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# INTRODOS

T O N Y R O B E R T S

**W**hat are the differences among DOS versions? Are you cheating yourself by not having the latest and the greatest? Should you stay with what you have?

The answers to these questions depend mainly on what hardware you have and how you use it. The changes in DOS over the years have mirrored the evolution of computing hardware. As new hardware has been invented and put into use—high-density 3½-inch drives for example—DOS has been upgraded so the systems could use the new hardware.

You'll see DOS referred to as either PC-DOS or MS-DOS. Both versions are produced by Microsoft. PC-DOS is the version distributed with IBM-brand equipment, while MS-DOS is distributed with most clones. Although there are some subtle differences between the two families, this discussion treats them as equals.

You won't find DOS 1.x in use anywhere these days, but DOS 2.x, 3.x, and 4.x are all widely used. To see which version you have, type VER at DOS prompt.

DOS 1.0 came out in 1981 to support the original IBM PC, by today's standards an unsophisticated machine with little memory and a single-sided disk drive. After a few months, DOS 1.0 was upgraded to provide support for double-sided disk drives.

In early 1983, the IBM PC XT was announced, and along with it came DOS 2.0. This version provided support for the 10MB hard disk that came with the XT and introduced the subdirectory structure we still use.

The IBM PC AT, introduced in 1984, provided another set of hardware enhancements. It was bundled with DOS 3.0, which supported the AT's 1.2MB high-density floppy disk and provided ramdisk software to access the AT's extended memory. DOS 3.0 was subsequently tweaked a few times: DOS 3.1 added network support; DOS 3.2 allowed 3½-inch 720K disk drives and added the XCOPY command; and DOS 3.3 added sup-

port for 1.44MB 3½-inch disk drives, allowed multiple hard disk partitions, and improved batch-file processing and hard disk backup.

The DOS 3.3 enhancements coincided with the introduction of the IBM PS/2 in 1987. The PS/2 included a high-density 3½-inch floppy disk drive and a large hard disk. Prior to this version, DOS could only access hard disks smaller than 32MB. DOS 3.3 allowed larger hard disks to be partitioned into smaller units that could be accessed as separate logical drives.

SHOULD YOU  
**CHANGE  
YOUR  
DOS?**

In 1988, DOS 4.0 was announced. This version eliminated the 32MB barrier, provided support for expanded memory, and offered a shell as an alternative to the DOS command line. These changes gave computer owners with gigantic hard disks and megabytes of memory better control over those features. The shell provides menus and mouse support, making it easier to operate with fewer typed commands.

The original release of each of the DOS versions—1.0, 2.0, 3.0, and 4.0—was quickly followed by an update that exterminated some of the bugs. If you're using any of these original releases, don't hesitate to upgrade.

While each version added features, each added weight as well. The system files of DOS 2.x occupy 40K while the system files for DOS 3.x and 4.x consume 59K and 108K, respectively.

In choosing which DOS version to use, you must weigh the features against the costs of disk space and RAM usage. If you have a floppy drive system with no hard disk and limited memory, DOS 2.10 or 2.11 is probably just fine unless you want to run software that requires a higher DOS version.

If your system has a hard disk or you plan to add one, you'll benefit by using DOS 3.x. If that hard disk is larger than 32MB, you'll need DOS 3.3. Likewise, if you're adding 3½-inch drives, you'll want DOS 3.3.

DOS 4.x is attractive because of its shell, but if you don't have at least 640K of RAM and a hard disk, the overhead will outweigh the enhancements. If you have a hard disk that's larger than 32MB, DOS 4.01 allows you to format the entire disk as one unit. DOS 3.30 requires you to break these disks into partitions that can be no larger than 32MB each.

Another caveat with DOS 4.01 is that it looks at the disk a bit differently than previous versions. You'll need to reformat your hard disk under DOS 4.01 to use it, and you'll find that some of your software—disk optimizers, undelete programs, and so on—may not work unless you upgrade them to versions compatible with the more advanced DOS.

If you decide to upgrade your DOS, make sure you don't change DOS families. If your system came with PC-DOS, upgrade with a later version of PC-DOS. Similarly, if the machine came with MS-DOS, stick with it.

Also, some clones are shipped with versions of DOS that have been adjusted specifically for that hardware. If your machine uses such a nonstandard DOS version, contact the dealer or manufacturer for advice about the upgrade path. □





# POWER UP

C L I F T O N K A R N E S

**W**ith Christmas just around the corner, it's time to think about gifts. Whether you're playing Santa for that significant other power user in your life or just rewarding yourself for a year well done, here are three ideas for super stocking stuffers.

Everyone needs a text editor, and although you can get by with DOS's EDLIN (barely get by, that is) or with a shareware product, a power user needs a power tool. For editing, the hands-down winner is *BRIEF* (Solution Systems, 541 Main Street, Suite 410, South Weymouth, Massachusetts 02190; 800-821-2492); \$199. An acronym for Basic Reconfigurable Interactive Editing Facility, *BRIEF* has everything you could want in an editor and about 300 features more.

From the moment you crank it up, *BRIEF* feels like a fine sports car—fast and powerful, with a cursor that corners as if it were on rails. In fact, although the program's setup offers several cursor speeds, only arcade players will be able to take the Gs of Fast.

*BRIEF* is reconfigurable. If you don't like the keystroke associated with a command, you can change it. And if you want to write your own commands, you can use either of *BRIEF*'s macro languages. That's right; *BRIEF* offers two macro languages: one that's LISP-like and one that's C-like. Both are amazingly powerful.

Power and speed are great, but the feature that really made *BRIEF* famous is its Undo, which allows you to undo as many as 300 keystrokes. This feature has probably saved programmers more hours of work than Jolt Cola.

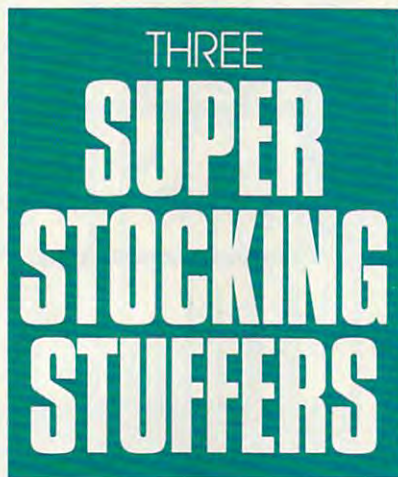
One last point about *BRIEF*: Many of the best programmers in the country have written macros for it. That translates into outstanding support for almost anything you want to do with *BRIEF*.

To put the icing on the cake, you could top off your *BRIEF* gift with Greg and Carolyn Belfor's *CBRIEF*

*Macro Help* (Greg Belfor, 1270 Estes Street, Lakewood, Colorado 80215; \$15).

Written in *BRIEF*'s macro language, this shareware product is a superb online help system for *BRIEF*'s macro language. Impressively, *CBRIEF Macro Help* not only provides help on the official, known *BRIEF* commands, but it also includes details on many otherwise undocumented features.

Most power users telecommunicate, and so most will already have some sort of communications software. But chances are they don't have *Telix*, an elegant shareware program that can put some of the pizzazz back in everyday computer phoning.



To start with, *Telix*'s list of protocols reads like a telecommunications Who's Who: ASCII, CompuServe Quick B, Kermit, MODEM7, SEALink, Telink, XMODEM, 1K-XMODEM, G-1K-XMODEM, YMODEM batch, YMODEM-G, and ZMODEM. In short, everything.

Noteworthy features include a scroll-back buffer that displays the last seven screens of text and *Telix*'s ability to invoke your own editor (*BRIEF*, if you're lucky) at the touch of a key so that you can edit messages and other text online.

You'd expect to find macros, a

large dialing directory, and online help in a full-featured telecommunications program, and you wouldn't be disappointed. They're all here. But unless you were very imaginative, you wouldn't have expected to find *Telix*'s script language, SALT. SALT is a very versatile C-like scripting language. You simply can't go wrong with *Telix*.

No matter what a power user's special interests are, if he or she has a PC, it's a sure bet that there's a keyboard attached. Although every PC is shipped with a keyboard, it's usually one of average-to-poor quality. Most people don't even think of replacing their keyboards with better ones, but if you surprise your loved one with a ZEOS/RS keyboard (ZEOS International, 530 5th Avenue NW, St. Paul, Minnesota 55112; 800-423-5891; \$89.95), you'll have a friend for life.

The ZEOS is notable for two things: It's significantly smaller than the usual 101-key keyboards, and it has the best feel of any keyboard on the planet.

Because of the ZEOS's small size, it takes up only 75 percent of the desk space used by a normal keyboard. That's great in general, but if you have a mouse or a trackball, that means that you can get these devices much closer to your keys and save precious hand movement when you go from one to the other.

The ZEOS may be small, but it doesn't downsize its keys or scrunch them to gain that size. All keys are full sized and arranged in a standard 101-key layout with separate dedicated cursor keys (in an inverted T) and 12 function keys along the top of the keyboard. The Backspace key is oversized on most keyboards but is normal sized on the ZEOS.

If you're looking for action, this keyboard has it. The ZEOS keys offer an audible click and excellent tactile feedback. The keyboard also has raised dashes on the F and J keys to guide your hands to the home row. Lights for NumLock, CapsLock, and ScrollLock keys (in seasonal green) provide the finishing touches. □





# BASIC TRAINING

T O M C A M P B E L L

**O**ne of *QuickBASIC's* strong points is the way it handles strings—that is, anything you might see between quotation marks. BASIC's string handling is so easy to learn that BASIC experts moving to C, assembler, or ISO standard Pascal tend to experience severe culture shock.

In this column we'll discuss the CHR\$, LEFT\$, and MID\$ functions; then we'll present an ambitious program that performs a word-wrap on any message you care to feed it, wrapping up the result in a tidy box.

There are some strings you can't type. CHR\$ returns a one-character string matching an ASCII value you pass it. CHR\$ is a function, meaning you can use it anywhere you'd use a variable. For example, uppercase *A* is ASCII 65. Here are two equivalent ways to display the letter *A*:

```
'Print the letter A
PRINT CHR$(65);
PRINT "A"
```

This example prints two *A*'s one after another. The semicolon (;) tells BASIC not to issue a carriage return and linefeed after the PRINT.

CHR\$ would seem to be less than a revelation when taken at face value, but it suddenly becomes interesting when we realize it can be used to represent characters that the BASIC interpreter itself uses. For example, the Esc key is ASCII 27, but it's also used to cancel an operation in most editors. So if you want to send an ASCII 27 to a printer, instead of typing LPRINT followed by double quotation marks and pressing Esc (which might pop you out of the editor), you'd type LPRINT CHR\$(27).

Another good use of CHR\$ is when your printer won't print the PC-specific box characters in the upper 127 extended ASCII characters.

As you can see in this and last month's program listings, the DBox\$ variable is declared using CHR\$ for just that reason.

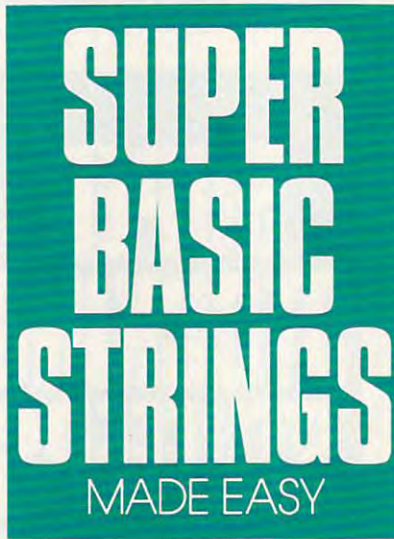
Finally, it's put to work in several

parts of this month's program. For example:

```
'Building a string
Blank$ = CHR$(13) + " " + CHR$(9)
```

This creates a string called Blank\$ consisting of the carriage return (ASCII 13), the space character, and the tab character (ASCII 9).

You can pluck out parts of a string readily with LEFT\$, RIGHT\$, and MID\$. LEFT\$ returns any number of characters starting at the beginning of the string. The following example prints the single word *Paula*.



```
'Printing a substring
PRINT LEFT$("Paula Abdul slept here", 5)
```

The AddWord routine needs to handle the case where a single word is longer than is legal for a line; it chooses to clip the word like this:

```
NextWord$ = LEFT$(NextWord$,
WrapWidth - 1)
```

I won't insult you by explaining RIGHT\$, except to say that it works from the end of the string.

It might seem logical to use array

notation to check each character of a string:

```
' This example won't work!
' Assign a string to TEST$
TEST$ = "hello, world."
' Print each character,
FOR I = 1 TO LEN(TEST$)
' using array notation. Wrong!
PRINT TEST$(I);
NEXT
```

This won't work because TEST\$(I) is accessing the Ith member of an *array* of strings, not each member of I. And in BASIC, don't forget, a string isn't an array. The correct method is this:

```
' This example works!
' Assign a string to TEST$
TEST$ = "hello, world."
FOR I = 1 TO LEN(TEST$)
' Print a substring of TEST$
PRINT MID$(TEST$, I, 1);
NEXT
```

MID\$ prints the middle *n* characters specified, where *n* is the third parameter. They start at the position named in the second parameter, shown above as I. DrawBox uses it like so:

```
'MID$ example
LOCATE Row, TCol
PRINT MID$(Box$, 4, 1);
```

In the example above, the vertical bar character is printed. It's the fourth character in the string named Box\$.

Now to this month's program. It's a reusable subroutine that displays a box and then word-wraps text inside it. Here are highlights of the program.

- The WrapBox subroutine, which lets you position a box anywhere on-screen, using any colors for the foreground and background, and display any message inside it with word wrap. This is at the heart of an online help system I'm writing, and you can use it, too.
- The Wrap\$ function, which returns a string completely formatted with





# BASIC TRAINING

word-wrap, given a raw input string.

- The DrawBox routine (stolen from last month's program and stripped of comments to save space in the program listing), which draws a box on-screen using specified coordinates and colors.
- No global variables in any routine, which means that you can use your own globals without problems—there won't be any unpleasant side effects.

This is some of the most compact code I've ever written, but some of the credit goes to BASIC itself. A word-wrap routine I wrote in C that does slightly less than Wrap\$ was much longer and more difficult to follow because a lot of the things we take for granted in BASIC, such as string concatenation using +, initializing strings to "", and intelligent but transparent allocation of memory for strings.

On the minus side, BASIC doesn't allow array notation to let you step through the successive characters of a string as does C.

The AddWord routine is internal

```

DEFINT A-Z
DECLARE SUB AddWord (LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines
DECLARE SUB DrawBox (TRow, TCol, Wide, High, TextColor, BackColor, Box$)
DECLARE FUNCTION Wrap$ (Raw$, WrapWidth, MaxLines)
DECLARE SUB WrapBox (LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$, Msg$

CLS
DBox$ = CHR$(205) + CHR$(201) + CHR$(187) + CHR$(186) + CHR$(200) + CHR$(188)
LINE INPUT "Please type in a test string: "; Msg$
CALL WrapBox(6, 30, 13, 9, 7, 0, DBox$, Msg$)

SUB AddWord (LineLen%, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
IF (LineLen + NextWordLen) >= WrapWidth THEN ' Line'd be too long.
IF NextWordLen > WrapWidth THEN ' This word alone is
NextWord$ = LEFT$(NextWord$, WrapWidth - 1) ' longer than the line.
NextWord$ = NextWord$ + ">" ' Truncate with flag
END IF ' char.
Final$ = Final$ + CHR$(13) ' Force end of line.
Lines = Lines + 1 ' # of output lines.
LineLen = 0 ' Starting a new line.
ELSE IF LineLen > 0 THEN Final$ = Final$ + " ": LineLen = LineLen + 1
END IF ' Now add token to output string.
Final$ = Final$ + NextWord$: LineLen = LineLen + NextWordLen
NextWord$ = "": NextWordLen = 0 ' Reinit vars.
END SUB ' AddWord

SUB DrawBox (TRow, TCol, Wide, High, TextColor, BackColor, Box$)
COLOR TextColor, BackColor ' Set text fore- & background colors.
BottomRow = TRow + High ' Calculate outside of loop.
FarRight = TCol + Wide
FOR Row = TRow + 1 TO TRow + High - 1 ' Draw interior.
LOCATE Row, TCol + 1: PRINT STRING$(Wide - 1, " ");
NEXT Row
FOR Col = TCol TO FarRight ' Draw top row.
LOCATE TRow, Col: PRINT LEFT$(Box$, 1);
NEXT Col
LOCATE TRow, TCol: PRINT MID$(Box$, 2, 1);
LOCATE TRow, FarRight: PRINT MID$(Box$, 3, 1);
FOR Row = TRow + 1 TO TRow + High - 1 ' Draw sides.
LOCATE Row, TCol: PRINT MID$(Box$, 4, 1);
LOCATE Row, TCol + Wide: PRINT MID$(Box$, 4, 1);
NEXT Row
FOR Col = TCol TO FarRight ' Draw the bottom row.
LOCATE BottomRow, Col: PRINT LEFT$(Box$, 1);
NEXT Col

```

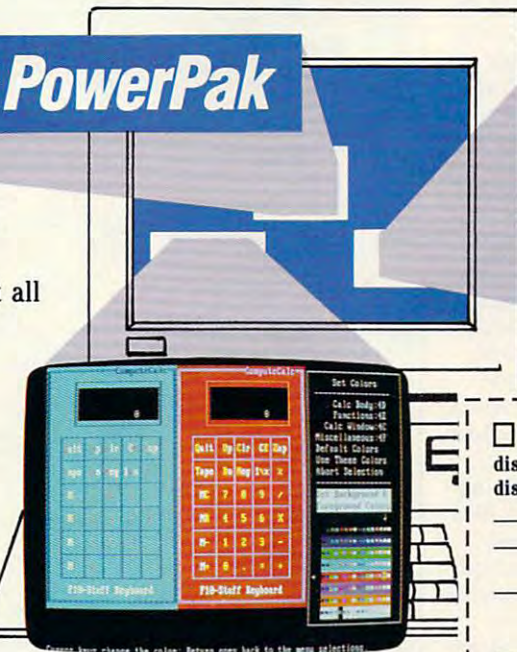
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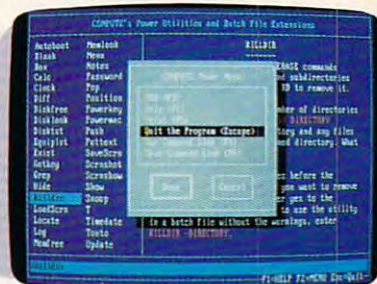
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## BASIC TRAINING *continued from page 19*

to Wrap\$, so don't use it by itself. To use DrawBox, pass it the starting row and column (the upper left corner of the screen is at location 1,1), the width of the box, its height, a number from 1 to 16 for the text color, a number from 1 to 8 for the background color, and a string containing characters to draw the box.

A box using the characters in Box\$ will be displayed onscreen. The Wrap\$ function takes as its input a string to be word-wrapped, the width to which it should be wrapped, and the maximum number of lines the output string can be. Wrap\$ returns a string with carriage returns embedded where lines should wrap.

Since there's no text windowing built into *QuickBASIC*, the WrapBox routine goes through the wrapped string character by character and relocates the cursor at the beginning of the line whenever a carriage return is found. It also calls Wrap\$ with parameters that allow the characters making up the box itself, and a space of padding on either side, to be taken into account.

There's a lot of computing going on here, and this routine is quite a bit slower in the integrated environment than it is in the final EXE. □

```
LOCATE BottomRow, TCol: PRINT MID$(Box$, 5, 1);
LOCATE BottomRow, FarRight: PRINT MID$(Box$, 6, 1);
END SUB ' DrawBox
```

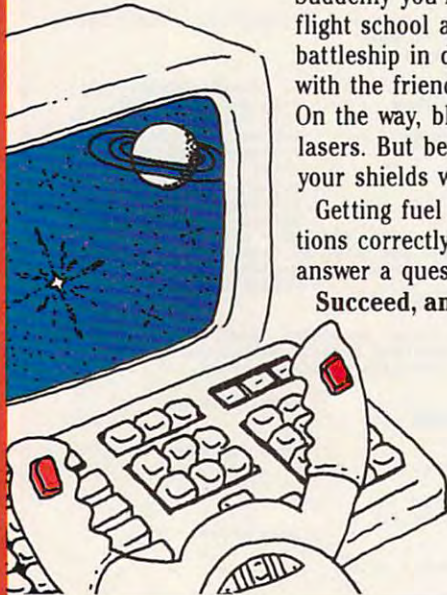
```
FUNCTION Wrap$(Raw$, WrapWidth, MaxLines)
  Blank$ = CHR$(13) + " " + CHR$(9) ' Word separators.
  EndWord$ = ",.!" ' Sentence separators.
  LineLen = 0 ' Current line length.
  Final$ = "" ' Output string.
  NextWord$ = "" ' Next word from input.
  NextWordLen = 0 ' Tracks length of NextWord$.
  Lines = 0 ' # of lines in the output string.
  RawLen = LEN(Raw$) ' Length of input string.
```

```
IF RawLen <= WrapWidth THEN ' If the input string is short enough,
  Wrap$ = Raw$ ' short-circuit the function, returning
  EXIT FUNCTION ' the input string unchanged.
END IF
```

```
FOR Index = 1 TO RawLen
  NextChar$ = MID$(Raw$, Index, 1) ' Next character from the string.
  IF INSTR(Blank$, NextChar$) THEN ' The next word has been built.
    CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
  ELSE
    NextWord$ = NextWord$ + NextChar$ ' Not a blank.
    NextWordLen = NextWordLen + 1 ' Track its length.
    IF INSTR(EndWord$, NextChar$) THEN ' If punctuation mark, end word.
      CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
    END IF
  END IF
NEXT
```

```
IF NextWord$ <> "" THEN
  CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
END IF
Wrap$ = Final$
END FUNCTION ' Wrap$
```

```
SUB WrapBox (LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$, Msg$)
  CALL DrawBox(LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$)
  Msg$ = Wrap$(Msg$, Wide - 5, High) ' Word-wrap input with inside padding.
  MsgLen = LEN(Msg$) ' Calculate this outside of loop.
  NextRow = LeftRow + 1 ' Start under the top row of the box.
  LOCATE NextRow, LeftCol + 2 ' Start one past the left row.
  FOR Index = 1 TO MsgLen
    NextChar$ = MID$(Msg$, Index, 1) ' Loop through word-wrapped input,
    IF NextChar$ = CHR$(13) THEN ' jumping over to the left side when
      NextRow = NextRow + 1 ' a carriage return is hit and printing
    ELSE PRINT NextChar$; ' all other characters as is. The0
    LOCATE NextRow, LeftCol + 2 ' right boundary has already been
  ELSE PRINT NextChar$; ' taken care of with the call to
  END IF ' Wrap$.
  IF NextRow >= LeftRow + High THEN EXIT SUB ' Truncate at bottom.
NEXT Index
END SUB ' WrapBox
```







# HOT TIPS

## H I N T S   A N D   T I P S   F R O M   O U R   R E A D E R S

**H**ave you ever wondered why the single and double dots ( . and . . ) appear as the first two files in all your subdirectory listings?

These two directory entries refer to the parent directory of the current directory and the current directory itself. They are automatically included when a subdirectory is created with the MKDIR command.

You can use these entries to navigate through the DOS directory structure on your disks using the CD command. You can enter CD . . at the DOS prompt to move to the parent directory of the current directory without specifying a long path. Try moving up two levels by entering CD . . \ . . at the DOS prompt. You can move freely through the entire directory structure this way.

*Kim Rokosa  
Bristol, CT*

### Label Miser

How many labels do you waste when setting printer tabs and linefeeds? Try printing on the back side of the labels until the settings are correct. You don't even need to hold the labels up to the light to determine what adjustments are required. When you're satisfied with the results, simply feed the labels into the printer with the label side up. You'll get rows and rows of perfect labels with no waste. This tip is especially handy for printing three-wide labels.

*David Nagel  
Jenison, MI*

### WordMaster Mail Merge

I was disappointed that *WordMaster* (May 1990 *COMPUTE!*'s *PC Magazine*) lacked a mail-merge option. Then I discovered that *WordMaster*'s macro language is sufficient for creating a basic mail-merge option.

The easiest way to create a macro is to use Edit mode under Macros (located in the Misc menu). Press F1, highlight Macros in the Misc menu, and then press Enter. Go to Edit macros, highlight the first entry that says *No Name*, and then press Enter. Enter

your macro name (for instance, SET-UP). An empty box will appear on the screen. Press the appropriate keys (see macros below). To include the Enter key or cursor keys, press ScrollLock, press the key, and press ScrollLock again. Press Enter to exit Edit mode.

After you've entered the macros below, highlight *Store macros* and enter a filename such as WM at the prompt.

The following macros implement a framework for mail merge that provides the basics and can be modified or extended easily. It consists of two steps: a setup function and a merge-next-address function.

Mail-Merge Setup:

**Ctrl-F8 ADDRESS.LIST Enter Alt-F8 Alt-F10 D:\$temp\$\$ Enter**

This macro opens a new window, loads in the address list, switches back to the document, and saves a temporary working copy.

Merge Next Address:

**Ctrl-PgUp Alt F2 %address% Enter Enter Ctrl-Y Alt-F8 Ctrl-B Ctrl-S Dn Dn Dn Dn Dn Ctrl-B Ctrl-E Alt-F8 Ctrl-B Ctrl-C Alt-F10 D:\$temp\$\$ Enter Y Shift-F7 Dn Enter D:\$temp\$\$ Enter Up Enter Ctrl-Y Ctrl-Y Ctrl-Y Ctrl-Y %address%**

This macro goes to the beginning of the document, looks for the string %address%, and deletes it. Then it switches to the address window, starts a block, moves down five lines, and ends the block. Next it switches to the document, does a block copy, saves the working copy, prints the document, deletes the address, and puts the search string %address% back in the document.

Each address in the address list must consist of five lines for these macros to work on your system. You can change the setup macro to write to your hard drive or a floppy disk as well. Simply change the D: in the macros to the correct drive identifier, such as C: for your hard disk.

You can merge each entry one at a time by pressing the Alt key assigned to the merge macro, or you can automate the entire process by creating a third macro that invokes the setup and merge macros as many times as needed to process the entire list.

*Robert Rankin  
New Paltz, NY*

### Date

If your system uses an AUTOEXEC .BAT file in its boot-up sequence, the date and time prompts don't appear when the system boots. If you'd like to see the current date and time at boot-up to make sure your system clock is accurate but you don't want to enter a new date, add the following lines to your AUTOEXEC.BAT file.

### ECHO OFF

**DATE < RETURN.DAT | FIND "C" > DATE.TMP  
TYPE DATE.TMP**

Make sure the C in the second line is uppercase (FIND is one of a very few DOS commands that are case-sensitive). Then create a file called RETURN.DAT by entering COPY CON RETURN.DAT at the DOS prompt. Next press the Enter key, F6, and Enter again. This creates a file with a single carriage return to send to the DATE command. The FIND.EXE file that comes on your DOS disk should also be available to the system (the directory where it's located should be listed in the PATH statement in your AUTOEXEC.BAT file).

*Marvin Heikkila  
Duluth, MN*

*If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE!'s PC Hot Tips, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We'll pay you \$25-\$50 and send you a COMPUTE!'s PC LCD clock radio for each tip we publish.* □





# ON DISK

G E O R G E C A M P B E L L

**F**or this issue's disk, we've rounded up an assortment of shareware and public domain programs you won't want to miss. Ranging from a floppy disk organizer to an educational math game, they're all winners.

If you bought your copy of *COMPUTE* on the newsstand, you'll want to order your own copy of this disk so you can try out the programs. Subscribers automatically get these disks, so if you haven't subscribed to *COMPUTE's PC Disk* yet, now's the time. For more information, see the order blank on the next page.

If you have the disk, to find out how to use it, insert it in your drive and run *CMOS, COMPUTE's Menu Operating System*, by typing MENU at the DOS prompt. Next, choose Information and Extras from the disk's initial menu. On the subsequent menu, select How to Use the Disk, and you're on your way.

## DISKTRAK

If you're like most PC users, you've accumulated an impressive stack of floppy disks, and finding the file you need can be tough. Stuffing each disk in a floppy drive and listing a directory is one way, but it can take hours.

*DISKTRAK*, written by California programmer Birk Binnard, is the answer. It's a database program for your disk collection. It automatically reads your disks' directories, adding the filenames to its data file. All you do is feed your disks into a floppy drive—*DISKTRAK* does the rest. To find a file later, just type in the whole or partial name of the file; *DISKTRAK* will locate it almost instantly.

That's not all. *DISKTRAK* lets you add a note for each file, making it that much easier to identify your programs and data. It can read the names of files inside a compressed ZIP file, print detailed reports for future reference, and help you delete unwanted files. The moving-bar menus make it easy to learn and use.

To run *DISKTRAK*, you'll need an IBM, Tandy, or compatible PC

with at least 256K of RAM, DOS 2.1 or higher, and a minimum of two floppy disk drives. *DISKTRAK* is a shareware program, with a low registration fee of only \$10.

## Star Blaster

Education really *can* be fun, and *Star Blaster* is surefire proof. Written by North Carolina's Richard C. Leincker, it offers fast arcade-style action, with learning as a plus.

Your mission: To reach a destination in space while destroying or avoiding UFOs. To do this, you must

*Blaster*. Registration for this shareware program is only \$15, and registered users receive three more educational games from the author.

## EnvEd

The little-known DOS environment is a powerful tool for users, storing your PC's PATH, variables, and other important data. Unfortunately, editing the individual elements in the environment can be a tough job. Most people make changes to their AUTOEXEC.BAT file and reboot.

*EnvEd* is a tiny program designed to solve this problem. It lets you edit any item in the DOS environment, with a word processor-like screen that uses a subset of the *WordStar* command set. Written by Jeff Bowles, it simplifies a difficult job. You'll need an IBM, Tandy, or compatible PC, DOS 2.1 or higher, but only 128K of memory to use the program.

To help you understand the DOS environment, see the feature article "Becoming a PC Environmentalist" in this issue of *COMPUTE's PC*. You'll find information there about the environment in general and about this valuable program in particular.

## Screen Saver

There are scores of programs on the shareware market that blank your computer's screen after a period of inactivity. Most are limited to specific video modes, and many can't handle graphics-based programs.

Tom Donnelly, a California programmer, wrote *Screen Saver* to give users one program that handles every possible situation. It will clear any monitor at an interval you set. Pressing any key or moving your mouse restores your screen instantly.

That's not all *Screen Saver* can do. It can also blank your screen anytime you like. Just press a hot key of your choice. Finally, you can designate a password, which allows you to blank the screen and leave your computer without worrying about unauthorized access.

*Screen Saver* uses a separate in-



solve math problems that use decimal fractions. Correct solutions can increase fuel, ammunition, and defensive shield strength. You control the difficulty of the problems.

You'll need to keep your wits about you, though, because *Star Blaster* is a fast-moving game requiring all your concentration. The program uses the keyboard during play, but you can select menu functions with a mouse.

You'll need an IBM, Tandy, or compatible PC with at least 256K of RAM and a CGA display or better (EGA, MCGA, or VGA) to run *Star*





# ON DISK



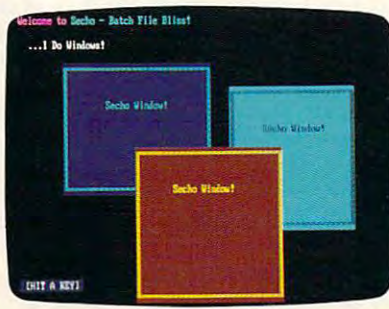
DISKTRAK



Star Blaster



EnvEd



Secho

stallation program to handle configuration chores. Once configured, a memory-resident program takes over. You can change configurations or turn off the program at any time.

To use *Screen Saver*, you'll need an IBM-compatible PC with at least 40K of free memory, any video adapter, and DOS 2.0 or higher. The author requests a registration fee of \$20.

### REPL

At one time or another, most of us need to replace text in a group of files. While most word processors can do this on a single file, it's not so easy when you have many files to change.

John Bridges, from California, came up with *REPL* to handle this job. To use it, you create an ASCII file with any text editor. This file contains the original text, followed by the new text, and can contain multiple search-and-replace pairs. Once you've created the file, a simple command sends *REPL* into action. Before you know it, the job is done.

Some common uses for *REPL* include altering a drive name in a list of batch files or changing passwords in a group of log-on scripts for communications software. *REPL* can run on any PC with at least 128K of RAM and DOS 2.1 or higher. The program requires no registration fee.

### Secho

Almost every PC owner uses batch files to speed up and automate DOS commands. There's just one problem: Regular batch files are *boring*. There's no color or sound, just a series of humdrum DOS commands.

*Secho*, from Michigan author Chris Lucksted, puts an end to all that tedium. It's designed to replace the DOS ECHO command, which you normally use to write text to the screen in batch files.

Using *Secho*, you can add customized sound effects, change screen colors, display the date or time, clear the screen by fading it out, or pause for a specific time. You can also use *Secho* to place text anywhere on the screen, display available memory, draw boxes and windows, and more.

You can use *Secho* on any PC, but its color commands, naturally, require a color monitor. The author asks for a contribution of \$10 if you like the program.

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# ONLINE

G E O R G E C A M P B E L L

Everyone needs to take a break from time to time, and PC games are an ideal way to escape the monotony of everyday chores. There's no shortage of exciting and entertaining games, ranging from simple, text-based adventures to the latest arcade-style thrillers.

Most of these games, however, lack one thing: competition. There's something about playing against a human opponent that makes a game more satisfying. While some games allow two or more people to play, switching players can take some of the excitement out of the process.

The answer is as close as your telephone. You can use your modem as a gateway into the world of online competition. You have several options: commercial online game software, online games on services like CompuServe and GEnie, games you can play on your local BBS, and online games written by shareware authors.

A number of software publishers have produced games capable of communicating with other modem users. *Flight Simulator 3* (Microsoft), *Modem Wars* (Electronic Arts), *Falcon* (Spectrum Holobyte), and *BattleChess* (Sierra On-Line) are just a few of the programs in this category. All offer excellent graphics and exciting scenarios.

Commercial online services offer a wide assortment of games you can play while you're connected. These range from simple blackjack games to multiplayer text-adventure classics. On CompuServe, enter GO GAMES (on GEnie, type GAMES) to go to the service's gaming area. Access, complete instructions, and help for each game are just a menu entry away. Remember that normal online charges apply here. If you get carried away, your pocketbook could suffer permanent damage!

Many local BBSs also offer online games. In most cases, these are single-player games, such as the classic *Adventure*, or multiplayer games in which only one player at a time is ac-

tive, like *TradeWars*. These games offer an important advantage over games on commercial services: They're free.

Shareware games combine the best of all worlds. You play them over the phone lines with another person, like commercial online games, but you can try them out without emptying your wallet. Unlike the games you play on a BBS or commercial online service, they offer more than simple text on the players' screens.



All of the games listed in this column are available on CompuServe (GO IBMNEW). The filenames shown are those used on CompuServe. Most are also available on GEnie and other online services, as well as on many local BBSs, though their filenames may be different. You can use those services' search tools to find them. Just use *game* and *online* as search text.

*ModemPoker* (MPOKER.ZIP) allows two people to play the classic game of five-card-draw poker over the phone lines. It offers excellent color screens and can handle modem speeds up to 9600 baud. Registration costs just \$7, and a future version will offer a choice of several poker games, plus blackjack.

*PC-Othello* (PCOTHL.ZIP) is an excellent online game for two people. It's the centuries-old strategy game, Othello, updated for the twentieth century. Aside from its attractive game board, this game allows both players to type comments at any time.

*Trek 2.8* (TREK28.ARC), another classic, uses graphics to create an arcade-style atmosphere in which you and a competitor play a wide-ranging space wars game. It's not as easy to learn as some simpler games, but its complexity ensures that you'll never get tired of playing. There's even a single-player mode for practice.

*Space Shades* (SHADES.ZIP) is just as complex and just as entertaining as *Trek*. Battle it out alone or against an online opponent. The shareware version of this game runs in text mode and can be played on any PC. For a registration fee of \$17, you can get a graphics version that offers outstanding screen images.

If you prefer card games, give *Gin Rummy Challenge* (RUMMYX.ZIP) a try. You can play against the computer or dial up a friend for a game. The program runs on monochrome or color systems and can use either the mouse or keyboard. Help screens make the game easy to learn and use. If you like the game, its author asks you to send a donation to a charity.

Just in case one game isn't enough for you, *Worthy Opponent* (WORTHY.ZIP) lets you select from a menu of four games, including Checkers, Snake Pit, Cornerstone, and Cannonball. All offer excellent text-based screens, sound effects, and easy-to-learn commands. *Worthy Opponent* includes talk windows and a phone book to list all your favorite opponents' phone numbers. Each game is complete with its own help screens. A \$15 registration fee brings you five additional games for the program.

There are other modem games available, but these are some of the best shareware games. If you enjoy gaming, you owe it to yourself to download one or more of these and give them a try. □





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# INTERFACES AND BEYOND



Once, every PC owner did battle with the command line. Today, we can choose from a staggering array of interfaces, including every shading from pure graphical (complete with icons and folders) to textlike graphical interfaces, such as DOS 4.0's DOSSHELL, to text-based interfaces like *The Norton Commander*, to, finally, command line interfaces that offer alternatives to DOS.

But what distinguishes a graphical interface like *Windows* from an interface like DOSSHELL? And what features cause people to gravitate toward graphical interfaces?

The answer is simple: Graphical user interfaces provide a platform for programs to run under and emulate. At a glance, a user can tell the difference between a *Windows* application and a *DeskMate* application—and for good reasons, as you'll see. By contrast, DOSSHELL launches programs indiscriminately, imposing no design requirements and providing no special resources for them (this approach has its benefits, too).▷

FIND THE INTERFACE

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## Up from the Command Line

For the past year or so, the buzzword in computer circles has been *GUI* (pronounced GOO-ey). The computer and software pros aren't talking about gummi bears. GUI stands for graphical user interface, the hottest ten-year-old news story around.

About ten years ago, the first graphical interface was displayed by its proud developers at the Xerox Palo Alto Research Center, changing the way Steve Jobs—and, later, the rest of us—thought of computer/human interaction.

A graphical user interface involves more than being able to work with pictures, called *icons*, on a graphic (rather than text) screen. It also refers to the *look and feel* of the programs that run under the graphical user interface.

You may recognize *look and feel* as another recent buzzword. This phrase was used in Apple's 1989 lawsuits alleging that Microsoft's *Windows* and Hewlett-Packard's *NewWave* were too much like the Macintosh interface.

Industry wags had a field day with the lascivious overtones of the phrase, and many were quick to point out that Apple was far from the first to apply graphical interfaces to a computer.

The merits of these cases will have to be weighed in the courts. The only thing certain is this: Whoever created the graphical interfaces was right on the money. Users like graphical interfaces, find them easy to work with, and can even develop an affection for them—three statements that could never be made about the command line interface.

A few dissenting voices have spoken out, however, complaining that graphical interfaces are too slow, too RAM-hungry, and too idiosyncratic. But despite these complainers, the momentum is clearly in the direction of graphical user interfaces.

## Getting Graphic

If you're new to graphical interfaces, you should know that they can be confusing at first. As a group, they aren't as intuitive as their creators might have you believe.

The advantage of a graphical interface is that it can be learned quickly and with only a little work, in contrast to DOS. Programs that run under a graphical user interface will follow certain conventions: Menus, file handling, and navigation will all be basically the same from one application to another.

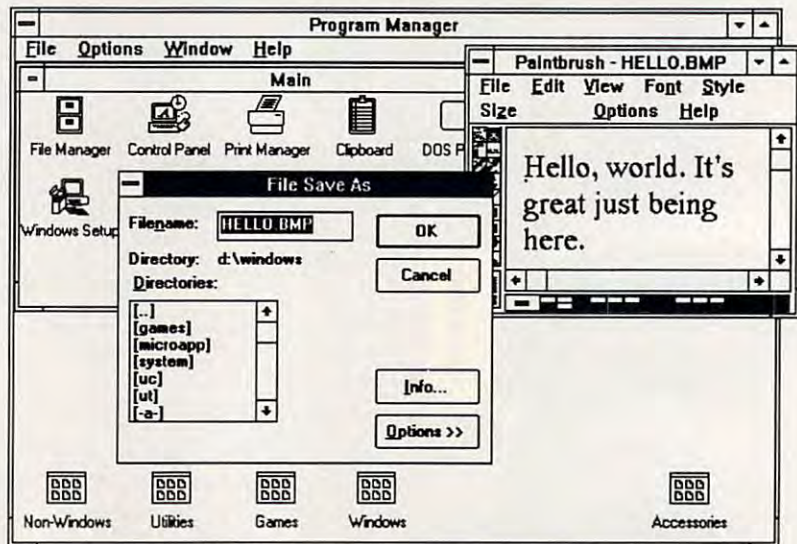
This uniformity is ensured by the fact that the program running under a graphical interface uses the same rou-

tines as the interface to provide these tools. Knowing what a dialog box will look like before opening it will take some of the shock out of using the system.

Command line interfaces like DOS and UNIX stand in stark contrast to this uniformity. Known for their unusual program and command names (UNIX is by far the worse of these two, featuring commands like *grep* and *nohup*) and given to arcane switches and arguments, command line interfaces send even seasoned veterans running back to the manuals and software documentation.

with *Presentation Manager*, the OS/2 graphical interface, providing a bridge OS/2 has lacked: a ready supply of commercial software that can use the resources OS/2 offers. Whether or not this linkage occurs, *Windows* programs today are identical to their *Presentation Manager* counterparts, from the user's point of view. IBM and Microsoft have been looking for a gentle way to convince its millions of customers to walk up the ramp to OS/2. *Windows 3.0* may be just the ticket.

Although *Windows* ships with a usable complement of software, only in the past couple of years has there



Microsoft Windows

GUIs are friendly and intuitive and most likely lie between you and the future. Decisions about which interface dominates the market are not made by industry insiders or computer gurus, but rather by people like you and me, who take our hard-earned dollars to the computer store, weigh the alternatives, and take home the interface that most closely meets our needs. So it's important that some time and space be devoted to looking over the features (and futures) of the interface options available.

## Windows

Microsoft's offering for the MS-DOS GUI world is probably the best known of all entries. In June, Microsoft released the much-storied *Windows 3.0*. This new *Windows* is much more attractive, graphical, and complex than previous versions. It uses RAM beyond the 640K boundary and can multitask (if you have an 80386 and enough RAM). Furthermore, programs written to the new *Windows 3.0* standard may one day be compatible

been third-party interest in *Windows* software development. For years, the only word processing option with *Windows* was *Windows Write*. Recently, Samna's *Ami* and *Ami Professional* and NBI's *Legacy* have arrived to fill the gap.

Even Microsoft has jumped on the bandwagon with its own *Microsoft Word for Windows*. After years of eager rumors and subsequent disappointments, *Word* has shown itself to be a powerful *Windows* alternative. New users will discover that it resembles Macintosh *Microsoft Word* more than it resembles *Microsoft Word 5.x* for DOS.

It's interesting that, although Microsoft didn't recommend *Windows 286* for the 8088 world, you can run *Windows 3.0* in so-called *real mode* on a machine with an 8088 or 8086 and 640K of RAM. Besides real mode, *Windows 3.0* has standard mode, intended for use with 80286-based computers, and 386-enhanced mode, which allows for multitasking of both *Windows* and DOS applica-



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But Wonderland isn't just a bewitching story. It's playing environment breaks new ground for computer adventures. Here's what the editor of Computer Gaming World has to say about it!

"The game is neither strictly a text adventure nor can it be described as a graphic adventure. It is its own genre... The game uses multi-tasking to offer an incredible array of features..."

Besides superb graphics and sound support, Wonderland's unique windowing environment offers pull-down verb and noun menus, graphics you can size up or down and move around the screen, automated mapping, a compass for directional movement, and extensive on-screen help.

"Innovative," "ambitious" (The Chicago Tribune), "exquisite and impressive" (CGW), "brilliant and insane" (The Electronic Gamer), are more words used to describe Wonderland. Questbusters calls its windowed universe "the ultimate interface." Stunning graphics, impressive sound board support and a captivating story, all in a sophisticated new windowing system, combine to make Wonderland the richest adventure ever: a game to play, to tell, and to inhabit.



