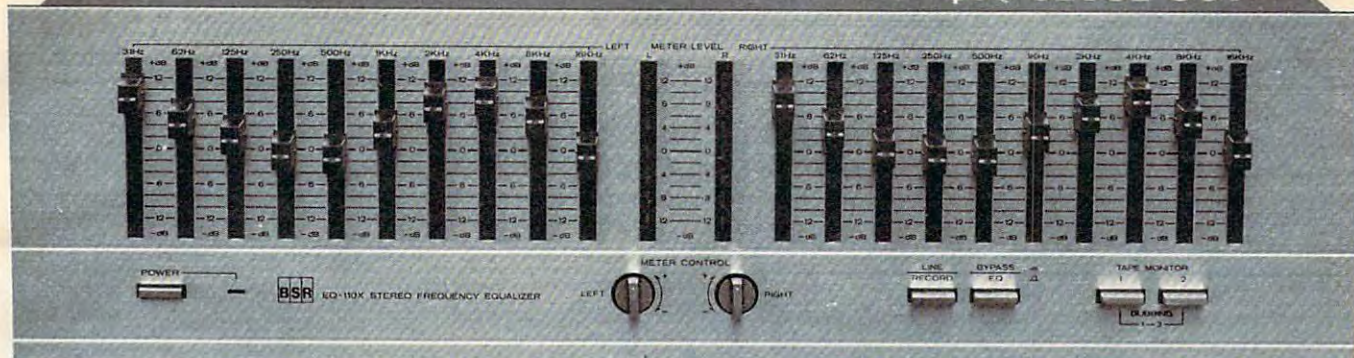


**\$89 CLOSE-OUT**



# Sound Detonator Plus

**Make your stereo system's sound explode with life. Improve the sound quality by 30 to 50%. Plus, you'll add tape dubbing too with this limited BSR \$89 close-out.**

It's like night and day. Crashing cymbals, the depth of a string bass, more trumpets or more voice will come bursting forth from your stereo at your command.

You'll make your music so vibrant that it will virtually knock your socks off when you use this professional quality 10 band stereo Sound Detonator Plus Equalizer.

It has a frequency response from 5hz to 100,000hz  $\pm 1$  db. BSR, the ADC equalizer people, make this super equalizer and back it with a 2 year limited warranty. Our \$89 close-out price is just a fraction of its true \$249 retail value.

## CAN YOUR STEREO SOUND BETTER?

Incredibly better. Equalizers are different from regular bass and treble controls. And, 10 band EQs are the best.

Bass controls turn up the entire low end as well as the low mid-range, making the sound muddy and heavy. With an equalizer, you simply pick the exact frequencies you want to enhance.

You can boost the low-bass at 31hz, 62hz and/or 125hz, and the mid-bass at 250hz and 500hz to animate specific areas of the musical spectrum.

And, when you boost the part of the bass you like, you don't disturb the mid-range frequencies and make your favorite singer sound like he has a sore throat.

The high frequencies really determine the clarity and brilliance of your music.

You can boost the mid-range and highs at 1,000hz, 2,000hz, 4,000hz, 8,000hz and 16,000hz. So, you can bring crashing cymbals to life at 16,000hz while at the same time you cut tape hiss or annoying record scratches at 8000hz.

You can also boost or cut specific mid-range frequency areas to add or subtract vocal, trumpets, guitars or whatever instrument ranges you prefer.

## GREAT FOR 2 TAPE DECKS

You can push a button and transfer all the equalization power to the inputs of two tape decks. So, if you have a cassette deck in your car or a personal stereo that you wear, now you can pre-equalize your cassettes as you record them.

Now you can get all the dramatically enhanced sound wherever you are. This

is an especially great feature for bass starved portables and high-end starved car stereos to make them come alive.



**And, look at this.** There are two tape inputs and outputs, so you can dub from tape deck A to B, or make two tapes at once with or without equalization.

## EASY HOOK UP

Use your tape monitor circuit, but don't lose it. Now your one tape monitor circuit lets you connect two tape decks.

Just plug the equalizer into the tape 'in' and 'out' jacks on your receiver. We even supply the cables.

As you listen to your records, FM or 'aux', any time you push the tape monitor switch on your receiver you'll hear your music jump to life.

The output from your receiver is always fed directly to your tape decks for recording, and with the touch of a button, you can choose to send equalized or non-equalized signal to your recorders.

When you want to listen to a tape deck, just press a tape monitor button on the equalizer and your tape deck will work exactly as it did before. Except, that now you can choose to listen with or without equalization and you can dub.

You won't be listening to any distortion or hum. The Sound Detonator Plus has a 95db signal to noise ratio and total harmonic distortion of just 0.018%.

Once you've set your equalizer controls, switch it in and out of the system. You'll hear such an explosive improvement in sound, you'll think you've added thousands of dollars of new equipment.

## WHY A CLOSE-OUT?

Last year DAK closed out over 18,000 of BSR's 7 band equalizers because BSR had decided to only sell equalizers under their ADC name and they still had some left with the BSR name on them.

Well, as Detroit comes out with new cars each year, ADC comes out with new equalizers. We got them to supply us

with just 15,000 of last year's model before they shut down for the new one.

They had already paid for all the tooling, all the research and design, so we were able to buy these for less than half the normal price, for cold hard cash.

So, you can go to any HiFi store and buy this year's design in an ADC equalizer made by the parent company BSR, or you can get this \$249 value BSR equalizer while our limited supply lasts, for \$89.

## THE FINAL FACTS

There are 20 slide controls, each with a bright LED to clearly show its position. Each control will add or subtract up to 12db. (That's a 24db range!)

There are separate sound detonation slide controls for each channel at 31hz, 62hz, 125hz, 250hz, 500hz, 1,000hz, 2,000hz, 4,000hz, 8,000hz, and 16,000hz.

LED VU meters with  $\pm 0.5$ db accuracy show levels for each channel. It is 17" wide, 6 1/2" deep and 4 1/2" tall.

## PUT LIFE INTO YOUR MUSIC RISK FREE

Prepare for a shock the first time you switch in this equalizer. Instruments you never heard in your music will emerge and bring a lifelike sound that will envelop you and revolutionize your stereo system.

If your system doesn't spring to life, simply return the equalizer within 30 days in its original box for a refund.

To order your Sound Detonator Plus Tape Dubbing BSR 110X 10 Band Stereo Frequency Equalizer risk free with your credit card, call toll free or send your check not for ADC's \$249 value, but for only \$89 plus \$7 for postage and handling. Order No. 9724. CA res add 6% tax.

Wake up the sound in your stereo. Your sound will explode with life as you detonate each frequency band with new musical life. And now you'll be in control of two tape decks as an added plus.



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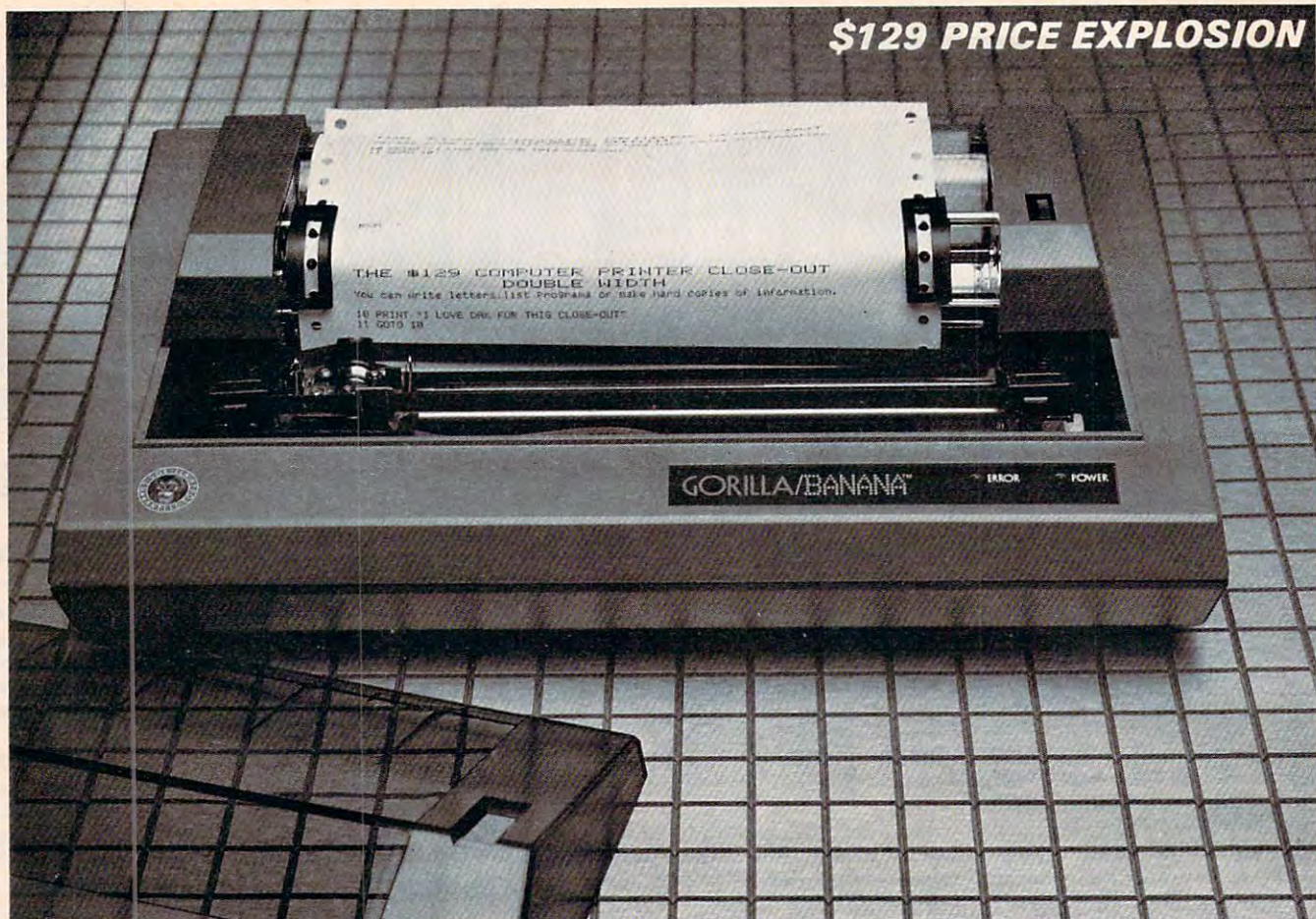
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**\$129 PRICE EXPLOSION**



# The Complete Computer

*Here's a 50 character per second, plain paper, dot matrix printer that you can use with virtually any home or office personal computer. It's built really tough to withstand heavy use. It's really easy to use. And, it even prints graphics. Price Slashed to \$129.*

By Drew Kaplan

Complete your computer. Now you can harness the full power of your computer. From writing letters to listing programs, your computer will be incredibly more useful.

It uses plain paper and it's super reliable. It prints both upper and lower case characters. And, if you aren't using a printer with your computer, read on.

## LISTING/INDEXES/LETTERS AND MORE

Experience the thrill of actually writing your letters and reports on your computer. Now you'll be able to use all of your computer's word processing and correcting capabilities to really explore your creative talents.

It's easy. Some of the new word processing programs are so 'user friendly' that you can learn to use them in just about 10 minutes. Change a line, change a word, move a line. Just push a button.

**Are data bases a four letter word?** Not on your life. Now you can use your computer to organize all your telephone numbers, your stocks, stamps, and recipes.

If you're using your computer for business, you can have a complete, instantly accessible file for each customer by name, what they bought, when, etc.

A data base will let you find or organize and print out any information you want, however you want, whenever you want.

There's no more complicated programming required. And, inexpensive data base programs are available at any computer store.

## PERMANENT RECORD

If you have a modem, you're in for a treat. You can access encyclopedias, stock market reports, and much more. When you sign on a service like CompuServe or The Source, the world is quite literally at your finger tips.

With a printer, you can get a 'hard copy' of all the incoming information. You can get everything from SAT test simulations and IQ tests to loan amortization schedules.

## AFRAID OF PROGRAMMING?

You don't need to know the first thing about programming to use this or any printer. But, if you've never typed in and run a program, here's the easiest one I know. Turn on your computer.

Commodore Owners, and Atari Owners, your computer, and most others will say 'Ready'. Just push Control and Reset on an Apple. Then type the following:

```
10 PRINT "DAK IS WONDERFUL"  
20 GOTO 10  
RUN
```

You should type a carriage return at the end of each line. Why not try this program now? Next time, I'll tell you how to get out of the program, and maybe even discuss peeks and pokes.

If the program isn't running, type LPRINT instead of PRINT in line 10.

To you sophisticated programmers, think how easy your life will be when you can print out program lists that you can study at length.

And, you won't have to load a bunch of disks to find a program when you print out a menu for each of your disks.

## LOOK AT ALL IT DOES

An ad in several August computer magazines listed a \$149 thermal printer (that needs expensive thermal paper) as the lowest priced printer in the U.S.

Imagine a 50 character per second, plain paper, full 80 column dot, matrix printer with a built-in standard Centronics Parallel Interface, slashed to just \$129.

This printer handles plain old cheap standard fanfold pin feed computer paper from 4.5" to 9.5" wide, with its built-in adjustable tractor pin feed drive.

It's so powerful you can even use two-part forms for a carbon copy. Plus, there's an impact control for print darkness.

It understands and prints 116 upper and lower case characters, numerals and symbols. And that's not all.

You can even print Double Width characters. And, look at this. This printer has full graphic capabilities with 480 dot horizontal resolution and 63 dot per inch vertical resolution. So, you can print out your pictures, pie charts or graphs.



It prints 10 characters to the inch, six lines to the inch. In short, it's going to make typewriters into dinosaurs. When hooked to your computer, you'll never have to retype anything again. If you find an error, just make the correction and let the computer retype your work for you.

The printer is made by C.I.TOH/Leading Edge in Japan. It's built to really take heavy use. But in the unlikely event that it should need service, there are approximately 400 service centers nationwide.

It takes standard long life inked ribbon cassettes that are readily available nationwide. This is a printer that will give you many years of continuous reliable service and enjoyment.

#### AND NOW THE BAD NEWS

If you're the president of a large company sending important business letters, you may want a \$1000 daisy wheel printer. But for most uses, dot matrix printers are incredibly faster, and there isn't any way to print out a graph or picture on a daisy wheel printer.

But, there are two things you need to know about this printer. First, it has about the dumbest name I've ever seen. It's built tough and rugged. So, they named it The Gorilla Banana Printer.

Second, like many dot matrix printers, the letters g, j, p, q, and y are level with the other letters. Each letter is completely and perfectly formed, but each sits level with the rest of the alphabet.

Upper case letters and symbols are unaffected. So, if you don't want letters that look like they were printed by a computer, this printer isn't for you.

But for most letters, term papers or reports, programming and all the data bases and information you'll get through a modem, this printer is perfect.

#### COMPATIBLE COMPUTERS

Any Computer with a standard Centronics parallel port, such as: Apple, Franklin, IBM PC, TRS80, Osborn, Atari, Commodore VIC 20, Commodore 64, Kaypro, and virtually any other personal computer. Plus, most briefcase portables.

#### FEAR OF INTERFACES?

Your computer is smart. But, it doesn't know how to 'talk' to other devices. That's why you need an interface.

An interface isn't just a cable. It's actually an intelligent translator that lets your computer talk to other equipment.

Usually the computer manufacturers don't include the various interfaces when you buy your computer, because they don't know if you'll ever add peripherals such as disk drives, printers or modems.

So, rather than sell you something you don't need, you don't buy an interface until you add onto your computer.

There are two types of printer interfaces. The first allows you to do text word processing. For 99% of computer use, this is all that is needed. It translates all the possible letters and punctuation known as ASCII. This printer understands 116 characters and symbols.

A second type of interface also allows you to dump pictures or graphics from your screen or memory. This is more complicated because every dot must be told where to go. This interface, or 'driver program' as it is called, is available in two forms; built into an interface card, or as a program on a disk which you use in

conjunction with any standard interface.

Either way, you'll have the printer operating in just a few minutes. And if you already have a printer, the same Centronics parallel interface and cable (about 85% of all printers are compatible) should work with this printer.



With this printer you can alter your graphics as you desire. You can print normal or reversed (both shown above, reduced to fit in this catalog) and you can even print double size.

#### WHY SO CHEAP

A new model will emerge soon with a different name. Leading Edge had just 28,000 of these remarkable printers which have been selling at discount for as little as \$199, left in stock.

DAK bought them all for cold hard cash. And now we're offering them to you for less than the original price we were quoted as wholesale.

The printer is approximately 16½" wide, 9" deep and 7" tall. It's backed by Leading Edge's standard limited warranty.

#### ADD PRINTING POWER TO YOUR COMPUTER RISK FREE

Now you can really make use of your computer. 50 characters per second printing on plain paper for just \$129. Wow!

Now you can print out your programs, your notes or your letters. If you're not 100% satisfied, simply return the printer and any accessories in their original boxes to DAK within 30 days for a refund.

To order your 50 Character Per Second Dot Matrix, Plain Paper Printer with a built-in Centronics Parallel Interface, risk free with your credit card, call toll free, or send your check for the breakthrough close-out price of just \$129 plus \$8 for postage and handling to DAK. Order No. 4101. CA res add 6% sales tax.

**Special Note:** If you need a serial printer for a computer, such as the TRS80 Color Computer, order the identical printer with a built-in Serial Interface for the same price. Use Order No. 4102.

The Printer comes packaged with a long life ribbon. Extra ribbons are available at computer stores. DAK has them for \$4 each (\$1 P&H) Order No. 4103.

Standard Centronics Interfaces for your computer are available at any computer store. This Printer has its receiving inter-

face built in. You simply need one, complete with its cable, to plug into your computer 'to send' information. Below are our favorites for 5 of the most popular computers.

For your Apple. We have Practical Peripherals' text interface for just \$49 (\$2 P&H) Order No. 9877. We have their graphics capable interface for just \$79 (\$2 P&H) Order No. 4104. If you already have a Centronics Parallel Interface, we have a graphics driver program on disk for just \$7 (\$1 P&H) Order No. 4105.

For your IBM PC, you don't need an interface. It's usually already built-in. But, you do need a cable. We have a cable, ready to connect this printer to your computer, for just \$19 (\$2 P&H) Order No. 9879. We have a graphics driver program on disk for just \$7 (\$1 P&H) Order No. 4106.

For your Atari 800, 800XL, 400, or 600XL, we have a text interface for just \$69 (\$2 P&H) Order No. 9881. We have a graphics driver program on disk for just \$7 (\$1 P&H) Order No. 4107.

For your Commodore VIC 20 or 64, we have a text interface for just \$39 (\$2 P&H) Order No. 9883. We have a Graphics Interface for just \$54 (\$2 P&H) Order No. 4108.

**Special Bonus for Commodore 64 owners.** We have a powerful word processing program with editing, including changing a line, a word, or moving a line. Once you've tried computer word processing, you'll never want to look at a typewriter again.

Plus, we have a super data base program that lets you use 8 fields of information on up to 200 subjects at a time. Then you can search for any part, sort alphabetically or numerically and print out an address book, a list of your stocks or anything you can imagine. They're both yours for just \$5 (\$1 P&H) with purchase of the printer. Use Order No. 4122 for Disk, or Order No. 4123 for Cassette.

For most TRS80 Computers, you don't need an interface, just a cable. For the Black and White Computers, we have a Parallel Cable for just \$18 (\$2 P&H) Order No. 9885. For the Color Computers we have a Serial Cable (you need the Serial Printer as well) for just \$18 (\$2 P&H) Order No. 4109.

For briefcase-type portables, the Centronics Interface is usually built-in. Just stop by any computer store. All Centronics Printers use the same cable at the printer end, but you'll need a cable that fits your particular computer's plug.

Get hard copy print-outs of your programs or your graphics. Turn your computer into a powerful word processor. Forget retyping ever again. For just \$129 you can make your computer complete.

Apple, Atari, IBM PC, Franklin, Commodore VIC 20 & 64, TRS80, Osborn, and Kaypro, are registered trademarks of Apple Computer, Atari Inc., International Business Machine Corp., Franklin Computer, Commodore Electronics Ltd., Radio Shack/Tandy, Osborn Corp. and Kaypro respectively.



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```

410 REM{8 SPACES}ZERO PAGE + INDEX :rem 121
430 GOSUB 350:ND$=A$+"X":CM$="ZERO PAGE, :rem 2
INDEX X":GOTO 210 :rem 6
450 GOSUB 350:ND$=A$+"Y":CM$="ZERO PAGE, :rem 6
INDEX Y":GOTO 210 :rem 220
470 REM{8 SPACES}ZERO PAGE :rem 220
490 GOSUB 350:ND$=A$:CM$="ZERO PAGE":GOTO :rem 25
210 :rem 124
510 REM{8 SPACES}ABSOLUTE + INDEX:rem 124
530 GOSUB 370:ND$=A$+"X":CM$="ABSOLUTE,I :rem 7
NDEX X":GOTO 210 :rem 11
550 GOSUB 370:ND$=A$+"Y":CM$="ABSOLUTE,I :rem 223
NDEX Y":GOTO 210 :rem 30
570 REM{8 SPACES}ABSOLUTE :rem 10
590 GOSUB 370:ND$=A$:CM$="ABSOLUTE":GOTO :rem 202
{SPACE}210 :rem 130
610 REM{8 SPACES}IMMEDIATE :rem 103
630 A=PEEK(PC+1):PC=PC+2:GOSUB 280 :rem 91
:rem 218
640 ND$="#" + A$:CM$="IMMEDIATE" :rem 25
650 GOTO 210 :rem 219
670 REM{7 SPACES}GROUP ZERO OP CODES :rem 183
:rem 117
680 REM{8 SPACES}{SOME MOSTECH GROUP 3} :rem 56
:rem 110
700 OP$=MID$(G$(P1),P2*3+1,3) :rem 48
710 IF OP$=BD$ GOTO 1970 :rem 112
720 IF P2=4 GOTO 1330:{5 SPACES}REM :rem 31
{13 SPACES}8 BRANCHES :rem 35
730 IF P1<4 GOTO 760:{6 SPACES}REM :rem 33
{13 SPACES}SPECIAL FUNCTION :rem 176
740 ON(P2+1)GOTO 630,490,1720,590,1930,4 :rem 202
0,1720,530 :rem 118
760 IF P2=0 GOTO 1010:{5 SPACES}REM :rem 220
{12 SPACES}BRK,JSR,RTI,RTS :rem 54
770 IF OP$="JMP" GOTO 820: REM{12 SPACES} :rem 89
JMP :rem 153
780 ON(P2+1)GOTO 1930,490,1720,590,1930,4 :rem 253
30,1720,530 :rem 229
800 REM{4 SPACES}JUMPS HANDLED HERE :rem 54
:rem 118
820 B1=PEEK(PC+1)+LB*PEEK(PC+2):A=B1 :rem 220
:rem 89
830 GOSUB 250:ND$=A$:CM$=BL$ :rem 153
840 IF(BD=1)AND(P1=2) THEN PC=PC+3:GOTO 1 :rem 253
170 :rem 229
850 IF P1=2 THEN PC=B1:GOTO 1170 :rem 54
860 ND$="( " + ND$ + " )" :rem 239
870 B1=PEEK(B1) + LB*PEEK(B1+1):A=B1:GOSU :rem 118
B 250 :rem 220
880 PRINT#PR:PRINT#PR,"*** ENCOUNTERED IN :rem 54
DIRECT JUMP" :rem 89
890 PRINT#PR,"{2 SPACES}THRU ";ND$;" :rem 118
{2 SPACES}TO ";A$ :rem 153
900 IF(BD=1) THEN PC=PC+3:GOTO 1170 :rem 253
:rem 229
910 PRINT:PRINT"ENCOUNTERED INDIRECT JUMP :rem 54
":PRINT" THRU ";ND$;" TO ";A$:rem 239
920 PRINT:PRINT"IS THIS VALID?":INPUT A$ :rem 118
:rem 153
930 IF LEFT$(A$,1)=YA$ THEN PC=B1:GOTO117 :rem 220
0 :rem 89
940 PRINT#PR :rem 153
950 PRINT:PRINT"DO YOU WANT TO CONTINUE ? :rem 239
":INPUT A$ :rem 118
960 IF LEFT$(A$,1)=YA$ THEN GOSUB 2320:GO :rem 220
TO 80 :rem 201
970 CLOSE PR:END :rem 201
990 REM{5 SPACES}HANDLES{2 SPACES}BRK,JSR :rem 183
,RTI, AND RTS :rem 146
1010 ON(P1+1)GOTO 1020,1120,1060,1210 :rem 92
:rem 239
1020 A=PC:GOSUB 250:PRINT#PR:PRINT#PR,"** :rem 50
**{2 SPACES}BREAK AT ";A$ :rem 155
1030 PRINT:PRINT"ENCOUNTERED BREAK AT ";A :rem 125
$ :rem 192
1040 GOTO 940 :rem 159
1060 A=PC:GOSUB 250:PRINT#PR:PRINT#PR,"** :rem 92
**{2 SPACES}RTI AT ";A$ :rem 240
1070 PRINT:PRINT"ENCOUNTERED RTI AT ";A$ :rem 50
:rem 166
1080 GOTO 940 :rem 152
1100 REM{33 SPACES}STACK{2 SPACES}{JSR} :rem 136
:rem 114
1120 A=PEEK(PC+1) + LB*PEEK(PC+2):rem 240
1130 LC=PC:IF(BD=1) GOTO 1150 :rem 50
1140 SP=SP+1:SS(SP)=PC+2 :rem 166
1150 PC=A:GOSUB 250:ND$=A$:CM$=BL$ :rem 152
:rem 136
1160 IF(BD=1) THEN PC=LC+3 :rem 114
1170 PRINT#PR,"-----":GOTO 210 :rem 18
1190 REM{33 SPACES}UNSTACK (RTS) :rem 192
1210 IF(BD=1) THEN PC=PC+1:GOTO 1240 :rem 103
:rem 167
1220 IF SP<1 GOTO 1270 :rem 106
1230 PC=SS(SP)+1:SP=SP-1 :rem 80
1240 PRINT#PR,"-----" :rem 17
1250 ND$=BL$:CM$=BL$:GOTO 210 :rem 29
1270 A=PC:GOSUB 250:PRINT#PR:PRINT#PR,"** :rem 162
* RTS AT ";A$;" - STACK EMPTY" :rem 26
:rem 170
1280 PRINT:PRINT"NO STACK ENTRY FOR RTS A :rem 25
T ";A$ :rem 224
1290 GOTO 940 :rem 49
1310 REM{5 SPACES}BRANCHES - REL ADDR :rem 147
:rem 46
1330 A=PEEK(PC+1) :rem 90
1340 IF A>127 THEN A=A-LB :rem 158
1350 B1= PC+2+A:ND$="*":IF A=>0 THEN ND$= :rem 13
"*+" :rem 127
1360 GOSUB 250:ND$=ND$+A$:CM$=BL$ :rem 1430
1370 A=B1:GOSUB 250:ND$=LEFT$(ND$+BL$,7)+ :rem 110
RIGHT$(BL$+A$,7) :rem 190
1380 A=PC:GOSUB 250 :rem 100
1390 PRINT :rem 71
1400 IF(BD=1) GOTO 1470 :rem 146
1410 PRINT OP$,"-- CONDITIONAL BRANCH ENC :rem 38
OUNTERED" :rem 120
1420 PRINT" FROM ";A$;" TO ";ND$ :rem 243
1430 PRINT:PRINT"DO YOU WANT TO FOLLOW TH :rem 187
E BRANCH ?" :rem 243
1440 INPUT A$ :rem 183
1450 IF LEFT$(A$,1)=YA$ THEN PC=B1:GOTO 1 :rem 183
170 :rem 183
1460 IF LEFT$(A$,1)=Q$ GOTO 970 :rem 183
1470 PC=PC+2:GOTO 210 :rem 183
1500 REM{6 SPACES}GROUP ONE OP CODES :rem 183
:rem 120
1520 OP$=MID$(G1$,P1*3+1,3) :rem 120
1530 IF (P1=4)AND(P2=2) THEN OP$=BD$:GOTO :rem 205
1970 :rem 55
1540 ON(P2+1)GOTO 1580,490,630,590,1620,4 :rem 187
30,550,530 :rem 243
1560 REM{8 SPACES}{INDIRECT,X) ADDRESSING :rem 183
:rem 243
1580 GOSUB 350:ND$="( " + A$+"X )":CM$="IN :rem 183
DEXED INDIRECT":GOTO 210 :rem 183
1600 REM{8 SPACES}{INDIRECT},Y{2 SPACES}A :rem 183
DDRESSING :rem 183

