM*1Ø1
35Ø     :REM*15
36Ø    :REM*171
37Ø    :REM*235
38Ø    :REM*197
39Ø    :REM*163
4ØØ     :REM*71
41Ø    :REM*183
42Ø    :REM*113
43Ø    :REM*139
44Ø      :REM*5
45Ø    :REM*129
46Ø     :REM*83
47Ø     :REM*17
48Ø     :REM*49
49Ø     :REM*81
5ØØ    :REM*111
51Ø    :REM*199
52Ø    :REM*228
53Ø     :REM*9Ø
54Ø    :REM*19Ø
55Ø     :REM*16
56Ø     :REM*48
57Ø    :REM*166
58Ø    :REM*128
59Ø    :REM*2Ø6
6ØØ    :REM*13Ø
61Ø     :REM*34
62Ø    :REM*168
63Ø     :REM*7Ø
64Ø    :REM*188
65Ø    :REM*116
66Ø    :REM*2Ø8
67Ø     :REM*34
68Ø    :REM*1Ø2
69Ø    :REM*218
7ØØ     :REM*2Ø
71Ø     :REM*12
72Ø    :REM*24Ø
73Ø    :REM*112
74Ø    :REM*142
75Ø    :REM*14Ø
76Ø    :REM*14Ø
77Ø    :REM*119
78Ø    :REM*245
79Ø    :REM*161
8ØØ     :REM*45
81Ø    :REM*159
82Ø     :REM*75
83Ø    :REM*145
84Ø     :REM*33
85Ø    :REM*253
86Ø     :REM*15
87Ø    :REM*115
88Ø     :REM*43
89Ø    :REM*233
9ØØ    :REM*155
91Ø    :REM*2Ø7
92Ø    :REM*251
93Ø     :REM*49
94Ø    :REM*143
95Ø    :REM*195
96Ø      :REM*7
97Ø     :REM*69
98Ø    :REM*2Ø3
99Ø    :REM*165
1ØØØ    :REM*19
1Ø1Ø   :REM*189
1Ø2Ø    :REM*77
1Ø3Ø   :REM*116
1Ø4Ø    :REM*58
1Ø5Ø   :REM*224
1Ø6Ø   :REM*142
1Ø7Ø    :REM*46
1Ø8Ø    :REM*98
1Ø9Ø   :REM*182
11ØØ    :REM*24
111Ø    :REM*92
112Ø   :REM*174
113Ø    :REM*5Ø
114Ø    :REM*2Ø
115Ø   :REM*2ØØ
116Ø   :REM*152
117Ø    :REM*72
118Ø   :REM*172
119Ø    :REM*76
12ØØ    :REM*192
121Ø    :REM*22Ø
122Ø    :REM*62
123Ø   :REM*242
124Ø   :REM*174
125Ø   :REM*148
126Ø    :REM*44
127Ø   :REM*222
128Ø   :REM*237
129Ø    :REM*11
13ØØ    :REM*159
131Ø   :REM*2Ø7
132Ø   :REM*217
133Ø    :REM*53
134Ø   :REM*131
135Ø   :REM*1Ø1
136Ø    :REM*47
137Ø   :REM*2Ø9
138Ø    :REM*33
139Ø    :REM*45
14ØØ    :REM*13
141Ø   :REM*2Ø3
142Ø   :REM*211
143Ø     :REM*7
1435    :REM*1Ø2
144Ø   :REM*2Ø5
145Ø   :REM*169
146Ø   :REM*121
147Ø     :REM*23
148Ø    :REM*1Ø9
149Ø    :REM*241
1495     :REM*82
15ØØ    :REM*251
151Ø     :REM*29
152Ø     :REM*55
153Ø     :REM*39
154Ø    :REM*228
155Ø    :REM*1Ø4
156Ø    :REM*198
157Ø    :REM*182
158Ø    :REM*222
159Ø      :REM*4
16ØØ     :REM*82
161Ø     :REM*7Ø
162Ø    :REM*25Ø
163Ø    :REM*114
164Ø    :REM*146
165Ø    :REM*166
166Ø    :REM*2Ø6
167Ø     :REM*8Ø
168Ø     :REM*1Ø
169Ø    :REM*232
17ØØ    :REM*178
171Ø    :REM*178
172Ø    :REM*18Ø
173Ø    :REM*164
174Ø    :REM*214
175Ø    :REM*24Ø
176Ø     :REM*94
177Ø    :REM*128
178Ø    :REM*16Ø
179Ø    :REM*156
18ØØ    :REM*211
181Ø    :REM*227
182Ø    :REM*193
183Ø    :REM*223
184Ø    :REM*157
185Ø    :REM*119
186Ø     :REM*69
187Ø    :REM*199
188Ø    :REM*245
189Ø     :REM*81
19ØØ     :REM*11
1905     :REM*46
191Ø    :REM*237
192Ø     :REM*85
193Ø    :REM*2Ø7
194Ø    :REM*141
195Ø     :REM*79
196Ø    :REM*219
197Ø     :REM*69
198Ø    :REM*1Ø5
199Ø    :REM*147
2ØØØ    :REM*191
2Ø1Ø    :REM*177
2Ø2Ø     :REM*69
2Ø3Ø     :REM*61
2Ø4Ø     :REM*71
2Ø5Ø    :REM*218
2Ø6Ø     :REM*52
2Ø7Ø      :REM*Ø
2Ø8Ø    :REM*218
2Ø9Ø    :REM*194
21ØØ     :REM*12
211Ø    :REM*244
212Ø    :REM*182
213Ø    :REM*19Ø
214Ø    :REM*126
215Ø     :REM*96
216Ø     :REM*18
217Ø    :REM*16Ø
218Ø    :REM*15Ø
219Ø    :REM*218
22ØØ      :REM*Ø
221Ø    :REM*236
222Ø     :REM*28
223Ø     :REM*86
224Ø    :REM*114
225Ø     :REM*46
226Ø     :REM*3Ø
227Ø     :REM*56
228Ø    :REM*228
229Ø     :REM*86
23ØØ    :REM*216
3ØØØ     :REM*49
3Ø1Ø     :REM*25
3Ø2Ø    :REM*151
3Ø3Ø     :REM*41
3Ø4Ø    :REM*161
3Ø5Ø    :REM*159
3Ø6Ø    :REM*165
5ØØØ     :REM*63
```

Snakes, by Douglas Fish; May, p. 62.

```
1Ø      :REM*226
2Ø      :REM*2ØØ
3Ø      :REM*25Ø
35      :REM*161
36      :REM*186
4Ø      :REM*21Ø
45      :REM*187
5Ø      :REM*66
6Ø      :REM*7Ø
7Ø      :REM*58
8Ø     :REM*23Ø
9Ø      :REM*24
1ØØ      :REM*8
11Ø     :REM*134
12Ø     :REM*248
13Ø     :REM*14Ø
2ØØ      :REM*1Ø
21Ø     :REM*184
22Ø      :REM*94
23Ø     :REM*196
24Ø      :REM*56
25Ø     :REM*118
26Ø     :REM*2Ø3
265     :REM*118
266     :REM*179
27Ø     :REM*117
28Ø     :REM*241
285      :REM*5Ø
29Ø     :REM*181
3ØØ      :REM*95
3Ø5      :REM*64
31Ø     :REM*221
32Ø     :REM*127
33Ø      :REM*17
5ØØ     :REM*219
51Ø     :REM*225
52Ø     :REM*228
1ØØØ     :REM*3
1Ø1Ø    :REM*251
1Ø2Ø     :REM*63
2ØØØ    :REM*239
2Ø1Ø     :REM*35
2Ø2Ø    :REM*153
2Ø3Ø     :REM*13
2Ø4Ø     :REM*35
2Ø5Ø     :REM*34
2Ø6Ø    :REM*21Ø
2Ø7Ø    :REM*134
2Ø8Ø    :REM*2ØØ
21ØØ    :REM*2Ø4
211Ø    :REM*15Ø
212Ø    :REM*15Ø
213Ø    :REM*198
214Ø     :REM*36
215Ø    :REM*15Ø
216Ø     :REM*94
2165    :REM*159
217Ø     :REM*7Ø
25ØØ    :REM*233
251Ø     :REM*29
252Ø     :REM*93
3ØØØ    :REM*219
3ØØ3    :REM*116
3ØØ5    :REM*19Ø
3Ø1Ø     :REM*1Ø1
3Ø2Ø    :REM*139
3Ø3Ø    :REM*229
3Ø4Ø    :REM*2Ø5
3Ø45     :REM*14
3Ø5Ø     :REM*1Ø7
3Ø6Ø     :REM*1Ø1
3Ø66     :REM*29
3Ø7Ø    :REM*241
```

Energy Watchdog, by Ann Sykes; May, p. 44.