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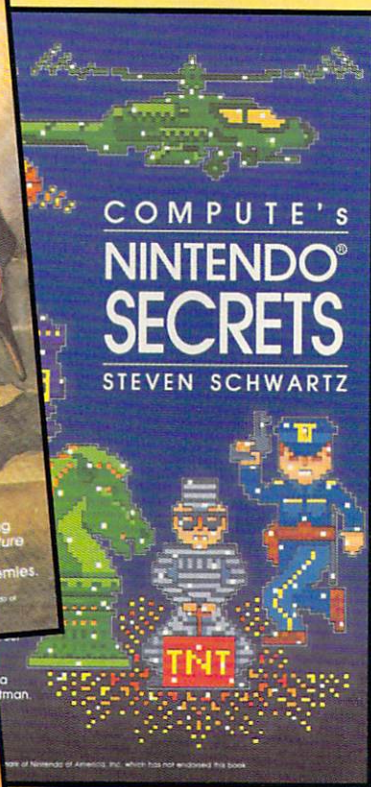
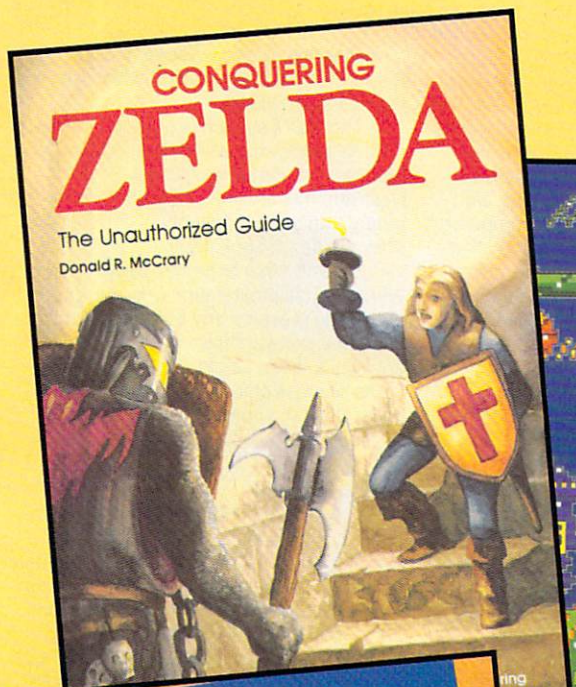
## Fast Features: User Interfaces

Product	Company	Price	System Requirements	Type	Display Options	Program Handling	Support Programs
Concurrent DOS	Digital Research 70 Garden Ct. Monterey, CA 93942	\$495.00	80386-based PC, 2MB of RAM, hard disk	Command line	N/A	Multitasking and multiuser	None
DeskMate	Tandy 1800 One Tandy Center Fort Worth, TX 76102	\$99.95	IBM, Tandy, or com- patible PC; 512K of RAM; DOS 3.2 or higher	Graphical	Tree or file list	Task switching (among <i>Desk- Mate</i> applica- tions)	Spelling checker, calculator, phone list, to-do list, cork- board, alarm, calendar, word processor, spreadsheet
DESQview	Quarterdeck Office Systems 150 Pico Blvd. Santa Monica, CA 90405	\$129.95	IBM, Tandy, or com- patible PC	Text	Menu, win- dows	Multitasking, task switching	None
DOSSHELL	IBM 1133 Westchester Ave. White Plains, NY 10604	Available with DOS 4.x	PC, Tandy, and com- patible computers	Text	Tree, file list, menu	Single tasking	Comes with DOS 4.0 or higher
DR DOS	Digital Research 70 Garden Ct. Monterey, CA 93942	\$199.00	IBM, Tandy, or com- patible PC; 256K of RAM	Command line	N/A	Single tasking	Text editor
4DOS	JP Software Box 1470 East Arlington, MA 02174	\$50.00 regis- tration fee (shareware) (plus \$4.00 shipping in the U.S.)	IBM, Tandy, or com- patible PC; DOS 3.0 or higher	Command line	N/A	Single tasking	None
GEM	Digital Research 70 Garden Ct. Monterey, CA 93942	\$49.95	IBM, Tandy, or com- patible PC; 512K of RAM; DOS 2.1 or higher, DR DOS, Concurrent DOS XM 6.0, or Concurrent DOS 386 2.0; mouse	Graphical	Icons, win- dows, file list	Single tasking	None
NewWave	Hewlett-Packard 19310 Pruneridge Ave. Cupertino, CA 95014	\$195.00	80386 system with 4MB of RAM, <i>Windows</i>	Graphical	Icons; file list	Multitasking, with the ability to make pro- grams interact within a single document	<i>NewWave Write</i>
The Norton Commander	Peter Norton Computing 2210 Wilshire Blvd. Santa Monica, CA 90403	\$149.00	PC, Tandy, or com- patible computer	Text	Tree, file list, menu, windows	Single tasking	Viewers for <i>dBase</i> , <i>Lotus 1-2-3</i> , <i>Excel</i> , <i>Quattro</i> , <i>WordPerfect</i> , <i>Micro- soft Word</i> , <i>XyWrite</i> , <i>WordStar</i> , and <i>PCX</i> graphics files
PC Tools Deluxe	Central Point Software 15220 NW Greenbriar Pkwy., #200 Beaverton, OR 97006	\$149.00	PC, Tandy, or com- patible computer; 512K of RAM; DOS 3.0 or higher	Text	Tree, file list, menu, windows	Single tasking	Text editor, shell, telecommu- nications, cache, mirror, back up and restore, hard disk op- timizer, clipboard, database
Presentation Man- ager (OS/2)	Microsoft 16011 NE 36th Way Redmond, WA 98073	\$340.00	80386 computer, 4MB of RAM, hard disk	Graphical	Icons	Multitasking	Information not available
SoftBreeze	Softshell Systems 1163 Triton Dr. Foster City, CA 94044	\$99.00	IBM, Tandy, or com- patible PC; 512K of RAM; DOS 3.0 or higher; hard disk	Text	Tree, file list, menus	Task switching	File- and disk-management utilities
Software Carousel	SoftLogic Solutions 1 Perimeter Rd. Manchester, NH 03103	\$89.95	PC, Tandy, or com- patible computer; 192K of RAM; DOS 2.0 or higher; hard disk recommended	Text	Full-screen menu	Task switching	A companion program is pro- vided that will swap infor- mation among applications, TSR manager
Switch-It	Better Software Technology 55 New York Ave. Framingham, MA 01701	\$99.95	PC, Tandy, or com- patible computer; 256K of RAM; DOS 2.1 or higher; hard disk and EMS memo- ry recommended	Text	Menu	Task switching	Includes cut and paste be- tween applications and command retriever
Take Charge!	Departmental Technologies Box 645 Andover, NJ 07821	\$99.00	IBM, Tandy, or com- patible PC; 320K of RAM; DOS 2.0 or higher; hard disk	Text	Tree, file list, menus	Task switching	Telecommunications, directo- ry and file utilities, alarm, cal- culator, calendar, text editor, card-file database, automatic dialing through a modem
Windows 3.0	Microsoft 16011 NE 36th Way Redmond, WA 98073	\$149.00	80286, hard drive, mouse, 640K of RAM (EMS recommended), DOS 3.1	Graphical	File list, windows	Multitasking	<i>Windows Write</i> , <i>Windows Paint</i> , calculator, notepad, card file, clock, reversi



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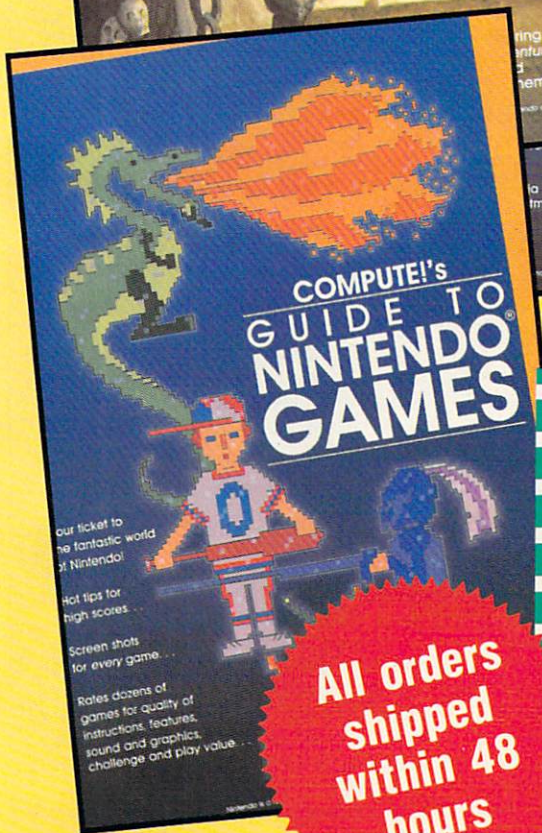
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tions, as long as you're operating an 80386-based machine with at least 2MB of RAM.

*Windows'* current incarnation is a beautiful thing to see. In contrast to earlier versions, it will run many DOS programs without problems. Unfortunately, it won't run some programs written specifically for earlier versions of *Windows*, resulting in many new product announcements simultaneous with the announcement of *Windows* 3.0. This will reap some small change for the *Windows* developers. *Microsoft Word for Windows* and Computer Support's *Arts & Letters* are two products that can be run under either version of *Windows*. Microsoft claims that if developers programmed according to the rules, their products should be upwardly compatible. *Excel*, Microsoft's own *Windows* spreadsheet, didn't play by the rules and had to be updated for the new version. From the standpoint of the user looking for a graphical interface, *Windows* in its earlier incarnation wasn't especially graphical. The new version cures that problem with full-color icons (on machines with color graphics adapters).

So where does *Windows* fit in? Microsoft founder Bill Gates has said that he sees the operating-system market segmented by CPUs: DOS is primarily for 8088 machines, *Windows* is for the 80286 machines, and *Presentation Manager* is for the 80386 machines, though he has equivocated on this stand.

As you might expect, there is some overlap: DOS works on all three platforms. *Windows* runs on machines powered by the 8088 through 80486 CPUs, while OS/2 and *Presentation Manager* will run on 80286, 80386, and 80486 machines.

*Presentation Manager* and OS/2, an operating system and interface combination, look, act, and feel just like *Windows*. Unfortunately, OS/2 has failed to generate the excitement its developers had hoped for, though it is slowly gaining in popularity. Whether OS/2 was ahead of its time or whether it was just a bad idea is up in the air at the moment.

The shortcomings of *Windows* and *Presentation Manager* have inspired enhancements from third-party manufacturers. Hewlett-Packard's *NewWave* gives *Windows* a more Mac-like look. It also adds improvements like macros (through an entity known as the *Agent*) and dynamic links among programs (known as *hot links*).

One of *NewWave's* advantages is that it makes *Windows* more compatible with non-*Windows* applications. *NewWave* costs \$195 and requires

either a 386 system with 4MB of RAM or a 286 system with 3MB of EMS 4.0 memory. It also requires at least a 40MB hard drive, DOS 3.2 or higher, and *Windows* version 2.11 or higher, EGA or VGA graphics, a mouse, and a 1.2MB floppy drive. This is *serious* software.

Now that *Windows* also allows for hot links and broader compatibility, the onus is on Hewlett-Packard to come up with more features to justify

*NewWave's* existence. At PC Expo, held in New York City this past June, I had the opportunity to talk to a Hewlett-Packard representative. He made a strong case for *NewWave*. True, *Windows* allows for dynamic links among software packages, allowing (for example) figures in a spreadsheet to be updated instantaneously as values are changed where they appear in databases, graphics, and documents; but the only thing you need to

### NeXT and Mac

When Steve Jobs was forced out of Apple by noted fizz-water salesman John Sculley, people throughout the industry wondered "What next?" Steve must have heard them, because he seemed to think some further action on his part was called for, and he named his new company NeXT. Ever the champion of the black-and-white computer, he created a monochrome Maserati called the NeXT. He did it with a pile of money invested by notables like H. Ross Perot, IBM, and Sony. IBM probably yearned for the new interface so that it could crush once and for all that troublesome upstart, the Macintosh. Perhaps Sony was keen to place its incredibly capacious optical drives in the American marketplace.

NeXT was delayed quite awhile in its introduction. Now that it's out, people—especially intelligent, well-educated, creative people at universities across the land—have been trying to find something to use it for. Music seems to be a possibility, because in terms of sound, the \$10,000 NeXT is right up there with the \$600 Amiga and the similarly priced Atari ST. In advertising and company press releases, NeXT has been pushing the machine for desktop publishing, though there's only one piece of NeXT software in this area at this time: *FrameMaker* from Frame Technology.

Despite the identity crisis (which is fairly normal in anyone's adolescence, and no less so if that person happens to be a computer), no one will argue that NextStep, the user-interface-cum-development-system, is remarkable. Beyond the fact that it's monochrome and is thinly hiding something as mundane as UNIX, people can't take their eyes off of it. No one who sees a NeXT in operation can fail to be impressed with the fine clarity of the images, the readability of the text, and the more complete realization of the standard features thought to be done to perfection on earlier machines. Looking at it, it's obvious where Microsoft found some of its ideas for *Windows* 3.0 (and Commodore-Amiga for the new Amiga Workbench 2.0).

The onscreen buttons and controls are finely sculpted. The menus are logical. The windows can all scroll and be updated at once, even though some of them are behind other windows, because NextStep and UNIX are truly multitasking. Supposedly, IBM will be introducing NextStep for use with its line of computers at some point, though no one knows when that will occur (and IBM isn't talking). NextStep is called a *development environment* by its creators. It includes under its umbrella the Workspace

Manager, the Window Server (including Display PostScript), the Application Kit, and the Interface Builder.

The NeXT system is only one of several UNIX windowing alternatives. Owing to the savvy media style of its developer, NextStep has received more press than the others, but there are plenty of competitors. They are Open Look, Motif (an X Window variant), and other schemes based on X Window. This proliferation of opposing standards prevents any publisher of micro-computer software from issuing the kind of applications that would bring UNIX into the home or small office, thus promising to make UNIX the best-kept secret in small systems for some time to come.

### The Macintosh

When it comes to the Macintosh, the computer that arguably started the current spate of graphical user interfaces, the interface and the operating system are so intertwined that they are barely distinguishable. That's because the Mac's interface was part of the original design of the machine, not an add-on as is the case with most PC interfaces.

The Macintosh has come a long way since the original version made its debut six years ago. The original Mac was a 128K, single-floppy-drive computer with a nearly useless keyboard and a monochrome screen.

In its latest incarnations, the Mac doesn't look very different from an AT clone. Even its keyboard looks like the standard 101-key enhanced PC keyboard. The Macintosh is available with a fire-breathing 68030 processor, 24-bit color, and virtually all of the features of the highest-tech PC. The graphical interface, however, has remained consistent across the years, taking the advent of hard drives, color, and the rest completely in stride.

As futuristic as the Macintosh looked in 1984, its interface looks like a toy beside the NeXT interface. Rather than attempting to maintain its place at the head of the line through litigation, many people wish Apple would expend more effort on innovation.

Over the years, Apple has effectively quashed all efforts to clone the Macintosh (though recently Apple has entered into an agreement with Outbound, manufacturer of a portable Mac clone), but now it might appear that software developers have executed an end run around the Apple defense. The appearance of *Windows* 3.0 will induce a lot of PC users to stick with DOS rather than switch to the Mac.



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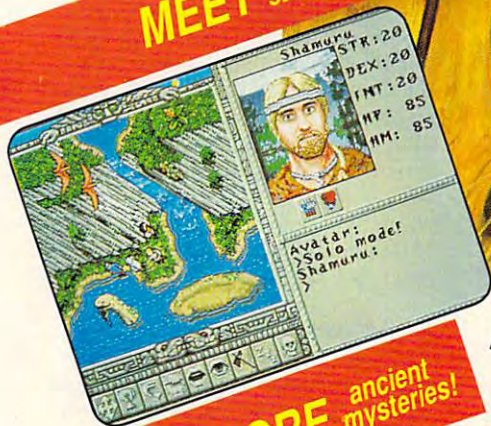
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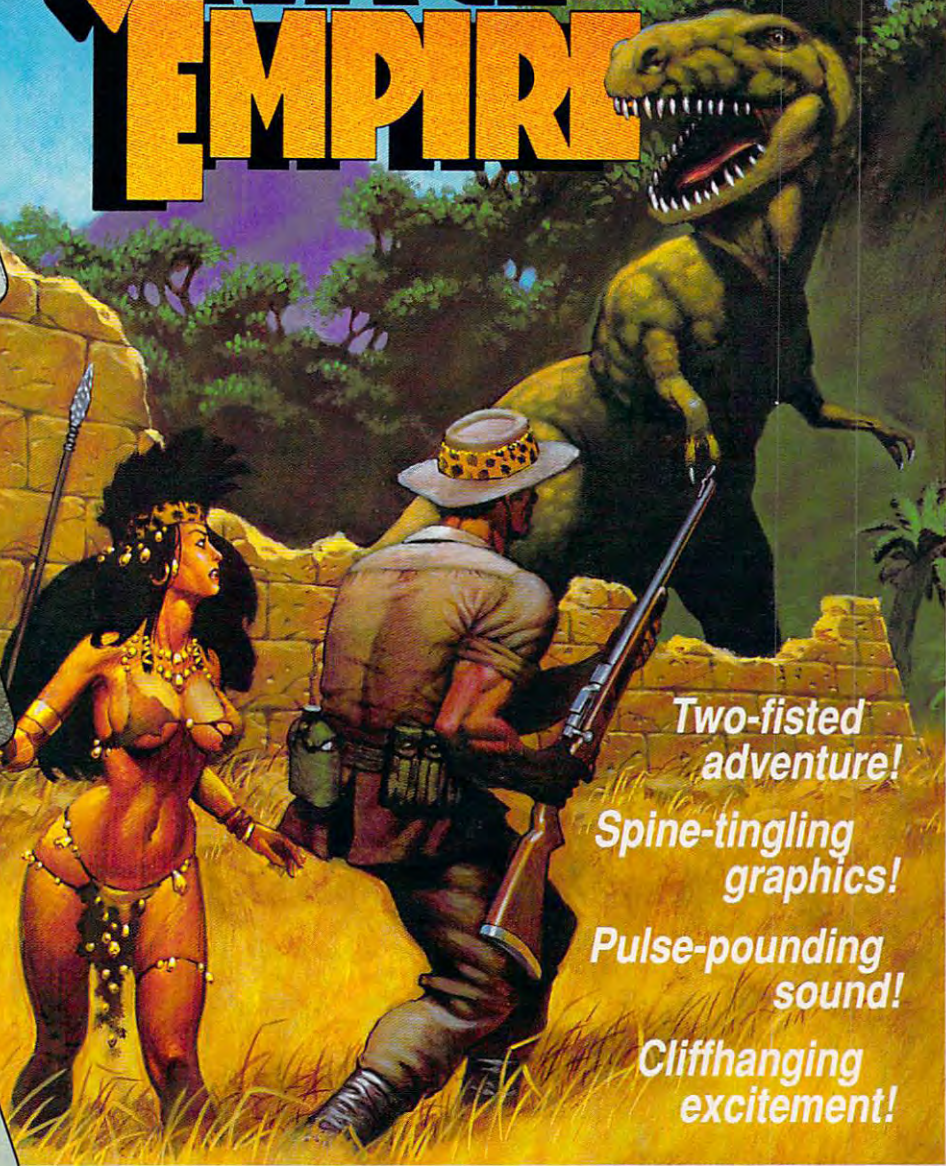
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do to break the dynamic link in *Windows* is change a linked document's name. *NewWave* maintains the link, regardless of the changes made in the document or in its name.

The links *NewWave* provides are more powerful as well. Placing a linked graphic file in *Microsoft Word for Windows*, a *Windows* product requires that it be in a format the program can handle, such as TIF or *Windows* Metafile. If a new format emerged tomorrow, a new version of the *Word* product would have to be developed to accommodate it. In the *Ami Professional* version developed for use with *NewWave*, the word processor has nothing to do with the graphic. When a linked graphic is imported, it remains part of the program that created it. I saw a demonstration in which an animated graphic was imported to an *Ami Professional* document. The word processor didn't have to be able to provide animation for the graphic. All it did was allow the section of the page where the animation appeared to be a part of the external animation program.

The *NewWave* environment features *Agent*, a macro recorder similar to *Recorder*, provided with *Windows* 3.0. But instead of simply recording keypresses and mouse movements as does *Recorder*, *Agent* deals with files by name and its macros take the form of programs that can be edited with a word processor. If you use *Windows* 3.0's macro recorder capability, it will record that you moved the mouse to a given position and double-clicked to invoke *Excel*. However, if you move *Excel* to a different location on the screen and replace it with an *Ami Professional* document, invoking the macro will start *Ami Professional* instead of *Excel*. By contrast, *NewWave's Agent* will contain instructions to start *Excel*, regardless of its position on the screen. This will make your macros more reliable and therefore more useful.

## GEM

Gary Kildall's Digital Research is one of the great might-have-beens of the computer industry. It was once king of the hill with its ubiquitous CP/M operating system, but because of misunderstandings with representatives from big blue IBM, Microsoft—rather than Digital Research—got the nod to create DOS. Shortly after the appearance of the IBM PC, Digital saw its market share dwindle to a very few true believers.

Ever since, with product after product, Digital Research has tried to find its niche in a world it never made—the world of DOS. One of these products is DR DOS, an MS-

## Which Interface Is Right for You?

How can you decide which interface is for you?

If you're managing a large number of programs and would like to be able to switch among them, consider a task switcher like *Switch-It*, *Take Charge!*, or *SoftBreeze* rather than a graphical interface. Context switchers are generally much more efficient in their use of RAM, and they usually require little from the programs they switch.

If you're interested in running *Windows* applications, such as *Word for Windows* and *Ami*, you'll probably want *Windows*. In addition, it comes with two powerful programs: *Microsoft Windows Write* and *Microsoft Windows Paint*.

As a file switcher, *Microsoft Windows* may cause you some problems. A small group of DOS applications steadfastly refuse to run under *Windows*. Yet it's the leader of the pack of graphical interfaces because the programs that will run under it, using its resources and emulating it, include some of the major success stories of software. *CorelDraw*, *Arts & Letters*, and *Micrografix Designer*, the big-three PC drawing programs, are all *Windows* applications. Microsoft's *Excel* spreadsheet is only available as a *Windows* application, and *Windows*-based word processors are also beginning to appear in numbers. The first databases have begun to appear, too.

*GEM* draws very little attention these days, but it's a good file switcher and far more graphical at its heart than *Windows 2.x* was. One of *GEM's* biggest claims to fame is that it provides the operating environment for *Ventura Publisher*, one of the two top PC desktop publishing packages.

It's been said that a musical instrument exists to perform the music written for it. Few people study basset horn anymore, though this instrument was common in the last century. Without new music written for it, the basset faded until it became a musical footnote.

DOS alternative. Another is *GEM*.

Perhaps inspired by the Macintosh, Digital Research's programmers set to work on an early windowing interface for the PC called *GEM*, which is now seen mainly on Atari STs and as the operating environment for a handful of PC desktop publishing packages such as *Ventura Publisher* and *GEM Desktop Publisher*.

Although it isn't multitasking, *GEM* is still a powerful shell. It provides many of the same advantages as *Windows*, including the simple routines necessary to place text and dialog boxes onscreen.

A few users are crazy about *GEM*, though one witty detractor called it "CP/M with windows." In its current release, it's a little more informative than *Windows* (for example, the size of the thumb mark in the scroll bar tells you how much of the file is currently visible onscreen), and it costs half to a quarter as much. And

*GEM* is a capable programming achievement but has very little important software written to take advantage of its abilities. Without software, *GEM* may become another basset horn.

*DeskMate* will probably live as a standard as long as Tandy sells PC compatibles, which means that it will probably never die.

The programs supported by *Windows* and *DeskMate* vary in their focus. Although there is some high-level software available to operate under the *DeskMate* interface, the Lotus *DeskMate* spreadsheet cannot compare with *Excel*. By its pricing and its small locations, Tandy is obviously aiming at the home and small-office user rather than the upper-end corporate customer, who is in Microsoft's sights.

Although *Windows* 3.0 is very exciting, *DeskMate* is probably a better choice as a graphical interface for the home user than *Windows* or *GEM*. In addition to the fact that the interface is friendly, logical, inexpensive, and packed with features, *DeskMate* is a better switcher.

Among the other products mentioned, *Take Charge!* is very powerful and takes up virtually no memory, so it would be a good option to use, if you're only looking for a task switcher and you have very limited memory. *DESQview* becomes more valuable with a more capable machine and more RAM. If you're operating an 80386 with two or three megabytes of RAM, you should look into *DESQview*.

If you're tired of the DOS command line but don't need the features of a GUI or a task switcher, consider *The Norton Commander* or *PC Tools Deluxe* shell. Both programs make DOS easier to use and more powerful.

Command line enthusiasts should take a serious look at *4DOS*. It's shareware, so you can try it before you pay. In many ways, it's the interpreter *COMMAND.COM* should have been.

*GEM* should operate on all machines that run DOS.

People who run *GEM* after running *Windows* may be surprised to discover that *GEM* comes with very few desktop utilities. You get a basic operating system shell, which lacks the paint program and word processor shipped with *Windows*, and which is missing interesting tidbits (such as the *Reversi* and *Solitaire* games supplied with *Windows*). Word processors and graphics packages exist that will work within the *GEM* operating environment, but they are sold separately.

## DeskMate

Venerable *DeskMate* (now in its 3.0 release) would be a strong presence in the software world, even if it weren't friendly and powerful, because of the fact that it's the operating system shell available for one of the best-selling personal computers: the Tandy 1000 line. Tandy has been aggressively pur-



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suing non-Tandy users with a *DeskMate* version that will run on any compatible, and it has been making converts.

It will come as no surprise to the thousands of Tandy users that *DeskMate* is a viable alternative to *Windows*. It loads rapidly, can run at full speed on virtually any DOS computer, and has a graphical desktop appearance (though it looks as garish as fingerprint next to the designer graphics of *Windows*' screens).

*DeskMate* provides an onscreen clock and calendar, plus an address book, an appointment calendar, and a telecommunications module. In addition, it sports an object-oriented drawing program, a simple word processor, a small spreadsheet, and several other personal-productivity programs.

And these aren't the only programs available to run under the *DeskMate* interface. Several manufacturers have gotten behind Tandy in creating important software that has the *DeskMate* look and feel.

Some familiar names appear among the software available in this special format, including *PFS:First Publisher*, *Quicken*, *Q & A Write*, and a Lotus product called *Lotus Spreadsheet for DeskMate*. These software packages are virtually assured success, as they're being aggressively marketed through the nationwide network of Radio Shack stores.

Tandy is obviously serious about making *DeskMate* a contender in the GUI wars.

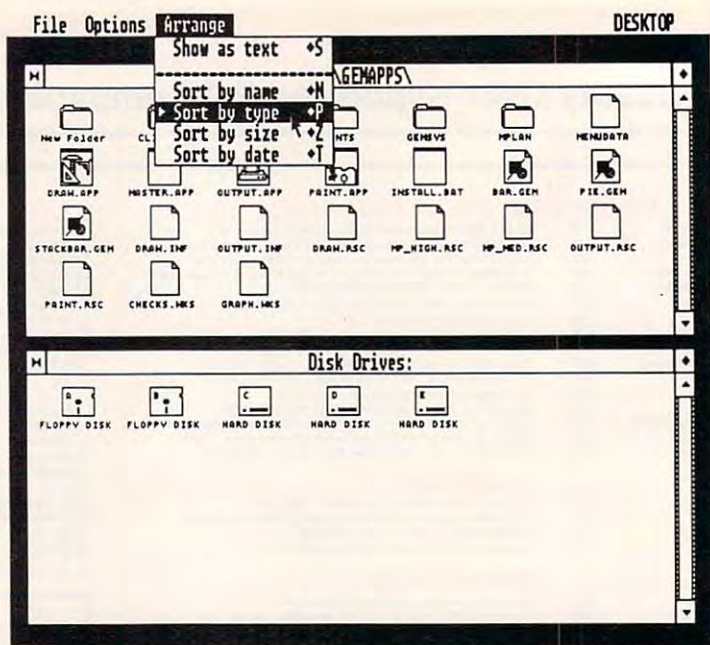
### Nongraphical User Interfaces

Not everyone is happy with graphical user interfaces. They tend to be slow and demand a lot of system resources. There are ways, however, to work with the faster, more responsive text screen without having to depend on the command line.

The interfaces described below take less time to learn than the command line and provide assistance like help screens, point-and-click selections, user customization, and menus. For a new computer user, or a user who spends as little time as possible on the command line, one of these text-based interfaces may be the answer.

### DESQview

Although *DESQview* uses 150K or less, it typically takes control of all available memory. On some machines (specifically 286s), it can take advantage of a little-known glitch in the way the CPU manages memory and move a portion of itself into the RAM between 640K and 1MB, which frees more memory below the 640K barrier for running programs.



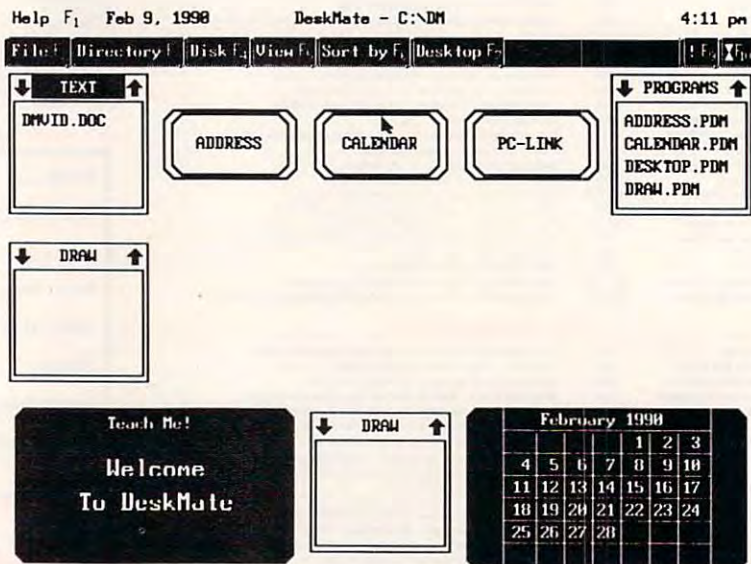
GEM's icon-oriented desktop.

While *DESQview* isn't a graphical interface itself, it provides an alternative to programs like *Windows* or *DeskMate*. Essentially, *DESQview* hides in the background until you call it with a keypress. When you press the hot key, it provides a menu. From this menu, you can open a window, close a window, or switch windows.

*DESQview* is multitasking, if you have EEMS or EMS 4.0 expanded memory. Without expanded memory, you can still multitask, but you must multitask with programs that fit in the 640K of conventional memory. This severely restricts the number of pro-

grams that will multitask on an unexpanded system, particularly when you take *DESQview*'s 150K overhead into account. You can, however, use *DESQview* for context switching (moving from one program to another without having both run simultaneously).

There's one definite advantage to *DESQview*: It will work on any existing system, from the original IBM PC to the 80486 machines. Although it's far from a graphical user interface, *DESQview*'s windows and menus will please those who need multitasking or context switching but who want the speed of a text-based interface.▷



File selectors dominate *DeskMate*'s interface.



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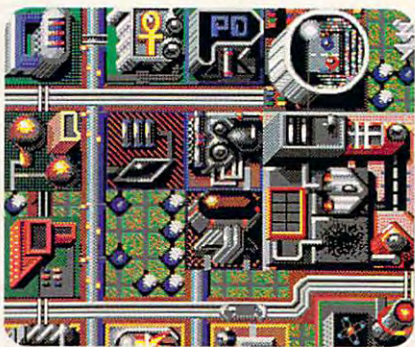
*As a Shogun in Ancient Asia, you hold the secrets to the Orient. And the keys to an empire.*



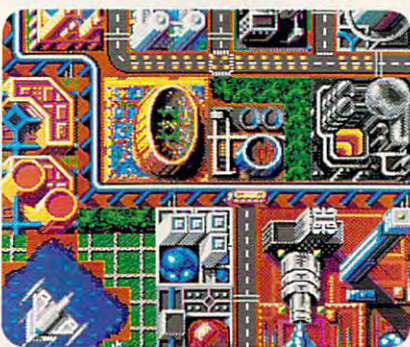
*Serfs up! Thou art king or queen of your castle. Beware of plagues, dragons, witches, and other legendary dangers.*



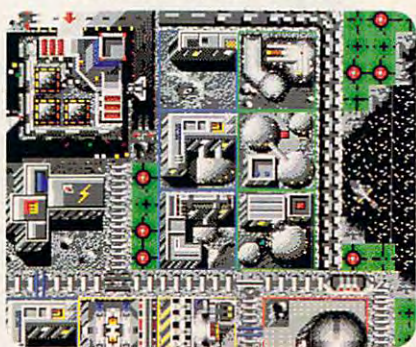
*It's home on the range. And you're mayor of a bustling frontier town filled with gold, cows, and plenty o' bad guys.*



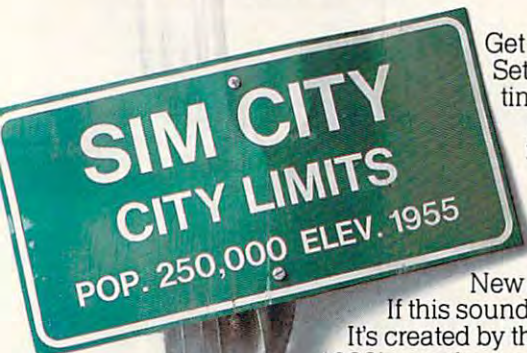
*Main street U.S.A. in the 21st century. Do you have what it takes to turn your town into a thriving interplanetary hub?*



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## Take Command

The Norton Commander and DOS-SHELL (the shell shipped with DOS 4.0) represent additional options in the shell game. DOSSHELL is extremely capable and would be a contender in a friendliness competition with *Windows* or *DeskMate*.

Interestingly, while DOSSHELL appears to be a text-based interface, it's actually graphical in nature (at least on EGA or better systems). Perhaps later versions will exploit the

shell's graphic potential. If not, this squandering of CPU and memory resources (drawing letters on the graphics screen takes much longer than displaying characters on a text screen) seems a little strange.

The Norton Commander contains all of the standard DOS-shell features, adding a utility that can directly read *Lotus 1-2-3*, *dBase*, and most word processor files. Although not designed with the beginner in mind, it provides a depth of features

that will richly reward the time invested in studying the manual.

*Commander* also features a command line on the same screen as the menu options, providing many of the benefits of a graphical interface right along with the command line.

No discussion of shells would be complete without mentioning *PC Tools Deluxe*. If you're among the half-dozen or so PC users who haven't yet purchased *PC Tools Deluxe*, it's waiting for you in its sixth version. It



## GUI Glossary

*The world of the graphical user interface has its own vocabulary. Here's a short list of words you'll hear when GUIs are under discussion.*

**Button.** Buttons are rectangles or circles, usually found in a dialog box, that affect an operation if they're selected by the mouse. Generally the default button is marked in some way to indicate that it can be selected simply by pressing Enter. Usually, the Esc key activates the Cancel button. To change the button that's highlighted, use the Tab or cursor keys. And you can always click on any of the buttons with the mouse pointer. There are many different kinds of buttons, including check boxes and radio buttons, but their action is fairly uniform.

**Clicking.** When you click, you move the mouse pointer to a specific position, such as over an item in a menu, and press the mouse button once, releasing it as soon as the click is felt. This action is usually employed to make a selection from a list or to select a button.

**Close box.** You can usually make a window disappear by clicking on the close box. The close symbol is usually located in the upper left corner of the window. *Windows* uses a slightly different scheme, providing a menu when you click where the close box should be, which offers a choice among minimizing, maximizing, closing, and other operations. If you double-click on this box in *Windows*, it acts like a close box.

**Dialog box.** Dialog boxes are rectangles of information superimposed on the screen. They're usually designed to appear when you're about to lose data, or they may be displayed to advise you of a change of circumstances or to give you a list of options.

**Double-clicking.** When you double-click, you move the mouse pointer to a position on the screen and then press the mouse button twice in rapid succession. This action is usually employed to start an applica-

tion or to make a selection from a file list and command the application running to load it.

**Dragging.** When you drag, you move the mouse pointer to a position on the screen, press the mouse button, and then move the mouse with the button depressed. Usually this causes something on the screen to move along with the mouse pointer. This action is usually employed for moving and sizing windows or for moving icons around the screen.

**Friendly.** An interface is friendly if you can learn it thoroughly in a few days.

**Icons.** Icons are little pictures of things, to quote an ad copywriter. There are many uses for icons. In *GEM*, dragging an icon from one window to another can be used to copy the file represented by the icon from one directory to another. Most graphical user interfaces offer you the choice of icons or filenames in the listing.

**Maximize.** *Windows'* windows can be made to fill the entire screen with the maximize button, which is an upward-pointing arrow in the upper right corner of the window. When the window is maximized, clicking on the same button will make the screen an intermediate size between maximized and minimized.

**Menu.** Menus provide lists of options and commands. While a dialog box will generally provide information and options in table format, menus are nearly always in the form of a single list.

**Minimize.** *Windows'* windows can be turned into tiny icons at the bottom of the screen by clicking on the minimize box, a small downward-pointing arrow at the upper right corner of the window. This isn't the same as closing a window. The program may still be operating when it's minimized.

**Mouse pointer.** Usually the mouse pointer is either a tiny arrowhead or a rectangle. It

moves in response to your mouse movements.

**Move bar.** If your graphical user interface allows you to move its windows, you can drag the move bar to reposition its windows. Usually the move bar is the bar that runs along the top of the window.

**Scrolling.** Graphical interfaces allow you to move up and down or sideways in a document with the aid of slide bars or scroll bars. These bars are typically made up of arrows, a thumb mark or slide box, and a gray bar along which the thumb mark moves. Generally, clicking on the arrows moves the screen a short distance in the direction indicated. Clicking on the gray area between the thumb mark and the arrows moves the screen a larger distance in the direction of the arrow. Dragging the thumb mark moves you proportionally through the document. Dragging the thumb mark halfway along the slide bar will take you to a position roughly halfway through the document. Scroll bars typically appear at the right side of a window or selection list or along the bottom of a window.

**Selection list.** Selection lists are used to view the contents of a disk or directory. They're usually scrollable. If you see a file you want to load, most graphical user interfaces allow you to double-click on the file's name in order to load it.

**Window.** An area of the screen where your application is running. Some user interfaces allow you to have multiple onscreen windows.

**Zoom box.** If you resize a window, you may want to make it fill the entire screen at least during part of its operation. If so, you could click on the window's zoom box (usually in the upper right corner) to make the window fill the screen again. *Windows* uses minimize and maximize buttons instead of a zoom box.



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has virtually everything, including a DOS shell.

Since *PC Tools Deluxe* will inevitably be mentioned in every review of virtually every kind of software, from disk utilities to word processors, we don't need to dwell on its virtues here, other than to say that it has plenty of them.

Other GUI alternatives include menu programs, such as *Direct Access*. Menu software acts primarily as a buffer between the user and DOS: It provides powerful menu-making options but lacks utilities.

There are many additional shells available, both commercially and through shareware and freeware. Check your software outlet, bulletin boards, online services, and shareware distributors for these packages.

### Prompt Innovations

Some users are wedded to the command line. If you've mastered it, the command line can be amazingly fast and flexible. Part of the command line's power comes from the fact that it's really a mini programming language that lets you use features like pipes, filters, and redirection. It also lets you automate frequently repeated commands with batch files.

However, most people who have been using DOS for a few years have accumulated a bag of DOS utilities, many of which may have come from *COMPUTE!'s PC Disk*. These utilities fill the gaps in the operating system, making it more usable and friendly. Common utilities allow you to recall previous commands entered at the command line or to display directories in two-column, sorted form.

Developers of MS-DOS alternatives have capitalized on DOS shortcomings by providing the programs power users have accumulated over time as part of the operating system. Two prominent DOS alternatives are *4DOS* and *DR DOS*.

### 4DOS

This program is not actually a replacement for DOS but an alternative command line interpreter. It takes the place of the *COMMAND.COM* file on your boot disk and provides a collection of useful commands that Microsoft and IBM left out of MS- and PC-DOS.

*4DOS* has two advantages over *COMMAND.COM*. First, it provides much more power. And second, it's more intuitive. For example, where in DOS you have to issue multiple commands to copy selected files from one disk to another, *4DOS* allows you to list several files after the *COPY* command, and it will copy each in turn.

One of *4DOS*'s nicest features is a file selector that can be called at the command line. From it, you can select the files on which your command will operate. The file selector features a *MOVE* command and an *EXCEPT* command, which allows you, for example, to move the entire contents of a directory, with the exception of files you specify.

*4DOS* also provides a batch-file programming language that's much more capable than DOS's. While supporting standard batch files, it introduces a new, timesaving alternative in *BTM* (Batch To Memory) files. One of the things that slows down conventional batch files is the fact that as each line is read from disk, interpreted, and acted on, the disk file containing the batch commands is opened and closed. *BTM* files are read and executed from RAM, reducing the disk access and increasing operating speed by two to five times.

In addition, *4DOS* allows batch files operating under it to use *IF-THEN-ELSE* statements, box-drawing commands, and commands that allow the batch file to make use of such knowledge as the amount of RAM and disk space available, the display type, and even your PC's CPU.

### DR DOS

By the time you read this, you'll be able to buy *DR DOS* (Digital Research's Disk Operating System) from your computer store. For some time, PC compatibles manufacturers have been able to buy it as an alternative to MS-DOS. Digital Research's DOS has all the features of MS-DOS 3.3 (a very popular version) plus some of DOS 4.0's enhancements.

Two of *DR DOS*'s most important features are its support for hard disk partitions larger than 32MB and *LIM EMS 4.0* memory (the current expanded-memory specification). Most significant to the companies that purchase *DR DOS* for installation is the fact that it is *ROMable*. In other words, it can be placed in a ROM chip, allowing for virtually instantaneous booting. No more waits while the DOS wheels grind themselves to dust inside the machine. Award Software, maker of the Award BIOS, now sells *DR DOS* on a ROM card. This is good news for network managers who want to run diskless DOS workstations and for impatient DOS users who want DOS to be on instantly.

*DR DOS* sports a witty reply to the deadheaded *EDLIN*. Rather than clone the worst text editor in computerdom, Digital Research has provided a full-screen editor that uses well-known *WordStar* commands.

Another important *DR DOS* feature is command line recall, which allows you to retrieve the last several command line entries.

Power users will appreciate the password protection for files and directories built into *DR DOS*. Novices will be grateful for the online help provided for every *DR DOS* command.

### Concurrent DOS

It's obvious from *Concurrent DOS*'s \$495 price that it's one for power users. Digital Research has provided a response to *OS/2* in *Concurrent DOS* that puts *OS/2* out of the picture.

Systems running *Concurrent DOS* are able to act as local area networks (LANs). The user operating the console (the main computer running *Concurrent DOS*) can operate as many as four sessions (four individual programs, batch files, or whatever). Nine more users can work under the same operating system from PC terminals through serial cables. Each of these nine can have two independent sessions running simultaneously.

*Concurrent DOS* is designed with the 80386 CPU in mind and is recommended only for 386s and 386SXs. The minimum memory required to run *Concurrent DOS* is one megabyte, but you'll need at least another megabyte to run all those sessions. ☐

### Choosing an Interface

CPU	Suggested Interfaces
8088 or 8086	DOS <i>4DOS</i> <i>DeskMate</i> <i>The Norton Commander</i> <i>PC-Tools Deluxe</i> <i>Switch-It</i> <i>Take Charge!</i> <i>SoftBreeze</i>
80286	Any 8088/8086 interface or one of the following: <i>Windows</i> <i>OS/2</i> <i>DESQview</i>
80386	Any 8088/8086 or 80286 interface or one of the following: <i>DESQview 386</i> <i>Concurrent DOS</i>





# AMIGA VIEW

R A N D Y T H O M P S O N

**G**o west, young man! It's the end of the year and the end of an era for me at COMPUTE. After four years of service, I've handed in my resignation, I've packed up my belongings, and I'm heading west (to the left coast, as my wife would say). These are my last editor's notes.

Although it's usually not kosher to tell readers why you're leaving—most editors don't even get the chance to say farewell—I'm going to break the tradition. I've chosen to accept a position at Microsoft in Redmond, Washington. Yes, Microsoft, the maker of MS-DOS (smile when you say that), Windows 3.0, and OS/2. No, it doesn't make any Amiga products, with the possible exception of Amiga Basic. I hope to change that.

Leaving COMPUTE was a tough decision for me. My work here has been both rewarding and fun. COMPUTE has assembled some of the best people in the industry, and it was great to be a part of that. Leaving Amiga Resource behind will be the hardest, however. The entire magazine was designed, conceived, and edited by Rhett Anderson and me, and it will be difficult to let go. But the magazine has changed, and it's taken a path I choose not to follow.

From the beginning, Amiga Resource has been unique. Unlike most magazines, it had no one all-powerful editor; it had two. As co-editors, Rhett and I made a formidable editorial tag team. And although we may disagree on many topics, we are the best of friends (we live only a few blocks apart, and neither of us has burned down the other's house). Besides,

I think our often-differing viewpoints only enhanced the magazine's editorial perspective.

Rhett and I may not be here in person anymore, but we aren't cutting our ties entirely. As usual, we'll continue to write the controversial column "Taking Sides," and I'll continue to push the Commodore 64 to its limits with my "Programmer's Page" column in COMPUTE's Gazette section. Don't be surprised if you see my name on a feature article or two, either.

Rest assured, my departure doesn't mark the end of Amiga Resource. In fact, COMPUTE would like your suggestions on what direction you'd like to see this section take. Now that Amiga Resource's original bullheaded editors are out of the way, it's your turn to take command. Write to us with your ideas and comments. Tell us what you like and don't like about the new COMPUTE format. Give us suggestions on what type of

specialized Amiga products you'd like to see, as well. An all-Amiga newsletter? An expanded "On Disk" product? A publication composed entirely of "Readers' Feedback?" These are exciting times for the Amiga, and COMPUTE certainly wants to be there.

But enough about business. Before I go, I'd like to share with you some of my favorite moments in COMPUTE history. Warning: These have nothing to do with the Amiga.

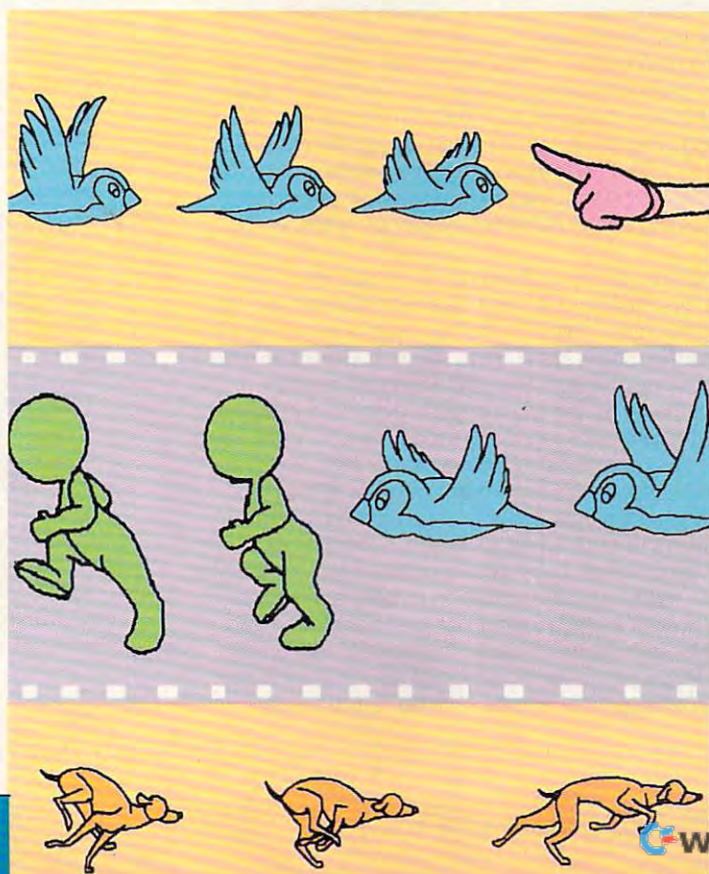
First, there were the Scotch tape wars. Initiated by one David Hensley and finalized by Troy Tucker and me, these battles left no object safe from our tape dispensers. In an attempt to find the ultimate practical joke involving clear adhesive, we taped everything from chairs to the buttons that hang up telephones (when you get a call and lift the receiver, the telephone continues to ring).

Then, of course, there was the time we had to explain to the recently hired New York native Bill Chin that the "dead baby pigs" he continually encountered on the North Carolina roads were actually animals known as opossums. Apparently they don't have any such critters in the Big Apple.

And I'll never forget when Tim Midkiff wrote a particularly volatile program on the IBM PC that, when it crashed (which it often did in its early stages), somehow managed to print a nicely formatted calendar on the screen with the current date flashing. The surprising thing about it was that he was writing an arcade game, not a datebook.

As you can probably tell, I'm going to miss COMPUTE, its people, and its readers.

Good-bye. □







# NEWS & NOTES



## FIRE SALE

Commodore's marketing department says **we can expect another ad campaign** this fall, which should start about the time you read this. All I've heard about this one is that it "won't be dumb," and it won't feature our friend Stevie from last year's commercials. The company has already started a modest print campaign to promote a free monitor promotion for the Amiga 2000HD and 2500 (after bumping the memory on the 2500/30 to five megabytes). Does this promotion tell us something about the 2000HD and 2500? Since the introduction of the 3000, some people have insisted that **the days of the high-end 2000s are numbered**, particularly in light of rumors of several new Amiga models in development. The most concrete stories I've heard are about a slightly faster 3500 model in a tower case.

—SHELDON LEEMON



## 3-D MANIA

Most people have been pretty impressed with Alan Hastings' *Lightwave* program, but some were **thrown for a loop by Newtek's recent announcement** that it would only come bundled with the Video Toaster and not be sold separately. Although the Toaster's 24-bit color output obviously produces better quality than native Amiga display, it takes longer to produce each frame when working at such a high resolution. In addition, the Toaster can't play back a 24-bit animation in real-time. This means that you'll need fairly sophisticated single-frame recording equipment to produce any animations with *Lightwave*, and you'll be able to show them only on videotape, not directly on the computer. The biggest complaint, however, comes from people who are only interested in doing animations that they can display on the Amiga and who think that at \$1,595, **the Toaster makes a rather expensive dongle** for the *LightWave* program. Maybe those people should take a look at the \$3,000 price tag for the *Autodesk Studio* program, or for *Caligari Professional*.