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1620 GOSUB 350:ND$="( "+A$+" ),Y":CM$="IN
DIRECT INDEXED":GOTO 210 :rem 239
1650 REM{9 SPACES}GROUP TWO OP CODES
:rem 68
1670 OP$=MID$(G2$,P1*3+1,3) :rem 127
1680 IF P1<4 GOTO 1870{10 SPACES}REM
{11 SPACES}SHIFTS AND ROTATES :rem 2
1690 ON(P2+1)GOTO 630,490,1710,590,1830,1
740,1770,1810 :rem 215
1710 OP$=MID$(GG$, (P1-4)*3+1,3) :rem 65
1720 ND$=BL$:CM$=BL$:PC=PC+1:GOTO 210
:rem 75
1740 IF P1<6 GOTO 450 :rem 32
1750 IF P1>5 GOTO 430 :rem 32
1770 OP$=MID$(GG$,P1*3+1,3) :rem 149
1780 IF OP$=BD$ GOTO 1970 :rem 19
1790 GOTO 1720 :rem 212
1810 IF P1=5 GOTO 550 :rem 31
1820 IF P1>5 GOTO 530 :rem 31
1830 OP$=BD$:GOTO 1970 :rem 186
1850 REM{10 SPACES}SHIFTS AND ROTATES
:rem 120
1870 ON(P2+1)GOTO 1830,490,1890,590,1830,
430,1830,530 :rem 169
1890 ND$=BL$:CM$=BL$:PC=PC+1:GOTO 210
:rem 83
1910 REM{5 SPACES}VOID GROUP CODE:rem 137
1930 OP$=BD$:GOTO 1970 :rem 187
1950 REM{5 SPACES}INVALID OP CODE:rem 116
1970 ND$=BL$:CM$="BAD OP CODE" :rem 102
1980 Z$="{2 SPACES}":FOR I=0 TO 10
:rem 172
1990 A=PEEK(PC+I):GOSUB 280:Z$=Z$+A$
:rem 37
2000 NEXT :rem 1
2010 PRINT#PR:PRINT#PR,PC$;Z$;" HEX"
:rem 161
2020 PC=PC+1:GOTO 1170 :rem 191
2050 REM{22 SPACES}INITIALIZATION:rem 211
2070 CL$=CHR$(147):PRINTCL$:{2 SPACES}REM
{11 SPACES}CLEAR SCREEN AND HOME CUR
SOR :rem 64
2080 SP=0:DIM SS(50):{9 SPACES}REM
{11 SPACES}POINTER AND STACK:rem 210
2090 PC=0:{20 SPACES}REM{11 SPACES}PROGRA
M COUNTER :rem 33
2110 DIM G0$(7):{14 SPACES}REM{11 SPACES}
OP CODES :rem 236
2120 G0$(0)="BRKBADPHPBADBPLBADCLCBAD"
:rem 245
2130 G0$(1)="JSRBITPLPBITBMIBADSECBAD"
:rem 62
2140 G0$(2)="RTIBADPHAJMPBVCBADCLIBAD"
:rem 29
2150 G0$(3)="RTSBADPLAJMPBVSBADSEIBAD"
:rem 70
2160 G0$(4)="BADSTYDEYSTYBCCSTYTYABAD"
:rem 144
2170 G0$(5)="LDYLDYTAYLDYBCSLDYCLVLDY"
:rem 164
2180 G0$(6)="CPYCPYINYCPYBNEBADCLDBAD"
:rem 88
2190 G0$(7)="CPXCPXINXCPXBEQBADSEDBAD"
:rem 98
2200 G1$="ORAANDORADCSTALDACMPSBC"
:rem 181
2210 G2$="ASLROLLSRRORSTXLDXDECINC"
:rem 33
2220 GG$="TXATAXDEXNOPTXSTXBADBAD"
:rem 45
2230 TP=65535:{16 SPACES}REM{11 SPACES}ME
MORY ADDRESS LIMIT :rem 44
2240 B3=4:B6=32:{14 SPACES}REM{11 SPACES}
SHIFTS OP CODE RIGHT :rem 41
2250 LB=256:{18 SPACES}REM{11 SPACES}LEFT
BYTE MULTIPLIER :rem 181
2260 BL$="{14 SPACES}":YA$="Y":BD$="BAD":
B2$="{6 SPACES}" :rem 78
2270 HX$="0123456789ABCDEF":Q$="Q":rem 51
2280 OP=3:{20 SPACES}REM{11 SPACES}CRT DE
VICE RETURN WITHOUT GOSUB :rem 38
2290 PRINT"DO YOU WANT PRINTER OUTPUT ?":
INPUT A$ :rem 235
2300 IF LEFT$(A$,1)=YA$ THEN OP=4:
{5 SPACES}REM: PRINTER DEVICE RETURN
WITHOUT GOSUB :rem 176
2310 PR=5:OPEN PR,OP :rem 179
2320 PRINT:PRINT"WHAT IS A GOOD TITLE FOR
THIS ?":INPUT A$ :rem 168
2330 BD=0 :rem 187
2340 PRINT#PR:PRINT#PR :rem 167
2350 PRINT:PRINT"DEFAULT IS TO FOLLOW THE
PROGRAM THREAD :rem 8
2360 PRINT"DO YOU WANT A BLOCK DISASSEMBL
Y :rem 48
2370 INPUT Z$:IF LEFT$(Z$,1)<>YA$ GOTO 24
00 :rem 85
2380 BD=1:PRINT#PR,"{2 SPACES}BLOCK DISAS
SEMBLY OF":PRINT#PR,".. ";A$:rem 245
2390 GOTO 2410 :rem 206
2400 PRINT#PR,"{2 SPACES}THREADING DISAS
SEMBLY OF":PRINT#PR,"{3 SPACES}";A$
:rem 143
2410 PRINT#PR :rem 25
2420 PRINT"DEFAULT IS HEX MODE":PRINT"DO
{SPACE}YOU WANT TO USE DECIMAL ?"
:rem 215
2430 HX=1:INPUT A$ :rem 6
2440 IF LEFT$(A$,1)=YA$ THEN HX=0:PRINT"D
ECIMAL MODE SELECTED" :rem 90
2450 PRINT"DISASSEMBLY TO START AT LOCATI
ON ?" :rem 58
2460 GOSUB 2560:PC=A:IF PC>TP GOTO 2450
:rem 166
2470 A=PC:GOSUB 250:PRINT#PR,"STARTING LO
CATION =";A$ :rem 205
2480 PRINT#PR :rem 32
2490 PRINT#PR,"LOC{12 SPACES}OP{5 SPACES}
OPERAND" :rem 23
2500 PRINT#PR :rem 25
2510 PRINT:PRINT" PRESS Q TO STOP AT ANY
{SPACE}TIME":PRINT :rem 154
2520 RETURN :rem 169
2540 REM{13 SPACES}SUBROUTINE TO GET STAR
TING LOCATION :rem 7
2560 IF HX=1 GOTO 2590 :rem 115
2570 INPUT A:RETURN :rem 185
2590 A=0:INPUT A$:IF LEN(A$)>4 THEN PRINT
"TOO BIG-TRY AGAIN":GOTO 2590 :rem 16
2600 OK=1:FOR I=1 TO LEN(A$):Z$=MID$(A$,I
,1) :rem 91
2610 BAD=1:FOR J=1 TO 16:IF Z$<>MID$(HX$,J,
1) GOTO 2630 :rem 140
2620 BAD=0:A=A*16+J-1 :rem 91
2630 NEXT:IF (BAD=0) THEN NEXT:GOTO 2650
:rem 6
2640 PRINT:PRINT"INVALID HEX CHAR":OK=0:N
EXT :rem 40
2650 IF OK=1 THEN RETURN :rem 115
2660 GOTO 2590 :rem 215 ©

```



# PCjr Memory Compatibility

Charles Brannon, Program Editor

*IBM's memory expansion modules for the PCjr let you boost RAM up to 512K, allowing you to run many more PC programs that wouldn't fit before. However, there are still some compatibility problems that must be dealt with before you can fully take advantage of this extra memory.*

---

IBM's snap-on 128K memory modules can expand PCjr memory to a whopping half-megabyte (512K), more than any other personal computer in its price range. Along with the new typewriter-style keyboard, this was part of IBM's response to months of slow sales and criticism that the PCjr was not as PC-compatible as it promised to be (see "IBM's New & Improved PCjr," *COMPUTE!*, October 1984). Now, finally, the PCjr can tackle many of the sophisticated but memory-hungry programs written for the IBM PC, such as *Lotus 1-2-3*.

Nevertheless, a few compatibility problems remain. The PCjr was not originally designed to take more than 128K RAM, and its memory layout differs somewhat from the PC's. Ironically, in many cases a 512K PCjr cannot run programs developed for a 128K Junior. To understand why, let's look at how the PCjr addresses its internal and expansion memory.

## Invisible Memory

When you switch on a system with more than 128K, the IBM logo screen counts up to the total, recognizing the extra RAM. But none of this memory is visible to DOS 2.1. Since almost all programs follow DOS conventions, they'll also fail to take advantage of the extra memory.

Before any programs can "see" the added memory, you must customize your DOS 2.1 startup disk. You can reconfigure DOS in several

different ways. For example, you can set up the expansion memory as additional RAM, as a RAMdisk, or as a combination of both.

A RAMdisk, or memory disk, is simply a simulated disk drive in RAM. You set aside a chunk of memory (10K to 512K) which DOS treats as a disk drive, addressed as drive C:. It acts just like an extra drive, allowing you to save and load files, call directories, and so forth, with one important exception: The files are stored in RAM instead of on a floppy disk. This means that disk access is virtually instantaneous, even faster than a hard disk. (It also means that the files will be lost if you turn off the computer without remembering to save them on a real disk.)

IBM offers the RAMdisk option so the PCjr can run some PC programs which require two disk drives (IBM doesn't make a second disk drive for the Junior, although some third-party companies do). However, some programs will not work with the RAMdisk due to memory conflicts.

## Screen Memory Interference

To customize DOS for a RAMdisk or for extra memory, the memory modules come with a configuration disk containing an installation program. This program copies up to three files onto a backup of your DOS disk: *CONFIG.SYS*, *PCJRMEM.COM*, and *RAMDISK.COM*. By running the installation program and following its instructions, you create the customized DOS.

Why do you have to reconfigure DOS at all? On the IBM PC, DOS automatically recognizes how much memory is available. But on the PCjr, there's a complication—screen memory.

When a computer displays a picture on a screen, the image begins to fade within 1/60



second. Therefore, the video hardware must redraw the screen 60 times each second. To do this, the computer keeps a copy of the screen in memory. Different text and graphics screens require different amounts of memory—anywhere from about 2K for a 40-column text screen to as much as 32K for a 16-color graphics screen. In the PCjr, screen memory is part of regular RAM.

But in the IBM PC, screen memory doesn't consume usable RAM. Instead, it's part of the monochrome or color/graphics adapter. So a 512K IBM PC actually has 528K, including the screen RAM. In order to sell the PCjr inexpensively, some tradeoffs had to be made, so IBM decided to use part of regular RAM for screen memory.

By default, the topmost 16K of a 128K PCjr is reserved for screen memory. That's why an Enhanced Model PCjr with 128K actually has only 112K free RAM. For 32K graphics screens, such as the 320 × 200 16-color mode, extra RAM is subtracted from the top of memory. When you add memory modules to a PCjr, the extra RAM is added after the 128K boundary, but DOS still puts screen memory at the top of 128K, wedged between the internal 128K and the extra memory. This memory arrangement is shown in Figure 1.

## Configuration Options

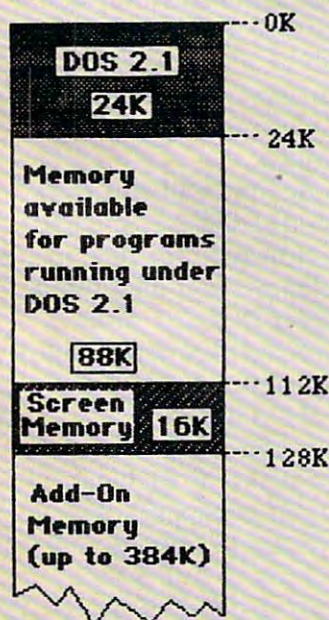
Since DOS insists that all memory be contiguous (uninterrupted), the video memory, sitting where it is, blinds DOS to the presence of extra RAM. So on a PCjr, you need a way to relocate the video memory. The configuration program can set up three new memory configurations, shown in Figures 2, 3, and 4. Figure 2 shows the default *expanded memory option*. This arrangement embeds 16K of screen memory within DOS, so all memory after the end of DOS is contiguous and usable. This is most like the IBM PC memory map.

The biggest problem is that since screen memory is embedded within DOS, there is no room to expand it to allow 32K graphics modes or multiple graphics screens. Programs requiring more than 16K of video memory just won't work with this configuration. However, it does allow maximum memory and the best compatibility with PC programs.

If you need more screen memory, you can use the *enhanced expanded memory option* (Figure 3). This puts 32K of video space within DOS. It gives you 16K less usable RAM, but allows one 32K graphics screen, two 16K screens, eight 80-column text screens, or sixteen 40-column screens. Many more PCjr programs will run un-

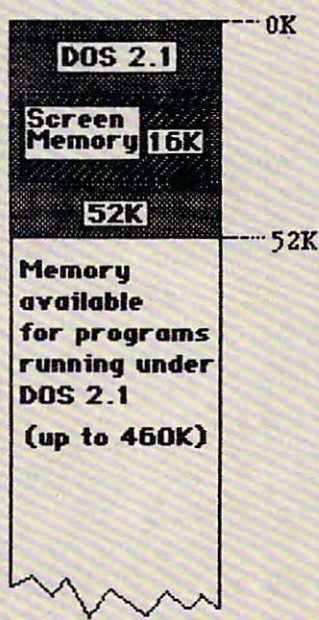
**Figure 1: Standard PCjr Memory Configuration**

The PCjr memory map with DOS 2.1. Video memory is stored just under the 128K boundary. Memory beyond 128K is ignored by DOS and applications programs running under DOS (including BASIC).



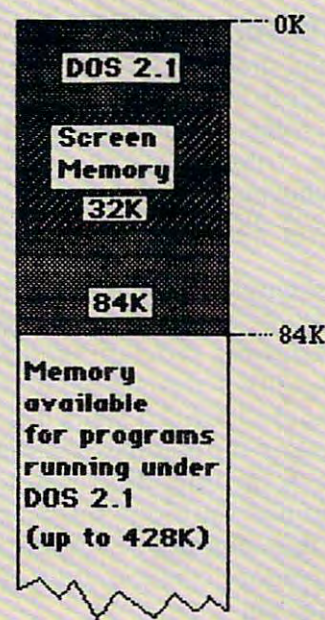
**Figure 2: Expanded Memory Option**

Screen memory (limited to 16K) is stored within DOS, and all memory after 52K is free for use. 32K graphics modes are not possible.



**Figure 3: Enhanced Expanded Memory Option**

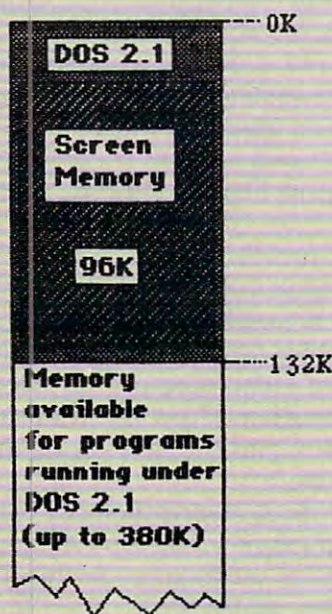
32K of screen memory is embedded within DOS. Up to 428K of user RAM is free.





## Figure 4: Compatible Expanded Memory Option

This provides the largest video area (96K), permitting screen flipping and up to three 32K screens.



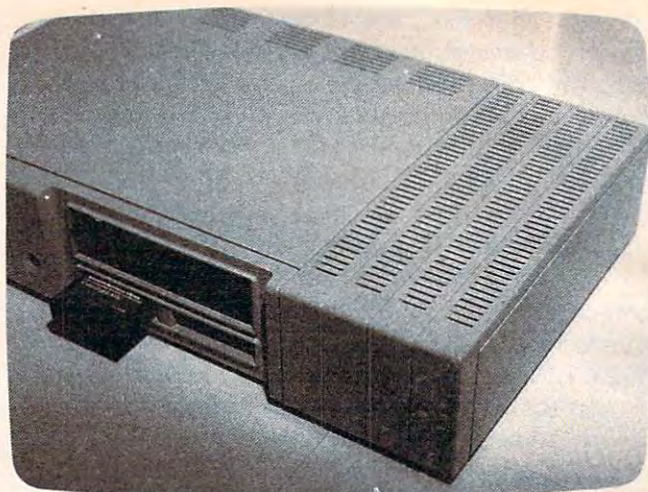
der this configuration, but not those requiring more than 32K of graphics space.

The ultimate solution is the *compatible expanded memory option* (Figure 4). This mode allows 96K of video memory, which, like the other configurations, is stored within the area reserved for DOS. The rest of memory is continuous after the end of DOS. If you don't need 96K of screen memory, this configuration is wasteful. However, it does permit up to three 32K screens, which should be enough for almost any PCjr program.

### BASIC Incompatibility

Amazingly, though, none of these configurations works with PCjr Cartridge BASIC. This could be a major problem, since many applications programs are written in BASIC (including most programs published in magazines). Unfortunately, even a 512K PCjr can use no more than 64K for BASIC.

For example, "The Screen Machine" (COMPUTE!'s PC & PCjr magazine, April 1984), a graphics-drawing program written in BASIC, requires two 32K screens. Therefore, it works only with standard DOS 2.1, which ignores the extra memory. Any of the other memory configurations—even the one IBM refers to as *compatible*—confuses Cartridge BASIC and sometimes locks up the computer. Even the default expanded memory configuration works only with the text screen.



IBM's 128K memory expanders bolt onto the side of the PCjr system unit. More than one expander requires the power supply module in the first position. This PCjr has the maximum 512K.

Since BASIC cannot use more than 64K, it would seem that the added memory would be useless to you anyway. But think of the possibilities of over 400K of screen memory. You could instantly flip between 14 detailed  $320 \times 200$ , 16-color graphics screens. Alternately, you could store nearly 30 four-color frames. Since it takes 1/10 second for an image to fade from the human eye, this would allow three full seconds of high-quality animation. No other computer in the PCjr's price range would be capable of this feat. But with Cartridge BASIC, neither is the PCjr.

The IBM technical hotline (1-800-222-PCJR) had no answer for these problems. Probably Cartridge BASIC was never designed to use the extra memory. Indeed, IBM states that you should not try to use the expanded RAM with applications written especially for 128K. Only software written for the PC (and compatible with the PCjr) seems to anticipate additional memory. Some PCjr software doesn't even have the ability to access a second disk drive, which also precludes the ability to use the RAMdisk.

Nonetheless, 128K programs will still work with standard (unconfigured) DOS 2.1, since the extra memory is ignored. However, for full compatibility with all programs, you might end up maintaining four different DOS 2.1 disks—standard DOS and the three configurations. Plus a few more, if you want to configure the extra memory as various-sized RAMdisks.

The best solution would be to place screen memory at the very top of RAM, as high as 512K. This would leave room to expand the graphics screen downward. Again, though, unless an application knows how to find screen memory, there may be hopeless confusion.



# Atari Disk Rx

Robert P. Dolan

*"Disk Rx" is a utility which allows you to examine and repair damaged or deleted files. Here's nearly everything you need to cure sick disks. For single-density (DOS 1 and DOS 2) disks only.*

---

When most people first purchase a personal computer, they buy a cassette recorder to save programs. This is because disk drives are often more expensive than the computers they serve. I started out with an Atari 400 and 410 program recorder, and remember thinking "Who needs a disk drive anyway?"

Well, I found out what all cassette users know. Programs can disappear for no reason at all. Since I was beginning to do a lot of programming, I wasted many hours from crashed cassettes.

I now own an Atari 810 disk drive. This mysterious peripheral enabled me to save my work frequently and reliably. Then I discovered data bases and word processors. It seemed that the fun could go on forever. Well, it's not all fun. Disks do crash for the strangest reasons. At times their directories get impossible to decipher (for example, I didn't mean to delete that file . . .).

Some of you have probably encountered these or other disasters. There is an excellent program called DISKEY, which can alleviate most of these problems. However, unless you are experienced or *very* careful, you can very easily lose files. DISKEY is good, but as far as I can tell it cannot do everything.

## Reclaiming Files

Case in point: While using my data base, the program locked up and when I rebooted, the data file in which I had invested so many hours was all gone (error #170, #164, etc.). A friend who has DISKEY promised "no problem," and after several hours of trying, we gave up (maybe

we didn't understand the manual—it is heavy reading). Determined not to reenter all that data, I set out to reclaim my file. After consulting COMPUTE!'s book *Inside Atari DOS*, I figured out how to get whatever was left of my file into a clean, closed, accessible file. This original routine was only 12 sectors long and now makes up the consecutive sector routine in "Disk Rx."

The more I studied, the more ideas I had about fixes for common problems. These ideas were added to Disk Rx. The program has been thoroughly tested, but I highly recommend that you transfer all important files to a backup disk (if possible) before attempting to repair the problem disk. Also, once you've repaired a disk, to be safe you should back it up immediately and reformat it to start fresh and avoid any additional problems.

## Serious Modifications

Since this program performs serious modifications to the disk directory, the utmost care must be taken when typing it in. Areas requiring special attention are string assignments, disk calls, and as usual, DATA statements. If you just don't want to bother typing it in, send a disk or cassette, a self-addressed, stamped mailer, and \$3 to me, and I will make a copy for you which actually initializes faster (it uses strings instead of DATA statements for the machine language setup). My address is:

Robert P. Dolan  
99 Meriden St.  
Rochester, NY 14612

## Disk Rx In Action

The main purpose of this utility is the examination and repair of disk files. Most damaged files can be put back together for normal loading or other access. There are also provisions for file modifications which are normally not allowed by



DUP.SYS. These and other features of this program will be explained in detail in the following sections.

The main menu of the program presents these options:

- [1] FILE BUILDER
- [2] SPECIAL DOS
- [3] ACTIVE DIRECTORY
- [4] SECTOR DIRECTORY

The functions of these options are as follows:

### [1] File Builder

When you select this, a second menu is displayed which allows file reconstruction in two ways. First, if a file is in a known location with consecutive sectors, a range of sectors is specified for grouping and saving in a new named file. The other and more powerful of these functions is the file trace routine. This portion allows the examination of a file's chain link on the disk. Through this, much can be learned about a damaged file, as well as one that is intact.

### [2] Special DOS

Basically, this routine provides certain directory modifications that DUP.SYS would normally challenge. When called, the user is presented with another menu from which to decide the particular function desired. The subroutines are Rename, Delete, and the life-saving Undelete. If a disk has not been written to much since the target file was deleted, the deleted file can be saved. The other two functions may not sound so special, but sometimes DUP.SYS will not allow their use. These functions will be further explained in the Special DOS section.

### [3] Active Directory

This is a simple directory access which will present the files that DOS considers to be on the disk. Only these files can be accessed through normal means. This program puts any files existing on the disk into this listing. Therefore, the success of an operation performed on a file can be checked by calling this directory. Of course, the ultimate proof of success is only evident when a resurrected file has been normally accessed.

### [4] Sector Directory

On this directory are all of the files which exist or have existed since the disk was last formatted (except that one or more old filenames may have been written over). With this, much information can be gained about the entire disk. When called, the following data is displayed: file number, filename, starting sector, number of sectors, and the current condition of the file (locked, unlocked, deleted, or undefined).

## File Builder

In most cases, the reconstruction of a lost file can be accomplished only if the file were damaged by either of two causes. First, if the file was being accessed by another program and the calling program locked up, the called file would usually be left in an open state. Subsequent attempts to access this file would be unsuccessful. If this was a data file or a text file (such as a program saved with a LIST command), almost all of the file can be reconstructed. If the damaged file was created by a SAVE command, the outlook is not so good. The second way that a file can be lost is if it is mistakenly deleted. In that case, you'll have to use the Undelete function of the Special DOS option to retrieve it.

When a file is left open, be sure not to write to this particular disk until you have a chance to try to correct the problem. Doing so decreases your chances of rebuilding the file to a usable condition, since DOS may write over some of the sectors you need. Run Disk Rx and select the File Builder option. From the second menu, select item 2, File Trace.

Provide the damaged file's name (the D: prefix is not necessary). Disk Rx will look up your file in the disk directory and determine at which sector it begins. When this is done you will be presented with a screen detailing all of the information there is on the target file. Press a key when you are ready, and the actual trace will begin.

As the file is traced, pertinent data about the file is displayed at the top of each sector display. This data is: TGT#—target file number, the number that we use as a reference; CUR#—current file number, the actual file number as derived from byte 125 of the sector just read and displayed (we want this to match our reference); NSEC#—the forward sector reference, which tells us where we are going; and BYTES—number of bytes in this sector which belong to the file we are tracing (this should equal 125 unless we are done, in which case it can be less).

While we're on the subject, a word about sectors and bytes. There are physically 720 sectors, and 128 bytes in these sectors. The reason we're interested mainly in 125 of these is that we are reading and working with data sectors which reserve the remaining three bytes for controlling where the load is going. A boot sector uses all 128 bytes since it loads consecutively and does not need control. Disk Rx is not concerned with boot sectors. This program is a file fixer and works with files and data sectors.

## More Options

When a file's trace is completed or stopped, the forward sector reference should be 0. The



number of bytes claimed by our file should be less than or equal to 125. The trace routine will not continue if either of these parameters contains incorrect values, or if file number references do not match. The latter usually prevents a complete recovery of the file.

In any case, you will have the option of saving the sector data collected during this trace or aborting the effort (in which case you go back to the main menu and all strings and buffers are cleared). When you save the new file, be sure to use the D: prefix. Using a different filename is suggested, so that you don't modify the sectors you just used as your source.

The other option offered in the File Builder mode is the consecutive sector approach. This routine is used when the exact location of a file is known. This information can be learned by consulting the sector directory and tracing the file's sector linkage on the disk. The only information provided here is the sector being read and the file number to which the sector is supposed to belong.

There is no checking for file integrity. This routine will cycle until it completes the sector range previously selected by the user. At this point, you are again presented with the choice to save or abort. This routine is also good for simply taking a tour of the disk. By selecting a range of 1 to 720, you can view as much of the disk as you like. Do this by answering N to the prompt regarding data collection.

The routines and aids available in the File Builder section of Disk Rx are helpful and, in most cases, can bring a dead program back to life. However, not every damaged file can be recalled.

## Special DOS: Uses And Limitations

The Special DOS functions differ from their conventional counterparts. When implemented, no checking is done on the directory bitmap or the file itself. The requested changes are made to the sector directory only. If you have a botched file and don't care about it, DOS usually won't allow you to delete it. Disk Rx will perform the deletion but will not free the sectors the target file used for other purposes. For a file which occupies many sectors, see the suggestions below. However, most small files can simply be deleted by Disk Rx and forgotten about (except for sector count discrepancies).

This checking procedure also applies to the other Special DOS functions, Rename and Delete. The filename entry will be renamed even if its sectors are written over by another file. The Rename function is useful mainly for solving the problem of having duplicate filenames on the same disk. (If it hasn't happened to you yet,

you're not trying.) When a Rename command is called, it acts on the first instance of the target name in the directory. Because of this, subsequent duplications remain unchanged.

The most often needed routine in this program is probably the Undelete procedure. This function is also the simplest, but its success can only be guaranteed if the disk on which the file resides hasn't been written to since the deletion. Otherwise, recovery must be attempted through use of the File Builder option. This is another nonverify process, which means we are only changing the status of the sector directory entry so DOS will now acknowledge its presence and load it (assuming it is still intact). The final procedure recommended for this function is different from that for the Delete function. This time, load and save the newly accessible file by standard procedures to insure its success.

These Special DOS functions can only be lifesavers if any necessary follow-up procedures are performed. Once again, the only true indication of a successful operation is the loading and execution of the recovered file. It is also strongly recommended that you resave any file which has been through any of Disk Rx's routines to insure complete recovery.

## Botched File Deletion

One way to delete a damaged file and clear its related sectors for other uses is to use the File Trace function of File Builder to build a deletable file. This new file *must* be saved under the same name as the old file. This will insure that the same sectors are used in the new SAVE procedure. The new file can then be deleted completely by more conventional means, thereby freeing the associated sectors. This action is usually worth the trouble for very large files.

## Console Button Controls

When sectors are displayed by Disk Rx, they can be toggled or aborted at any time by using the console buttons. During the display output, simply press the START button. This will freeze output to the screen. Pressing the SELECT button will then return control to where it left off. If you wish to terminate the function in progress, press the OPTION key instead and you will be returned to the main menu.

Here are brief explanations of the sub-routines included in Disk Rx. Some can be used in other applications, and to that end, have been written with portability in mind.

**150-200 Initialization:** String dimensions, buffer setup (clearing), machine language sub-routine loading, and subroutine variable setup.

**300-400 Consecutive sector loop:** Note the IF-THEN statements in this routine as well as



others which provide for usage by other, more central routines.

**400-500 File I/O setup:** Gets filename and directs program flow to file I/O routine if there is data in the buffer to be saved.

**500-600 Sector I/O routine:** Probably the most used routine in the program, it is capable of reading or writing a sector as determined by the SWRITE flag (POKE 770).

**600-700 Sector printout loop:** Prints the contents of the sector buffer to the screen while not allowing control characters to perform their normal function. This is done by printing an escape character (CHR\$(27);) before the intended character.

**1000-2000 Main menu:** Displays options and gets choice.

**2000-3000 Console button control:** Checks for START, SELECT, or OPTION pushed.

**3000-4000 Special DOS routine:** Prints a menu and performs Undelete, Delete, or Rename.

**4000-5000 Directory search routine:** This is not really suitable for portability since it jumps around so much. However, it is useful to study the method for examining and manipulating the filename string (FN\$) and the directory entry string (ITEM\$).

**5000-6000 File trace routine:** Extracts information from disk sectors for rebuilding files.

**6000-7000 Sector directory printout routine:** Displays sector information on the screen in the proper format.

**28000-29000 File I/O routine:** This is extremely portable for any application in which it is necessary to save any portion of memory to a disk file (or to any device, for that matter). It is derived from a routine provided in *De Re Atari*.

**31000-32000 Proceed routine:** Most routines use this to terminate their function. It clears the keyboard of previous entries and asks for another. When received, execution goes to the main menu (where the program is rerun to clear all buffers).

**32000-32110 Standard disk directory routine:** This is entirely portable and a very useful feature to have in any program.

## Disk Rx

Please refer to "COMPUTE!'s Guide To Typing In Programs" before entering this listing.

```

NM 150 ? "{CLEAR}":? "Okay...":DIM
      FN$(25),TANK$(130),DIS$(10
      ),ITEM$(25),ENT$(25),EXT$(5
      ),FLAG$(25),ID$(3),CBIN$(32
      )
NB 155 DIM CIO$(7),CURNM$(16),NWNM
      $(16)
JE 156 POKE 16,64:POKE 53774,64:SE
      TCOLOR 2,13,0

```

```

IO 157 RAM=INT(FRE(0)*0.75):DIM BU
      F$(RAM)
FA 160 CBIN=ADR(CBIN$):CIO=ADR(CIO
      $):START=ADR(TANK$)
GP 165 BUF$="{,}":BUF$(RAM)=BUF$:B
      UF$(2)=BUF$:TANK$="{,}":TAN
      K$(130)=TANK$:TANK$(2)=TANK
      $
CJ 170 NAME=4008:MENU=1000:HALT=20
      00:SREAD=500:IO=28000:CYCLE
      =220:PRNT=600:CONVERT=5160:
      DIREAD=4000
AK 175 IF PEEK(1572)=83 THEN 1010
AL 180 RESTORE :FOR A=1570 TO 1574
      :READ D:POKE A,D:NEXT A
NI 181 FOR A=1 TO 32:READ D:CBIN$(
      A,A)=CHR$(D):NEXT A
JP 182 FOR A=1 TO 7:READ D:CIO$(A,
      A)=CHR$(D):NEXT A:GOTO 1010
NI 185 DATA 104,32,83,228,96
LG 186 DATA 104,104,104,141,144,6,
      141,145,6,78,144,6,78,144,6
      ,162,5,14,145,6,202,16,250,
      162,5,78,145,6,202,16,250,9
      6
JA 187 DATA 104,104,104,170,76,86,
      228
HG 200 REM
OA 205 TRAP 1150:?"{CLEAR}{2 DOWN}
      ENTER FIRST SECTOR ":INPUT
      FSEC:CONS=1
OB 210 ? "{DOWN}ENTER LAST SECTOR
      ":INPUT LSEC
IK 215 POKE 764,255:TRAP 220:?"
      {DOWN}DISPLAY SECTORS ":IN
      PUT DIS$:IF DIS$(1,1)="Y" T
      HEN DISPLAY=1
PF 217 TRAP 220:?"{DOWN}LOAD SECT
      OR DATA INTO BUFFER":INPUT
      DIS$:IF DIS$(1,1)="Y" THEN
      FILL=1:TRAP 40000
IE 220 POKE 764,255:TRAP 225:?"
      {2 DOWN}INSERT SOURCE DISK
      AND PRESS RETURN":INPUT A
DN 225 TRAP 40000:?"
HH 300 REM
NG 305 FOR SECT=FSEC TO LSEC
OO 310 IF PEEK(53279)=6 THEN GOSUB
      HALT
AP 315 IF CONS=1 THEN ? "READING
      SECTOR":SECT
NE 320 GOSUB SREAD:IF DISPLAY=1 TH
      EN GOSUB PRNT
LE 322 IF DIR<>1 THEN GOSUB CONVER
      T:?"FILE NO.":FILNO:?"
NH 325 IF FILL=1 THEN BUF$(BCNT,BC
      NT+TYPE)=TANK$(1,TYPE):BCNT
      =BCNT+TYPE
CJ 330 NEXT SECT:IF DIR=1 THEN RET
      URN
HI 400 REM
BN 405 ? :?"HIT START TO SAVE":?"
      HIT OPTION TO RESTART"
OB 410 IF PEEK(53279)=6 THEN 425
LG 415 IF PEEK(53279)=3 THEN GOTO
      MENU

```



```

GE 420 GOTO 410
AB 425 IF BCNT<2 THEN ? :? CHR$(25
3);"NO DATA TO SAVE":GOTO 3
1000
CA 427 POKE 764,255:?"{CLEAR}
{2 DOWN}ENTER OUTPUT FILESP
EC ";;INPUT FN$
NE 430 IF FN$(1,2)<>"D:" THEN 425
EH 435 ? "{2 DOWN}PARAMETERS FOR F
ILE "FN$
PP 440 BYTES=BCNT:?"{DOWN}BYTES R
EAD=";BYTES
OC 445 ? "{DOWN}WHICH EQUALS ";INT
(BYTES/125);" SECTORS"
OD 450 STADR=ADR(BUF$):CMD=11:GOSU
B 10:GOTO 31000
HJ 500 REM
IN 505 REM *** SECTOR READ ROUTINE
***
NB 510 POKE 769,1:POKE 770,82:POKE
779,0
AN 515 IF SWRITE=1 THEN POKE 770,8
7
NP 520 BUFLO=START-256*INT(START/2
56):BUFHI=INT(START/256)
LO 525 POKE 772,BUFLO:POKE 773,BUF
HI
PD 530 POKE 778,SECT-256*INT(SECT/
256)
NG 535 POKE 779,INT(SECT/256)
GA 540 X=USR(1570):RETURN
IC 545 REM
HK 600 REM
HP 605 REM
IC 610 FOR X=1 TO 128
PG 615 IF PEEK(53279)=6 THEN GOSUB
HALT
GE 620 ? CHR$(27);TANK$(X,X);:NEXT
X:?" :? :? :RETURN
IN 996 REM
ND 997 REM *** MAIN MENU ***
LG 1000 RUN
DL 1010 SWRITE=0:DIR=0:UNDEL=0:NAM
ER=0:CMD=7:DISPLAY=0:SECDI
R=0:BCNT=1
PI 1020 POKE 764,255:TRAP MENU:?"
{CLEAR}{2 DOWN}{8 SPACES}=
=>{4 SPACES}DISK RX
{4 SPACES}K=<{9 SPACES}"
BJ 1035 FOR S=1 TO 55:POKE 53279,0
:NEXT S
WH 1040 ? "{3 DOWN}{7 SPACES}***OP
TIONS***"
DI 1060 ? "{DOWN} [1] BROKEN FILE
BUILDER"
BN 1070 ? " [2] SPECIAL DOS
[8 SPACES]"
KI 1080 ? " [3] ACTIVE DIRECTORY
[5 SPACES]"
LO 1090 ? " [4] SECTOR DIRECTORY
[5 SPACES]"
NF 1095 ? " [5] QUIT PROGRAM
[4 SPACES]";
HD 1099 INPUT CHOICE:TRAP 40000
FM 1100 IF CHOICE=2 THEN 3000
HF 1110 IF CHOICE=5 THEN END
JC 1120 IF CHOICE=3 THEN 32000