```
1       :REM*53
2      :REM*182
3      :REM*2Ø7
4      :REM*16Ø
5       :REM*67
6       :REM*68
1Ø     :REM*148
15     :REM*193
2Ø     :REM*122
25     :REM*237
3Ø      :REM*74
4Ø     :REM*142
5Ø     :REM*19Ø
6Ø     :REM*218
65     :REM*135
75      :REM*79
8Ø     :REM*244
85     :REM*231
95     :REM*127
2ØØ    :REM*224
21Ø      :REM*14
22Ø      :REM*32
23Ø    :REM*244
24Ø    :REM*17Ø
25Ø    :REM*18Ø
252    :REM*242
26Ø      :REM*25
27Ø    :REM*123
28Ø    :REM*143
29Ø     :REM*35
295     :REM*46
3ØØ    :REM*185
31Ø    :REM*185
32Ø     :REM*37
33Ø     :REM*75
34Ø    :REM*253
35Ø    :REM*1Ø1
36Ø    :REM*141
37Ø     :REM*31
38Ø    :REM*251
39Ø     :REM*31
4ØØ    :REM*1Ø3
41Ø    :REM*245
42Ø    :REM*175
421     :REM*156
422     :REM*127
423      :REM*66
43Ø    :REM*247
432     :REM*1Ø5
433     :REM*138
434     :REM*125
435     :REM*246
44Ø    :REM*123
441      :REM*5Ø
442      :REM*35
443     :REM*13Ø
45Ø    :REM*183
46Ø    :REM*1Ø5
5ØØ    :REM*197
5Ø1     :REM*76
5Ø2    :REM*249
5Ø3     :REM*24
5Ø4    :REM*221
5Ø5    :REM*214
5Ø6    :REM*155
5Ø7    :REM*19Ø
5Ø8    :REM*131
```

→

Listing continued.

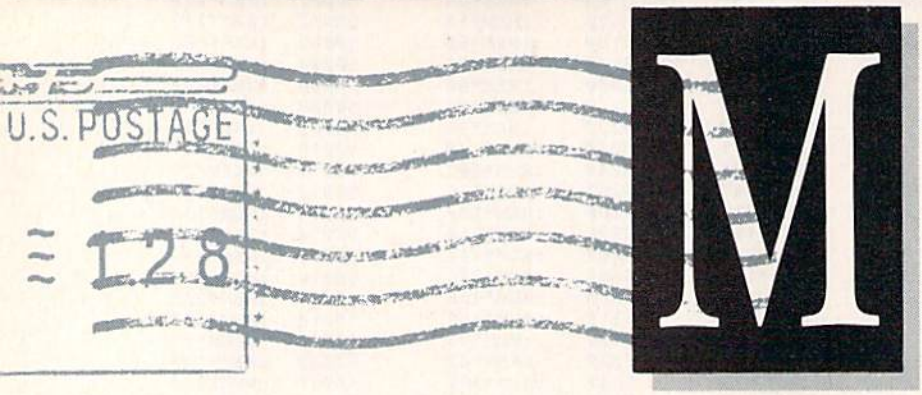
```
509     :REM*48
510     :REM*39
520   :REM*182
530    :REM*42
540    :REM*74
550    :REM*90
560   :REM*230
570   :REM*120
580    :REM*86
600   :REM*206
610    :REM*60
620   :REM*158
630     :REM*6
640     :REM*8
650   :REM*148
660   :REM*166
670    :REM*68
680   :REM*166
690   :REM*210
700    :REM*16
720   :REM*110
730   :REM*202
740    :REM*34
750    :REM*68
760    :REM*50
770   :REM*199
780    :REM*39
800   :REM*175
810   :REM*133
820    :REM*41
830    :REM*91
840    :REM*45
850   :REM*175
860   :REM*219
861    :REM*76
862    :REM*75
863   :REM*104
864   :REM*147
865   :REM*224
866    :REM*61
867   :REM*224
868   :REM*169
870    :REM*67
871    :REM*70
872    :REM*19
873    :REM*30
874   :REM*229
875   :REM*138
876   :REM*225
877   :REM*234
878   :REM*209
879   :REM*162
880    :REM*41
1000  :REM*123
5000  :REM*157
5010  :REM*239
5020  :REM*233
6000  :REM*171
6010  :REM*125
6020  :REM*147
6030  :REM*215
6035  :REM*196
6040  :REM*215
6050  :REM*101
6060   :REM*17
6070   :REM*61
6080  :REM*169
6090  :REM*205
6100   :REM*73
6110   :REM*61
6120   :REM*59
6130   :REM*25
6140  :REM*135
6150  :REM*246
6160   :REM*88
6170   :REM*14
6180   :REM*60
6190   :REM*78
6200   :REM*96
6210  :REM*254
6220   :REM*96
6230  :REM*140
6240  :REM*208
6250   :REM*30
6260  :REM*122
6270  :REM*210
6280  :REM*244
6290  :REM*226
6300  :REM*238
6310  :REM*148
6320   :REM*84
6330   :REM*42
6340  :REM*206
6350    :REM*0
6360  :REM*206
6370  :REM*120
6380    :REM*96
50000 :REM*161
50001 :REM*240
50002 :REM*203
50003 :REM*106
50004 :REM*127
50006 :REM*149
50008  :REM*89
50009  :REM*44
50010 :REM*251
50011  :REM*26
50012 :REM*149
50013 :REM*136
50014 :REM*207
50015 :REM*252
50016 :REM*169
50017 :REM*236
50018 :REM*163
50019  :REM*28
50020 :REM*153
50021 :REM*230
```

Con Game, by Nick Sullivan; May, p. 84.

```
100     :REM*12
110   :REM*236
120    :REM*60
130   :REM*112
140   :REM*158
150    :REM*82
160    :REM*72
170   :REM*210
180   :REM*144
190    :REM*20
200   :REM*218
210   :REM*250
220   :REM*110
230    :REM*32
240   :REM*254
250   :REM*198
260   :REM*205
270   :REM*223
280   :REM*111
290    :REM*63
300   :REM*129
310   :REM*113
320   :REM*165
330    :REM*91
340   :REM*115
350   :REM*119
360   :REM*123
370   :REM*197
380   :REM*131
390   :REM*227
400   :REM*139
410    :REM*45
420   :REM*223
430    :REM*75
440   :REM*113
450    :REM*51
460   :REM*153
470    :REM*67
480   :REM*205
490   :REM*137
500   :REM*151
510    :REM*65
520   :REM*176
530     :REM*2
540   :REM*230
550   :REM*120
560   :REM*178
570   :REM*186
580   :REM*154
590   :REM*128
600   :REM*104
610   :REM*154
620   :REM*160
630   :REM*242
640   :REM*150
650   :REM*212
660   :REM*252
670    :REM*28
680   :REM*156
690   :REM*222
700    :REM*32
710   :REM*102
720    :REM*46
730   :REM*164
740   :REM*200
750    :REM*68
760    :REM*22
770   :REM*107
780    :REM*15
790   :REM*109
800    :REM*63
810   :REM*147
820    :REM*13
830    :REM*75
840    :REM*65
850     :REM*3
860    :REM*95
870   :REM*189
880    :REM*59
890   :REM*191
900   :REM*219
910     :REM*9
920   :REM*117
930    :REM*83
940    :REM*89
950    :REM*61
```

Datafile Update, by Mike Konshak; May, p. 100.