Other new entries include Impulse's *Imagine*, Progressive Peripherals & Software's *3-D Professional*, and Hash Enterprises' *Animation: Journeyman*. Of the three, only *3-D Pro* has been released at the time of this writing, but the others are due out soon. There will also be an update for *3-D Pro* sometime later this year which will add ray-tracing capabilities. Of the three, the most eagerly awaited is *Imagine*. It promises to combine the powerful rendering capabilities of *Turbo Silver* with **a user interface that somebody could actually use**. This program will also work with Impulse's Firecracker board for 24-bit color output (natch), though you won't get realtime animation on the frame buffer. The dark horse in this race is Martin Hash's *Animation: Journeyman* program. It, too, promises to have a more usable interface than its predecessor, but it still uses the same intriguing armature model for motion, in which **you create a skeleton** for purposes of motion and then model the surfaces around this skeleton for realistic motion of people and animals. Those who saw the program at SIGGRAPH say that it produced a nice animation of sharks, with no hint of blocky polygons.

—SHELDON LEEMON

## A Tad Better

There's no shortage of hot new Amiga software in the works. First out of the chute will be ASDG's *Art Department Professional*. This enhanced version of *The Art Department (TAD)* graphics conversion program adds the ability to save, as well as load, non-IFF graphics formats. Other enhancements include *ARexx* support and the ability to control and render to devices such as Black Belt's HAM-E, Digital Creations' DCTV, film recorders, and the Mimetics FrameBuffer.

*Art Department Professional* has enhanced color-palette control, including the ability to render in 256 colors, which is useful for transferring images to VGA PCs and Mac II systems. Special effects such as line art and color-to-gray-scale conversion are now handled using external modules, so you can easily add new effects.

The new program sells for \$199.95 (*TAD* owners can upgrade for \$75.00) and includes load and save modules in *Digi-View*, *Sculpt*, *Turbo Silver*, *DeluxePaint II Enhanced*, *MacPaint*, GIF, IFF, and PCX formats. Also available are the *Art Department Professional Conversion Pack* (89.95), which includes loaders and savers for Targa, TIFF, PICT2, and *Rendition* formats, and the *Art Department Presentation Graphics Pack* (\$129.95), a module that lets you combine multiple images with business graphics.

Contact ASDG, 925 Stewart Street, Madison, Wisconsin 53713; (608) 273-6585.

—DENNY ATKIN



= INSIDER NEWS AND GOSSIP

continued on page A-4



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## NEWS & NOTES *continued from page A-2*

### TRUE COLORS

All of a sudden, *true color* is one of the big buzzwords in the micro-computer industry. Once Apple and IBM discovered the analog RGB monitor, it was only a matter of time until people started developing 24-bit color-display adapters for their computers. And once they saw the photographic-quality color displays these 24-bit adapters provided, they quickly agreed that this was the new standard for professional color graphics. This meant that the Amiga, which had previously been in the forefront of micro-computer graphics, had suddenly fallen to the middle of the pack.

Nonetheless, the true-color craze isn't necessarily bad news for the Amiga. For one thing, it means that there's a new emphasis on color input and output devices that can be used with the conventional Amiga graphics display. Take a look at the success of the Sharp JX-100 scanner in the Amiga market, and you'll see what I mean. As color becomes the new craze, we'll see cheaper and better

color scanners, laser printers, thermal printers, and film recorders.

Nor is the Amiga community taking the true-color challenge lying down. At the recent SIGGRAPH show, Impulse was showing off its 24-bit Firecracker board for the Amiga, which allows you to overlay the normal Workbench screen on top of the color frame-buffer display, just as NewTek was once again showing the Video Toaster,



which includes dual 24-bit color frame buffers. Commodore was also showing the University of Lowell graphics card, which displays 1024 colors at once from a palette of 16.8 million, at SIGGRAPH. The main focus for this board appears to be as a UNIX display, possibly running a color version of X-Win-

dow, the most popular protocol for multiuser graphics workstations. The most encouraging rumor that I've been hearing is that Commodore has been making progress toward developing display-independent system software that will provide hooks for running current software (like the Workbench) on alternative displays. Until then, all such displays on the Amiga will be secondary monitors that will require special software that knows how to render to them.

For now, 24-bit color is still fairly expensive. It also is hard to manipulate the display quickly, with almost a megabyte of memory to move around for each frame. Therefore, developers are looking for ways to do onscreen compression on the fly. Ironically, the Amiga has the lead in this area, since the Hold-and-Modify (HAM) mode can actually be thought of as a compression scheme by which you get 12 bits' worth of color for only 6 bits' worth of data.

—SHELDON LEEMON



# 3 THREE NEW PRODUCTS FROM ICD

## Flicker Free Video™

With *Flicker Free Video* (FFV) and a standard VGA or multi-frequency monitor, any Amiga® 500, 1000, or 2000 computer can produce a high quality display, free of interlace flicker and visible scan lines. Installation requires no soldering or advanced technical knowledge and frees the video slot in Amiga 2000 computers for other uses. *FFV* is compatible with all software, works in low and high resolutions interlaced or not, and has no genlock conflicts. *FFV* uses a multi-layer circuit board and surface-mounted components, packing a lot of power into a very small space. Both PAL and NTSC are automatically recognized and fully supported. Full overscan is supported, not just a limited overscan. Three megabits of random access memory are used to ensure compatibility with overscan screens as large as the Amiga can produce.

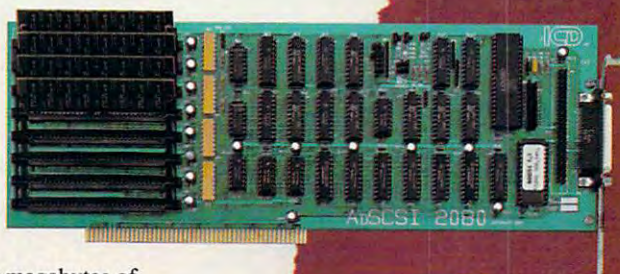
## AdSpeed™

ICD expands its line of innovative enhancement products for the Amiga with the introduction of *AdSpeed*, a full featured 14.3 MHz 68000 accelerator for all 68000-based Amiga computers. *AdSpeed* differs from other accelerators by using an intelligent 16K static RAM cache to allow zero wait state execution of many operations at twice the regular speed. All programs will show improvement. *AdSpeed* will make your Amiga run faster than any 68000 or 68020 accelerator without on-board RAM. *AdSpeed* works with all 68000 based Amiga computers, including the 500, 1000, and 2000. Installation is simple and requires no soldering. *AdSpeed* has a software selectable true 7.16 MHz 68000 mode for 100% compatibility — your computer will run as if the stock CPU was installed. 32K of high speed static RAM is used for 16K of data/instruction cache and 16K of cache tag memory. A full read and write-through cache provides maximum speed.



## AdSCSI™ 2080

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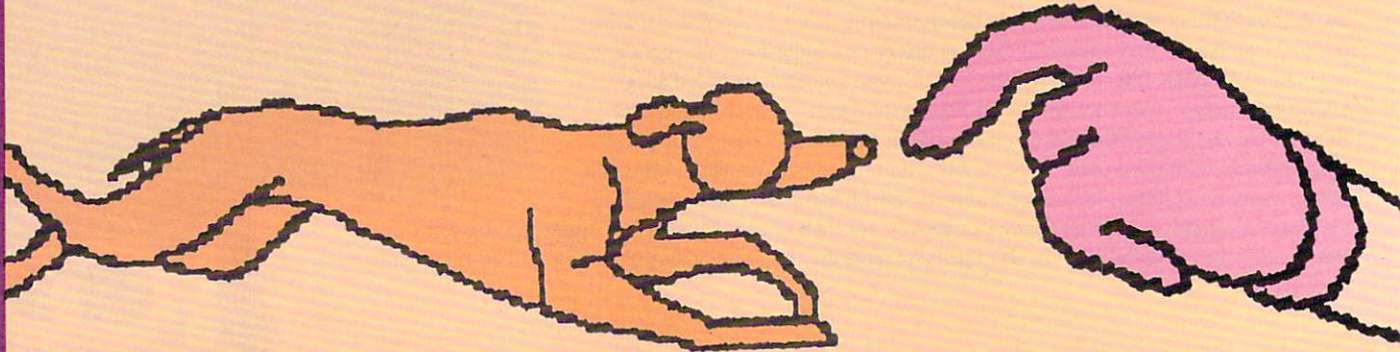
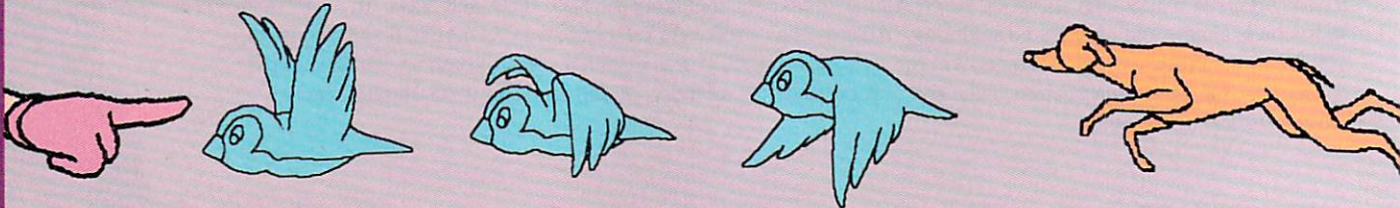
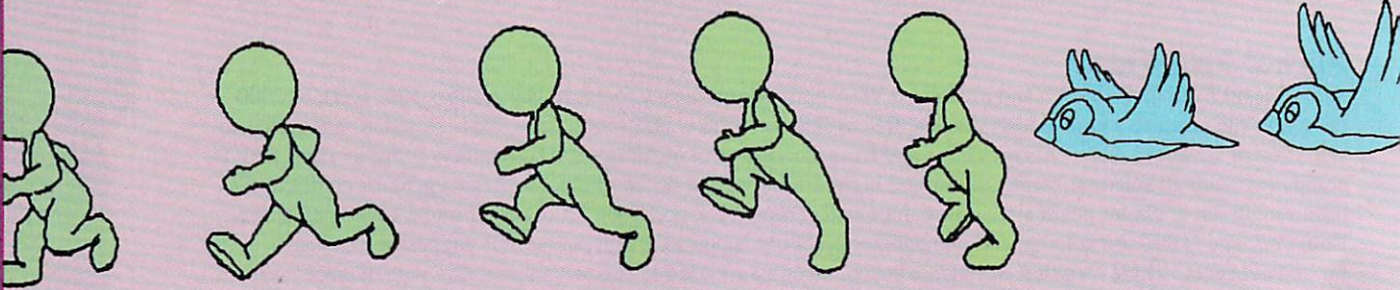
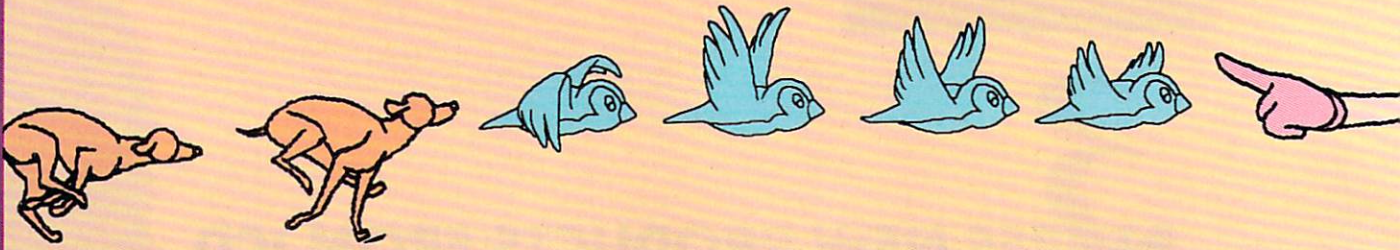
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**D**isney has been quietly selling Amiga software under its Buena Vista title for quite some time. *The Animation Studio*, however, has broken this trend—it's the first software package to be marketed under the Walt Disney name. It's also Disney software's first creativity program, and it's only available on the Amiga.

*The Animation Studio's* aim is to provide Amiga animators with the tools to do Disney-style 2-D cel animation on their computers. The program has four main parts: Pencil Test, where you draw your black-and-white animation cels; Exposure Sheet, where you sequence your cels and add sounds; Ink and Paint, where you color in your black-and-white animation; and Camera, where you composite the painted cels over backgrounds. With these tools, the program simulates the traditional process of animation—at least that's the goal. Let's see if it hits the mark.▷

**B E N   A N D   J E A N   M E A N S**





## Interview with Leo Schwab Creator of Disney's *The Animation Studio*

### BEN AND JEAN MEANS

How did Leo Schwab, a quiet boy from Marin County, California, become Bols Ewhac, terror of the bulletin boards, caped crusader of the graphic computer shows, inventor of the Schwabby, and author of Disney's *The Animation Studio*?

Was it fate? Was it Kismet? Was it one too many chromosomes? No, it all started with a high school prank. Leo reminisces, "Once upon a time in high school, I was doing a video for civics class about criminal justice, so I wrote a court drama, called *Death Sentence*. You could look at it as light comedy, I suppose, terminally bad. But when I faded up the title screen, it said *Death Sentence by Bols Ewhac*. I said, 'All right, who's the wise guy?' and C. H. Summers said, 'I gave it to you. It's your Swedish moniker.' So it stuck in my mind. I don't remember what grade I got on the video."

#### Bols Ewhac Dons a Cape

Later in college, Leo became notorious for his online antics. "At that time, there were a lot of electronic mail wars going around. I was pretty good at stopping a mail war with a rather long and eloquent flame, until one day this Tolkienesque mail war showed up. And being the kind of guy not to turn down a challenge, I thought fine, I'm going to end this with one particularly well-thought-out story."

Thus began *MicroSaga*, starring Bols Ewhac and Nam Rejof, which is an anagram of fellow hacker John Foreman's name. Leo adds, "The story kind of got out of hand. It's 200K worth of text now, and it's still not done. So that's how Bols Ewhac came to be part of me. The cape came about when John said he'd have to show up at our pizza parties one day as Nam Rejof in a flowing purple cape. So I had one made for him."

Leo had a matching cape made for Bols Ewhac in blue, and soon cape madness set in. A plumed velvet hat appeared after the third cape. Leo, who plans a fifth cape in a short style for bicycle riding, explains his cape fetish, "There are two ways to look distinctive in the 1990s. One way is to shave off 80 percent of your hair and stick a safety pin through your nose, and the other way is to wear a cape. Personally, I think the cape looks better."

#### Schwabbies

Leo wore one of his capes to SIGGRAPH '87 in Anaheim and promptly got in trouble



Leo Schwab, the author of Disney's *The Animation Studio*, often appears disguised as a normal person.

with Pixar, though the cape wasn't at fault. Leo says, "The week before SIGGRAPH, I saw Pixar's latest production called *Red's Dream*, and it was great." Animated on a high-end graphics workstation, Pixar's demo featured a juggling unicycle. Not to be outdone, Leo promptly set out to re-create the animation on the Amiga.

Using *VideoScape 3-D* and his own C program, which was used to generate the points that defined several of the animated objects, Leo had a working 96-frame animation of a juggling unicycle in just a few days. With balls bouncing off the seat and pedals and the camera view circling the unicycle, the animation looked great—but not to Pixar. The people at Pixar's booth were not amused when Leo displayed his work at SIGGRAPH.

Pixar refused Leo permission to post his controversial creation on the boards and sent him a nice formal letter which said, "Although there are technical differences between the animations created on the Amiga and on our system, we feel viewers could be misled to believe otherwise, even with your disclaimers to the contrary."

So Leo created *The Dream Goes Berserk*, where an animated Boing ball (a red-and-white checkered ball that appeared in the first-ever Amiga graphics demo) juggles three unicycles, and promptly posted that to his proliferating collection of bulletin board Schwabbies.

No one knows who coined the word *Schwabby*, but Leo admits his favorite is *Robotroff*, which appears to do nothing. Says Leo, "Type ROBOTROFF, and you get your prompt back, when in fact it has forked itself into the background and is bidding its time until finally a little robot comes out and attacks your pointer. The Grunt and the Enforcer destroy your pointer; then the Hulk pushes it off the screen."

#### Enter Reichart and Disney

SIGGRAPH '87 was a turning point in the life of Leo, for it was here that he first met the enigmatic Reichart von Wolfshield, his Dungeon Master for the last two years. It all started out quite innocently. One day Reichart described his idea for an onionskin animation program in the classic Disney style. Says Leo, "He asked me if I could program it. I thought about it for about five seconds and then said, 'Sure!'" So began two years of intensive programming with grave sacrifices, such as missing DEVCON, the conference for Amiga hackers, and even the Renaissance Faire.

Dragon Master Leo, the terror of the bulletin boards, had finally met his match in *The Animation Studio*'s designer Reichart von Wolfshield. Adds Leo, "Reichart's like this: He'll walk up to you, and he'll say, 'You are one of the most creative, competent people I've ever met. You've done great things; you are doing great things; you will continue to do great things; and you are an amazing person and a credit to the human race. But don't you dare forget for one damn minute that I'm better than you are!'"

The product of Leo's collaboration with Reichart was, of course, *The Animation Studio*. Says Leo, "I've always been fascinated with motion, moving stuff on the screen, but I wanted to spin cubes around as opposed to animating Mickey Mouse, which is screwy considering the program I wrote." And while Leo feels that the program still has some rough spots, his accomplishments (along with his wardrobe) have rightfully earned him a permanent place in Amiga lore: Bols Ewhac, Amiga wizard *extraordinaire*. >









### Onionskin

A traditional animator draws on onionskin paper set on top of a light box. After finishing a drawing, he or she lays the next piece of onionskin over the first and uses the lines of the first drawing that show through as a guide to draw the next. Similarly, *The Animation Studio's* Pencil Test displays three previous drawings in ascending shades of gray along with your current drawing. This is the single best feature in the program; it works like a charm. You can adjust the brightness of the cels that show through to make drawing complex characters easier.

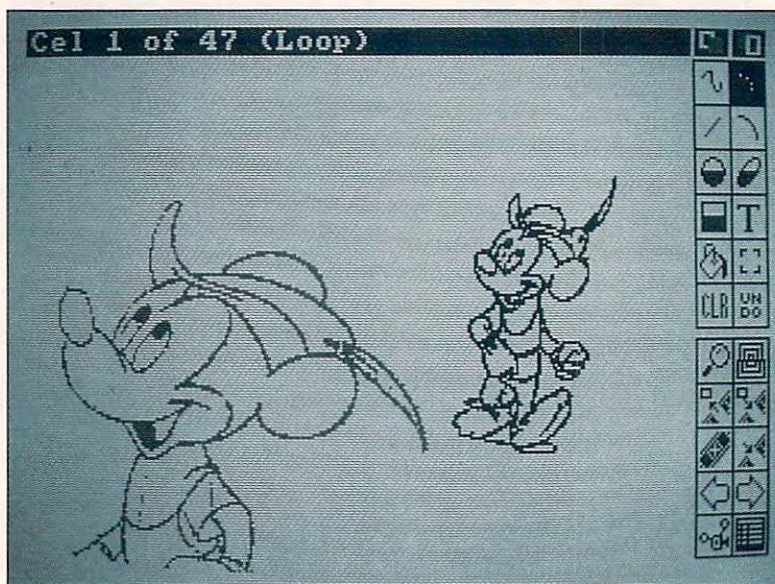
Pencil Test is strictly a black-and-white drawing program, while the Ink and Paint section adds color. The Pencil Test toolbox provides the usual freehand, line, and shape tools for drawing, with the notable lack of a polygon tool. Pencil Test works in all resolutions including overscan, but the circle tool has a few problems. In lo-res interlace, it makes flattened circles, and in hi-res noninterlace, it makes heightened circles.

Custom brushes can be picked up, sized, and rotated, but the custom brush pickup has a strange quirk. After unselecting a custom brush, you end up with no brush at all. Instead of reverting to a single-pixel brush, you have to manually pick up one pixel from your drawing. Strange.

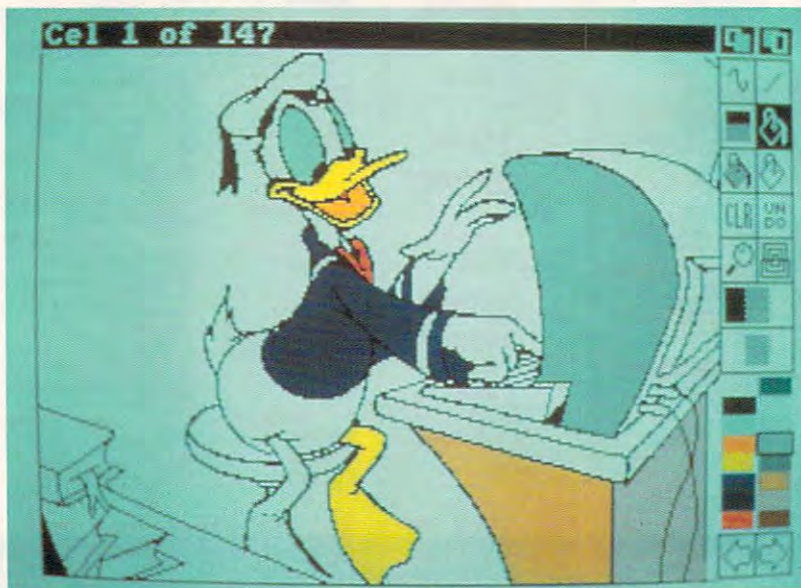
There are the usual text and magnify tools, as well as four cel-edit tools. Unfortunately, there's no undo option for the Delete Cel gadget, which is directly over the Go Back One Cel gadget. One careless click, and instead of going back one cel, your current drawing has gone to Siberia forever. Ouch!

As with *DeluxePaint III*, Pencil Test allows you to play your animations by rapidly flipping through each frame. This part of the program offers good flexibility, with frame rate settings from 1 to 30 frames per second. However, *The Animation Studio* doesn't have utilities for SMPTE synchronization or single-frame animation controllers, which limits its usefulness for professional animators.

Saving animations to disk is dreadfully slow. A 61-frame animation that took 34 seconds to save in *DeluxePaint III* took a glacial 2 minutes and 7 seconds to save in Pencil Test. Both programs were saving the animation in standard ANIM format. ▶



The Pencil Test module shows changes in the three previous animation frames by using an onionskin technique, just like pro animators.



Donald gets some color from *The Animation Studio's* Ink and Paint mode, which can dither colors and superimpose background art behind the animation.



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The Animation Studio's proprietary CFAST animation format saves as fast as *DeluxePaint III*, but CFAST files can't be read by other programs.

### Exposure Sheet

A traditional animator uses an exposure sheet to track when each word (broken down into phonemes), music, and action cue occurs within an animation. Armed with an exposure sheet, the animator creates motion that lines up exactly with the already-recorded soundtrack. This is *not* what *The Animation Studio's* Exposure Sheet does. It creates the soundtrack after the animation has been drawn instead of before.

Exposure Sheet is a text-based editor. With it you edit the order and timing of your completed Pencil Test animations and add SMUS scores, IFF, and Sonix sounds to it. Editing the order and timing of your cels is easy, but entering sound information is downright gruesome. If you're a programmer or a CLI fanatic, you can conceivably succeed at this. As a hunt-and-peck typist, my experiences with putting sounds into Exposure Sheet were uniformly frustrating.

When you enter Exposure Sheet from the Pencil Test, you emerge into a void where the only information is that you're at Frame 1, Cel 1. To create a simple sequential exposure sheet, you hit the Return key once per cel. Hitting Return 61 times to create a simple exposure sheet list for a 61-frame animation was not amusing.

The instrument format was even less amusing. On Frame 24, we wanted to play one note of an IFF slap bass sample. Exposure Sheet insists that all IFF sound files have a .instr suffix appended to their filenames. After changing the filename to slapbass.instr, we looked up the Note command format which is !NOTE ["note.instr"] [KEY value] [OCTAVE n.] [CHANNEL <num/STEREO/ALL>] [RELEASE]. Even after two calls to Disney's user support line, we never did get to hear that bass note in our animation.

Sound also poses a problem if you want to distribute your animation files. While *The Animation Studio* includes an animation player that will also play sounds, it contains licensed code and isn't freely distributable. If you plan to give away your animations, you can only include the Flick player, which doesn't support sound.

FRAME	CEL	DIAL, MUSIC, AND COMMENTS (Cel: 1)	TIME: 00:01.01
1	1	!Instrdir "Studio:SoundFX"	
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8	!SFX "Zwip.instr" Channel all	
9	9		
10	10		
11	11		
12	12		
13	13	!SFX "Low_Thunk.instr"	
14	14		
15	15		
16	16		
17	17		
18	18		
19	19		
20	20		

You arrange the order of your cels, control timing, and add sound effects using a script typed in *The Animation Studio's* Exposure Sheet.

### Ink, Paint, and Camera

Ink and Paint offers a rudimentary paint program for coloring the animations created in Pencil Test. Ink and Paint's toolbox has three basic drawing functions: freehand draw, line, and rectangle, along with three kinds of fill: flood, fill to color, and dither. The dither pattern is a simple checkerboard effect, which is most effective in hi-res interlace. Brush and variable dither fills are not supported. You can use 2-32 colors in each frame, and each frame can have its own unique palette! Unfortunately, neither Extra Halfbrite nor HAM modes are supported. Also unfortunate is that you can't transfer animations directly from Pencil Test to Ink and Paint. You must first save them in Pencil Test and then reload them into Ink and Paint.

Once you've colored your cel, the program's Camera options overlay the animation onto the background or scenery. Camera can automatically re-map foreground to background colors, and vice versa. This works well with simple backgrounds, but complex backgrounds can lead you on a frustrating trip to the guru.

One particularly annoying feature of Ink and Paint is that you can't animate from its Exposure Sheet. To see your inked animation run with its Exposure Sheet timing, you have to quit

*The Animation Studio* and load the animation into one of two players called *Flick* (without sound) or *Flicker* (with sound). Adding large areas of moving color can bog down animation playback speed. And to get back into *The Animation Studio*, you have to run the gauntlet of its manual-based copy protection, which quizzes you on words found within the program's instruction booklets.

### Conclusion

*The Animation Studio* (\$179.95) costs \$30.00 more than its chief competitor, *DeluxePaint III*. Its drawing and fill tools are vastly inferior to *DeluxePaint*, but the onionskin effect of *The Animation Studio's* Pencil Test is truly an outstanding feature. Although difficult to use, its animation editing and sound playback capabilities are powerful tools that *DeluxePaint* lacks entirely.

The bottom line is how enamored you are with Disney-style animation. The program's *User's Guide* is chock-full of hints and tips about how the Disneyites do what they do; and the sample animations of Pluto, Goofy, Mickey, and especially Donald Duck are as hilarious as they are educational. *The Animation Studio* has some rough edges—but it also has a heart of gold. □



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- #135 **Applications II** - LongMovie-plays several IFF pictures in fast succession, creating animation. QuickBase-a mail manager DBase Persmail + a DataBase for keeping records of friends, family, associates, customers or employees. MORE.
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- #151 **4 in a Row** - A fun, but challenging game you play against the computer. There is an excellent Demo "MandFXP-D3", a utility or 2 and the fun TARGET - A weirdo thingy.

- #158,159 **Sinking Island II** - Fantastic text adventure with graphics. See if you can find the treasure and escape the island before it sinks into the sea! (2 Disks).

- #161 **Sorry!** - One of the all-time favorite board games.

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# FEEDBACK

## QUESTIONS FROM OUR READERS

### Reading Amiga Joysticks

I'm programming in Amiga Basic, and I want to write a program that uses two joysticks. How can I read a joystick plugged into port 1 (the port where the mouse normally goes)?

TODD LOWELL  
ALBUQUERQUE, NM

*Amiga Basic's STICK function works for port 2 but not for port 1. Since the mouse is used to access Amiga Basic's own menus, the designers may have assumed that you would never want to unplug it from port 1. However, it's possible to read a joystick in port 1 by PEEKing a location in memory. Location 14675978 (\$DFF00A) is a 16-bit register that contains the information you need. The position of the joystick is returned in bits 0-1 and 8-9 of this location. Different bits are set to a value of 1 depending on which direction you press the joystick, as shown below.*

Right: bit 1 = 1  
Left: bit 9 = 1  
Down: (bit 0 XOR bit 1) = 1  
Up: (bit 8 XOR bit 9) = 1

*Location 14675980 (\$DFF00C) contains corresponding information for joystick port 2.*

*Amiga Basic's BUTTON function also works only for port 2. Here's a program that prints the directions and button status of a joystick in port 1.*

```
Stick1:
p1%=PEEKW(14675978&)
bit1%=p1% AND 2
bit9%=p1% AND 512
IF bit1%=2 THEN PRINT "right ";
IF bit9%=512 THEN PRINT "left ";
IF (p1% AND 1) XOR bit1%/2 THEN
PRINT "down ";
IF (p1% AND 256) XOR bit9%/2
THEN PRINT "up ";
IF (PEEK(10952895&) AND 64)=0
THEN PRINT "fire ";
PRINT
GOTO Stick1
```

*The last IF statement in the program checks the joystick button in port 1. If for some reason you don't want to use the BUTTON command for port 2, you can test that button with this statement:*

```
IF (PEEK(10952895&) AND 128)
=0 THEN PRINT "port 2 fire ";
```

### Speed vs. Compatibility

I have an Amiga 500 and wish to purchase an expansion box and an accelerator board such as GVP's 68030 board. Will it work with all of my software, or will I have to shut it off to get it to work with some programs?

CARLOS ALEJANDRO MARTINEZ BARRERA  
CANCUN, MEXICO

*First of all, most accelerator boards (including GVP's) are designed to plug into the Amiga 2000's CPU slot. And since we don't know of any expansion boxes that provide the 500 with a CPU slot, you're going to have a hard time getting the GVP board to work with your 500. However, there are accelerators available for the 500—the 33-MHz 68030 Mega Midget Racer from CSA, the 16-MHz 68020 Hurricane 500 from Imtronics, and the new 16-MHz 68000 AdSpeed from ICD. All of these boards are designed to fit inside your Amiga 500.*

*Accelerator boards work fine with most programs, but you'll find a few that must be run in 7.14-MHz 68000 mode (that is, with the accelerator board deactivated).*

*We run a wide variety of software on our 68020- and 68030-based Amigas, and the programs that we have the most problems with are arcade games. Unfortunately, the copy-protection methods used in these games prevent them from running on anything but a standard Amiga with a 68000. You see, there are certain machine language instructions and illegal programming practices (such as storing non-address data in the upper four bits of a memory pointer) that don't sit*

*well with the 68020 or 68030.*

*You might want to call the manufacturers of the programs that you use and ask them if their software is compatible with the accelerator board you're interested in. Better yet, if you have a local dealer who sells accelerator boards, bring in your most-used software and give the boards a test drive.*

### AmigaDOS Resource Project

What's ARP, and what's it useful for?

SPENCER DORM  
CHAPEL HILL, NC

*AmigaDOS has had some longstanding problems, especially prior to the release of Workbench 1.3. Because AmigaDOS was originally coded in a programming language known as BCPL and the rest of the Amiga's operating system was written in C, AmigaDOS commands—which have to work hard to communicate with both languages—tend to be slow and bulky. To solve these problems, several Amiga programmers (led by Charlie Heath of Microsmiths) banded together to rewrite the bulk of the AmigaDOS CLI commands. The result is ARP—AmigaDOS Resource Project (originally called AmigaDOS Replacement Project).*

*To make the individual commands as small and reliable as possible, the ARP authors wrote an Amiga-shared library called arp.library. This library has several functions designed to extend the Amiga's built-in dos.library (good news for programmers). The functions contained within the arp.library can be accessed by any program. All that's required is that the arp.library file be located in the libs directory of your Workbench disk.*

*One of the arp.library's most useful features is its file requester—a window that allows you to select files from disk for loading, saving, deleting, or whatever. The file requester should have been built into*



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continued from page A-14

the operating system of the Amiga from the beginning and is only now a standard feature under AmigaDOS 2.0. That's why different programs written for AmigaDOS 1.3 and earlier have different-looking (and differently-functioning) file selectors.

For the average user, ARP means smaller, faster, and more versatile CLI commands. ARP commands tend to handle wildcards better than AmigaDOS commands do (in fact, ARP commands support \* as a wildcard equivalent to the AmigaDOS #?). Following are a few size comparisons (in bytes) between the AmigaDOS 1.3 commands and the ARP 1.3 commands.

Command	AmigaDOS	ARP
AddBuffers	876	492
Assign	3008	1264
Avail	1964	692
CD	1756	580
Copy	9848	2784
Delete	6124	936

In each case, the ARP command is smaller than its AmigaDOS counterpart. For the ARP commands to work, you must have arp.library (17,100 bytes) on your boot disk in the libs directory. The latest release is version 39.1.

Many of ARP's improvements have been incorporated into AmigaDOS 2.0. In fact, ARP creator Charlie Heath wrote most of AmigaDOS's new ASL library, which provides programmers with a standard file requester, a font requester, and tools for displaying lists of information. AmigaDOS 2.0 also has the ability to use the \* wildcard.



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*With the vast improvements made in AmigaDOS 2.0, there isn't as big a need for the arp.library as there has been. But with the large number of programs that currently take advantage of the arp.library, including Amiga Resource's own V file viewer, ARP should be with us for some time.*

*If you're interested in the ARP system, you can obtain it from a user group, a bulletin board system, and most commercial telecommunications services. You can also contact ARP's developers directly by writing AmigaDOS Resource Project, c/o Microsmiths, P.O. Box 561, Cambridge, Massachusetts 02140. □*

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# PROGRAMMER'S PAGE

R H E T T A N D E R S O N A N D T I M M I D K I F F

**T**he Amiga has a powerful processor—the Motorola 68000. This chip is incredibly flexible. With this flexibility comes complexity. For example, there are several ways to clear a data register.

```
CLR.L D0
MOVE.L #0,D0
MOVEQ #0,D0
SUB.L D0,D0
```

Which is the best? Amazingly, although each instruction does the same thing (clears data register 0), each requires a different number of machine cycles to execute. The fewer machine cycles required, the faster the instruction is. In this case, the third choice is the best choice. The MOVEQ variety of the move instruction (which is limited to a small range of immediate values) is actually faster than the CLR (clear) operation. Of what use is CLR? While you can use CLR to clear out a byte or a word, MOVEQ always clears out the entire longword of a register. However, neither CLR nor MOVEQ can be used on an address register.

How about these choices?

```
MOVE.L #0,A0
SUB.L A0,A0
```

The second choice is the better one. Let's take a closer look at the instructions we've tried so far.

Instruction	Cycles	Size
CLR.L D0	; 6 cycles	2 bytes
MOVE.L #00,D0	;12 cycles	6 bytes
MOVEQ #00,D0	; 4 cycles	2 bytes
SUB.L D0,D0	; 8 cycles	2 bytes
MOVEA.L #00,A0	;12 cycles	6 bytes
SUBA.L A0,A0	; 8 cycles	2 bytes

These instruction timings were obtained from the *Program Module Analyzer* that comes with the *ADAPT* assembler system from Lake Forest Logic. You can also find instruction timings in most 68000 programming manuals. We found the sizes of the instructions by assembling one instruction at a time.

**Moving data.** Here are some general rules for using the MOVE instruction in immediate mode.

**Data registers:** Use MOVEQ if the immediate value is in range -128-127. Otherwise, use the normal MOVE instruction. Never use CLR.

**Address registers:** To move 0 into an address register, use SUB.L with the address register as both the source and destination. If the number is in the range from -128 to 127 and you have a data register that is not in use, use the following combination of instructions.

ADDQ.L #1,A0	; 8 cycles	2 bytes
ADDA.L #1,A0	;14 cycles	6 bytes
LEA 1(A0),A0	; 8 cycles	4 bytes

The first two instructions add 1000 to address register 0. Surprisingly, the load effective address (LEA) instruction is faster at addition than the standard ADDA instruction. The next three instructions in the table add 1 to address register 0. Here, ADDQ wins out. Thus, this is the rule for adding an immediate value to an address register: Use ADDQ when adding numbers within that instruction's value range (1-8); otherwise, use the LEA instruction as shown above.

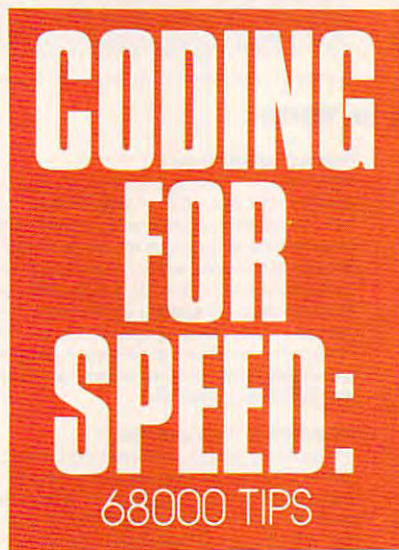
**Data arithmetic.** Here are some representative timings for adding numbers to data registers in immediate mode.

Instruction	Cycles	Size
ADDI.L #127,D0	;16 cycles	6 bytes
MOVEQ #127,D1	; 4 cycles	2 bytes
ADD.L D1,D0	; 8 cycles	2 bytes
ADDQ.L #1,D0	; 8 cycles	2 bytes
ADDI.W #127,D0	; 8 cycles	4 bytes
MOVEQ #127,D1	; 4 cycles	2 bytes
ADD.W D1,D0	; 4 cycles	2 bytes
ADDQ.W #1,D0	; 4 cycles	2 bytes

To add a number in the address-quick range (1-8), use ADDQ. To add a number in the move-quick range (-128-127), move the value into a scratch register and add it with a data-register to data-register add (note that this helps only longword adds, not word adds).

In general, replace all ADD, SUB, and MOVE immediate instructions with their quick counterparts whenever you can.

Since moving and adding are the most common 68000 instructions, these hints should help you write significantly better code. Here are a few other tricks that you might want to keep up your sleeve.



```
MOVEQ #VALUE,D0
MOVE.L D0,A0
```

Otherwise, use the normal MOVE.L instruction.

**Address addition.** Although you can't perform all of the 68000's math and logical operations on address registers, you can perform addition and subtraction on them. Here are a few timings for different methods of adding numbers to address registers.

Instruction	Cycles	Size
ADDA.L #1000,A0	;14 cycles	6 bytes
LEA 1000(A0),A0	; 8 cycles	4 bytes



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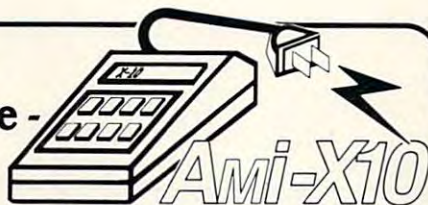
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## PROGRAMMER'S PAGE continued from page A-18

Replace ASL.L #1,D0 with ADD.L D0,D0. Replace ASL.W #1,D0 with ADD.W D0,D0 and ASL.W #2,D0 with two consecutive ADD.W D0,D0 instructions.

Avoid multiply and divide if you can. MULU takes on the order of 70 cycles. DIVU takes about twice that number of cycles. If it's practical, use a lookup table or shift instructions instead. For example, the following shows two ways to multiply D0 by 10.

Instruction	Cycles	Size
MOVE.L D0,D1 ; 4 cycles	2 bytes	
ADD.L D0,D0 ; 8 cycles	2 bytes	
ADD.L D0,D0 ; 8 cycles	2 bytes	
ADD.L D1,D0 ; 8 cycles	2 bytes	
ADD.L D0,D0 ; 8 cycles	2 bytes	
MULU #10,D0 ;74 cycles	4 bytes	

The first method uses ten bytes but only 36 cycles, whereas the second uses four bytes and 74 cycles. The former method would be best inside

loops, while the latter would be best if called only once.

**Miscellaneous tips.** The MOVEM instruction should only be used with three or more registers. Replace MOVEM.L D2/A2,-(SP) with the two instructions MOVE.L D2,-(SP) and MOVE.L A2,-(SP). Remember to pop the register off the stack in the correct order when you make this change.

Use PC relative mode if possible. This will cut down the size of your program significantly. The *Devpac* assembler from Michtron converts all instructions to PC relative mode automatically if you use the OPT A+ directive. If you use any absolute addressing in your program, *Devpac* will warn you to change an instruction like MOVE.B \$BFEC01,D0 to MOVE.B (\$BFEC01).L,D0. The results are well worth the trouble. Inovatronics' CAPE and Lake Forest Logic's new ADAPT assembler packages also have some support for PC relative mode.

Use short branches if you can. Change all JSR and BSR instructions to BSR.S instructions. Change BEQ and other branches to BEQ.S instructions. If the branch is too long, your assembler will warn you.

Know your assembler. If it changes appropriate MOVES to MOVEQs or BNEs to BNE.Ss, you won't have to worry about making the changes yourself. If your assembler manual doesn't explicitly tell you what alterations it makes, you should purchase a disassembler to find out exactly what code is being generated.

The best way to learn how to code efficiently is to try several approaches and analyze the results. But don't lose sight of the forest for the sake of the trees. First concentrate on eliminating bugs and improving your code; then worry about optimizing it. But if you know that your code is spending a significant amount of time deep in the center of a nested loop, attention to every cycle will pay off. □





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# ABSTRACTIONS

A R L A N L E V I T A N

**N**ow that "Abstractions" is part of the new improved *COMPUTE* (with secret ingredient GMI-90), there's a high likelihood that owners of other computers are reading Amiga coverage for the first time. A little background on this column is in order for the benefit of those newcomers. "Abstractions" is loosely patterned on the public executions of medieval England and France, but it lacks much of the structure and good taste associated with those sporting events.

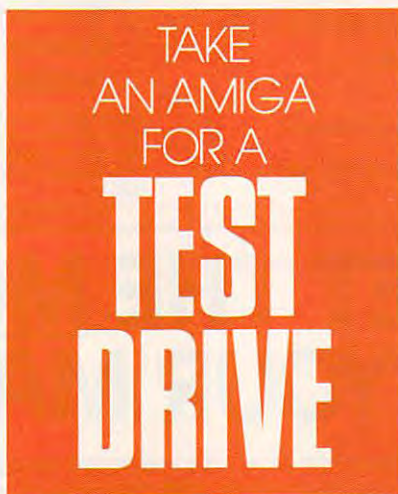
Roughly one-third of the old *Amiga Resource* subscribers are convinced that the portions of my brain devoted to logical thought processes have been surgically removed. Another third is assembling incontrovertible proof that I'm a petty functionary in an international conspiracy whose sole purpose is vilifying the Amiga and Commodore Business Machines in print. The rest know that I'm just plain ornery when it comes to computer manufacturers and purveyors of software.

As much as I enjoy micros and the people who use them, I firmly believe that the computer industry deserves the lifetime underachievement award in respect to actually delivering innovative and intuitive hardware and software for just plain folks. Home computing is getting more and more homogenized, and, for my money, the milk is starting to curdle.

Some industry observers claim that increasing standardization and the accompanying convergence of user interfaces across machine platforms will benefit the home user in the end. If you buy into that claptrap, let's meet down at McDonald's, Wendy's, or Burger King for some insanely great food, watch a few terrific sitcoms on the boob tube, and hop over to the local mega-mini-theater complex for the midnight screening of *Bill and Ted's Excellent Adventure*.

My Amiga friends (both of them) have lately taken to reminding me that I should be try to behave in a more dignified manner in print, since

it's not polite to beat up on your peer group while company's around. They've even gone so far as to suggest that this column should be used to promote and extoll the wonderfulness of eating, walking, talking, and sleeping the Amiga way. I'm afraid I'd rather eschew such evangelism and remain on the technical sidelines (hmmmm . . . guess that makes me a diAgnostic).



I will make a couple of concessions, since the in-laws have apparently moved in to stay with us and this is, after all, the Amiga section of *COMPUTE*. The rules of engagement should be slightly modified now that we're in mixed company. I might as well refrain from beating up on Commodore's public relations hacks for at least a couple of months. That should give them enough of a breather to unlock their jaws so they can switch feet. I'll try to keep a low profile until Commodore launches another Amiga advertising campaign spawned from an inadvertent mix of ethanol and Valium.

I've got some friendly advice for our new neighbors, which will likely horrify those lost editorial souls who still pray for IBM to resurrect the home computer market with the new PS/1. Before you plop down over a

thousand bucks on tired technology with a nose job, go spend time with an Amiga.

Since our new reader mix requires more even-handedness, I might as well incur the wrath of tens of thousands of fanatic Amiga fans by not even making a weak stab at telling you folks on the fence why I think you should buy an Amiga. Look, this may be the Amiga section of the magazine, but that doesn't give me a license to ignore the mechanics operating behind the quasireality of the publishing world. Spending four or five paragraphs here waxing poetic over the capabilities of Amiga computers is inherently suspect, an easy way to fill copy, and soothingly reassuring to current Amiga owners. I won't do it.

Our lives are awash with torrents of "information" intended to convince us that (a) we need widgets and (b) ACME widgets are the ones to buy. In point of fact, this column is in itself a mild eddy in the currents of persuasion.

Our media fill us with second-hand bites of information that we do not experience directly. Since we tend to blindly trust our regular sources of information, we assume that assimilating what is served up results in real knowledge. There is an implicit bond of trust between reader and information provider which all publications seek to build and maintain. The greater the trust, the greater the capacity to mold opinion.

Reviews of hardware and software in magazines are fine starting points for making purchasing decisions, but there's no substitute for first-hand experience. I don't want you to trust me. I want you to trust yourself.

If you're interested in computers, go see an Amiga and decide for yourself. Don't be deterred by negative comments from dealers who don't sell Amigas. Go see an Amiga. If you're thinking of buying an XT-class machine, check out an Amiga 500. If an 80286- or SX386-based PC clone is on your shopping list, test drive an





# ABSTRACTIONS

Amiga 2000. Power users who believe they need the muscle of an 80386 should slip on the new Amiga 3000.

Go use an Amiga. Not for 5 or 15 minutes—take 2–3 hours. If dealers won't spend a that much time with you before a potential sale, they don't deserve your hard-earned cash. Period.

Trust your own eyes, ears, and hands. If you come away from the experience with the impression that a PS/1 would better suit your needs, go buy one. You'll probably have a great time perusing IBM's new Prodigy information service.

If you already own a PC or Mac, you're as welcome here as anyone else. Keep your machine, and use it in good health. In my book, it's perfectly acceptable to use Apple and IBM machines on a daily basis for text-oriented and desktop publishing drudgery. But do yourself a favor. Before you add a CD-ROM player or new hard drive to your present system, add an Amiga to your computing stable. An Amiga 500 will cost a lot less and will widen your options and eyes at the same time.

If you own an Amiga, consider buying a Mac or a PC (oh well, here come the calls for a Holy War on "Abstractions"). This isn't the Persian Gulf, folks! You can play both sides and come out ahead of the game. Anyone who has the temerity to suggest that one size fits all can go build a house with a screwdriver.

So much for hardware flag-waving. Let's move on to mushier material. Rumor has it that the manner in which the industry measures software sales is changing radically. Most bizarre is the new MDI (Mass to Dollar Index) rating for application software. For a favorable MDI, the discounted price of the software must be less than the weight (in ounces) of the shrink-wrapped packaging. Manufacturers who want to keep their prices and profit margins up are being forced to load up on bulk. The latest release of one popular database package tips the scales at over 19 pounds. Add a handle and the product would be perfect for impromptu self-defense or power walking.

For years, telephone handsets have been routinely filled with lead shot to yield a solid heft, and the software-packaging biz has cleverly come

up with its own variation on that theme. Who cares if your terminal package's documentation is shorter than Sean Penn's temper? Slap 12 ounces of free sign-up offers for an assortment of information services in the bundle and you're playing with the big boys.

The weight wars have crossed over into the entertainment arena as well. Flight simulators are usually good for a pound and a half, but those who require heavyweight material will opt for tank simulations which average well over a deuce.

Those who can't go head-to-head on the basis of sheer poundage are opting for volume instead. Prominent among the last batch of entertainment titles I perused were a handful that may not have weighed much, but occupied three times the normal amount of shelf space. An eye-catching move, but it's rather disconcerting to excitedly shred a garishly decorated two-inch-thick package, only to find an inch and three-quarters of plastic foam, one disk and a six-page instruction booklet.