GF 1130 IF CHOICE=4 THEN 6000
EI 1140 IF CHOICE<>1 THEN GOTO MEN
U
NA 1150 TRAP 1150:?"{CLEAR}
{2 DOWN} [5 SPACES]FILE E
UNDER{5 SPACES}"
NK 1160 ? "{3 DOWN}{6 SPACES}***OP
TIONS***"
LN 1170 ? "{DOWN} [1] CONSECUTIVE
SECTORS"
BI 1180 ? " [2] DISK SEARCH
[8 SPACES]"
NG 1190 ? " [3] MAIN MENU
[10 SPACES]";:INPUT OPTION:
TRAP 40000
OE 1200 IF OPTION=1 THEN TYPE=125:
GOTO 200
DJ 1210 IF OPTION=3 THEN GOTO MENU
NP 1220 IF OPTION<>2 THEN 1150
KI 1230 GOTO DREAD
KG 2000 REM
OA 2020 IF PEEK(53279)=3 THEN GOTO
MENU
FF 2030 IF PEEK(53279)=5 THEN RETU
RN
CI 2040 GOTO HALT
KH 3000 REM
IL 3010 REM *** SPECIAL DOS ***
KJ 3020 REM
JL 3030 TRAP 3000:?"{CLEAR}
{2 DOWN} [5 SPACES]SPECIA
L DOS{6 SPACES}"
NJ 3040 ? "{3 DOWN}{6 SPACES}***OP
TIONS***"
WH 3050 ? "{DOWN} [1] UNDELETE FIL
E"
AO 3060 ? " [2] RENAME FILE
[8 SPACES]"
AL 3070 ? " [3] DELETE FILE
[6 SPACES]"
NH 3080 ? " [4] MAIN MENU
[10 SPACES]";:INPUT OPTION:
TRAP 40000
IE 3090 ON OPTION GOTO 3110,3210,3
110,MENU
NA 3100 GOTO 3000
KD 3110 REM *** UNDELETE ROUTINE
NN 3120 TRAP 40000:UNDEL=1:GOSUB D
I READ:ITEM$(1,1)="B":SECT=
361:SWRITE=1:IF OPTION=3 T
HEN ITEM$(1,1)="{U}"
NN 3130 BUF$(1+REC*16,16+REC*16)=I
TEM$(1,16):START=ADR(BUF$)
NE 3140 ? :? "HIT START TO WRITE
NEW DIRECTORY"
AP 3142 ? "HIT OPTION TO ABORT P
ROCEDURE"
OL 3147 IF PEEK(53279)=3 THEN GOTO
MENU
EE 3150 IF PEEK(53279)=6 THEN 3160
NG 3155 GOTO 3147
LJ 3160 GOSUB SREAD
KK 3170 FOR XX=1 TO 7
BN 3180 SECT=SECT+1:START=START+12
8
AE 3190 GOSUB SREAD:NEXT XX:UNDEL=
0

```



```

HH 3200 SWRITE=0:GOTO 31000
AG 3210 REM *** RENAME ROUTINE
PB 3220 NAMER=1: ? "{2 DOWN}ENTER C
CURRENT FILENAME";:INPUT FN$
$:GOSUB NAME:CURNM$=FN$
BC 3230 NAMER=1: ? "ENTER NEW FILEN
AME{4 SPACES}";:INPUT FN$:
GOSUB NAME:NWNM$=FN$:FN$=C
URNM$
NL 3240 TRAP 40000:UNDEL=1:GOSUB 4
010:ITEM$(6,16)=NWNM$:SECT
=361:SWRITE=1:GOTO 3130
MC 3999 REM
AP 4000 REM *** DIRECTORY SEARCH *
**
PA 4005 TRAP 4005: ? "{DOWN}ENTER T
ARGET FILESPEC ";:INPUT FN$
KH 4008 D=LEN(FN$):IF D=0 THEN 400
5
LH 4010 FOR I=1 TO D:IF FN$(I,1)="
." THEN GOTO 4200
EP 4012 NEXT I
JL 4015 TRAP 4020:IF FN$(1,2)="D:"
THEN FN$=FN$(3,LEN(FN$))
HK 4020 TRAP 40000:IF LEN(FN$)<11
THEN FN$(LEN(FN$)+1)="
{11 SPACES}":IF LEN(FN$)>11
THEN FN$=FN$(1,11)
GE 4025 IF NAMER=1 THEN NAMER=0:RE
TURN
BH 4030 FSEC=361:LSEC=368:DISPLAY=
0:DIR=1:TYPE=128:REC=0
BN 4035 CONS=0:FILL=1:GOSUB CYCLE:
IF REN=1 THEN REN=0:RETURN
MC 4040 ITEM$=BUF$(1+REC*16,16+REC
*16):IF ITEM$(6,16)=FN$ TH
EN 4055
HP 4045 IF REC>65 THEN ? CHR$(253)
:FN$:" NOT FOUND":GOTO 310
00
FB 4050 REC=REC+1:GOTO 4040
FC 4055 IF UNDEL=1 THEN RETURN
BG 4060 ? "{CLEAR}{DOWN}*****
*****
*{DOWN}"
BB 4065 ? : ? ITEM$(6,16);" IS FILE
NO.":REC: ? :THIS=REC
FE 4070 FLAG=ASC(ITEM$(1,1)):SCNTL
=ASC(ITEM$(2,2)):SCNTH=ASC
(ITEM$(3,3)):SSNL=ASC(ITEM
$(4,4)):SSNH=ASC(ITEM$(5,5
))
BE 4075 SCNT=SCNTH*256+SCNTL:SSN=S
SNH*256+SSNL:IF SECDIR=1 T
HEN RETURN
EB 4080 ? : ? "*** PARAMETERS FOR F
ILE"
BJ 4085 ? : ? "DISK STARTING SECTOR
=":SSN: ?
FG 4090 ? "TOTAL SECTOR COUNT
{3 SPACES}=":SCNT: ?
FC 4095 ID$=ITEM$(1,1):IF ID$<>"b"
AND ID$<>"B" AND ID$<>"
{ }" THEN FLAG$="UNDEFINED
"
AJ 4100 IF ITEM$(1,1)="b" THEN FLA
G$="LOCKED"
JB 4105 IF ITEM$(1,1)="B" THEN FLA
G$="UNLOCKED"
GN 4110 IF ITEM$(1,1)="{ }" THEN F
LAG$="DELETED"
JB 4115 IF SECDIR=1 THEN RETURN
JN 4120 ? : ? "CURRENT FILE STATE I
S ":FLAG$
MH 4125 ? : ? "HIT ANY KEY TO BEGIN
TRACE":POKE 764,255
HI 4130 IF PEEK(764)<>255 THEN 500
0
MO 4135 GOTO 4130
HC 4200 EXT$=FN$(1+1,D):FN$=FN$(1,
1-1)
PH 4205 D=LEN(FN$):IF D<8 THEN FN$
(D+1)="{8 SPACES}":IF LEN(
FN$)>8 THEN FN$=FN$(1,8)
AI 4210 ? CHR$(253):FN$(LEN(FN$)+1
)=EXT$:GOTO 4015
KJ 5000 REM
GN 5020 ? "{CLEAR}{2 DOWN}>>>>>FI
LE TRACE<<<<<<<"
OM 5022 DISPLAY=0:FILL=0:POKE 764,
255
LN 5025 TRAP 5027: ? : ? "{2 DOWN}DI
SPLAY SECTORS";:INPUT DIS$
:IF DIS$(1,1)="Y" THEN DIS
PLAY=1
FN 5027 TRAP 5030: ? "{DOWN}LOAD SE
CTOR DATA INTO BUFFER";:IN
PUT DIS$:IF DIS$(1,1)="Y"
THEN FILL=1:TRAP 40000
PJ 5030 BCNT=1:SWRITE=0:UNDEL=0:DI
R=0:TYPE=125:SEARCH=1:SECT
=SSN:GOSUB SREAD
GK 5040 GOSUB CONVERT
EL 5050 ? : ? "TGT=";THIS;" CUR$="
;FILNO;" NSEC=";NSEC;" BYT
ES=";BYTES: ?
EN 5060 IF FILL=1 THEN BUF$(BCNT,B
CNT+TYPE)=TANK$(1,TYPE):BC
NT=BCNT+BYTES
NC 5070 IF DISPLAY=1 THEN GOSUB PR
NT
OM 5075 IF THIS<>FILNO THEN ? : ? "
FILE NUMBER MISMATCH";CH
R$(253): ? : ? " OPTION -ABO
RT/SELECT-CONTINUE":GOTO
HALT
KD 5080 IF TANK$(127,127)="{,}" TH
EN 400
IN 5090 SECT=NSEC:GOSUB SREAD
CA 5100 IF PEEK(53279)=6 THEN GOSU
B HALT
MJ 5110 GOTO 5040
KN 5120 REM
PO 5130 REM *** BYTE CONVERT ***
KO 5140 REM
AG 5160 A=USR(CBIN,ASC(TANK$(126,1
26)))
MP 5170 FILNO=PEEK(1680):NSEC=PE
EK(1681):NSECLO=ASC(TANK$(
127,127)):BYTES=ASC(TANK$(
128,128))

```



```

KE 5180 NSEC=NSECHI*256+NSECLO
KP 5190 RETURN
KK 6000 REM
LG 6020 REM *** SECTOR DIR. PRINTO
UT *
KM 6030 REM
PF 6040 FSEC=361:LSEC=368:DISPLAY=
0:DIR=1:TYPE=128:REC=1:SEC
DIR=1:R=0:START=ADR(TANK$)
IK 6050 FILL=1:GOSUB CYCLE
GE 6055 TRAP 6060:?:?"WANT PRINT
OUT";:INPUT ITEM$:IF ITEM$
(1,1)="Y" THEN P=1:GOSUB 6
200
MO 6060 ? "{CLEAR}{DOWN}
{7 SPACES}SECTOR DIRECTORY
{11 SPACES}"
LL 6070 ? "RECFILENAMESSNSCN
TSTATUS"
KA 6080 ITEM$=BUF$(1+REC*16,16+REC
*16)
KG 6090 GOSUB 4070:GOSUB 4095
MK 6100 IF ITEM$(1,5)="{5,}" THEN
SECDIR=0:GOTO 31000
IC 6105 IF P=1 THEN LPRINT REC,ITE
M$(6,16),SSN,SCNT,FLAG$
KK 6110 POSITION 3,R+4:?:REC:POSIT
ION 6,R+4:?:ITEM$(6,16):PO
SITION 18,R+4:?:SSN
NE 6120 POSITION 23,R+4:?:SCNT:POS
ITION 28,R+4:?:FLAG$:R=R+1
:REC=REC+1:IF R<>15 THEN 6
080
BG 6130 POKE 764,255:?:?"[X]=END
...[C]=CONTINUE"
KP 6140 IF PEEK(764)=22 THEN GOTO
MENU
EF 6150 IF PEEK(764)=18 THEN R=0:G
OTO 6060
NB 6160 GOTO 6140
LC 6170 REM
LD 6200 TRAP 6220:LPRINT " ":LPRIN
T " ":LPRINT "{7 SPACES}SE
CTOR DIRECTORY{11 SPACES}"
KF 6210 LPRINT "REC#{6 SPACES}FILE
NAME{12 SPACES}SSN
{7 SPACES}SCNT{6 SPACES}ST
ATUS":LPRINT " ":RETURN
DH 6220 ? :?"TURN ON PRINTER":G
OTO 31000

PI 27999 REM
DB 28000 REM ** SHORT FORM FILE I /
O **
NP 28001 REM
GH 28025 CB=1:BX=16*CB:CM=834+BX:S
TA=835+BX:AL=836+BX:AH=83
7+BX:LL=840+BX:LH=841+BX:
A1=4:IF CMD=11 THEN A1=8
FA 28040 CLOSE #1:OPEN #CB,A1,0,FN
$:TEMP=STADR:GOSUB 28060:
POKE AL,LOW:POKE AH,HI:TE
MP=BYTES:GOSUB 28060
EN 28050 POKE LL,LOW:POKE LH,HI:PO
KE CM,CMD:ERROR=USR(ADR(C
IO$),BX):ERROR=PEEK(STA):
CLOSE #1:RETURN

```

```

IG 28060 HI=INT(TEMP/256):LOW=INT(
TEMP-HI*256):RETURN
PJ 31000 POKE 764,255:?:?"HIT
ANY KEY TO CONTINUE"
EO 31010 IF PEEK(764)<>255 THEN GO
TO MENU
CE 31020 GOTO 31010
BJ 32000 REM DISK DIRECTORY
NO 32010 OPEN #5,6,0,"D:*.*":POKE
82,1
PF 32020 ? "{CLEAR}":TRAP 32110:?:
? "{11 SPACES}DISK DIREC
TORY{11 SPACES}"
FG 32040 INPUT #5,ENT$:?:ENT$:" "
;
AJ 32050 INPUT #5,ENT$:?:ENT$:GOTO
32040
MO 32110 CLOSE #5:?:?"
{70 SPACES}":?:POKE 82,2:GO
TO 31000

```

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## Retrospective

*Editor's Note: This is Jim Butterfield's last "Machine Language" column for COMPUTE!—but that doesn't mean he is departing our pages. Butterfield will continue to contribute articles, programs, advice, and "Readers' Feedback" answers on a regular basis. And as always, he welcomes your letters, comments, and suggestions (c/o COMPUTE!).*

This winds up the machine language column. It's been running since issue 3 of COMPUTE! (March/April 1980) and has covered a variety of topics related to machine language. Now it's time to look back and reflect on the nature of machine language and how to cope with it.

### Assembly Vs. Machine Language

Why *machine language* as opposed to *assembly language*? If I write about a command to load the A register and call it LDA, for Load A, isn't this assembly code? In a sense, yes. It seems to me that if you have your mind firmly fixed on the machine—where the program will be located, how big it is, and details on how it works—you are writing machine language.

With assembly language programming, on the other hand, you disconnect yourself from the machine to some extent. You can write code without knowing where it will eventually reside in the computer. You can call subroutines, say for input and output, without knowing exactly where they are located. You can use abstract locations in zero page and figure out later what addresses will be free for the job.

All of these characteristics of assembly language are good. They allow you to write a program in principle and worry about the details later. They let you concentrate on ideas instead of detail. They help to make code transportable from one type of computer to another.

But to the beginner, the ideas are too abstract. As you learn, you build confidence and allay fear by writing programs that work, not just on paper, but on a real machine. Most beginners

want to see something happen. And that's machine language.

When you start, there are all kinds of details you must keep track of: how to use the monitor, what parts of memory are safe, how input and output works, and so on. At this stage, an assembler can be extra clutter: a whole set of extra rules you must learn. Wait.

If you're going to work in machine/assembly language a fair amount, do plan to buy an assembler . . . eventually. It will make your job easier and your programs better. But before you do, get to know machine language; you'll gain a fundamental understanding of what's going on inside the computer.

### Mathematics

Most of us have learned that a computer may be mathematical in nature, but you don't need to be a math wizard to use it. In many cases we can write programs without ever visibly using mathematics.

In machine language, the mathematical nature of the computer is more tangible. We quickly discover that since each byte can contain a value of only 0 to 255, coding is needed to handle large numbers. We may be concerned with signed numbers and need to learn about the mysteries of twos-complement arithmetic. New number systems such as binary and hexadecimal become important.

Even to do simple jobs such as inputting or outputting a numeric value, we must dig into math procedures, since binary numbers must be converted to or from decimal. Addition, subtraction, multiplication, and division become new challenges. None of this is "advanced" mathematics; it's a new look at an old subject.

To some programmers, this is drudgery. To others, it's a challenge. People can be amazed to discover that numbers can be fun.

### Problems And Discipline

BASIC programmers may go to the computer and type in whatever instructions pop into their



heads. That's not a good idea in BASIC, and it's a disaster in machine language.

Form a plan. Write the planned program on paper, not on your screen. Desk check: Go through each instruction and pretend you are the computer, writing down what is in each register and in memory. Then enter the program into the computer.

Try to form the program into modules so you can test it in parts. Put a halt command after each module (a BRK, break, hexadecimal 00, will do the job on 6502 systems). As each module works, remove the halt command and continue to the next module.

Your program will run correctly if you write it correctly. A computer is dumb and doesn't know how to make mistakes. It takes a programmer to do that. And it takes a careful programmer to fix the mistakes.

## The Joy Of Machine Language

It's quite a thrill to get a machine language program working. Everything happens so quickly—machine language is fast. And everything happens precisely—you have more control when you write in machine language.

There's a great sense of accomplishment. And that's what programming is all about. ©

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# IBM Personal Computing

Donald B. Trivette

## The Most Important Peripheral

One of my friends recently bought an IBM AT. This is the Rolls Royce of IBM Personal Computers—the machine that is three times faster than the PC and PCjr, that comes with 256K of memory, and that has an optional 20-megabyte hard disk. This is the computer that I want but can neither afford nor justify. My friend doesn't really need the speed and power of the AT either—mostly he uses it to balance his checkbook, from which he deducted a tidy \$5,795 to be able to do it faster than anyone else. Until he bought the AT, he *got by* with an IBM PC-XT, an Apple III, and a PCjr. (This guy has more computer power in his spare bedroom than many Fortune 500 companies had a decade ago.)

Anyway, he was in the process of moving his files from the 10-megabyte PC-XT hard disk to the AT's 20-meg hard disk by copying them on floppy disks. Although this is time-consuming, it's not particularly difficult. At least it wouldn't have been difficult except my computer-rich friend was running his PC-XT without a monitor. His only monitor (gotta save a few bucks somewhere) was connected to the new AT. Do you know how much havoc you can cause running a computer without a video display? It's frightening!

As my friend discovered, the most important peripheral attached to a computer is the display. Some would argue that the keyboard is equally important, but the keyboard isn't a peripheral in one sense—it nearly always comes with the computer, and the display almost never does. Besides, how much damage can you do without a keyboard?

Once you've selected a PC or PCjr (or even an XT or AT), you can choose among six types of monitors. They are not completely interchangeable. An IBM Monochrome Display can be con-

nected only to the PC; an IBM RGBjr Display can be connected only to the PCjr. For display purposes, the XT and AT are compatible with the PC. The PCjr has built-in circuitry to connect a monitor, while the more expensive PC has none. Therefore, the PC requires a separate internal display adapter before a monitor can be attached. The accompanying tables will help sort out what can be connected to what (prices don't include the cost of the video adapter boards and cables).

### Display Choices

The best—and most expensive—choice for a monitor is an RGB (red-green-blue) display. An RGB monitor is capable of displaying sharp, vivid colors as well as black-and-white images. To connect this display to a PC, you'll need the color/graphics adapter board (\$244). Although the PCjr has the equivalent of a color/graphics adapter built-in, IBM changed the connectors on the Junior so the IBM RGB Display is not directly compatible. It requires a four-inch long adapter cable (\$20).

Because the IBM RGB Display is rather expensive (\$680), IBM sells a special RGB monitor just for the PCjr—the RGBjr Display (\$429). The RGBjr plugs directly into the PCjr's unusual connector. Unlike the more expensive RGB monitor, the RGBjr has an internal speaker, but it cannot be connected to the PC.

Of course, you can also use a color or black-and-white TV set with a PC-series computer. Although a TV image is less sharp and the colors less vivid than an RGB image, a TV is a good choice for running many home-type computer programs. Besides, you probably already have one. The TV connects to the PC's color/graphics adapter via an RF modulator. IBM recommends the RF modulator made by M&R Electronics



**Table 1: IBM PC Display Compatibility**

Display Type	Connects To	Color	Graphics	Sound	Price
IBM RGB	color/graphics adapter	Yes	Yes	No	\$680
IBM RGBjr	not compatible	—	—	—	—
IBM Monochrome	monochrome adapter	No	No	No	\$275
Monochrome composite video	color/graphics adapter	No	Yes	No	\$100*
Color composite video	color/graphics adapter	Yes	Yes	Yes	\$249†
TV set	color/graphics adapter	Yes	Yes	No	\$300‡

\*Approximate price of 12-inch green screen or amber monitor.

†Approximate price of 12- to 14-inch color monitor.

‡Approximate price of 12- to 19-inch color TV. Add \$70 for required RF modulator.

**Table 2: IBM PCjr Display Compatibility**

Display Type	Connects To	Color	Graphics	Sound	Price
IBM RGB	\$20 cable	Yes	Yes	No	\$680
IBM RGBjr	Plug-ready	Yes	Yes	Yes	\$429
IBM Monochrome	Not compatible	—	—	—	—
Monochrome composite video	Plug-ready	No	Yes	No	\$100*
Color composite video	Plug-ready	Yes	Yes	Yes	\$249†
TV set	RF modulator	Yes	Yes	Yes	\$300‡

\*Approximate price of 12-inch green screen or amber monitor.

†Approximate price of 12- to 14-inch color monitor.

‡Approximate price of 12- to 19-inch color TV. Add \$30 for required RF modulator.

(\$70). The PCjr also requires an RF modulator, but in this case IBM sells one for \$30.

A monochrome composite video monitor can also be connected to any PCjr or PC with a color/graphics adapter. This is a good choice when you don't need color but do want graphics. Such a monitor produces much sharper characters than a TV, and many people (myself included) prefer it to an RGB display for word processing. There are amber-screen and green-screen models. According to some European studies, the newer amber screens are easier on the eyes. If you want color graphics but don't want to spend the money for an RGB display, a color composite video monitor is a good alternative to a TV. Like the monochrome composite video monitor, it connects directly to the video jack on the PCjr or the color/graphics adapter on the PC.

The last choice for a display is a choice only for the PC; the IBM Monochrome Display will not work on the PCjr. While it displays superb characters, it has neither color nor graphics capabilities. It plugs into the PC's optional monochrome/printer adapter (\$250).

If you have the right adapters, cables, and fittings, you can connect several displays to the PCjr at the same time. I have had a color TV, a composite video monitor, and an RGB display all connected to my PCjr—and all three displaying

the same screen at the same time. Multiple monitors on the PC react differently; you must select either the monochrome or color/graphics adapter by software.

## Adding Color To DOS

One of the first things you find out when you connect a color monitor to your PC or PCjr is that the Disk Operating System (DOS) screen isn't in color. DIR, CHKDSK, COPY, and all the other commands do their stuff in dull black and white. With up to \$680 invested in a color monitor, who wants to look at black and white?

The solution is the BASIC program below. It sets the text, background, and border colors and alters DOS so that once you've left BASIC, the screen colors remain unchanged. (It requires DOS 2.0 or higher.)

Before entering the BASIC program, you've got to do some preliminary work with DOS. Format a new disk—a work disk—using the /S option. Then, from the original IBM DOS disk, copy the file named ANSI.SYS to the work disk with the COPY command:

```
COPY A:ANSI.SYS B:*
```

Next, make a new file on the work disk and put just one command in it. To do that, use the COPY command again—this time to copy from the keyboard into the new file. Type:

```
COPY CON: CONFIG.SYS
```



and then, the command:

```
DEVICE=ANSI.SYS
```

Finally, to save the file, press the F6 key and the Enter key. After this, there should be a file on the work disk named CONFIG.SYS as well as one named ANSI.SYS. Check to be sure.

When DOS is started, it looks to see if there's a file named CONFIG.SYS on the boot disk. If so, it uses information from that file to set certain parameters. However, even though the CONFIG.SYS file is there, DOS doesn't yet know about it. To fix that situation, clear the computer by turning it off, waiting a few seconds, and then turning it back on. (Alternately, use the Ctrl-Alt-Del sequence.) Now, as DOS boots, it will find out about CONFIG.SYS and ANSI.SYS. (Don't put anything in an AUTOEXEC.BAT file about these files.)

The next step is to type in the BASIC program following this column. Be especially careful when typing line 540—it contains semicolons in unusual places. Save the program on the boot disk with the filename COLORPGM.BAS *before running it for the first time*. If you run it without saving and there are no typing errors, the program will exit to DOS and all your typing will be lost. The irony is that if you get everything right, you lose. So save it, *then* test it.

## Using The Color Changer

Now let's see how the program works. Lines 180–250 may look familiar. They are the BASIC color numbers; color 4 is red. However, DOS has a different numbering scheme; red is number 31 for the foreground and 41 for the background. Lines 60–130 are a conversion table to translate between BASIC and DOS colors. When you run the program, lines 270–290 ask whether you like the colors—initially black and white—shown on the screen. If you respond by typing anything other than Y or y, the program gives you a chance to make changes.

Lines 300–410 allow you to enter numbers for the foreground (text), background, and border colors. Background colors may be only the numbers 0 through 7, however. If you forget and enter color 12 (light red), BASIC will use color 4 (red) instead. Lines 420–500 warn if you've selected an invisible combination—black text on a black background, for example. Pressing Enter leaves the color unchanged.

Line 510 actually changes the screen colors, and line 530 loops back to display the menu again. Should this be the combination you want, answer the prompt by pressing Y. Line 540 then creates a disk file named COLOR.DOS. The filename is determined by line 40; you may want to change it to something else. Line 560 ends the

program and returns control to DOS. That's why you should save the program on disk before testing it. Should you want to stay in BASIC with the screen colors active, you'll need to delete line 560 or insert a REM as its first statement.

Once you're back in DOS, you'll find that the screen is still in black and white. The COLOR.DOS file is the one that really changes the screen colors. To get the file to perform its magic, use the DOS TYPE command. That is, at the A> prompt, enter:

```
TYPE COLOR.DOS
```

and then:

```
CLS
```

From here on, the DOS screen will appear in the colors you selected. Whether the screen colors remain when you run another program depends on whether that program sets colors.

If you get letters and numbers instead of a color change when you use the TYPE COLOR.DOS command, then CONFIG.SYS or ANSI.SYS has not been copied correctly to your disk, or you have not rebooted the system. You must boot the system using a disk containing these two files for the program to work.

## Automating The Process

This *does* seem a roundabout way to change DOS colors, but it's simpler than some of the other methods. The problem is that while it's possible to set foreground and background colors for DOS, only BASIC can set the border color. When BASIC ends, it takes its colors with it—except the border color. Therefore, we use BASIC to set the border and create a file that DOS can use to set the foreground and background.

You can use DOS batch commands to automate all this. Create a DOS batch file named COLOR.BAT. In it, put the following commands:

```
BASIC COLORPGM
TYPE COLOR.DOS
CLS
```

Typing COLOR at the DOS prompt invokes the batch file, which loads BASIC, runs the COLORPGM program, and executes the TYPE and CLS (Clear Screen) commands.

You might want to change the filename in line 40 from COLOR.DOS to something else in order to create and save several files of color combinations. For example, brown on white might be named BRNWHI.DOS; blue on white might be named BLUWHI.DOS. Once these files are on the DOS disk, you can change colors just by entering TYPE *filename*. (By the way, the file extension of .DOS isn't special—use anything you like.) By including the TYPE command in an AUTOEXEC.BAT file, you can boot up DOS in color—provided the boot disk has the ANSI.SYS



and CONFIG.SYS files. And remember, TYPE filename can't set the border—only the BASIC program can do that.

The program requires DOS 2.0 or higher because earlier versions of DOS do not support the CONFIG.SYS features.

## DOS Color Changer

Please refer to "COMPUTE!'s Guide To Typing In Programs" before entering this listing.

```
LA 5 REM Program to set colors in BASI
C & DOS
BG 10 KEY OFF
PK 20 OPTION BASE 0
FB 30 COLOR 7,0,0
LP 35 FG$="7":BG$="0":BD$="0"
OM 40 OPEN "color.dos" FOR OUTPUT AS
#1
DP 50 DIM FGDOS$(7),BGDOS$(7)
BA 60 FGDOS$(0)="30":BGDOS$(0)="40"
LM 70 FGDOS$(1)="34":BGDOS$(1)="44"
HB 80 FGDOS$(2)="32":BGDOS$(2)="42"
GC 90 FGDOS$(3)="36":BGDOS$(3)="46"
NB 100 FGDOS$(4)="31":BGDOS$(4)="41"
"
NN 110 FGDOS$(5)="35":BGDOS$(5)="45"
"
JB 120 FGDOS$(6)="33":BGDOS$(6)="43"
"
JN 130 FGDOS$(7)="37":BGDOS$(7)="47"
"
AF 140 CLS
OH 160 PRINT " SET BASIC & DOS COLO
RS"
JO 170 PRINT
PF 180 PRINT " 0 Black 8 Gre
y"
AC 190 PRINT " 1 Blue 9 Lt.
Blue"
BE 200 PRINT " 2 Green 10 Lt.
Green"
MM 210 PRINT " 3 Cyan 11 Lt.
Cyan"
LK 220 PRINT " 4 Red 12 Lt.
Red"
NG 230 PRINT " 5 Magenta 13 Lt.
Magenta"
PH 240 PRINT " 6 Brown 14 Yel
low"
JK 250 PRINT " 7 White 15 Bri
ght White"
JN 260 PRINT
PI 270 PRINT " Use these colors? Y/N
"
KD 280 A$=INKEY$:IF A$="" THEN 280
AF 290 IF A$="Y" OR A$="y" THEN 540
IC 300 PRINT
MD 310 LINE INPUT " TEXT: ";A$
FP 320 IF A$<>" " THEN FG$=A$
OK 330 IF VAL(FG$)>15 THEN BEEP:GOTO 1
40
CA 340 LINE INPUT " Background: ";A$
ID 350 IF A$<>" " THEN BG$=A$
NA 360 IF VAL(BG$)>15 THEN BEEP:GOTO 1
40
ID 370 LINE INPUT " Border: ";A$
NM 380 IF A$<>" " THEN BD$=A$
```

```
FD 390 FG=VAL(FG$)
OD 400 BG=VAL(BG$)
KA 410 IF VAL(BD$)>15 THEN BEEP:GOTO 1
40
KD 420 IF FG>7 THEN HI$="1":FG=FG-8:F
G$=STR$(FG):FG=FG+8 ELSE HI$="
0;"
PL 430 IF BG>7 THEN BG=BG-8:BG$=STR$(B
G)
PH 440 IF BG<>FG THEN 510
JN 450 PRINT
OL 460 BEEP
DK 470 PRINT " WARNING: Characters wil
l be invisible."
LH 480 PRINT " Is this Okay? Y/N"
OK 490 A$=INKEY$:IF A$="" THEN 490
PD 500 IF A$="Y" OR A$="y" THEN 510 EL
SE 140
PH 510 COLOR FG,BG,VAL(BD$)
AF 520 CLS
DC 530 GOTO 140
NI 540 PRINT #1,CHR$(27);"[";HI$;FGDOS
$(VAL(FG$));";";BGDOS$(VAL(BG$)
);"m"
PE 550 CLOSE
MK 560 SYSTEM
NM 570 END
```

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# Automatic Atari DATAline Generation

Robert E. Miller

*Location 842 in Atari computers allows the computer to perform a clever trick called the dynamic keyboard. What this means is that a line can be entered into the computer automatically from the screen. "Automatic Atari DATAline Generator" uses this technique to make data line entry less tedious.*

One of the more interesting features of the Atari is the dynamic keyboard capabilities of POKE 842,13, discussed in Bruce Frumker's "Restoring Data and Updating Data on the Atari" (COMPUTE!, August 1981). The small tutorial program discussed here illustrates a few of the possibilities.

The sample program allows storage of information in DATA lines when keyed in at "prompt" pauses. It provides a search function for printing data on the screen (or on other printers), based on the first string in the data set. Stored data can be edited—that is, corrected or changed using routines based on POKE 842,13.

## Useful For Nonprogrammers

All DATA lines are written and deleted under program control, avoiding the problems inherent in typing in "line number, data, and commas." This approach is particularly useful when programs are to be run by nonprogrammers. The program incorporates "block deletion" of lines as discussed in the August 1981 article.

As explained by Frumker, the activity of writing or deleting DATA lines can be hidden from the user by setting the luminances of the background and characters on the screen to the same level if the display is objectionable. It was not

suppressed here since it is instructive to observe the action and allows the checking of each entry.

String data is referred to as "first, second, and third word"; but "name", "address", etc., could be handled in the same manner. Additional explanation is included in the program description and in remarks in the listing.

## The Data Storage Sample Program

### Lines

5-64	Title display call, initialization, and menu development.
66-70	Branch to appropriate subroutine.
80	Repeat menus after return from subroutine.
500-510	Closing title call, screen clearing.
600-655	Subroutine to list all entries directly.
1000-1070	Search subroutine, simply searches data using first string as the key.
2000-2100	Preparation of data for line entry subroutine. Subroutine 25010 writes prompted entries into a DATA line which has a line number incremented from previously written DATA line. Note that no further keyboard DATA inputs are required to write DATA lines because POKE 842,13 allows reading from screen. The line number is repeated as the first data item to allow incrementing after locating previous bottom DATA line. (Thanks to Frumker.)
3000-3300	Preparation of data for entry correction subroutine. This subroutine retrieves an entry ("first, second, and third word" in this example), requests revised entry, repeats new entry to insure that correction is as desired, and then branches to 25010 to automatically write a new DATA line.
4000-4999	DATA storage lines written by 25010 subroutine—could be a larger block if desired. A few entries are included as samples.
6000-6290	Preparation for entry deletion subroutine. Branches to 32000 to delete DATA line chosen



and hence entry. Sets up line number for use in 32000.

7000-7060 Program title display subroutine.

8000-8040 Closure display subroutine.

25010-25060 Enter strings and line number into a DATA line which is stored by dynamic keyboard action.

32000-32150 Block deletion subroutine. Allows automatic line deletion based on beginning and ending line numbers as in Applesoft or in a manner similar to Atari LIST line no. x, line no. y. POKE 842,13 is again the key since it, in effect, "presses the RETURN key" when a line number is onscreen. The routine is used in this program to delete a single line specified in subroutine 6000, that is, STLIN equals ENLINE. The deletion routine can be used directly with GOTO 32000 after direct entry of STLIN and ENLINE.

## Automatic Atari DATAline Generator

Refer to "COMPUTE!'s Guide For Typing In Programs" article before typing this program in.