```
10      :REM*68
16      :REM*50
22    :REM*116
23    :REM*107
44    :REM*216
46    :REM*164
47    :REM*105
48     :REM*26
49    :REM*133
59    :REM*163
60     :REM*26
62     :REM*18
66     :REM*70
78     :REM*30
80     :REM*78
82     :REM*94
84    :REM*246
88    :REM*244
96     :REM*46
98    :REM*226
100    :REM*32
106   :REM*206
108   :REM*146
110    :REM*84
112    :REM*18
116     :REM*4
118   :REM*146
124   :REM*160
126   :REM*214
128   :REM*230
144   :REM*108
152   :REM*188
154   :REM*248
156     :REM*0
158   :REM*140
159    :REM*45
162   :REM*168
164     :REM*6
165    :REM*39
166   :REM*246
172   :REM*100
173   :REM*255
174   :REM*206
175   :REM*105
176   :REM*142
177   :REM*147
180   :REM*132
184   :REM*126
186   :REM*236
188    :REM*46
198   :REM*102
244   :REM*238
272   :REM*213
284    :REM*73
286   :REM*191
304   :REM*219
334    :REM*71
348   :REM*215
352    :REM*37
353    :REM*88
354   :REM*167
355   :REM*164
385   :REM*178
389    :REM*48
390   :REM*233
394   :REM*183
402     :REM*5
403   :REM*240
410    :REM*29
411    :REM*90
414    :REM*69
416   :REM*111
418    :REM*49
422    :REM*67
424    :REM*97
426    :REM*99
428   :REM*101
436   :REM*191
440    :REM*73
442   :REM*111
446   :REM*137
456   :REM*151
460   :REM*245
462   :REM*151
464   :REM*187
466   :REM*169
468   :REM*237
470   :REM*133
472   :REM*235
474   :REM*127
476    :REM*45
478    :REM*67
480   :REM*159
482   :REM*233
484    :REM*17
486   :REM*233
488    :REM*35
490   :REM*241
492   :REM*167
493     :REM*6
494   :REM*181
495   :REM*246
496   :REM*119
497   :REM*176
498   :REM*239
499     :REM*8
500    :REM*27
504    :REM*75
515   :REM*181
516    :REM*62
517    :REM*35
532   :REM*148
560    :REM*26
570   :REM*206
574   :REM*216
575    :REM*93
576   :REM*242
598     :REM*4
602   :REM*222
608    :REM*58
610   :REM*230
625    :REM*71
636    :REM*10
638    :REM*20
639   :REM*205
642   :REM*112
706   :REM*246
708   :REM*116
709    :REM*19
710   :REM*138
711   :REM*239
740   :REM*112
742    :REM*56
744    :REM*98
748    :REM*72
754   :REM*198
758   :REM*212
760    :REM*52
762     :REM*6
770   :REM*251
771   :REM*130
772   :REM*135
776    :REM*21
782   :REM*181
786   :REM*161
788   :REM*189
798    :REM*79
806   :REM*111
820   :REM*143
834    :REM*99
838    :REM*79
868   :REM*201
870   :REM*159
876    :REM*21
884    :REM*55
886    :REM*99
888   :REM*213
890    :REM*55
892    :REM*39
894    :REM*23
896    :REM*53
898    :REM*49
1000   :REM*11
1008  :REM*245
1017   :REM*46
1018   :REM*53
1019   :REM*26
1034  :REM*140
1113   :REM*49
1124  :REM*216
1126  :REM*106
1127   :REM*87
1130  :REM*160
1198   :REM*34
1200  :REM*130
1206   :REM*58
1212  :REM*166
1224  :REM*198
1225  :REM*125
1230     :REM*2
1253    :REM*59
1257   :REM*241
1260  :REM*108
1262  :REM*158
1274    :REM*58
1302   :REM*253
1304   :REM*233
1310    :REM*57
1316   :REM*207
1324   :REM*241
```



Astronomy Software?

I want to thank you for the many useful programs and informative articles in every issue of *RUN*, as well as your continued support of the good old C-64. Although I've been tempted to upgrade to a 128, I still find my old reliable, if not stylish, workhorse more than adequate for my needs.

Being an amateur astronomer as well as a hacker, I would like to see more articles and software reviews dealing with this particular area. I know of several "home planetarium" programs on the market and one book, *Celestial Basic: Astronomy on Your Computer*, by Eric Burgess, that I highly recommend to Commodore users interested in such things as calculating planetary positions and celestial coordinates. Beyond these, I'm pretty much in the dark, so to speak. How about shedding a little light on the subject?

Cecil Cox
PO Box 3051
Ruidoso, NM 88345

Thank you for your letter, Cecil. We are publishing your complete address so readers can contact you with information on available astronomy programs.

If you have CP/M on your C-64, or if you do get a C-128, we know of at least two public domain CP/M programs that might interest you. One contains, on eight disks, the entire Yale Catalog of Bright Stars. As you may know, this is professional-level data, including such things as magnitude, class, declination and hour angle.

You can get one or all of the disks through the SIG/M CP/M user's group, PO Box 97, Iselin, NJ 08830; or, for a little more money but probably less time, from a commercial source of CP/M public domain software such as Poseidon Electronics, c/o Ralph S. Lees, Jr., 103 Waverly Place, New York, NY 10011, 212-777-9515. Either way, ask for SIG/M volumes 31–38. Another possible source would be on-line from an RCP/M bulletin board.

The other program we have in mind is one on celestial navigation (SIG/M volume 80), and you might find more astronomy-related CP/M programs in CP/M public domain catalogs. SIG/M will send you theirs for $3, and you get Poseidon's by sending an SASE with 44 cents postage.

One recently released commercial program is The Observatory, from Lightspeed Software, distributed by CBS Interactive Learning, One Fawcett Place, Greenwich, CT 06836; 203-622-2500. The program gives views of the sky as visible from any selected point on earth within a time range of 10,000 years.

For other non-CP/M programs, try contacting Sky and Telescope *magazine, 49 Bay State Road, Cambridge, MA 02238, 617-864-7360. They sometimes publish material on microcomputers and astronomy.*

Editors

Kudos for Ultra Hi-Res

I'm writing to you about that fantastic program, Ultra Hi-Res, you published in your February 1986 issue. To my knowledge, nowhere else is there a package for the C-128 that offers a resolution of 640-by-200 and a graphics screen dump. Everyone I've shown the program to has been overwhelmed, and we all hope to see more material on Ultra Hi-Res soon.

You mentioned that if there is enough demand for more printer routines for Ultra Hi-Res, you'll make them available. I have an Okidata 120, which is a very popular printer. I hope to see an Ultra Hi-Res routine for it in *RUN* soon.

John Fitzgerald
Berkeley, CA

Thanks, John. We've had a lot of letters on this trailblazing 128-mode program. For those readers who don't want to type the program in, Ultra Hi-Res is also available on our ReRUN disks (January/February edition for Part 1; March/April for Part 2). It can be downloaded from QuantumLink in the 128th precinct, as well, and is supported on that network by the program's author, Louis Wallace (user name LRW). RUN *will continue to offer updates on Ultra Hi-Res.*

Editors

Fontmaster II File Translator

The reviewer of Fontmaster II in the July 1986 issue states, "My only serious complaint is that Fontmaster II won't read a program file that it didn't write. It only reads and saves sequential files, so you'll have to convert previously saved program files to sequential files in order to tap Fontmaster II's Typewriter font."

This statement is incorrect and fails to mention an accompanying file-converter program called Translator that converts text saved as program files by other word processors to the Fontmaster II *program file* format. The list of other word processors includes

Speedscript, PaperClip, Fontmaster I, Script64, Easy Script, Fleet System 2, Creative Writer and Omniwriter.

I would like to make your readers aware of this feature, since some may bypass this product completely, thinking it would take too much time to translate program files to sequential format.

Gregg M. Lott
Greenville, SC

GEOS Hardware Compatibility

After reading your glowing report of the GEOS system, I sent for it, but could not use it because it only works with the 1541 or 1571 Commodore disk drive.

Nothing was said in any article I've read about GEOS to warn me that my MSD SD-2 drive would not handle the GEOS. I feel that you have not been quite fair to your readers not to have mentioned that GEOS only works with Commodore drives. I'm afraid that I'll be a little leery of your reviews in the future.