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Since it's grouse season, is anyone else growing weary of the multi-tiered code wheels used in lieu of traditional copy protection? Talk about storage problems. I've got two cross-indexed files—one for disks, the other for code wheels. The last code wheel I tried using was as much fun as a high-security padlock. It had no less than five interlocked wheels, and the pivot grommet was just enough off-center to make using it an exercise in clairvoyance. Besides, unless filed immediately after use, such devices dis-

appear into a black hole within minutes. I wonder if anyone has considered recycling old Captain Midnight secret decoder rings as a substitute for those flimsy and bulky cardboard wheels?

Speaking of games, I'd be less than forthright if I didn't comment on the disappointing quality of much of the entertainment software being released for the Amiga these days. On the other hand, I haven't been thrilled with Jack Nicholson's last few flicks either. I don't discern a lack of talent in either case; the problem is the material.

For better or worse, the display and speed capabilities of today's ubiquitous IBM clones have become the least common denominator (LCD) in the entertainment software biz. IBM's VGA and MCGA graphics are better than a poke in the eye with a sharp stick, but even pricey 386 systems lack adequate horsepower to perform the feats of animation magic supported on the humble Amiga 500.

So what's happening? Due to the sheer number of PC owners out there, the prototype versions of most of today's entertainment titles are developed for the IBM. Yesterday's clunky CGA and EGA graphics are gradually being supplanted by VGA-specific renderings, but despite their seductive look, the end products are inherently static. When the Amiga translation is undertaken, we usually end up with a straight copy of the IBM version.

There are a few notable exceptions who have managed to evade the strait jacket of the "pump code and port" strategy. Firms such as Psygnosis (*Shadow of the Beast*), ReadySoft (*Dragon's Lair*), FTL (*Dungeonmaster*), and Innerprise (*Battle Squadron*) have continued to release Amiga-specific products that steadily push the Amiga's perceived performance envelope. Their efforts deserve to be rewarded, but how long they can resist the siren song of the tens of millions of IBM PCs is anybody's guess.

On second thought, let's count our blessings. If the ubiquitous Nintendo Entertainment System becomes the LCD for entertainment software, we're in serious trouble—yesterday an adult asked me what kind of tapes I had for my Amiga. . . .

I don't think we're in Kansas anymore, Kyoto. □





## SPOTLIGHT

JOHN FOUST

There's the old joke about asking a laconic Yankee farmer for directions, and after a moment of characteristic silence, he declares "You can't get there from here."

When hoping to move bitmap graphics image from program to program or machine to machine, don't be surprised if you get the Yankee Farmer answer.

This month's "Spotlight" explores exporting Amiga images to machines such as the Macintosh and IBM PC. Last month, we covered the basics of moving files from here to there, but largely ignored the complications of actually *using* this data on foreign computers.

Sometimes there's nothing to worry about at all. For instance, Electronic Arts makes versions of *DeluxePaint* for both the IBM PC and the Amiga, and their Studio series is the Mac version of this popular product. Each program can load and save images that are instantly compatible with versions of the program on other platforms, once you've moved the file between disk formats.

Chances are, though, you won't have it that easy. Conspiracy theorists have yet to explore the latent evil intent behind the abundance of conflicting, yet seemingly similar, software standards. Apparently, software companies create their own file standards because they're so impressed with the success of other companies' standard formats. This conspiracy can make life very complicated for the computer artist. Suppose, for example, that you prefer to work in *Photon Paint*, but your client expects to receive your artwork in TIFF format for a Macintosh. Or your client has clip art in PCX format and you want to enhance it in *DeluxePaint*. Changing between proprietary formats can be a big obstacle.

As you've seen so far, image conversion involves lots of three-letter acronyms (TLAs). There's PCX, IFF, HAM, TIFF (oops, that's an FLA), MAC, IMG, and TGA. Using the English alphabet, there are only 17,576 possible TLAs. When these are

exhausted, we can start adding punctuation marks, leading to the A&\$ format, which will be all the rage by 1997.

Getting from here to there can be a multistep process. You might convert an Amiga IFF image to GIF format, then move the GIF file to a PC disk, and then use a third PC program to convert the GIF file to PCX format. If you're lucky, your picture will still resemble the original.

On the PC, if you have a hand scanner or a paint program, be sure to examine its documentation for signs that it can load and save other formats, thus shortening the number of steps in the conversion. On the Macintosh, the paint program family tree has grown a new branch for programs that clean and prepare images for desktop publishing, such as Adobe's *PhotoShop*. These programs import Amiga IFF images, but don't be surprised if they can't handle HAM and

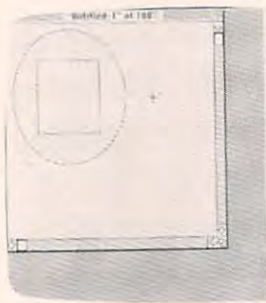


Figure 1

the latest Superhires and super-HAM variants. There's a similar incompatibility with 256-color VGA images from *DeluxePaint* on the PC. Some Amiga HAM paint programs can load them, such as Impulse's *Prism*, but the Amiga version of *DeluxePaint* won't handle 256-color pictures. It will load PC pictures with 16 or fewer colors in their palette with no problem.

If you're shopping for a program to solve your conversion problems,

don't forget public domain (PD) software. There's a good *MacPaint* translator for the Amiga called *MacView*. CompuServe's GIF format has grown popular, and PD GIF conversion tools are available for the Amiga as well as many other machines. If you can convert an image to GIF, chances are there's a way to display it on another computer. As a side benefit, GIF files are compressed to a minimum size, making them smaller than images in other formats. Another important PD tool is a screen-capture utility. Once this type of program is running, a certain magic keystroke will save the current screen to disk as an image. Again, these are available for all computers.

These PD programs might not solve all your problems. For example, you might notice that perfect circles in a *MacPaint* image look like ovals when moved to the Amiga. Beyond simple format conversion is the land of image processing.

Computers display graphics in different ways. The Amiga's high-resolution mode displays  $640 \times 400$  pixels, while an IBM PC might fit  $640 \times 480$  pixels on the same screen. Given the same amount of screen space, a computer display might use a different number of pixels in a horizontal inch than it would in a vertical inch. For example, when you load a lo-res image into an interlaced screen in *DeluxePaint*, the image is squished lengthwise because of the difference in aspect ratio between lo-res and interlace.

On the Amiga, higher resolutions double in one direction or the other, making it relatively easy to correct squished pictures. The situation is worse when exchanging images with the Macintosh. Its black-and-white screen has a different aspect ratio than the Amiga, and the problem isn't solved by doubling pixels in one direction or the other. *MacPaint* images are  $576 \times 720$  pixels, assuming 72 square pixels per inch. Displayed in  $640 \times 400$  pixels in Amiga hi-res, *MacPaint* images look slightly stretched. For the same reason, all A-





# SPOTLIGHT

Max screens look elongated. Mac monitors display square pixels, but Amiga pixels are slightly rectangular.

There are several companies rushing to help you move images from one format to another, including formats native to other machines. To varying degrees, these programs include image-processing abilities to help solve the problem of elongated images. Stretching or shrinking an image along one axis can compensate for differences in screen aspect ratio. This isn't a perfect process. Some information will be lost, meaning some pixels might be blurred. For many video-presentation applications, this is a bonus, because antialiased (blurred) pixel boundaries look good on video.

MiGraph's Hand Scanner includes *Touch-Up*, software for manipulating scanned images. Aside from some paint program features, *Touch-Up* imports Amiga IFF, monochrome TIFF, PCX, *MacPaint*, PrintMaster, and IMG files. The IMG format is native to GEM, the user interface on the Atari ST. GEM is also used on the PC, mainly by people using the *Ventura Publisher* desktop publishing software. The latest versions of *WordPerfect* on the PC import IMG graphics, too. *Touch-Up* software exports all the formats it imports, plus monochrome and dithered IFF, giving effectively 31 grays in some cases, as well as the CompuServe GIF format, EPSF encapsulated PostScript files, and hi-res mono images for *Degas*, a popular Atari ST paint program. The scanner and software retail for \$399 (MiGraph, 200 South 33rd, #220, Federal Way, Virginia 98003; 800-223-3729).

*ImageLink* from Active Circuits (106 Highway 71, Suite 101, Manassquan, New Jersey 08736; 201-223-5999) converts to and from a handful of formats, such as IFF (including HAM and 24 bit), *Sculpt* RGB, *Turbo Silver* RGBN and RGB8, Rendition (the image format used in *Caligari Broadcast*), Macintosh PICT and PICT2 bitmaps (but not included structured drawings), PCX from the PC world, CompuServe GIF, Sun Rasterfile, and, by the time you read this, TIFF. All this is \$199.95.

ASDG's *The Art Department* is based on the technology it used in its Sharp color scanner software. It has a

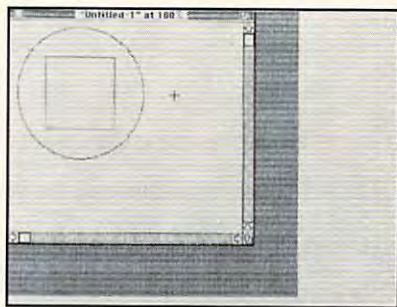


Figure 2

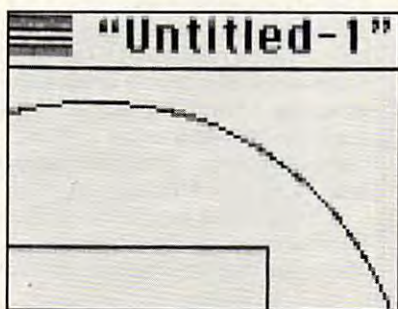


Figure 3

host of image-processing abilities, including great stretching and dithering. It can load images from many formats and convert them to Amiga IFF format. It can read and write IFF files, including Dynamic HiRes, Dynamic HAM, and Rhett Anderson's Sliced HAM, plus *Sculpt* RGB, Impulse RGBN and RGB8, and *DigiView* DV21. It lists for \$89.95. Modules for loading other formats are sold separately. (At press time, ASDG announced *Art Department Professional*, which lets you save in non-IFF formats.) The TIFF module is \$49.95; PCX is \$39.95; CompuServe GIF is \$39.95; Rendition is \$49.95; Targa is \$39.95; *DeluxePaint II Enhanced* from the PC is \$19.95 (ASDG, 925 Stewart, Madison, Wisconsin 53713; 608-273-6585).

To demonstrate how getting from here to there might work for you, here's an example of moving a Mac screen image to the Amiga, via an IBM PC. Why would someone do this? Imagine you're using the Amiga for desktop publishing and your client wants to document a Macintosh program. You need good-looking, realistic screen shots of the

client's program in action.

Figure 1 is an unretouched screen grab of a *MacPaint* picture of a circle and a square. Note that the circle looks like an oval and the square like a rectangle. (The Mac in question is actually an Amiga, running the A-Max emulator.) A screen grab desk accessory called *Camera* saved the image as a *MacPaint* file. Next, I used a Mac terminal program to send the file to a PC clone for temporary storage. After all, it would be nice to grab several images at a time and then process them en masse on the Amiga.

On the PC, I used the CONVERT utility that comes with *DeluxePaint II* to convert the image to IFF format. I copied the file to a 3½-inch MS-DOS floppy and then copied it to the Amiga using *CrossDOS*, described last month. Once in the Amiga, *The Art Department* reduced the height of the image to 88 percent of its original size, turning the two-color *MacPaint* image into a 16-color dithered image with the proper aspect ratio, as shown in Figure 2. The circle looks like a circle. Looking closely at the corrected image, we can see how the image was reduced in the Y direction and how 16-gray-shade dithering was used to smooth the jagged corners (Figure 3.)

What does the future hold? Like the Amiga's custom graphics display chips, we can expect future computers to contain chips dedicated to image compression and decompression, leading to new generations of image file formats. These will encompass realtime decompression of computer generated animations, too. If we're fortunate, these chips will reduce the popularity of obscure image formats. As another spinoff, these custom compression chips could take over much of the work of archiving and compression programs such as *PKZIP* and *LHARC*, making them faster and better than before.

On the downside, these new compression formats could leave some computers behind in the "can't get there from here" wasteland. Performing the compression magic in software might be too time-consuming for some computers. After all, that's why they switched to dedicated hardware for these tasks. In other words, don't expect anyone to emulate hardware compression in your Commodore 64 paint program. □





# CLI CLIPS

J I M B U T T E R F I E L D

**T**his column covers the whole Amiga spectrum and will continue to do so, even though some users will be upgrading to Workbench 2.0 while others choose to stay behind. Because Workbench 1.3's Shell is so versatile and convenient, I will often emphasize it. You may have noticed my hints that if you haven't upgraded to 1.3 yet, you should do so. Techniques that work on 1.3 systems will continue to work with AmigaDOS 2.0. From time to time, I'll throw in tidbits about how an AmigaDOS 2.0 system goes about certain jobs.

**Version.** Few Amiga users know about the CLI command Version, but it can be useful. Say you get a new program and notice a comment in its documentation that says *This program runs only with Workbench 34.27 or subsequent*. How can you tell what version of Workbench (or Kickstart) you have? You might have spotted these values at the time your computer started up. If not, type VERSION at any Shell prompt, and you can see them again.

But Version has more features: It can check the versions of libraries and devices for you. For example, type VERSION GRAPHICS.LIBRARY or VERSION PRINTER.DEVICE and the computer gives the specific revision number of these system elements. This way, you can tell if they're up to date. Some programs need a specific library version in order to work. There's even an option within Version that allows script files to ask questions such as *Is the narrator device version 33.2 or later?*

Your system may contain more libraries than those originally provided by Commodore. Supplementary libraries may have been added for ARP, the AmigaDOS Resource Project, or for such commercial products as ARexx and WordPerfect. Type DIR LIBS: to see all the shared libraries on your Amiga's system disk. The Version command can give you details on any of these libraries. For example, typing VERSION LIBS:TRANSLA-

TOR.LIBRARY will tell you the version number of the Amiga's voice translator library.

AmigaDOS 2.0 expands on Version's capabilities. The 2.0 Version command allows you to ask for information about commands and programs. Thus, you can type VERSION C:COPY or VERSION SYS:UTILITIES/MORE in order to get the specific revision number of these commands. Developers writing programs for AmigaDOS 2.0 can even include the version number in their code, so you may someday be able to type VERSION DELUXEPAINT4.

**Fault.** Have you ever used the Fault command? Here's a surprise: You've probably used Fault without

mand by typing RENAME C:FLT C:FAULT. Type DIR DF9: again and then click CANCEL on the requester that pops up. This time, the response is *Device (or Volume) Not Mounted*, which makes a lot more sense. We didn't type the Fault command, but the system found the command in the C: directory and used it to make its error message more understandable.

**Finding the commands.** The first word you type on a CLI or Shell line is the command—the name of a program that is loaded into memory and run to produce the action you want. Most of these programs are found in a logical device named C:, which is normally assigned to the C directory on your system (boot) disk. The directory name C stands for commands; it has nothing to do with the C computer language. A few commands may be found elsewhere; the System and Utilities directories contain commands such as Format and Say.

The S (Script) drawer contains script commands, batch files that can be executed like programs if they have the S protection bit set.

With all of these directories, how does your Amiga know where to look for the command you type at the Shell prompt? The computer keeps a list of directories called the *path* so it knows which directories to search in which order. Type PATH at the Shell prompt, and the Amiga will display a list of directories in the order they will be searched.

Not all commands are found on your disk in a directory, though. Some may have been made resident. When a command is resident in memory, it can be loaded and run almost instantly. Type RESIDENT, and you'll see a list of any such turbocharged commands.

There's one more way a command can be implemented; it may be built in. You won't find these commands in any directory, since they are built into the Shell. On Workbench 1.3, Alias is the only embedded command, but you'll see quite a few more when AmigaDOS 2.0 arrives. □

## OBSCURE AMIGADOS COMMANDS AND FINDING FAULT

knowing it. Fault is often called in by the system when you have trouble.

Let's hide this command and see what happens. Type RENAME C:FAULT C:FLT (you can only do this under Workbench 1.2 and 1.3). This changes the name of the command so that the system can't find it. We'll restore it later, of course. Now enter a nonsense command such as DIR DF9:. A requester will appear; just click on Cancel. You'll see a response in your CLI window that says *Error Code 218*, which isn't too useful unless you look up the number in the manual. Now restore the Fault com-



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# JUST FOR FUN

S H A Y A D D A M S

**A**s a Commodore watcher since the early eighties, I've had as much fun watching the company's ill-planned and poorly timed ventures as I've had playing games on its computers. True, things haven't been as colorful since Jack Tramiel left, but I still find the corporate antics amusing, from the overpricing of the original Amiga, which nearly killed it from the start, to the futile efforts to kill the C-64—the Computer That Wouldn't Die. And what was that C-128D thing all about?

So it's depressing to see Commodore finally do something right for a change. Just when I thought I could count on its usual ineptitude (you know, the kind of thinking that says, "Hey! It's Tuesday. Let's switch PR firms again!"), it comes out with the CDTV player. CDTV stands a good chance of finally coaxing the mass market into accepting computers, which hasn't happened so far because 98 percent of the public has trouble setting digital clocks and VCRs. Commodore hopes to achieve that acceptance by getting rid of the keyboard and not calling it a computer.

Because the success of a new computer hinges on the support it draws from software publishers, Commodore is partially funding development and providing technical assistance for some games. This might even pay off for people with Amigas, since a disk-based version of some CDTV games could be put together while the CD-ROM game is being converted or written.

**Accolade leads the way.** Though I contacted everyone in the wide world of sports, adventures, simulations, and every other kind of game you can name, only one company, Accolade, revealed plans to do an all-new, second-wave game for the CDTV right out of the chute. Producer Shelly Safir says Accolade is eager "to take full advantage of the power CDTV will provide, instead of just porting over something from another format." Accolade's first release will be a golf simulation endorsed by Jack Nicklaus.

You'll play on one of the courses designed by Nicklaus himself, and Accolade executives are already running up huge expense accounts as they check out golf courses around the world in search of the best site for the game.

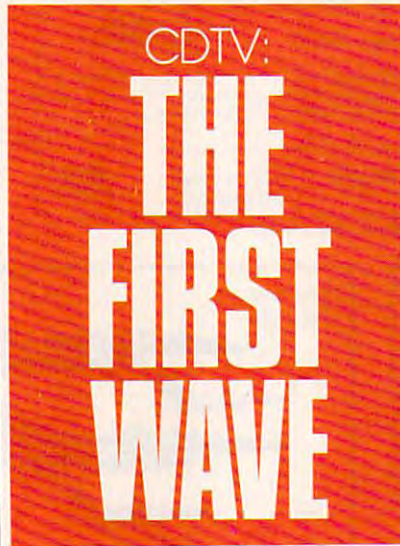
"Through CDTV, we feel we can provide people the closest experience possible to actually being on the golf course," Safir explained moments after returning from Tahiti. Peter Doctrow, Accolade's head honcho of product development, elaborated on the possibilities as he prepared to catch the Concord for the Bahamas: "We'll probably use live footage as much as possible. If Jack's available, we'll use digitized images of his swing, and he'll offer audio tips. Thanks to the CDTV's tremendous storage, we'll

"The prospect of what could be done is very broad—suddenly you take games out of the realm of a stream of data and put them into the realm of an emotional experience, something people can be more involved with. And due to [CDTV's] location in the home, it will be more of a family experience."

**Making waves at Cinemaware and Origin.** Cinemaware looks like another surefire CDTV supporter. Most of its highly visual interactive movies are perfectly suited for the keyboardless environment. Cinemaware's first Amiga game, *Defender of the Crown*, has been out in CD-ROM format in Europe for two years, so it has a good lead on most of the competition.

According to Cinemaware's Jerry Albright, *Defender of the Crown* and *TV Sports Football* are good contenders to become the company's first CDTV games. Albright figures we'll see two waves of CDTV games. The first will be like Cinemaware's European *Defender of the Crown*, which is essentially an enhanced version of the computer game with genuine voices and music. He predicts this wave will start rolling in by Christmas. Next year we'll witness the second wave, which will incorporate live TV and film footage. *It Came from the Desert*, with its monster-movie motif, is a natural for this treatment. And we'll see brand new games in the second wave, not just conversions.

CD-ROM has been making waves in Japan since last year, when people started queuing in *Ultima I, II, and III* on a CD-ROM computer called the FM Towns. Development for this 80286-powered computer was done by Japanese programmers, but Origin will now be developing CDTV products in Austin, Texas. The first Origin products should be *Ultima VI* and *Wing Commander*. An Amiga version of *Ultima VI* had already been planned, and the advent of CDTV most likely means we'll see that sooner than we would have otherwise. *Wing Commander*, Origin's spectacu-



be able to provide images we couldn't do on a regular disk drive." While this game, due out in the spring, could be ported to the Amiga, it would be a significantly different product. "You'd need at least 15 floppies," says Safir, and even then the game still couldn't reproduce all the CDTV visuals.

Accolade has discussed other games with Commodore, but future releases depend on the public's response to CDTV. According to Safir,





# JUST FOR FUN

lar space game, had not even been on tap for an Amiga conversion, so the CDTV player can be thanked for this bonus. These are likely to fall into the first-wave category, with both tentatively set for release in the fall of 1991. And you can expect more. Greg Malone, who wrote Origin's *Moebius* and *WindWalker*, says, "The kind of fantasy worlds we create are well suited for CDTV, which gives us the room we need for greater detail, vaster environments, and a greater range of interactive possibilities."

Interplay is another leader in fantasyland development, and producer Troy Worrell says, "We believe CD-ROM is the future; it's the way the technology is going." And *Battle-Chess*, with better sound and music and some improved graphics, will be available on the CDTV player by Christmas. *Dragon Wars*, just out for the Amiga, might be converted next year. Interplay is also planning games designed specifically for CDTV, games that will incorporate digitized film footage or video instead of computer animation.

**Lucasfilm and Sierra.** No announcements were forthcoming from Skywalker Ranch, so I can only speculate on that company's plans for CDTV. Its representatives refused to say a word "until the official press release is released to the press," a clue that something is up. First-wave remakes of *Loom* and the Indiana Jones adventures are likely. But look for Lucasfilm to exploit a unique advantage it has over other software developers, the one found in the last syllable of the company name—film. With access to so much footage from the Indy films and other projects, CDTV is a natural for Lucasfilm; unlike other companies, it won't have to spend a fortune shooting live footage to digitize and splice into the games.

Among the most stalwart supporters of the Amiga this year, Sierra On-Line has no clear-cut plans for CDTV. But gonzo PR man Kirk Greene says the company's policy regarding this new format is, "If it's CD-ROM, we're doing it." With its CD-ROM versions of *King's Quest V* and *Mixed-Up Mother Goose* for MS-DOS computers, Sierra has practically paved the way for the format.

*Space Quest IV* is also being writ-

ten for CD-ROM, though, like the others, it is for MS-DOS machines. What Sierra has done with it for MS-DOS machines is remarkable. Those cartoon-style graphics seen in previous animated adventures have been replaced with cinemagraphics—digitized, Disney-esque scenes painted by a staff of 60 artists now slaving away at Sierra's rustic high-rise in the California mountains that gave the company its name. They're the closest thing yet to true interactive movies, and the characters' lips are even synchronized with their dialogue. *Space Quest IV* and *King's Quest V* will arrive for regular Amigas next year, and a sequel to *Hero's Quest* is on the way.



Origin's *Wing Commander* should be available for CDTV in the fall of 1991.

## A NUMBER OF COMPANIES ARE WAITING TO SEE IF ANYONE ACTUALLY BUYS A CDTV BEFORE THEY SUPPORT IT

**Wait and CDTV.** A number of companies are waiting to see if anyone actually buys a CDTV before they support it. Brøderbund's Jessica Switzer says, "When we were at CES, it seemed like a fantastic machine. We don't have anything for it right now, but we are looking into it." From an outside source, I hear Brøderbund has already scheduled an educational game, and I'm betting it will be a Carmen Sandiego adventure.

Strategic Simulations is also taking a wait-and-see approach. It has been

slow to bring the *Advanced Dungeons & Dragons* games to the Amiga, probably because it's relying on UBIsoft in Europe to do the conversions. MicroProse does Amiga conversions mainly for Europe and is not planning anything for CDTV. Data East says it will convert *Drakkhen* next year.

**The voice of doom.** The most negative note has been sounded by former Amiga supporter Electronic Arts, whose Stuart Bonn (a vice president and overall head of development) says, "We have bigger opportunities that are more interesting and less risky. There's no need to rush in." Those opportunities are cartridge-based games for the Sega and Nintendo videogame machines, to which EA has shifted so much of its talent and time. (But if videogames are so hot, why is Nolan Bushnell, godfather of the Atari 2600 machine, working with Commodore on CDTV?)

Electronic Arts is not only ignoring CDTV but has also dropped all development for the Amiga, C-64, and Apple II computers. It's going to be an MS-DOS and videogame world, according to its current visions of the future. [We contacted Electronic Arts and were assured that Amiga development is continuing full-steam, with over 13 new titles and conversions in the works.—Ed.] Should CDTV score big this Christmas, however, Bonn says EA will "revise our position. We can respond very quickly." (Didn't Custer say the same thing right before riding out for the Little Big Horn?)

**Commodore promises.** Perhaps Commodore will follow through quickly on its promise of a press release listing the games and other software titles scheduled for CDTV. All the company had to do was get it approved by two departments and cleared by legal in three days. As a veteran Commodore watcher, I know better than to keep an eye on the mailbox. But perhaps next month I'll be able to tell you about even more games on the way for CDTV.

Maybe we'll even know whether Commodore actually got the machine to the stores on schedule. Regardless, I have at least managed to add a few more words (*CDTV*, *cinemagraphics*, and *Disney-esque*) to my spelling checker, so I can finally shut this thing down and get back to playing games instead of talking about them. □





# ART GALLERY



## AFRICAN GIRL

Dan Bradford

Baltimore, MD

This unique combination of digitized images and freehand art was created on a 3MB Amiga 500 with the help of NewTek's Digi-View digitizer. "Although the images are complete in themselves," says artist Dan Bradford, "I often use these types of compositions in large paintings."

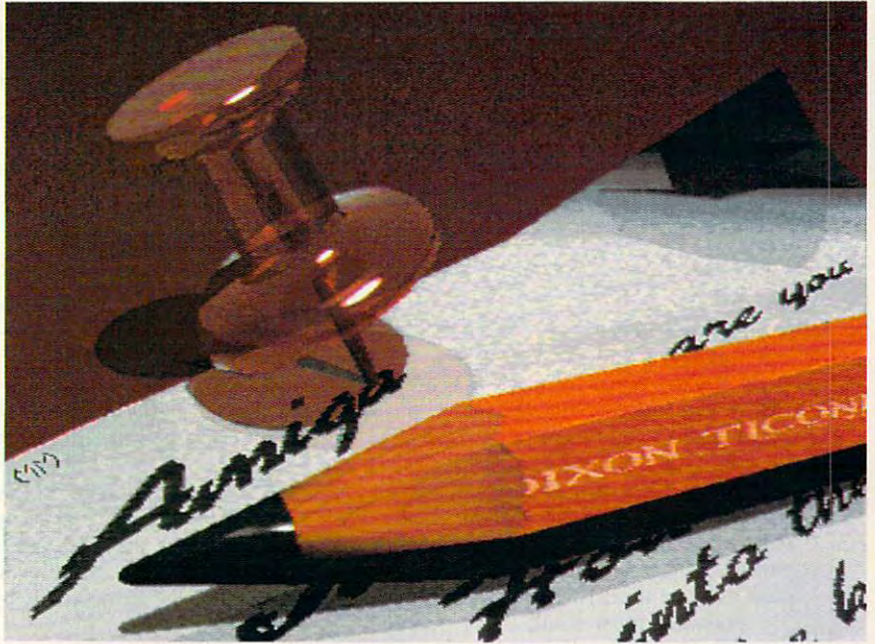


## PUSHPIN

Mike Malloy

North Hollywood, CA

*Pushpin* was created on a 3MB Amiga 500 armed with a 20MB Supra hard drive. To create the three-dimensional pin, pencil, and paper, Mr. Malloy used *Sculpt 4-D*. The text was then created and turned perspective using *Deluxe-Paint III*, and the entire picture was brought together in *Photon Paint 2.0* using 320 X 400 HAM mode.



## SUFI DANCER

Charles Morpheus

Bedford, TX

*Sufi Dancer* was drawn using *Photon Paint 2.0*. Regarding the picture's name, Charles Morpheus admits, "*Sufi Dancer* is really called . . . and we lost ourselves in the dance, but that wouldn't fit in the Amiga's string gadget." Mr. Morpheus is an artist of the Invisible College, a small multimedia co-op whose goals include the integration of video, music, hermetic philosophy, quantum theory, and brainwave entertainment.

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# TAKING SIDES

R H E T T A N D E R S O N v s . R A N D Y T H O M P S O N

**OUCH!** It all started with IBM. Decades ago, when you bought a mainframe computer from IBM, Big Blue set up the computer, maintained and serviced it, and wrote your software. At the time, a computer cost so much that software expenses were a drop in the bucket. People got used to the idea that software was cheap and hardware was expensive. That's not true any more. Hardware prices have gone down, and software prices have gone up.

Software must stand up to ever-growing standards. It costs a lot of money to produce a commercial program. The days of photocopied documentation and plastic-bag packaging are over. The Amiga market is small enough that every software developer is taking a risk when he or she puts half of a year (or more) into a single product. It must be disheartening when the developer finally ships the product and then sees three or four "clones" of the program show up within a matter of weeks.

Granted, these derivative products may not always be as slick or useful as the original, but when a computer user has a chance to download *RGB Exchange* for free or to buy *ImageLink* for \$199.95, it's clear that *ImageLink* is going to lose some of its potential customers.

Where did all this shareware come from? The Amiga took a long time to grow into a healthy market. Publishers found out that they couldn't make much money in the Amiga market, so they abandoned it. Desperate Amiga owners could find software only by downloading it from bulletin boards and by copying club disks and Fred Fish PD disks. Amiga owners ended up with an astounding number of modems.

On the Amiga, shareware and public domain software have run amuck. That's not to say that there's no place for these programs. The problem is that they're enough of a force (along with software piracy) to hurt the commercial software market.

Obviously, I can't blame the programmers who take their time out to produce this software for the benefit of all Amiga owners. I don't have a solution to the problem. But that doesn't mean it's not a problem. It is—just ask your friendly neighborhood software developer.

Looking over at Mr. Thompson's side, I read that shareware is "try before you buy" software. It's more like "use instead of buying" software. Amiga owners are used to getting their software for free. That devalues the work of programmers and promotes piracy. You see, with shareware, both the user and the programmer lose out. Maybe that's why the Amiga's biggest problem is software.

**DON'T BE RIDICULOUS!** When the Amiga first came out, something interesting happened. People wrote software.

I'm not talking about big corporations creating commercial programs that sold for half your paycheck. These were real computer enthusiasts, like you and me, who saw the Amiga's potential and wrote software for the computer because they wanted to. And instead of selling their programs to the highest bidder, many Amiga programmers

uploaded their work to telecommunications networks and distributed disks through user groups. These programs, referred to as public domain and shareware, were either given away or sold for a nominal charge.

As hard as it is for a non-MS-DOS computer to make it in today's marketplace, the contribution made by public domain and shareware authors went a long way to help sell the Amiga. No one wants to buy a computer that doesn't have any software, and thanks to the grass-roots support of early Amiga programmers, the Amiga had (and has) plenty.

The Amiga is older now, and things have changed. Many commercial software companies are supporting the Amiga, and lack of software isn't that big of an issue. But shareware is still strong and still important.

Shareware, which works on the honor system (you use the program

for a while, and if you like it, you send the author the requested donation), provides Amiga users with the unique opportunity to "try before you buy"—something we can all appreciate.

In the shareware system, both the user and the programmer win. The user can obtain software for just a few dollars, and the programmer has an inexpensive means of distributing and selling his or her software without releasing all rights to a commercial distributor.

Best of all, shareware software keeps commercial developers on their toes. It gives them a bit of competition, forcing manufacturers to sell truly commercial-quality programs instead of quick-and-dirty hacks. In effect, this mild competition has raised the quality of Amiga programs, and in my opinion, that's good.

Looking over at Mr. Anderson's side, he once again displays his uncanny knack at finding something wrong with everything. Yes, some commercial software sales are hurt (albeit minimally) by shareware clones, but commercial software—with its dealer distribution channels and magazine advertisements—clearly has the upper hand in the sales race. As with life, shareware may have its problems, but it's definitely *not* hurting the Amiga. □

COULD  
SHAREWARE BE  
**HURTING  
THE  
AMIGA?**





# 64/128 VIEW

T O M N E T S E L



was the night before Christmas,  
when all through the house  
Every creature was stirring with  
joystick or mouse.

The 1541 was humming, but its speed was a bore;  
I knew by the wait it had to be a Commodore.

The kids were all snuggled by the monitor's bright glow  
While multicolored sprites danced to and fro.  
I'd just settled down for a long winter's nap,  
Waiting for *Rambo* to load and some bad guys to zap,

When out on the lawn there arose such a clatter,  
I glanced at my drive to see what was the matter.  
I could tell by the glare of its steady red light  
It was still sending data; at least it was all right.

I ran to the window, banged my head on the sash  
(The kids continued to play and ignored the loud crash),  
When what to my watering eyes did appear  
But a miniature sleigh and eight tiny reindeer.

With a little old driver who handled his team  
As lively and smoothly as machine language routine.  
Though they looped through the heavens, he was never  
space sick,  
Yet I get quite queasy just debugging BASIC.

His eyes—how they twinkled; his waist was not slim.  
For a moment he reminded me of a Butterfield named Jim.  
He shouldered his pack, though it was quite a chore,  
Then trod 'cross my lawn and burst open the door.

I gasped in amazement (he no doubt thought me a jerk),  
But he ignored us completely and went straight to his work.  
He placed gifts 'neath our tree after clearing a place;  
The kids—paying him no heed—blasted aliens from space.

He brought *Bard's Tale*, and *Krynn*, *Seven Cities of Gold*—  
Great software titles, both new ones and old.  
There was *SuperBase* and *EasyScript*, and what did I  
detect?  
There was even a hard drive from the folks at Xetec!

He unpacked extra RAM, CPUs, and such things,  
Plus a mysterious black box that made my floppy drive zing.  
Then a wrapped gift he handed me; it wasn't a weighty one,  
But I knew in a moment 'twas a new 1581!

Modems and monitors he pulled out of his sack  
And even a plotter I made him take back.  
But one gift he gave me I couldn't dispute:  
A lifetime subscription to the revamped *COMPUTE*.

The jolly elf chuckled as he made for the door.  
But he stopped, turned, and asked if there was any-  
thing more.  
I booted up *SpeedScript* on my wife's 128  
And dashed off a missive, praying I wasn't too late.

Though it's scratched, dinged, and dented, and sometimes  
quite slow,  
My 64's a delight that others should know.  
'Twould be such a pity to walk into a store,  
Only to be told, "It's not made anymore."

So before Santa left on this magical night,  
I pressed a note in his hand and squeezed it real tight.  
"Take this message to Commodore in West Chester, PA.  
It says, 'Keep the 64s coming, guys, at least through next  
May.'"

"Now, Dasher! Now, Dancer! Now, Prancer and Vixen!  
On, Comet! On, Cupid! On, Donder and Blitzen!"  
Up to the garage-top the coursers did loop  
And turned a neat figure eight past our basketball hoop.

As they flew to the north past my satellite dish,  
I was hoping that Commodore would grant my last wish.  
But even if it didn't, I was still brimming with cheer  
Because finally tonight I'd learned the names of those deer.

*Rambo* was still loading on my old 64  
As I reentered the house and closed the front door.  
A carol was playing on our stereo SID,  
And the kids were apologizing for something they did.

I went to the window and gazed into the night,  
But something caught my attention and gave me a fright.  
Santa's last gift rested there on the sill.  
I opened it up; 'twas a credit card bill.



*If Clement C. Moore had access to a 64 and a good word  
processor, no telling how "A Visit from St. Nicholas"  
might have turned out. Happy holidays and my appologies  
to Mr. Moore.*





# NEWS & NOTES

## Not Dead Yet

Upon hearing a rumor that he was dead, Mark Twain once quipped, "The reports of my death are greatly exaggerated." Similar rumors abound about the demise of the 64, and they've been circulating throughout user groups across the country and in their newsletters. In order to seek out the truth, Gazette contacted Charles Russell, Commodore's national marketing manager for consumer electronics, and put the question to him. His answer was almost as succinct as Twain's: "The 64 is in production and still going as usual."

TOM NETSEL

## A Little Help from Our Friends

A further indication that there's still life in the 64 is a new service Commodore has announced for its 8-bit computer.

Commodore Express, a Commodore/Federal Express joint venture, offers a 24-hour toll-free "helpline" and door-to-door customer service for owners of the 64 and Commodore's MS-DOS-compatible Select Edition computers. This protection service was introduced earlier in the year for Amiga 500 owners.

Commodore Express is part of a new customer service package designed with the home computer user in mind. It offers free pick-up and return delivery for in-warranty repairs, plus free telephone assistance to help users set up and operate their computers. The Commodore Express contact number is (800) 448-9987.

According to Tom Kilcoyne, Commodore's director of consumer marketing, in the first two months of the program, 75 percent of the incoming calls were serviceable over the telephone, and the average turnaround time on Federal Express pick-up/delivery has been 48 hours.

TOM NETSEL

## Meanwhile, Back in the Dungeon

*Dragons of Flame* is the most recent release for the Commodore 64/128 from Strategic Simulations.

The second Advanced Dungeons & Dragons action game to take place in TSR's Dragonlance game world, *Dragons of Flame* (\$19.95) challenges you to save the world of Krynn from Takhisis, the Queen of Darkness. You lead eight "Companions of the Lance" through the land of Dragonlance, acquiring valuable allies in your quest.

*Dragons of Flame* is available from Electronic Arts (1810 Gateway Drive, San Mateo, California 94404), distributed under its affiliated label program.

LIZ CASEY



*The Magician*, by Jack Modjallal (DocJM) of Encino, California, is this disk's Picture of the Month. Enjoy it and the rest of the fine pictures found only on the Gazette Disk.

Welcome to "Gazette Gallery." Each month the *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay \$50 for each piece of art we accept and an extra \$50 for the one selected as Picture of the Month. (You retain the rights to your work.) Send your original 64/128 art in Doodle, Koala, or any other popular format to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Greensboro, North Carolina 27408. Enclose a self-addressed, stamped disk envelope if you want your submission returned. We want to see your best work today!



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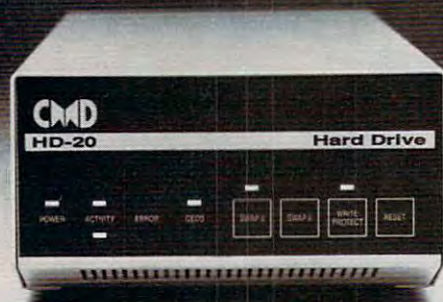
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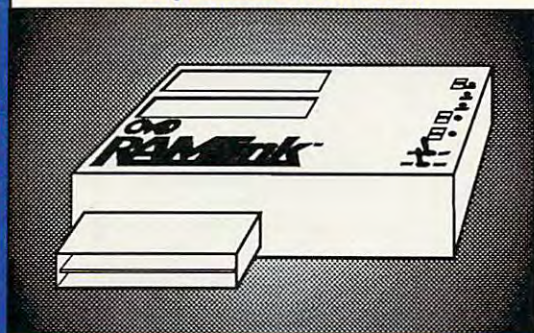
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**D**esktop publishing and the 64? Anyone who has performed professional-level desktop publishing could be excused for doing a double-take. The fact is that the 64 only has one drawback when it comes to placing graphics and formatted text on paper: its severely restricted memory.

In the days when the 64 was first introduced, memory was not a problem. Most programs were text-based and RAM-frugal. New users were grateful to have any graphics capability at all. A lack of memory is the root cause of much of what is good and bad about the 64. On the one hand, there isn't much room for storing data and code when they aren't in use, which means that they must reside on disk. On the other hand, tight memory restrictions make programmers more efficient. Sloppy programmers don't last long in the Commodore arena. They quickly move on to the world of the PC, where owners are programmed to add megabytes of memory at a whim. The 64 has no space to waste. ▶

ROBERT BIXBY



While the memory continues to be a roadblock, the processor is a good one. Most people unfamiliar with the Commodore 8-bit line have missed out on the fact that the 6510 is actually a very capable chip.

One solution to the RAM problem is geoRAM, which was reviewed in these pages about a year ago. Scantronik's *Pagefox*, a desktop publishing package newly imported from Germany, takes a similar approach by providing an additional 100K of RAM for its own use. *Pagefox* avoids yet another of the 64's drawbacks by coming etched in the ROM of the same cartridge that contains the expanded memory. This avoids the necessity of loading the program from the escargotesque Commodore disk drive.

*Pagefox* is not a single program, but like all other desktop publishing programs, it contains several modules, including a good monochrome graphics package, a text editor, and a formatter that can integrate graphics and automatically format text into columns.

### A Professional Look

If you're really a fan of desktop publishing on the 64, Scantronik offers two other options that have the potential of making your efforts look professional: a hand scanner and a character editor, known respectively as *Handscanner 64* and *Character Fox*.

A scanner is a device that can import text and graphics directly into a computer. It's different from a digitizer like *ComputerEyes* in that it does not require a camera. It is used primarily for importing two-dimensional images, while a digitizer can be used with three-dimensional subjects.

A hand scanner is not used to scan hands, as one person suggested, though it could be used for that. It's called a *hand scanner* because it's small enough to fit in a person's hand. Most professional-level scanning units look like photocopiers or fax machines. They generally take up a lot of desk space and scan whole pages at a time. A hand scanner is about twice as big as a mouse. It's perfect for use with the 64 because it will only scan an image about four inches wide and a few inches high—which quickly fills all available memory in the 64. Larger images can be scanned by reducing the scanner's sensitivity, but these images are usually unrecognizable.

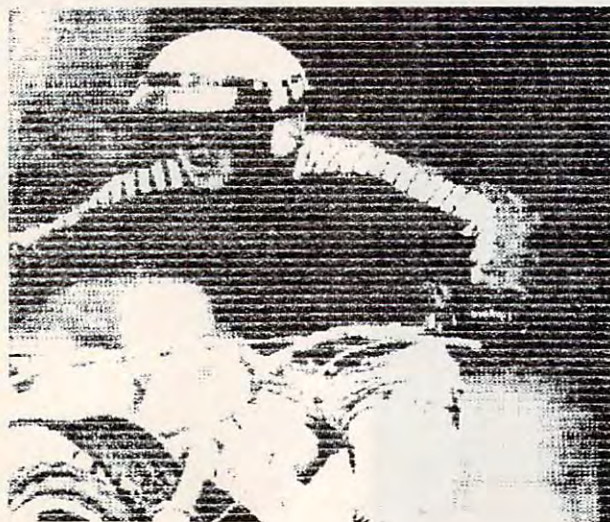
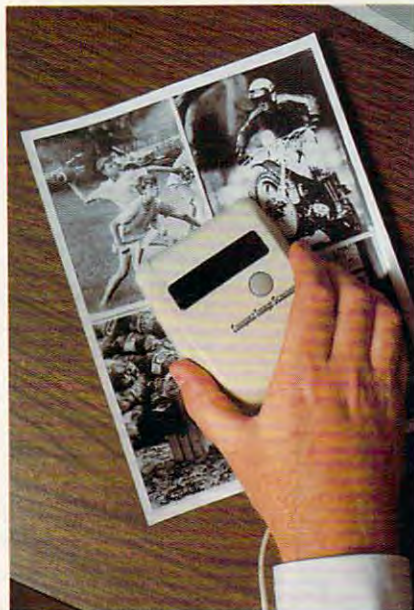
The hand scanner and character editor will be dis-

cussed later. For now let's look closely at *Pagefox*.

### Design a Page

To be blunt, when I sat down with *Pagefox*, I didn't find it as intuitive as *geoPublish*, but with a little practice, I found I could accomplish some of the

PASS THE SCANNER OVER A PHOTOGRAPH, CHECK THE RESULTS, AND THEN PRINT IT.



same tricks while avoiding the overhead of loading GEOS. *Pagefox* occupies a middle range between *geoPublish* and *Outrageous Pages*, another page-formatting program that, despite its capabilities, actually lived up to its name by outraging many of its users and was quickly withdrawn from the market.

One of the things that made *Outrageous Pages* difficult to use was its idiosyncratic user interface. *Pagefox* also takes a tremendous risk by asking users to forget everything they know about operating system interfaces and start learning a new one. It's more than some people can bear. In my opinion, now that GEOS is widely used, programmers should turn to it and stop reinventing the wheel. Every new program shouldn't require reeducation.

On the other hand, *Pagefox* didn't just suddenly appear, as did *Outrageous Pages*. The heart of the program was available in different German versions known as *Printfox* and *Hi-Eddi*, so the designer has had a chance to shake out the bugs in the European market. In this latest version, the operation is fairly smooth. In fact, many of my criticisms of *Pagefox* have to do with its incomplete translation from the German version. This will be covered later.

*Pagefox*, true to its name, is geared for designing the single page. It's capable of chaining multiple pages at print time, but each page is discrete. There's no way to flow text from a column on one page to a column on another without creating discrete text files.

*Pagefox* contains a complete text editor, though it can only work with files of up to 9000 characters. The reason is, as the manual points out, "More than 9000 characters you won't get on one page." (The page size is 640 × 800 pixels—enough to fill a standard sheet of paper.)

The text editor sports search-and-replace. The search-and-replace supports wildcards, identified as *jokers* in the manual. There's no insert mode; the text editor is locked permanently in overwrite mode. The delete key is a true delete key, like on the PC. It draws in characters from the right of the cursor and deletes them. The f7 key is used as a backspace/delete key, erasing characters from the cursor to the left.

*Pagefox* also features a Caps Lock key similar to that found on the PC



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continued on page G-8

keyboard. The program accepts imported text in ASCII, PetASCII, and screen code format as used by *Speed-Script*. If your word processor supports any of these formats, you won't need to use *Pagefox's* text editor for your text.

The program provides good-looking close quotation marks ("), but it has no way to enter open quotation marks ("). Where you might expect to find open quotation marks, you will find close ones lowered to the baseline.

*Pagefox* can do some limited hyphenation, though the manual is unclear on this point. Evidently, if you want a hyphen to appear in the middle of a word, you must capitalize the letter before which the hyphen may fall. When the word is printed out, the capitalization is removed and, if the word falls in the hyphenation range at the right margin, it will be broken according to your wishes. There is another method, using a dictionary-style hyphenation and embedded codes, that doesn't appear to be as reliable as inserting capital letters at paragraph breaks. The manual states in more than one place that the automatic hyphenation is based on German grammar, so if you happen to be writing in some other language, hyphenation (or "syllabification") may not work.

### Translate That Again

To do the program justice, the manual needs to be translated into real English instead of the pidgin English in which the German translator left it: "But even with all these simplifications you won't be able to control within [sic] minutes such a complex and efficient [sic] program like the *Pagefox*. Especially as a beginner for DTP you will need a few hours time to become well acquainted with the different program parts, before you are able to print out your first pretentious work."

Any of us who have read the instructions provided with Pacific Rim stereos, watches, and calculators can follow the meaning of this kind of text, though the awkwardness and idiosyncrasies of the translation will probably make the user smile for a while. Then, the user begins to go crazy. The effect of reading page after page of text that ignores syntax and is ignorant of the English idiom is like having your skull half-full of ginger ale.