```
NF 5 GOSUB 7000:REM TO DISPLAY TITLE
CP 8 DIM D$(15),E$(15),F$(15),A$(15)
      ,B$(15),C$(15),Y$(5),T$(15)
OC 10 GRAPHICS 0
HF 20 GRAPHICS 0:?"SELECT OPERATION
    BY NUMBER"
JE 30 ? :? :?
JJ 32 ? "(1) SEARCH FOR ENTRY"
KG 34 ?
GG 40 ? "(2) NEW ENTRY"
KH 44 ?
PL 50 ? "(3) CORRECT EXISTING ENTRY"
KG 52 ?
MC 56 ? "(4) LIST ALL ENTRIES"
KL 57 ?
LL 58 ? "(5) DELETE ENTRY"
KF 60 ?
LF 62 ? "(6) QUIT"
CC 64 ? :?
LM 66 INPUT SELECT
FH 70 ON SELECT GOSUB 1000,2000,3000
      ,600,6000,500
AD 80 GOTO 20
NN 500 GOSUB 8000
BH 510 GRAPHICS 0
GO 520 END
EM 600 REM TO LIST ALL ENTRIES
LM 602 RESTORE
GN 605 TRAP 650
AD 610 READ LN,A$,B$,C$
GB 620 ? A$,B$,C$
GN 625 GOTO 610
OB 650 ? "-----"
EP 651 ? :? "TO CONTINUE PRESS RETURN"
      :?" :INPUT T$
IA 655 RETURN
OE 1000 REM SEARCH FOR ENTRY SUBROUTINE
DK 1002 FLG1=0
EG 1004 GRAPHICS 0
GK 1005 ? "INPUT FIRST WORD OF ENTRY
    TO BE FOUND"
IA 1007 ? :?
ON 1008 RESTORE
NC 1009 INPUT T$
```

```
HK 1010 ? :?
MG 1011 TRAP 1065
CP 1020 READ LN,A$,B$,C$
GC 1030 IF A$=T$ THEN 1050
MB 1040 GOTO 1020
IC 1050 ? "FIRST WORD IS---";A$:FLG1
    =1
AH 1052 ? "SECOND WORD IS---";B$
EC 1054 ? "THIRD WORD IS---";C$:?
MD 1060 GOTO 1020
NI 1065 IF FLG1=0 THEN ? "NO ENTRY FOUND":FOR WAIT=0 TO 500:NEXT
    WAIT
EI 1066 ? :? "SEARCH FOR ANOTHER ENTRY?"
BL 1068 INPUT T$:IF T$="Y" THEN GOTO
    1000
KI 1070 RETURN
NC 2000 REM TO PUT ENTRY IN A COMPUTER GENERATED LINE
EF 2002 GRAPHICS 0
MN 2005 ? "INPUT FIRST WORD":INPUT A$
AE 2007 ? "INPUT SECOND WORD":INPUT B$
MG 2009 ? "INPUT THIRD WORD":INPUT C$
OM 2015 RESTORE
GL 2020 TRAP 2050:REM CATCHES LAST EXISTING LINE NUMBER
CA 2030 READ LN,D$,E$,F$:REM LN=LINE NUMBER
ME 2040 GOTO 2030
MH 2050 LN=LN+2:IF LN>=4999 THEN STOP
EK 2060 GOSUB 25010:REM BRANCHES TO AUTOMATIC LINE WRITING SUBROUTINE
CA 2070 ? :? :? "ANOTHER ENTRY?"
NH 2080 INPUT Y$
KC 2090 IF Y$="Y" THEN 2000
KD 2100 RETURN
HN 3000 REM TO CORRECT AN ENTRY
EF 3001 GRAPHICS 0
OJ 3002 RESTORE
OI 3004 ? "INPUT FIRST WORD OF CURRENT ENTRY"
LN 3005 INPUT A$
AK 3010 FLG=0
ME 3015 TRAP 3100
NJ 3020 IF FLG=1 THEN GOTO 3120
DL 3021 READ LN,D$,E$,F$
ND 3030 IF D$=A$ THEN GOSUB 3200
MF 3040 GOTO 3020
EE 3100 ? "ENTRY TO BE CORRECTED NOT FOUND.DO YOU WANT TO TRY AGAIN?"
NC 3110 INPUT Y$
KC 3115 IF Y$="Y" THEN 3000
GH 3117 GOTO 20
KG 3120 RETURN
PE 3200 REM TO PRINT OLD DATA TO ASSURE PROPER LINE IS BEING CORRECTED AND TO MAKE NEW ENTRY
EH 3210 GRAPHICS 0
ED 3220 ? "#1 OLD IS---";D$
EH 3222 ? "#2 OLD IS---";E$
EL 3224 ? "#3 OLD IS---";F$
GF 3230 ? "IS THIS THE DATA TO BE CORRECTED?":INPUT Y$
```



```

OC 3240 IF Y$="Y" THEN GOTO 3260
NI 3250 GOTO 3020
NN 3260 GRAPHICS 0:FLG=1
FG 3262 ? "INPUT CORRECTED FIRST WORD":INPUT A$:IF A$="" THEN A$=D$
IN 3270 ? "INPUT CORRECTED SECOND WORD":INPUT B$:IF B$="" THEN B$=E$
FB 3280 ? "INPUT CORRECTED THIRD WORD":INPUT C$:IF C$="" THEN C$=F$
KF 3282 ? "IS THIS THE CORRECTED ENTRY YOU DESIRE?":?
DP 3284 ? "FIRST WORD---":A$
HG 3286 ? "SECOND WORD---":B$
DI 3288 ? "THIRD WORD---":C$
GL 3289 INPUT T$:IF T$<>"Y" THEN GOTO 3262
EG 3290 GOSUB 25010
HA 3292 ? :? "DO YOU WISH TO CORRECT ANOTHER ENTRY?":INPUT T$
KF 3294 IF T$="Y" THEN 3000
KG 3300 RETURN
IM 4000 DATA 4000,EPSILON,RHO,GAMMA
JA 4002 DATA 4002,MILLER,3907 MAIN,FORT WORTH TX.
BL 4004 DATA 4004,COMPUTER,COMPUTE! MAG.,SEPT. 1981
KH 4006 DATA 4006,JONES,938-3456,A/C 817
HE 4008 DATA 4008,SMITH W.R.,406 OAK ST.,DETROIT MICH.
EP 6000 REM . TO DELETE AN ENTRY
EI 6001 GRAPHICS 0
OM 6002 RESTORE
OL 6004 ? "INPUT FIRST WORD OF CURRENT ENTRY"
MA 6005 INPUT A$
AN 6010 FLG=0
MK 6015 TRAP 6100
MP 6020 IF FLG=1 THEN GOTO 6120
DO 6021 READ LN,D$,E$,F$
NJ 6030 IF D$=A$ THEN GOSUB 6200
ML 6040 GOTO 6020
MN 6050 GOTO 6120
KD 6100 ? "ENTRY TO BE DELETED NOT FOUND.DO YOU WANT TO TRY AGAIN?"
OK 6110 INPUT Y$:IF Y$="Y" THEN 6000
GK 6117 GOTO 20
KJ 6120 RETURN
FD 6200 REM TO PRINT OLD DATA TO ASSURE PROPER LINE IS BEING DELETED AND TO MAKE NEW ENTRY
EK 6210 GRAPHICS 0
EG 6220 ? "#1 OLD IS---":D$
EK 6222 ? "#2 OLD IS---":E$
EO 6224 ? "#3 OLD IS---":F$
ME 6230 ? "IS THIS THE DATA TO BE DELETED?":INPUT Y$
OI 6240 IF Y$="Y" THEN GOTO 6260
MO 6250 GOTO 6020
BF 6260 FLG=1
PM 6270 STLIN=LN:ENLINE=LN
EF 6280 GOSUB 32000
LB 6290 RETURN
EK 7000 GRAPHICS 2
NA 7010 POSITION 4,3
FN 7020 PRINT #6;"DATA STORAGE"

NH 7030 POSITION 7,5
PC 7040 PRINT #6;"SAMPLE"
DH 7050 FOR WAIT=0 TO 100:NEXT WAIT
KN 7060 RETURN
EL 8000 GRAPHICS 2
ND 8010 POSITION 5,4
FJ 8020 PRINT #6;"GOODBYE!"
DG 8030 FOR WAIT=0 TO 100:NEXT WAIT
KM 8040 RETURN
LB 25010 REM AUTOMATIC DATA LINE GENERATION
CJ 25018 ? CHR$(125)
BA 25020 ? "{DOWN}";LN;"DATA ";LN;"";A$;" ";B$;" ";C$:REM THIS IS THE DUMMY LINE SET UP WHERE DATA IS ENTERED
KH 25024 ? :? :? :?
LF 25025 ? "CONT"
CL 25030 ? :? :?
AA 25035 POSITION 0,0
NI 25040 POKE 842,13:STOP
FI 25050 POKE 842,12
NN 25060 RETURN
AN 32000 REM TO DELETE A GROUP OF LINES
KF 32021 IF STLIN>=32000 THEN 32000
NH 32022 IF ENLINE>=32000 THEN 32000
IM 32023 ? :? "STARTING LINE=";STLIN
IO 32024 ? "ENDING LINE=";ENLINE
HI 32025 FOR ERASE=STLIN TO ENLINE
LJ 32030 ? CHR$(125):REM CLEARS SCREEN
GI 32040 ? "{DOWN}";ERASE:REM {DOWN} APPARENTLY MOVES CURSOR DOWN."ERASE" IS THE LINE NUMBER BEING DELETED THIS PASS.
AL 32050 ? :? :? "CONT":REM MUST HAVE THIS TO WORK.APPEARS TO START IT AFTER STOP COMMAND
PM 32060 POSITION 0,0
PE 32070 POKE 842,13:STOP:REM APPARENTLY PUTS INTO "RETURN MODE"
GF 32080 POKE 842,12:REM PUTS BACK TO NORMAL MODE
KN 32090 NEXT ERASE
IE 32095 GRAPHICS 0
BN 32100 ? "ANOTHER DELETION?"
AD 32105 INPUT T$
AN 32108 IF T$="Y" THEN GOTO 6000
NL 32150 RETURN

```

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# SpeedScript 3.0

## All Machine Language Word Processor For Commodore 64

Charles Brannon, Program Editor

Since its introduction in the January 1984 issue of our companion magazine, *COMPUTE!'s GAZETTE*, SpeedScript has been the most popular program ever published by *COMPUTE! Publications*. Written entirely in machine language, SpeedScript contains nearly every command and convenience you'd expect from a quality word processor. Starting this month, *COMPUTE!* presents the most recent and most powerful version of SpeedScript ever, version 3.0. It incorporates a year's worth of enhancements, readers' suggestions, and additional debugging. This month's SpeedScript is for the Commodore 64, and versions for the VIC-20, Atari, and Apple II-series computers are coming in future issues.

The Commodore 64 version of SpeedScript 3.0 may be ordered on disk directly from *COMPUTE! Publications*. Call **TOLL FREE 800-334-0868** (in NC 919-275-9809) to charge your order 8:30 a.m.-7:00 p.m. EST, Monday through Friday. Or send check or money order (\$12.95 plus \$2.00 shipping and handling) to:

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SpeedScript 3.0, though compact in size (6K), has many features found on commercial word processors. SpeedScript is also very easy to learn and use. You can start writing with it the first time you use it. You type in everything first; preview

and make corrections on the screen; insert and delete words, sentences, and paragraphs; then print out an error-free draft, letting SpeedScript take care of things like margins, centering, headers, and footers.

SpeedScript is a writing tool. It won't make you a better writer, but you may become a better writer once the tedium of retyping and erasing is replaced by the flexibility of a word processor. Words are no longer frozen in place by ink; they become free-floating entities. You no longer think about typewriting; you can stand back and work directly with words and ideas. The distinction between rough and final drafts becomes blurred as you perfect your writing while you write it.

### Typing In SpeedScript

The main disadvantage of SpeedScript is that you can't just go into a store and buy it—you have to type it in. SpeedScript is one of the longest machine language programs we've ever published, but the MLX machine language entry system helps you type it right the first time. MLX also lets you type SpeedScript in more than one sitting. Unfortunately, if you have an earlier version of SpeedScript, you cannot just make certain changes to bring it up to version 3.0. You have to type it in from scratch.

Although this might seem daunting, we guarantee it will be worthwhile.

### Using MLX

MLX makes it possible for you to type in a long machine language program correctly. It can detect most errors people make when entering numbers. See the MLX article elsewhere in this issue.

Before you begin typing

SpeedScript (or begin a subsequent session of typing if you enter SpeedScript in more than one sitting), you must enter the following POKES before you load and run the MLX program. These POKES are essential to protect SpeedScript from BASIC while you are typing it in. Again, these POKES should be performed before you load MLX, but are not necessary to run the finished program:

**POKE 44,33:POKE 8448,0:NEW**

Now load and run the 64 version of MLX. Answer the first two questions like this:

**Starting Address? 2049**  
**Ending Address? 8204**

You will then see the first prompt, the number 2049 followed by a colon. Type in each three-digit number shown in the listing. You do not need to press the comma shown in the listing. MLX types the comma automatically.

The last number you enter in a line is a *checksum*. It represents the values of the other numbers in the line summed together. If you make a mistake while entering the line, the checksum calculated by MLX should not match that of the listing, and you will have to retype the line. MLX is not foolproof, though. It's possible to fool the checksum by exchanging the position of the three-digit numbers. Also, an error in one number can be offset by an error in another (just as  $3 + 4 + 7 = 1 + 4 + 9$ ). Keep this in mind. MLX will help catch your errors, but you still must be very careful.

### Typing SpeedScript In Multiple Sitzings

If you want to stop typing the listing at some point and pick up later, press SHIFT-S and follow the



screen prompts. Remember to note the line number of the last line you typed in. When you are ready to continue typing, enter the POKES mentioned above, load MLX, answer the starting and ending address prompts, then press SHIFT-L. MLX asks for the filename you gave to the partially typed program. After the LOAD is complete, press SHIFT-N and tell MLX the line number you stopped at. Now continue typing as before. When you finish all typing, MLX automatically prompts you to save the program.

At this point MLX has saved a program file on tape or disk. If you load it and list it, you'll see that it looks like a normal one-line BASIC program, with a line number and a SYS command. The machine language program that is *SpeedScript* starts in memory just after the SYS command. The simulated BASIC line is included so that you can load *SpeedScript* like any BASIC program, and enter RUN to start it. You don't need to add the ",1" like you do with many machine language programs. Just LOAD "SPEEDSCRIPT" (or whatever filename you called it) for tape, or LOAD "SPEEDSCRIPT",8 for disk, then enter RUN. Once *SpeedScript* is in memory, you can save it from BASIC like any BASIC program. If *SpeedScript* is running, tap the RESTORE key to exit to BASIC.

Before using *SpeedScript*, you should generally unplug all cartridges and expanders such as *Simons' BASIC* or 80-column video cards. *SpeedScript* cannot take advantage of any custom hardware configurations except those that do not interfere with normal operations.

## Entering Text

When you run *SpeedScript*, the screen colors change to dark gray on light gray, simulating the appearance of type on paper. The first line on the screen is black with white letters. This *command line* is used to communicate with *SpeedScript*. *SpeedScript* presents all messages here. The remaining 24 lines of the screen are used to enter, edit, and display your document. A blinking dark square, the *cursor*, shows where the next character you type will appear on the

screen. *SpeedScript* lets you move the cursor anywhere within your document, making it easy to find and correct errors.

To begin using *SpeedScript*, just start typing. When the cursor reaches the right edge of the screen, it automatically jumps to the beginning of the next line, just as in BASIC. But unlike BASIC, *SpeedScript* never splits words at the right edge of the screen. If a word you're typing won't fit at the end of one line, it's instantly moved to the next line. This feature, called *word wrap* or sometimes *parsing*, makes it much easier to read your text on the screen. Even if you make numerous editing changes, *SpeedScript* reformats the screen and rewraps all words.

## Scrolling And Screen Formatting

When you finish typing on the last screen line, *SpeedScript* automatically scrolls the text upward to make room for a new line at the bottom. This is similar to the way BASIC works, but with one exception: The screen can scroll both up and down. Imagine the screen as a 24-line window on a long continuous document. More than 43K of text space is available in memory, room enough for 20-40 printed pages of text. To check at any time how much space is left, press CTRL-= (hold down the CTRL key while pressing the = key). The number which appears in the command line indicates how much room remains for characters of text.

If you're used to a typewriter, you'll have to unlearn some habits. First, since the screen is only 40 columns wide, and most printers have 80-column carriages, it doesn't make sense to press RETURN at the end of each line as you do on a typewriter. *SpeedScript's* word wrap takes care of this automatically. You want to press RETURN only when you want to force a carriage return to end a paragraph or limit the length of a line. To permit you to see these forced carriage returns, they appear on the screen as a left-pointing arrow. (This is called a *return-mark* in this article.)

When you print your document, *SpeedScript* automatically formats your text to fit the width of

the paper. Don't manually space over for a left margin or try to center a line yourself, as you would on a typewriter. *SpeedScript's* printing routine automatically takes care of all margins and lets you customize the margin settings. Also, don't worry about where a printed page would end. When printing, *SpeedScript* automatically fits your text onto separate pages, and can even put short phrases and page numbers at the top or bottom of each page if you want.

Like all good word processors, *SpeedScript* has a wide selection of editing and convenience features. You can move the cursor a single space in either direction, or skip to the next or previous word, sentence, or paragraph. You can also move the cursor to the top of the screen, the top of the document, or to the end of the document. The INST/DEL key is used to insert a single space or delete a single character. Other features let you erase a word, sentence, or paragraph, and move or copy sentences, words, and paragraphs to other places in your document. Using Search and Replace, you can find any phrase, and even automatically change one phrase to another throughout the entire document.

You can save your text on tape or disk, then load it later for additions and corrections. You can transpose (exchange) two characters, change the screen and text colors, send disk commands, read the disk error channel, and automatically tab over five spaces for paragraph indents. You don't need to learn all these commands right away, but you'll be glad they're available as you become more comfortable with word processing.

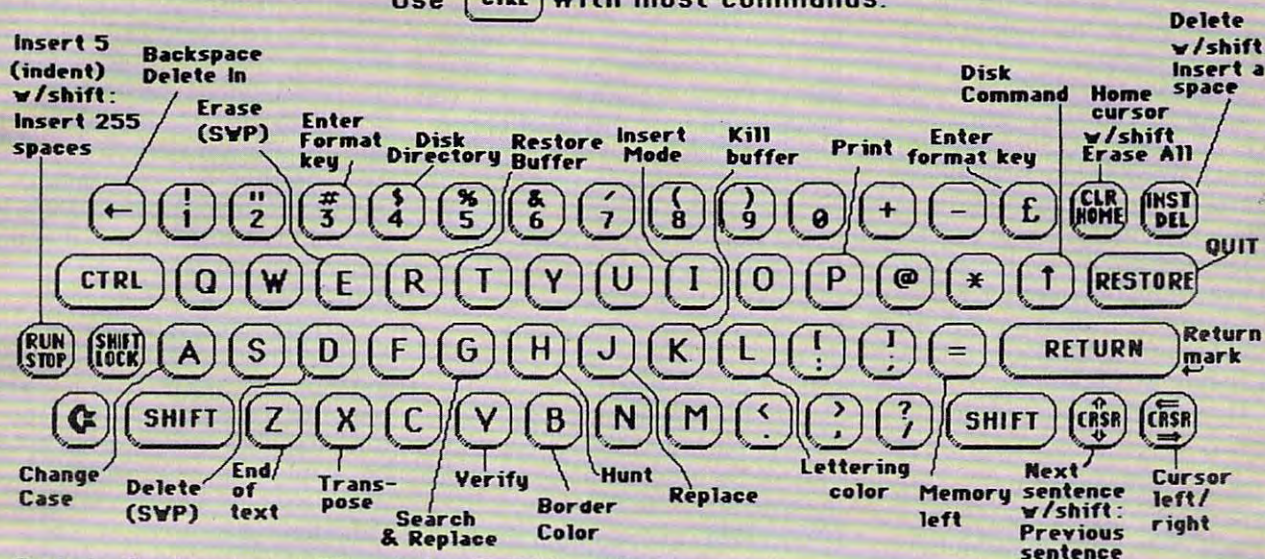
## Using The Keyboard

Most of these features are accessed with control-key commands—you hold down CTRL while pressing another key. In this article, control-key commands are abbreviated CTRL-*x* (where *x* is the key you press in combination with CTRL). An example is the CTRL-= mentioned above to check on free memory. CTRL-E means hold down CTRL and press E. Sometimes you have to hold down both SHIFT and CTRL as you type the command key, as in SHIFT-CTRL-H.



Figure 1:

## 64 SpeedScript 3.0 Keyboard Map

Use **CTRL** with most commands.

## Quick Reference Chart to Editing Commands

\* Notes commands changed or added since Version 2.0

<b>CTRL</b> <b>A</b>	Change case	* <b>RUN STOP</b>	Indent 5 spaces w/SHIFT: Insert 255 spaces
<b>CTRL</b> <b>B</b>	Change Border Color	<b>RESTORE</b>	Exit SpeedScript
<b>CTRL</b> <b>D</b>	Delete (S,W,P)	* <b>←</b>	Backspace w/CTRL: Delete In w/SHIFT & CTRL: Delete spaces
<b>CTRL</b> <b>E</b>	Erase (S,W,P)		Return mark
* <b>CTRL</b> <b>G</b>	Auto. Search & Replace	* <b>RETURN</b>	w/SHIFT: End Paragraph
* <b>CTRL</b> <b>H</b>	Hunt. w/SHIFT: Select Hunt Phrase	<b>INST DEL</b>	Delete w/SHIFT: Insert space
<b>CTRL</b> <b>I</b>	Enter/Exit Insert Mode	<b>↑</b>	Go to next sentence w/SHIFT: Goto previous sentence.
* <b>CTRL</b> <b>J</b>	Replace. w/SHIFT: Select Replace Phrase	<b>f1</b>	Word Right
<b>CTRL</b> <b>K</b>	Kill Buffer	<b>f2</b>	Word Left
<b>CTRL</b> <b>L</b>	Change Lettering Color	<b>f3</b>	Next Sentence
<b>CTRL</b> <b>P</b>	Print	<b>f4</b>	Previous Sentence
<b>CTRL</b> <b>R</b>	Restore Buffer	<b>f5</b>	Next Paragraph
<b>CTRL</b> <b>V</b>	Verify	<b>f6</b>	Previous Paragraph
<b>CTRL</b> <b>X</b>	Transpose Characters	<b>f7</b>	Load
<b>CTRL</b> <b>Z</b>	Go to End of Text	<b>f8</b>	Save
<b>CTRL</b> <b>=</b>	Display free memory		
<b>CTRL</b> <b>↑</b>	Send disk command/read error		
<b>CTRL</b> <b>4</b>	Display Disk Directory		
<b>CTRL</b> <b>3</b>	Enter Format (printer) command		
<b>CLR HOME</b>	Press once to go to top of screen; hold down to go to top of text. w/SHIFT: Erase ALL		
<b>CURSR</b>	Cursor left/right		

Other keys are referenced by name or function, such as *back-arrow* for the left-pointing arrow in the top-left corner of the keyboard, *pound sign* for the British pound sign (£), CLR/HOME for the Home Cursor key, SHIFT-CLR/HOME

for the Clear Screen key, f1 for special function key 1, and *up-arrow* for the upward-pointing arrow to the left of the RESTORE key. See Figure 1 for a complete quick-reference chart of all keyboard commands.

Some keys let you move the cursor to different places in the document to make corrections or scroll text into view. *SpeedScript* uses a unique method of cursor movement that is related to writing, not programming. Programmers



work with lines of text, and need to move the cursor up and down a line or left and right across a line. *SpeedScript*, however, is oriented for writers. You aren't working with lines of text, but with a continuous document.

Therefore, *SpeedScript* moves the cursor by character, word, sentence, or paragraph. *SpeedScript* defines a word as any sequence of characters preceded or followed by a space. A sentence is any sequence of characters ending with a period, exclamation point, question mark, or return-mark. And a paragraph is defined as any sequence of characters ending in a return-mark.

Here's how to control the cursor:

- The **left-right cursor key** works as usual; pressing this key by itself moves the cursor right (forward) one space, and pressing it with **SHIFT** moves the cursor left (backward) one space.

- The **up/down cursor key** moves the cursor forward to the beginning of the next sentence. Pressing it with **SHIFT** moves the cursor backward to the beginning of the previous sentence.

- The **f1 special function key** moves the cursor forward to the beginning of the next word. The **f2 key** (hold down **SHIFT** and press **f1**) moves the cursor backward to the beginning of the previous word.

- The **f3 special function key** moves the cursor forward to the beginning of the next sentence (just like the up/down cursor key). The **f4 key** (hold down **SHIFT** and press **f3**) moves the cursor backward to the beginning of the previous sentence (just like pressing **SHIFT** and the up/down cursor key).

- The **f5 special function key** moves the cursor forward to the beginning of the next paragraph. The **f6 key** (hold down **SHIFT** and press **f5**) moves the cursor backward to the beginning of the previous paragraph.

- The **CLR/HOME key**, pressed once by itself, moves the cursor to the top of the screen without scrolling. Pressed twice, it moves the cursor to the beginning of the document.

- **CTRL-Z** moves the cursor to the bottom of the document.

## Correcting Your Typing

One strength of a word processor is that you need never have mistakes in your printed document. Since you've typed everything before you print it, you have plenty of opportunities to proofread and correct your work. The easiest way to correct something is to just type over it, but there are other ways, too.

Sometimes you'll have to insert some characters to make a correction. Maybe you accidentally dropped a letter, typing "hngry" instead of "hungry." When you change the length of a word, you need to push over everything to the right of the word to make room for the insertion. Use **SHIFT-INST/DEL** to open up a single space, just as in **BASIC**. Merely position the cursor at the point where you want to insert a space, and press **SHIFT-INST/DEL**.

## Insert Modes

It can be tedious to use the **SHIFT-INST/DEL** key to open up enough space for a whole sentence or paragraph. For convenience, *SpeedScript* has an insert mode that automatically inserts space for each character you type. In this mode, you can't type over characters; everything is inserted at the cursor position. To enter insert mode, press **CTRL-I**. To cancel insert mode, press **CTRL-I** again (a command key that turns something on and off is called a *toggle*). To let you know you're in insert mode, the normally black command line at the top of the screen turns light blue.

Insert mode is the easiest way to insert text, but it can become too slow when working with a very long document because it must move *all* the text following the cursor position. Although *SpeedScript* uses turbocharged memory-move routines, the 6502/6510 microprocessor can go only so fast. So *SpeedScript* has even more ways to insert blocks of text.

One way is to use the **RUN/STOP** key. It is programmed in *SpeedScript* to act as a five-space margin indent. To end a

paragraph and start another, press **RETURN** twice and press **RUN/STOP**. Alternatively, press **SHIFT-RETURN**, which does this automatically (a function suggested by *COMPUTE!'s GAZETTE* reader Richard Scherer). You can use **RUN/STOP** to open up more space than **SHIFT-INST/DEL**. No matter how much space you want to insert, each insertion takes the same amount of time. So the **RUN/STOP** key can insert five spaces five times faster than pressing **SHIFT-INST/DEL** five times.

There's an even better way, though. Press **SHIFT-RUN/STOP** to insert 255 spaces. This is enough room for a sentence or two. You can press it several times to open up as much space as you need. And **SHIFT-RUN/STOP** is *fast*. (You don't want to be in insert mode when you use this trick; that would defeat its purpose.)

Since the **INST/DEL** key also is slow when working with large documents (it, too, must move all text following the cursor), you may prefer to use the back-arrow key to backspace. The back-arrow key by itself moves the cursor left one space and blanks out that position. It's more like a backspace than a delete.

After you're done inserting with these methods, there will probably be some inserted spaces left over that you didn't use. Just press **SHIFT-CTRL-back arrow**. This instantly deletes all extra spaces between the cursor and the start of following text. **SHIFT-CTRL-back arrow** is also generally useful whenever you want to delete a bunch of spaces.

## Erasing Text

Inserting and retyping are not the only kinds of corrections you'll need to make. Part of writing is separating the wheat from the chaff. On a typewriter, you pull out the paper, ball it up, and dunk it in the trash can. *SpeedScript* lets you be more selective.

Press the **INST/DEL** key by itself to erase the character to the left of the cursor. All the following text is pulled back to fill the vacant space.

Press **CTRL-back arrow** to delete the character on which the cursor is sitting. Again, all the



following text is moved toward the cursor to fill the empty space.

These keys are fine for minor deletions, but it could take all day to delete a whole paragraph this way. So *SpeedScript* has two commands that can delete an entire word, sentence, or paragraph at a time. **CTRL-E** erases text *after* (to the right of) the cursor position, and **CTRL-D** deletes text *behind* (to the left of) the cursor.

To use the **CTRL-E** erase mode, first place the cursor at the beginning of the word, sentence, or paragraph you want to erase. Then press **CTRL-E**. The command line shows the message "Erase (S,W,P): RETURN to exit." Press S to erase a sentence, W for a word, or P for a paragraph. Each time you press one of these letters, the text is quickly erased. You can keep pressing S, W, or P until you've erased all the text you wish. Then press RETURN to exit the erase mode.

The **CTRL-D** delete mode works similarly, but deletes only one word, sentence, or paragraph at a time. First place the cursor after the word, sentence, or paragraph you want to delete. Then press **CTRL-D**. Next, press S, W, or P for sentence, word, or paragraph. The text is immediately deleted and you return to editing. You don't need to press RETURN to exit the **CTRL-D** delete mode unless you pressed this key by mistake. (In general, you can escape from any command in *SpeedScript* by simply pressing RETURN.) **CTRL-D** is most convenient when the cursor is already past what you've been typing.

## The Text Buffer

When you erase or delete with **CTRL-E** and **CTRL-D**, the text isn't lost forever. *SpeedScript* remembers what you've removed by storing deletions in a separate area of memory called a *buffer*. The buffer is a fail-safe device. If you erase too much, or change your mind, just press **CTRL-R** to restore the deletion. However, be aware that *SpeedScript* remembers only the last erase or delete you performed.

Another, more powerful use of this buffer is to move or copy sections of text. To move some text from one location in your document to another, first erase or de-

lete it with **CTRL-E** or **CTRL-D**. Then move the cursor to where you want the text to appear and press **CTRL-R**. **CTRL-R** instantly inserts the contents of the buffer at the cursor position. If you want to copy some text from one part of your document to another, just erase or delete it with **CTRL-E** or **CTRL-D**, restore it at the original position with **CTRL-R**, then move the cursor elsewhere and press **CTRL-R** to restore it again. You can retrieve the buffer with **CTRL-R** as many times as you like.

Important: The **CTRL-E** erase mode lets you erase up to the maximum size of the buffer (12K, or over 12,000 characters), and **CTRL-E** also removes the previous contents of the buffer. Keep this in mind if there's something in the buffer you'd rather keep. If you don't want the buffer to be erased, press **SHIFT-CTRL-E**. This preserves the buffer contents and adds newly erased text to the buffer.

Now you can see why **CTRL-D** lets you delete only a single sentence, word, or paragraph at a time. If it didn't, the deleted text would be added to the end of the buffer, and when you pressed **CTRL-R** to retrieve the buffer, the deleted text would be out of order (since **CTRL-D** deletes backward).

If you ever need to erase the contents of the buffer, press **CTRL-K** (remember *kill buffer*).

It's relatively easy to move blocks of text between documents. Using the buffer, you can load one document, erase some text into the buffer, load another document, then insert the buffer. You can also use the buffer to save an often-used word or phrase, then repeat it whenever you need it.

## The Wastebasket Command

If you want to start a new document, or simply obliterate all your text, press **SHIFT-CLR/HOME**. *SpeedScript* asks, "ERASE ALL: Are you sure? (Y/N)." This is your last chance. If you *don't* want to erase the entire document, press N or any other key. Press Y to perform the irreversible deed. There is no way to recover text wiped out with Erase All.

The RUN/STOP-RESTORE reset combination has been disabled

in *SpeedScript*. As mentioned above, pressing RUN/STOP by itself inserts five spaces for indenting paragraphs. Pressing RESTORE by itself brings up the message "Exit *SpeedScript*: Are you sure? (Y/N)." If you press Y for yes, you exit to BASIC. In BASIC you still have one chance to reenter *SpeedScript* without losing your text—simply enter RUN (but your chances decrease if you execute other commands in BASIC). If you press N or any other key at the prompt, you return to editing text with no harm done.

## Search And Replace

Here's another feature only a computer can bring to writing. *SpeedScript* has a Hunt command that searches through your document to find a selected word or phrase. A Replace option lets you automatically change one word to another throughout the document. Since **CTRL-S** is synonymous with the CLR/HOME key (try it), and since *SpeedScript* already uses **CTRL-R**, we have to resort to command keys which are slightly less than mnemonic for these functions.

**SHIFT-CTRL-H** activates the Hunt feature, **SHIFT-CTRL-J** (J is used because it's next to the H) lets you selectively hunt and replace, and **CTRL-G** (also next to the H) is for automatically searching and replacing.

Searching for something is a two-step process. First you need to tell *SpeedScript* what to search for, then you trigger the actual search. Press **SHIFT-CTRL-H**. The command line says "Hunt for:". Type in what you'd like to search for, the *search phrase*, up to 29 characters. *SpeedScript* remembers the search phrase until you change it. (Incidentally, when you are typing on the command line, the only editing key that works is the INST/DEL key for backing up. *SpeedScript* does not let you enter control codes or cursor controls when you type in the command line, and you can type no more than one screen line.) Press RETURN when you've finished typing. If you press RETURN alone without typing anything, the Hunt command is canceled.

When you are ready to search, press **CTRL-H**. *SpeedScript* looks for the next occurrence of the search phrase *starting from the cur-*



rent cursor position. If you want to hunt through the entire document, press CLR/HOME twice to move the cursor to the very top before beginning the search. Each time you press CTRL-H, *SpeedScript* looks for the next occurrence of the search phrase and places the cursor at the start of the phrase. If the search fails, you'll see the message "Not Found."

**CTRL-J** (Replace) works together with CTRL-H. After you've specified the search phrase with SHIFT-CTRL-H, press **SHIFT-CTRL-J** to select the replace phrase. *SpeedScript* also remembers this replace phrase until you change it. (You can press RETURN alone at the "Replace with:" prompt to select a null replace phrase. When you hunt and replace, this deletes the located phrase.) To manually search and replace, start by pressing CTRL-H. After *SpeedScript* finds the search phrase, press CTRL-J if you want to replace the phrase. If you don't want to replace the phrase, don't press CTRL-J. You are not in a special search and replace mode. You're free to continue writing at any time.

**CTRL-G** links CTRL-H and CTRL-J together. It first asks "Hunt for:", then "Replace with:", then automatically searches and replaces throughout the document starting at the cursor position.

A few hints and cautions: First, realize that if you use "the" as the search phrase, *SpeedScript* dutifully finds the embedded "the" in words like "therefore" and "heathen." If you changed all occurrences of "the" to "cow," these words would become "cowrefore" and "heacown." If you want to find or replace a single word, include a space as the first character of the word, since almost all words are preceded by a space. Naturally, if you are replacing, you need to include the space in the replace phrase, too. Also, *SpeedScript* distinguishes between uppercase and lowercase. The word "Meldids" does not match with "meldids." *SpeedScript* will not find a capitalized word unless you capitalize it in the search phrase. To cover all bases, you will sometimes need to make two passes when replacing a word. Keep these

things in mind when using CTRL-G, since you don't have a chance to stop an out-of-control search and replace.

## Storing Your Document

Another advantage of word processing is that you can store your writing on tape or disk. A Commodore disk, with 170K of storage space, can store 80-150 pages of text in one or more documents. Tapes also have great storage capacity, but they're slower, and it's harder to locate one of several documents on a cassette. However, *SpeedScript* can be used with tape, making it possible to set up an extremely economical word processing system. (Note: Although you can load *SpeedScript* much more quickly from cassette using the "TurboTape" utility published in the January 1985 issue of *COMPUTE!*, you can't use TurboTape to save and load *SpeedScript* documents at high speed. The two programs are not compatible.)

*SpeedScript* can also be used as a simple data base manager. Type in the information you need, then store it as a *SpeedScript* document. The search feature lets you quickly find information, especially if you use graphics characters to flag key lines. You can search for the graphics characters and quickly skip from field to field.

It's easy to store a document. First, make sure the cassette or disk drive is plugged in and functioning. Insert the tape and rewind it, or insert a formatted (NEWed) disk into the drive. Press **f8** (SHIFT-f7). You'll see the prompt "Save:". Type in a filename for your document. A filename can be up to 16 characters long and can include almost any characters, but do not use question marks or asterisks. You cannot use the same name for two different documents on a single disk. To replace a document already on disk using the same filename, precede your filename with the characters **@0:** or **@:**. You can also precede the filename with either **0:** or **1:** if you use a dual disk drive. *SpeedScript* cannot access a second disk drive with a device number of 9.

After entering the filename, answer the prompt "Tape or Disk" by pressing either the **T** or **D** key.

(Unless you see the green cursor on the command line, *SpeedScript* is asking only for a single keystroke, and RETURN is not necessary.) You can cancel the SAVE command by pressing RETURN without typing anything else at either the "Save:" or "Tape or Disk?" prompt.

After you press **T** for tape, press RECORD and PLAY simultaneously on the cassette drive. *SpeedScript* begins saving. If you press **D** for disk, and the disk is formatted and has room, your file is stored relatively quickly. After the SAVE, *SpeedScript* reports "No errors" if all is well, or reads and reports the disk error message if not.

It is not possible to detect errors during a tape SAVE, so if you want peace of mind, use the Verify command. Rewind the tape, press **CTRL-V**, then type the filename. Press **T** for tape, then press PLAY on the recorder. *SpeedScript* compares the file on tape with that in memory, and reports "No errors" if the verify succeeds, or "Verify Error" if not. You can also verify disk files.

## Loading A Document

To recall a previously saved document, press **f7**. Answer the "Load:" prompt with the filename. Insert the tape or disk, rewind the tape, then answer **T** or **D**. Press PLAY on tape. *SpeedScript* loads the file and should display "No errors." Otherwise, *SpeedScript* reads the error channel of the disk drive or simply reports "Load error" for tape.

The position of the cursor is important before loading a file. *SpeedScript* starts loading at the cursor position, so be sure to press CLR/HOME twice or SHIFT-CLR/HOME (Erase All) to move the cursor to the start of text space, unless you want to merge two documents. When you press **f7** to load, the command line turns green to warn you if the cursor is not at the top of the text space.

To merge two or more files, simply load the first file, press CTRL-Z to move the cursor to the end of the document, and then load the file you want to merge. Do not place the cursor somewhere in the middle of your document before loading. A LOAD does not insert the text from tape or disk,



but overwrites all text after the cursor position. The last character loaded becomes the new end-of-text pointer, and you cannot access any text that appears ahead of this pointer.

## File Compatibility

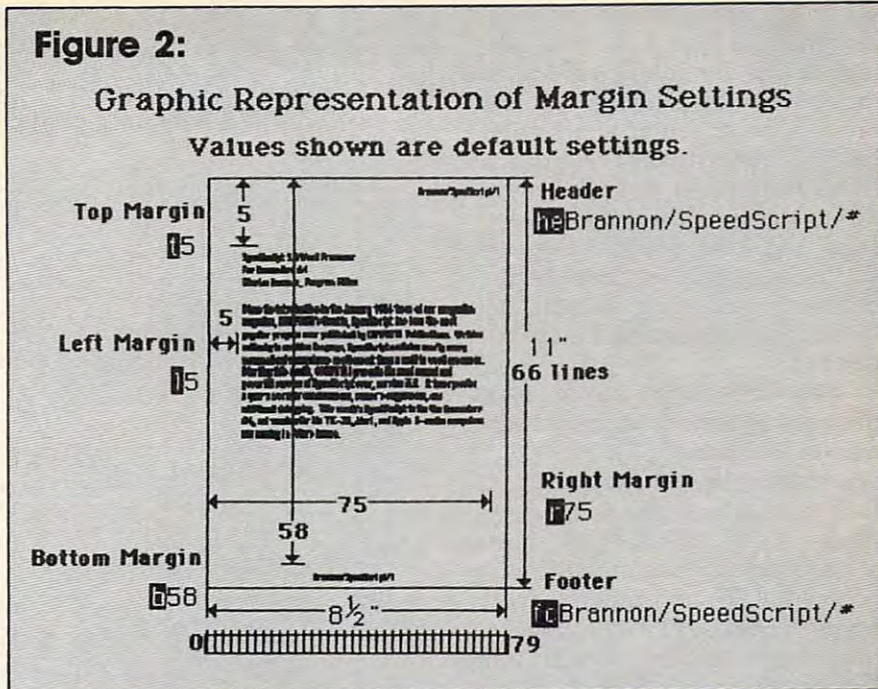
*SpeedScript* documents are stored as program files (a PRG type on disk). Naturally, you can't load and run a *SpeedScript* file from BASIC. Program files on tape are more reliable than data files. The characters are stored in their screen code (POKE) equivalents. Several commercial word processors store text similarly, including *WordPro 3+*, *PaperClip*, and *EasyScript*. As a matter of fact, two commercial spelling checkers designed for *WordPro* also work with *SpeedScript*: *SpellRight Plus* (from Professional Software) and *SpellPro 64* (from Pro-Line).

Program 2 after this article is a *SpeedScript* file conversion utility. It translates *SpeedScript* screen-code program files into either Commodore ASCII or true ASCII. These translated files are stored in SE-Quential format, the file type used in most file-processing applications. The file converter program can also translate a Commodore ASCII sequential file into a screen-code *SpeedScript* program file. You can use the file converter to translate a data base into a *SpeedScript* file (or vice versa), and you can convert *SpeedScript* files to true ASCII and use a modem program to upload them to another computer.

## Disk Commands

Sometimes you forget the name of a file, or need to scratch or rename a file. *SpeedScript* gives you full control over the disk drive. Just press **CTRL-up arrow**, then type in a 1541 disk command. You don't need to type **PRINT#15** as you do in BASIC, just the actual command. If you press RETURN without typing a disk command, *SpeedScript* displays the disk status. It also displays the status after completing a disk command. Here is a quick summary of disk commands:

**n:disk name,ID** This formats (NEWs) a disk. You must format a new disk before using it for the first time. The disk name can be up to



16 characters. The ID (identifier) is any two characters. You must use a unique ID for each disk you have. Don't forget that this command erases any existing data on a disk.

**s:filename** Scratches (deletes) a file from the disk.

**r:newname=oldname**  
Changes the name of file *oldname* to *newname*.

**c:backup filename=original name** Creates a new file (the backup copy) of an existing file (original copy) on the same disk.

**i:** Initialize disk. This resets several disk variables and should be used after you swap disks or when you have trouble reading a disk.

**v:** Validate disk. This recomputes the number of available blocks and can sometimes free up disk space. Always use Validate if you notice a filename on the directory flagged with an asterisk. Validate can take awhile to finish.

**uj:** Resets the disk drive to power-up state.

## Additional Features

*SpeedScript* has a few commands that don't do much, but are nice to have. **CTRL-X** exchanges the character under the cursor with the character to the right of the cursor. Thus you can fix transposition errors with a single keystroke. **CTRL-A** changes the character under the

cursor from uppercase to lowercase or vice versa. You can hold down **CTRL-A** to continue changing the following characters.

Press **CTRL-B** to change the background and border colors. Each time you press **CTRL-B**, one of 16 different background colors appears. Press **CTRL-L** to cycle between one of 16 character (lettering) colors. The colors are preserved until you change them. In fact, if you resave *SpeedScript*, the program will load and run with your color choice in the future.

## PRINT!

If you already think *SpeedScript* has plenty of commands, wait until you see what the printing package offers. *SpeedScript* supports an array of powerful formatting features. It automatically fits your text between left and right margins you can specify. You can center a line or block it against the right margin. *SpeedScript* skips over the perforation on continuous-form paper, or can wait for you to insert single-sheet paper. A line of text can be printed at the top of each page (a header) and/or at the bottom of each page (a footer), and can include automatic page numbering, starting with whatever number you like.

*SpeedScript* can print on different lengths and widths of paper, and single-, double-, triple-, or any-



spacing is easy. You can print a document as big as can fit on a tape or disk by linking several files together during printing. You can print to the screen or to a sequential disk file instead of to a printer. Other features let you print to most printers using most printer interfaces, and send special codes to the printer to control features like underlining, boldfacing, and double-width type (depending on the printer).

But with all this power comes the need to learn additional commands. Fortunately, *SpeedScript* sets most of these variables to a default state. If you don't change these settings, *SpeedScript* assumes a left margin of five, a right margin position of 75, no header or footer, single-spacing, and continuous-paper page feeding. To begin printing, simply press **CTRL-P**. If your printer is attached, powered on, and selected (on-line), *SpeedScript* begins printing immediately. To cancel printing, hold down the **RUN/STOP** key until printing stops, then release it when the border color changes to white.

Before printing, be sure the paper in your printer is adjusted to top-of-form (move the paper perforation just above the printing element). **CTRL-P** assumes a Commodore printer, so it's helpful if your interface simulates the modes and codes of the Commodore 1525, MPS-801, or 1526 printers. **CTRL-P** prints with a device number of 4 and a secondary address of 7 (uppercase/lowercase mode).

If **CTRL-P** doesn't work for you, try another variation, **SHIFT-CTRL-P**. Answer the prompt "Print to: Screen, Disk, Printer?" with the single letter **S**, **D**, or **P**. Press any other key to cancel the command.

If you press **P** for printer, *SpeedScript* requests two more keystrokes. First answer "Device number" with a number from 4 to 7. This lets you print to one of several printers addressed with different device numbers. Next answer "Secondary Address?" with a number from 0 to 9.

## Non-Commodore Printers

The secondary address is used on most non-Commodore printer interfaces to control special features.

## Figure 3: Quick Reference Chart Format (Printer) Commands

Enter with CTRL-3 or CTRL-E

Command	Description	Default	Command	Description	Default
<b>a</b>	True ASCII	off	<b>n</b>	Next Page	
<b>b</b>	Bottom Margin	58	<b>p</b>	Page Length *	66
<b>c</b>	Centering		<b>r</b>	Right Margin	75
<b>e</b>	Edge Right		<b>s</b>	Spacing	1
<b>f</b>	Footer		<b>t</b>	Top Margin	5
<b>g</b>	Goto Linked File *		<b>u</b>	Underline toggle	
<b>h</b>	Header		<b>w</b>	Page Wait	
<b>i</b>	Information *		<b>x</b>	Columns across *	80
<b>j</b>	Select linefeeds *		<b>@</b>	Initial page # *	1
<b>l</b>	Left Margin	5	<b>?</b>	Skip pages *	
<b>m</b>	Margin Release *		<b>#</b>	Print page number	

**hc** SpeedScript/**h** ← **Centered Header with page number**  
**l10r70s2** ← **Left margin 10, right margin 70, double spacing.**

**gd**:SpeedScript.2 ← **Goto and continue printing with filename "SpeedScript.2"**

\* Notes command changed or added since Version 2.0

For example, you can bypass the emulation features and use graphic mode to communicate directly with your printer (see the true ASCII command below). Consult the list of secondary addresses in your printer interface manual.

*SpeedScript* does not work properly with RS-232 serial printers or interfaces.

One additional note: Some printers and interfaces incorporate an automatic skip-over-perforation feature. The printer skips to the next page when it reaches the bottom of a page. Since *SpeedScript* already controls paper feeding, you need to turn off this automatic skip-over-perf feature before running *SpeedScript*, or paging won't work properly.

We've successfully tested *SpeedScript* with the following printers: Commodore 1525/MPS-801, Commodore 1526 (second revision), Prowriter/C. Itoh 8510,

Epson MX-80, Gemini 10-X, Okimate-10, Okidata 82, Okidata 92, and Hush-80 CD.

We've also successfully tested *SpeedScript* with these printer interfaces: Cardco A/B/G+, Tymac Connection, Xetec, TurboPrint, and MW-350.

*SpeedScript* should work even if your printer or interface is not on this list. These are just the ones we've tested.

Be sure your printer or interface supplies its own linefeeds. Again, consult your manuals and insure that either your printer or interface (but not both) supplies an automatic linefeed after carriage return. To test this, print a small sample of text with **CTRL-P**. Since the default is single-spacing, you should not see double-spacing, nor should all printing appear on the same line. If you still aren't getting linefeeds, use the linefeed command discussed below.



## Printing To Screen And Disk

SHIFT-CTRL-P prints to the screen when you press S. The screen colors change to white letters on a black background, and what appears on the screen is exactly what would print on the printer. It takes two screen lines to hold one 80-column printed line, of course. If you use double-spacing (see below), it's much easier to see how each line is printed. With this screen preview, you can see where lines and pages break. To freeze printing, hold down either SHIFT key or engage SHIFT lock. The border color changes to white while SHIFT is held down. When printing is finished, press any key to return to editing.

SHIFT-CTRL-P prints to a disk file when you press D. Enter the filename when requested. *SpeedScript* sends out all printer information to a sequential file. You can use other programs to process this formatted file. Try this simple example:

```
10 OPEN 1,4
20 OPEN 2,8,8,"filename"
30 GET#2,A$:SS=ST:
  PRINT#1,A$;IF SS=0
  THEN 30
40 PRINT#1:CLOSE1
50 CLOSE2
```

This program dumps the disk file specified by the filename in line 20 to any printer. You can use it to print *SpeedScript* files (produced with SHIFT-CTRL-P) on another Commodore computer and printer without running *SpeedScript*. Change line 10 to **OPEN 1,2,0,CHR\$(6)** to dump the file to a modem or RS-232 printer, or **OPEN 1,3** to display it on the screen.

## Formatting Commands

The print formatting commands must be distinguished from normal text, so they appear onscreen in reverse field with the text and background colors switched. You enter these reverse-video letters by pressing **CTRL-pound sign**. You can also use **CTRL-3**, which is easier to type with one hand. Answer the prompt "Enter format key:" by pressing a single key. This key is inserted into text in reverse video. All lettered printer com-

mands should be entered in lowercase (unSHIFTed). During printing, *SpeedScript* treats these characters as printing commands.

There are two kinds of printing commands, which we'll call Stage 1 and Stage 2. Stage 1 commands usually control variables such as left margin and right margin. Most are followed by a number, with no space between the command and the number. Stage 1 commands are executed before a line is printed.

Stage 2 commands, like centering and underlining, are executed while the line is being printed. Usually Stage 1 commands must be on a line of their own, although you can group several Stage 1 commands together on a line. Stage 2 commands are by nature embedded within a line of text. A sample Stage 1 line could look like this:

**11015052**

Embedded Stage 2 commands look like this:

**1This line is centered.1**  
This is **1underlining1**.

## Stage 1 Commands

**l** Left margin. Follow with a number from 0 to 255. Use 0 for no margin. Defaults to 5. See Figure 2 for a graphic illustration of margin settings.

**r** Right margin position, a number from 1 to 255. Defaults to 75. Be sure the right margin value is greater than the left margin value, or *SpeedScript* will go bonkers.

**t** Top margin. The position at which the first line of text is printed, relative to the top of the page. Defaults to 5. The header (if any) is always printed on the first line of the page, before the first line of text.

**b** Bottom margin. The line at which printing stops before continuing to the next page. Standard 8½ × 11-inch paper has 66 lines. Bottom margin defaults to the fifty-eighth line. The footer (if any) is always printed on the last line of the page, after the last line of text.

**p** Page length. Defaults to 66. If your printer does not print six lines per inch, multiply lines-per-inch by 11 to get the page length. European paper is usually longer

than American paper—11½ or 12 inches. Try a page length of 69 or 72.

**s** Spacing. Defaults to single-spacing. Follow with a number from 1 to 255. Use 1 for single-spacing, 2 for double-spacing, 3 for triple-spacing.

**@** Start numbering at page number given. Page numbering normally starts with 1.

**?** Disables printing until selected page number is reached. For example, a value of 3 would start printing the third page of your document. Normally, *SpeedScript* prints starting with the first page.

**x** Sets the page width, in columns (think a cross). Defaults to 80. You need to change this for the sake of the centering command if you are printing in double-width or condensed type, or are using a 40-column or wide-carriage printer.

**n** Forced paging. Normally, *SpeedScript* prints the footer and moves on to the next page only when it has finished a page, but you can force it to continue to the next page by issuing this command. It requires no numbers.

**m** Margin release. Disables the left margin for the next printed line. Remember that this executes before the line is printed. It's used for outdenting.

**a** True ASCII. Every character is assigned a number in the ASCII (American Standard Code for Information Interchange) character set. Most printers use this true ASCII standard, but Commodore printers exchange the values for uppercase and lowercase to match Commodore's own variation of ASCII. Some printer interfaces do not translate Commodore ASCII into true ASCII, so you need to use this command to tell *SpeedScript* to translate. Also, you will sometimes want to intentionally disable your interface's emulation mode in order to control special printer features that would otherwise be rejected by emulation. Place this command as the first character in your document, even before the header and footer definitions. Don't follow it with a number.

Since, in effect, the true ASCII command changes the case of all letters, you can type something in



lowercase and use true ASCII to make it come out in uppercase.

**w** Page wait. Like the true ASCII command, this one should be placed at the beginning of your document before any text. With page wait turned on, *SpeedScript* prompts you to "Insert next sheet, press RETURN" when each page is finished printing. Insert the next sheet, line it up with the printhead, then press RETURN to continue. Page wait is ignored during disk or screen output.

**j** Select automatic linefeeds after carriage return. Like **a** and **w**, this command must be placed before any text. Don't use this command to achieve double-spacing, but only if all text prints on the same line.

**i** Information. This works like REM in BASIC. You follow the command with a line of text, up to 255 characters, ending in a return-mark. This line will be ignored during printing, and is handy for making notes to yourself such as the filename of the document.

**h** Header define and enable. The header must be a single line of text (up to 255 characters) ending in a return-mark. The header prints on the first line of each page. You can include Stage 2 commands such as centering and page numbering in a header. You can use a header by itself without a footer. The header and footer should be defined at the top of your document, before any text. If you want to prevent the header from printing on the first page, put a return-mark by itself at the top of your document before the header definition.

**f** Footer define and enable. The footer must be a single line of text (up to 255 characters) ending in a return-mark. The footer prints on the last line of each page. As with the header, you can include Stage 2 printing commands, and you don't need to set the header to use a footer.

**g** GOTO (link) next file. Put this command as the last line in your document. Follow the command with the letter D for disk or T for tape, then a colon (:), then the name of the file to print next. After the text in memory is printed, the link command loads the next file

into memory. You can continue linking in successive files, but don't include a link in the last file. Before you start printing a linked file, make sure the first of the linked files is in memory. When printing is finished, the last file linked to will be in memory.

## Stage 2 Commands

These commands either precede a line of text, or are embedded within one.

**c** Centering. Put this at the beginning of a line you want to center. This will center only one line ending in a return-mark. Repeat this command at the beginning of every line you want centered. Centering uses the page-width setting (see above) to properly center the line. To center a double-width line, either set the page width to 40 or pad out the rest of the line with an equal number of spaces. If you use double width, remember that the spaces preceding the centered text will be double-wide spaces.

**#** When *SpeedScript* encounters this command, it prints the current page number. You usually embed this within a header or footer.

**u** A simple form of underlining. It does not work on Commodore printers, but only on printers that recognize CHR\$(8) as a backspace and CHR\$(95) as an underline character. Underlining works on spaces, too. Use the first **u** to start underlining, and another one to turn off underlining.

## Fonts And Styles

Most dot-matrix printers are capable of more than just printing text at ten characters per inch. The Commodore MPS-801 can print in double width and reverse field. Some printers have several character sets, with italics and foreign language characters. Most can print in double width (40 characters per line), condensed (132 characters per line), and in either pica or elite. Other features include programmable characters, programmable tab stops, and graphics modes. Many word processors customize themselves to a particular printer, but *SpeedScript* was purposely designed not to be printer-specific. Instead, *SpeedScript* lets you define

your own Stage 2 printing commands.

You define a programmable *printkey* by choosing any character that is not already used for other printer commands. The entire uppercase alphabet is available for printkeys, and you can choose letters that are related to their function (like D for double width). You enter these commands like printer commands, by first pressing **CTRL-3**.

To define a printkey, just press **CTRL-3**, then the key you want to assign as the printkey, then an equals sign (=), and finally the ASCII value to be substituted for the printkey during printing. For example, to define the + key as the letter Z, you first look up the ASCII value of the letter Z (in either your printer manual or in Appendix J in *The Commodore 64 User's Manual*). The ASCII value of the letter Z is 91, so the definition is: **+ = 91**.

Now, anywhere you want to print the letter Z, substitute the printkey:

Gadzooks! The zoo is zany!←

This would appear on paper as:

Gadzooks! The zoo is zany!

More practically, look up the value of reverse-on and reverse-off. Reverse-on, a value of 18, prints all text in reverse video until canceled by reverse-off (a value of 146) or a carriage return. So define **SHIFT-R** as 18 and **SHIFT-O** as 146. Anywhere you want to print a word in reverse, bracket the word with printkey R and printkey O.

You can similarly define whatever codes your printer uses for features like double width or emphasized mode. For your convenience, four of the printkeys are predefined, though you can change them. Printkey 1 is defined as a 27, the value of the ESCape code used to precede many two-character printer commands. For example, the Epson command for double strike is ESC-G. You can select it in *SpeedScript* with **1G**.

Printkey 2, a value of 14, goes into double-width mode on most printers, and printkey 3, a value of 15, turns off double width on some printers and selects condensed mode on others. Printkey 4 is de-



lined as 18, which selects reverse field with Commodore printers (and on some graphics interfaces in emulation mode), or condensed mode on some other printers.

With so many codes available, you can even design custom logos and symbols using your printer's graphics mode. For example, on the 1525/MPS-801, you can draw a box (perhaps for a checklist) by first setting the appropriate codes:

**1=82=253=2554=193+**

Then display the box with text by typing:

**13444432 Toothpaste+**

This appears on paper as:

☐ Toothpaste

Keep one thing in mind about printkeys. *SpeedScript* always assumes it is printing to a rather dumb, featureless printer, the least common denominator. *SpeedScript* doesn't understand the intent of a printkey; it just sends its value out. So if you make one word within a line double-width, it may make the line overflow the specified right margin. There's no way for *SpeedScript* to include built-in font and type-style codes without being customized for a particular printer, since no set of codes is universal to all printers.

## Hints And Tips

It may take you awhile to fully master *SpeedScript*, but as you do you'll discover many ways to use the editing and formatting commands. For example, there is a simple way to simulate tab stops, say for a columnar table. Just type a period at every tab stop position. Erase the line, then restore it multiple times. When you are filling in the table, just use word left/word right or sentence left/sentence right keys to jump quickly between the periods. Or you can use programmable printkeys to embed your printer's own commands for setting and jumping to tab stops.

You don't have to change or define printer commands every time you write. Just save these definitions as a small text file, and load this file in each time you write. You can create many custom definition files and have them ready to use on disk. You can create customized "fill-in-the-blank" letters. Just type the letter, and everywhere you'll

need to insert something, substitute a graphic symbol. When you're ready to customize the letter, just hunt for each graphic symbol and insert the specific information.

*SpeedScript* does not work with any 80-column video boards or software. *SpeedScript* also wipes out most kinds of resident (RAM-loaded) software, including most software-simulated printer drivers.

The Commodore 64 version of *SpeedScript 3.0* may be ordered on disk directly from COMPUTE! Publications. Call TOLL FREE 800-334-0868 (in NC 919-275-9809) to charge your order 8:30 a.m.-7:00 p.m. EST, Monday through Friday. Or send check or money order (\$12.95 plus \$2.00 shipping and handling) to:

COMPUTE! Publications, Inc.  
P.O. Box 5058  
Greensboro, NC 27403 USA

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## Program 1: *SpeedScript 3.0* For Commodore 64

Please refer to the "MLX" article before entering this listing.

```
2049 :011,008,010,000,158,050,238
2055 :048,054,049,000,000,000,158
2061 :032,136,009,169,203,205,255
2067 :110,035,141,110,035,240,178
2073 :003,032,055,009,032,197,097
2079 :009,076,105,010,165,038,178
2085 :141,067,008,165,039,141,086
2091 :068,008,165,158,141,070,141
2097 :008,165,159,141,071,008,089
2103 :166,181,240,032,169,000,075
2109 :141,021,032,160,000,185,088
2115 :000,000,153,000,000,200,164
2121 :204,021,032,208,244,238,252
2127 :068,008,238,071,008,224,184
2133 :000,240,007,202,208,224,198
2139 :165,180,208,222,096,165,103
2145 :181,170,005,180,208,001,074
2151 :096,024,138,101,039,141,130
2157 :139,008,165,038,141,138,226
2163 :008,024,138,101,159,141,174
2169 :142,008,165,158,141,141,108
2175 :008,232,164,180,208,004,155
2181 :240,013,160,255,185,082,044
2187 :036,153,087,036,136,192,011
2193 :255,208,245,206,139,008,182
2199 :206,142,008,202,208,234,127
2205 :096,169,040,133,195,133,155
2211 :206,169,004,133,196,169,086
2217 :010,133,021,173,017,032,249
2223 :133,251,173,018,032,133,147
2229 :252,162,001,173,020,032,053
2235 :133,012,173,029,013,141,176
2241 :032,208,160,000,173,044,042
2247 :013,145,020,177,251,153,190
2253 :029,032,200,041,127,201,067
```