Robert Richards
Pittsburgh, PA

Because of its diskTurbo and software protection, GEOS is limited as to the drives that will handle it. It will work only with the 1541 and 1571, and perhaps with a drive that's 100% compatible with the 1541. It will not work with MSD dual or single drives or with a 1541 that's modified with fast-loading or disk-cracking hardware.

GEOS comes with several printer drivers that work with most Commodore-compatible printers. To select the correct driver, use GEOS's printer setup desk accessory; or you can save disk space by removing all the printer drivers except the one you're using from your work disk. (Be sure to keep backups of the other drivers in case you need them!)

The following printers have been tested with GEOS: Blue Chip M120/10; C. Itoh 8510; Commodore 1525; MPS-801 and MPS-1000; Epson MX, FX, RX and JX series; Ergo Hush 80CD; Mannesmann Tally Spirit 80; Okidata Okimate 10, 120 and Microline 92; Panasonic KX-1090 and KX-P1091; Seikosha SP-1000VC; Star Gemini 10X and SG series; and Toshiba PA7253.

GEOS has also been tested with the following interfaces: Cardco Card? + G, G-Whiz and Super G; Micrographix MW350; Telesys TurboPrintGT; Xetec Graphic Printer Interface, Super Graphix and Super Graphix Jr.

Even if your printer isn't listed above, you can still use GEOS if your setup can print 80 dots per inch in bit-image mode. GeoPaint and GeoWrite are both designed to work only with printers that print in 80 dots-per-inch bit-image increments.

Printers such as the Commodore MPS-1000 and MPS-803 print in 60 dots-per-inch densities, which would result in a loss of roughly 25 percent of the right side of your GeoPaint or GeoWrite document. So, before buying GEOS, it's a good idea to check your printer manual to see if it has 80 dots-per-inch increments.

Further questions about GEOS may be directed to Berkeley Softworks Technical Support, 2150 Shattuck Drive, Berkeley, CA 94704; 415-644-0883.

Editors

Finding 64Cs

I really enjoyed reading your article on the "New Members of the Commodore Family" in the July 1986 issue. I want to purchase the 64C, and I was wondering if you could tell me where to find it.

Christopher Miller
Morristown, TN

The 64C is being sold in the same stores that sell the C-64, like Toys-R-Us, Child World and K-Mart. Also, watch the mail-order-house ads in RUN. *Some of them are offering the 64C.*

Editors

Copyright Quandary

I found many good articles in the July 1986 issue of *RUN*, but I especially enjoyed the one on producing a disk-based magazine. Thinking it would be just right for our new user's group (so new, we haven't named it yet), I dug up my March 1986 issue and typed in C-64 Perfect Typist, ML Perfect Typist and RUN Script, then returned to the July issue and typed in MagProduction, MagReader and MagPrint. I'm pleased to say I didn't spend four days for nothing. Your programs are excellent, as usual, and well worth the time.

However, a problem has come up. You, along with many other magazines, constantly repeat that your programs are copyrighted. Well, now I'm in a fix! I can produce our user's group magazine, but, because of the copyright laws, I *can't* legally distribute MagReader and MagPrinter so members can read it. Is there something you can do about this?

John King
Campbellsville, KY

You make a good point—one that escaped our attention when we published our disk-magazine programs. To allow anyone to use the programs, RUN *is dropping its copyright on MagReader and MagPrinter. Feel free to distribute them, and we hope your disk magazine will work out well for your new user's group.*

Incidentally, contact RUN *when you've decided on a name, so we can add it to our user's group list.*

Editors

Fix for Paperback Writer 128

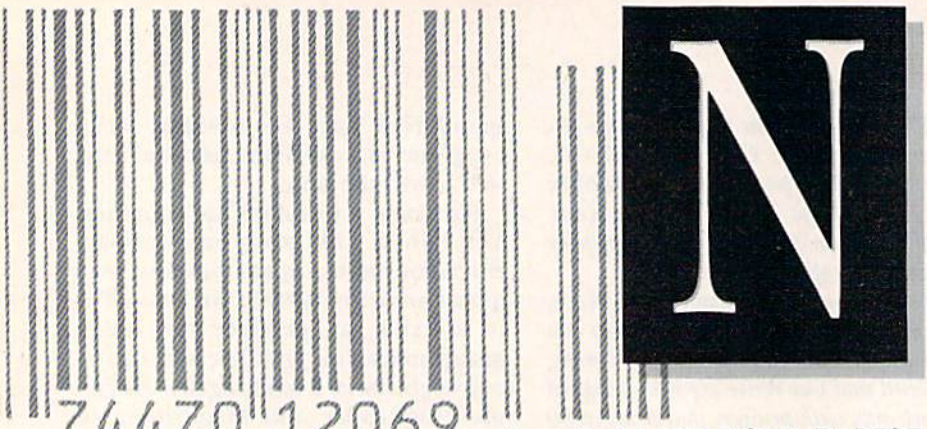
In the May 1986 issue of *RUN*, the reviewer of Paperback Writer 128 noted that your choice of printer can't be saved to the master disk. There is a simple way to make your printer the default selection. Delete the first file option from the directory (the printer files end in .pf), after saving it to your data disk. Then load your printer file and save it to the master disk under a slightly different name. When you load the program and the printer list appears, the cursor will be on the name of your printer. Press return and you're on your way.

Richard A. Coleman
Baltimore, MD

Learning to Walk

Regarding the article on page 110 of the June 1986 *RUN*, "Learn to Walk Before You RUN"—thank you, thank you, thank you.

Martin S. Gunn
Alexandria, VA



Compiled by HAROLD R. BJORNSEN

For Realty Investors

Useful Software (Dept. DD, Box 54H, Scarsdale, NY 10583) has released new C-64 software for real estate businesses.

Prepay determines the savings you or your client would have by prepaying a mortgage, what the additional payments would be, the time and money saved from mortgage reduction and whether it would be practical to borrow the funds if cash is not available.

Realanal prints out the projected cash flows, depreciation, mortgage costs, internal rates of return, adjusted basis, equity value and tax benefits necessary to evaluate the feasibility of any income-producing real estate investment. Up to 15 years may be projected.

Both programs are demonstrated on a five-inch disk, which comes with instructions and a coupon for a full rebate of its purchase price ($14.95) when you buy either program for $99.95.

Check Reader Service number 402.

More Women Filling Editorial Positions

The publishing industry is slowly catching up to other fields that employ women in decision-making positions.

Computer PR Update (Cycon Communications, Inc., 376 East St. Charles Road, Suite K, Lombard, IL 60148) has announced that in the first five months of 1986 the number of women in editorial management positions has grown from 30 percent to 37 percent—a 28 percent increase.

In magazines and newspapers serving the computer industry, women hold 106 of the 388 top editorial spots. In newsletter publishing, the number of women in editorial positions has increased five percent in the first four months of 1986.

The update further states that women are now in positions where they can strongly influence a publication's artistic and editorial content.

Animal Farm

Cyber-Farmer 64 is a self-contained, single-entry accounting system that controls your farm's finances. It's set up with over 300 account names and numbers to cover nearly every type of income and expense. You can tailor the account list to individual needs. Cyber-Farmer 64 also prepares a detailed cash-flow statement to help you track your monthly income and expenses. Available on disk for $125.

Also available on disk are Farm Manager, a series of farm planning and management programs covering general business, grain management and beef and pork products ($49.95 per volume); and Hog Farm 64, a swine enterprise analysis program that creates a feed-ration setup and keeps a daily record of feed costs and hog sales ($99.95). Pro-Ag Software Co., Route 1, Box 43AR, Marble Rock, IA 50653.

Check Reader Service number 400.

CP/M 128 & Cobol-64

Abacus Software (PO Box 7219, Grand Rapids, MI 49510) has released the *Commodore 128 CP/M User's Guide*, which covers built-in and transient commands, function key definitions, CP/M internals, files and filenames and special 128 commands. $19.95.

Also available is Cobol-64, a software package for teaching the English-like Cobol syntax on the C-64. It includes an editor, compiler, interpreter and symbolic debugger, and a 149-page manual. $39.95.

Check Reader Service number 401.

Mind Game