Desktop publishing is so complicated, even at its simplest, that a friendly, lucid manual is a minimum requirement. (That's another reason for my preference for *geoPublish*.) In the words of the manual, "This is especially with the C 64 are not so easy. . . ."

### A Foxy Editor

*Character Fox* is a character/font editor. It contains an editing field familiar to those who have worked with sprite and character editors. Its manual is written in an interesting way: The author takes on the persona of the program, explaining its actions as if they were his own.

*Character Fox* can work with images scanned with the hand scanner (described below), allowing you to im-



port text from a book, magazine, or clip-art collection, modifying it into your own typeface. This one capability is enough to recommend it. I only wish the creator of these programs had made them GEOS-compatible so the fonts would be applicable beyond the world of *Pagefox*.

### Handyscanner 64

As mentioned earlier, scanning is a method for bringing real-world art and text directly into the computer. There are three basic types of scanning equipment: a flat-bed scanner that resembles a photocopy machine, a page-fed scanner that resembles a fax machine, and a hand-scanner that resembles a mouse with a severe thyroid condition.

The Handyscanner 64 allows you to scan small images. It operates with software that closely resembles the graphics part of *Pagefox*. The scanner itself emits a greenish light from a bank of LEDs (Light-Emitting Diodes). When you press the scan button on top of the scanner, the lights become a little brighter. Since these LEDs would represent a significant power drain on a 64's power supply, the scanner comes with its own power transformer. The scanner attaches to the user port of the 64 with a small interface device, into which you also plug the power cord from the transformer.

With the power cords from your computer, disk drive, monitor, printer, and hand scanner, you should think seriously about investing in a multioutlet surge-protector power strip, if not rewiring your computer room to provide a dozen outlets at your desk.

The scanner can be set to scan in pure black-and-white with no attempt at shading, or to provide one of three

levels of dithered shading. Dithering is a technique of approximating a shade of gray by placing random dots in the area. A darker area has more dots; a brighter area, fewer dots.

In addition, Handyscanner provides you with separate brightness and contrast adjustments. Unlike many hand scanners, the scanner itself offers no dot-per-inch setting. This is set through the software. You can set any sensitivity between 33 and 300 dots per inch (dpi), but any sensitivity less than 200 dpi will provide a very poor scan.

The Handyscanner provides a simple, handy way to import real-world images into the 64. I was skeptical that the Commodore's graphics capabilities were up to handling scanned images. I work a great deal with scanned images on the PC. They take up a lot of disk space and are time-consuming to manipulate. Furthermore, a hand scanner is tricky; you have to pull it down the page at a perfectly uniform speed and in a perfectly straight line to prevent distortion. To my surprise, Handyscanner provided consistently good scans despite my shaky hands and a sticky scanning surface. The hardware must cope with minor inconsistencies better than the Logitech scanner I am accustomed to using.

The software associated with the Handyscanner compresses the images efficiently, although interpreting the scanned image and bringing it up on the screen take several seconds.

### Conclusions

When I bought my 64, my plan was to use its graphics and text-editing abilities to save myself the labor of endlessly recreating graphics and rewriting text. It worked better than I had imagined. If I had also been able to bring real-world images into the machine, I would have been ecstatic. The foundation of the value of *Pagefox*, in my estimation, is the Handyscanner. Other, better, alternatives exist in word processing, graphics, and desktop publishing than *Pagefox*. But, as far as I know, only one scanning alternative is available for the 64—the Handyscanner—and, since it only works with *Pagefox* and *Character Fox*, it makes these products worth having as adjuncts to its power. □

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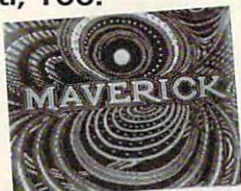
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# PROGRAMMER'S PAGE

R A N D Y T H O M P S O N

**T**his month I've compiled some reader tips that are sure to catch your attention. I like to call them *dazzlers* because of their flashy, graphic appeal. Try a few and see what you think.

## Flash!

After running the following program, all shifted characters displayed on the 64's screen flash wildly. By taking advantage of the computer's extended color background mode, this machine language routine toggles the characters' background colors, making the letters appear to flicker and glow.

```

MQ 100 FOR I=679 TO 758:READ D
      :POKE I,D:NEXT
PB 110 SYS 679:POKE 251,1:POKE
      252,6:POKE 253,3 :POKE
      53281,0:POKE 53280,0
XF 120 POKE 53283,15
BE 130 PRINT "{CLR}WITH THIS PR
      OGRAM ANY {YEL}SHIFTED
      {CYN} CHARACTERS"
JJ 140 PRINT "{11 SPACES}ARE HI
      GH L I G H T E D "
BD 150 REM POKE 251,SPEED OF F
      L A S H
KB 160 REM POKE 252,COLOR 1
QG 170 REM POKE 253,COLOR 2
HK 180 DATA 120,169,192,141,20
      ,3,169,2,141,21,3,173,1
      7,208,9,64
PS 190 DATA 141,17,208,169,0,1
      33,162,88,96,165,162,19
      7,251,240,3,76
SB 200 DATA 49,234,173,252,3,2
      01,1,240,4,201,2,240,17
      ,165,252,141
FJ 210 DATA 34,208,169,2,141,2
      52,3,169,0,133,162,24,1
      44,225,165,253
SC 220 DATA 141,34,208,169,1,1
      41,252,3,169,0,133,162,
      24,144,208,2
  
```

You can change the speed at which the letters flash by POKEing a value 0-255 into memory location 251 after running the program. The lower the value, the faster the characters flash—except in the case of the value 0, which is the *slowest* setting possible (1 is the fastest).

To change the background color of the flashing characters, POKE two different color values into locations 252 and 253. The machine language

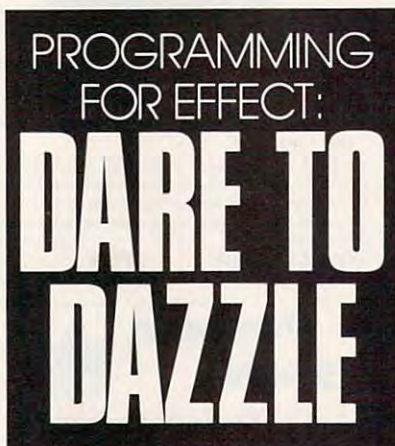
routine will alternate between these two colors to create the flashing effect.

You can easily disable the flashing by turning off extended background color mode. Turn it off with POKE 53265,PEEK(53265) AND 191. If you want the effect to run again, turn it back on with POKE 53265,PEEK(53265) OR 64.

JOEL SUDQUIST  
STERLING HEIGHTS, MI

## Screen Scrambler

Here's a routine that scrambles and then clears your computer screen. It works by decreasing the value of each



character's screen code until all of the characters turn into spaces. It's an eye-catching way to remove information from the screen, and it works with the 64 and the 128 in 40-column mode.

```

MS 10 AD=4864
QQ 20 FOR I=0 TO 49:READ D:POK
      E AD+I,D:NEXT
GS 30 DATA 169,4,133,251,160,0
      ,132,250
FJ 40 DATA 132,252,177,250,201
      ,32,240,15
AX 50 DATA 162,1,134,252,201,0
      ,208,2
QC 60 DATA 169,33,170,202,138,
      145,250,230
KQ 70 DATA 250,208,231,230,251
      ,165,251,201
KF 80 DATA 8,208,223,165,252,2
      ,01,0,208
QH 90 DATA 207,96
  
```

After you've run the program, execute SYS 4864 to clear the screen. For the best results, get a bunch of characters on the screen first. For such a simple concept, the effect is really quite impressive.

By default, this program stores its screen-clearing machine language routine in memory at 4864-4913. By changing the value assigned to AD in line 10, you can move the routine to any 50-byte area of free memory. Just remember to change your SYS statements to reflect this change. For example, if you move the routine into the 64's cassette buffer located at 828, you must enter SYS 828 to invoke the screen scrambler.

STACY OLIVAS  
GRAHAM, WA

## 128 Screen Split

For an interesting example of scrolling the 128's split graphics screen, type in and run the following demo program. Don't clear the graphics screen before you run the program. In fact, it's best if you turn the computer off and then on again before entering the listing.

```

PH 10 GRAPHIC 2,0,0
EB 20 FOR I=48 TO 249
QS 30 POKE 2612,I
QG 40 NEXT
MR 50 FOR I=249 TO 48 STEP -1
QA 60 POKE 2612,I
RJ 70 NEXT
QF 80 GOTO 20
  
```

This program opens a hi-res graphics screen and smoothly scrolls it down over the text screen and back up again. It does this by altering memory location 2612. This location holds the raster number used by the interrupt routine that controls the GRAPHIC 2 and GRAPHIC 4 split screen.

STEVE SCHOWIAK  
GIESSEN, WEST GERMANY

"Programmer's Page" is interested in your programming tips and tricks. Send all submissions to Programmer's Page, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We'll pay \$25-\$50 for each tip we publish. □



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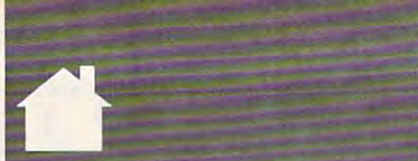
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# BEGINNER BASIC

L A R R Y C O T T O N

**H**appy holidays! In the past few months, we sharpened our BASIC skills with a program that demonstrated how to create and control a sprite, or Movable Object Block. The 64 is not restricted to a single sprite, however; it can simultaneously maneuver up to eight sprites in BASIC.

When dealing with more than one sprite, things get a bit more complicated. Before we actually create some sprites in shapes that are appropriate for the season, here's what we have to do:

- Create shape data for the sprites.
- Tell the computer where to look for the data.
- Locate the sprites horizontally and vertically.
- Determine their sizes.
- Assign them one or more colors.
- Turn them on.

Last month's program contained 63 pieces of data which defined our single sprite's shape. For each additional sprite shape, 63 more pieces of data are required to be POKEd into memory registers.

In addition, you must tell the computer where to look for the data. Memory registers 2040-2047 are the eight sprite data pointers; they tell the computer in which memory registers the sprite shape data can be found.

When we located sprite 0's shape-defining data from 12288 to 12350, we POKEd 2040 with 192. The sprite data pointers and their corresponding data locations are detailed below.

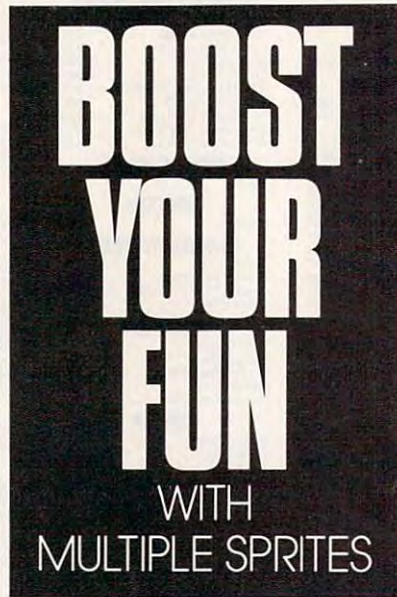
Sprite	Data Pointer	Value	Data At
0	2040	192	12288-12350
1	2041	193	12352-12414
2	2042	194	12416-12478
3	2043	195	12480-12542
4	2044	196	12544-12606
5	2045	197	12608-12670
6	2046	198	12672-12734
7	2047	199	12736-12798

Each sprite doesn't need unique data; one may share the data of another.

If you want, say, sprite 7 to have the same shape as sprite 0, you would POKe 2047 with 192.

When you're working with three sprites or fewer, there are other popular locations in which to put sprite shape data. When you use them, the same pointers are used, but different values are POKEd there.

Sprite	Data Pointer	Value	Data At
0	2040	13	832-894
1	2041	14	896-958
2	2042	15	960-1022



This month we'll begin a short program for the 64 that should give you an understanding of how to handle more than one sprite. Be sure to save lines 10-90 because we'll add to them next month. First clear the screen and color the screen white:

```
10 PRINTCHR$(147):POKE53280,1:POKE53281,1
```

Next, because we'll use sound with our sprites (since the 64 is so musically gifted, I almost always include sound in my programs), we must clear the sound-producing chip and set the

maximum volume, envelope, and a frequency for voice 3. These have been discussed in previous columns.

```
20 FORT=54272TO54295:POKET,0:NEXT:POKE54296,15
30 POKE54277,8:POKE54278,255:POKE54287,3
```

Read in the sprite shape data:

```
40 FORJ=12288TO12350:READD:POKEJ,D:NEXT
50 DATA0,16,0,0,0,0,0,16,0,0,56,0,0,124,0,0,254,0,0,56,0,0,124,0,0,254,0,255
60 DATA0,3,255,128,0,254,0,1,255,0,3,255,128,7,255,192,15,255,224,0,56,0,56
70 DATA0,0,254,0,0,0,0,0,0,0
```

Because we're using only one sprite shape (I won't tell you what it is yet), we can point all eight data pointers to the same data (from 12288 to 12350).

```
80 FORT=2040TO2047:POKET,192:NEXT
```

Define constants:

```
90 V=53248:X=157:Y=129:K=255:V1=54276:VF=54273:M=79
```

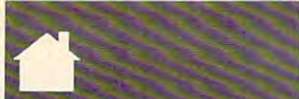
V is the important first memory register of the 64's sprite-controlling chip. Many other registers will be addressed as an offset of V. X and Y are the starting horizontal and vertical coordinates for all eight sprites. V1 and VF are voice 1's control and high-frequency registers, respectively.

We'll stop here for this month. Next month I'll explain M and K and finish the program.

Now, you may recall that way back in March I challenged you to send me some examples of programs that use NOT. Thinking that the mailbox wouldn't yield many responses, I shrugged off NOT as a keyword of minimal interest.

I was wrong. Apparently, there





# BEGINNER BASIC

are those of you who actually use NOT in your BASIC programming. Several people wrote to explain how they use the NOT statement in various ways. Thanks for the feedback, which I always welcome.

Walt Schumacher, a computer teacher at St. Ferdinand School in Florissant, Missouri, sent in perhaps the clearest and best documented use of the NOT logical operator. He writes:

"My use of NOT stems from seeing its real-world analogy: the ON/ OFF push button. To utilize this function, one must be aware that on Commodore machines, 0 stands for false, and -1 stands for true. I used this feature recently to toggle between upper- and lowercase for a keyboard practice program."

Here's a slightly revised version of Walt's program.

```
10 BIG=0:CASE=53272:UP=21:DOWN=23
20 PRINT CHR$(147)
30 FOR T=1 TO 11:PRINT:NEXT
40 PRINT TAB(10)"WATCH THIS MESSAGE!
150 BIG=NOT BIG:REM TOGGLE
160 IF BIG THEN POKE CASE,UP
170 IF NOT BIG THEN POKE CASE,DOWN
180 FOR DELAY=1 TO 400:NEXT
190 GOTO 150
```

Line 10 defines the variable BIG and the constants CASE, UP, and DOWN. In the 64 and 128, memory register 53272 controls, among other things, whether your monitor or TV screen displays upper- or lowercase lettering. POKEing 21 (UP) or 23 (DOWN) to that register determines whether the computer prints in upper- or lowercase, respectively.

Lines 20-40 clear the screen, center the cursor vertically on the screen, and print a message.

Line 150 contains the ON/OFF toggle switch. BIG takes turns having the value 0 or -1. If BIG is 0, for instance, NOT BIG changes it to -1, and vice versa.

Lines 160 and 170 evaluate BIG and alternately POKE 53272 with either 21 or 23. If BIG=0, the message switches to lowercase; if BIG=-1, the message switches to uppercase. Thanks, Walt, for shedding more light on NOT. ☐

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# D'IVERSIONS

F R E D D ' I G N A Z I O

**E**ight years ago I wrote a column in *COMPUTE!* magazine detailing how people could program their own "computer friends" inside their home computers. A computer friend was a program written in BASIC. When the program began running, the friend would come to life inside your computer and have a conversation with you. You could name the friend, teach it your name, and give it personality traits, special interests, and lovable quirks. You could even program the friend to tell your favorite jokes.

The idea for a computer friend came from my habit of naming my cars. Over the years I have gone through several cars, each with its own name (like George, Eric the Orange, Mishy Kiku, and Peppy) and each with its unique personality. I began thinking that if cars could have names and personalities, then so could computers. You can decorate your car and give it a personality all its own, so you should be able to program a computer to act as your friend.

I was also inspired by a famous artificial intelligence (AI) program called *Eliza* written by MIT computer scientist Joseph Weizenbaum. When you sat down at the computer, *Eliza* would act like a psychoanalyst trying to get to know a new patient. The session would start with *Eliza's* asking you some friendly questions, such as *What is your name?* and *Do you have any brothers or sisters?*

You would type in answers, and *Eliza's* questions would start getting more and more personal. Before you knew it, you would be telling "her" all sorts of extremely private things, such as how you felt about your mother and father, if you had ever been mean to your cat, and other secrets. Even world-famous computer scientists would sit down and begin chatting with *Eliza*, telling her embarrassing personal tidbits that they wouldn't dare share with another human being.

In my column I challenged *COMPUTE!'s* readers to invent their own computer friends. The readers'

response was unbelievable. I received hundreds of letters and over five dozen disks in the mail, each with its own customized "Friend" program written in BASIC and each with its own special design. Many of the programs printed out a picture of the computer friend. Some of the computer friends were good at reciting poetry, puns, and odd bits of trivia. Others had a special knowledge of comic-book heroes, offbeat movies, science-fiction books, and rock music.

Each time I ran one of the readers' friend programs, I felt I was meeting a new person, and in a funny way I knew that the friend was a reflection

## MAKING FRIENDS WITH COMPUTER AGENTS

of the human who invented it (just as my cars were a fun house-mirror reflection of me). I came to think of the computer friends as if they were sidekicks of their inventors, like the dummy Charlie McCarthy and his creator Edgar Bergen or Kermit the Frog and Jim Henson.

I wrote several columns featuring many of the best computer friends that readers sent in. Interest in computer friends was high for many months, but eventually it faded.

Recently a new type of computer friend has become popular. These new friends are called *agents*. An agent is a program, as the computer friend was. Its job is to "live" inside your computer. Whenever the computer is turned on, the computer agent does special chores for you.

What chores does an agent do? It can automatically sign onto your online information services and bulletin boards and assemble a personalized electronic newspaper for you out of news stories and data it has collected overnight, concerning topics especially interesting to you. It can print out this newspaper, and you can read it at the breakfast table before you leave for school or work.

What else can an agent do? If your computer were wired into some household appliances, your agent could do things like shut the house lights off and on when you wanted, start coffee brewing in the morning, or turn on the VCR and TV whenever your favorite program came on. It could play your stereo system, print out messages to remind you of your best friends' birthdays, and even play games with you.

Thanks to the growing popularity of agents, it's time to take another look at computer friends. What kind of agent or friend would you invent? Would your agent have human characteristics, or would it resemble an animal, a robot, an alien, or something completely different? What sorts of tasks would you assign to your agent? What machines would it control for you? Would your agent have a name? A fictitious past? Some favorite computer jokes? Would your agent be reliable and trustworthy? Or fickle and unpredictable? Would it be fun-loving and a practical joker or an awful nag?

Please send me your ideas. I'll gather a few of the best ideas and publish them in one of my upcoming columns. Mail your letter to Fred D'Ignazio, *COMPUTE!* Publications, 324 West Wendover Avenue, Greensboro, North Carolina 27408.

Meanwhile, be on the lookout for real computer agents living inside your machine. According to software publishers, agents will be designed into most of the new computer programs reaching the market in the future. When you buy a piece of software, you'll get a free, built-in agent along with it! □



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# MACHINE LANGUAGE

J I M B U T T E R F I E L D

In its favor, the Commodore 128 comes with a built-in machine language monitor (MLM) with many attractive features. If a program crashes, just hold down the Run key and press the reset button. The computer will recover into the MLM so you can investigate the cause of the problem. The BASIC SYS command allows values to be preset for the A, X, Y, and status registers. BLOAD and BSAVE are big BASIC improvements.

On the negative side, 128 BASIC can relocate. Also, special code and new system calls are needed to reach data or a subroutine across banks. The interrupt has so many jobs—such as graphics, animation, and sound—that it's easy for new code to conflict with built-in operations.

The bank system makes it hard to put code higher than location \$3FFF. Beginners are advised to place ML programs below \$4000 and stay in bank 15. That way, you can SYS to the ML program from BASIC and use a JSR to call subroutines in the Kernal.

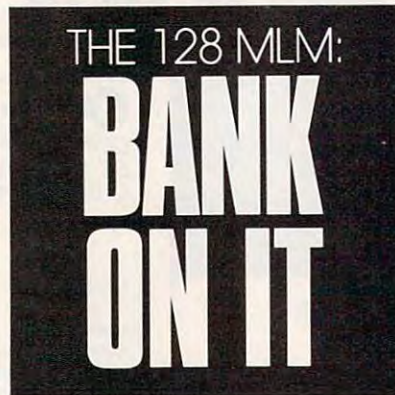
What happens if you try to put code at higher addresses? Suppose you wish to locate a program at \$6000. The trouble is that, if BASIC stays in its normal bank 15 state, a call to \$6000 (SYS 24576) wouldn't take your program to RAM but to the overlaying ROM containing the BASIC interpreter. Bank 15 configures RAM from \$0000 to \$3FFF, ROM from \$4000 to \$CFFF, I/O chips from \$D000 to \$DFFF, and ROM from \$E000 to \$FFFF. The program at \$6000 wouldn't be visible.

The obvious solution—enter the command BANK 0 before the SYS call—usually ends in disaster. The SYS gets to your program, but when your program calls a Kernal routine such as BSOUT at \$FFD2 for printing, the ROM's gone! Instead, the program arrives at empty RAM in Bank 0 and gets lost. Even if you somehow transfer valid program code into that area, you can't achieve output since

the I/O chips are no longer accessible.

What you need is a configuration that will give you RAM from \$0000 to \$BFFF, Kernal ROM from \$C000 to \$CFFF and \$E000 to \$FFFF, and I/O chips in the \$D000 to \$DFFF slot. No bank number gives you this; bank 12 is sometimes used to produce a similar effect, but it's not the best way.

You can produce the desired configuration by a direct store to address \$FF00; a value of decimal 14 stored there will do the job. But you can't do that from BASIC. That powerful POKE to address \$FF00 would make the BASIC interpreter itself disappear!



The solution is to use BASIC to select BANK 0 to make your program visible so you can SYS to it. Once the program starts, it puts \$0E into address \$FF00, reconfiguring to the desired map. It's a good idea to restore the configuration to Bank 0 just before the program returns to BASIC, so BASIC will be there waiting when control is returned to it, thus preventing a crash. Bank 0 can be restored by storing \$3F into \$FF00.

Here's a simple 128 program to print HELLO! to the screen just to show how a program may be positioned above the \$4000 barrier. BASIC will have set up BANK 0 before the call to \$6000 (the program's location). The program's first task is to make sure the Kernal ROM and I/O chips are accessible.

```
6000 LDA #0E ;"special" config
6002 STA $FF00
6005 LDX #00
6007 LDA $6018,X
600A JSR $FFD2
600D INX
600E CPX #07
6010 BNE $6007
```

The string HELLO!, followed by a carriage return, is printed from a buffer to be established at \$6018. Now restore the original configuration (bank 0, value \$3F in \$FF00).

```
6012 LDA #3F ;restore config
6014 STA $FF00 ;("BANK 0")
```

You return to BASIC with the RTS command. It seems a little odd that you can go back to BASIC when the Bank 0 configuration has switched out the BASIC interpreter. Don't worry. The mechanism of the SYS call takes care of all the bank arrangements.

```
6017 RTS
```

The text to be printed ("HELLO") must be stored in memory.

```
6018 48 45 4C 4C 4F 21 0D 00
```

It takes a while to get used to the architecture of the 128, but with careful planning it all works well.

You could enter the program using the built-in monitor, but here's a BASIC program to do the job.

```
100 DATA 169,14,141,0,255,162,0
110 DATA 189,24,96,32,210,255
120 DATA 232,224,7,208,245
130 DATA 169,63,141,0,255,96
140 DATA 72,69,76,76,79,33,13
150 BANK 0
160 FOR J=24576 TO 24606
170 READ X:T=T+X
180 POKE J,X
190 NEXT J
200 IF T<>3605 THEN STOP
210 BANK 15
300 BANK 0
310 SYS 24576
320 BANK 15
```

□



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# FEEDBACK

## QUESTIONS FROM OUR READERS

### A Dynamic Loader

Recently, I was going through one of your back issues and found a program similar to the one below.

```

CE 10 POKE 184,2:POKE 185,0:PO
KE 186,8
KG 20 INPUT "FILENAME";NS:IFLE
N(NS)>16THEN20
FQ 30 INPUT "STARTING ADDRESS"
;S:IFS<0ORS>65535THEN30
KG 40 POKE 183,LEN(NS):POKE 18
7,0:POKE 188,2
XK 50 FOR I=1 TO LEN(NS):POKE
{SPACE}511+I,ASC(MID$(NS
,I,1)):NEXT I
XK 60 POKE 780,0:POKE 781,S-IN
T(S/256)*256:POKE 782,IN
T(S/256)
CE 70 SYS 65493:IFST<>64THENPR
INT"FILE NOT FOUND"

```

It POKEs a few numbers into memory and then SYSs to an address. When I run it, it loads a program into a selected memory area.

I've seen programs similar to this one in other magazines. Could you explain to me the principles behind this program and how it might be used?

JERRY HALLETT  
STOCKTON, NY

*The program uses the Kernal LOAD routine to load a file beginning at a specific address. The three POKES in line 10 set the logical file number, secondary address, and device number as you would for an OPEN command. (The equivalent OPEN command would be OPEN 2,8,0.) Lines 20 and 30 request the filename and the file's starting address from the user. The first POKE in line 40 sets the length of the filename, and the other two represent the address (512) of the filename in low-byte/high-byte format. Line 50 actually stores the filename in locations 512-527.*

*Line 60 sets the 6502's registers to prepare for calling the Kernal LOAD routine. The first POKE sets the accumulator to 0 to tell the routine to perform a load. (Placing a 0 in the accumulator would cause the routine to verify.) The next two POKES store the low and high bytes*

*of the starting address into the X and Y registers, respectively. Line 70 calls the Kernal routine and then checks for an error after it has returned.*

*You didn't mention a save routine in your letter, but we've included one to demonstrate how to call the Kernal's SAVE routine from BASIC.*

```

QH 10 DV=8:INPUT "FILENAME";NS
:OPEN15,DV,15:OPEN1,DV,1
,NS+"P,W"
JA 20 INPUT#15,EN:IFEN<>0THENP
RINT"DISK ERROR":GOTO70
FQ 30 INPUT "STARTING ADDRESS"
;S:IFS<0ORS>65535THEN30
SR 40 INPUT "ENDING ADDRESS";E
:IFE<SORE>65535THEN40
KS 50 POKE 193,S-INT(S/256)*25
6:POKE 194,INT(S/256)
PE 60 POKE 174,E-INT(E/256)*25
6:POKE 175,INT(E/256):SY
S62957
KM 70 CLOSE1:CLOSE15

```

*Line 10 inputs the filename from the user and attempts to open it. Line 20 checks to see whether the open was successful. Lines 30 and 40 get the starting and ending addresses for the file from the user. Line 50 sets a pointer to the starting address while line 60 sets the pointer to the ending address and calls the routine. Line 70 closes the file after the save.*

### Big CPU in the Sky

In your recent article "Into the Crystal Ball" (June 1990), many people blamed software companies or the market for the declining interest in the 64. They blamed everything except what's really wrong. It's hardware, not software or the market. The main problem is that the 64 isn't attractive anymore. The 64 has already died and gone to the big CPU in the sky.

I've had a 64 for close to ten years, but it lacks hardware capabilities. It should be taken into the factory and given a total overhaul. When it comes out, it should have 256K of ROM, an operating system that takes up minimal space in memory, a faster

CPU, 64K or 128K of video RAM, a ramdisk, and a built-in program that would still let it run conventional 64 software.

It may sound like I have MS-DOS in mind, but the 64 has to have some sort of hardware enhancement and a true operating system.

C. SYMONDS  
BECKENHAM, W.A.  
AUSTRALIA

### No Joy

I am writing out of sheer frustration regarding your MLX program. I have tried to enter this program with and without *The Automatic Proofreader*, and in both instances line 130 gives no joy. Please help!

It is also noted that *The Automatic Proofreader* program printed in my December 1989 *Gazette* is different from the ones printed after. I have tried to load both, and only the December one works. The big question is, is it me or my overgrown calculator?

ALAN CULPH  
MOOROOLBARK, VIC.  
AUSTRALIA

*Alan, we checked line 130 of MLX with several versions of The Automatic Proofreader, and we got the correct checksum with all of them. The handwritten sample you provided was missing an equal sign after the L\$, but we have no way of knowing whether it was absent from your typed-in version or not.*

*Line 130 does contain several points for possible confusion. Where it says \$\$=" ", there is one space between the quotation marks. It is typed by pressing the quote key, the space bar, and then the quote key again. Where it says T\$="{13 RIGHT}", press the quote key and then tap the right Crsr key 13 times before pressing the quote key again. If you press the space bar 13 times, the final result may be the same but your checksum will be different. Be sure to read and familiarize yourself with the instructions on how to type in *Gazette* programs. >*



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The Automatic Proofreader has undergone several revisions over the years, and it was changed slightly in January 1990 when we dropped reference to the Plus/4 and 16 computers. It works the same as the earlier version, but you must be careful to enter it correctly since the Proofreader can't check itself.

### So It's Your Birthday!

I am 72 and not at all interested in games, but I'm having trouble with a program that shouldn't be too complicated for you smart young fellows. I have a list of 86 names, addresses, and birthdays from my mailing label program, and I'd like a utility to go through the data and select the names and birthdays of all the people born in a particular month. It would be nice to have it print them to the screen or printer.

DON SHEA  
LAKE CITY, FL

Here's a simple program that should do what you want, Don. It reads six pieces of information from data statements about each person. The first name, last name, address, phone number, and birth date are all single items; but notice that the city, state, and ZIP code are also listed as one item. For the program to work properly, make certain that you have six entries separated by commas for each data statement. Use a space if you need to leave an item blank.

Once you've entered your data statements, change the value of MAX in line 10 to equal the number of names on your list. Our sample program has only two people; therefore, MAX=2. If you have 86 names on your list, then MAX=86.

```
GM 10 MAX=2:DIM AS(MAX),BS(MAX),CS(MAX),DS(MAX),ES(MAX)
```

# FEEDBACK

```
),FS(MAX),MS(12)
GE 20 FORX=0TO11:READMO$(X):NEXT
PK 30 FOR X=0TOMAX-1:READ AS(X),BS(X),CS(X),DS(X),ES(X),FS(X):NEXT
FE 40 PRINT"{CLR}{WHT}{3 DOWN}ENTER MONTH (EXAMPLE:JAN)":INPUT M$
FD 50 IF LEN(M$)>3 THEN 40
MF 60 PRINT"{2 DOWN}PRESS (P)FOR PRINTER OR "
PQ 70 PRINT"{7 SPACES}(S)FOR{SPACE}SCREEN OUTPUT"
ME 80 GET P$:IF P$=""THEN 80
PB 90 FORX=0TO11:IF M$=MO$(X){SPACE}THEN 120
MH 100 NEXT
CM 110 GOTO40
KM 120 FOR X=0TOMAX-1:IF LEFT$(FS(X),3)=M$ THEN GOSUB 170
XJ 130 NEXT:PRINT "{2 DOWN}{RVS}PRESS ANY KEY{OFF}"
ER 140 GETAS:IFAS=""THEN 140
CR 150 GOTO40
BG 160 REM ** PRINT ROUTINE **
KB 170 IF P$="P"THENOPEN4,4:CMD4
SX 180 PRINT:PRINT
RJ 190 PRINT"NAME:{2 SPACES}";AS(X);";";BS(X)
XD 200 PRINT"ADDR:{2 SPACES}";CS(X)
BK 210 PRINT"{7 SPACES}";DS(X)
CD 220 PRINT"PHONE: ";ES(X)
PP 230 PRINT"B'DAY: ";FS(X)
RA 240 IF P$="P"THEN PRINT#4:CLOSE4
SG 250 RETURN
SX 260 REM ** NAMES **
PC 270 DATA JAN,FEB,MAR,APR,MA Y,JUN,JUL,AUG,SEP,OCT,N OV,DEC
PF 280 DATA JOHN A.,DOE,RT 1 B OX 123,SILER CITY NC 27 344,555-0123,AUG 31
KD 290 DATA JANE B.,EDWARDS,RT 2 BOX 334,PLANT CITY F L 32055,555-9876,JAN 10
KC 999 DATA JAN,FEB,MAR,APR,MA Y,JUN,JUL,AUG,SEP,OCT,N OV,DEC
JS 1000 DATA JOHN A.,DOE,RT 1 {SPACE}BOX 123,SILER C ITY NC 27344,555-0123, AUG 31
EM 1001 DATA JANE B.,EDWARDS,R T 2 BOX 334,PLANT CITY FL 32055,555-9876,JAN 10
```

### Scanning for Scanners

I would like to know if you can help me with a question. I would like to know if there are any companies out there that make scanners that are compatible with the 64. If there are, I'd like the address or information about them.

JOSEPH PATRICK  
APO, NY



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Circle Reader Service Number 119

*Good timing, Joseph. As a matter of fact, COMPUTE associate editor Robert Bixby takes an in-depth look at a new import from Germany. Read his Gazette article "Take a Scan at This," which is about a handy hand-held scanner designed especially for the 64.*

### More about SpeedScript

I am wondering if there will be any 128 SpeedScript enhancements in the future. This has been the best word processor that I have ever used. Simple, but it gets the job done. One program I'd like to see is one that would let me use SpeedScript 128 with my second disk drive as the data disk and have the necessary POKES to accomplish this. Also, I would like to have a program that would alphabetize the 128 SpeedCheck files. I have done this by hand, and it tends to make the spelling checker run a little faster. I'd like the spelling checker accessed by using Ctrl-C. The word under the cursor could be checked with the main program in drive 8.

I enjoy the new format for your magazine, and I'm looking forward to each new issue. I was afraid your magazine would stop the articles on the 8-bit machines. Many people and I think there's a place for a small machine in this world. I'll be watching the pages of Gazette for any response to the ideas I have proposed.

ROBERT HARTLE  
TIONESTA, PA

*Thanks for the kind words, Robert. Over the years we've been able to add a number of utilities to SpeedScript to make it even more useful to our readers. A few of those enhancements have come from our staff, but most of them have come as submissions from our readers. By*

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Circle Reader Service Number 316



**FEEDBACK**

*posting your suggestion here, you may inspire someone to develop your ideas and share their programs with us. We're always eager to see SpeedScript enhancements or other useful programs. Send them to the Submissions Reviewer in care of this magazine. Don't forget that we're also looking for original 64 artwork for "Gazette Gallery," our new on-disk feature.*

**EPROM Primer**

I am interested in EPROM programming using the 64. I want to know how to manage the memory of a 16-kilobyte or larger EPROM. I've seen this done on cartridges.

MATTHEW HUDSON  
DORAN, VA

*The EPROM (Erasable Programmable Read Only Memory) chip is a powerful tool in the programmer's arsenal. These chips hold your own programs or code on a cartridge. They can even be used as custom replacements for standard chips that come with the computer.*

*EPROMs come in several capacities, usually in multiples of 4K (16 CBM disk blocks). The hardware required for customizing and using them is relatively inexpensive and easy to use. It consists mainly of an "eraser," for reinitializing EPROMs during the process of program development, and a "burner," or programmer for putting your code into the chips.*

*There's a wide variety of cartridge formats for the 64. Some cartridge boards are little more than ROM/EPROM sockets on a plug-in card, while others are sophisticated enough to have their own logic elements. The possibilities vary widely.*

*For more information about EPROM and cartridge availability and price, as well as devices such as EPROM erasers and burners, write to Jason-Ranheim, 580 Parrott Street, San Jose, California 95112.*

**A Little Help**

Several years ago our school purchased six MicroIllustrator light pens and disks produced by Tech Sketch. Recently, the pens have started to malfunction, and I would like to purchase replacements. Unfortunately, mail to

this company has been returned, and no one seems to stock these pens.

I tried the Flexidraw light pens, but they didn't seem to work with the MicroIllustrator program.

Does anyone know who repairs these pens? Does anyone have an old one he or she would like to donate to a school? If you have a new one, I would buy it for a reasonable price.

JOHN SCHICK  
NORWALK MIDDLE SCHOOL  
64 CHRISTIE AVE.  
NORWALK, OH 44857

I am desperate and don't know where to turn. I have been searching in vain for a tractor feed for a Blue Chip D12/10 (or Brother HR10) printer. I would appreciate it if anyone could point me in the right direction.

RAYMOND McALISTER  
2215 S. PERKINS AVE.  
INDIANAPOLIS, IN 46203

I recently purchased a PET/CBM 8032 with an 8050 dual disk drive. Does anyone have a word processing program, editing program, or spelling checker that will run on this computer? I am interested in public domain programs or software that's reasonably priced. I have tried several user groups without much luck. Please help! I really need a word processor.

JANELLE HARVEY  
20 CLAY ST.  
DANVILLE, NY 14437

I have been looking for a geoPrint cable as sold by Berkeley Softworks until about three years ago. BSW has discontinued the product, and I am unable to locate it or the alternative Power Print Cable.

Does anyone know where I can buy either of these cables? Perhaps someone could draw me a wiring diagram so I can make one for myself.

JAMES C. LYNCH  
P.O. BOX 4680  
ST. THOMAS, VI 00801

*How about it, readers? Can you help these people with their needs?*

*Do you have a question, comment, or problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, 324 West Wendover Avenue, Greensboro, North Carolina 27408. We regret that, due to the volume of mail received, we cannot respond individually to questions.* □





# PROGRAMS

D A N N Y E N G L I S H

**P**ut on your armor and sharpen your sword! The black knight has stolen the king's crown, and it's up to you to get it back. It won't be easy. To solve this intricate puzzle, you must find your way through six castles, 16 rooms, and more than 50 maze screens.

Pick up keys to unlock castles, but watch out! The black knight is waiting for you inside one of them. You must defeat him in order to retrieve the crown, but you're not safe until you slay the dragons.

## Getting Started

*Crown Quest* is written entirely in machine language, so you'll need to use *MLX*, the machine language entry program, to type it in. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801

Ending address: 2058

When you've finished typing *Crown Quest*, be sure to save a copy of the program before exiting *MLX*.

Although *Crown Quest* is written in machine language, it loads and runs like a BASIC program. When you're ready to play, plug a joystick into port 2. Load the program and type RUN. *Crown Quest* requires disk access, so don't remove the disk from the drive until you've finished playing.

## Playing the Game

In *Crown Quest*, you're a knight of the white castle. Your mission is to find and return the king's crown as quickly as you can. When you run *Crown Quest*, the program will search for a file on the disk named CQ.TIMES. If the file isn't there, it will be written automatically. This file is a record of the best playing times of people who have won the game. Once this file has loaded, the title and the best times are displayed.

Use the joystick to select one of four versions of the game. Each version uses the same *Crown Quest* king-

dom, but the objects are located in different places. Game 1 is easiest; game 4, the most difficult.

Play begins with your knight standing in front of the white castle, where you must return the crown to win the game. Control the knight with the joystick and begin exploring. The kingdom is connected by a series of rooms with mazes between them. Some of the mazes may be simple, but they can be up to 12 screens large and have many rooms connected to them.

**CROWN QUEST**  
EXPLORE A VAST KINGDOM IN THIS ACTION/ADVENTURE GAME FOR THE 64. JOYSTICK REQUIRED.

Somewhere in the kingdom is a toll bridge. Once you've crossed it, you enter the realm of the black knight, which consists of two challenging mazes, one room, and the black castle.

There are nine different objects to collect and use as you play *Crown Quest*. These objects appear in the lower left corner of the screen. You press the fire button to pick up an object, but you may carry only one item at a time. You may not drop objects when you're inside a maze. The object you're currently carrying is displayed in the text window at the bottom of

the screen. Should you attempt to pick up an object while you're already carrying one, the two will be swapped.

You may find piles of gold worth either 5 or 10 points. Your gold points are displayed at the bottom of the screen. You'll need 50 gold points before you can pay to cross the black knight's toll bridge.

Other objects you may find are castle keys, a sword, a magnet, and the crown. You cannot enter a castle until the gate is open. If the gate is closed, you'll need to find a key that's the same color as the castle. The one exception is the white castle. Since it is already open, you won't need a key to enter it.

When exploring mazes, you may come across dragons flying toward you above the maze. If the dragon hits you, you'll see a flash of bright light. You can sustain only two or three hits in one maze before you're struck down, penalized two minutes, and sent back to the white castle. If you find the sword, you can defend yourself against the dragon.

## The Black Knight's Lair

When you cross the toll bridge, 50 gold points will be taken, and you'll enter a corridor that leads to the black knight's kingdom. Once inside the black castle, you'll come face to face with the black knight himself. He stands twice as tall as you, guarding the entrance to a deep, dark, invisible maze—his hiding place for the crown. If you attempt to pass him without a sword, you'll be struck by his mighty fist and sent back to the white castle. Your only hope is to carry your sword, get a long running start, and try to strike him down.

Once past the black knight, you enter the most challenging maze of all. You're surrounded in darkness, but suddenly lightning illuminates the path for an instant. You must find your way through the maze using only the lightning as your guide. When you finally reach the crown, you'll see that the black knight has hidden it inside the maze wall. One of the other ob-





# PROGRAMS

jects in the game can help you take possession of the crown. I won't tell you exactly how to get it out of the wall, but you'll need one of the objects mentioned earlier.

## Winning the Game

When you have the crown, take it back to the white castle. The king will congratulate you, and your winning time will be displayed. Press the fire button, and the best-times screen will appear. If your time is better than the current best time for the game you played, you may type in your name. Press Return, and the best-times file will be updated on your disk. If your time did not make the list, the title screen will appear. Press the button to play again.

The first few times you play *Crown Quest*, it may take you more than 20 minutes to get through game 1. Once you've become familiar with a certain game, it becomes much easier to get a decent time. Game 4 should take you about an hour to solve.

To pause the game, press f1. The screen's border will flash different colors to let you know play is suspended. To continue the game, press f1 again. To restart the game completely, press f3.

Without question, the most difficult task in *Crown Quest* is trying to find your way through a maze with a dragon on your tail. The best way to solve this problem is to find the sword first and then to kill the dragon. However, in the more difficult games, you might have to pass through two or three mazes before you locate the sword. When a dragon is in your path, avoid it by backing into the previous maze for a second and then return. This will confuse the dragon and give you more time to escape. Remember that you can survive a couple of dragon hits.

Another challenging aspect of *Crown Quest* is that you can carry only one object at a time. You may find yourself retracing your steps many times during a game. When you cross the toll bridge, you must go back for necessary objects to recover the crown. The best strategy is to remember where you left certain items so you can recover them quickly.

Keep in mind that there are many hidden rooms branching off from the mazes that could contain valuable ob-

jects. You may have to explore every passageway in the kingdom before you locate them all. It's not easy to be victorious in your quest for the crown, but when you are, you'll agree it was well worth the adventure.