```
2259 :031,240,019,192,040,208,173
2265 :235,136,177,251,041,127,160
2271 :201,032,240,005,136,208,021
2277 :245,160,039,200,132,059,040
2283 :136,185,029,032,145,195,189
2289 :136,016,248,164,059,024,120
2295 :152,101,251,133,251,165,020
2301 :252,105,000,133,252,224,195
2307 :001,208,003,140,016,032,147
2313 :192,040,240,008,169,032,178
2319 :145,195,200,076,009,009,137
2325 :024,165,195,105,040,133,171
2331 :195,133,020,144,004,230,241
2337 :196,230,021,232,224,025,193
2343 :240,003,076,195,008,165,214
2349 :251,141,027,032,165,252,145
2355 :141,028,032,096,173,008,017
2361 :032,133,251,141,017,032,151
2367 :141,023,032,133,057,173,110
2373 :009,032,133,252,141,018,142
2379 :032,141,024,032,133,058,239
2385 :056,173,011,032,237,009,087
2391 :032,170,169,032,160,255,137
2397 :198,252,145,251,200,230,089
2403 :252,145,251,200,208,251,126
2409 :230,252,202,208,246,145,108
2415 :251,096,133,059,132,060,074
2421 :160,000,177,059,240,006,247
2427 :032,210,255,200,208,246,250
2433 :096,032,228,255,240,251,207
2439 :096,169,147,032,210,255,020
2445 :169,054,133,001,169,000,155
2451 :141,020,032,141,008,032,009
2457 :141,010,032,141,012,032,009
2463 :141,014,032,141,176,032,183
2469 :141,207,032,169,036,024,006
2475 :105,001,141,009,032,169,116
2481 :207,141,011,032,169,208,177
2487 :141,013,032,169,255,141,166
2493 :015,032,141,174,032,076,147
2499 :132,255,032,226,013,169,254
2505 :128,141,138,002,133,157,132
2511 :032,093,017,169,006,141,153
2517 :024,003,169,010,141,025,073
2523 :003,173,008,032,133,057,113
2529 :173,009,032,133,058,032,150
2535 :246,009,169,038,160,030,115
2541 :032,113,009,238,019,032,168
2547 :076,177,011,032,078,010,115
2553 :169,018,160,030,032,113,003
2559 :009,169,000,141,019,032,113
2565 :096,072,138,072,152,072,095
2571 :169,127,141,013,221,172,086
2577 :013,221,016,003,076,114,204
2583 :254,173,113,036,240,006,077
2589 :165,002,160,000,145,057,046
2595 :169,002,133,012,032,202,075
2601 :255,032,078,010,169,247,064
2607 :160,031,032,113,009,032,168
2613 :167,016,208,009,032,069,042
2619 :020,120,169,127,076,102,161
2625 :254,032,069,020,162,250,084
2631 :154,032,197,009,076,105,132
2637 :010,162,039,169,032,157,134
2643 :000,004,202,016,250,169,212
2649 :019,076,210,255,072,041,250
2655 :128,074,133,059,104,041,122
2661 :063,005,059,096,160,000,228
2667 :140,113,036,177,057,133,251
2673 :002,160,000,177,057,073,070
2679 :128,145,057,173,113,036,003
2685 :073,001,141,113,036,032,009
2691 :158,008,032,228,255,208,252
2697 :013,165,162,041,016,240,006
2703 :245,169,000,133,162,076,160
2709 :114,010,170,160,000,165,000
2715 :002,145,057,140,113,036,136
2721 :224,095,208,012,032,112,076
2727 :012,169,032,160,000,145,173
2733 :057,076,105,010,173,019,101
2739 :032,240,007,138,072,032,188
2745 :246,009,104,170,138,201,029
2751 :013,208,002,162,095,138,041
2757 :041,127,201,032,144,078,052
2763 :224,160,208,002,162,032,232
2769 :138,072,160,000,177,057,045
2775 :201,031,240,005,173,020,117
2781 :032,240,003,032,056,016,088
```



2787 :104,032,093,010,160,000,114  
2793 :145,057,032,158,008,056,177  
2799 :165,057,237,023,032,133,118  
2805 :059,165,058,237,024,032,052  
2811 :005,059,144,014,165,057,183  
2817 :105,000,141,023,032,165,211  
2823 :058,105,000,141,024,032,111  
2829 :230,057,208,002,230,058,030  
2835 :032,177,011,076,105,010,174  
2841 :138,174,059,011,221,059,175  
2847 :011,240,006,202,208,248,178  
2853 :076,105,010,202,138,010,066  
2859 :170,169,010,072,169,104,225  
2865 :072,189,100,011,072,189,170  
2871 :099,011,072,096,039,029,145  
2877 :157,137,133,002,012,138,128  
2883 :134,020,148,004,019,009,145  
2889 :147,135,139,005,136,140,007  
2895 :022,145,017,159,018,024,208  
2901 :026,016,028,030,006,001,192  
2907 :011,008,031,003,131,010,029  
2913 :141,007,102,012,111,012,226  
2919 :122,012,176,012,016,013,198  
2925 :029,013,044,013,146,013,111  
2931 :217,014,055,016,013,015,189  
2937 :080,015,157,016,190,016,083  
2943 :224,016,001,017,163,017,053  
2949 :202,019,181,018,225,020,086  
2955 :044,013,146,013,097,020,216  
2961 :123,021,033,022,244,012,088  
2967 :179,022,168,019,079,027,133  
2973 :244,014,049,022,225,013,212  
2979 :232,027,239,029,244,015,181  
2985 :236,015,139,028,028,016,119  
2991 :199,027,032,015,012,056,004  
2997 :165,057,237,017,032,165,086  
3003 :058,237,018,032,176,032,228  
3009 :056,173,017,032,237,008,204  
3015 :032,133,059,173,018,032,134  
3021 :237,009,032,005,059,240,019  
3027 :013,165,057,141,017,032,124  
3033 :165,058,141,018,032,032,151  
3039 :158,008,056,173,027,032,165  
3045 :229,057,133,251,173,028,076  
3051 :032,229,058,133,252,005,176  
3057 :251,240,002,176,024,024,190  
3063 :173,017,032,109,016,032,114  
3069 :141,017,032,173,018,032,154  
3075 :105,000,141,018,032,032,075  
3081 :158,008,076,225,011,096,071  
3087 :056,173,023,032,237,010,034  
3093 :032,133,059,173,024,032,218  
3099 :237,011,032,005,059,144,003  
3105 :012,173,010,032,141,023,168  
3111 :032,173,011,032,141,024,196  
3117 :032,056,165,057,237,008,088  
3123 :032,133,059,165,058,237,223  
3129 :009,032,005,059,176,011,093  
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3147 :165,057,237,023,032,133,210  
3153 :059,165,058,237,024,032,144  
3159 :005,059,176,001,096,173,085  
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3171 :032,133,058,096,230,057,193  
3177 :208,002,230,058,076,177,088  
3183 :011,165,057,208,002,198,240  
3189 :058,198,057,076,177,011,182  
3195 :165,057,133,251,165,058,184  
3201 :133,252,198,252,160,255,099  
3207 :177,251,201,032,240,004,016  
3213 :201,031,208,003,136,208,160  
3219 :243,177,251,201,032,240,011  
3225 :008,201,031,240,004,136,005  
3231 :208,243,096,056,152,101,247  
3237 :251,133,057,165,252,105,104  
3243 :000,133,058,076,177,011,114  
3249 :160,000,177,057,201,032,036  
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3261 :200,208,243,096,200,208,064  
3267 :011,230,058,165,058,205,154  
3273 :024,032,144,002,208,025,124  
3279 :177,057,201,032,240,236,126  
3285 :201,031,240,232,024,152,069  
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3297 :105,000,133,058,076,177,006  
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3309 :173,024,032,133,058,076,221  
3315 :177,011,169,000,141,017,246  
3321 :032,173,024,032,056,233,031  
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3339 :032,158,008,076,232,012,017  
3345 :238,029,013,173,029,013,000  
3351 :041,015,141,029,013,096,102  
3357 :012,238,044,013,173,044,041  
3363 :013,041,015,141,044,013,046  
3369 :076,158,008,011,165,057,004  
3375 :133,251,165,058,133,252,015  
3381 :198,252,160,255,177,251,066  
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3393 :240,008,201,063,240,004,053  
3399 :201,031,208,004,136,208,091  
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3417 :201,063,240,019,201,031,076  
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3429 :252,165,252,205,008,032,247  
3435 :176,226,076,134,013,132,096  
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3447 :177,251,201,032,240,247,243  
3453 :136,076,162,012,164,059,222  
3459 :076,079,013,173,008,032,000  
3465 :133,057,173,009,032,133,162  
3471 :058,076,177,011,160,000,113  
3477 :177,057,201,046,240,029,131  
3483 :201,033,240,025,201,063,150  
3489 :240,021,201,031,240,017,143  
3495 :200,208,235,230,058,165,239  
3501 :058,205,024,032,240,226,190  
3507 :144,224,076,232,012,200,043  
3513 :208,014,230,058,165,058,150  
3519 :205,024,032,144,005,240,073  
3525 :003,076,232,012,177,057,242  
3531 :201,032,240,233,201,046,132  
3537 :240,229,201,033,240,225,097  
3543 :201,063,240,221,201,031,148  
3549 :240,217,076,217,012,173,132  
3555 :012,032,141,140,032,173,245  
3561 :013,032,141,141,032,032,112  
3567 :078,010,169,058,160,030,232  
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3579 :019,032,096,056,165,057,164  
3585 :237,008,032,133,059,165,123  
3591 :058,237,009,032,005,059,151  
3597 :208,003,144,104,096,165,181  
3603 :057,133,038,165,058,133,091  
3609 :039,096,056,165,057,133,059  
3615 :158,073,255,101,038,141,029  
3621 :144,032,165,058,133,159,216  
3627 :073,255,101,039,141,145,029  
3633 :032,165,038,141,146,032,091  
3639 :165,039,141,147,032,165,232  
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3651 :165,159,141,149,032,133,078  
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3663 :141,032,205,015,032,144,136  
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3687 :133,198,096,173,140,032,107  
3693 :133,158,173,141,032,133,111  
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3705 :024,09,140,032,141,140,195  
3711 :032,173,145,032,133,181,055  
3717 :109,141,032,141,141,032,217  
3723 :169,000,141,026,208,169,084  
3729 :052,133,001,032,035,008,150  
3735 :169,054,133,001,169,001,166  
3741 :141,026,208,073,146,032,115  
3747 :133,038,173,147,032,133,051  
3753 :039,173,148,032,133,158,084  
3759 :173,149,032,133,159,056,109  
3765 :173,023,032,229,158,133,161  
3771 :180,173,024,032,229,159,216  
3777 :133,181,032,035,008,056,126  
3783 :173,023,032,237,144,032,072  
3789 :141,023,032,173,024,032,118  
3795 :237,145,032,141,024,032,054  
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3813 :140,032,032,031,141,140,148  
3819 :032,173,141,032,233,000,078  
3825 :141,141,032,096,173,141,197  
3831 :002,201,005,208,003,076,230  
3837 :122,015,032,103,012,032,057  
3843 :254,013,032,112,012,032,202  
3849 :027,014,076,227,014,032,143  
3855 :226,013,169,002,133,012,058  
3861 :032,078,010,169,005,160,043  
3867 :030,032,113,009,032,130,117  
3873 :009,072,032,246,009,104,249  
3879 :041,191,201,023,208,009,200  
3885 :032,254,013,032,123,012,255  
3891 :076,027,014,201,019,208,084  
3897 :009,032,254,013,032,045,186  
3903 :013,076,027,014,201,016,154  
3909 :208,009,032,254,013,032,105  
3915 :002,017,076,027,014,096,051  
3921 :056,165,057,237,017,032,133  
3927 :133,059,165,058,237,018,245  
3933 :032,005,059,240,011,173,101  
3939 :017,032,133,057,173,018,017  
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3951 :032,133,057,173,009,032,035  
3957 :133,058,076,177,011,165,225  
3963 :057,133,251,133,158,165,252  
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3981 :030,200,208,247,165,252,219  
3987 :205,024,032,144,015,173,228  
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4029 :158,133,180,173,024,032,121  
4035 :229,159,133,181,056,165,094  
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4047 :165,039,229,159,141,145,061  
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4071 :145,032,141,024,032,096,189  
4077 :169,255,141,169,032,076,055  
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4119 :057,200,202,208,250,096,012  
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4137 :200,145,057,032,158,008,129  
4143 :032,103,012,032,103,012,085  
4149 :076,245,015,169,001,141,188  
4155 :169,032,169,000,141,170,228  
4161 :032,032,078,016,169,032,168  
4167 :160,000,145,057,076,177,174  
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4179 :169,032,173,024,032,109,110  
4185 :170,032,205,011,032,144,171  
4191 :005,104,104,076,157,016,045  
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4203 :169,032,133,158,165,058,054  
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4215 :159,056,173,023,032,229,023  
4221 :038,133,180,173,024,032,193  
4227 :229,039,133,181,032,096,073  
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4287 :169,002,133,012,032,078,105  
4293 :010,169,123,160,030,032,209  
4299 :113,009,032,167,016,240,012  
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4311 :154,032,055,009,032,197,182  
4317 :009,076,105,010,160,000,069  
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4329 :200,208,247,230,058,165,061  
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4341 :240,236,076,232,012,200,217  
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4371 :017,136,192,255,208,245,048  
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4383 :032,176,236,076,134,013,186  
4389 :056,152,101,251,133,251,213  
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4401 :056,165,251,229,057,133,172  
4407 :059,165,252,229,058,005,055  
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4437 :057,165,252,133,058,076,058  
4443 :177,011,120,169,000,141,197  
4449 :014,220,169,027,141,017,173  
4455 :208,169,124,141,020,003,000  
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4467 :001,141,026,208,141,018,138  
4473 :208,088,096,169,058,164,136  
4479 :012,205,018,208,208,005,015  
4485 :169,001,172,029,013,140,145  
4491 :033,208,141,018,208,201,180  
4497 :001,240,008,169,001,141,193  
4503 :025,208,076,188,254,169,047  
4509 :001,141,025,208,076,049,145  
4515 :234,173,141,002,041,001,243  
4521 :208,003,032,226,013,032,171  
4527 :078,010,169,138,160,030,248  
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4539 :057,073,128,145,057,032,167  
4545 :158,008,160,000,177,057,241  
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4635 :165,058,133,039,237,135,026  
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4707 :210,255,169,032,032,210,239  
4713 :255,169,157,032,210,255,159  
4719 :169,155,032,210,255,165,073  
4725 :059,201,013,240,050,201,113  
4731 :020,208,015,136,016,004,010  
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4755 :144,172,204,025,032,240,196  
4761 :167,165,059,153,069,032,030  
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4815 :174,023,032,172,024,032,152  
4821 :169,251,032,216,255,176,032  
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4839 :173,027,019,201,008,144,035  
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4893 :056,018,240,022,169,236,002  
4899 :160,030,032,113,009,032,155  
4905 :130,009,162,008,201,068,107  
4911 :240,012,162,001,201,084,235  
4917 :240,006,032,246,009,104,178  
4923 :104,096,142,027,019,169,104  
4929 :001,160,000,032,186,255,187  
4935 :160,000,224,001,240,049,233  
4941 :185,069,032,201,064,208,068  
4947 :014,185,070,032,201,058,131  
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5073 :133,059,165,058,237,009,102  
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5265 :195,255,096,032,231,255,185  
5271 :169,001,162,008,160,000,139  
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5313 :032,204,255,032,228,255,175  
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5427 :136,032,046,137,032,014,192  
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5439 :136,032,046,137,032,013,203  
5445 :136,032,141,136,032,200,234  
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5625 :057,133,158,165,058,133,185  
5631 :159,173,012,032,133,038,034  
5637 :173,013,032,133,039,169,052  
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5715 :112,002,009,064,133,059,206  
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5775 :246,165,145,201,127,208,211  
5781 :009,238,032,208,032,084,240  
5787 :025,076,120,024,104,168,160  
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5799 :032,078,010,169,164,160,012  
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5817 :036,169,000,133,012,141,164  
5823 :032,208,141,029,013,032,134  
5829 :189,255,169,004,141,170,101  
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5847 :023,032,078,010,169,071,086  
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5865 :142,170,032,201,083,240,077  
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5877 :201,068,240,034,201,080,045  
5883 :208,180,032,078,010,169,160  
5889 :109,160,031,032,113,009,199  
5895 :032,130,009,056,233,048,003  
5901 :201,004,144,160,201,080,035  
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5913 :070,023,032,078,010,169,151  
5919 :145,160,031,032,113,009,009  
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5937 :032,200,169,087,153,069,247  
5943 :032,200,140,026,032,173,146  
5949 :026,032,162,069,160,032,030



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5961 :168,201,004,144,026,201,049  
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5973 :169,124,160,031,032,113,202  
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6033 :172,032,142,112,036,189,060  
6039 :090,022,157,152,032,232,068  
6045 :224,012,208,245,169,255,246  
6051 :141,166,032,141,164,032,071  
6057 :162,004,189,101,022,157,036  
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6159 :252,105,000,133,252,160,149  
6165 :000,173,166,032,201,255,080  
6171 :208,003,032,009,025,173,221  
6177 :164,032,240,003,032,049,041  
6183 :025,056,046,164,032,173,023  
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6225 :133,059,165,252,237,024,183  
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6243 :169,000,141,150,032,141,220  
6249 :155,032,032,151,024,173,160  
6255 :170,032,201,003,208,003,216  
6261 :032,130,009,032,225,255,032  
6267 :240,251,169,001,032,195,243  
6273 :255,032,231,255,173,111,162  
6279 :036,141,029,013,162,250,254  
6285 :154,032,246,009,076,105,251  
6291 :010,076,190,023,056,173,163  
6297 :154,032,237,166,032,168,174  
6303 :136,136,240,008,048,006,221  
6309 :032,084,025,136,208,250,132  
6315 :173,151,032,240,017,141,157  
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6333 :025,032,051,029,032,084,186  
6339 :025,032,084,025,032,084,221  
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6387 :255,032,078,010,169,179,198  
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6399 :130,009,032,167,022,162,009  
6405 :001,032,201,255,173,150,049  
6411 :032,240,017,141,021,032,238  
6417 :169,110,133,253,169,034,117  
6423 :133,254,032,049,025,032,036  
6429 :051,029,172,155,032,140,096  
6435 :166,032,136,240,008,048,153  
6441 :006,032,084,025,136,208,020  
6447 :250,096,169,032,172,152,150  
6453 :032,140,165,032,240,006,156  
6459 :032,106,022,136,208,250,045  
6465 :096,172,157,032,024,152,186  
6471 :109,166,032,141,166,032,205  
6477 :032,084,025,136,208,250,044  
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6489 :173,112,036,240,003,032,173  
6495 :106,022,096,141,168,032,148  
6501 :041,127,032,071,022,174,056  
6507 :173,025,221,173,025,240,196  
6513 :009,202,208,248,206,165,127  
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6525 :010,170,140,167,032,169,045  
6531 :025,072,169,144,072,189,034  
6537 :193,025,072,189,192,025,065  
6543 :072,096,056,173,167,032,227  
6549 :101,251,133,251,165,252,022  
6555 :105,000,133,252,076,190,143  
6561 :023,177,251,201,031,240,060  
6567 :001,136,140,167,032,096,227  
6573 :018,087,065,076,082,084,073  
6579 :066,083,078,072,070,064,100  
6585 :080,063,088,077,073,071,125  
6591 :074,032,026,050,026,059,202  
6597 :026,069,026,079,026,089,000  
6603 :026,099,026,109,026,124,101  
6609 :026,158,026,006,026,022,217  
6615 :026,246,025,236,025,227,232  
6621 :025,183,026,224,026,041,234  
6627 :026,200,169,000,141,164,159  
6633 :032,076,162,025,200,032,248  
6639 :019,021,141,163,032,076,179  
6645 :162,025,200,032,019,021,192  
6651 :141,161,032,173,139,032,161  
6657 :141,162,032,076,162,025,087  
6663 :200,032,019,021,141,159,067  
6669 :032,173,139,032,141,160,178  
6675 :032,076,162,025,200,032,034  
6681 :019,021,141,154,032,076,212  
6687 :162,025,169,000,141,158,174  
6693 :032,200,076,162,025,169,189  
6699 :010,141,112,036,200,076,106  
6705 :162,025,200,169,001,141,235  
6711 :171,032,076,162,025,200,209  
6717 :032,019,021,141,152,032,202  
6723 :076,162,025,200,032,019,069  
6729 :021,141,153,032,076,162,146  
6735 :025,200,032,019,021,141,005  
6741 :155,032,076,162,025,200,223  
6747 :032,019,021,141,156,032,236  
6753 :076,162,025,200,032,019,099  
6759 :021,141,157,032,076,162,180  
6765 :025,172,167,032,200,152,089  
6771 :072,032,151,024,104,168,154  
6777 :140,167,032,096,032,151,227  
6783 :026,136,140,150,032,160,003  
6789 :001,177,251,153,109,034,090  
6795 :200,204,150,032,144,245,090  
6801 :240,243,200,076,162,025,067  
6807 :200,177,251,201,031,208,195  
6813 :249,096,032,151,026,136,079  
6819 :140,151,032,160,001,177,056  
6825 :251,153,110,035,200,204,098  
6831 :151,032,144,245,240,243,206  
6837 :076,162,025,032,151,026,141  
6843 :076,162,025,200,177,251,054  
6849 :201,061,240,007,136,173,243  
6855 :168,032,076,217,023,200,147  
6861 :032,019,021,072,173,168,178  
6867 :032,041,127,170,104,157,074  
6873 :238,032,032,162,025,076,014  
6879 :145,025,200,162,008,177,172  
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6891 :009,162,001,201,020,240,100  
6897 :003,076,177,022,142,027,176  
6903 :019,200,177,251,201,058,143  
6909 :240,003,076,177,022,200,203  
6915 :177,251,201,031,240,009,144  
6921 :032,071,022,153,106,032,169  
6927 :076,002,027,152,056,233,049  
6933 :003,162,109,160,032,032,007  
6939 :189,255,032,204,255,169,107  
6945 :002,032,195,255,169,002,176  
6951 :174,027,019,160,000,032,195  
6957 :186,255,032,055,009,169,239  
6963 :000,166,057,164,058,032,016  
6969 :213,255,144,003,076,177,157  
6975 :022,142,023,032,140,024,190  
6981 :032,104,104,162,001,032,248  
6987 :201,255,076,180,023,032,074  
6993 :231,255,169,000,032,189,189  
6999 :255,169,015,162,008,160,088  
7005 :015,032,186,255,032,192,037  
7011 :255,144,011,169,015,032,213  
7017 :195,255,032,231,255,076,125  
7023 :246,009,032,078,010,169,143  
7029 :029,160,031,032,113,009,235  
7035 :032,056,018,240,022,162,141  
7041 :015,032,201,255,176,223,007  
7047 :169,069,160,032,032,113,198  
7053 :009,169,013,032,210,255,061  
7059 :032,204,255,032,231,255,132  
7065 :169,000,032,189,255,169,199  
7071 :015,162,008,160,015,032,039  
7077 :186,255,032,192,255,176,237  
7083 :186,032,078,010,162,015,142  
7089 :032,198,255,032,056,018,000  
7095 :032,204,255,169,015,032,122  
7101 :195,255,032,231,255,169,046  
7107 :001,141,019,032,096,032,004  
7113 :240,027,173,176,032,240,065  
7119 :022,032,147,028,032,022,234  
7125 :028,173,174,032,201,255,052  
7131 :240,009,032,182,028,032,230  
7137 :158,008,076,211,027,076,013  
7143 :246,009,173,141,022,201,235  
7149 :005,208,038,032,078,010,096  
7155 :169,213,160,031,032,113,193  
7161 :009,032,056,018,141,176,169  
7167 :032,208,003,076,246,009,061  
7173 :160,000,185,069,032,153,092  
7179 :177,032,200,204,026,032,170  
7185 :208,244,076,246,009,165,197  
7191 :057,133,251,165,058,133,052  
7197 :252,169,255,141,174,032,028  
7203 :160,001,162,000,173,176,195  
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7215 :032,093,010,209,251,240,114  
7221 :002,162,255,200,208,011,123  
7227 :230,252,165,252,205,024,163  
7233 :032,240,002,176,054,232,033  
7239 :236,176,032,208,224,024,203  
7245 :152,101,251,133,059,165,170  
7251 :252,105,000,133,060,173,038  
7257 :023,032,197,059,173,024,085  
7263 :032,229,060,144,024,056,128  
7269 :165,059,237,176,032,133,135  
7275 :057,141,173,032,165,060,223  
7281 :233,000,133,058,141,174,084  
7287 :032,032,177,011,096,032,243  
7293 :078,010,169,223,160,031,028  
7299 :032,113,009,169,001,141,084  
7305 :019,032,096,173,141,002,088  
7311 :201,005,208,035,032,078,190  
7317 :010,169,233,160,031,032,016  
7323 :113,009,032,056,018,141,012  
7329 :207,032,240,014,160,000,046  
7335 :185,069,032,153,208,032,078  
7341 :200,204,026,032,208,244,063  
7347 :076,246,009,056,165,057,020  
7353 :133,158,237,173,032,133,027  
7359 :059,165,058,133,159,237,234  
7365 :174,032,005,059,208,101,008  
7371 :169,255,141,174,032,024,230  
7377 :173,176,032,101,057,133,113  
7383 :038,169,000,101,058,133,202  
7389 :039,056,173,023,032,229,005  
7395 :158,133,180,173,024,032,159  
7401 :229,159,133,181,032,035,234  
7407 :008,056,173,023,032,237,000  
7413 :176,032,141,023,032,173,054  
7419 :024,032,233,000,141,024,193  
7425 :032,173,207,032,240,041,214  
7431 :141,169,032,169,000,141,147  
7437 :170,032,032,078,016,160,245  
7443 :000,185,208,032,032,093,057  
7449 :010,145,057,200,204,207,080  
7455 :032,208,242,024,165,057,247  
7461 :109,207,032,133,057,165,228  
7467 :058,105,000,133,058,076,217  
7473 :177,011,160,000,204,021,110  
7479 :032,240,032,177,253,048,069  
7485 :029,032,071,022,032,208,199  
7491 :029,032,106,022,173,172,089  
7497 :032,240,010,169,008,032,052  
7503 :106,022,169,095,032,106,097  
7509 :022,200,076,053,029,096,049  
7515 :140,167,032,041,127,141,227  
7521 :168,032,032,071,022,201,111  
7527 :067,208,027,056,173,163,029  
7533 :032,237,021,032,074,056,049



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7539 :237,152,032,168,169,032,137
7545 :032,106,022,136,208,250,107
7551 :172,167,032,076,086,029,177
7557 :201,069,208,017,056,173,089
7563 :153,032,237,021,032,056,158
7569 :237,152,032,168,169,032,167
7575 :076,121,029,201,085,208,103
7581 :008,173,172,032,073,001,104
7587 :141,172,032,201,035,208,184
7593 :026,140,167,032,174,159,099
7599 :032,173,160,032,160,055,019
7605 :132,001,032,205,189,160,132
7611 :054,132,001,172,167,032,233
7617 :076,086,029,174,168,032,246
7623 :189,238,032,032,032,066,022,050
7629 :076,086,029,174,171,032,005
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7659 :059,138,005,059,096,032,112
7665 :078,010,056,173,010,032,088
7671 :237,023,032,170,173,011,125
7677 :032,237,024,032,160,055,025
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7707 :211,067,082,073,080,084,112
7713 :032,051,046,048,000,032,242
7719 :066,089,032,195,072,065,046
7725 :082,076,069,083,032,194,069
7731 :082,065,078,078,079,078,255
7737 :000,194,085,070,070,069,033
7743 :082,032,195,076,069,065,070
7749 :082,069,068,000,194,085,055
7755 :070,070,069,082,032,198,084
7761 :085,076,076,000,196,069,071
7767 :076,069,084,069,032,040,201
7773 :211,044,215,044,208,041,088
7779 :000,058,032,193,082,069,021
7785 :032,089,079,085,032,083,249
7791 :085,082,069,063,032,040,226
7797 :217,047,206,041,058,000,174
7803 :197,210,193,211,197,032,139
7809 :193,204,204,032,212,197,147
7815 :216,212,000,197,082,065,139
7821 :083,069,032,040,211,044,108
7827 :215,044,208,041,058,032,233
7833 :018,210,197,212,213,210,189
7839 :206,146,032,084,079,032,226
7845 :069,088,073,084,000,208,175
7851 :082,069,083,083,032,070,078
7857 :079,082,077,065,084,032,084
7863 :075,069,089,058,000,211,173
7869 :065,086,069,058,000,212,167
7875 :065,080,069,032,197,210,080
7881 :210,207,210,000,211,084,099
7887 :079,080,080,069,068,000,071
7893 :214,069,082,073,070,089,042
7899 :032,197,082,082,079,082,005
7905 :000,206,079,032,069,082,181
7911 :082,079,082,083,000,147,192
7917 :032,018,212,146,065,080,022
7923 :069,032,079,082,032,018,043
7929 :196,146,073,083,075,063,117
7935 :000,204,079,065,068,058,217
7941 :000,214,069,082,073,070,001
7947 :089,058,000,208,082,069,005
7953 :083,083,032,018,210,197,128
7959 :212,213,210,206,146,000,242
7965 :196,073,083,075,032,067,043
7971 :079,077,077,065,078,068,223
7977 :058,000,036,206,079,032,196
7983 :210,079,079,077,000,206,186
7989 :079,032,084,069,088,084,233
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8007 :147,208,082,073,078,084,231
8013 :032,084,079,058,032,018,124
8019 :211,146,067,082,069,069,215
8025 :078,044,018,196,146,073,132
8031 :083,075,044,018,208,146,157
8037 :082,073,078,084,069,082,057
8043 :063,000,196,069,086,073,082
8049 :067,069,032,078,085,077,009
8055 :066,069,082,063,000,211,098
8061 :069,067,079,078,068,065,039
8067 :082,089,032,193,068,068,151
8073 :082,069,083,083,032,035,009
8079 :063,000,208,082,073,078,135
8085 :084,032,084,079,032,070,018
8091 :073,076,069,078,065,077,081
8097 :069,058,000,147,208,082,213
8103 :073,078,084,073,078,071,112
8109 :046,046,046,013,013,000,081
8115 :201,078,083,069,068,065,008
8121 :032,078,069,088,084,032,056
8127 :083,072,069,069,084,044,100
8133 :032,080,082,069,083,083,114
8139 :032,018,210,197,212,213,061
8145 :210,206,146,000,200,085,032
8151 :078,084,032,070,079,082,128
8157 :058,000,206,079,084,032,168
8163 :198,079,085,078,068,000,223
8169 :210,069,080,076,065,067,032
8175 :069,032,087,073,084,072,144
8181 :058,000,197,216,201,212,105
8187 :032,211,080,069,069,068,012
8193 :211,067,082,073,080,084,086
8199 :000,013,013,013,013,013,072

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## Program 2: SpeedScript 3.0 File Converter

Please refer to "COMPUTE!'s Guide To Typing In Programs" before entering this listing.

```

100 PRINT "{CLR}{RVS}{N}{2 SPACES} SPEEDSCRIPT
    {SPACE} FILE CONVERSION PROGRAM {3 SPACES}"
    :rem 25
110 GOSUB 410 :rem 167
120 INPUT "{DOWN} INPUT FILE NAME"; I$ :rem 113
130 IF I$ = "" THEN 120 :rem 211
140 INPUT "{DOWN} OUTPUT FILE NAME"; O$ :rem 218
150 PRINT "{DOWN} {RVS} D[OFF] ISK, {RVS} S[OFF] CR
    EEN, {RVS} P[OFF] RINTER, {RVS} M[OFF] ODEM,
    {SPACE} {RVS} O[OFF] THER" :rem 223
160 GETAS: IFA$ = " " THEN 160 :rem 81
170 DV = -(A$ = "T") - 2*(A$ = "M") - 3*(A$ = "S") - 4*(A$ =
    "P") - 8*(A$ = "D"): SA = 7 :rem 166
180 IF DV = 0 THEN INPUT "DEVICE NUMBER"; DV: INPUT "S
    ECONDARY ADDRESS"; SA :rem 11
190 PRINT "{2 DOWN} WHICH CONVERSION:" :rem 192
200 PRINT "{DOWN} 1) SPEEDSCRIPT TO COMMODORE A
    SCII" :rem 197
210 PRINT "{DOWN} 2) SPEEDSCRIPT TO TRUE ASCII"
    :rem 98
220 PRINT "{DOWN} 3) COMMODORE ASCII TO SPEEDSC
    RIPT" :rem 201
230 GETP$: IF P$ < "1" OR P$ > "3" THEN 230 :rem 101
240 ADR = 828 + VAL(P$) * 3 - 3 :rem 220
250 OPEN 15, 8, 15, "I0": REM REMOVE "I0" IF YOU'
    VE CHANGED THE DRIVE'S SPEED :rem 97
260 OPEN 1, 8, 3, I$: INPUT #15, EN, EM$: F$ = I$: IF EN = 0
    THEN 290 :rem 44
270 PRINT "{DOWN} DISK ERROR FOR "; F$: PRINT EM$
    :rem 185
280 PRINT "{3 DOWN} RUN {3 UP}": CLOSE 1: CLOSE 2: CL
    OSE 15: END :rem 48
290 IF DV = 2 THEN OPEN 2, 2, 3, CHR$(6+32) + (6+64): GOT
    O 380 :rem 28
295 IF DV < 8 THEN OPEN 2, DV, SA, O$: GOTO 380 :rem 65
300 EX$ = "S,W": IF P$ = "3" THEN EX$ = "P,W" :rem 56
310 OPEN 2, DV, SA, "0": + O$ + EX$: INPUT #15, EN, EM$: F
    $ = O$ :rem 42
320 IF EN = 0 THEN 380 :rem 238
330 IF EN < 63 THEN 270 :rem 99

```

```

340 IF EN = 63 THEN PRINT "{DOWN}"; O$; " EXISTS... R
    EPLACE? {RVS} Y[OFF] / {RVS} N[OFF]:" :rem 26
350 GETA$: IFA$ < "Y" AND A$ < "N" THEN 350 :rem 45
360 IFA$ = "N" THEN 270 :rem 36
370 PRINT #15, "S0: "+ O$: CLOSE 2: GOTO 310 :rem 100
380 SYS (ADR): IF (PEEK(144) AND 191) = 0 THEN PRINT "
    [DOWN] DONE." : GOTO 280 :rem 184
390 PRINT "I/O ERROR DURING CONVERSION.": INPUT
    #15, EN, EM$: IF EN < 0 THEN 270 :rem 253
400 GOTO 280 :rem 103
410 FOR I = 828 TO 1001: READ A: POKE I, A: CK = CK + A: NEXT
    I :rem 222
420 PRINT "{RVS} ERROR IN DATA STATEMENTS.": END
    :rem 251
430 DATA 076,069,003,076,122,003 :rem 33
440 DATA 076,174,003,032,225,255 :rem 36
450 DATA 240,018,032,216,003,032 :rem 20
460 DATA 095,003,032,183,255,072 :rem 39
470 DATA 032,224,003,104,041,064 :rem 21
480 DATA 240,233,076,204,255,133 :rem 38
490 DATA 251,041,064,010,005,251 :rem 24
500 DATA 041,191,133,251,041,032 :rem 20
510 DATA 073,032,010,005,251,201 :rem 12
520 DATA 095,208,002,169,013,133 :rem 34
530 DATA 251,096,032,225,255,240 :rem 37
540 DATA 221,032,216,003,032,095 :rem 24
550 DATA 003,041,127,201,065,144 :rem 25
560 DATA 018,201,091,176,014,170 :rem 34
570 DATA 165,251,041,128,073,128 :rem 43
580 DATA 074,074,133,251,138,005 :rem 41
590 DATA 251,133,251,032,183,255 :rem 40
600 DATA 072,032,224,003,104,041 :rem 15
610 DATA 064,240,207,076,204,255 :rem 37
620 DATA 032,225,255,240,169,032 :rem 35
630 DATA 216,003,201,013,208,002 :rem 14
640 DATA 169,031,072,041,128,074 :rem 40
650 DATA 133,251,104,041,063,005 :rem 24
660 DATA 251,133,251,032,183,255 :rem 38
670 DATA 072,032,224,003,104,041 :rem 22
680 DATA 064,240,217,076,204,255 :rem 45
690 DATA 162,001,032,198,255,076 :rem 47
700 DATA 207,255,162,002,032,201 :rem 21
710 DATA 255,165,251,076,210,255 :rem 42

```



# Auto-Applesoft

Karl R. Beach

*This program automates educational programming. But it's also useful for adding text to an adventure game or simply writing a letter to a friend.*

---

This program is a conversion of "VIC Automatic BASIC" (COMPUTE!, April 1983). "Auto-Applesoft" will allow educators to write their own educational software.

Auto-Applesoft is designed to let you see how each page of text will appear on the screen before it is converted into BASIC. It is designed to allow the use of all of the Apple II's screen-editing features. Most important, it is designed to allow pages of instructional text to be quickly created in BASIC program lines rather than through the use of sequential text files.

Just as VIC Automatic BASIC was useful for a variety of noninstructional uses, Auto-Applesoft is a handy utility to keep on a disk in case you want to add some text to an animated adventure game (either directly or by appending it) or write an Apple-letter to a friend. The program here is deliberately specialized for educational applications, but you can experiment with the program, and mold it to fit your needs.

## Specialized Feature

When several students are going to use the program at one time, programs made with Auto-Applesoft will allow the instructor to monitor their work. When prompted for "Name," the instructor may enter TEACHER and review up to 50 students' work. To avoid problems with rapid scrolling, the instructor must press a key (any key will do) to call up each student's results. It would be easy to customize the program to direct the results to either a printer or a sequential disk file by rewriting the program between lines 600 and 800.

To write a page of text: First, load Auto-Applesoft. Then, insert an initialized disk into the disk drive and type RUN. You will be greeted by a flashing announcement of the program's name. You can shorten the time delay in line 8 to save time when you run the program. After the title screen, you will be asked to input a beginning line number. Jot this line number on a scrap of paper since you might wish to refer to it later.

The first line number you should enter is 1000. When you've entered it, the screen will go blank and the cursor will appear at the upper left-hand corner. Simply type your first line of text. When you come to the right-hand margin, press the SHIFT key and the asterisk (\*). The cursor will drop down two lines and back to the left-hand margin. This is the position where the second line of text will be when you run your program. Many children have a very difficult time reading Apple II screens when the text is single-spaced.

Type additional lines the same way. To reposition the cursor after each line, just press SHIFT and the asterisk. It is possible to enter up to nine lines of text on one page. However, fewer lines make a nicer display and are safer when you are ready to trick the Apple into letting you trap the text as BASIC program lines.

If you make a typing error, press the SHIFT key and the at symbol (@). The cursor will drop one line and back to the left-hand margin. You can then retype the line.

## Trapping Text

When you are ready to trap the text as BASIC lines, press the SHIFT key and the ampersand symbol (&) key. You will be asked if this is the end of a page of text. If it is, enter 1, but if you



expect the student to input a response, enter 2. If you enter a 1, the screen will immediately be filled with what appears to be a well-spaced set of BASIC program lines beginning one line number higher than the beginning line number that you initially entered. If you enter a 2, you will be asked to input the answer that the students should give. After you have entered this answer, the screen will fill with program lines as described above. The spacing of these lines is critical if text trapping is to work on the Apple II.

## Creating BASIC Lines

On the Apple you have to move the cursor all the way to the end of a line to enter the entire program line. If you hit RETURN before the end of the line, only the portion preceding the RETURN will be entered into the computer. Follow these steps to enter the lines displayed on the screen as BASIC program lines:

Press the ESCAPE key and drive the cursor to the top of the screen by holding down the REPEAT key and the I key. Then drive the cursor all the way across the program line using the → cursor control key and the REPEAT key. Make sure you move past the last quotation mark of the line, then press RETURN. The cursor should drop down beside the next line number. Repeat these steps until the entire screen has been entered as part of your BASIC program.

Type RUN again and begin with a line number higher than the last one that you saw on the screen. While this process isn't painless, you will quickly develop a rhythm for it and you'll be amazed at how quickly you can build up a fairly complex educational program.

## Adding Highlight And Flash

There are many times when it is important to highlight a word or phrase in an educational program. Auto-Applesoft has provisions for two methods of highlighting: inverse video and flashing.

Immediately before you type the word you want to highlight in inverse video, press CTRL and the I key. The cursor will blink, but it will not move. Now type the word you want highlighted. Immediately after typing the word, press CTRL N. The cursor will again blink without moving. Now simply type the rest of your line of text as you normally would. When you are ready to trap the text, you'll see that the proper commands for inverse video have automatically been included around the word in the line.

If you want to highlight a word or phrase in flashing video, follow the same procedure you used for highlighting in inverse, except type CTRL and the letter F instead of CTRL-I. This

will add some flash to your finished program.

When you've completed your program, enter a program line with the instruction GOTO 890 before your END statement. Delete the core of Auto-Applesoft by typing DEL 1,200 and pressing RETURN. Put a title, a FOR-NEXT time delay, and a HOME command in between line 306 and 309. Finally, save the program on an initialized disk.

## Auto-Applesoft