Mind Pursuit is a test of intelligence, knowledge and trivia and includes questions for both adults and children. Music and graphics clues are used in game play. An optional on-screen game board utilizes animated characters and various strategy elements. Available on disk for the C-64 for $29.95. Additional question disks are available for $14.95. Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311.

Check Reader Service number 407.



Datasoft's Mind Pursuit.



E.T. the cat stands ready to receive a printout from the quiet and compact Diconix 150 ink-jet printer.

Peewee Printer

The Diconix 150, a portable, battery-powered ink-jet printer, has been released by Diconix (PO Box 3100, Dayton, OH 45420). It weighs less than four pounds and prints on single sheets or continuous-feed computer paper with near-letter-quality print at speeds as high as 150 cps in draft mode. It can produce italic, emphasized, enlarged, proportional and condensed print styles. Available for $479.

Check Reader Service number 406.

Michaelsoft Magic

Michaelsoft (4821 Harvest Court, Colorado Springs, CO 80917) has released dfile 128—the C-128 version, on disk, of the Datafile series—along with its associated file utility programs and Wordfile 128, a word processor. Each program retails for $24.95.

The dfile database management system is totally flexible as to the number and length of fields, and record data may contain punctuation, including commas. The program may be used for everything from genealogical studies and collections and hobbies to financial reports and scientific data acquisition.

The file utility programs let you change your file structures and increase the capabilities and flexibilities of the dfile 128 database management system when the number of records exceeds dfile 128's capacity or when you need to use some records in an old file for a new file. It also merges compatible record files, prints labels, reports, lists and calculated reports, clones record files, exports record files and reads files.

The Wordfile 128 word processor includes help screens and pull-down windows, and prints documents to screen or printers. You can cut and paste large portions of text, change words or sentences and merge other text files.

Check Reader Service number 408.

Move Over, Jane Fonda

Bodylink is a dual-channel, microprocessor-driven body-signal monitor for the C-64 that measures EMG, GSR, EEG, EKG, temperature, heart rate, blood pressure, breath, sounds, optics and posture. Bodylink comes in four basic configurations: muscle coordination, aerobic exercise, stress reduction and isometric muscle training. Each package contains the Bodylink, accessories and a demo disk, and they range in price from $139.95 to $209.95 Separate sensors and accessories are available from $1 to $99.95. Various programs are also available on disk to help you achieve your health goals. These range in price from $29.95 to $199.95. Bodylog, Inc., 120 Kisco Ave., Mt. Kisco, NY 10549.

Check Reader Service number 409.

Be a Telecommunications Pro

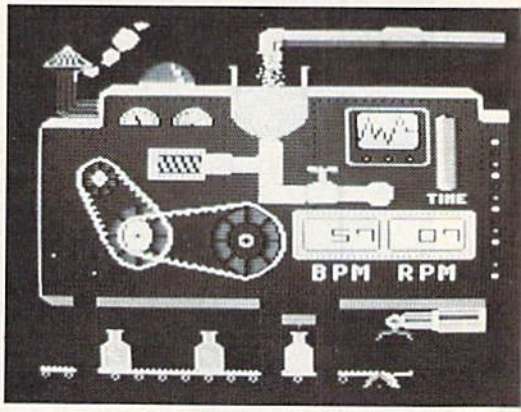
BobsTerm Pro-128, a telecommunications package from Progressive Peripherals & Software (464 Kalamath St., Denver, CO 80204), is menu driven and supports VT-100 and VT-52 80 ADM-31 (CP/M type) terminal emulation. It offers a full-screen text editor and on-screen status display of available space in the 60K buffer. You can edit files while it simultaneously reads, writes, uploads and downloads to any disk type, including CP/M. Available on disk for $79.95.

Check Reader Service number 404.

A Chorus Line

Owners of Hearsay 1000, a two-way voice-interaction system that speaks, understands and obeys verbal commands, can now purchase four new programs on disks for use in conjunction with the system and the C-64.

The Intelligent Talking Terminal is a telecommunications program that lets other computers and databases such as CompuServe, Dow Jones, MCI



Fun ways to get into shape: Bodylink, from Bodylog.

and The Source, talk, listen to and obey your verbal commands. The program functions with manual- or auto-dial modems and includes the X-modem, CompuServe's B-protocol, Punter file-transfer methods and the standard capture buffer method ($29.95).

Think Bank (for children ages 6–9) is a memory game to help build retention, math, problem-solving and reasoning skills ($29.95); Rhyme & Reason (ages 2–5) teaches about animals, body parts, clothing, the seasons, direction, family members and safety ($29.95); Aqua Circus (ages 2–5) introduces basic colors, shapes, numbers counting and simple arithmetic ($29.95). Think Bank, Rhyme & Reason and Aqua Circus all feature colorful graphics, animation, music and sound, and each exercise builds on materials previously introduced. In addition, children need no parental supervision or prior computer experience. Hearsay, Inc., 1825 74th St., Brooklyn, NY 11204.

Check Reader Service number 413.

Who?

In Intrigue!, your brother suckers you into managing his down-and-out detective agency. But he disappears, and you've got to scour the city to find him. Did the urbane ambassador do it? Or was it his gorgeous secretary? The tough guy from the FBI? Who?

To solve the mystery, you must interrogate the characters and then search the city using the clues they give you.

There are thousands of variations and three levels of difficulty, so the game is different every time you and up to three of your friends play it. Even if you manage to find your brother, you won't reach the full acclaim of the city and an evening with your favorite character unless you finger the guilty party or parties. Intrigue! is available on disk for the C-64 for $39.95 from Kinemation, PO Box 3076, Peterborough, NH 03458.

Check Reader Service number 403.

Rings of Zilfin

Rings of Zilfin, a fantasy/adventure game, utilizes a new kind of windowing animation that provides screen insets and zooms into room interiors. In this strategy game, you must find the two Rings of Zilfin as you defend yourself against 26 kinds of monsters. Available on disk for the C-64 at $39.95. Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043.

Check Reader Service number 405.

C-128 Gnomes

Briwall (PO Box 129, Kutztown, PA 19530) has released two software packages. Gnome Speed compiles most Basic 7.0 and 2.0 programs. It transforms programs into P-code that will be up to 50% smaller and run up to ten times faster. Available on disk for the C-128 for $59.95. Gnome Kit is a transparent programmer's utility with full merge, find and selective line renumbering commands. Available on disk for the C-128 and C-64 for $39.95.

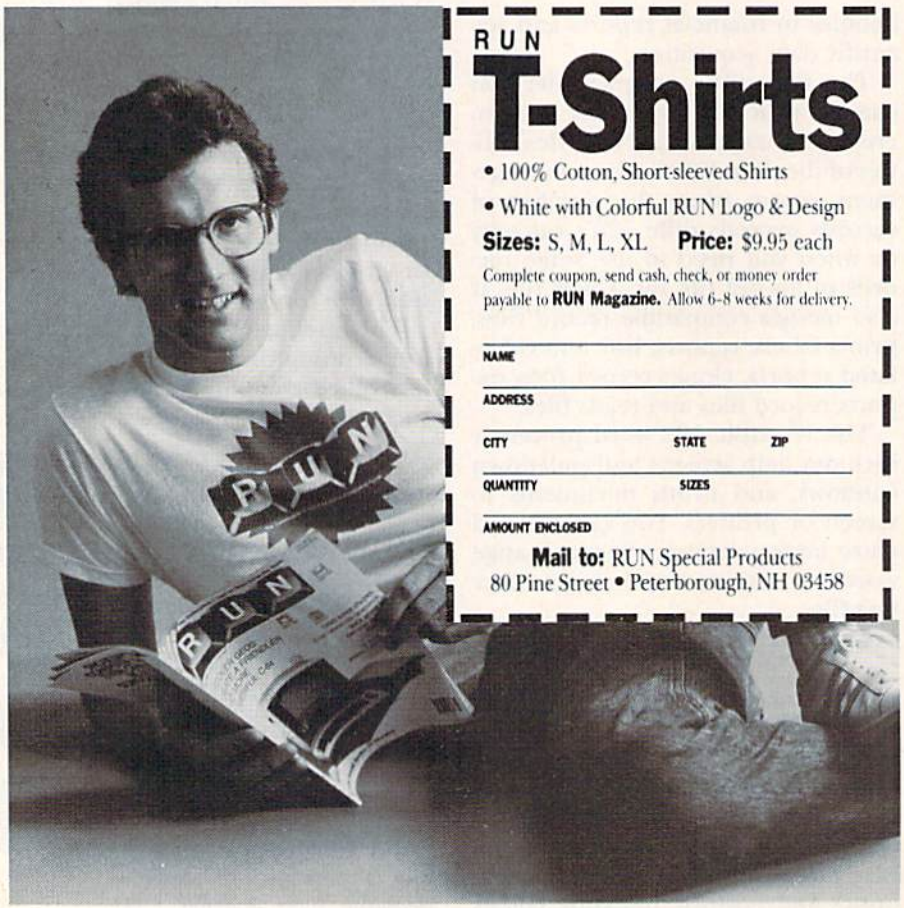
Check Reader Service number 410.

Hallmark Greetings

Hallmark Cards (2440 Pershing Road, Suite G-40, Kansas City, MO 64108) introduces Color Mail, a graphics and telecommunications package that lets you create electronic greetings featuring animated graphics and music drawn from library elements available on Color Mail disks. These greetings can be sent to other Color Mail owners via CompuServe's electronic mail facility.

Side one of the disk contains graphics such as backgrounds, characters, holidays and symbols, and music, sound effects and special effects. Side two contains the Vidtex telecommunications program. New libraries will be available periodically for $3.50–$5. Hallmark Color Mail is available for the C-64 for $40.

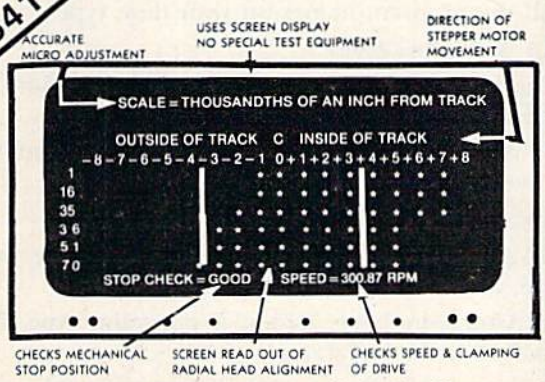
Check Reader Service number 412.



Circle 193 on Reader Service card.

1571 PHYSICAL EXAM
• 1541 • 8050 • 4040 •

SEE REVIEWS IN:
INFO #10 MAY/JUNE 1986 P. 54
Midnite Gazette #32 6/86 P.19
RUN 6/85 P. 14
AHOY 4/85 P. 32



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Learn to Walk Before You RUN

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

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

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

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