## Crown Quest

```
0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 00 85 2D A9 30 85 F5
0839:2E 4C 00 01 19 B4 03 00 25
0841:30 D1 1E B9 6E 09 99 E8 F0
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 0A 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FF A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0B 20 34 BF
08D1:03 E6 A7 4C 5C 01 E8 20 AF
08D9:34 03 D0 0A E8 20 34 03 B2
08E1:18 69 04 A8 D0 D6 E8 20 37
08E9:34 03 D0 0A A2 02 20 34 21
08F1:03 18 69 06 D0 ED A2 08 A2
08F9:20 34 03 D0 E6 A9 00 85 F7
0901:A7 A4 FB F0 0C 06 FA 2A 37
0909:26 A7 C6 FB CA D0 E2 A8 D8
0911:60 48 B1 FE 85 FA A9 08 FE
0919:85 FB 68 A4 FE D0 02 C6 4A
0921:FF C6 FE C0 E7 D0 DE A4 B5
0929:FF C0 07 D0 D8 A9 37 85 BA
0931:01 58 4C 28 08 A4 A8 F0 FA
0939:22 A5 F7 38 E5 A8 00 03 7E
0941:C6 F8 38 85 F7 A5 FC E5 8A
0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 F8 C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 0B 08 73
0971:0A 00 9E 32 30 38 38 00 52
0979:26 08 14 00 8F 20 43 52 F8
0981:4F 57 4E 20 51 55 45 53 9A
0989:54 21 1D 7C 18 E8 00 00 DD
0991:00 83 7B 85 FB 69 85 85 62
0999:25 A9 10 AE FC 69 08 85 B8
09A1:26 18 A9 00 65 FB 85 27 4F
09A9:A9 40 65 FC 85 28 A2 FF 2F
09B1:A0 00 8C 01 08 8C 02 08 34
09B9:F0 04 B1 25 91 27 C6 25 A9
09C1:E4 25 C4 84 3F 26 C6 27 B7
09C9:E4 27 D0 02 C6 28 C6 FB B2
09D1:E4 FB D0 E6 C6 FC E4 FC CE
09D9:D0 E0 A5 28 C9 A0 B0 0A FF
09E1:85 34 85 38 A5 27 85 33 FF
09E9:85 37 4C BE 63 28 0A 8F 61
09F1:73 E5 B1 02 22 8F 23 59 7C
09F9:79 3C C7 CA 63 A7 C8 E3 AC
0A01:39 34 1E 57 B1 F1 F8 06 45
0A09:9E 47 30 78 3C 46 E1 E2 6D
0A11:71 06 28 0F 93 27 8F 3C E9
0A19:B8 78 A0 41 C5 A3 23 C6 99
```

```
0A21:A3 AD C5 C3 32 C4 A3 B6 0A
0A29:C7 63 FB C8 23 A6 C4 A3 E6
0A31:68 C7 23 26 C3 A3 36 C4 10
0A39:23 A1 E0 F9 F0 40 98 C3 80
0A41:6C C4 63 67 C8 E3 AE C8 9B
0A49:63 78 C3 63 B4 C2 A3 A8 7C
0A51:20 1E 35 95 E3 A4 C3 C3 F9
0A59:A5 C7 23 66 C7 23 A1 C2 CD
0A61:A3 A3 C2 23 A1 C2 23 21 3A
0A69:C3 60 0E 5E 12 12 27 1E 64
0A71:14 75 74 6D EC 74 78 48 C4
0A79:7C 78 2C 64 58 6C 4C 54 17
0A81:78 80 D4 91 36 07 C1 86 7D
0A89:40 61 38 C7 49 21 50 04 0D
0A91:64 08 48 87 47 41 1C 03 D5
0A99:45 20 80 9C DC 21 00 2F CC
0AA1:00 72 C7 C9 8C C7 C1 86 75
0AA9:49 06 18 E0 38 99 F1 64 65
0AB1:F1 80 C6 53 A8 C7 49 94 78
0AB9:C7 C9 89 C7 40 C6 47 C6 44
0AC1:D3 9B C7 49 94 20 CF 49 42
0AC9:88 47 5B 5B 5B 80 9D 84 B1
0AD1:20 20 64 F8 15 64 48 54 39
0AD9:78 18 40 44 44 44 80 05 B5
0AE1:C0 41 1C 04 43 43 42 41 57
0AE9:41 41 64 64 0B C4 39 8A 2A
0AF1:01 98 80 81 0B 9C 2C 68 60
0AF9:60 C4 71 09 3A 2E 37 EC 14
0B01:01 10 20 20 C7 60 30 3C FD
0B09:64 33 06 32 06 40 0B 0B 54
0B11:82 34 80 AF 70 03 C6 70 0E
0B19:34 44 40 A8 80 10 CC 30 FA
0B21:04 61 07 7D 28 10 71 28 CF
0B29:36 02 07 1C 33 19 D9 CC
0B31:C5 7F 86 D5 86 43 86 D1 58
0B39:06 6C 1C 9F 1B 03 06 39 15
0B41:0A 0E 8D 4F E4 18 C8 08 A7
0B49:0C 0C A0 81 0D 06 32 00 79
0B51:07 32 43 03 18 53 45 08 B0
0B59:88 06 F0 88 46 33 30 52 8D
0B61:41 DC 6E 88 41 0E A6 10 45
0B69:57 C0 08 9D 23 1B 18 23 0F
0B71:71 D0 65 5C 80 08 18 80 BB
0B79:06 0C 6E A8 02 0F A7 1E A7
0B81:08 00 03 18 86 73 1C 40 F7
0B89:04 44 67 B4 66 F4 0F 05 15
0B91:64 29 83 20 85 86 22 18 39
0B99:14 86 D0 F0 85 1C E3 C5 AE
0BA1:41 E1 0F 39 82 01 07 42 AE
0BA9:C1 02 02 05 44 E8 00 64 DB
0BB1:E3 AB 38 0D 68 98 40 22 C4
0BB9:83 0C 92 0B 58 10 8E C0 78
0BC1:B0 80 B8 38 28 36 88 32 48
0BC9:82 0F 1A D4 0C 00 0C 8C 3D
0BD1:C2 36 E3 7E 04 0F 2E BC B0
0BD9:03 86 00 3E 20 26 63 00 57
0BE1:26 61 2E 04 80 84 00 73 0F
0BE9:A0 0B 2E 0E AF F0 02 09 06
0BF1:C8 E0 CF 08 80 23 08 82 42
0BF9:1C 5C 0E 39 B4 08 0C 59 C1
0C01:40 80 23 29 07 E7 07 04 3A
0C09:41 40 CE 43 88 C7 41 1D E2
0C11:32 D0 80 CB 98 81 D1 02 B3
0C19:06 1E 33 28 32 DE EA C8 50
0C21:2B 04 A0 A0 08 DD D8 28 7F
0C29:5A 0A 13 B8 2B 92 60 B4 F7
0C31:02 C9 05 6A 84 20 AB 02 02
0C39:0C 32 28 96 20 00 F2 03 3C
0C41:72 1A 02 03 AA 19 10 01 64
0C49:10 0B 81 B0 8D A8 E2 A0 8D
0C51:8E D8 38 DC 36 98 32 28 5C
0C59:8A 17 18 29 DE 36 26 E6 15
0C61:D0 03 01 04 01 2A 0D 0A D7
0C69:17 80 00 01 B8 CA 01 05 35
0C71:1A 28 42 06 1A 81 03 C6 EC
0C79:20 23 A5 28 88 43 A0 70 A4
0C81:28 54 0A 0E 58 80 81 04 B0
0C89:0F 6A 21 83 A0 18 28 86 5C
0C91:00 A1 70 DA 20 28 06 60 DB
```





# PROGRAMS

0C99:A4	18	C8	98	C8	C8	80	00	17	0F11:0B	F0	13	B0	B9	D9	0C	98	44	1189:46	1D	12	D4	AD	1B	D4	DC	06
0CA1:E0	29	30	EA	80	28	06	03	DC	0F19:E6	F8	C7	60	4C	F0	B2	05	78	1191:09	D2	4F	C9	7F	90	4D	FF	4C
0CA9:84	24	83	A3	98	C8	18	C8	98	0F21:0E	4D	4C	D5	08	B6	4C	45	79	1199:10	A5	60	86	0B	18	B3	20	E1
0CB1:08	80	0F	0E	79	80	82	8D	11	0F29:18	04	39	18	73	80	66	4C	B3	11A1:32	4F	9D	0E	30	94	61	26	02
0CB9:01	40	06	68	12	07	0E	08	7A	0F31:D7	81	7D	FC	1D	C6	61	00	E1	11A9:03	9B	F0	75	AD	7A	48	25	B6
0CC1:62	08	01	07	02	06	04	0A	D7	0F39:41	A3	02	A6	EB	50	A0	FF	6D	11B1:22	00	A8	1A	22	D5	D0	92	38
0CC9:06	06	08	07	07	04	9B	07	5E	0F41:AC	38	00	4F	34	E2	68	04	B6	11B9:AD	2B	70	5E	E6	08	7F	EE	B6
0CD1:08	08	FF	98	0A	80	DC	44	C9	0F49:8D	62	27	43	A3	C8	4C	9D	56	11C1:EA	08	AD	48	C9	0E	B0	03	80
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0CE9:40	87	8F	8C	84	A0	98	A0	37	0F61:4C	84	A1	0E	70	80	8E	0D	8B	11D9:E6	08	A5	08	C9	78	D0	F0	69
0CF1:B0	B0	81	F8	14	B7	3C	0C	52	0F69:0B	E8	88	A3	02	3A	38	E9	E5	11E1:CD	C1	8A	3A	C2	32	75	A9	C3
0CF9:20	02	12	09	04	07	05	08	C3	0F71:AA	8E	4A	4C	2D	87	62	00	E2	11E9:0C	A4	C6	08	C7	07	31	B6	08
0D01:47	35	30	20	07	0F	0C	04	A4	0F79:F8	4C	57	C9	20	05	77	8D	40	11F1:08	E4	A1	CE	9E	40	00	8D	F5
0D09:20	20	20	EE	52	0C	CA	D0	57	0F81:62	28	18	69	08	B0	B3	4C	2B	11F9:6B	49	92	22	1B	17	A9	2F	50
0D11:FD	CE	A2	06	A0	0E	FF	4C	1C	0F89:37	4C	E6	72	21	83	5F	E6	17	1201:A5	44	08	8D	FD	F2	3C	88	9F
0D19:AB	49	84	02	86	03	A4	03	98	0F91:38	0B	C6	F8	A6	F8	E0	FF	D1	1209:A1	46	02	A6	C0	0E	B0	03	80
0D21:B1	FC	A4	02	91	FE	A6	03	E0	0F99:0C	2F	C6	F9	4A	21	E3	05	A5	1211:48	C1	91	A9	0F	2E	81	11	DB
0D29:C8	E8	B7	73	CC	0A	D0	E6	27	0FA1:14	E2	B0	00	B1	00	3C	C0	5F	1219:76	D4	C0	4C	17	D4	B4	E1	E1
0D31:C7	11	47	D2	34	3C	5A	25	F5	0FA9:F8	99	39	21	50	54	38	08	30	1221:A0	0E	63	76	8E	F8	01	F0	38
0D39:3C	D0	E9	9F	4D	1C	BF	27	5E	0FBL:44	86	60	14	A7	C1	28	07	79	1229:1D	3C	7B	20	32	EE	23	64	54
0D41:26	C0	24	A8	C0	08	F0	07	B8	0FB9:8C	03	60	8A	A7	10	20	2C	7D	1231:52	26	C1	9C	29	35	B7	2C	C3
0D49:C0	0C	2E	B9	48	78	A9	D2	80	0FCL:4D	A9	1C	68	9F	43	AC	87	E5	1239:63	D2	2F	9A	B4	32	60	A2	25
0D51:53	74	18	A5	FE	67	30	FE	84	0FC9:A9	04	AE	C0	00	39	46	46	92	1241:06	92	A2	0E	83	0D	0A	30	D6
0D59:A5	FF	CE	60	FF	CC	9D	E0	75	0FD1:44	3C	19	19	1E	01	32	61	90	1249:D8	00	A0	07	6B	88	08	C7	B3
0D61:CD	D9	D0	E8	A5	DC	06	1D	FF	0FD9:54	83	00	8D	55	20	4F	4D	F2	1251:20	02	A0	09	CF	20	0B	1E	DD
0D69:13	86	FE	86	FC	A2	C4	86	79	0FEL:EE	80	02	AD	66	24	16	D0	73	1259:83	A2	07	A0	0A	4C	16	1A	9A
0D71:FF	A2	40	86	FD	AA	CA	E7	BC	0FE9:F3	A9	02	A2	AD	D6	DB	B0	08	1261:08	4A	8E	EA	8C	46	8A	86	55
0D79:ED	21	14	DE	44	41	4A	88	87	0FF1:2F	C9	32	90	28	E0	AA	C6	4A	1269:01	32	00	DC	29	10	3A	03	69
0D81:C0	01	A9	20	FB	49	4C	4C	5D	0FF9:1C	90	07	C9	45	B0	10	E0	B5	1271:E3	D0	1C	05	43	A4	D1	50	30
0D89:C7	E6	14	2C	60	90	28	A2	BE	1001:27	C1	38	05	1C	0C	5A	39	7B	1279:C0	C9	07	F0	3E	C9	08	F0	7A
0D91:0A	67	90	50	A2	14	67	90	66	1009:12	B0	07	38	F8	4C	73	41	E3	1281:34	88	F0	7C	61	90	C1	CC	65
0D99:78	A2	1E	67	90	A0	E2	28	47	1011:09	8C	4D	4C	A6	4D	28	55	57	1289:8F	BC	C0	1F	94	C6	B1	57	29
0DA1:A7	A0	C8	A2	32	20	BE	49	B3	1019:29	FE	45	55	18	29	FB	91	7A	1291:78	15	6B	A5	57	61	23	0D	8C
0DA9:60	86	FA	84	FB	D0	72	22	67	1021:11	B4	84	FA	09	A9	11	62	AA	1299:9C	02	0A	E0	E2	88	8C	43	71
0DB1:8E	E9	8E	10	AE	82	04	06	ED	1029:A9	E0	51	1F	50	B1	FA	01	83	12A1:63	AD	A7	18	69	05	C0	16	50
0DB9:85	8C	63	20	32	4A	AC	68	A4	1031:FC	82	0C	FA	C2	FA	D0	48	8D	12A9:C9	B9	B0	03	4A	85	C2	B2	08
0DC1:49	50	9B	10	D0	EF	A9	1B	BD	1039:00	43	FB	18	A5	FC	69	01	20	12B1:E5	B1	E4	C7	4C	66	51	D4	C1
0DC9:8D	11	D0	60	8D	86	20	87	5D	1041:85	FC	A5	FD	69	00	85	FD	4C	12B9:B1	12	76	0B	60	55	4E	E0	90
0DD1:9A	20	AA	4A	8E	9C	3C	8C	27	1049:A5	FB	C9	D7	D0	DC	DB	07	AA	12C1:FF	C5	29	DB	46	01	A2	45	19
0DD9:02	06	AE	D2	B8	99	98	25	FB	1051:40	C3	AB	1F	E2	C1	80	4A	53	12C9:47	4A	C1	5E	C0	8B	C0	82	7A
0DE1:F9	A2	78	B2	85	FE	A9	C4	1C	1059:F5	A5	01	09	04	85	01	AD	74	12D1:0C	00	AA	AD	E7	85	FA	AD	25
0DE9:85	FF	EB	4A	61	0C	27	91	04	1061:E1	04	09	A2	0E	DC	4D	0B	48	12D9:C2	30	A5	FB	AD	2C	85	FC	02
0DF1:FE	74	C5	28	8D	67	DD	AA	54	1069:A8	99	C0	C3	48	40	23	44	66	12E1:83	CA	AE	2C	70	9D	00	70	7D
0DF9:31	54	14	4A	E8	E0	18	D0	B4	1071:C3	00	89	BC	1C	2A	68	3B	06	12E9:8D	2E	C4	70	14	8A	00	39	7C
0E01:E2	AD	69	43	71	93	0C	15	62	1079:07	30	D2	A0	20	C0	20	B8	0B	12F1:AD	31	14	E0	1A	A5	FA	8A	B1
0E09:30	10	11	93	12	C6	21	8E	19	1081:20	02	E0	C2	08	C6	A9	06	2F	12F9:57	A5	FB	20	9C	51	AC	AA	E2
0E11:82	20	45	B8	0A	20	36	B2	9A	1089:99	90	C1	02	B8	22	E0	20	23	1301:A5	FC	28	55	11	91	20	58	FA
0E19:2A	1A	4B	AD	6A	49	F4	05	7C	1091:21	08	DA	14	38	D7	9C	81	BC	1309:A5	EE	23	AD	20	09	C9	14	C9
0E21:09	CC	27	0B	19	41	0A	60	CC	1099:41	31	12	70	7C	20	0A	20	88	1311:F4	90	11	22	70	EE	67	02	2A
0E29:20	70	08	20	4C	60	4B	4C	3B	10A1:99	79	26	7A	C5	99	7B	C5	AA	1319:AD	92	00	1F	CC	F5	3C	80	E3
0E31:54	4B	50	3B	0D	34	02	0E	53	10A9:A0	F0	78	D9	99	7C	D9	A2	18	1321:AD	80	24	C0	47	CB	3D	0F	C1
0E39:22	0F	C4	40	AB	C4	E2	90	8D	10B1:00	C8	E8	E0	E2	B8	FA	C0	DF	1329:20	AD	20	09	F0	51	C9	CF	8F
0E41:A5	23	A6	20	02	A7	A2	A8	6C	10B9:F0	D0	D9	A0	00	B9	95	14	F1	1331:03	08	AD	48	C9	B6	02	3D	7F
0E49:2D	EF	C5	08	82	08	30	08	CD	10CL:F1	02	F2	4C	B9	A0	49	99	82	1339:C4	C8	F3	00	02	AD	92	C9	28
0E51:58	82	2C	00	8D	2F	0B	09	08	10C9:1A	C5	C8	C0	0B	D0	EF	E6	EF	1341:BA	40	E8	C1	B0	8D	C6	C7	1F
0E59:57	C6	8D	7F	C6	60	F0	1F	35	10D1:58	40	4E	8C	58	A9	18	8D	E7	1349:EE	C5	F0	60	E1	12	F0	05	95
0E61:89	FB	C0	B1	43	99	00	64	59	10D9:18	69	5A	DD	09	56	CD	45	0C	1351:C9	05	F0	17	D9	2A	F0	2D	B3
0E69:05	BF	52	FF	C4	B9	F1	44	77	10E1:02	18	29	FC	09	D8	00	DD	87	1359:EE	1C	05	A5	C5	C9	04	D0	27
0E71:99	31	00	BC	48	FF	D0	E9	40	10E9:AD	88	19	29	3F	09	C0	8D	E5	1361:F7	3E	20	68	0E	B9	49	48	CF
0E79:9C	20	94	54	99	F1	C5	99	7D	10F1:88	02	A9	93	10	67	80	72	D6	1369:20	84	44	10	5F	28	95	00	11
0E81:19	C6	99	41	C6	10	8F	05	BD	10F9:8D	25	D0	8E	26	D0	8C	28	E2	1371:99								





# PROGRAMS

1401:FF	8E 46 BC 08 89 A9 0B 26	1679:30	81 B5 78 0B F8 10 0D C5	18F1:A9	5B 36 9D DD A9 09 C5 DB
1409:51	EE 92 43 61 0A 3A 0A CD	1681:36	8C 06 4C 5D 9D 20 80 93	18F9:05	02 CA D9 C4 D9 20 81 73
1411:93	43 48 67 56 58 1E 19 BC	1689:0C	7C 49 5B 07 74 5E 33 B3	1901:65	9B 40 04 39 80 07 64 53
1419:04	1B 4F 1D 05 43 79 0A F7	1691:94	E0 F5 0E 93 9B 57 AC 46	1909:AE	4C 09 2D A2 36 AE 64 49
1421:47	52 34 55 4C 41 60 5D E2	1699:D7	A2 00 5E 19 73 DA 62 EE	1911:C0	58 C7 2F 59 C5 9B 6E 2D
1429:80	53 24 27 9E F3 C8 14 DF	16A1:E3	A5 23 00 33 7B 5A A0 6A	1919:73	AD D0 24 C9 B5 B0 01 54
1431:EC	59 4F 55 20 48 41 56 60	16A9:52	A0 9B 98 69 EC 0D E6 24	1921:E0	B0 8D E4 C7 8D E5 09 39
1439:C0	19 20 54 55 52 4E 45 27	16B1:EC	CE 06 A2 0E A0 04 2B 19	1929:9B	83 24 1C A2 04 20 D7 8D
1441:44	85 59 48 45 20 43 52 20	16B9:2A	8C 82 02 B8 25 11 95 A0	1931:52	AD 24 00 87 2C FC 5F C2
1449:4F	57 4E 21 13 8C 1F D4 A8	16C1:87	C7 74 30 44 A5 81 91 82	1939:5C	AA A1 C9 31 02 CA C5 02
1451:31	90 11 11 11 90 60 01 F5	16C9:F0	F0 25 97 9B 51 50 00 8B	1941:8D	CB C5 60 2C 84 D9 48 5B
1459:1D	1D 50 52 38 53 21 0E E5	16D1:17	65 C5 71 C1 00 AD A0 BC	1949:6E	EC F9 C7 57 11 C0 50 7A
1461:55	54 34 4E 20 0C 4F 20 A4	16D9:39	5A 80 43 4C DD 8A 94 01	1951:82	08 C0 21 B7 F9 A3 01 DE
1469:56	49 45 57 20 42 C2 00 C9	16E1:C5	45 54 06 3A BD C0 88 FF	1959:19	79 34 1B C0 FC 1D 34 17
1471:80	54 49 4D 45 53 52 35 40	16E9:85	5E D8 71 34 4B 1C 13 BC	1961:26	C0 84 E9 C9 B4 F0 1E 27
1479:01	64 00 96 20 04 2C 08 16	16F1:01	8D 2A 80 5E 18 E0 F4 59	1969:C5	07 60 14 14 0F 20 0A B4
1481:E4	22 43 23 43 A2 A0 81 A6	16F9:82	C3 1A A7 17 18 55 3E 18	1971:0A	0B 10 51 85 05 88 25 F8
1489:15	8C 29 62 02 24 A1 28 C5	1701:BB	A0 B2 A0 45 45 AF C9 E5	1979:4C	B0 5C 48 18 2D 02 A4 6C
1491:81	01 06 71 80 86 0C 12 DA	1709:57	59 B4 20 9E 44 74 62 23	1981:20	6C AC 60 10 61 9A C3 79
1499:03	69 08 01 07 08 28 0F 66	1711:36	29 B1 02 C7 3C 05 A2 D6	1989:00	04 03 4C 12 5D A9 01 3C
14A1:08	04 06 F2 04 A0 00 03 64	1719:0D	A0 08 F2 BA 82 60 06 CC	1991:8D	21 F0 02 20 90 54 AD AA
14A9:07	06 07 40 07 01 00 08 FF	1721:21	D0 AD 57 50 B0 82 30 B9	1999:1B	D5 01 03 03 20 8D 4B 1E
14B1:07	07 04 EA 01 02 05 00 68	1729:61	85 EB 3C 92 29 1E 0C 2C	19A1:AD	01 D0 C9 92 90 13 E4 83
14B9:00	20 00 52 20 71 52 E3 FF	1731:A2	F0 29 F1 49 66 30 C4 3A	19A9:5D	F2 A9 A0 F1 7D 48 35 CB
14C1:44	A9 23 4C AB 49 A2 04 6B	1739:62	F0 16 27 99 C1 00 78 56	19B1:80	4C A5 5C 20 BA ED 95 0F
14C9:20	38 09 30 B6 A0 8D 23 AA	1741:92	39 12 81 43 4C 99 87 67	19B9:54	11 25 8E 02 A0 02 20 9E
14D1:70	C3 06 A0 D1 6A 8C 38 77	1749:2A	49 57 C9 06 18 D7 C1 68	19C1:B3	4A A9 15 20 AD E3 48 AE
14D9:4C	BF 4B 8D 60 1E 02 88 62	1751:F0	A8 83 EB 78 78 00 43 3A	19C9:A8	50 AD 29 08 00 D0 2A B8
14E1:1B	8D 11 F0 4E 33 50 81 8D	1759:0D	00 08 8B 63 A2 0E 70 F9	19D1:6A	1E 2B 60 16 80 FC 73 4C
14E9:82	54 20 5D 4C 20 20 51 B6	1761:1D	82 54 8D 0E C6 1F 07 89	19D9:1F	2F 3D 8D 1D 95 4E 18 DB
14F1:4C	C0 4D 8E CB 35 8C 04 53	1769:70	FE 80 E2 E1 14 20 7A E7	19E1:69	96 4E A9 90 8D 09 26 C5
14F9:8D	44 2E 60 8E 28 8C 54 48	1771:0C	81 C1 10 64 F0 26 9F 12	19E9:41	8D 08 81 35 C3 17 D0 F0
1501:E2	8B E7 C6 86 F8 84 F9 04	1779:21	30 18 E2 44 C9 03 F1 B6	19F1:0A	01 41 D2 F6 3C 55 1F 31
1509:B1	25 ED 3B 12 75 90 54 A2	1781:07	A2 3D C4 17 54 F0 09 C4	19F9:A2	B4 A0 9A 20 D4 05 17 DD
1511:6D	1F 70 F8 8D 64 38 F8 BE	1789:B8	3F 60 D8 4C 3A 59 4C C7	1A01:DB	90 8E 4C F0 5C 3C 4D 9C
1519:44	14 96 27 22 E9 76 22 77	1791:F4	58 30 9A E4 03 69 05 0B	1A09:11	B9 AD 52 00 7E 10 8D B6
1521:18	76 56 8A A4 13 15 70 74	1799:11	2B 0A 9D 96 0E 0F 30 71	1A11:10	D0 60 A9 20 A2 44 A0 DC
1529:70	69 00 8D 8A 10 30 07 C2	17A1:9B	E1 C4 44 E4 A4 86 0E C7	1A19:49	20 CA 54 20 9C D2 61 13
1531:8E	4F 31 A2 FF 8E 2C 70 C9	17A9:A4	68 58 84 0E 2B F8 83 2A	1A21:BF	4B C8 60 2E 4C CD 81 E6
1539:AE	0C AC 1E 70 4C 82 4A 39	17B1:87	87 22 18 0F 4C C9 59 E1	1A29:5C	41 4B 44 56 20 66 55 DE
1541:C1	C5 D7 D0 21 29 38 E6 CA	17B9:A2	72 92 D3 04 85 58 B8 05	1A31:20	BE 54 81 70 50 F0 F3 62
1549:A9	79 82 3F 6A 0E FC 35 A5	17C1:8C	02 72 2C 82 0E 83 20 3B	1A39:02	0C 6F C0 0E 9C 03 F0 F9
1551:3C	0E 40 61 1A 07 85 4D 80	17C9:0A	8F 2A 09 E0 90 01 8D 8F	1A41:4B	48 04 F0 19 20 E4 2D FC
1559:8C	18 F8 62 E0 8C 90 56 C5	17D1:51	01 20 08 1A 07 41 1C F8	1A49:C8	20 F7 54 63 AD 1D A8 E2
1561:07	6B 49 95 00 08 F0 12 80	17D9:11	3E 08 92 03 00 13 3A C2	1A51:30	44 F0 0F 20 0A B4 20 70
1569:53	06 8D 51 61 73 E2 33 57	17E1:D5	B5 F2 04 0A 82 06 A2 10	1A59:20	1C 55 4C B7 57 C5 5D 18
1571:44	EE A5 08 AD C8 CD 90 6B	17E9:03	0F 3B 08 9E 71 02 A2 A6	1A61:4C	39 5D AD 2D 70 C9 09 58
1579:B0	90 ED 50 5D F1 7A 62 EC	17F1:0A	A0 07 E0 DE 80 A0 0D 83	1A69:F0	03 4C 81 56 00 3A 43 E2
1581:2A	49 4A 8F FB C7 D5 57 57	17F9:46	41 41 03 28 86 06 16 71	1A71:AE	53 20 17 17 7D 1C C0 EE
1589:E2	A2 01 4C C4 D8 7E 85 BE	1801:1E	F7 C0 0B 4C 4B E3 87 E1	1A79:B9	E0 64 38 E9 8D 08 C5 9B
1591:F8	A9 C7 85 F9 A9 84 2A 9D	1809:73	4C A6 5A E0 A9 5C E7 CE	1A81:81	E8 7F A9 06 99 C3 D9 33
1599:8E	79 DA 1C CC 60 AD 1E E7	1811:59	78 2D 07 E6 2C CE E1 89	1A89:F1	0D D0 EA 82 91 40 5A F7
15A1:73	61 11 92 97 05 33 68 C8	1819:1A	A9 05 0A 71 C3 43 3E 61	1A91:C0	D7 C8 C0 28 9B A9 8E CE
15A9:C2	15 05 D0 41 78 9B 27 72	1821:14	4C 79 57 7E 82 E3 0D E5	1A99:8D	04 86 04 68 8D 05 46 70
15B1:F8	4C E1 41 B2 07 8D 2C B4	1829:EF	04 3D F5 40 F1 15 31 7E	1AA1:07	8D 29 60 09 0C 8D FA 76
15B9:87	08 20 16 05 0A 82 8B 1D	1831:1E	6C 9C 0B 22 F8 D8 2F A5	1AA9:C7	A9 05 CC 01 A0 63 02 71
15C1:09	48 99 04 8D 0B D0 49 79	1839:39	CE 90 88 E3 E7 38 8E 12	1AB1:04	C8 8D 01 26 02 8D F8 29
15C9:48	90 2B 86 A4 20 71 AE 41	1841:A4	E2 B8 60 00 DA D3 9C 49	1AB9:C7	81 82 A1 F7 C7 A3 15 D7
15D1:8C	41 68 0C 99 29 70 60 13	1849:E3	38 6C 4C BA 48 2E 5A 79	1ACL:D0	A9 B3 07 85 97 8F 3D 96
15D9:8E	26 05 1E 9A CE 46 AD A1	1851:4C	35 00 ED 01 77 D8 00 6B	1AC9:30	C4 81 4C 41 62 8D C9 B4
15E1:40	04 A0 C3 F1 8C 58 F8 E8	1859:9A	96 12 9C 96 0E 8F 38 CC	1AD1:01	A1 D0 20 E0 4B 20 73
15E9:C7	20 B9 49 D8 2B 35 50 F9	1861:68	1B 91 96 0D 8F 81 C0 92	1AD9:A5	4B 0D DF 05 6C 49 85 45
15F1:EE	E3 09 AD 08 C9 5A F0 95	1869:00	63 19 13 8F 65 87 87 6F	1AE1:01	1B FE D0 F8 AD FF 7F 48
15F9:83	7D 94 01 89 8D 2F 70 39	1871:66	49 8E 26 EC D3 CB C2 6C	1AE9:C9	00 F0 18 C9 01 F0 24 FA
1601:E8	28 80 A4 A9 96 20 AB 99	1879:4C	AF 5A 9E 63 11 A0 47 D8	1AF1:C9	02 F0 30 7B FD A1 6C 30
1609:49	EC BB 21 D0 60 B9 CF E9	1881:77	14 0C 1C 06 30 38 80 97	1AF9:79	F8 F0 2A 79 F8 F0 49 8B
1611:61	78 4C 0C 23 10 54 4C A4	1889:83	18 04 4F AD F2 15 ED 48	1B01:79	C8 F0 B8 04 56 54 99 BB
1619:07	5E F6 20 46 E2 C1 02 84	1891:4F	8D 27 70 BA 46 F0 F1 8B	1B09:00	70 C8 C0 16 D0 F5 4C AC
1621:51	D2 D8 2A BC A2 01 B3 8E	1899:04	C5 C2 17 27 28 74 48 12	1B11:87	53 CD 15 F6 FE B2 0A 00
1629:15	E2 31 0B 2F 30 0B D3 93	18A1:C4	11 F0 1C A7 02 0C A5 5B	1B19:80	72 06 32 02 FF 00 A0
1631:B0	A9 22 2B 87 53 04 5B 04	18A9:42	05 04 03 34 00 D1 47 79	1B21:80	20 4C 52 63 C6 39 5C 53
1639:AC	C4 00 33 18 47 15 04 2C	18B1:1F	46 80 71 4C 80 5B 4C 91	1B29:52	40 78 D5 43 51 2E 9A 5B
1641:C7	C3 C3 25 18 5A D9 22 0D	18B9:F1	56 C3 31 0E A2 01 79 7A	1B31:DE	2C 50 2C 57 66 08 E5 F8
1649:00	5A 4C C0 57 C6 23 0D CA	18C1:F6	24 D8 40 8C 42 4B 86 20	1B39:20	29 A6 3A 96 43 9E 52 93
1651:0F	29 70 F9 F0 0D E9 92 1F	18C9:C7	56 13 33 5D 60 E0 5B 92	1B41:99	4F 9F 57 9A BC 38 51 0B
1659:85	29 58 4C 63 A7 B9 00 8F	18D1:A9	30 C2 D1 A0 46 0A 07 8D	1B49:9F	55 99 45 9E 53 96 54 EF
1661:74	50 0A B3 68 FC C3 34 4B	18D9:CB	6C A9 C8 A9 0D 8A CF 37	1B51:29	71 D9 0D 90 05 43 BA 5E
1669:44	3C 58 34 72 58 95 E4 1A	18E1:0F	89 8F 23 74 4C CC 5B E9	1B59:00	41 54 45 44 D1 0F 0A 50
1671:7B	09 47 15 C4 13 A8 82 1E	18E9:BE	EB 20 62 4E 4E 97 44 BD	1B61:44	41 4E 4E 59 20 45 80 0F





# PROGRAMS

## ONLY ON DISK

There's something new on the Gazette Disk. In addition to the type-in programs found in each issue of the magazine, we're putting more features and programs every month on the Gazette Disk. Check out the original 64 and 128 artwork on display in "Gazette Gallery," and look for our bonus programs as well. These programs and their instructions appear only on disk. Here are descriptions of this month's bonus programs.

### AFK

Ben Campbell

AFK (Attack, Fire, Kill) is a two-player shoot-'em-up written in machine language. Players guide their attack helicopters from a split-screen perspective through a maze of caverns in this aerial game of hide-and-seek.

### Sprite Grabber

Hubert Cross

Sprite Grabber allows you to grab sprites and save them to disk as BASIC data statements, assembly language .BYT statements, or an ML file.

### Sprite Album

Hubert Cross

Sprite Album is a database for storing sprites you've collected. Besides storing, you can edit and animate the sprites, too.

LB69:C3	4C	49	53	48	E2	42	1D	62	ID E1:90	27	B0	22	AD	16	33	43	D5
LB71:54	19	19	1D	9F	3E	6B	E0	BA	1DE9:17	3C	0C	F0	AD	26	7F	20	74
LB79:05	63	49	92	53	11	41	93	52	1DF1:34	62	18	6D	27	7F	8D	80	8B
LB81:21	1E	2C	9A	CD	63	1C	22	55	1DF9:BC	AD	36	5F	CD	37	5F	90	55
LB89:9B	72	50	C7	40	46	2E	2E	56	1E01:03	40	38	66	01	B1	BD	05	8B
LB91:20	1E	00	0A	14	02	3A	30	4D	1E09:7F	99	D3	05	4D	08	D0	F4	57
LB99:30	06	B3	1C	13	13	50	52	79	1E11:A2	00	D1	5E	14	6A	60	A9	73
LB A1:45	53	53	EF	55	54	05	45	04	1E19:07	53	C5	D9	E8	C8	E0	A0	D0
LB A9:80	4F	4E	00	D1	DC	20	32	32	1E21:F0	8F	14	8D	8A	0A	80	14	A6
LB B1:05	4F	20	42	45	47	AE	1F	2A	1E29:36	20	F0	13	F5	D9	53	34	C9
LB B9:90	13	24	50	90	11	9F	10	9E	1E31:2E	36	C9	41	90	E9	C9	5A	79
LB C1:C9	53	45	4C	45	43	54	DC	DB	1E39:B0	E5	38	E9	40	2D	57	29	7B
LB C9:26	55	53	49	4E	47	20	4A	81	1E41:6E	C8	EE	2A	05	98	A9	64	A9
LB D1:4F	59	53	54	49	43	4B	11	B4	1E49:20	AB	A9	69	37	10	D0	C9	A5
LB D9:11	05	0D	F1	F5	83	3A	06	D2	1E51:20	E4	FF	B2	29	F9	C9	14	DA
LB E1:32	02	20	20	47	41	4D	45	D6	1E59:F0	07	C9	0D	F0	1C	4C	89	F3
LB E9:20	31	0D	A9	08	90	57	00	E9	1E61:63	AC	6A	2E	AD	21	09	C9	78
LB F1:8D	20	E4	09	21	88	00	04	53	1E69:00	F0	AD	A9	2E	88	CE	35	98
LB F9:42	06	8D	32	A8	34	58	CC	3B	1E71:5F	99	C2	05	8C	34	5F	4C	AC
LC01:A9	04	8D	88	02	A9	3F	8D	0C	1E79:52	63	20	EF	61	20	FD	61	A3
LC09:02	E2	04	C7	8D	00	56	15	26	1E81:4C	E7	60	FF	3A	78	08	5F	0D
LC11:2E	55	D0	E2	38	D0	38	C4	38	1E89:85	FB	69	1B	85	25	A9	03	7D
LC19:7C	73	37	B5	8F	48	2B	3C	DE	1E91:85	FC	69	64	85	26	18	A9	E1
LC21:77	19	E7	3E	77	0F	06	59	99	1E99:00	65	FB	85	27	A9	C0	65	CD
LC29:77	37	06	55	51	E0	5F	55	23	1E A1:FC	85	28	A2	FF	A0	00	8C	FB
LC31:B4	30	53	AD	24	0E	30	19	E7	1E A9:01	08	8C	02	08	F0	04	B1	D7
LC39:15	46	3D	B8	38	11	20	8D	94	1E B1:25	91	27	C6	25	E4	25	30	6D
LC41:33	C6	C1	8D	18	03	A9	EF	E5	1E B9:FC	41	26	C6	27	E4	27	D0	E1
LC49:8D	28	03	20	E1	8E	BC	17	8E	1E C1:02	C6	28	C6	FB	E4	FB	D0	5E
LC51:86	A0	21	06	20	9F	61	AE	6A	1E C9:E6	C6	FC	E4	FC	D0	E0	A5	AB
LC59:AD	F4	9E	B6	0D	87	10	C6	52	1E D1:28	C9	A0	B0	8A	85	34	85	08
LC61:21	2D	1E	07	A2	00	E2	3D	C1	1E D9:38	A5	27	85	33	85	37	4C	43
LC69:60	AC	AC	0A	4E	17	E1	84	4A	1E E1:10	5F	51	F8	9F	28	14	28	A5
LC71:47	E8	E0	D2	EE	15	15	8D	54	1E E9:2A	54	A8	2A	14	A8	AA	96	37
LC79:A5	22	33	8D	CD	30	02	34	B3	1E F1:AA	89	96	62	0A	75	A0	02	48
LC81:8D	F5	DB	0B	8D	76	30	D2	D2	1E F9:7D	80	B8	7B	51	7D	04	96	03
LC89:0C	8D	9E	23	0F	8D	C6	D9	47	1F01:10	74	55	D0	90	00	F0	14	96
LC91:A9	82	60	86	A9	3E	AC	8E	E1	1F09:1B	51	3B	05	41	40	01	41	2F
LC99:06	5C	A9	32	AA	99	60	30	F0	1F11:F8	73	47	00	64	0B	09	54	47
LCA1:0F	C9	0E	F0	1A	B4	05	2C	6E	1F19:88	40	21	14	20	14	96	00	8F
LCA9:AD	00	DC	29	10	C9	00	D0	5F	1F21:02	96	80	2A	55	A8	A9	75	CE
LCB1:DD	A9	93	20	D2	FF	21	BA	4B	1F29:6A	2A	7D	AD	08	7D	20	00	D7
LCB9:76	4C	84	53	C0	00	F0	CE	BC	1F31:7D	D8	23	5D	C0	48	40	00	46
LC C1:C1	2F	EA	38	E9	BA	C8	CE	22	1F39:15	70	00	51	10	00	41	04	3A
LCC9:B9	D8	C0	78	F0	B6	A9	20	8A	1F41:01	45	40	39	6E	85	E8	CF	18
LCD1:99	76	05	AD	E3	05	60	28	0C	1F49:DF	8A	C7	46	C1	73	87	40	A2
LCD9:8D	31	5F	8A	47	4C	41	61	0C	1F51:7E	23	BD	20	2A	66	3B	02	B4
LCE1:A9	46	6D	4E	AE	73	00	39	8F	1F59:E7	F2	37	E4	21	F4	E1	61	7F
LCE9:5F	D8	99	5E	D8	6D	0C	8E	44	1F61:2C	D3	20	6C	08	14	27	45	99
LCF1:E4	8E	68	D8	18	D1	16	3C	4B	1F69:2C	88	BF	22	30	1F	9E	0E	43
LCF9:44	0C	0D	51	86	20	D5	17	85	1F71:3A	9F	96	78	1D	01	CE	11	AA
LD01:B7	FF	C9	04	D0	08	A9	FF	8A	1F79:44	90	9F	1E	0F	A1	12	0F	06
LD09:82	F0	51	4C	FD	61	70	0D	13	1F81:9B	34	06	61	43	A0	38	1C	9A
LD11:05	99	84	28	40	43	1C	5D	EB	1F89:69	7E	86	3C	10	0C	9A	82	19
LD19:B9	B8	05	99	00	7E	C8	C0	E4	1F91:8D	91	42	A0	28	5C	68	04	D4
LD21:9F	D0	F5	60	CA	99	40	9C	FD	1F99:3C	44	1E	40	04	73	44	22	67
LD29:A2	22	A0	5F	A9	0F	20	BD	CE	1F A1:40	1C	3A	18	7C	70	86	3C	BE
LD31:08	47	00	A2	08	A0	01	20	50	1F A9:28	00	C4	00	41	10	00	44	23
LD39:BA	00	0E	7E	85	FB	A9	00	E9	1F B1:A0	C7	F1	C6	50	1E	BA	20	6D
LD41:85	FA	A2	9F	A0	7E	A9	FA	98	1F B9:0E	7C	00	06	21	AE	B3	E5	8F
LD49:20	D8	FF	A9	1B	8D	11	D0	66	1F C1:B1	90	51	FF	FF	FF	82	50	7C
LD51:C1	1D	BF	F8	28	D0	FA	60	16	1F C9:B6	14	46	4F	1E	1F	71	14	8A
LD59:AA	CA	E0	FF	F0	06	18	69	F0	1F D1:04	84	54	05	1B	02	87	80	7E
LD61:0A	4C	35	62	00	EE	EB	BA	D1	1F D9:07	CF	80	AD	40	01	53	A8	CF
LD69:AD	32	5F	8D	00	3A	54	60	BD	1F E1:14	41	49	1E	3F	17	71	C0	7F
LD71:A0	00	AD	B4	06	C9	01	F0	47	1F E9:06	6E	9E	3F	6E	F2	6E	FC	A7
LD79:09	CE	8A	2B	62	4C	4F	62	35	1F F1:FE	31	83	3F	FF	F2	13	E4	37
LD81:DF	6A	80	08	2A	0C	26	B9	5E	1F F9:21	32	38	8F	06	5C	03	FF	FC
LD89:D4	3A	83	1F	B9	D6	3C	83	44	2001:00	07	83	28	BF	E0	1F	87	3D
LD91:18	B9	D7	3C	B9	11	B9	D9	B2	2009:F0	3F	FB	FC	FF	BF	FF	3F	0F
LD99:3C	83	0A	B9	DA	05	C9	30	5E	2011:C7	F0	03	FC	92	F4	86	0E	25
LD A1:00	0C	4E	24	63	49	12	70	28	2019:0F	83	39	06	32	02	A0	04	28
LD A9:59	48	64	6C	0C	44	F2	8E	81	2021:0A	1C	EE	70	3A	81	08	44	7E
LD B1:61	11	B9	28	87	50	30	9D	16	2029:20	0C	44	60	0E	EE	86	0B	4F
LD B9:4C	15	C8	E8	14	F1	AD	10	DA	2031:E0	0F	FF	E0	94	05	71	08	57
LD C1:D8	31	C4	11	53	B2	20	83	87	2039:07	FF	C0	00	94	07	FE	FE	D2
LD C9:11	21	4F	C9	86	4D	B0	48	6E	2041:FE	00	EF	EF	EF	00	EE	EE	4A
LD D1:AD	13	2F	43	14	3C	25	23	C0	2049:EE	9B	7C	20	F7	00	7F	00	38
LD D9:3B	18	24	F1	94	54	78	B0	F2	2051:53	A0	18	18	18	3C	18	00	C9





# PROGRAMS

G A R Y D U G G E R T

G A Z E T T E C O M M O D O R E 6 4 / 1 2 8

**T**he secret to making money on the stock market is simple: Buy low and sell high. The trick is picking a stock whose value is going to increase after you've bought it. Here's your chance to become a Wall Street tycoon in this exciting game for the 128 in 80-column mode.

*Stock Market 128* is fast paced and operates entirely from the keyboard or keypad. It requires no skill or knowledge of the actual stock market and will provide you with unlimited hours of family entertainment.

## Getting Started

*Stock Market 128* is written entirely in BASIC. To avoid typing errors, enter the program using *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program to disk.

Each player starts the game with \$5,000, and the object is to become a millionaire before your opponent does. Use this bankroll to buy stock from any or all of six stock options that are presented at the start of the game.

Once the main screen appears, the game, just like the actual stock market, is active. Stock values are moving up and down. When you're ready to make your purchases, press either Return or the space bar. You're presented with the option to select player 1 or 2. From there you have the option to buy stock, sell stock, or return to the game.

Since you have no stock at the start of the game, select the buy option. You're then asked which stock you wish to purchase. Choose by selecting the number next to the stock's name. You're then asked how much stock you want to buy. The program tells you how many shares you can purchase depending on the amount of cash you have on hand. You may decide on a diverse portfolio by spreading your money over a number of stocks, or you may invest heavily in just a few.

Because of the instability of the

market, stocks can take devastating crashes or make incredible gains in a matter of seconds. You can buy or sell stock at any time by pressing Return or the space bar.

Dividends and bonuses are paid to those who have the foresight to buy into stocks whose worth rises to more than \$100 per share, but there's also a risk that the stock will crash and most of the investment will be lost.

# STOCK MARKET 128

BECOME A MILLIONAIRE IN THIS FASCINATING ONE-OR TWO-PLAYER STOCK MARKET SIMULATION FOR THE 128

If a stock goes broke, all investors lose the monies in that stock, and a new commodity will take its position on the board at a value of \$50 per share. Taxes are assessed every 200 updates, which is equivalent to one year's time. Uncle Sam wants 25 percent of the profits (including dividends/bonuses) each year. Game speed can be varied using the + or -

keys, and it can be paused by pressing the P key.

If a player's total net worth declines for three consecutive years, then that player's seat on the stock market is sold. At that point, the game is over, and the opponent is victorious.