```

4 HOME : VTAB 10: HTAB 10: FLASH : PRINT
  "
5 HTAB 10: PRINT "  AUTO-APPLESOFT
  "
6 HTAB 10: PRINT "
  ": NORMAL
8 FOR I = 1 TO 2000: NEXT I: HOME
10 PRINT : INPUT "BEGIN LINE # ";LN

12 HOME
15 FOR L = 1 TO 9
20 GET E$: IF E$ = "" THEN 20
25 IF E$ = "3" THEN A$(L) = "": E$ =
  "": PRINT : PRINT : GOTO 20
27 IF E$ = CHR$ (6) THEN E$ = "": A
  $(L) = A$(L) + CHR$ (34) + "":
  FLASH:PRINT" + CHR$ (34): GOTO
  20
28 IF E$ = CHR$ (14) THEN E$ = "":
  A$(L) = A$(L) + CHR$ (34) + "":
  :NORMAL:PRINT" + CHR$ (34): GOTO
  20
29 IF E$ = CHR$ (9) THEN E$ = "": A
  $(L) = A$(L) + CHR$ (34) + "":
  INVERSE:PRINT" + CHR$ (34): GOTO
  20
30 IF E$ = "&" THEN 60
35 IF E$ = "*" THEN 50
40 PRINT E$:
45 A$(L) = A$(L) + E$: E$ = "": GOTO
  20
50 PRINT : PRINT : PRINT :
52 K = K + 1
55 NEXT L
60 INPUT "1=PAGE 2=ANSWER ";B
65 IF B = 1 THEN 75
70 INPUT "ANSWER=";B$
75 HOME
80 FOR L = 1 TO K
85 LN = LN + L
90 PRINT : PRINT " ";LN;"PRINT:PRI
  NT"; CHR$ (34);A$(L); CHR$ (34)

95 NEXT L
100 IF B = 1 THEN PRINT : PRINT "
  ";LN + 1;"GOSUB900"
105 IF B = 2 THEN PRINT : PRINT "
  ";LN + 1;"A$="; CHR$ (34);B$; CHR$
  (34);":GOSUB800"
110 END
250 DIM ST$(50),SC$(50)
300 S = - 16336
305 HOME
306 REM TITLE
310 FOR I = 1 TO 100:Z = PEEK (S):
  NEXT I
  
```



```

330 FOR I = 1 TO 100:Z = PEEK (S):
    NEXT I
340 FOR I = 1 TO 2000: NEXT I: HOME

400 VTAB 10: HTAB 5: INPUT "WHAT'S
    YOUR NAME? ";N$
402 IF N$ = "TEACHER" THEN 600
405 PRINT : HTAB 15: PRINT "HELLO,
    ";N$;"!"
410 FOR I = 1 TO 100:Z = PEEK (S):
    NEXT I
415 PRINT : HTAB 15: PRINT "I'M YOU
    R COMPUTER!"
420 FOR I = 1 TO 2000: NEXT I
500 HOME : GOTO 1000
600 HOME
605 FOR L = 1 TO CT
610 PRINT : PRINT ST$(L); "="; SC$(L)

615 GET P$: IF P$ = "" THEN 615
620 P$ = ""
625 NEXT L
630 HOME : GOTO 400
800 PRINT : PRINT : INVERSE : PRINT
    " PLEASE TYPE YOUR ANSWER & RE
    TURN ": NORMAL
805 PRINT : INPUT "ANSWER= ";B$
810 IF A$ = B$ THEN R = R + 1: GOSUB
    850: PRINT "CORRECT, ";N$;"!"
820 IF A$ < > B$ THEN W = W + 1: GOSUB
    870: PRINT "THE ANSWER IS ";A$;
    "."
830 FOR I = 1 TO 2000: NEXT I: HOME
    : RETURN
850 FOR I = 1 TO 50:Z = PEEK (S): NEXT
    I
855 FOR I = 1 TO 50: NEXT I
860 FOR I = 1 TO 50:Z = PEEK (S): NEXT
    I
865 RETURN
870 FOR I = 1 TO 200:Z = PEEK (S):
    NEXT I
875 RETURN
890 HOME : VTAB 10: PRINT " GOOD J
    OB, ";N$;"!"
891 CT = CT + 1:ST$(CT) = N$:SC$(CT)
    = STR$(R) + "&" + STR$(W)
892 FOR I = 1 TO 100:Z = PEEK (S):
    NEXT I
893 PRINT : PRINT " YOUR SCORE= ";
    R;" AND ";W
894 PRINT : PRINT : PRINT : FLASH :
    PRINT "PLEASE GET THE NEXT STU
    DENT!": NORMAL
895 PRINT : INVERSE : PRINT " TY
    PE ANY KEY TO BEGIN PROGRAM
    ": NORMAL : PRINT : PRINT
896 GET P$: IF P$ = "" THEN 896
897 P$ = "":W = 0:R = 0: HOME : GOTO
    300
900 PRINT : PRINT : INVERSE : PRINT
    " PRESS ANY KEY FOR NEXT PAGE
    ": NORMAL
905 GET P$: IF P$ = "" THEN 905
910 P$ = "": HOME : RETURN
1000 REM PROGRAM AREA
9999 END

```

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# COMPUTE!'s Guide To Typing In Programs

Before typing in any program, you should familiarize yourself with your computer. Learn how to use the keyboard to type in and correct BASIC programs. Read your manuals to understand how to save and load BASIC programs to and from your disk drive or cassette unit. Computers are precise—take special care to type the program *exactly* as listed, including any necessary punctuation and symbols. To help you with this task, we have implemented a special listing convention as well as a program to help check your typing—the “Automatic Proofreader.” Please read the following notes before typing in any programs from COMPUTE!. They can save you a lot of time and trouble.

Since programs can contain some hard-to-read (and hard-to-type) special characters, we have developed a listing system that spells out in abbreviated form the function of these control characters. You will find these special characters within curly braces. For example, {CLEAR} or {CLR} instructs you to insert the symbol which clears the screen on the Atari or Commodore machines. A symbol by itself within curly braces is usually a control key or graphics key. If you see {A}, hold down the CONTROL key and press A. Commodore machines have a special control key labeled with the Commodore logo. Graphics characters entered with the Commodore logo key are enclosed in a new kind of special bracket. A graphics character can be listed as [A]. In this case, hold down the Commodore logo key as you type A. Our Commodore listings are in uppercase, so shifted symbols are underlined. A graphics heart symbol (SHIFT-S) would be listed as S. One exception is {SHIFT-SPACE}. Hold down SHIFT and press the space bar.

If a number precedes a symbol, such as {5 RIGHT}, {6 S}, or {<8 Q>}, you would enter five cursor rights, six shifted S's, or eight Commodore-Q's. On the Atari, inverse characters (printed in white on black) should be entered with the Atari logo key. Since spacing is sometimes important, any more than two spaces will be listed, for example, as {6 SPACES}. A space is never left at the end of a line, but will be moved to the next printed line as {SPACE}. There are no special control characters found in our IBM PC/PCjr, TI-99/4A, and Apple program listings. For your convenience, we have prepared this quick-reference key for the Commodore and Atari special characters:

## Atari 400/800/XL

When you see	Type	See
{CLEAR}	ESC SHIFT <	⌘ Clear Screen
{UP}	ESC CTRL -	↑ Cursor Up
{DOWN}	ESC CTRL =	↓ Cursor Down
{LEFT}	ESC CTRL +	← Cursor Left
{RIGHT}	ESC CTRL *	→ Cursor Right
{BACK S}	ESC DELETE	⌫ Backspace
{DELETE}	ESC CTRL DELETE	⌫ Delete character
{INSERT}	ESC CTRL INSERT	⌫ Insert character
{DEL LINE}	ESC SHIFT DELETE	⌫ Delete line
{INS LINE}	ESC SHIFT INSERT	⌫ Insert line
{TAB}	ESC TAB	⌫ TAB key
{CLR TAB}	ESC CTRL TAB	⌫ Clear tab
{SET TAB}	ESC SHIFT TAB	⌫ Set tab stop
{BELL}	ESC CTRL 2	⌫ Ring buzzer
{ESC}	ESC ESC	⌫ ESCape key

## Commodore PET/CBM/VIC/64

When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	⌫	{GRN}	CTRL 6	⌘
{HOME}	CLR/HOME	⌫	{BLU}	CTRL 7	⌘
{UP}	SHIFT ↑ CRSR	⬆	{YEL}	CTRL 8	⌘
{DOWN}	↓ CRSR	⬇	{F1}	f1	⌘
{LEFT}	SHIFT ← CRSR	⬅	{F2}	f2	⌘
{RIGHT}	→ CRSR	➡	{F3}	f3	⌘
{RVS}	CTRL 9	⌘	{F4}	f4	⌘
{OFF}	CTRL 0	⌘	{F5}	f5	⌘
{BLK}	CTRL 1	⌘	{F6}	f6	⌘
{WHT}	CTRL 2	⌘	{F7}	f7	⌘
{RED}	CTRL 3	⌘	{F8}	f8	⌘
{CYN}	CTRL 4	⌘			
{PUR}	CTRL 5	⌘			

## The Automatic Proofreader

Also, we have developed a simple, yet effective program that can help check your typing. Type in the appropriate Proofreader program for your machine, then save it for future use. On the VIC, 64, or Atari, run the Proofreader to activate it, then enter NEW to erase the BASIC loader (the Proofreader will still be active, hidden in memory, as a machine language program). Pressing RUN/STOP-RESTORE or SYSTEM RESET deactivates the Proofreader. You can use SYS 886 to reactivate the VIC/64 Proofreader, or PRINT USR(1536) to reenable the Atari Proofreader. The IBM Proofreader is a BASIC program that lets you enter, edit, list, save, and load programs that you type. It simulates the IBM's BASIC line editor.

## Using The Automatic Proofreader

Once the Proofreader is active, try typing in a line. As soon as you press RETURN, either a number (on the Commodore) or a pair of letters



(Atari or IBM) appears. The number or pair of letters is called a *checksum*. Try making a change in the line, and notice how the checksum changes.

All you need to do is compare the value provided by the Proofreader with the checksum printed in the program listing in the magazine. In Commodore listings, the checksum is a number from 0 to 255. It is set off from the rest of the line with *rem*. This prevents a syntax error if the checksum is typed in, but the REM statements and checksums need *not* be typed in. It is just there for your information.

In Atari and IBM listings, the checksum is given to the left of each line number. Just type in the program, a line at a time (without the printed checksum) and compare the checksum generated by the Proofreader to the checksum in the listing. If they match, go on to the next line. If not, check your typing: You've made a mistake. On the Commodore and Atari Proofreader, spaces are not counted as part of the checksum, and no check is made to see that you've typed in the characters in the right order. If characters are transposed, the checksum will still match the listing. Because of the checksum method used, do not use abbreviations, such as ? for PRINT. However, the Proofreader does catch the majority of typing errors most people make. The IBM Proofreader is even pickier; it *will* detect errors in spacing and transposition. Also, be sure you leave Caps Lock on, except when you need to enter lowercase characters.

## Special Proofreader Notes For Commodore Cassette Users

The Proofreader resides in the cassette buffer, which is used during tape LOADs and SAVEs. Be sure to press RUN/STOP-RESTORE before you save or load a program, to get the Proofreader out of the way. If you want to use the Proofreader with tape, run the Proofreader, then enter these two lines *exactly* as shown, pressing RETURN after each one:

```
A$="PROOFREADER.T":B$="{10 SPACES}"
:FORX=1TO4:A$=A$+B$:NEXT
FORX=886TO1018:A$=A$+CHR$(PEEK(X))
:NEXT:OPEN 1,1,A$:CLOSE1
```

Then press RECORD and PLAY on a blank tape, and a special version of the Proofreader will be saved to tape. Anytime you need to reload the Proofreader after it has been erased, just rewind the tape, type OPEN1:CLOSE1, then press PLAY. When READY comes back, enter SYS 886.

## IBM Proofreader Commands

Since the IBM Proofreader replaces the computer's normal BASIC line editor, it has to include

many of the direct-mode IBM BASIC commands. The syntax is identical to IBM BASIC. Commands simulated are LIST, LLIST, NEW, FILES, SAVE, and LOAD. When listing your program, press any key (except Ctrl-Break) to stop the listing. If you enter NEW, the Proofreader will prompt you to press Y to be especially sure you mean yes.

Two new commands are BASIC and CHECK. BASIC exits the Proofreader back to IBM BASIC, leaving the Proofreader in memory. CHECK works just like LIST, but shows the checksums along with the listing. After you have typed in a program, save it to disk. Then exit the Proofreader with the BASIC command, and load the program into the normal BASIC environment (this will replace the Proofreader in memory). You can now run the program, but you may want to resave it to disk. This will shorten it on disk and make it load faster, but it can no longer be edited with the Proofreader. If you want to convert a program to Proofreader format, save it to disk with SAVE "filename",A.

## VIC/64 Proofreader

```
100 PRINT "{CLR}PLEASE WAIT...":FORI=886TO1018:READA:CK=CK+A:POKEI,A:NEXT
110 IF CK<>17539 THEN PRINT "{DOWN}YOU MADE {SPACE}AN ERROR":PRINT "IN DATA STATEMENTS." :END
120 SYS886:PRINT "{CLR}{2 DOWN}PROOFREADER ACTIVATED." :NEW
886 DATA 173,036,003,201,150,208
892 DATA 001,096,141,151,003,173
898 DATA 037,003,141,152,003,169
904 DATA 150,141,036,003,169,003
910 DATA 141,037,003,169,000,133
916 DATA 254,096,032,087,241,133
922 DATA 251,134,252,132,253,008
928 DATA 201,013,240,017,201,032
934 DATA 240,005,024,101,254,133
940 DATA 254,165,251,166,252,164
946 DATA 253,040,096,169,013,032
952 DATA 210,255,165,214,141,251
958 DATA 003,206,251,003,169,000
964 DATA 133,216,169,019,032,210
970 DATA 255,169,018,032,210,255
976 DATA 169,058,032,210,255,166
982 DATA 254,169,000,133,254,172
988 DATA 151,003,192,087,208,006
994 DATA 032,205,189,076,235,003
1000 DATA 032,205,221,169,032,032
1006 DATA 210,255,032,210,255,173
1012 DATA 251,003,133,214,076,173
1018 DATA 003
```

## Atari Proofreader

```
100 GRAPHICS 0
110 FOR I=1536 TO 1700:READ A:POKE I,A:CK=CK+A:NEXT I
120 IF CK<>19072 THEN ? "Error in DATA Statements. Check Typing." :END
130 A=USR(1536)
140 ? : ? "Automatic Proofreader Now Activated."
```



```

150 END
1536 DATA 104,160,0,185,26,3
1542 DATA 201,69,240,7,200,200
1548 DATA 192,34,208,243,96,200
1554 DATA 169,74,153,26,3,200
1560 DATA 169,6,153,26,3,162
1566 DATA 0,189,0,228,157,74
1572 DATA 6,232,224,16,208,245
1578 DATA 169,93,141,78,6,169
1584 DATA 6,141,79,6,24,173
1590 DATA 4,228,105,1,141,95
1596 DATA 6,173,5,228,105,0
1602 DATA 141,96,6,169,0,133
1608 DATA 203,96,247,238,125,241
1614 DATA 93,6,244,241,115,241
1620 DATA 124,241,76,205,238,0
1626 DATA 0,0,0,0,32,62
1632 DATA 246,8,201,155,240,13
1638 DATA 201,32,240,7,72,24
1644 DATA 101,203,133,203,104,40
1650 DATA 96,72,152,72,138,72
1656 DATA 160,0,169,128,145,88
1662 DATA 200,192,40,208,249,165
1668 DATA 203,74,74,74,74,24
1674 DATA 105,161,160,3,145,88
1680 DATA 165,203,41,15,24,105
1686 DATA 161,200,145,88,169,0
1692 DATA 133,203,104,170,104,168
1698 DATA 104,40,96

```

## IBM Proofreader

```

10 'Automatic Proofreader Version 2.00 (L
    ines 270,510,515,517,620,630 changed f
    rom V1.0)
100 DIM L$(500),LNUM(500):COLOR 0,7,7:KEY
    OFF:CLS:MAX=0:LNUM(0)=65536!
110 ON ERROR GOTO 120:KEY 15,CHR$(4)+CHR$(
    70):ON KEY(15) GOSUB 640:KEY (15) ON
    :GOTO 130
120 RESUME 130
130 DEF SEG=&H40:W=PEEK(&H4A)
140 ON ERROR GOTO 650:PRINT:PRINT"Proofre
    ader Ready."
150 LINE INPUT L$:Y=CSRLIN-INT(LEN(L$)/W)
    -1:LOCATE Y,1
160 DEF SEG=0:POKE 1050,30:POKE 1052,34:P
    OKE 1054,0:POKE 1055,79:POKE 1056,13:
    POKE 1057,28:LINE INPUT L$:DEF SEG:IF
    L$="" THEN 150
170 IF LEFT$(L$,1)="" THEN L$=MID$(L$,2)
    :GOTO 170
180 IF VAL(LEFT$(L$,2))=0 AND MID$(L$,3,1
    )="" THEN L$=MID$(L$,4)
190 LNUM=VAL(L$):TEXT$=MID$(L$,LEN(STR$(L
    NUM))+1)
200 IF ASC(L$)>57 THEN 260 'no line numbe
    r, therefore command
210 IF TEXT$="" THEN GOSUB 540:IF LNUM=LNU
    M(P) THEN GOSUB 560:GOTO 150 ELSE 15
    0
220 CKSUM=0:FOR I=1 TO LEN(L$):CKSUM=(CKS
    UM+ASC(MID$(L$,I)))*I AND 255:NEXT:LO
    CATE Y,1:PRINT CHR$(65+CKSUM/16)+CHR$(
    65+(CKSUM AND 15))+""+L$
230 GOSUB 540:IF LNUM(P)=LNUM THEN L$(P)=
    TEXT$:GOTO 150 'replace line
240 GOSUB 580:GOTO 150 'insert the line
260 TEXT$="":FOR I=1 TO LEN(L$):A=ASC(MID
    $(L$,I)):TEXT$=TEXT$+CHR$(A+32*(A>96
    AND A<123)):NEXT

```

```

270 DELIMITER=INSTR(TEXT$,""):COMMAND$=T
    EXT$:ARG$="":IF DELIMITER THEN COMMAN
    D$=LEFT$(TEXT$,DELIMITER-1):ARG$=MID$(
    TEXT$,DELIMITER+1) ELSE DELIMITER=IN
    STR(TEXT$,CHR$(34)):IF DELIMITER THEN
    COMMAND$=LEFT$(TEXT$,DELIMITER-1):AR
    G$=MID$(TEXT$,DELIMITER)
280 IF COMMAND$<>"LIST" THEN 410
290 OPEN "scrn:" FOR OUTPUT AS #1
300 IF ARG$="" THEN FIRST=0:P=MAX-1:GOTO
    340
310 DELIMITER=INSTR(ARG$,"-"):IF DELIMITE
    R=0 THEN LNUM=VAL(ARG$):GOSUB 540:FIR
    ST=P:GOTO 340
320 FIRST=VAL(LEFT$(ARG$,DELIMITER)):LAST
    =VAL(MID$(ARG$,DELIMITER+1))
330 LNUM=FIRST:GOSUB 540:FIRST=P:LNUM=LAS
    T:GOSUB 540:IF P=0 THEN P=MAX-1
340 FOR X=FIRST TO P:N$=MID$(STR$(LNUM(X)
    ),2)+""
350 IF CKFLAG=0 THEN A$="":GOTO 370
360 CKSUM=0:A$=N$+L$(X):FOR I=1 TO LEN(A$
    ):CKSUM=(CKSUM+ASC(MID$(A$,I)))*I AND
    255:NEXT:A$=CHR$(65+CKSUM/16)+CHR$(6
    5+(CKSUM AND 15))+""
370 PRINT #1,A$+N$+L$(X)
380 IF INKEY$<>" " THEN X=P
390 NEXT :CLOSE #1:CKFLAG=0
400 GOTO 130
410 IF COMMAND$="LLIST" THEN OPEN "lpt1:"
    FOR OUTPUT AS #1:GOTO 300
420 IF COMMAND$="CHECK" THEN CKFLAG=1:GOT
    O 290
430 IF COMMAND$<>"SAVE" THEN 450
440 GOSUB 600:OPEN ARG$ FOR OUTPUT AS #1:
    ARG$="":GOTO 300
450 IF COMMAND$<>"LOAD" THEN 490
460 GOSUB 600:OPEN ARG$ FOR INPUT AS #1:M
    AX=0:P=0
470 WHILE NOT EOF(1):LINE INPUT #1,L$:LNU
    M(P)=VAL(L$):L$(P)=MID$(L$,LEN(STR$(V
    AL(L$))+1):P=P+1:WEND
480 MAX=P:CLOSE #1:GOTO 130
490 IF COMMAND$="NEW" THEN INPUT "Erase p
    rogram - Are you sure";L$:IF LEFT$(L$
    ,1)="y" OR LEFT$(L$,1)="Y" THEN MAX=0
    :GOTO 130:ELSE 130
500 IF COMMAND$="BASIC" THEN COLOR 7,0,0:
    ON ERROR GOTO 0:CLS:END
510 IF COMMAND$<>"FILES" THEN 520
515 IF ARG$="" THEN ARG$="A:" ELSE SEL=1:
    GOSUB 600
517 FILES ARG$:GOTO 130
520 PRINT"Syntax error":GOTO 130
540 P=0:WHILE LNUM>LNUM(P) AND P<MAX:P=P+
    1:WEND:RETURN
560 MAX=MAX-1:FOR X=P TO MAX:LNUM(X)=LNUM
    (X-1):L$(X)=L$(X-1):NEXT:RETURN
580 MAX=MAX+1:FOR X=MAX TO P+1 STEP -1:LNU
    M(X)=LNUM(X-1):L$(X)=L$(X-1):NEXT:L$
    (P)=TEXT$:LNUM(P)=LNUM:RETURN
600 IF LEFT$(ARG$,1)<>CHR$(34) THEN 520 E
    LSE ARG$=MID$(ARG$,2)
610 IF RIGHT$(ARG$,1)=CHR$(34) THEN ARG$=
    LEFT$(ARG$,LEN(ARG$)-1)
620 IF SEL=0 AND INSTR(ARG$,".")=0 THEN A
    RG$=ARG$+".BAS"
630 SEL=0:RETURN
640 CLOSE #1:CKFLAG=0:PRINT"Stopped.":RET
    URN 150
650 PRINT "Error #";ERR:RESUME 150

```



# MLX Machine Language Entry Program For Commodore 64

Charles Brannon, Program Editor

*MLX is a labor-saving utility that allows almost fail-safe entry of machine language programs published in COMPUTE!. You need to know nothing about machine language to use MLX—it was designed for everyone.*

MLX is a new way to enter long machine language (ML) programs with a minimum of fuss. MLX lets you enter the numbers from a special list that looks similar to BASIC DATA statements. It checks your typing on a line-by-line basis. It won't let you enter illegal characters when you should be typing numbers. It won't let you enter numbers greater than 255 (forbidden in ML). It won't let you enter the wrong numbers on the wrong line. In addition, MLX creates a ready-to-use tape or disk file.

## Using MLX

Type in and save the appropriate version of MLX (you'll want to use it in the future). When you're ready to type in an ML program, run MLX. MLX for the 64 asks you for two numbers: the starting address and the ending address. These numbers are given in the article accompanying the ML program.

When you run MLX, you'll see a prompt corresponding to the starting address. The prompt is the current line you are entering from the listing. It increases by six each time you enter a line. That's because each line has seven numbers—six actual data numbers plus a *checksum number*. The checksum verifies that you typed the previous six numbers correctly. If you enter any of the six numbers wrong, or enter the checksum wrong, the computer rings a buzzer and prompts you to reenter the line. If you enter it correctly, a bell tone sounds and you continue to the next line.

MLX accepts only numbers as input. If you make a typing error, press the INST/DEL key; the entire number is deleted. You can press it as many times as necessary back to the start of the line. If you enter three-digit numbers as listed, the computer automatically prints the comma and goes on to accept the next number. If you enter less than three digits, you can press either the space bar or RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

To simplify your typing, 64 MLX redefines part of the keyboard as a numeric keypad (lines

581-584):

U	I	O		7	8	9
H	J	K	L	become	0	4 5 6
M					1	2 3

## 64 MLX Commands

When you finish typing an ML listing (assuming you type it all in one session) you can then save the completed program on tape or disk. Follow the screen instructions. If you get any errors while saving, you probably have a bad disk, or the disk is full, or you've made a typo when entering the MLX program itself.

You don't have to enter the whole ML program in one sitting. MLX lets you enter as much as you want, save it, and then reload the file from tape or disk later. MLX recognizes these commands:

SHIFT-S: Save  
SHIFT-L: Load  
SHIFT-N: New Address  
SHIFT-D: Display

When you enter a command, MLX jumps out of the line you've been typing, so we recommend you do it at a new prompt. Use the Save command to save what you've been working on. It will save on tape or disk, as if you've finished, but the tape or disk won't work, of course, until you finish the typing. Remember what address you stop at. The next time you run MLX, answer all the prompts as you did before, then insert the disk or tape. When you get to the entry prompt, press SHIFT-L to reload the partly completed file into memory. Then use the New Address command to resume typing.

To use the New Address command, press SHIFT-N and enter the address where you previously stopped. The prompt will change, and you can then continue typing. Always enter a New Address that matches up with one of the line numbers in the special listing, or else the checksum won't work. The Display command lets you display a section of your typing. After you press SHIFT-D, enter two addresses within the line number range of the listing. You can abort the listing by pressing any key.

## 64 MLX: Machine Language Entry

```
10 REM LINES CHANGED FROM MLX VERSION 2.0
   0 ARE 750,765,770 AND 860           :rem 50
20 REM LINE CHANGED FROM MLX VERSION 2.01
   IS 300                               :rem 147
100 PRINT "{CLR}[63]";CHR$(142);CHR$(8);:PO
    KE53281,1:POKE53280,1              :rem 67
```



```

101 POKE 788,52:REM DISABLE RUN/STOP
:rem 119
110 PRINT"[RVS]{39 SPACES}"; :rem 176
120 PRINT"[RVS]{14 SPACES}{RIGHT}{OFF}{*}
£{RVS}{RIGHT}{RIGHT}{2 SPACES}{*}
{OFF}{*}£{RVS}£{RVS}{14 SPACES}";
:rem 250
130 PRINT"[RVS]{14 SPACES}{RIGHT}{G}
{RIGHT}{2 RIGHT}{OFF}£{RVS}£{*}
{OFF}{*}{RVS}{14 SPACES}"; :rem 35
140 PRINT"[RVS]{41 SPACES}"; :rem 120
200 PRINT"[2 DOWN]{PUR}{BLK} MACHINE LANG
UAGE EDITOR VERSION 2.02{5 DOWN}"
:rem 238
210 PRINT"[5]{2 UP}STARTING ADDRESS?
{8 SPACES}{9 LEFT}"; :rem 143
215 INPUTS:F=1-F:C$=CHR$(31+119*F)
:rem 166
220 IFS<256OR(S>40960ANDS<49152)ORS>53247
THENGOSUB3000:GOTO210 :rem 235
225 PRINT:PRINT:PRINT :rem 180
230 PRINT"[5]{2 UP}ENDING ADDRESS?
{8 SPACES}{9 LEFT}";:INPUTE:F=1-F:C$=
CHR$(31+119*F) :rem 20
240 IFE<256OR(E>40960ANDE<49152)ORE>53247
THENGOSUB3000:GOTO230 :rem 183
250 IFE<STHENPRINTC$;"{RVS}ENDING < START
{2 SPACES}":GOSUB1000:GOTO 230
:rem 176
260 PRINT:PRINT:PRINT :rem 179
300 PRINT"[CLR]";CHR$(14):AD=S :rem 56
310 A=1:PRINTRIGHT$("0000"+MID$(STR$(AD),
2),5);":": :rem 33
315 FORJ=ATO6 :rem 33
320 GOSUB570:IFN=-1 THENJ=J+N:GOTO320
:rem 228
390 IFN=-211 THEN 710 :rem 62
400 IFN=-204 THEN 790 :rem 64
410 IFN=-206 THENPRINT:INPUT"{DOWN}ENTER N
EW ADDRESS";ZZ :rem 44
415 IFN=-206 THENIFZZ<SORZZ>ETHENPRINT"
{RVS}OUT OF RANGE":GOSUB1000:GOTO410
:rem 225
417 IFN=-206 THENAD=ZZ:PRINT:GOTO310
:rem 238
420 IF N<>-196 THEN 480 :rem 133
430 PRINT:INPUT"DISPLAY:FROM";F:PRINT,"TO
";:INPUTT :rem 234
440 IFF<SORF>EORT<SORT>ETHENPRINT"AT LEAS
T";S;"{LEFT}, NOT MORE THAN";E:GOTO43
0 :rem 159
450 FORI=FTOTSTEP6:PRINT:PRINTRIGHT$("000
0"+MID$(STR$(I),2),5);":": :rem 30
451 FORK=0TO5:N=PEEK(I+K):PRINTRIGHT$("00
"+MID$(STR$(N),2),3);":": :rem 66
460 GETA$:IFA$>" "THENPRINT:PRINT:GOTO310
:rem 25
470 NEXTK:PRINTCHR$(20);:NEXTI:PRINT:PRIN
T:GOTO310 :rem 50
480 IFN<0 THEN PRINT:GOTO310 :rem 168
490 A(J)=N:NEXTJ :rem 199
500 CKSUM=AD-INT(AD/256)*256:FORI=1TO6:CK
SUM=(CKSUM+A(I))AND255:NEXT :rem 200
510 PRINTCHR$(18);:GOSUB570:PRINTCHR$(146
); :rem 94
511 IFN=-1 THENA=6:GOTO315 :rem 254
515 PRINTCHR$(20):IFN=CKSUMTHEN530
:rem 122
520 PRINT:PRINT"LINE ENTERED WRONG : RE-E
NTER":PRINT:GOSUB1000:GOTO310:rem 176
530 GOSUB2000 :rem 218
540 FORI=1TO6:POKEAD+I-1,A(I):NEXT:POKE54
272,0:POKE54273,0 :rem 227
550 AD=AD+6:IF AD<E THEN 310 :rem 212
560 GOTO 710 :rem 108
570 N=0:Z=0 :rem 88
580 PRINT"[£]"; :rem 81
581 GETA$:IFA$=" "THEN581 :rem 95
582 AV=- (A$="M")-2*(A$=",")-3*(A$=".")-4*
(A$="J")-5*(A$="K")-6*(A$="L"):rem 41
583 AV=AV-7*(A$="U")-8*(A$="I")-9*(A$="O")
:IFA$="H"THENA$="0" :rem 134
584 IFAV>0THENA$=CHR$(48+AV) :rem 134
585 PRINTCHR$(20);:A=ASC(A$):IFA=13ORA=44
ORA=32THEN670 :rem 229
590 IFA>128THENN=-A:RETURN :rem 137
600 IFA<20 THEN 630 :rem 10
610 GOSUB690:IFI=1ANDT=44THENN=-1:PRINT"
{OFF}{LEFT}{LEFT}";:GOTO690 :rem 62
620 GOTO570 :rem 109
630 IFA<48ORA>57THEN580 :rem 105
640 PRINTA$;:N=N*10+A-48 :rem 106
650 IFN>255 THEN A=20:GOSUB1000:GOTO600
:rem 229
660 Z=Z+1:IFZ<3THEN580 :rem 71
670 IFZ=0THENGOSUB1000:GOTO570 :rem 114
680 PRINT",";:RETURN :rem 240
690 S$=PEEK(209)+256*PEEK(210)+PEEK(211)
:rem 149
691 FORI=1TO3:T=PEEK(S$-I) :rem 67
695 IFT<>44ANDT<>58THENPOKES$-I,32:NEXT
:rem 205
700 PRINTLEFT$("{3 LEFT}",I-1);:RETURN
:rem 7
710 PRINT"[CLR]{RVS}*** SAVE ***{3 DOWN}"
:rem 236
715 PRINT"{2 DOWN}(PRESS {RVS}RETURN{OFF}
ALONE TO CANCEL SAVE){DOWN}";:rem 106
720 F$="":INPUT"{DOWN} FILENAME";F$:IFF$=
""THENPRINT:PRINT:GOTO310 :rem 71
730 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
{RVS}D{OFF}ISK: (T/D)" :rem 228
740 GETA$:IFA$<>"T"ANDAS$<>"D"THEN740
:rem 36
750 DV=1-7*(A$="D"):IFDV=8THENF$="0":+F$:
OPEN15,8,15,"S"+F$:CLOSE15 :rem 212
760 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$
):POKE782,ZK/256 :rem 3
762 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
T$):SYS65469 :rem 109
763 POKE780,1:POKE781,DV:POKE782,1:SYS654
66 :rem 69
765 K=S:POKE254,K/256:POKE253,K-PEEK(254)
*256:POKE780,253 :rem 17
766 K=E+1:POKE782,K/256:POKE781,K-PEEK(78
2)*256:SYS65496 :rem 235
770 IF(PEEK(783)AND1)OR(191ANDST)THEN780
:rem 111
775 PRINT"{DOWN}DONE.{DOWN}":GOTO310
:rem 113
780 PRINT"{DOWN}ERROR ON SAVE.{2 SPACES}T
RY AGAIN.":IFDV=1THEN720 :rem 171
781 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTEL$
;E2$:CLOSE15:GOTO720 :rem 103
790 PRINT"[CLR]{RVS}*** LOAD ***{2 DOWN}"
:rem 212
795 PRINT"{2 DOWN}(PRESS {RVS}RETURN{OFF}
ALONE TO CANCEL LOAD)" :rem 82
800 F$="":INPUT"{2 DOWN} FILENAME";F$:IFF
$=""THENPRINT:GOTO310 :rem 144
810 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
{RVS}D{OFF}ISK: (T/D)" :rem 227
820 GETA$:IFA$<>"T"ANDAS$<>"D"THEN820
:rem 34

```