```
CLOSE15 <Press Return>
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

How to Type Listings from *RUN*

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using *RUN*'s Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted pro-

gram that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
40 IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
60 POKEML+4,PG:POKE ML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,P
   G
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   **********************"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}**********************
    **************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

Listing 2. *128 Perfect Typist program.*

```
1 REM 40/80 COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 FORX=5120TO5379:READD:T=T+D:POKEX,D:NEXT

20 IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
   N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{20 SPACEs}
   "
30 PRINT"{SHFT CLR}"A$"{CRSR RT}**********
   **************************"
40 PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
   S NOW ACTIVE **"
50 PRINTA$"{CRSR RT}**{2 SPACEs}SYS 5120=ON
   {7 SPACEs}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$"{CRSR RT}**********************
   **************":SYS5120:NEW
5120 DATA 173,005,003,201,020,208,001,096,1
     41,045
5130 DATA 020,173,004,003,141,044,020,162,0
     43,160
5140 DATA 020,142,004,003,140,005,003,096,2
     34,234
5150 DATA 173,044,020,141,004,003,173,045,0
     20,141
5160 DATA 005,003,096,032,013,067,140,255,0
     19,162
5170 DATA 000,142,252,019,142,253,019,142,2
     54,019
5180 DATA 189,000,002,201,032,240,008,201,0
     48,144
5190 DATA 007,201,058,176,003,232,208,238,1
     89,000
5200 DATA 002,240,054,201,032,208,005,172,2
     54,019
5210 DATA 240,042,201,034,208,010,072,173,2
     54,019
5220 DATA 073,001,141,254,019,104,072,238,2
     53,019
5230 DATA 173,253,019,041,007,168,104,024,0
     72,024
5240 DATA 104,016,001,056,042,136,016,246,1
     09,252
5250 DATA 019,141,252,019,232,208,197,173,2
     52,019
5260 DATA 024,101,022,024,101,023,141,252,0
     19,169
5270 DATA 042,032,241,020,032,188,020,160,0
     02,185
5280 DATA 185,020,032,241,020,136,016,247,1
     65,116
5290 DATA 208,009,165,117,208,005,169,145,0
     32,241
5300 DATA 020,172,255,019,096,013,032,032,1
     62,000
5310 DATA 173,252,019,232,056,233,100,176,2
     50,105
5320 DATA 100,202,240,003,032,232,020,201,0
     10,176
5330 DATA 005,205,252,019,240,015,162,000,2
     32,056
5340 DATA 233,010,016,250,024,105,010,202,0
     32,232
5350 DATA 020,170,072,138,009,048,032,241,0
     20,104
5360 DATA 096,170,173,000,255,072,169,000,1
     41,000
5370 DATA 255,138,032,210,255,104,141,000,2
     55,096
```

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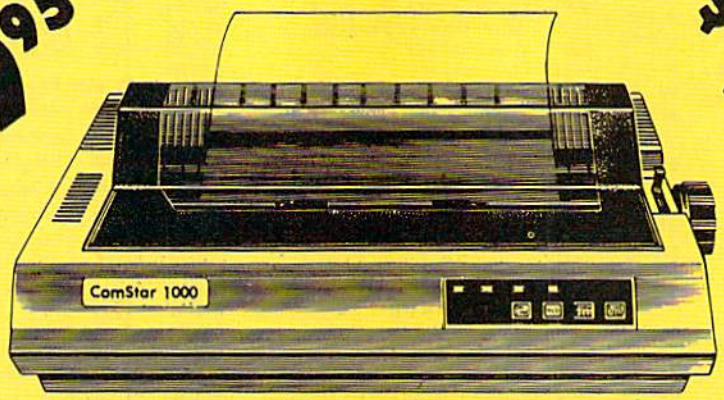
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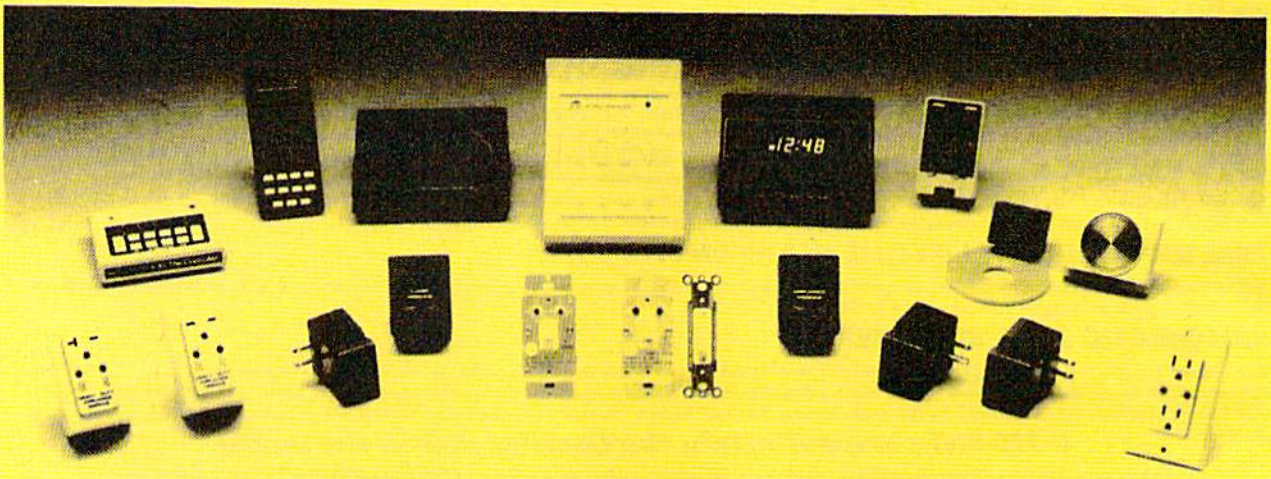
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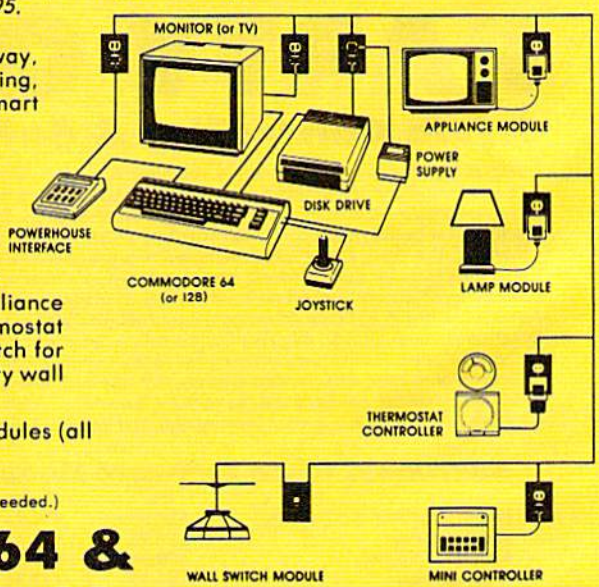