## Stock Market 128

```
CG 10 REM COPYRIGHT 1990, COMP
UTE PUBLICATIONS INT'L L
TD. ALL RIGHTS RESERVED.
CS 20 FAST:WINDOW 0,0,79,24:CO
LOR6,1:SCNCLR:PRINTCHR$(
142)
CX 30 PRINTTAB(26)" {3}{D}
{26 I}{F}"
MH 40 PRINTTAB(26)" {RVS}{K}
{CYN}{26 SPACES}{3}{OFF}{K}
MS 50 PRINTTAB(26)" {RVS}{K}
{CYN}{2 SPACES}$$ STOCK
{SPACE}MARKET 128 $$
{2 SPACES}{3}{OFF}{K}"
QE 60 PRINTTAB(26)" {RVS}{K}
{CYN}{26 SPACES}{3}{OFF}
{K}
BS 70 PRINTTAB(26)" {3}{C}{RVS}
{26 I}{OFF}{V}"
FX 80 AS="COPYRIGHT
{SHIFT-SPACE}1990 COMPUT
E PUBLICATIONS INT'L LTD
":PRINT"{WHT}{DOWN}":GOS
UB1160
EC 90 AS="ALL RIGHTS RESERVED"
:PRINT"{DOWN}{YEL}":GOSU
B1160
JJ 100 WINDOW 5,13,74,24:SCNCL
R:PRINT"{CLR}{HOME}";:Y
=INT(RND(0)*6)+1:Z=1:P=
0
HB 110 PRINT"{7}{RVS}
{70 SPACES}"
KM 120 FORX=0TO6:PRINT"{RVS}
{OFF}{8}++++++
++++++
++++++{7}{RVS}":NEXT
FX 130 PRINT"{7}{RVS}
{70 SPACES}{DOWN}"
RS 140 AS="{3}PRESS ANY KEY TO
START{6}":PRINTTAB(24)
AS;
MF 150 PRINT"{HOME}":FORX=1TOY
-1:PRINT:NEXT:PRINTTAB(
1)
BF 160 GET AS:IFAS=""THEN170:E
LSE250
RD 170 X=INT(RND(0)*2):IFY<1TH
ENY=1:ELSEIFY>7THENY=7
ER 180 IFP=0ANDX=0ANDY=7THENAS
="N":X=1:GOTO240
XP 190 IFP=0ANDX=0THENAS="
{DOWN}M":Y=Y+1:GOTO240
```

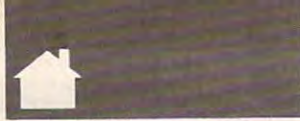




# PROGRAMS

DF 200	IFP=0ANDX=1THENAS="N":G OTO240	JH 400	WINDOW0,0,20,0:PRINT" {WHT}GAME SPEED =" ;TS+1 ;WINDOW60,0,79,0:PRINT "{CLR}{HOME}TAX DUE IN {SPACE}-";200-YR:IF RT= 1 THEN RETURN		=TW(2)+TV(N,2):NEXT:WIN DOW 40,20,78,20:PRINT" {7}STOCK VALUE {WHT}";: PRINTUSING"###,###,### .##";TW(2)
AE 210	IFP=1ANDX=0THENAS="M":G OTO240	JH 410	SLEEP TS:GETAS:IFAS\$THEN 420:ELSEGOSUB1530:GOSUB 1250:GOSUB920:IFYR=0THE N300:ELSE GOTO400	QF 600	WINDOW 40,21,78,21:PRIN T"{GRN}CASH ON HAND {WHT}";:PRINTUSING"### ,###,###.##";CH(2)
HG 220	IF P=1AND X=1ANDY=1THEN AS="M":X=0	QJ 420	IFAS="P"THEN COLOR6,13: GETKEYS:COLOR6,1:GOTO4 00	MB 610	FT(2)=TW(2)+CH(2):WINDO W 40,22,78,22:PRINT" {PUR}TOTAL WORTH {WHT}" ;:PRINTUSING"###,###,## .##";FT(2)
DD 230	IFP=1ANDX=1THENAS="{UP} N":Y=Y-1	KK 430	IFAS="+ "THEN TS=TS-1:EL SEIFAS="- "THENTS=TS+1	XR 620	RETURN
GJ 240	PRINTAS;P=X:Z=Z+1:IFZ= 69THEN100:ELSEFORQ=0TO1 10:NEXT:GOTO160	SF 440	IFTS>4THENTS=4:ELSEIFTS <0THENTS=0	PG 630	WINDOW0,10,79,24:SCNCLR :AS="BUY OPTIONS":COLOR 5,11:S=(80-LEN(AS))/2:P RINTTAB(S)AS{DOWN}"
CB 250	FORX=0TO5:READSK(X):SV (X)=50:NEXT:CH(1)=5000: CH(2)=5000:OW(1)=5000:O W(2)=5000:YR=0:LT\$="*": UY=6	RD 450	IFAS<>CHRS(13)ANDAS<>CH RS(32)THEN 400	QF 640	PRINT"{PUR}STOCKTAB(15 )"CURRENT VALUE"TAB(30) "AMOUNT OWNED"
JM 260	PRINTCHR\$(14){CLR} {HOME}";DE\$=CHR\$(27)+" Q":COLOR6,1	DG 460	WINDOW 0,10,79,24:PRINT "{CLR}{HOME}{YEL}";AS= "PLAYER 1 OR 2?":GOSUB1 160	XQ 650	FORX=0TO5:PRINT"{WHT}"X +1{LEFT}. ";:COLOR5,2+ INT(X*1.2):PRINTSK\$(X)T AB(15);:PRINTUSING"### .##";SV(X);:PRINTTAB(30 )BG(X,P):NEXT
RQ 270	DATA "SILVER","GOLD","C ARS","TRUCKS","TRAINS", "PIZZA","SOAP","FURS", "SOCKS","BEADS","CORN", "SHEEP","SHIRTS","HOTELS ","BUSES","STEEL","OIL", "COPPER"	PM 470	FAST:GETAS:IFAS=CHRS(13 )THEN350:ELSEIFAS="ORA S<"1"ORAS">2"THEN470	KA 480	P=VAL(AS)
GF 280	DATA "NICKEL","BRASS"," PHONES","PAPER","PANTS", "MILK"	HR 490	WINDOW 0,10,79,24:PRINT "{CLR}{HOME}{RVS}{WHT}1 . {OFF}{2}BUY":PRINT" {RVS}{WHT}2. {OFF}{2}SE LL":PRINT"{RVS}{WHT}RET URN{OFF}{2} FOR GAME"	HR 490	WINDOW 0,10,79,24:PRINT "{CLR}{HOME}{RVS}{WHT}1 . {OFF}{2}BUY":PRINT" {RVS}{WHT}2. {OFF}{2}SE LL":PRINT"{RVS}{WHT}RET URN{OFF}{2} FOR GAME"
JS 290	DATA "COFFEE","TIRES"," RADIOS"	PS 500	GETAS:IFAS=" "THEN500:EL SEIFAS=CHRS(13)THEN350	PS 500	GETAS:IFAS=" "THEN500:EL SEIFAS=CHRS(13)THEN350
QB 300	WINDOW0,0,79,24:PRINT" {CLR}{HOME}TAB(30)" {GRN}CURRENT STOCK VALU E{DOWN}"	XP 510	A=VAL(AS):IF A<1 OR A>2 THEN 500:ELSE ON A GOT O 630,790	XP 510	A=VAL(AS):IF A<1 OR A>2 THEN 500:ELSE ON A GOT O 630,790
MG 310	PRINTTAB(15){2}0 {3 SPACES}10{2 SPACES}2 0{2 SPACES}30{2 SPACES} 40{2 SPACES}50 {2 SPACES}60{2 SPACES}7 0{2 SPACES}80{2 SPACES} 90{2 SPACES}100 110 120 "	HC 520	LL\$="":COLOR5,2+INT(X*1 .2):WINDOW 15,3+X,79,3+ X:PRINTDE\$:FORX=0TO(SV( X)/2.5):LL\$=LL\$+LT\$:NEX T:PRINTLL\$;	HC 520	LL\$="":COLOR5,2+INT(X*1 .2):WINDOW 15,3+X,79,3+ X:PRINTDE\$:FORX=0TO(SV( X)/2.5):LL\$=LL\$+LT\$:NEX T:PRINTLL\$;
DE 320	IFRR=0THENFORX=0TO5:COL ORS,2+INT(X*1.2):PRINTS K\$(X)TAB(15)***** *****;TAB(70)"\$50 _00":NEXT:RR=1:GOTO350	DK 530	PRINTTAB(54);:PRINTUSIN G"###,###";SV(X):IFRR=> 2THENRETURN	DK 530	PRINTTAB(54);:PRINTUSIN G"###,###";SV(X):IFRR=> 2THENRETURN
EG 330	FORX=0TO5:COLOR5,2+INT( X*1.2):PRINTSK\$(X)TAB(1 5);:IFSV(X)=0THENPRINT" {G}TAB(74)SV(X):NEXT:E LSEFORX=0TOINT(SV(X)/10 ):PRINT"****";:NEXT:PRI NTTAB(68);	GE 540	COLOR5,10:WINDOW 10,13+ X,38,13+X:TV(X,1)=BG(X, 1)*SV(X):PRINTDE\$;:PRIN TUSING"###,###,###,###. ##";TV(X,1)	GE 540	COLOR5,10:WINDOW 10,13+ X,38,13+X:TV(X,1)=BG(X, 1)*SV(X):PRINTDE\$;:PRIN TUSING"###,###,###,###. ##";TV(X,1)
AD 340	PRINTUSING"###,###,###";SV (X):NEXT	PA 550	TW(1)=0:FORN=0TO5:TW(1) =TW(1)+TV(N,1):NEXT:WIN DOW 0,20,38,20:PRINT" {7}STOCK VALUE {WHT}";: PRINTUSING"###,###,### .##";TW(1)	PA 550	TW(1)=0:FORN=0TO5:TW(1) =TW(1)+TV(N,1):NEXT:WIN DOW 0,20,38,20:PRINT" {7}STOCK VALUE {WHT}";: PRINTUSING"###,###,### .##";TW(1)
BG 350	WINDOW 0,10,79,24:SCNCLR: PRINTTAB(10){6}PLAYE R ONE'S ASSETS"TAB(50)" {YEL}PLAYER TWO'S ASSET S{DOWN}"	ED 560	WINDOW 0,21,38,21:PRINT "{GRN}CASH ON HAND{WHT}" ;:PRINTUSING"###,###, ###.##";CH(1)	ED 560	WINDOW 0,21,38,21:PRINT "{GRN}CASH ON HAND{WHT}" ;:PRINTUSING"###,###, ###.##";CH(1)
KE 360	PRINTTAB(9){7}BOUGHT {9 SPACES}CURRENT"TAB(4 9)"BOUGHT{9 SPACES}CURR ENT"	CD 570	FT(1)=TW(1)+CH(1):WINDO W 0,22,38,22:PRINT" {PUR}TOTAL WORTH {WHT}" ;:PRINTUSING"###,###,## .##";FT(1)	CD 570	FT(1)=TW(1)+CH(1):WINDO W 0,22,38,22:PRINT" {PUR}TOTAL WORTH {WHT}" ;:PRINTUSING"###,###,## .##";FT(1)
RK 370	FORX=0TO5:COLOR5,2+INT( X*1.2):PRINTSK\$(X);TAB( 40)SK\$(X):NEXT	JF 580	TV(X,2)=BG(X,2)*SV(X):W INDOW 50,13+X,78,13+X:P RINT"{2}DE\$;:PRINTUSIN G"###,###,###.##";T V(X,2)	JF 580	TV(X,2)=BG(X,2)*SV(X):W INDOW 50,13+X,78,13+X:P RINT"{2}DE\$;:PRINTUSIN G"###,###,###.##";T V(X,2)
GX 380	PRINTCHR\$(27)+"M";" {YEL}";:FORX=0TO5:GOSUB 540:NEXT	EE 590	TW(2)=0:FORN=0TO5:TW(2) =TW(2)+TV(N,2):NEXT:WIN DOW 40,20,78,20:PRINT" {7}STOCK VALUE {WHT}";: PRINTUSING"###,###,### .##";TW(2)	EE 590	TW(2)=0:FORN=0TO5:TW(2) =TW(2)+TV(N,2):NEXT:WIN DOW 40,20,78,20:PRINT" {7}STOCK VALUE {WHT}";: PRINTUSING"###,###,### .##";TW(2)
MH 390	WINDOW0,9,79,9:FORZA=0T 079:PRINT"*";:NEXT				

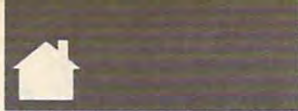




# PROGRAMS

490	LIE TO US!{2 SPACES}TH	F OF YOU!"
BJ 790 WINDOW0,10,79,24:SCNCLR	E IRS IS GOING TO INVES	CA 1200 PRINT"TOO BAD..HAHAHA,
AS="SELL OPTIONS":COLO	TIGATE THIS!":GOSUB1160	HE HE... HAHHA...
R5,11:S=(80-LEN(AS))/2:	:GOTO1130	{2 SPACES}EXCUSE ME, B
PRINTTAB(S)AS"{DOWN}"	EM 1000 IF YP<0THENBEGIN:LY(P)	UT IT IS FUNNY."
HP 800 PRINT"{PUR}STOCK"TAB(15	=LY(P)+1:WS=3-LY(P):IF	MA 1210 PRINT"{3 DOWN}WOULD YO
)"CURRENT VALUE"TAB(30)	LY(P)=3THEN1170	U LIKE ANOTHER CHANCE?
"AMOUNT OWNED"	BH 1010 AS="{RED}WARNING{BLK}"	"
CF 810 FORX=0TO5:PRINT"{WHT}"X	:PRINTCHR\$(2);:GOSUB11	SD 1220 GETAS:IFAS="Y"ORAS="N"
+1"{LEFT}. ";:COLOR5,2+	60:PRINT"{2 DOWN}"	THEN1230:ELSE1220
INT(X*1.2):PRINTSK\$(X)T	BQ 1020 AS="{3 SPACES}THROUGH	BP 1230 SLEEP2:PRINT"SORRY BUT
AB(15);:PRINTUSING"###	{SPACE}COMPLETE INCOMP	I CHANGED MY MIND, YO
.##";SV(X);:PRINTTAB(30)	ETENCE, YOU HAVE MANAG	U CAN'T HAVE ANOTHER C
BG(X,P):NEXT	ED TO COMPLETELY UNDER	HANCE!"
GJ 820 WINDOW45,12,79,18:PRINT	WHELM THE":PRINTAS	AA 1240 PRINT"{3 DOWN}GOOD-BYE
"{2}PLAYER "P" CASH ON	FF 1030 AS="NEW YORK STOCK EXC	:SLEEP1:COLOR5,1:COLO
{SPACE}HAND{2 DOWN}	HANGE, EMBARRASSING YO	R6,1:END
{YEL}":PRINTUSING"###,	UR FRIENDS, NEIGHBORS	CK 1250 X=INT(RND(Y)*6):Y=RND(
###,###.##";CH(P)	{SPACE}AND RELATIVES.	X)*10+1:Z=INT(RND(X)*2
PA 830 WINDOW0,22,79,22:PRINT	{2 SPACES}IF":PRINTAS	):IFZ=1THENY=0-Y
{GRN}WHICH STOCK DO YOU	CS 1040 AS="THIS UNSEEMLY BEHA	KJ 1260 SV(X)=SV(X)+Y
WISH TO SELL?":GETAS:	VIOR CONTINUES FOR"+ST	BQ 1270 IFSV(X)<0THENSV(X)=0:
IFAS=CHR\$(13)THENWINDOW	R\$(WS)+" MORE YEARS, Y	ELSEIFSV(X)>120THENSV
0,10,79,24:SCNCLR:GOTO	OUR SEAT ON THE STOCK"	(X)=120
460	:PRINTAS	BH 1280 IFSV(X)=0THENBEGIN
RX 840 IFAS<"1"ORAS>"6"THEN830	RB 1050 AS="EXCHANGE WILL BE G	GD 1290 WINDOW0,10,79,24:SCNC
:ELSEX=VAL(AS)-1:PRINTA	IVEN TO ONE WHO IS MOR	LR:COLOR5,2+INT(X*1.2)
\$	E WORTHY!":PRINTAS:PRI	:AS=SK\$(X)+" HAS GONE
EJ 850 IF BG(X,P)=0THENPRINT"	NT"{DOWN}":OW(P)=FT(P)	{SPACE}BROKE!":GOSUB11
{CLR}{HOME}{3}YOU DON'T	QF 1060 IFDT(P)>0THENBEGIN:TX=	60:PRINT"{YEL}"
OWN ANY OF THAT STOCK!	INT(DT(P)/4):PRINT"YOU	MC 1300 PRINT"{DOWN}A NEW COMP
":SOUND1,4291,30,2,2145	DID MANAGE TO COLLECT	ANY HAS REPLACED THIS
,2146,2,2048:SLEEP 2:GO	{LEFT}"+STR\$(DT(P))	{SPACE}FAILURE.
TO830	+" IN DIVIDENDS.{DOWN}	{2 SPACES}ALL STOCKS O
HA 860 WINDOW0,23,79,23:B=0:IN	"	F THIS COMPANY HAVE BE
PUT"{CLR}{HOME}{6}HOW M	DJ 1070 PRINT"LET'S SEE... AH	EN"
ANY";B:IFB<0THEN910	{SPACE}YES, A MERE 25%	JK 1310 PRINT"REMOVED FROM YOU
HX 870 IFB>BG(X,P)THENPRINT"	FOR UNCLE SAM AMOUNTS	R PORTFOLIO.{2 SPACES}
{CLR}{HOME}{3}YOU DON'T	TO";:PRINTUSING"###,	YOU WILL NOTICE THAT I
OWN THAT MUCH":SOUND1,	###,###.##";TX:CH(P)=C	F YOU OWNED STOCK IN T
8583,30:SLEEP2:GOTO860	H(P)-TX	HIS"
JF 880 PR=B*SV(X)	KX 1080 PRINT"THANK YOU FOR YO	BH 1320 PRINT"YOU NO LONGER OW
HE 890 BG(X,P)=BG(X,P)-B:CH(P)	UR GENEROSITY":BEND:BE	N IT.":BG(X,1)=0:BG(X,
=CH(P)+PR	ND	2)=0:READSK\$(X):SV(X)=
XB 900 GOTO790	BA 1090 IFYP<0THEN1130	50:WINDOW0,3+X,8,3+X:S
MF 910 PRINT"{CLR}{HOME}{3}DO	MP 1100 TX=INT(YP/4):PRINT"YOU	CNCLR
{SPACE}I LOOK THAT STUP	HAVE EARNED";TAB(54);	KP 1330 COLOR5,2+INT(X*1.2):PR
ID! TRY AGAIN.":SOUND1,	CHR\$(2);:PRINTUSING"#\$	INTSK\$(X):RR=2:GOSUB52
3000,30,1:SLEEP2:GOTO86	##,###,###.##";YP:	0
0	MP 1110 PRINT"UNCLE SAM WANTS	GR 1340 SOUND 1,2000,30,0,0,0,
CX 920 YR=YR+1:IFYR<200THEN RE	{SPACE}HIS 25%, SO THA	1,1000
TURN:ELSE YR=0:COLOR5,1	T MEANS YOUR TAXES ARE	SH 1350 WINDOW0,20,79,20:COLOR
:COLOR6,16:SOUND 1,3433	"::PRINTUSING"###,###	5,2+INT(X*1.2):AS="PRE
4,90,0,4291,100,2,2048	,###.##";TX:CH(P)=CH(P	SS ANY KEY TO CONTINUE
SD 930 FORP=1TO2:WINDOW0,0,79,	)-TX	:GOSUB1160:IF UY=>26
24:PRINT"{CLR}{HOME}"	AS 1120 PRINT"{2 DOWN}HAVE A N	{SPACE}THEN RESTORE:UY
RH 940 AS="UNCLE {RVS}{RED} S	ICE DAY!":LY(P)=0	=0:ELSE UY=UY+1
{SPACE}{WHT} A {7} M	XH 1130 WINDOW0,24,79,24:AS="	XC 1360 GETAS:IFAS=""THEN1360
{BLK}{OFF} WANTS HIS SH	{RED}PRESS ANY TO CONT	EB 1370 COLOR6,1:RT=1:GOSUB350
ARE OF THE PROFITS!":GO	INUE.":GOSUB1160:DT(P)	:BEND
SUB1160:PRINT"{DOWN}"	=0	JP 1380 IFSV(X)=0THEN1520:ELSE
RJ 950 AS="PLAYER"+STR\$(P):GOS	CF 1140 GETAS:IFAS=""THEN1140	PS=INT(RND(Y)*5):IFSV
UB1160:PRINT"{DOWN}"	JK 1150 OW(P)=FT(P):DT(P)=0:NE	(X)<10ANDPS=3THENSV(X)
AR 960 PRINT"YOU ENDED THIS YE	XT:COLOR6,1:RETURN	=SV(X)+30:RR=2:GOSUB52
AR WITH"TAB(54);:PRINTU	SP 1160 S=(80-LEN(AS))/2:PRINT	0:RR=1:SOUND 1,10000,1
SING"###,###,###.##";F	TAB(S)AS;:RETURN	00,0,600,100,3,500
T(P)	GG 1170 WINDOW0,0,79,24:SCNCLR	QM 1390 PS=INT(RND(Y)*5):IFPS=
AD 970 PRINT"YOU STARTED THIS	:COLOR6,3:COLOR5,1	2ANDSV(X)>100THENBEGIN
{SPACE}YEAR WITH"TAB(54	ED 1180 AS="{BLK}PLAYER"+STR\$(P)	:SV(X)=SV(X)/5:RR=2:GO
);:PRINTUSING"###,###,	:GOSUB1160:PRINT	SUB520
###.##";OW(P)	KS 1190 PRINT"{2 DOWN}{BLU}GAM	JX 1400 FORT=1TO16:COLOR6,T:FO
HG 980 YP=FT(P)-OW(P):	E IS OVER FOR YOU.	RTT=0TO20:NEXT:NEXT:CO
KG 990 IFYP=0THENPRINT"	{2 SPACES}THE OTHER PL	LOR6,1:SOUND1,9000,120
{3 DOWN}":AS="YOU CAN'T	AYER BEAT THE PANTS OF	,1,0,20,0,2048:SOUND2,





# PROGRAMS

7000,120,1,0,20,0,2048 :SOUND3,6000,120,1,0,2 0,0,2048:BEND	DX 1490 WINDOW 0,23,79,23:A\$="	SH 1620 BEND
SA 1410 IF SV(X)>100THENBEGIN	{CYN}PRESS ANY KEY":GO	AF 1630 IF FT(P)=>1000000.00TH
CM 1420 DV=INT(RND(Y)*10)+10:F	SUB1160:RR=3:GOSUB520	ENBEGIN:WINDOW0,0,79,2
ORP=1TO2:IFBG(X,P)=0TH	GETAS:IFAS=""THEN1500	4:SCNCLR
EN1510:ELSEDX(P)=BG(X,	SP 1510 NEXT:BEND:IFRR=3THENRT	HK 1640 A\$="{3}PLAYER"+STR\$(P)
P)*DV:CH(P)=CH(P)+DX(P)	=1:GOSUB350:RT=0:RETUR	:GOSUB1160:PRINT"{2}
)	N	{3 DOWN}"
AF 1430 WINDOW0,10,79,24:SCNCL	BQ 1520 IFRT=1THEN RT=0:X=X-1:	JA 1650 PRINT"CONGRATULATIONS!
R:A\$="{7}PLAYER"+STR\$(P):	RETURN:ELSE IFRR>1THEN	{2 SPACES}YOU ARE A MI
GOSUB1160:PRINT"	RR=1:RETURN:ELSE RR=1:	LLIONAIRE.{2 SPACES}GO
{WHT}{3 DOWN}"	GOSUB520:RETURN	AHEAD AND SHAKE THE L
DX 1440 PRINT"YOU OWN "BG(X,P)	AG 1530 FORP=1TO2:IFFT(P)<100	OSER'S HAND."
" PIECES OF "SK\$(X)".	{SPACE}THEN BEGIN	HM 1660 PRINT"HE NEEDS THE COM
{2 SPACES}THEY ARE WOR	FS 1540 WINDOW 0,0,79,24:COLOR	FORT AFTER SUCH A CRUS
TH";TAB(60);:PRINTUSIN	6,13:SCNCLR	HING DEFEAT.{2 SPACES}
G"\$###,###,###.##";BG(X,	JB 1550 A\$="{BLU}PLAYER"+STR\$(P):	WELL DONE, NOW GET UP
P)*SV(X)	:GOSUB1160:PRINT"	{SPACE}OUT"
CA 1450 PRINT"{DOWN}YOUR COMPA	{BLK}{2 DOWN}"	RH 1670 PRINT"OF THAT CHAIR AN
NY IS PAYING YOU A DIV	CM 1560 PRINT"YOUR TOTAL WORTH	D LET SOMEONE ELSE PLA
IDEND OF";TAB(60);:PRI	HAS DECLINED TO LESS	Y FOR A WHILE.":CH(P)=
NTUSING"\$###,###,###.##	{SPACE}THAN \$100.00.	5000:FORZ=0TO5:BG(Z,P)
##";DX(P)	{2 SPACES}WE REGRET, (	=0:NEXT
DC 1460 IFSV(X)=120THENDB=BG(X,	HEHEHE),"	JD 1680 SOUND1,9000,180,2,100,
P)*25:CH=CH+DB:DT(P)=	DP 1570 PRINT"TO INFORM YOU TH	1000,0,100
DT(P)+DB:PRINT"{DOWN}F	AT YOUR SEAT ON THIS E	PX 1690 PRINT"{3 DOWN}{YEL}":A
OR YOUR LOYALTY TO THE	XCHANGE HAS BEEN SOLD!	\$="PRESS ANY KEY":GOSU
COMPANY,":PRINT"YOU R	{2 SPACES}PLEASE SHAKE	B1160
ECEIVE A SPECIAL BONUS	"	JQ 1700 GETKEYA\$:RUN
OF";TAB(60);:ELSEGOTO	GH 1580 PRINT"THE WINNER'S HAN	FQ 1710 BEND
1480	D ON YOUR WAY OUT THE	KQ 1720 NEXT
HP 1470 PRINTUSING"\$###,###,##	{SPACE}DOOR, AND DON'T	CQ 1730 RETURN
#.##";DB	SLAM IT!{3 DOWN}"	HP 1740 WINDOW0,0,79,24:PRINT"
MQ 1480 PRINT"{DOWN}DON'T SPEN	RE 1590 SOUND 1,6000,60:RR=3	{CLR}{HOME}"
D IT ALL IN ONE PLACE!	QA 1600 A\$="{RVS}{WHT} PRESS A	QR 1750 PRINTERR\$(ER);EL
"	NY KEY ":GOSUB1160	HS 1760 END
	HC 1610 GET A\$:IFAS=""THEN1610	
	:ELSE RUN	

HUBERT CROSS

Lengths of fuse have been laid out in overlapping patterns on a playing screen of movable tiles. Your job, once the fuse has been lit, is to join lengths of fuse in order to keep the flame burning for as long as possible

Like many other puzzles, *Fuse* appears deceptively simple at the beginning, but it grows in complexity as the game progresses. You find that quick thinking and careful planning yield the highest scores.

### Getting Started

*Fuse* is written entirely in machine language, but it loads and runs as a BASIC program. You'll need *MLX*, the machine language entry program, to type it in. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801

Ending address: 15F0

After you've entered all the data

# FUSE

ADDING FUEL TO THE  
FIRE IS THE WHOLE  
IDEA BEHIND THIS  
BURNING ARCADE  
GAME FOR THE 64.  
JOYSTICK REQUIRED.

for *Fuse*, save a copy to disk before exiting *MLX*. When you're ready to play, plug a joystick into port 2, load *Fuse*, and type RUN. Press the fire button to start playing.

The object of *Fuse* is to keep the flame burning for as long as possible. Help the flame stay alive by moving the tiles with the joystick. The longer you manage to keep it going, the higher your score. The game ends when the flame runs out of fuse or when it reaches one of the borders.

Don't wait until the flame is about to run out of fuse to start moving. Look ahead and follow the fuse to its end; then move to that area and maneuver the tiles to create the longest possible path. You won't be able to keep it going forever, but the longer you do, the more points you receive. As the flame travels, the fuse is burned up, leaving only a blank tile behind. So you must continuously shuffle the tiles around to keep the flame lit.

Sometimes it's a good idea to make the flame change paths by waiting beside a tile and moving that tile when the flame is on it. You'll have to be fast, though, because you'll lose if the flame reaches the tile's border before the tile stops moving.





# PROGRAMS

## Fuse

```

0801:0A 08 00 00 9E 32 30 36 6C
0809:31 00 00 00 BA 8E 12 08 ED
0811:A2 00 9A A2 00 A9 00 9D 34
0819:00 50 E8 D0 FA A9 3C 8D EB
0821:53 50 AD EF 15 8D 59 50 85
0829:A9 05 8D 55 50 A9 05 8D 17
0831:56 50 A9 0B 8D 57 50 A9 7A
0839:DF 8D FB 07 A9 CF 8D F9 2E
0841:07 20 81 FF A9 1F 8D 18 0A
0849:D0 A9 D8 8D 16 D0 A9 01 68
0851:8D 20 D0 A9 00 8D 21 D0 2E
0859:A9 0E 8D 22 D0 A9 06 8D 5C
0861:23 D0 A9 EE 8D 1C D0 A9 83
0869:0E 8D 25 D0 A9 01 8D 26 28
0871:D0 A9 07 D0 27 D0 A9 06 E3
0879:8D 28 D0 A9 06 8D 29 D0 98
0881:A9 06 8D 2A D0 A9 06 8D 03
0889:2C D0 A9 06 8D 2D D0 A9 E5
0891:06 8D 2E D0 20 0F 10 20 58
0899:8F 10 20 39 0F A9 09 8D CB
08A1:86 02 20 44 E5 A2 77 A9 10
08A9:A0 9D 30 13 CA 10 FA A9 30
08B1:0A 8D 72 13 A9 05 8D 4C 72
08B9:50 A9 04 8D 4D 50 A0 27 C9
08C1:A9 02 20 71 0C A0 27 A9 10
08C9:01 20 71 0C 20 F0 12 20 5A
08D1:0A 0D A9 02 20 65 0D AD DD
08D9:00 DC 29 10 D0 F9 A9 03 0C
08E1:20 65 0D 78 A9 3E 8D 14 F9
08E9:03 A9 0A 8D 15 03 58 A9 0F
08F1:D0 8D 20 50 A9 06 8D 28 7F
08F9:50 A9 08 8D 30 50 20 F7 71
0901:0C 20 CE 0B A9 0F 8D 15 65
0909:D0 20 60 0C 20 DC 0D F0 D7
0911:F8 AD 4C 50 18 79 51 0B ED
0919:C9 0C B0 ED 8D 4E 50 AD FB
0921:4D 50 18 79 55 0B C9 0A FC
0929:B0 DF 8D 4F 50 8C 1E 0A 2C
0931:AD 4E 50 AC 4F 50 18 79 E7
0939:33 13 AB B9 3D 13 8D 62 0E
0941:50 8C 63 50 AD 4E 50 CD 25
0949:55 50 D0 0B AD 4F 50 CD FD
0951:56 50 D0 03 4C C4 09 AC 21
0959:62 50 B9 3E 0B 8D FE 07 5F
0961:B9 48 0B 8D ED 07 A9 DF DB
0969:8D FF 07 A2 07 20 A6 0C 5F
0971:CA 0E 04 D0 F8 AD 15 D0 28
0979:09 E0 8D 15 D0 AC 63 50 9B
0981:A9 0A 99 3D 13 20 F0 12 FE
0989:A9 07 8D DA 0A 20 1D 0A A6
0991:20 60 0C AD 50 50 D0 F8 86
0999:AD 4C 50 AC 4D 50 18 79 BF
09A1:33 13 AB AD 62 50 99 3D C6
09A9:13 AD 4E 50 8D 4C 50 AD 6B
09B1:4F 50 8D 4D 50 20 F0 12 FC
09B9:AD 15 D0 29 1F 8D 15 D0 BE
09C1:4C 0A 09 AC 63 50 B9 3D 75
09C9:13 48 A9 0A 99 3D 13 20 55
09D1:F0 12 AD 4C 50 AC 55 50 8B
09D9:8D 55 50 8C 4C 50 AD 4D 27
09E1:50 AC 56 50 8D 56 50 8C 0A
09E9:4D 50 A9 03 8D DA 0A 20 28
09F1:1D 0A 0E 54 50 90 03 20 07
09F9:14 0D AD 5B 50 30 1A AD E9
0A01:50 50 D0 EE AD 55 50 AC 6A
0A09:56 50 18 79 33 13 AB 68 96
0A11:99 3D 13 20 F0 12 4C 0A 18
0A19:09 4C 70 0B A0 00 B9 29 25
0A21:0B 8D 48 50 B9 2D 0B 8D 52
0A29:49 50 A9 31 0B 8D 4A 50 B3
0A31:B9 35 0B 8D 4B 50 B9 39 F1
0A39:0B 8D 50 50 60 A2 07 BD 9E
0A41:30 80 F0 16 DE 40 50 D0 6A
0A49:11 9D 40 50 DE 38 50 F0 C3
0A51:06 FE F8 07 4C 5B 0A 20 BB
0A59:F7 0C CA 10 E2 0E 5C 50 1F
0A61:90 07 A9 00 8D 5A 50 F0 1C

```

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0A69:22 AD 5B 50 30 2F CE 59 9F
0A71:50 D0 2A AD EF 15 8D 59 4A
0A79:50 EE 5A 50 AD 5A 50 CD 07
0A81:F0 15 90 07 A9 80 8D 5B 9B
0A89:50 30 12 AC 5A 50 B9 F1 58
0A91:15 8D 5D 50 B9 05 16 8D DF
0A99:5E 50 20 85 0C CE 53 50 DF
0AA1:D0 29 A9 3C 8D 53 50 EE AA
0AA9:51 50 D0 03 EE 52 50 A9 CF
0AB1:80 8D 54 50 AC 51 50 CC 11
0AB9:ED 15 AD 52 50 ED EE 15 12
0AC1:90 09 8C ED 15 AD 52 50 25
0AC9:8D EE 15 AD 50 50 F0 39 BC
0AD1:CE 50 50 A9 03 8D 64 50 6D
0AD9:A2 07 BD 10 50 18 6D 48 BF
0AE1:50 9D 10 50 BD 00 50 6D 88
0AE9:49 50 9D 00 50 BD 18 50 64
0AF1:18 6D 4A 50 9D 18 50 BD 67
0AF9:08 50 6D 4B 50 9D 08 50 E1
0B01:20 B8 0C CA CE 64 50 D0 FC
0B09:D1 AD 5D 50 18 6D 01 50 EC
0B11:69 FF 8D 00 50 AD 5E 50 D3
0B19:18 6D 09 50 69 FA 8D 08 17
0B21:50 A2 00 20 B8 0C 4C 31 C9
0B29:EA 00 00 80 80 00 00 00 C0
0B31:FF AA 55 00 00 FF 00 9C
0B39:00 18 18 18 DA DB D7 95
0B41:DA DE DB DE D8 DE DE DC C2
0B49:DD D9 DE DC DE DD DE D9 74
0B51:DE 00 00 FF 01 FF 00 E0 E0
0B59:00 14 20 2C 38 44 50 5C 0B
0B61:68 74 80 8C 98 42 52 62 76
0B69:72 82 92 A2 B2 C2 D2 78 94
0B71:A9 31 8D 14 03 A9 EA 8D BD
0B79:15 03 58 A9 01 20 65 0D E0
0B81:20 E4 FF C9 4E F0 07 C9 8B
0B89:59 D0 F5 4C 11 08 20 81 6E
0B91:FF 4C 86 E3 20 49 0C BD C5
0B99:EE 14 99 3D 13 20 F0 12 BB
0BA1:AD 15 D0 29 F1 8D 15 D0 41
0BA9:AE 50 8D AD 55 50 18 7D AB
0BB1:11 15 C9 0C B0 B9 8D 55 6C
0BB9:50 AD 56 50 18 7D 3D 15 79
0BC1:C9 0A B0 AB 8D 56 50 BD 34
0BC9:69 15 8D 57 50 20 49 0C A2
0BD1:BD C5 13 30 9A A8 B9 1D A5
0BD9:14 85 FB B9 2B 14 85 FC 28
0BE1:A0 00 B1 FB 8D F0 15 85 1E
0BE9:02 C8 B1 FB 99 F0 15 C6 AA
0BF1:02 D0 F6 BD F1 13 AB B9 DE
0BF9:1D 14 85 FB B9 2B 14 85 3C
0C01:FC A0 00 B1 FB 9D 04 16 0F
0C09:85 02 C8 B1 FB 9D 04 16 FC
0C11:C6 02 D0 F6 BD 95 15 20 25
0C19:DE 0C BD C1 15 8D FA 07 53
0C21:A2 03 AC 55 50 B9 5A 0B 5F
0C29:9D 00 50 AC 56 50 B9 66 B2
0C31:00 9D 08 50 20 B8 0C CA 03
0C39:D0 E8 AD 15 D0 09 0E 8D 4F
0C41:15 D0 A9 80 8D 5C 50 60 34
0C49:AD 55 50 AC 56 50 18 79 FF
0C51:33 13 AB AD 57 50 18 79 5D
0C59:3D 13 8D 58 50 AA 60 0E 08
0C61:5B 50 90 03 20 95 0B 0E F8
0C69:54 50 90 03 4C 14 0D 60 2F
0C71:48 A9 77 20 4A 0E AA BD A6
0C79:3D 13 D0 F5 68 9D 3D 13 B5
0C81:88 10 ED 60 A9 0C 85 FD FE
0C89:A9 33 85 FE 20 ED 0D EE A5
0C91:5D 50 20 ED 0D EE 5E 50 80
0C99:20 ED 0D CE 5D 50 2E ED 26
0CA1:0D CE 5E 50 60 AC 4E 50 67
0CA9:B9 5A 0B 9D 00 50 AC 4F 5A
0CB1:50 B9 66 0B 9D 08 50 08 93
0CB9:78 8A 0A A8 BD 10 50 0A 55
0CC1:BD 00 50 2A 99 0D 0D BD 91
0CC9:08 50 99 01 D0 AD 10 D0 6B
0CD1:3D BD 13 90 03 1D B5 13 6E

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```

0CD9:8D 10 D0 28 60 4A 66 FB 4E
0CE1:4A 66 FB 85 FC A5 FB 29 30
0CE9:C0 85 FB A0 3F B1 FB 99 9F
0CF1:C0 33 88 10 F8 60 BD 20 2E
0CF9:50 9D F8 07 BD 30 50 9D 1E
0D01:40 50 BD 28 5D 9D 38 50 43
0D09:60 A0 02 20 5F 0D A2 04 36
0D11:20 74 0D A0 08 20 5F 0D 90
0D19:AD 51 50 AC 52 50 20 2D 74
0D21:0D A0 21 20 5F 0D AD ED 88
0D29:15 AC EE 15 85 63 84 62 4D
0D31:A2 90 38 20 49 BC 20 DD 25
0D39:BD A2 FF E8 BD 02 01 D0 32
0D41:FA F0 11 A9 30 8D 00 01 8A
0D49:A0 05 B9 00 01 99 01 01 9D
0D51:88 10 F7 E8 E0 04 D0 EB E5
0D59:A9 01 A8 4C 1E AB A2 17 5E
0D61:18 4C F0 FF 48 AA BC 7C 9B
0D69:0D BD 7F 0D AA 18 20 F0 21
0D71:FF 68 AA BD 82 0B 8C 86 1F
0D79:0D 4C 1E AB 0C 0F 0C 01 61
0D81:01 01 8B 9D A9 BB 0D 0D 0B
0D89:0D 0D 05 54 52 59 20 41 CC
0D91:47 41 49 4E 3F 20 28 59 D1
0D99:2F 4E 29 00 05 50 52 45 57
0DA1:53 53 20 46 49 52 45 00 C0
0DA9:09 20 20 20 20 20 20 38
0DB1:20 20 20 20 20 20 20 CB
0DB9:20 00 05 53 43 4F 52 45 FA
0DC1:3A 1D 1D 1D 1D 20 20 73
0DC9:20 20 20 20 20 20 48 0C
0DD1:49 47 48 20 53 43 4F 52 06
0DD9:45 3A 00 AD 00 DC 0A 0A 91
0DE1:0A 0A A0 04 0A 90 03 88 F8
0DE9:D0 FA 98 60 A0 00 8C 5F C1
0DF1:50 AC 5F 50 B9 46 0E 48 9B
0DF9:AC 5D 50 B9 1D 0E AC 5E 40
0E01:50 18 79 29 0E A8 AD 5D D8
0E09:50 29 03 AA 68 3D 3E 0E 65
0E11:85 06 B1 FD 3D 42 0E 05 9B
0E19:06 91 FD 60 00 00 00 00 62
0E21:01 01 01 01 02 02 02 4C
0E29:00 03 06 09 0C 07 12 15 2D
0E31:18 1B 1E 21 24 27 2A 2D 35
0E39:30 33 36 39 3C C0 30 0C E5
0E41:03 3F CF F3 FC 00 55 AA 25
0E49:FF 8D 75 0E A9 81 8D 0F D5
0E51:D4 8D 12 D4 A9 FF 8D 74 A7
0E59:0E AD 75 0E D0 04 60 4E 1D
0E61:74 0E 0A 90 FA AD 1B D4 1F
0E69:2D 74 0E CD 75 0E F0 02 9F
0E71:B0 F3 60 00 00 AD 61 50 B8
0E79:18 69 02 8D C4 0E AD 60 2F
0E81:50 18 69 03 8D BF 0E BD 6E
0E89:E1 0E 8D B5 0E BD EC 0E 76
0E91:8D B6 0E A9 00 85 03 AE 49
0E99:61 50 AC 60 50 BD F0 EC 5E
0EA1:85 FB B0 C8 0E 85 FC 86 CA
0EA9:02 0E 19 B0 0D C8 28 B0 99
0EB1:09 A6 03 BD FF FF 91 FB 57
0EB9:A6 02 E6 03 C8 C0 00 D0 D0
0EC1:E6 E8 0E 00 D0 D4 60 04 46
0EC9:04 04 04 04 04 04 05 05 E8
0ED1:05 05 05 05 06 06 06 06 FC
0ED9:06 06 06 07 07 07 07 15
0EE1:F7 FD 03 09 0F 15 1B 21 8E
0EE9:27 2D 33 0E 0E 0F 0F 0F 06
0EF1:0F 0F 0F 0F 0F F9 F8 CD
0EF9:FF FA F7 F6 F5 FD FB FE E1
0F01:FC F4 F5 F3 FF FA F2 F4 9F
0F09:F9 F8 F0 FA FE FE F1 EE 44
0F11:FF EF F7 F6 EE FD FB EF F0
0F19:EF F4 F5 EE F0 FE FC F1 89
0F21:EE ED F0 EF EC F1 F5 F5 60
0F29:FF FA FA F4 EE EE F0 EF B9
0F31:EF F1 20 20 20 20 20 20 AB
0F39:78 A9 33 85 01 A9 D0 8D 9A
0F41:4E 0F A9 38 8D 51 0F A0 73

```

G A Z E T T E C O M M O D O R E 6 4 / 1 2 8





# PROGRAMS

0F49:08	A2	00	BD	00	D0	9D	00	6E	11B9:00	3C	00	00	3C	00	00	3F	0C	1429:C5	D5	14	14	14	14	14	14	9A	
0F51:38	E8	D0	F7	EE	4E	0F	EE	1D	11C1:00	00	0F	C0	00	03	FF	00	DD	1431:14	14	14	14	14	14	14	14	59	
0F59:51	0F	88	D0	EE	A9	37	85	14	11C9:00	FF	00	00	00	00	00	00	EB	1439:0B	00	01	02	03	04	05	06	5F	
0F61:01	58	A2	00	BD	6F	0F	9D	D1	11D1:00	00	00	00	00	00	00	00	F3	1441:07	08	09	0A	0B	07	07	07	3A	
0F69:60	3F	E8	D0	F7	60	7D	7D	6B	11D9:00	00	00	00	00	00	00	00	FB	1449:07	07	07	07	07	07	07	07	71	
0F71:7D	7D	7D	7D	7D	BE	7D	7D	94	11E1:00	00	00	00	00	00	00	00	04	1451:0B	0A	09	08	07	06	05	04	81	
0F79:7D	7D	7D	7D	7D	7D	55	55	1F	11E9:00	00	00	00	00	00	00	00	0C	1459:03	02	01	00	0A	00	01	02	F7	
0F81:55	55	55	55	55	55	55	55	9F	11F1:00	00	00	00	00	00	00	00	14	1461:03	04	05	05	05	05	05	0A	4D	
0F89:55	55	55	55	55	AA	56	56	FF	11F9:00	00	00	00	00	00	00	1C	1469:00	01	02	03	04	05	06	07	89		
0F91:56	56	56	56	56	56	56	56	AF	1201:00	00	00	00	00	00	FF	00	25	1471:07	07	0A	05	05	05	05	05	BB	
0F99:56	56	56	56	56	AA	FF	55	5B	1209:03	FF	00	0F	C0	00	3F	00	24	1479:04	03	02	01	00	0A	05	05	EB	
0FA1:7D	7D	7D	7D	7D	BE	7D	7D	C4	1211:00	3C	00	00	3C	00	00	3C	62	1481:05	05	05	06	07	08	09	0A	E2	
0FA9:7D	7D	7D	7D	55	FF	FF	56	6E	1219:00	00	3C	00	00	3C	00	00	B5	1489:0A	07	07	07	06	05	04	03	19	
0FB1:56	56	56	56	56	AA	55	55	1E	1221:00	00	00	00	00	00	00	00	45	1491:02	01	00	0A	07	07	07	08	06	
0FB9:55	55	55	55	55	FF	FF	D6	59	1229:00	00	00	00	00	00	00	00	4D	1499:09	0A	0B	0C	0D	0E	0A	0A	9C	
0FC1:56	56	56	56	56	AA	57	5F	3C	1231:00	00	00	00	00	00	00	00	55	14A1:09	08	07	06	05	05	05	05	AC	
0FC9:7F	7D	7D	7D	7D	BE	7D	7D	ED	1239:00	00	00	00	00	00	00	00	5D	14A9:05	0A	0E	0D	0C	0B	0A	09	13	
0FD1:7D	7D	7D	FD	F5	D5	55	55	A4	1241:00	00	00	00	FF	00	00	FF	65	14B1:08	07	07	07	0F	00	01	02	6D	
0FD9:55	55	55	55	57	FF	FF	55	08	1249:C0	00	03	F0	00	00	FC	00	37	14B9:03	04	05	06	07	08	09	0A	D9	
0FE1:55	55	55	55	55	AA	56	56	58	1251:00	3C	00	00	3C	00	00	3C	A2	14C1:0B	0C	0D	0E	0F	05	05	05	90	
0FE9:56	56	56	56	56	FF	D5	F5	51	1259:00	00	3C	00	00	3C	00	00	F5	14C9:05	05	05	05	05	05	05	05	81	
0FF1:FD	7D	7D	7D	7D	BE	7D	7D	55	1261:00	00	00	00	00	00	00	00	85	14D1:05	05	05	05	0F	0E	0D	0C	F5	
0FF9:7D	7D	7D	7F	5F	57	FF	57	8D	1269:00	00	00	00	00	00	00	00	8D	14D9:0B	0A	09	08	07	06	05	04	0A	
1001:55	55	55	55	55	AA	56	56	79	1271:00	00	00	00	00	00	00	00	95	14E1:03	02	01	00	03	05	08	08	E8	
1009:56	56	56	56	56	FF	A9	34	54	1279:00	00	00	00	00	00	00	00	9D	14E9:09	08	09	09	08	08	08	04	73	
1011:8D	25	10	8D	36	10	A9	10	71	1281:00	00	00	00	00	00	00	00	A5	14F1:06	08	09	08	09	08	09	08	25	
1019:8D	33	10	A0	02	84	02	A2	A1	1289:00	00	00	00	00	00	00	00	AD	14F9:80	80	03	06	07	08	09	09	98	
1021:00	8A	9D	00	34	E8	D0	FA	79	1291:00	00	00	00	00	00	00	00	B5	1501:80	80	09	80	80	04	05	07	D9	
1029:EE	25	10	88	D0	F4	A0	00	30	1299:00	00	00	00	00	00	00	00	BD	1509:09	80	80	09	80	09	80	80	22	
1031:BD	4F	10	99	00	34	C8	C8	CA	12A1:00	00	00	00	00	00	00	00	C5	1511:01	FF	00	00	01	80	FF	00	CD	
1039:C8	E8	8A	29	07	D0	F1	98	D3	12A9:00	00	00	00	00	00	00	55	23	1519:80	80	80	FF	01	00	FF	80	3C	
1041:18	69	28	AB	90	EA	EE	36	9B	12B1:55	56	55	56	55	55	56	1F	1521:01	80	00	80	80	80	00	00	F9		
1049:10	C6	02	D0	E3	60	10	08	39	12B9:55	55	56	55	55	56	55	02	1529:FF	80	00	00	80	80	FF	80	F9		
1051:2A	52	35	5B	7E	3C	00	00	5C	12C1:56	55	55	56	55	55	56	55	78	1531:80	00	00	01	00	80	80	01	80	4E
1059:08	32	DC	59	3E	3C	04	89	AF	12C9:55	56	55	55	56	55	55	56	37	1539:80	01	80	80	00	00	FF	80	7C	
1061:59	16	99	25	3E	3C	04	20	C4	12D1:55	55	56	55	55	56	55	55	1A	1541:00	80	00	FF	80	80	80	00	92	
1069:10	1A	2E	59	74	3C	00	00	09	12D9:56	55	55	56	AA	AA	AA	00	E3	1549:00	01	00	80	80	80	01	80	40	
1071:4A	5C	3A	7B	36	3C	40	48	38	12E1:00	00	00	00	00	00	00	00	06	1551:80	80	01	FF	00	80	01	FF	FF	
1079:52	69	17	76	6C	3C	22	12	12	12E9:00	00	00	00	00	00	00	00	A0	1559:80	80	80	80	FF	01	00	FF		
1081:94	34	B6	1C	58	3C	44	12	DF	12F1:09	A2	0B	B9	29	13	8D	61	52	1561:FF	80	80	01	80	00	80	80	51	
1089:06	4E	BA	2B	3C	49	35	A9		12F9:50	BD	1D	13	8D	60	50	8E	A7	1569:21	16	00	80	21	80	16	00	E8	
1091:8D	A2	10	A9	10	8D	9F	10	C3	1301:13	13	1C	15	13	8A	18	79	C4	1571:80	80	80	16	21	0B	16	80	4F	
1099:A0	03	A2	00	BD	B0	10	9D	8D	1309:33	13	A8	BE	3D	13	20	76	7B	1579:21	80	0B	80	80	80	0B	00	D9	
10A1:C0	35	E8	D0	F7	EE	9F	10	64	1311:0E	A2	00	A0	00	CA	10	E1	E1	1581:16	80	0B	80	80	80	16	80	EA	
10A9:EE	A2	10	88	D0	EE	60	00	77	1319:88	10	D6	60	02	05	08	0B	A7	1589:80	00	0B	21	00	80	80	0B	75	
10B1:3C	00	00	3C	00	00	3C	00	2C	1321:0E	11	14	17	1A	1D	20	23	2F	1591:50	21	80	80	DC	DD	D7	DE	31	
10B9:00	3C	00	00	3C	00	00	3C	07	1329:02	04	06	08	0A	0C	0E	10	3F	1599:DC	DE	DD	D8	DE	DE	DE	DA	3E	
10C1:00	00	00	00	00	00	00	00	E1	1331:12	14	00	0C	18	24	30	3C	14	15A1:DB	D7	DA	DE	DB	DE	D8	DE	E3	
10C9:00	00	00	00	00	00	3C	00	62	1339:48	54	60	6C	20	50	20	43	31	15A9:DE	DE	DC	DB	D9	DE	DC	DB	34	
10D1:00	3C	00	00	3C	00	00	3C	1F	1341:4D	44	2E	20	20	52	30	52	FD	15B1:DE	DE	D9	DE	DE	DA	DD	D9	24	
10D9:00	00	3C	00	00	3C	00	00	72	1349:45	43	23	2C	20	4C	3D	4F	06	15B9:DA	DE	DE	DD	DE	D9	DE	DE	BD	
10E1:00	00	00	00	00	00	00	00	02	1351:46	46	53	45	54	00	8B	13	B7	15C1:DA	DB	D9	DA	DE	DB	DE	DE	3C	
10E9:00	00	00	00	00	00	00	00	0A	1359:7A	17	41	24	36	22	50	22	CD	15C9:D9	DE	DC	DD	D9	DE	DE	DC	33	
10F1:3C	00	00	3C	00	00	3C	00	6C	1361:AA	C7	28	39	36	AA	38	29	5D	15D1:DE	DD	DE	D9	DE	DE	DA	DD	62	
10F9:00	3C	00	00	3C	00	00	3C	47	1369:AA	C7	28	52	4C	29	AA	C7	25	15D9:D7	DA	DE	DE	DD	D8	DE	DE	5F	
1101:00	00	3C	00	00	3C	00	00	9B	1371:28	52	48	29	AA	C7	28	4C	EC	15E1:DE	DC	DB	D7	DE	DC	DB	DE	AC	
1109:3C	00	00	3C	00	00	3C	00	85	1379:29	3A	20	98	31	34	2C	41	44	15E9:D8	DE	DE	DE	00	00	0A	00	16	
1111:00	3C	00	00	3C	00	00	3C	60	1381:24	3A	20	98	31	34	2C	41	C9										
1119:00	00	3C	00	00	3C	00	00	B3	1389:24	00	C2	13	84	17	3A	20	60										
1121:00	00	00	00	00	00	00	00	43	1391:55	B2	53	43	3A	20	89	38	4B										
1129:00	00	00	00	00	00	00	00	4B	1399:30	30	30	20	20	20	20	20											





# PROGRAMS

P E T E R M . L . L O T T R U P

**H**ere's a challenging and entertaining game that pits you and another player against each other. The object is to see who can be the first to move across a number of squares to the opposing side of the board first without getting electrocuted. The problem is, which squares are wired for you, which for your opponent, and which have no power at all? Play *High Voltage!* and find out.

## Typing It In

*High Voltage!* is written entirely in BASIC. To avoid typing mistakes, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished, save the program to disk.

*High Voltage!* may be played from the keyboard or with a joystick plugged into port 2. After you've loaded and run the program, a presentation screen will appear. Press any key to start the game or press the fire button on the joystick. The computer will take a few seconds to "wire" the board (the board is different every time), and then the game will begin.

## Playing the Game

The object of *High Voltage!* is easy: Get to the opposing side of the board before your opponent does. The red player (player 1) moves from the top of the board to the bottom. The green player (player 2) moves from the bottom to the top.

The starting player is chosen at random by the computer. The player's turn is displayed on the bottom right of the screen. You may start from any of the squares along the top or bottom row, but you may move only on squares that are your color. The problem is that you can't tell what color a square is until you select it by pressing the fire button or hitting Return.

If you accidentally move onto a square with your opponent's color, you get zapped and are returned to your end of the board. You lose control of the game, and it becomes the other player's turn. If you fall on a square that's black (not wired at all),

you'll be returned to your previous position and may try again. You may land on up to three black squares, after which control passes to the other player. When you're zapped back to the start, you'll have to retrace your steps. Observation and a good memory will help, as you'll have to remember your steps along the board to be able to retrace them later.

Movement is limited to one position in any of eight directions and is controlled by the cursor keys on the keyboard or the joystick. To move to a square, put the cursor on it and press the fire button or press Return. If it's an invalid move, nothing will happen. Otherwise, you'll see what hides in that position.

**HIGH  
VOLTAGE!**

CHALLENGE A  
FRIEND TO THIS  
SHOCKING TWO-  
PLAYER GAME FOR  
THE 64

The game ends when either player has reached the other side of the board. The computer will reveal the board and announce the winner; you may then play again by pressing any key or the fire button.

If play gets to be too frustrating, you can press f7 at any time to end the current game without there being any winners. The game board and all the

squares will then be displayed with the correct path revealed. Play can then be resumed.

## Strategy

*High Voltage!* requires good memory and careful observation as well as luck. There will always be at least one correct path to the other side of the board, sometimes more. Pay attention to your own moves and try to memorize the moves you're making. Also watch what your opponent reveals. His or her mistakes may help you know the ending positions of your own path on the board.

Watch out for booby traps. Some paths may seem correct for two or three moves, but there will be no way out, making you lose valuable time backtracking.

## High Voltage