```

830 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$
      :rem 157
840 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$)
      :POKE782,ZK/256
      :rem 2
841 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
      T$):SYS65469
      :rem 107
845 POKE780,1:POKE781,DV:POKE782,1:SYS654
      66
      :rem 70
850 POKE780,0:SYS65493
      :rem 11
860 IF(PEEK(783)AND1)OR(191ANDST)THEN870
      :rem 111
865 PRINT"{DOWN}DONE.":GOTO310
      :rem 96
870 PRINT"{DOWN}ERROR ON LOAD.{2 SPACES}T
      RY AGAIN.{DOWN}":IFDV=1THEN800
      :rem 172
880 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTE1$
      ;E2$:CLOSE15:GOTO800
      :rem 102

```

```

1000 REM BUZZER
      :rem 135
1001 POKE54296,15:POKE54277,45:POKE54278,
      165
      :rem 207
1002 POKE54276,33:POKE 54273,6:POKE54272,
      5
      :rem 42
1003 FORT=1TO200:NEXT:POKE54276,32:POKE54
      273,0:POKE54272,0:RETURN
      :rem 202
2000 REM BELL SOUND
      :rem 78
2001 POKE54296,15:POKE54277,0:POKE54278,2
      47
      :rem 152
2002 POKE 54276,17:POKE54273,40:POKE54272
      ,0
      :rem 86
2003 FORT=1TO100:NEXT:POKE54276,16:RETURN
      :rem 57
3000 PRINTC$;"{RVS}NOT ZERO PAGE OR ROM":
      GOTO1000
      :rem 89

```

# CAPUTE!

Modifications Or Corrections To Previous Articles

## VIC TurboTape

In both the VIC and 64 versions of this high-speed tape utility from the January 1985 issue (p. 124), location \$8B (139) is used for temporary storage. On both computers this is the first of five bytes (\$8B-\$8F) that hold a *seed value* for the random number generator. TurboTape's use of this location does not appear to cause problems for the 64, but it introduces a bug in the VIC version with some programs. When a program containing the function RND(1) is TurboTaped and run, an *OVERFLOW ERROR* results because the TurboTape routine leaves a value in \$8B that produces a random number that is too large.

There are several simple ways to prevent this. First, you could change all occurrences of RND(1) to RND(-1) so that the random number generator will take its seed value from the software timer. This should not significantly alter the operation of any program using random numbers. Alternatively, reader Brian Mason notes that you could add the statement POKE 139,128 before the first RND(1) to return location \$8B to its proper value. If you'd like to change VIC TurboTape itself so that this problem is avoided, Joseph Kovalik suggests changing all references to location \$8B to the otherwise unused location \$FB. To accomplish this, change the following lines in the generator program (Program 2) and create a new version of TurboTape to replace the existing one:

```

50 IF CK<>123822 THEN PRINT "{RVS}ERROR D
      ETECTED IN DATA STATEMENTS":STOP
      :rem 69

```

```

4859 DATA 173,28,145,133,251,9
      :rem 215
4907 DATA 28,145,133,251,9,12
      :rem 153
4997 DATA 207,252,165,251,141,28
      :rem 57
5201 DATA 252,165,251,141,28,145
      :rem 37

```

## JTERM For Atari

Several readers have complained that lines 490, 510, and 590 of this telecommunications program from the January 1985 issue (p. 145) are too long to type in. The simple solution is to omit all spaces between the BASIC statements in those lines. For example, Atari BASIC sees no difference between POKE 702,64:INPUT SPOOL\$ and POKE702,64:INPUTSPOOL\$. Leaving out the spaces doesn't affect the Automatic Proof-reader checksum values either, since the Proof-reader ignores all spaces except those within quotes. When you list the lines, the screen editor will add spaces between the BASIC keywords so the lines will be easier to read.

The JTERM program cannot be used with the new Atari 1030 modems, since these are handled by the computer as the T: device. JTERM is designed for communications via the R: device, the designation of the older Atari 850 Interface Module to which the Atari 830 and other standard RS232 modems are connected.

## Atari Paratrooper

Line 11 of this game from the January 1985 issue (p. 70) has the same line-length problem as JTERM, and the same solution applies. Simply omit all spaces between the statements.

## TI Guitar Tuner

Line 280 of this music utility from the January 1985 issue (p. 100) is acceptable in Extended BASIC, but is too long to be typed in with regular console BASIC. To remedy this, break the line into two parts as shown:

```

280 A=- (A$="e") -2*(A$="a") -3*(A$="d
      ") -4*(A$="g") -5*(A$="b") -6*(A$=
      CHR$(133)) -7*(A$="E") -8*(A$="A")
      -9*(A$="D")
285 A=A-10*(A$="G") -11*(A$="B")

```



# NEWS & PRODUCTS



The Okimate 20 printer for IBM PCs and compatibles offers letter-quality, color printing for \$268. From Okidata.

## New IBM, Apple Printers

Okidata has introduced the Okimate 20, a letter-quality, color printer for the IBM PC and PC compatibles, and the Microline 182, a dot-matrix printer for IBM and Apple computers, both of which retail for under \$300.

The Okimate 20 (\$268) uses a thermal transfer printing process to create full color screen dumps on virtually any kind of paper. Two software programs, *Learn to Print* and *Color Screen Print*, are included. It prints 80 characters per second in draft mode, and 40 cps in letter-quality mode. The Microline 182 (\$299) prints 120 cps in utility-quality printing, and 60 cps for enhanced printing.

Okidata, 532 Fellowship Rd., Mt. Laurel, NJ 08054

Circle Reader Service Number 200.

## Commodore Software, Books

Thirteen new titles for the Commodore 64, encompassing books, language and development software, and productivity packages, have been announced by Abacus Software.

New programs are: *Ada Training*

*Course; BASIC-64 Compiler; C Language Compiler; Fortran Compiler; Video Basic Development; Cadpak-64 (design package); Chartpak-64 (charting package); Datamat-64 (data management program); and Power Plan-64, a spreadsheet with graphics. New book titles include: Cassette Book for C-64; More Tricks & Tips for C-64; Peeks & Pokes for C-64; and Turbo Pascal Training Guide.*

Abacus Software, 2201 Kalamazoo S.E., P.O. Box 7211, Grand Rapids, MI 49510

Circle Reader Service Number 201.

## Typing Program Update

An update of the popular typing instruction program *MasterType* has been announced by Scarborough Systems. The new version, *New Improved MasterType*, teaches basic and advanced typing and keyboard skills with a space-age game.

The program has 18 difficulty levels and is suitable for ages six through adult. Versions are available on disk for the Apple II family of computers, IBM PC-XT and PCjr, and Commodore 64 (\$39.95 each). A version for the Apple Macintosh is available for \$49.95. Cartridge formats for the Commodore 64 and Atari computers also are available.

Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, NY 10591

Circle Reader Service Number 202.

## Apple, Atari Educational Programs

Three educational programs that teach geography, history, and social studies have been announced by Rand McNally & Company for Apple II and Atari computers.

*Unlocking the Map Code* teaches geography and map reading skills. It is targeted for students in grades four through six. In *Time and Seasons*, students in grades seven through nine learn the various seasonal and time differences around the world. *Choice or Chance?* helps students understand and comprehend the reasons behind historical happenings in light of geography. Also targeted for grades seven through

nine, it covers three eras in history: exploration, westward movement, and industrialization.

Each program retails for \$111.

Rand McNally & Co., P.O. Box 7600, Chicago, IL 60680

Circle Reader Service Number 203.

## Games, Graphics Software

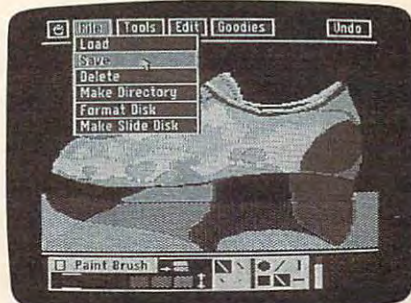
Brøderbund Software has announced a new graphics package, *Dazzle Draw*, for the Apple IIc and Apple IIe with 128K of memory, as well as an update of its *Print Shop* graphics package for the Apple II family and the Commodore 64. The firm also has released three new games, *Karateka*, *The Ancient Art of War*, and *The Serpent's Star*.

*The Print Shop Graphics Library Disk 1* (\$24.95) adds 120 designs, pictures, and symbols to the *Print Shop* program. *Dazzle Draw* (\$59.95) uses mouse control, icons, and pull-down menus to select various program functions. It requires an 80-column card, a Revision "B" board, and one disk drive.

*The Serpent's Star* (\$39.95, for Atari computers and the Commodore 64), an adventure game with animated graphics, is a sequel to *Mask of the Sun*. *Karateka* (\$34.95; for Apple II computers and the Commodore 64) is a karate game. *The Ancient Art of War* (\$44.95) is a strategy game for the IBM PC, PCjr, PC-XT, and compatibles.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903

Circle Reader Service Number 204.



Brøderbund Software's new program, *Dazzle Draw*, lets you create colorful graphics with an Apple II computer.



# COMPUTE! Back Issues

Here are some of the applications, tutorials, and games from available back issues of COMPUTE!. Each issue contains much, much more than there's space here to list, but here are some highlights:

**Home and Educational COMPUTING!** (Summer 1981 and Fall 1981—count as one back issue): Exploring The Rainbow Machine, VIC As Super Calculator, Custom Characters On The VIC, Alternative Screens, Automatic VIC Line Numbers, Using The Joystick (Spacewar Game), Fast VIC Tape Locator, Window, VIC Memory Map.

**May 1981:** Named GOSUB/GOTO in Applesoft, Generating Lower Case Text on Apple II, Copy Atari Screens to the Printer, Disk Directory Printer for Atari, Realtime Clock on Atari, PET BASIC Delete Utility, PET Calculated Bar Graphs, Running 40 Column Programs on a CBM 8032, A Fast Visible Memory Dump, Cassette Filing System, Getting To A Machine Language Program, Epidemic Simulation.

**June 1981:** Computer Using Educators (CUE) on Software Pricing, Apple II Hires Character Generator, Ever Expanding Apple Power, Color Burst for Atari, Mixing Atari Graphics Modes 0 and 8, Relocating PET BASIC Programs, An Assembler In BASIC for PET, Quadra PET: Multitasking?, Mapping Unknown Machine Language, RAM/ROM Memory, Keeping TABs on a Printer.

**July 1981:** Home Heating and Cooling, Animating Integer BASIC Loops Graphics, The Apple Hires Shape Writer, Adding a Voice Track to Atari Programs, Machine Language Atari Joystick Driver, Four Screen Utilities for the PET, Saving Machine Language Programs on PET Tape Headers, Commodore ROM Systems, Using TAB, SPC, And LEN.

**August 1981:** Minimize Code and Maximize Speed, Apple Disk Motor Control, A Cassette Tape Monitor for the Apple, Easy Reading of the Atari Joystick, Blockade Game for the Atari, Atari Sound Utility, The CBM "Fat 40," Keyword for PET, CBM/PET Loading, Chaining, and Overlaying, Adding A Programmable Sound Generator, Converting PET BASIC Programs To ASCII Files.

**October 1981:** Automatic DATA Statements for CBM and Atari, VIC News, Undeletable Lines on Apple, PET, and VIC; Budgeting on the Apple, Atari Cassette Boot-tapes, Atari Variable Name Utility, Atari Program Library, Train Your PET to Run VIC Programs, Interface a BSR Remote Control System to PET, A General Purpose BCD to Binary Routine, Converting to Fat-40 PET.

**December 1981:** Saving Fuel \$\$ (multiple computers), Unscramble Game (multiple computers), Maze Generator (multiple computers), Animating Applesoft Graphics, A Simple Atari Word Processor, Adding High Speed Vertical Positioning to Atari P/M Graphics, OSI Supercursor, A Look At SuperPET, Supermon for PET/CBM, PET Mine Maze Game, Replacing The INPUT # Command, Foreign Language Text on The Commodore Printer, File Recovery.

**January 1982:** Invest (multiple computers), Developing a Business Algorithm (multiple computers), Apple Addresses, Lowercase with Unmodified Apple, Cryptogram Game for Atari, Superfont: Design Special Character Sets on Atari, PET Repairs for the Amateur, Micromon for PET, Self-modifying Programs in PET BASIC, Tinymon: A VIC Monitor, VIC Color Tips, VIC Memory Map, ZAP: A VIC Game.

**May 1982:** VIC Meteor Maze Game, Atari Disk Drive Speed Check,

Modifying Apple's Floating Point BASIC, Fast Sort For PET/CBM, Extra Atari Colors Through Artifacting, Life Insurance Estimator (multiple computers), PET Screen Input, Getting The Most Out Of VIC's 5000 Bytes.

**August 1982:** The New Wave Of Personal Computers, Household Budget Manager (multiple computers), Word Games (multiple computers), Color Computer Home Energy Monitor, A VIC Light Pen For Under \$10, Guess That Animal (multiple computers), PET/CBM Inner BASIC, VIC Communications, Keyprint Compendium, Animation With Atari, VIC Curiosities, Atari Substring Search, PET and VIC Electric Eraser.

**September 1982:** Apple and Atari and the Sounds of TRON, Commodore Automatic Disk Boot, VIC Joysticks, Three Atari GTIA Articles, Commodore Disk Fixes, The Apple PILOT Language, Sprites and Sound on the Commodore 64, Peripheral Vision Exerciser (multiple computers), Banish INPUT Statements (multiple computers), Charades (multiple computers), PET Pointer Sort, VIC Pause, Mapping Machine Language, Commodore User-defined Functions Defined, A VIC Bug.

**January 1983:** Sound Synthesis And The Personal Computer, Juggler And Thunderbird Games (multiple computers), Music And Sound Programs (multiple computers), Writing Transportable BASIC, Home Energy Calculator (multiple computers), All About Commodore WAIT, Supermon 64, Perfect Commodore INPUTs, VIC Sound Generator, Copy VIC Disk Files, Commodore 64 Architecture.

**May 1983:** The New Low-Cost Printer/Plotters, Jumping Jack (multiple computers), Deflector (multiple computers), VIC Kaleidoscope, Graphics on the Sinclair/Timex,



# COMPUTE! Back Issues

Bootmaker For VIC, PET and 64, VICSTATION: A "Paperless Office," The Atari Musician, Puzzle Generator (multiple computers), Instant 64 Art, 64 Odds And Ends, Versatile VIC Data Acquisition, POP For Commodore.

**June 1983:** How To Buy The Right Printer, The New, Low-Cost Printers, Astrostorm (multiple computers), The Hawkmen Of Dindrin (multiple computers), MusicMaster For The Commodore 64, Commodore Data Searcher, Atari Player/Missile Graphics Simplified, VIC Power Spirals, UnNEW For The VIC and 64, Atari Fast Shuffle, VIC Contractor, Commodore Supermon Q & A.

**July 1983:** Constructing The Ideal Computer Game, Techniques For Writing Your Own Adventure Game, SpeedSki And Time Bomb (VIC), Castle Quest And Roadblock (Atari), RATS! And Goblin (64), How To Create A Data Filing System (multiple computers), How To Back Up Disks For VIC And 64, Atari Artifacts, All About The Commodore USR Command, TI Mailing List.

**August 1983:** Weather Forecaster (multiple computers), First Math And Clues (multiple computers), Converting VIC And 64 Programs To PET, Atari Verify, Apple Bytechanger, VIC And 64 Escape Key, Banish Atari INPUT Statements, Mixing Graphics Modes On The 64, VICplot, VIC/64 Translations: Reading The Keyboard, Musical Atari Keyboard, VIC Display Messages.

**September 1983:** Games That Teach, Caves Of Ice, Diamond Drop, Mystery Spell, and Dots (multiple computers), VIC Pilot, Ultrasort (VIC, 64, PET), Easy Atari Page Flipping, Computer Aided Design On The TI, Relative Files On the VIC/64, Atari Fontbyter, TI

Sprite Editor, All About Interrupts (multiple computers), Cracking The 64 Kernal, Making Change On The Timex/Sinclair, Build Your Own Random File Manager (multiple computers).

**October 1983:** Computer Games By Phone, Coupon File (multiple computers), Dragon Master And Moving Maze (multiple computers), Merging Programs From Commodore Disks, Atari Master Disk Directory, Sprites In TI Extended BASIC, Commodore EXEC, Multicolor Atari Character Editor, High Speed Commodore Mazer, Apple Sounds, Extra Instructions (multiple computers), Commodore DOS Wedges, Invisible Disk Directory For VIC And 64.

**February 1984:** What Makes A Good Game, Circus (multiple computers), Quatrainment (multiple computers), Commodore 3-D Drawing Master (Apple version also included), Speedy BASIC For VIC And 64, Dr. Video 64.

**March 1984:** All About Adding Peripherals, Modern Memory: The Future Of Storage Devices, Roader (multiple computers), Barrier Battle (multiple computers), Programming The TI: File Processing, Sound Shaper (multiple computers), Commodore Floating Subroutines, Big Buffer For Atari.

**April 1984:** Apple's Macintosh Unveiled, Securities Analysis (multiple computers), Worm Of Bemer (multiple computers), Programming The TI: File Processing, Part 2, 1540/1541 Disk Housekeeping, Hidden Atari DOS Commands, Function Keys For The Apple, TI Tricks And Tips, Super Directory (multiple computers).

**May 1984:** The Digital Palette: Fundamentals Of Computer Graphics, The Inside Story: How Graphics

Tablets And Light Pens Work, Picture Perfect For Atari And Commodore 64, 64 Hi-Res Graphics Editor, Snertle (multiple computers), Pentominos: A Puzzle-Solving Program (multiple computers), A BASIC Cross-Reference (PET, 64).

**June 1984:** Choosing The Right Printer: The Easy Way To Hard Copy, Pests (multiple computers), Olympiad (multiple computers), Programming The TI: TI Graphics, MacroDOS For Atari, Part 1, Apple Variable Save, Programming 64 Sound, Part 1, Apple Input And Menu Screens.

**July 1984:** Evolutionary To The Core: The Apple IIc Heads For Home, The ABC's Of Data Bases, Statistics For Nonstatisticians (multiple computers), Bunny Hop (multiple computers), Blueberries (multiple computers), Atari Artist, Applesoft Lister, Program Conversion With Sinclair BASIC And TI BASIC, Commodore 64 ROM Generations.

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## Games, Educational Packages

Action games and educational software for a variety of home computers have been announced by Datasoft. New titles include four action games, *Conan*, *Mr. Do!*, *Mancopter*, and *Lost Tomb*; and a series of educational games featuring the cartoon cat Heathcliff. *Mr. Do!* and *Conan* retail for \$39.95 each, while the other packages have a suggested price of \$34.95 each.

Datasoft, 19808 Nordhoff Place,  
Chatsworth, CA 91311

Circle Reader Service Number 205.

## Apple II, IBM Driving Program

CBS Software has announced *Keys to Responsible Driving* (\$79.95), a program to help youngsters ages 15 and older become responsible, defensive drivers. The program, available for the Apple II+, IIc, IIe, and IBM PC/PCjr, includes a pretest, nine topics, and a posttest. The user can assess his or her knowledge of safe driving principles with the pretest, and then work through the topics.

CBS Software, One Fawcett Place,  
Greenwich, CT 06836

Circle Reader Service Number 206.

## 64, Apple Educational Programs

*History Flash* and *Jigsaw Joggle*, two educational programs for the Commodore 64 and Apple II+ and IIe computers, have been announced by Orbyte Software at a suggested retail price of \$39.95 each.

*History Flash* leads students through 400 years of facts about the

United States, from the discovery of the New World through today. *Jigsaw Joggle* is designed to develop creative problem-solving abilities and to challenge spatial relations skills.

Orbyte Software, P.O. Box 948,  
Waterbury, CT 06720

Circle Reader Service Number 207.

## IBM Election Simulation

*President's Choice*, an educational game where the player assumes the role of a newly elected U.S. president, has been released by Spinnaker Software for IBM PCs with 128K of memory.

The objective of the game, which has a suggested retail price of \$39.95, is to manage the national economy to win reelection. The game is based on 20 years of actual government statistics. Versions for the Apple II family of computers and the Commodore 64 also are scheduled.

Spinnaker Software, One Kendall Square,  
Cambridge, MA 02139

Circle Reader Service Number 208.

## PC, Apple II Word Game

*Monty Plays Scrabble*, a computer version of the Scrabble crossword board game, has been released for the IBM PC and compatibles by Ritam Corporation. Versions for the Apple II family of computers also are available.

The game has a vocabulary of 44,000 words. It can be played by one, two, or three people at eight different skill levels. Suggested retail price is \$39.95.

Ritam Corporation, P.O. Box 921,  
Fairfield, IA 52556

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## Crosswords, Trivia For Computers

Uptown Software has announced *Compuzzler* and *Double Crostics*, two crossword computer games, and *Trivia*, a game with more than 3000 questions, for Commodore 64, Apple II-series, and IBM PC/PCjr computers.

*Compuzzler* and *Double Crostic* feature 70 puzzles each. Suggested retail price of each game is \$39.95.

Uptown Software, 310 Franklin St., Suite 339, Boston, MA 02110

Circle Reader Service Number 210.

## Productivity, Running, Educational Packages

A program for runners at every level, *The Running Program*, and a tutorial to help learn programming skills, *BASIC Building Blocks*, have been announced by Micro Education Corporation of America (MECA).

In addition, the firm has released an IBM PCjr version of its program *Managing Your Money* (suggested retail price \$199) in cartridge format. Also, registered owners of the program are being sent a free upgrade of the package. *BASIC Building Blocks* and *The Running Program* are available on disk for Apple, Atari, and IBM computers. Suggested retail price of each program is \$79.95.

Micro Education Corporation of America, 285 Riverside Ave., Westport, CT 06880

Circle Reader Service Number 211.

## Strategy Games

*Imperium Galactum*, a space strategy game for Apple and Atari computers, and *Field of Fire*, a tactical game of World War II combat for Atari and Commodore 64 computers, have been introduced by Strategic Simulations. The games have a suggested retail price of \$39.95 each.

*Imperium Galactum* features four difficulty levels. Up to four players, human or computer, try to conquer the universe and amass power through negotiations or war. In *Field of Fire*, the player leads Easy Company through many famous battles of World War II.

Strategic Simulations Inc., 883 Stierlin Rd., Bldg. A-200, Mountain View, CA 94043-1983

Circle Reader Service Number 212.

## Spelling Program

Cross Educational Software has announced *Spell-A-Vision*, a series of programs to aid poor spellers, for Apple, Commodore 64, and IBM PC

computers.

Recommended for ages ten to adult, each program contains 8000 words, with each word used in a sentence that communicates the word's meaning. Volumes 1 and 2 are one-syllable words. Volumes 3 and 4 are two-syllable words. Volume 5 asks students to choose between two words that sound alike. Volumes 6 and 7 are polysyllabic words, and volume 8 has "spelling demons." Each disk retails for \$19.95. The entire series may be purchased for \$150.

Cross Educational Software, P.O. Box 1536, Ruston, LA 71270

Circle Reader Service Number 213.

## Apple II Educational, Graphics Programs

Scholastic's software division has announced three new educational and graphics programs for the Apple II family of computers: *Survey Taker*, *Kids at Work*, and *Mystery Sentences*.

In *Mystery Sentences* (\$39.95), children's verbal and analytical skills are challenged as they try to uncover missing parts of sentences. *Survey Taker* (\$24.95) lets children take their own surveys and print out the results. With *Kids at Work* (\$24.95), children team up with a pair of animated workers to produce their own city and country scenes.

Scholastic, Inc., 730 Broadway, New York, NY 10003

Circle Reader Service Number 214.

## Apple Music Learning System

EduSoft has announced the *Magic Piano Learning System*, a package of three programs for Apple II-series computers. The package retails for \$49.95.

The programs included are *Magic Piano*, a music creativity tool; and the *Rhythm Game* and the *Melody Game*, two music skill-building programs. As users play songs on the keyboard, the program scores and displays the song on the screen. Compositions can be played back, edited, stored, or printed.

EduSoft, P.O. Box 2560, Berkeley, CA 94702

Circle Reader Service Number 215.

## Apple Half-Height Disk Drives

Microsci Corporation has introduced two half-height disk drives, the A.5 and A.5c, for the Apple II family of computers. Suggested list prices are \$269 and \$299 respectively.

The drives are less than two inches in height. Both have 143K of memory. The A.5 is 100 percent compatible with

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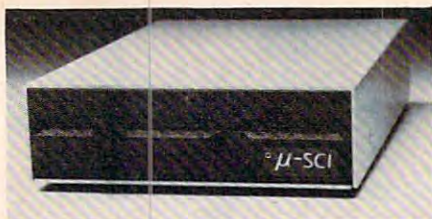
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Microsci Corporation has introduced two half-height disk drives for Apple II computers.

the Apple IIe. It can be attached directly to any Apple disk controller or to Microsci's C2 controller. The A.5c is designed as a second disk drive for the Apple IIc. It plugs directly into the machine, and also is 100 percent compatible.

Microsci Corp., 2158 S. Hathaway St., Santa Ana, CA 92705

Circle Reader Service Number 216.

### Casino Gaming Series

A series of programs designed to improve casino game skills, Caesar's Guide to Gaming, has been announced by Screenplay for IBM PC and compatibles, Apple II series, and Commodore computers.

Players will be able to use the appropriate casino house rules for such games as 21, roulette, craps, and bacarat. The rules can be modified to suit individual tastes. The first program in the series, *Blackjack*, has a suggested retail price of \$69.95.

Screenplay, Inc., 1095 Airport Rd., Minden, NV 89423

Circle Reader Service Number 217.

### IBM, Apple Tax Packages

Design Trends has released two state tax packages for the 1984 tax year which can be used with the company's *SoftTax* program for filing federal taxes. The New York tax package retails for \$300, and the package for New Jersey has a suggested price of \$250.

All *SoftTax* packages run on the IBM PC or XT and the Apple II+, IIe, and III computers. The federal program is available in three versions. The individual version contains 20 of the 1040 forms and schedules, and costs \$199. Annual updates are \$70. A professional preparer's version retails for \$499, with annual updates costing \$150. A professional version which also contains corporate, partnership, and trust returns costs \$850, with annual updates available for \$225 each.

Design Trends, Ltd., 525 S. Washington St., Naperville, IL 60540

Circle Reader Service Number 218.

### Tax Planning Program

*Tax Command Planner*, a program designed to compare the effects of financial decisions on taxes, has been released for Commodore, Apple, and IBM computers by Practical Programs.

Designed for end-of-year tax planning, the program allows the user to try different strategies to see which are best for his or her situation. Up to six strategies for periods of up to five years can be explored simultaneously. The program can be used in conjunction with *Tax Command*, a tax preparation program. Available on disk, the program retails for \$49.95 on the Commodore 64, \$99.95 for the IBM PC version, and \$79.95 for the Apple version.

Practical Programs, Inc., 625 N. Milwaukee St., P.O. Box 93104, Milwaukee, WI 53203

Circle Reader Service Number 219.

### Atari, Apple Robot Game

*Run For It*, a game which features a friendly robot, has been announced for Atari and Apple computers by Weekly Reader Family Software.

In the game, the player must help Orbit, the robot, escape from his adversaries through a series of 72 maze-like rooms, each of which contains ledges that become increasingly difficult to climb. Orbit can be reduced or expanded in size as he springs from ledge to ledge, depending upon the obstacles he faces. Suggested retail price is \$39.95. Available on disk.

Weekly Reader Family Software, Xerox Education Publications, 245 Long Hill Rd., Middletown, CT 06457

Circle Reader Service Number 220.

### Educational Typing Program

Mindscape has released *Keyboard Cadet*, a touch-typing/keyboarding skills program that features 3-D graphics for Apple, Commodore 64, and IBM computers.

*Keyboard Cadet* teaches proper hand positioning techniques, and uses animated hands to illustrate proper finger reaches. The program is designed for beginning to advanced typists. Suggested retail price is \$39.95.

Mindscape Inc., 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 221.

### Apple Speech Synthesizer

The Voice Master, a speech synthesizer originally introduced for the Commodore 64, has been released for the Apple IIe as an expansion board by Covox, Inc.

The Voice Master digitally records and plays back up to ten seconds of natural speech in any order. Up to 64 numbered words, phrases, or other sounds can be stored in memory for recall, using BASIC commands.

Complete vocabularies also can be put on disk or tape, and prerecorded vocabularies can be played back on some computers without any additional hardware.

The hardware includes a microphone and software on disk or tape, for \$89.95.

Covox, Inc., 675 Conger Street, Eugene, OR 97402

Circle Reader Service Number 222.

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# Advertisers Index

Reader Service Number	Advertiser	Page	Reader Service Number	Advertiser	Page
102	Abacus Software	40	126	Mimic Systems, Inc.	9
103	Abacus Software	62	127	Mindscape, Inc.	31
104	Abacus Software	70		NRI Schools	71
105	AB Computers	62		Okidata	18,19
106	Activision	39	128	Ortho Information Services	13
107	ADD ON Systems	158	129	Pacific Exchanges	150
	Batteries Included	27	130	Protecto Enterprises	78,79
	Batteries Included	51	130	Protecto Enterprises	80,81
	Book-of-the-Month Club, Inc.	15	130	Protecto Enterprises	82,83
108	Cardco, Inc.	IBC	131	PSI	45
	CBS Software	21	132	Quinsept, Inc.	40
	CBS Software	23	133	Sega Enterprises, Inc.	43
	CBS Software	25	134	Software Publishers Assoc.	72,73
	Commodore	BC		Starshine Group	75
109	CompuServe	7	135	Strategic Simulations Inc.	47
	ComputAbility	63	136	subLOGIC Corporation	49
110	Computel Publishing Society	150	137	Suncom	26
111	Computel Publishing Society	159	138	TAXAN	4
112	Computer Mail Order	154,155	139	Timeworks, Inc.	11
113	Cosmic Computers	153	140	Xerox Education Publications	29
	DAK Industries, Inc.	99			
	DAK Industries, Inc.	100,101			
114	Discwasher	37			
	Eastman Kodak Company	2,3			
115	Family Discount Computer				
	Products	151			
	Fidelity Brokerage Services, Inc.	26			
	Frontrunner Computer Industries	113			
116	General Electric	35			
	Happy Computers, Inc.	115			
117	Harmony Video & Computers	150			
118	Indus Systems	61			
119	Inforunner Corporation	IFC & 1			
	Jason-Ranheim	96			
120	Jensen Tools Inc.	150			
121	J & R Music World	77			
122	Legend Peripheral Products	41			
123	Lycos Computer Marketing & Consultants	156,157			
124	Micro-W Distributing, Inc.	96			
125	Micro-W Distributing, Inc.	115			

COMPUTE!'s Apple Applications	33
COMPUTE! Back Issues	148,149
COMPUTE! Binders	119
COMPUTE! Books - February Releases	64
COMPUTE! Subscriber Services	152
COMPUTE! Subscription	17



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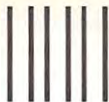
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101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134
135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151
152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202
203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236
237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253

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6:00

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7:30

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9:00



## MAGIC DESK I

The scene opens on an office desk, complete with digital clock, type-writer, wastebasket and file cabinet. Select functions (typing, filing, editing) by pointing animated finger (Cartridge)

6:30

## MATH FACTS

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8:00



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9:30

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7:00



## FRENZY/FLIP FLOP

(Ages 6 to 14) (Milliken Edufun) FRENZY (subtraction and division) The hungry gator arrives... save the fish... play the BONUS game... FLIP FLOP (transformed geometry) look at the two figures... do they need to flip, turn or slide? (Diskette)

8:30

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10:00

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