The X-10 POWERHOUSE Computer Interface is programmed from your Commodore 64 or 128. You can then turn off your computer or use it for something else. It does not tie up your computer. The software shows a graphical representation of your home and allows you to select a room, then select a light or appliance to be controlled, all just by pointing with the joystick. The interface sends digital signals over your existing house wiring to control your lights and appliances which are connected to plug-in modules (sold separately) List $99.95. **Sale $49.95.** *Coupon $39.95.*

It can wake you up to stereo or TV news. Light up your bedroom, hallway, bathroom. Start the coffee, start your central heating or air conditioning, warm up the curlers, all before you even get out of bed. But it's smart enough not to wake you up on weekends. At night it can lower the heat, play music or your favorite late night TV show for as long as you want, and can first dim and later turn out the lights automatically.

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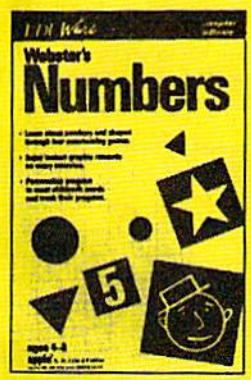
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The Body Transparent — Learn basic anatomy as you play a game of facts and functions of the human body. Choose a male or female body and move bones and organs to their proper location. Then learn what functions the body parts perform. Find out where food is digested, the importance of kidneys and much much more. Add your own biology questions to help make homework fun or to challenge a friend. The game has multiple difficulty levels and bonus points for fast answers, plus color graphics. (Disk) List $44.95. **Sale $26.95.**

European Nations and Locations — An exploration of the continent that combines important facts and information in a challenging game format. The only European geography program that allows you to add questions of your own. If you miss a question during game play it is recycled to guarantee learning. Each game, you move nations to the proper location on a map of Europe. The map fills in with color as questions are correctly answered. Fast answers are rewarded with bonus points. Winner of the Parents Choice Award. (Disk) List $44.95. **Sale $19.95.**

States & Traits — A valuable learning tool for geography and history students. Learn basic geography and then go on to find out interesting facts about every region in the country. Find out where historical events happened on the map. As you play quick answers are rewarded with bonus points. In the "States" part of the program you must move states into the right place on the map and the state lights up in bright color. In "Traits" you identify state capitals and landmarks. You can also design your own games. (Disk) List $44.95. **Sale $19.95.**



EDUWare®

Webster's Numbers — Introduce your young children to basic arithmetic concepts with this program that combines lively animation with four action games. For children with minimal reading skills, they will learn shape discrimination, eye-hand coordination, number recognition and sequential counting to name just a few. Children will delight in maneuvering a hot air balloon, leading a mosquito to safety and pushing blocks and triangles into different shapes. (Disk) List $39.95. **Sale $19.95.**

Algebra 1, 2, or 3 — An introduction to Algebra concepts and definitions. Helps students master the fundamentals of first year Algebra, addition of real numbers, multiplication of real numbers, solving equations, solving inequalities and absolute value sets. Students can learn in 4 ways: They can work the sample problems, read discussions of concepts, watch equations being solved, or study rules that govern mathemetic operations. The result is that the student creates a learning process that he or she is most comfortable with. (Disk) List $39.95. **Sale $19.95.**



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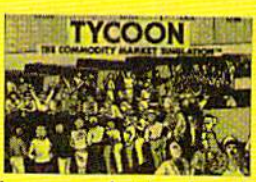
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Baron — If you were given the opportunity to invest in real estate with a complimentary sum of money, say $35,000 and a time limit of 52 game-weeks to turn that into a million, how would you proceed? Baron is a program that offers you the chance to find out what your chances of success in this complicated venture will be. You must utilize the allocated funds wisely in buying, selling and developing land because real life influences like fluctuating mortgage rates and other headaches that affect property owners will be apparent during play. (Disk) List $29.95. **Sale $16.95.** *Coupon $14.95.*



Millionaire — Put yourself in high gear and join the risk takers, because you are about to experience the New York Stock Exchange. To get you started in investments you are given $10,000 and 15 stocks from 5 industry categories. Learn the market as you are faced with influences based on true to life events, good judgment is essential to whether you buy or sell and the status of your personal portfolio depends on making the right choices. Includes an introduction to buying-on-margin, call options, put options, and borrowing against your net worth. (Disk) List $29.95. **Sale $16.95.** *Coupon $14.95.*



Tycoon — It takes an individual with loads of confidence and driving ambition, to deal in the commodities marketplace. To foresee market trends and develop a plan of action before trading, are talents that can make or break you as you deal in precious metals, oil, grains and other items of necessity. Armed with charts and details from real-life situations of the past, you can research the market and make your move accordingly. The element of risk makes the game play a real challenge for all aspiring tycoons, or even established entrepreneurs. (Disk) List $29.95. **Sale $16.95.** *Coupon $14.95.*

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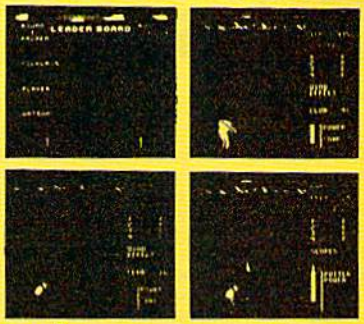
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(Disk) List $39.95. **Sale $23.95.** *Coupon $22.95.*

Disk No. 1 — Courses for Leader Board. Four different golf courses are on this disk of varying degrees of difficulty.
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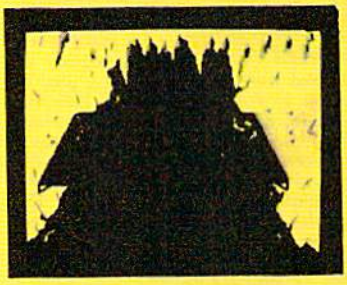


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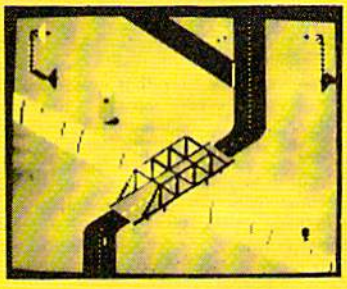
Mach 5 — Plug Mach 5 into the cartridge port and turn on the computer, the cartridge works automatically to load programs up to 5 times faster than normal. Loads 99% of all software, even copy protected games. Works with all popular printers. Will list directories without disturbing programs in memory. Commands such as LOAD, SAVE, OPEN etc. are executed with one keystroke. More features than most other "fast loaders". Does not disturb RAM. (Cart.) List $34.95. **Sale $19.95.**