```
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QK 10 V=53248:POKEV,0:POKEV+1,
0:POKEV+21,3:POKEV+23,0:
POKEV+29,0:POKE53287,1
KJ 20 POKE2040,13:X=RND(-TI)
PX 30 FORI=832TOI+63:POKEI,0:N
EXT
PJ 40 FORI=836TO886STEP3:POKEI
,28:NEXT
RF 50 FORI=859TO864:POKEI,255:
NEXT
HA 60 X=11:PRINT"{CLR}";:POKE5
3280,0:POKE53281,0
QG 70 DIMVS(25),T(X,X)
AR 80 VS(0)="{HOME}":FORI=1TO2
4:VS(I)=VS(I-1)+"[DOWN]"
:NEXT
RQ 90 GOSUB1170:GOSUB1380:PRIN
TVS(17)TAB(26){CYN}WIRI
NG BOARD"
.KH 100 PRINTTAB(26)"PLEASE WAI
T..."
HE 110 Y1=1:Y2=X
KQ 120 X1=INT(RND(1)*X)+1
GJ 130 T(Y1,X1)=2:O1=X1:U1=Y1
QM 140 XX=INT(RND(1)*5)+4
JQ 150 IFXX=4THENX1=X1-1
KR 160 IFXX=5THENX1=X1+1
MF 170 IFXX=6THENX1=X1-1:Y1=Y1
+1
DA 180 IFXX=7THENY1=Y1+1
GF 190 IFXX=8THENY1=Y1+1:X1=X1
+1
FA 200 IFX1>XORX1<1ORY1>XORY1<
1THENX1=O1:Y1=U1:GOTO14
0
```





# PROGRAMS

FR 210 IFT(Y1,X1)=0ORT(Y1,X1)= 2THENT(Y1,X1)=2:GOTO230	EF 680 =C+1:GOTO470 GOSUB1500:GOSUB950:IFSL <XTHEN470	{WHT}{OFF}{A}***** *****{S}
CE 220 X1=01:Y1=U1:GOTO140	XP 690 WW=1:GOTO1040	EQ 1070 PRINTTAB(5)"{WHT}- {15 SPACES}-"
QF 230 IFY1<>XTHEN130	RR 700 PL=2:S1=1:S2=1:FL=1:GOS UB1540:GOSUB950:GOTO450	PD 1080 PRINTTAB(5)"- {YEL}THE WINNER IS -"
GJ 240 X2=INT(RND(1)*X)+1:IFT( Y2,X2)THEN240	MX 710 V1=T1:V2=T2	CG 1090 PRINTTAB(5)"{WHT}- {YEL}PLAYER # "PL:PRINT V\$(13)TAB(17)" ! {2 SPACES}{WHT}-"
DS 245 WW=0:T(Y2,X2)=5	BF 720 A=T1:B=T2:POKE53287,5:I FC>2THEN940	PQ 1100 PRINTTAB(5)"{WHT}- {15 SPACES}-"
ME 250 01=X2:U1=Y2	RH 730 POKEV,B*2*8+20:POKEV+1, A*2*8+48:OA=A:OB=B	JA 1110 PRINTTAB(5)"{WHT}{Z}** *****{X}"
JC 260 XX=INT(RND(1)*5)+4	QG 740 GETAS	FB 1120 PRINTV\$(17)TAB(26)" {OFF}{CYN}PRESS ANY KE Y"
RM 270 IFXX=4THENX2=X2-1	QB 750 IFA\$="{RIGHT}"THENB=B+1 :GOTO830	GB 1130 PRINTTAB(26)" {2 SPACES}OR <FIRE> "
QP 280 IFXX=5THENX2=X2+1	DQ 760 IFA\$="{LEFT}"THENB=B-1: GOTO830	GR 1140 PRINTV\$(19)TAB(66)"TO {SPACE}PLAY AGAIN"
GC 290 IFXX=6THENX2=X2-1:Y2=Y2 -1	FK 770 IFA\$="{DOWN}"THENA=A+1: GOTO830	PR 1150 GETAS:U=PEEK(56320):IF AS<>"ORU=111THENRUN
AR 300 IFXX=7THENY2=Y2-1	BE 780 IFA\$="{UP}"THENA=A-1:GO TO830	SP 1160 GOTO1150
BH 310 IFXX=8THENY2=Y2-1:X2=X2 +1	DH 790 IFA\$=CHR\$(13)THEN850	FD 1170 A1\$="{RVS}{RIGHT}{4} {BLU}":A2\$=A1\$
BP 320 IFX2>XORX2<1ORY2>XORY2< LTHENX2=01:Y2=U1:GOTO26 0	KS 800 IFA\$="{F7}"THENPL=0:GOT O1040	RH 1180 TA(1)=0:TA(2)=2:TA(3)= 5
QX 330 IFT(Y2,X2)=0THENT(Y2,X2 )=5:GOTO370	JC 810 U=PEEK(56320):GOSUB1580 :IFA\$<>"THEN750	JF 1190 FORI=1TO11:A1\$=A1\$+" {A}{S}":NEXT
GK 340 IFT(Y2,X2)=2THENWW=WW+1	EJ 820 GOTO740	KC 1200 AA\$=AA\$+"{4} "+CHR\$(13 )+"{RIGHT}{RVS}{7}"
CC 350 IFWW>5THENY2=X:X2=INT(R ND(1)*X)+1:GOTO240	SX 830 IFA<LORB<LORA>XORB>XTHE NA=OA:B=OB:GOTO730	FP 1210 FORI=1TO11:A2\$=A2\$+" {Z}{X}":NEXT
FM 360 X2=01:Y2=U1:GOTO260	DP 840 GOTO730	KG 1220 GOSUB1290:GOSUB1380:GO SUB1540
GS 370 IFY2<>1THEN250	XH 850 IF(T1=XANDA<X)OR(T1<>X) THEN870	AS 1230 PRINTV\$(17)TAB(26)" {CYN}PRESS ANY KEY"
FB 380 FORI=1TOX:FORJ=1TOX:IFT (I,J)=2ORT(I,J)=5THEN42 0	AG 860 T1=A:T2=B:GOTO890	HA 1240 PRINTTAB(26)"TO BEGIN. .."
QF 390 UX=RND(1):IFUX<.2THENT(I ,J)=2:GOTO420	SA 870 IFABS(T1-A)>LORABS(T2-B )>1THEN730	CX 1250 I=INT(RND(1)*11)+1:J=I NT(RND(1)*11)+1:T(I,J) =TA(INT(RND(1)*3)+1)
AF 400 IFUX>.8THENT(I,J)=5:GOT O420	HJ 880 T1=A:T2=B	MH 1260 GOSUB980:T(I,J)=0:GETA S:U=PEEK(56320):IFA\$<> "ORU=111THEN1280
MX 410 T(I,J)=0	BG 890 POKEV,0:POKEV+1,0	CD 1270 GOTO1250
XH 420 NEXTJ,I	PJ 900 I=T1:J=T2:GOSUB980:IFT(I ,J)=2THEN940	FK 1280 GOSUB1290:RETURN
AB 430 S1=1:S2=1:T1=X:T2=X	JQ 910 IFT(I,J)=0THENGOSUB1520 :GOSUB950:T1=V1:T2=V2:C =C+1:GOTO710	QJ 1290 PRINT"{CLR}{RIGHT} {DOWN}{RVS}{4}";
KE 440 POKE198,0:PL=INT(RND(1) *2)+1	DM 920 GOSUB1500:GOSUB950:IFT1 <>1THEN710	FX 1300 FORI=1TO12:PRINT" {2 SPACES}";:NEXT:PRIN T
BA 450 C=0:GOSUB1330	SM 930 WW=2:GOTO1040	JC 1310 FORI=1TO11:PRINTA1\$" {4} ":PRINTA2\$"{4}":N EXT
QM 460 IFPL=2THEN710	GG 940 PL=1:T1=X:T2=X:FL=1:GOS UB1540:GOSUB950:GOTO450	BF 1320 PRINT"{RIGHT}{RVS}{4}" ;:FORI=1TO12:PRINT" {2 SPACES}";:NEXT:RETU RN
GQ 470 U1=S1:U2=S2	ED 950 IFI=7THENPRINTV\$(I*2-1) TAB(40+J*2)"{BLU}{RVS} {A}{S}{DOWN}{2 LEFT}{Z} {X}{HOME}":GOTO970	QC 1330 PRINTV\$(17)TAB(26)" {BLU}{OFF}{A}***** *{S}"
RE 480 A=S1:B=S2:POKE53287,2:I FC>2THEN700	RD 960 PRINTV\$(I*2)TAB(J*2)" {BLU}{RVS}{A}{S}{DOWN} {2 LEFT}{Z}{X}{HOME}";	XM 1340 PRINTTAB(26)"-";:PRINT "{RED}";:IFPL=2THENPRI NT"{GRN}";
KF 490 POKEV,B*2*8+20:POKEV+1, A*2*8+48:OA=A:OB=B	MC 970 RETURN	QA 1350 PRINT"PLAYER"PL:PRINT V\$(18)TAB(36)"{BLU} - {2 SPACES}"
HG 500 GETAS	QJ 980 IFT(I,J)=2THENPRINT" {RED}";	PJ 1360 PRINTV\$(19)TAB(66)" {BLU}{OFF}{Z}***** *{X}":RETURN
BP 510 IFA\$="{RIGHT}"THENB=B+1 :GOTO590	SG 990 IFT(I,J)=5THENPRINT" {GRN}";	BH 1370 PRINTV\$(3)TAB(28)" {OFF}{RED}{RVS}
RG 520 IFA\$="{LEFT}"THENB=B-1: GOTO590	PS 1000 IFT(I,J)=0THENPRINT" {BLK}";	
SB 530 IFA\$="{UP}"THENA=A-1:GO TO590	FM 1010 IFI=7THENPRINTV\$(I*2-1) TAB(40+J*2)"{RVS}UI {DOWN}{2 LEFT}{JK}{HOME} ";:GOTO1030	
XD 540 IFA\$="{DOWN}"THENA=A+1: GOTO590	JS 1020 PRINTV\$(I*2)TAB(J*2)" {RVS}UI{DOWN}{2 LEFT}{J K}{HOME}";	
FX 550 IFA\$=CHR\$(13)THEN610	SB 1030 RETURN	
BX 560 IFA\$="{F7}"THENPL=0:GOT O1040	CQ 1040 POKEV+21,0:FORI=1TOX:F ORJ=1TOX:GOSUB980:NEXT J,I	
GX 570 U=PEEK(56320):GOSUB1580 :IFA\$<>"THEN510	SF 1050 GOSUB1540:IFPL=0THEN11 20	
GH 580 GOTO500	XA 1060 PRINTV\$(10)TAB(5)"	
KK 590 IFA<LORB<LORA>XORB>XTHE NA=OA:B=OB:GOTO490		
JQ 600 GOTO490		
PX 610 IF(S1=LANDA>1)OR(S1<>1) THEN630		
HR 620 S1=A:S2=B:GOTO650		
QF 630 IFABS(S1-A)>LORABS(S2-B )>1THEN490		
XK 640 S1=A:S2=B		
JG 650 POKEV,0:POKEV+1,0		
HB 660 I=S1:J=S2:GOSUB980:IFT(I ,J)=5THEN700		
FS 670 IFT(I,J)=0THENGOSUB1520 :GOSUB950:S1=U1:S2=U2:C		





# PROGRAMS

```

{5 SPACES}{*}"
SG 1380 H=26:PRINTV$(3)TAB(H)"
{OFF}{6 SPACES}{RVS}
{YEL}{3 SPACES}{OFF}
{E}"
BQ 1390 PRINTTAB(H)"{5 SPACES}
{RVS}{3 SPACES}{OFF}
{E}"
FS 1400 PRINTTAB(H)"{4 SPACES}
{RVS}{3 SPACES}{OFF}
{E}"
QH 1410 PRINTTAB(H)"{5 SPACES}
{RVS}{2 SPACES}{OFF}
{E}"
SE 1420 PRINTTAB(H)"{4 SPACES}
{RVS}{2 SPACES}{OFF}
{E}"
JD 1430 PRINTTAB(H)"{3 SPACES}
{RVS}{2 SPACES}{OFF}
{E}"
AJ 1440 PRINTTAB(H)"{4 SPACES}
{RVS}{OFF}{E}"
HG 1450 PRINTTAB(H)"{3 SPACES}
{RVS}{OFF}{E}"
HX 1460 PRINTTAB(H)"{2 SPACES}
{RVS}{OFF}{E}"
PS 1470 PRINTTAB(H)"{2 SPACES}
{RVS}{OFF}{E}"
AC 1480 PRINTTAB(H)"{RVS}{E}
{OFF}{E}"
CD 1490 PRINTV$(9)TAB(26)"

```

```

{YEL}{OFF}HIGH{RVS}{E}
{OFF}VOLTAGE!":RETURN
BP 1500 POKE54273,70:POKE54278
,249:POKE54296,15:POKE
54276,17:POKE54276,16
QX 1510 FORDY=170500:NEXT:POKE
54273,0:RETURN
RB 1520 FORP=17015:POKE54296,1
5:POKE54296,0:NEXT:RET
URN
DP 1530 FORB=170250STEP3:POKE5
4273,B:NEXT:POKE54296,
0:FL=0:RETURN
RS 1540 FORP=542727054295:POKE
P,0:NEXT:POKE54296,15
MD 1550 POKE54277,8:POKE54278,
255:POKE54276,23:A=6:P
OKE54287,A:IFFLTHEN153
0
CQ 1560 FORB=170150:POKE54273,
B:A=A-.01:NEXT
KJ 1570 GOSUB1500:POKE54296,0:
RETURN
MC 1580 A$="":IFU=111THENAS$=CH
R$(13)
HR 1590 IFU=119THENAS$="{RIGHT}
"
JR 1600 IFU=123THENAS$="{LEFT}
"
HK 1610 IFU=126THENAS$="{UP}
"
XS 1620 IFU=125THENAS$="{DOWN}
"
JH 1630 RETURN

```

## TYPING AIDS

*MLX*, the machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. These labor-saving utilities are on each *Gazette Disk* and printed in issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write and we'll send you free copies of both of these handy utilities. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, COMPUTE!'s Gazette, 324 West Wendover Avenue, Greensboro, North Carolina 27408.

## K E I T H M . G R O C E

There are times when it would be nice to print a word processor file in something other than the box you get from setting margins. For example, you might want to print on letterhead or stationery without running into the preprinted matter, leave space for photos or hand-drawn illustrations, turn your notes into 3 x 5 cards, or print the text of your annual Christmas letter in the shape of a Christmas tree.

This program is a convenient way for anyone who doesn't own a desktop publishing program yet may want to publish a simple newsletter and have text fit around a graphic or photograph. You can place text in columns, rectangles, or any other shape that fits your requirements, preview it on your monitor, and then have the finished product roll off your printer.

*Text Fitter* lets you set text boundaries for each line and then fill these areas from standard Commodore-ASCII sequential files. The boundaries, or text-limit lines, are drawn anywhere on an 80-column x 55-line page. Word-wrapped text is placed between limit lines. You may also save any text which has not been placed in a "leftover" file. *Text Fitter*

# TEXT FITTER

PRINT TEXT IN  
COLUMNS OR HAVE  
IT FLOW IN WHATEVER  
SHAPE YOU DESIRE  
WITH THIS HANDY  
PRINTING UTILITY  
FOR THE 64

prints only one page at a time. The program pours text in, filling your custom-designed page or shape. If you have more text in the file than is needed to fill the page, then the left-

overs are saved and can be printed in another custom page or printed normally with your word processor.

### Getting Started

*Text Fitter* consists of a BASIC program and machine language subroutines. The BASIC program should be entered with *The Automatic Proofreader*; the machine language program, with *MLX*. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000  
Ending address: C808

Once you've finished entering the data, save a copy to disk. The BASIC program loads the machine language program, so be sure to save the ML program as *FITTER.ML*.

### Using the Program

Before using *Text Fitter*, you must create a source file. Any Commodore-ASCII sequential file (like those produced by *Easy Script* or by printing a file to disk with *SpeedScript*) is acceptable. Don't include control characters for underlining, italics, or the





# PROGRAMS

like in your text file because the results will be unsatisfactory.

When you load and run *Text Fitter*, a menu/help screen will be displayed. This screen lists all the commands to manipulate the text-limit lines. Press a key as indicated to move to the layout screen. Mark text-limit lines by moving the red and green cursors to the endpoints of the line you want to mark and pressing the M key. Marked lines will appear as a series of dashes on the layout screen. Connect lines to block out areas of text and non-text. (Note that the printing area edges are also text limits.) The layout screen displays the cursor positions in terms of column/line count and inches as measured from the upper left corner of the printing area. This is helpful when you need to lay out your text accurately.

When you've finished marking limit lines, return to the menu/help screen and press the T key. You'll be asked to enter the name of your source file and, optionally, leftover filenames for the text.

After these have been entered, the source file will be opened, and a second menu/help screen will be displayed. Press a key and move to the layout screen as before. Position the cursor where the first character is to be placed and press the T key. (Don't place the cursor directly on a dashed line.) Text will fill down the area marked, following the leftmost limit until no open spaces are detected beneath the line last placed.

Text characters are marked with dots on the layout screen page. Move the cursor and fill any open areas desired. Note that text will only fill downward from the starting point, since that's the way text is read. (If you want an open area in the middle of the page, divide the page into two or more columns to give each area of text a leftmost limit to follow.)

You can start a new source file from the menu/help screen by pressing the F key. The leftover file (if any) will be saved, and the new filename will be entered as before.

To print or save your page, press the S key at the menu/help screen. The source file will be closed and the leftover file saved before a third menu screen appears. From this menu you can print the page or save the formatted page to disk. The saved disk file

may be loaded into your word processor for enhancements or printing. Adjust the printer OPEN statement in Line 550 to match the secondary address for your printer. Also note the REM statement in line 540 that provides for carriage returns to be added at the end of each line should your printer require them.

## TEXT FITTER

```

PM 10 REM COPYRIGHT 1990, COMP
    UTE PUBLICATIONS INT'L,
    {SPACE}LTD. ALL RIGHTS R
    ESERVED.
AP 20 POKE55,192:POKE56,91
PM 30 IFA=0THENA=1:LOAD"FITTE
    .ML",8,1
PX 40 SYS49252:REM INIT
MA 50 POKE53280,0:POKE53281,0
RJ 60 PRINT"{CLR}{7}TEXT FITTE
    R - MARK TEXT LIMIT LINE
    S{CYN}"
EE 70 PRINT"{2 DOWN}SELECT CUR
    SOR: [R]=RED [G]=GREEN"
RH 80 PRINT"{DOWN}MOVE SELECTE
    D CURSOR WITH [CRSR] KEY
    S"
SH 90 PRINT"{DOWN}[M]=MARK LIN
    E BETWEEN CURSORS"
GA 100 PRINT"{DOWN}[U]=UNMARK
    {SPACE}LINE"
AH 110 PRINT"{DOWN}[CLR]=REMOV
    E ALL LINES"
GD 120 PRINT"{DOWN}[<]=RETURN
    {SPACE}TO THIS SCREEN"
HB 130 PRINT"{2 DOWN}{8}PRESS
    {SPACE}[T] AT THIS SCRE
    EN TO BEGIN"
AQ 140 PRINT"{DOWN}PLACING TEX
    T. {6}PRESS ANY OTHER K
    EY TO"
HP 150 PRINT"{DOWN}CONTINUE MA
    RKING LINES."
RM 160 GETK$:IFK$=""THEN160
KP 170 IFK$="T"THEN200
DG 180 SYS50450:REM MARKL
KA 190 GOTO160
GR 200 PRINT"{CLR}{7}TEXT FITT
    ER - PLACE TEXT{CYN}"
QB 210 PRINT"{DOWN}INSERT DISK
    AND ENTER FILENAME"
XH 220 PRINT"(PRESS [RETURN] A
    LONE TO GO BACK.)"
SG 230 SF$="":INPUTSF$:IFSF$=""
    THEN60
JF 240 PRINT"{DOWN}ENTER FILEN
    AME FOR LEFTOVER TEXT"
DH 250 PRINT"(PRESS [RETURN] A
    LONE FOR NO FILE.)"
JA 260 LF$="":INPUTLF$
QR 270 OPEN2,8,2,"0:"+SF$+"",S,
    R"
GP 280 PRINT"{CLR}{7}TEXT FITT
    ER - PLACE TEXT{CYN}"
EF 290 PRINT"{DOWN}MOVE CURSOR
    WITH [CRSR] KEYS"
QH 300 PRINT"{DOWN}[T]=FILL WI
    TH TEXT AT CURSOR LOCAT
    ION"
HG 310 PRINT"{DOWN}[<]=RETURN

```

```

    {SPACE}TO THIS SCREEN."
XD 320 PRINT"{2 DOWN}{8}PRESS
    {SPACE}[S] AT THIS SCRE
    EN TO SAVE OR"
EQ 330 PRINT"{DOWN}PRINT THE P
    AGE, [F] TO START A NEW
    "
SR 340 PRINT"{DOWN}SOURCE FILE
    . {6}PRESS ANY OTHER KE
    Y TO"
HD 350 PRINT"{DOWN}CONTINUE PL
    ACING TEXT."
AM 360 GETK$:IFK$=""THEN360
AA 370 IFK$="S"ORK$="F"THEN420
CE 380 SYS50683:IFPEEK(49249)=
    0THEN360:REM MARKTX, SA
    VEST
RP 390 CLOSE2:PRINT"{CLR}END O
    F ";SF$:PRINT"{DOWN}PRE
    SS ANY KEY"
SQ 400 GETK$:IFK$=""THEN400
GM 410 GOTO200
PB 420 IFLF$<" THENOPEN3,8,3,
    "0:"+LF$+"",S,W":SYS5115
    3:CLOSE3:REM LFTOVR
EG 430 CLOSE2
KD 440 IFK$="F"THEN200
HD 450 PRINT"{CLR}{7}TEXT FITT
    ER - SAVE/PRINT{CYN}"
BF 460 PRINT"{DOWN}[D]=SAVE TO
    DISK."
BD 470 PRINT"{DOWN}[P]=PRINT (
    BE SURE PRINTER IS READ
    Y).
AJ 480 PRINT"{DOWN}[X]=EXIT."
AB 490 GETK$:IFK$<"D"THEN530
FA 500 INPUT"FILENAME";SF$
DM 510 OPEN2,8,2,"0:"+SF$+"",S,
    W"
AJ 520 SYS51098:CLOSE2:GOTO450
    :REM OUTPGE
KQ 530 IFK$<"P"THEN560
SM 540 REM POKE51133,13:REM TO
    ADD RETURN TO EACH LIN
    E
FC 550 OPEN2,4,7:SYS51098:PRIN
    T#2:CLOSE2:GOTO450:REM
    {SPACE}OUTPGE
HM 560 IFK$<"X"THEN490
JK 570 END

```

## FITTER.ML

```

C000:70 D8 88 D8 70 00 00 00 12
C008:00 01 03 05 06 08 00 06 D0
C010:03 00 06 03 FD 7F DF F7 A9
C018:05 00 03 06 01 04 07 02 05
C020:06 01 04 07 02 05 00 03 FC
C028:03 0F 0C 20 30 30 20 28 1D
C030:30 2E 30 30 29 20 00 0C 34
C038:09 0E 05 20 30 30 20 28 0F
C040:30 2E 30 30 29 00 1F 20 16
C048:3D 20 0D 05 0E 15 00 00 27
C050:00 00 00 00 00 00 00 00 D1
C058:00 00 00 00 00 00 00 00 D9
C060:00 00 00 00 A9 00 8D 62 AC
C068:C0 A9 7F 8D 0D DC A5 01 A5
C070:29 FB 85 01 A0 00 B9 00 BE
C078:D0 99 00 80 B9 00 D1 99 DB
C080:00 81 C8 D0 F1 A5 01 09 B9
C088:04 85 01 A9 81 8D 0D DC 61
C090:A9 00 A2 12 A0 00 84 FB 66
C098:A0 82 84 FC A0 00 91 FB 8F
C0A0:C8 D0 FB E6 FC CA 10 F6 D2
C0A8:A0 00 8C 53 C0 A2 00 8E 60

```





# PROGRAMS

GAZETTE COMMODORE 64/128

C0B0:52 C0 20 D5 C1 AE 52 C0 1B  
 C0B8:A9 00 E0 16 B0 0E A9 F0 8E  
 C0C0:E0 15 F0 08 A9 1F E0 00 22  
 C0C8:F0 02 A9 FF A0 07 91 FD BA  
 C0D0:88 10 FB E8 E0 28 D0 D7 C9  
 C0D8:AC 53 C0 C8 8C 53 C0 C0 1E  
 C0E0:19 D0 CA A9 0A 8D 27 D0 BC  
 C0E8:A9 0D 8D 28 D0 A0 00 A9 69  
 C0F0:F0 99 00 5C 99 00 5D 99 38  
 C0F8:00 5E 99 00 5F C8 D0 F1 F6  
 C100:A9 00 8D 20 D0 A9 6F 8D A5  
 C108:F8 5F 8D F9 5F A9 19 8D 92  
 C110:52 C0 A9 03 8D 53 C0 20 AD  
 C118:44 C2 20 0F C2 A9 19 8D DF  
 C120:52 C0 A9 05 8D 53 C0 20 DD  
 C128:44 C2 20 29 C2 A9 19 8D 91  
 C130:52 C0 A9 09 8D 53 C0 20 2E  
 C138:49 C2 20 0F C2 A9 19 8D 82  
 C140:52 C0 A9 0B 8D 53 C0 20 5E  
 C148:49 C2 20 29 C2 A9 1C 8D 3A  
 C150:52 C0 A9 16 8D 53 C0 A2 A1  
 C158:00 8E 50 C0 BD 46 C0 F0 0F  
 C160:0D 20 71 C2 EE 52 C0 AE BD  
 C168:50 C0 E8 4C 59 C1 A0 3F 78  
 C170:A9 00 99 C0 5B 88 10 FA 20  
 C178:A0 15 A2 07 BD 00 C0 99 5F  
 C180:C0 5B 88 88 88 CA 10 F4 59  
 C188:A9 01 8D 56 C0 8D 58 C0 E5  
 C190:8D 57 C0 8D 59 C0 20 AD 5D  
 C198:C2 4C DA C2 A9 03 2C A9 73  
 C1A0:01 8D 15 D0 AD 00 DD 29 0A  
 C1A8:FE 8D 00 DD A9 79 8D 18 53  
 C1B0:D0 AD 11 D0 09 20 8D 11 2C  
 C1B8:D0 60 A9 00 8D 15 D0 AD 02  
 C1C0:11 D0 29 DF 8D 11 D0 A9 20  
 C1C8:15 8D 18 D0 AD 00 DD 09 7C  
 C1D0:03 8D 00 DD 60 A9 00 85 46  
 C1D8:FD A9 60 85 FE A9 40 85 CE  
 C1E0:FB AE 53 C0 86 FC 20 9A 87  
 C1E8:C2 20 01 C2 A9 00 85 FB 76  
 C1F0:86 FC 20 01 C2 A9 00 85 5D  
 C1F8:FB AD 52 C0 85 FC 20 9A 37  
 C200:C2 18 A5 FD 65 FB 85 FD A5  
 C208:A5 FE 65 FC 85 FE 60 A2 28  
 C210:00 8E 50 C0 BD 28 C0 F0 50  
 C218:2A 20 71 C2 EE 52 C0 AE 06  
 C220:50 C0 E8 8E 50 C0 4C 14 36  
 C228:C2 A2 00 8E 50 C0 BD 37 D8  
 C230:C0 F0 10 20 71 C2 EE 52 1D  
 C238:C0 AE 50 C0 E8 8E 50 C0 C2  
 C240:4C 2E C2 60 A2 00 4C 4B 51  
 C248:C2 A2 D0 A9 00 85 FD A9 48  
 C250:5C 85 FE AD 53 C0 85 FB C4  
 C258:A9 28 85 FC 20 9A C2 20 4E  
 C260:01 C2 8A AC 52 C0 A2 0E 1C  
 C268:91 FD C8 CA 10 FA 60 09 32  
 C270:30 8D 51 C0 20 D5 C1 AD 31  
 C278:51 C0 85 FB A9 00 85 FC BC  
 C280:20 9A C2 18 A9 00 65 FB AA  
 C288:85 FB A9 80 65 FC 85 FC 34  
 C290:A0 07 B1 FB 91 FD 88 10 C3  
 C298:F9 60 18 A9 00 A0 08 6A CD  
 C2A0:66 FB 90 03 18 65 FC 88 73  
 C2A8:10 F5 85 FC 60 AD 57 C0 5D  
 C2B0:0A 18 6D 57 C0 69 3D 8D 18  
 C2B8:01 D0 AD 56 C0 0A 18 69 D5  
 C2C0:1C 8D 00 D0 A9 03 8D 53 8C  
 C2C8:C0 AD 56 C0 20 45 C3 A9 38  
 C2D0:05 8D 53 C0 AD 57 C0 4C 4B  
 C2D8:04 C3 AD 59 C0 0A 18 6D 68  
 C2E0:59 C0 69 3D 8D 03 D0 AD 0C  
 C2E8:58 C0 0A 18 69 1C 8D 02 66  
 C2F0:D0 A9 09 8D 53 C0 AD 58 94  
 C2F8:C0 20 45 C3 A9 0B 8D 53 B3  
 C300:C0 AD 59 C0 8D 4F C0 A2 58  
 C308:1E 8E 52 C0 A2 0A 20 6F 85  
 C310:C3 20 6F C2 EE 52 C0 A5 83  
 C318:FA 20 6F C2 A9 22 8D 52 82  
 C320:C0 AD 4F C0 A2 06 20 6F 46

C328:C3 20 6F C2 EE 52 C0 EE E4  
 C330:52 C0 A4 FA B9 08 C0 20 E4  
 C338:6F C2 EE 52 C0 A4 FA B9 73  
 C340:0E C0 4C 6F C2 A2 1D 8E E8  
 C348:52 C0 A2 0A 20 6F C3 20 84  
 C350:6F C2 EE 52 C0 A5 FA 20 F5  
 C358:6F C2 A9 21 8D 52 C0 A5 6C  
 C360:F9 20 6F C2 EE 52 C0 EE 38  
 C368:52 C0 A5 FA 4C 6F C2 86 D9  
 C370:F9 A2 00 38 85 FA E5 F9 FE  
 C378:90 03 E8 B0 F7 86 F9 8A 89  
 C380:60 20 EA C3 A0 00 A9 20 52  
 C388:AE 5D C0 D0 02 A9 00 91 2C  
 C390:FD EE BA C3 A9 08 8D CA B9  
 C398:C3 20 A4 C3 CE BA C3 A9 6D  
 C3A0:00 8D CA C3 AD 54 C0 0A 6B  
 C3A8:18 69 06 4A 4A 4A 8D 52 E4  
 C3B0:C0 AD 55 C0 A4 18 6D 55 9B  
 C3B8:C0 69 0D 4A 4A 4A 8D 53 2B  
 C3C0:C0 20 D5 C1 AD 55 C0 29 F4  
 C3C8:07 09 00 A8 B9 18 C0 A8 F8  
 C3D0:AD 54 C0 29 03 AA BD 14 41  
 C3D8:C0 AE 5D C0 F0 05 31 FD 20  
 C3E0:4C E7 C3 49 FF 11 FD 91 67  
 C3E8:FD 60 A9 00 85 FD A9 82 B6  
 C3F0:85 FE A9 50 85 FB AD 55 02  
 C3F8:C0 85 FC 20 9A C2 20 01 05  
 C400:C2 18 A5 FD 6D 54 C0 85 49  
 C408:FD 90 02 E6 FE 60 AE 56 90  
 C410:C0 8E 54 C0 EC 58 C0 90 0F  
 C418:15 A2 CA 8E 9A C4 8E FC 19  
 C420:C4 38 AD 56 C0 ED 58 C0 64  
 C428:8D 5A C0 4C 40 C4 A2 E8 2F  
 C430:8E 9A C4 8E FC C4 38 AD 42  
 C438:58 C0 ED 56 C0 8D 5A C0 F2  
 C440:AC 57 C0 8C 55 C0 CC 59 77  
 C448:C0 90 15 A0 88 8C B9 C4 B1  
 C450:8C DD C4 38 AD 57 C0 ED ED  
 C458:59 C0 8D 5B C0 4C 72 C4 07  
 C460:A0 C8 8C B9 C4 8C DD C4 72  
 C468:38 AD 59 C0 ED 57 C0 8D 8C  
 C470:5B C0 AD 5B C0 CD 5A C0 F5  
 C478:90 03 4C C0 C4 AD 5A C0 F2  
 C480:4A 49 FF 8D 5C C0 EE 5C 7A  
 C488:C0 AE 54 C0 EC 58 C0 D0 CF  
 C490:03 4C 03 C5 20 81 C3 AE A8  
 C498:54 C0 EA 8E 54 C0 18 AD 46  
 C4A0:5C C0 6D 5B C0 8D 5C C0 A1  
 C4A8:30 DF F0 DD 38 AD 5C C0 30  
 C4B0:ED 5A C0 8D 5C C0 AC 55 4D  
 C4B8:C0 EA 8C 55 C0 4C 89 C4 53  
 C4C0:AD 5B C0 4A 49 FF 8D 5C 76  
 C4C8:C0 EE 5C C0 AC 55 C0 CC 0F  
 C4D0:59 C0 D0 03 4C 03 C5 20 9B  
 C4D8:81 C3 AC 55 C0 EA 8C 55 1F  
 C4E0:C0 18 AD 5C C0 6D 5A C0 7D  
 C4E8:8D 5C C0 30 DF F0 DD 38 22  
 C4F0:AD 5C C0 ED 5B C0 8D 5C B4  
 C4F8:C0 AE 54 C0 EA 8E 54 C0 20  
 C500:4C CC C4 AE 58 C0 8E 54 9F  
 C508:C0 AC 59 C0 8C 55 C0 4C DD  
 C510:81 C3 20 9C C1 20 E4 FF 73  
 C518:C9 52 D0 04 A9 00 F0 06 AC  
 C520:C9 47 D0 08 A9 01 8D 5E C7  
 C528:C0 4C 12 C5 C9 55 D0 04 0F  
 C530:A9 00 F0 06 C9 4D D0 0B 3F  
 C538:A9 01 8D 5D C0 20 0E C4 C7  
 C540:4C 12 C5 C9 93 D0 06 20 D7  
 C548:90 C0 4C 12 C5 C9 5F D0 DB  
 C550:03 4C BA C1 AE 5E C0 D0 25  
 C558:06 20 AE 55 4C 12 C5 C9 21  
 C560:1D D0 10 AE 58 C0 E8 E0 14  
 C568:51 D0 02 A2 01 8E 58 C0 EE  
 C570:4C A8 C5 C9 9D 00 0E AE 9C  
 C578:58 C0 CA D0 02 A2 50 8E 90  
 C580:58 C0 4C A8 C5 C9 91 D0 C5  
 C588:0E AE 59 C0 CA D0 02 A2 3E  
 C590:37 8E 59 C0 4C A8 C5 C9 EC  
 C598:11 D0 0D AE 59 C0 E8 E0 BD

C5A0:38 D0 02 A2 01 8E 59 C0 9C  
 C5A8:20 DA C2 4C 12 C5 C9 1D 70  
 C5B0:D0 10 AE 56 C0 E8 E0 51 A0  
 C5B8:D0 02 A2 01 8E 56 C0 4C 2D  
 C5C0:F7 C5 C9 9D D0 0E AE 56 3F  
 C5C8:C0 CA D0 02 A2 50 8E 56 6B  
 C5D0:C0 4C F7 C5 C9 91 D0 0E 6F  
 C5D8:AE 57 C0 CA D0 02 A2 37 61  
 C5E0:8E 57 C0 4C F7 C5 C9 11 E1  
 C5E8:D0 0D AE 57 C0 E8 E0 38 0F  
 C5F0:D0 02 A2 01 8E 57 C0 20 3D  
 C5F8:AD C2 60 20 9F C1 A9 01 72  
 C600:8D 5D C0 20 E4 FF C9 54 D4  
 C608:F0 0D C9 5F D0 03 4C BA 66  
 C610:C1 20 AE C5 4C 03 C6 20 D4  
 C618:72 C7 AD 5F C0 F0 E4 A2 B2  
 C620:02 20 C6 FF 4C 38 C6 20 80  
 C628:26 C7 AD 5F C0 D0 09 20 E1  
 C630:CC FF 20 AD C2 4C 03 C6 17  
 C638:20 CF FF 8D 60 C0 A6 90 86  
 C640:8E 61 C0 C9 D0 F0 18 AC 2B  
 C648:62 C0 C8 99 00 94 8C 62 B7  
 C650:C0 E0 00 D0 0A AC 62 C0 0C  
 C658:CC 5F C0 90 DB F0 D9 A9 45  
 C660:20 AC 62 C0 CC 5F C0 F0 D7  
 C668:02 B0 07 C8 99 00 94 4C D2  
 C670:64 C6 8C 62 C0 B9 00 94 1B  
 C678:C9 20 F0 03 88 10 F6 CC 80  
 C680:5F C0 B0 31 C0 00 F0 2D 2C  
 C688:8C 63 C0 A2 01 AC 56 C0 9F  
 C690:BD 00 94 91 FD E8 C8 EC BA  
 C698:63 C0 90 F4 E8 A0 01 BD F2  
 C6A0:00 94 99 00 94 E8 C8 EC 4D  
 C6A8:62 C0 F0 F3 90 F1 88 8C DE  
 C6B0:62 C0 4C E4 C6 AE 62 C0 ED  
 C6B8:BD 00 94 8D 63 C0 A2 00 F3  
 C6C0:CC 62 C0 F0 01 E8 8E 62 9F  
 C6C8:C0 A2 01 AC 56 C0 BD 00 7B  
 C6D0:94 91 FD E8 C8 EC 5F C0 D4  
 C6D8:F0 F4 90 F2 A2 01 AD 63 35  
 C6E0:C0 9D 00 94 18 AD 56 C0 64  
 C6E8:6D 5F C0 8D 63 C0 AC 57 C4  
 C6F0:C0 8C 55 C0 AC 56 C0 8C 85  
 C6F8:54 C0 20 EA C3 A0 00 B1 E5  
 C700:FD F0 07 C9 20 F0 03 20 33  
 C708:A4 C3 AC 54 C0 C8 CC 63 DB  
 C710:C0 90 E4 AD 61 C0 C9 00 3D  
 C718:F0 09 20 CC FF 20 AD C2 D1  
 C720:4C BA C1 4C 27 C6 AC 57 86  
 C728:C0 C8 C0 38 90 03 4C 6C 7B  
 C730:C7 8C 55 C0 A0 00 8C 54 EF  
 C738:C0 20 EA C3 18 AD 56 C0 AE  
 C740:6D 5F C0 8D 63 C0 AC 56 1D  
 C748:C0 B1 FD F0 09 C8 CC 63 DB  
 C750:C0 90 F6 4C 6C 7F 8C 56 F9  
 C758:C0 88 F0 04 B1 FD F0 F6 27  
 C760:AD 55 C0 8D 57 C0 AC 56 7A  
 C768:C0 4C 87 C7 A9 00 8D 5F A0  
 C770:C0 60 AC 57 C0 8C 55 C0 27  
 C778:A0 00 8C 54 C0 20 EA C3 4F  
 C780:AC 56 C0 B1 FD D0 E5 A2 D0  
 C788:01 C8 C0 51 B0 08 B1 FD FE  
 C790:D0 04 E8 4C 89 C7 8E 5F 53  
 C798:C0 60 A2 02 20 C9 FF A0 DD  
 C7A0:01 8C 55 C0 20 A2 00 8E 54 11  
 C7A8:C0 20 EA C3 A0 01 B1 FD A4  
 C7B0:D0 02 A9 20 20 D2 FF C8 75  
 C7B8:C0 51 90 F2 A9 00 F0 03 70  
 C7C0:20 D2 FF AC 55 C0 C8 8C AB  
 C7C8:55 C0 C0 38 90 D6 4C CC 14  
 C7D0:FF AC 62 C0 F0 17 A2 03 10  
 C7D8:20 C9 FF A2 01 AC 62 C0 55  
 C7E0:BD 00 94 20 D2 FF E8 88 D4  
 C7E8:D0 F6 8C 62 C0 A2 02 20 0B  
 C7F0:C6 FF 20 CF FF 48 A4 90 DF  
 C7F8:A2 03 20 C9 FF 68 20 D2 EF  
 C800:FF C0 00 F0 E8 4C CC FF E2





# MAC VIEW

D A V I D E N G L I S H

**D**on Lancaster is a man with a mission. Through his PostScript RoundTable on GEnie, he preaches the doctrine of *book-on-demand publishing*. Lancaster argues that today's low-cost laser printers make it cheaper to produce books in smaller quantities than in larger ones. He also claims that this method is faster and more flexible than old-style publishing.

Recent developments in the book industry have created the need for book-on-demand publishing. First, the chain bookstores have driven out most of the traditional mom-and-pop operations. While a typical mom-and-pop store stocks 60,000 titles, a typical chain store may stock ten copies each of only 6,000 titles. And because of the chain stores' collective buying power, they've bargained for the right to return any books that haven't sold within a short period of time.

Second, the IRS is, in effect, paying publishers to destroy their books. The IRS now requires publishers to carry the full value of an unsold book rather than its actual scrap value. A book returned because it's no longer popular has the same tax value as the new best-seller about to be shipped. Not surprisingly, publishers are shredding books by the millions and eliminating their backlists to keep their costs down.

Finally, the big publishing houses are commissioning fewer books as they pay increasingly larger advances to a handful of megahit authors. There's only so much money around, so for every \$25 million advance for a blockbuster sequel, 100 less-commercial books never see the light of day.

Tired of swimming against the stream, Lancaster decided to self-publish several of his own computer books—printing the books one at a time with his PostScript laser printer. Using a typical jiffy print shop, he figured he could produce a thousand copies of his book for \$7,000. But with his laser printer, he could produce the same thousand copies for just \$5,000, including the amortized cost of his printer.

More importantly, if he were to sell only a third of the books, his jiffy print shop costs would rise to a staggering \$21 a book. But with book-on-demand publishing, his costs remain constant because he prints each book as it's needed. The book is stored electronically, so there's no actual inventory—and no tax penalty. Each book is on a permanent backlist that can be called up whenever it's needed. And the author can make changes at any time without the additional costs of

printing a new edition.

To keep his costs down, Lancaster refills his own toner cartridges (lowering his toner costs to less than 0.3 cent per page), uses a duplex (double-sided) printer, and does his own maintenance and minor repair work.

Lancaster is a pioneer, but he isn't alone. In a number of disciplines, the dedicated enthusiast can now own the tools of the trade that used to be available only to the professional or the wealthy. Thousands of musicians are using their Macs with MIDI synthesizers, computer-controlled mixers, and cards that let them make CD-quality recordings direct to their hard drives. Computer-literate investors are using computer-based technical tools that rival the sophisticated stock-market programs used by the big brokerage houses. And programs such as *MacroMind Director* and *MacRenderMan* let individual artists create life-like animation that goes well beyond the quality of Saturday-morning cartoons.

We often hear that computers are widening the gap between the haves and the have-nots, that parents and small businesses in poor neighborhoods can't afford the technology and will slip farther behind. While that's a legitimate concern, the flip side is also true. With these powerful tools now available to a much larger group, there's a more broadly based opportunity for creativity and the possibility for a wider range of opinions.

If Lancaster is right, we may soon see a small army of one-person publishing houses producing custom books for a small but eager audience. Come to think of it, that's how publishing began nearly 600 years ago. □