Mach 128 — This "fast loader" will load programs up to 500% faster on the 1541 disk drive or the 1571 drive in 1541 mode, plus it has features that make it one of the best on the market. A full help menu, screen dump, 95% compatibility, 10 second formatting, plus much, much more. (Disk) List $49.95. **Sale $28.95.**





Beachhead II — Fantastic hi-res scrolling screens will lead you to new levels of excitement. Three scenarios, each with fantastic scrolling screens, add great realism to the game. First you maneuver your helicopter past tanks and artillery to the fortress wall. Then you must time your moves quickly as you go through the opening and closing gates. Scene 2 starts after you drop your paratroopers and make your way to the dictators machine gun emplacement. You must attack the dictator and rescue his hostages. Finally in Scene 3 you have the final confrontation plus you can be the rescuer or the dictator and play against an opponent or the computer. Fantastic two player Head to Head action. Highly recommended. (Disk) List $49.95. **Sale $22.95**



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Movie Monster — Remember all those Saturday afternoons in front of the TV, with a big bowl of popcorn and an old Japanese monster movie? If you do then Epyx has created a program that will soon become a favorite in your software library. You choose the monster and control the outcome of the movie. The movies of the past always ended with the destruction of the monster but you can turn the tables by placing your creation in the hero role. Develop exciting plots for hours of fun. (Disk) List $39.95. **Sale $23.95.**

The World's Greatest Football Game — This one has it all — strategy, action, three views of the field. It's in a class all its own! Finally, a football game that not only puts you on the field, but also on the sidelines in the coach's shoes. Use the "Playbook" or design your own offensive and defensive plays. Then, grab the joystick and put your strategy to the test. You control key players to run a sweep, make a tackle, throw a pass and even kick a fieldgoal. All the action and all the strategy make this your favorite football game. (Disk) List $39.95. **Sale $22.95.**

Winter Games — Experience the challenge of six winter sporting events. In the Bobsled, you're right in the tube careening along the walls. At the SkiJump, you control your form in take-off, flight and landing. In Figure Skating, timing counts for the transitions, the jumps and landings. Choreograph your own routine in Free Style Skating. Hot Dog Aerials push your agility to new heights. The Biathlon challenges your endurance in cross-country skiing. There's even an opening ceremony, complete with national anthems. One to Eight Players.
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Championship Wrestling — Jump in the ring with some of the roughest, rowdies in wrestling. These guys make the stars of the sport today look almost tame in comparison. Take out your frustrations with some viscious moves like Armspins, Body Slams, Headlocks, Elbow Drops and more. The crowd goes wild as you slam your opponent to the mat. You will crush heads, break kneecaps and smash noses. Strategy will make or break you and you will become so involved in the match that real-life concerns will fade away. Fast, fun and ferocious.
(Disk) List $39.95. **Sale $23.95.**

World Games — Travel the globe to compete in eight countries for the title of World Champion. The sporting events that you will test your skills in include Cliff Diving, Sumo Wrestling, Bull Riding, Barrel Jumping, Weight Lifting, Log Rolling, Caber Toss, and Giant Slalom. Play solo or with up to eight players. You are provided with background history of every country you visit, plus information on each event. Features award ranking and World Records Hall of Fame. Challenging and stimulating action.
(Disk) List $39.95. **Sale $24.95.**

Fast Load Cartridge — Load, save and copy disks five times faster than normal. It plugs into the cartridge port of the Commodore 64 and goes to work automatically loading disks with ease. And that's only the beginning. It can copy a single file, copy the whole disk, send disk commands, and even list directories without erasing programs stored in memory. (Cartridge) List $39.95. **Sale $22.95.**

Super Cycle — Experience the excitement and danger of motorcycle racing. Lean into the turns and cruise through the scenic Grand Canyon or the Rocky Mountains, as you race cross country. Measure your speed with your tachometer and speedometer. All the instruments are realistic. Features eight different courses, day and night racing and obstacles to challenge the driver, like road barricades, oil slicks and ice. The competition is stimulating and the graphics are first rate. (Disk) List $39.95. **Sale $23.95.**

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Stickybear Typing — Stickybear makes learning the keyboard both easy & fun for anyone. A 3 game format provides different levels so that as typing skills improve so does the level of difficulty. ***Stickybear Keypress*** is geared to the needs of the child or the beginner, the stress is on the keyboard. To increase typing speed and accuracy the fast-paced ***Stickybear Thump*** will provide a real challenge. ***Stickybear Stories*** allows further practice with real text for timed practice. Everything from jokes, stories and bright amusing graphics make this one of the most delightful typing programs ever, plus you can keep track of your progress and store on disk. (Disk) List $29.95. **Sale $14.95.**



C64 SALE



C64 SALE



Stickybear Spellgrabber — 3 games in one: Picture Spell contains over 200 word/picture combinations. Word Spell is a scramble game, players recreate words shown on the screen. Bear Dunk involves guessing a word to save Stickybear from a dunking. (Disk) List $29.95. **Sale $14.95.**

Stickybear Math — Kids learn math skills as they help the Stickybear Family out of sticky jams. For every set of addition and subtraction problems youngsters get right, Stickybear gets a step closer to getting out of the jam. (Disk) List $29.95. **Sale $14.95.**

Stickybear Town Builder
Kids develop essential map skills as they build a town with roads, parks, airports, bridges, etc. and save on disk. That's just the first game. In Take A Drive, Compass-reading and directions are stressed. With Find The Keys, follow clues to locate mystery keys. (Disk)
List $29.95. **Sale $14.95.**





Stickybear Reading
3 fun activities that build reading comprehension skills. Match The Words: Kids practice vocabulary as they match up word and picture sets. Find The Word: Turns the words in a sentence into animated action. Build A Sentence: Children choose a subject, a verb and an object, then watch them turn into a picture. (Disk)
List $29.95. **Sale $14.95.**

Stickybear ABC — Beautifully animated pictures help children learn their ABC's and become familiar with computers. Two full-screen, full-color pictures with sound represent each letter in the alphabet. Besides helping boys and girls become familiar with computers, Stickybear ABC teaches younger children to recognize and name the letters. Older children begin to recognize words on sight. (Disk)
List $34.95. **Sale $14.95.**





Stickybear Numbers — There are colorful groups of big moving objects, such as ducks, birds and bears, that reinforce numbers and counting skills. You can use the space bar to learn to count up and down. The many possible picture combinations work to captivate youngsters with an endless variety of picture shows and give them plenty of hands on computer experience. (32 page book, disk, colorful Stickybear poster, Stickybear stickers.) (Disk) List $34.95. **Sale $14.95.**

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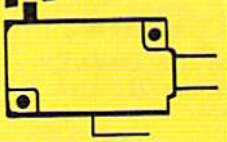
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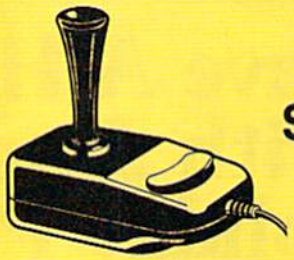
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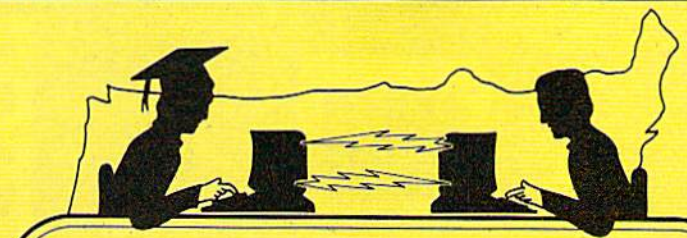
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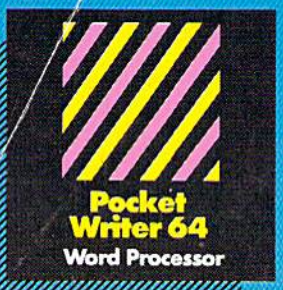
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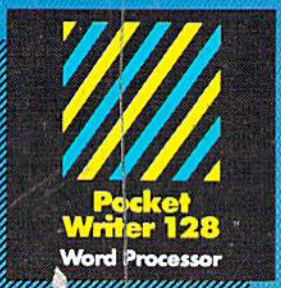
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