```
3C20: BF CA 4A 24 B0 BE A9 B9 44
3C28: 85 D7 A9 04 85 D6 A0 00 97
3C30: B1 D6 C9 00 D0 08 C8 B1 5A
3C38: D6 F0 34 4C 29 24 8D E5 7E
3C40: 1E 29 0F AA E8 8E 58 1E EE
3C48: C8 B1 D6 09 80 20 ED FD 5B
3C50: C8 CC 58 1E D0 F3 A9 8D 84
3C58: 20 ED FD A9 27 18 65 D6 F1
3C60: 85 D6 A5 D7 69 00 85 D7 B1
3C68: C9 BB F0 B2 4C FC 23 20 BA
3C70: 00 BF CC 52 24 4C DA 14 B3
3C78: 02 60 00 BE 04 01 00 B9 D3
3C80: 00 02 00 00 01 01 01 AB 33
3C88: 1E 07 AB 1E C3 06 00 00 5F
3C90: 01 00 00 00 00 03 AB 1E 0B
3C98: 00 BB 00 02 00 00 00 00 20
3CA0: 04 00 00 00 00 00 00 00 1B
3CA8: 01 00 02 00 00 00 00 04 E5
3CB0: 00 00 00 00 00 00 00 C5 EE
3CB8: D2 D2 CF D2 A0 A3 00 00 0A
```

Program 3: *SpeedScript* File Converter (ProDOS Version)

Please refer to the "Apple Automatic Proofreader" article in this issue before entering this listing.

```
4A 10 HOME
52 20 D$ = CHR$ (4)
25 40 PRINT "DO YOU WANT TO:"
A6 50 PRINT " (1) MAKE A SPEEDSC
      RIPT FILE INTO A TEXT
      FILE"
AE 60 PRINT " (2) MAKE A TEXT FI
      LE INTO A SPEEDSCRIPT
      FILE"
67 70 GET A$:A = VAL (A$)
47 80 IF A < > 1 AND A < > 2 THE
      N 70
65 90 ON A GOTO 100,200
53 100 PRINT "ENTER SPEEDSCRIPT
      FILE NAME": INPUT ":";A$
B9 110 PRINT "ENTER TEXT FILE NA
      ME TO CREATE": INPUT ":";
      B$
7E 120 PRINT D$;"BLOAD ";A$;",A$
      2000"
A4 125 L = PEEK (48859) + PEEK (
      48860) * 256 + 8192
5A 150 FOR I = 8192 TO L - 1
39 160 IF PEEK (I) = 60 THEN POK
      E I,141
09 180 NEXT
C9 190 PRINT D$;"CREATE ";B$;",T
      TXT"
F5 195 PRINT D$;"BSAVE ";B$;",A$
      2000,E";L - 1;",TTXT"
83 196 END
6D 200 PRINT "ENTER TEXT FILE NA
      ME": INPUT ":";B$
06 210 INPUT "ENTER SPEEDSCRIPT
      FILE NAME TO CREATE   :";
      A$
25 220 PRINT CHR$ (4);"BLOAD ";B
      $;",A$2000,TTXT"
93 230 L = PEEK (48859) + PEEK (
      48860) * 256 + 8192
59 240 FOR I = 8192 TO L - 1
1A 245 IF PEEK (I) = 141 THEN PO
      KE I,60
06 260 NEXT
4A 295 PRINT D$;"BSAVE ";A$;",A8
      192,E";L - 1
B4 296 END
```

The Apple version of *SpeedScript* 3.0, and all other Apple programs in the June 1985 issue, may be ordered on disk directly from COMPUTE! Publications. Call **TOLL FREE 1-800-334-0868** (in NC 1-919-275-9809) to charge your order 8:30 a.m.–7:00 p.m. Eastern Time, Monday through Friday. Or send check or money order ($12.95 plus $2.00 shipping and handling) to:

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Greensboro, NC 27403 USA

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Apple Automatic Proofreader

Tim Victor, Editorial Programmer

Now it's easier than ever to enjoy COMPUTE! *programs for Apple II-series computers. Our "Automatic Proofreader" utility, formerly available only for Commodore, Atari, and IBM computers, has now been adapted and enhanced for the Apple II+, IIe, and IIc with either DOS 3.3 or ProDOS. The Automatic Proofreader alerts you to most typing mistakes you might make while entering a* COMPUTE! *program.*

Beginning this month, there will be an extra two-digit hexadecimal number at the start of each program line in Applesoft BASIC program listings. This extra number is a *checksum* to be used with the "Apple Automatic Proofreader" utility. When you type in a program using the Automatic Proofreader, you can check for typing errors by comparing checksums instead of reading each line and comparing it, character by character, with the listing. The Proofreader and your computer do most of the work for you.

The Automatic Proofreader loads a short machine language routine into memory and attaches it to your Apple's operating system. Each time you press RETURN to enter a program line, this routine displays a two-digit checksum at the top of your screen. If you've typed the line correctly, the checksum on your screen matches the one in the printed listing—it's that simple. You don't have to use the Proofreader to enter listings, but doing so greatly reduces the chance of making a typo.

Getting Started

First, type in the Apple Automatic Proofreader program following this article. The Proofreader can't check itself before it's done, so you'll have to be extra careful to avoid mistakes. This chore might go a little faster if you remind yourself that this is the last time you'll have to do it.

The Proofreader checks which operating system you're running before it hooks up the checksum routine, so you can type it in with either DOS 3.3 or ProDOS. If you want to use the Proofreader with both operating systems, you won't have to retype it. All you need is a utility to copy a file between disks with different formats, such as the one provided on the ProDOS *System Utilities* disk.

As soon as you finish typing the Proofreader, save at least two copies. This is very important, because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Now type RUN and hit RETURN. The Proofreader clears the screen, loads the machine language routine, displays the message PROOFREADER ACTIVATED, erases the BASIC portion of itself, and ends. If you type LIST and press RETURN, you'll see that no BASIC program is in memory. The computer is ready for you to type in a new BASIC program.

Entering Programs

Once the Proofreader is activated, you can begin typing in a BASIC program as usual. Every time you finish typing a line and press RETURN, the Proofreader displays a two-digit checksum number in the upper-left corner of the screen. Compare this checksum with the checksum printed next to the corresponding line in the program listing. If the numbers match, you can be pretty certain the line was typed correctly. Otherwise, check for your mistake and type the line again.

A common mistake when entering BASIC programs on the Apple occurs when you accidentally press a key while holding down the control (CTRL) key. This adds an invisible control character to the line you are typing. If you don't find it before you run the program, this stray character may cause a syntax error or other mysterious behavior. Fortunately, the Proofreader detects the presence of these invisible control characters, displaying a checksum that doesn't match the one in the listing. So it's always a good idea to retype a line if the checksums don't match, even though you might not see any difference in the lines themselves.

The Proofreader ignores space characters, so you can omit spaces between keywords and still see a matching checksum. Spaces are important only between the quotation marks of PRINT statements or string assignments. If you accidentally type too many spaces or leave some out, this is the only mistake the Proofreader won't catch. For this reason, you should be extra careful when entering text within quotes.

Before running another BASIC program, it's a good idea to turn off the Proofreader by holding down CTRL while pressing the RESET button. The machine language part of the Proofreader is kept in memory starting at address 768 ($300 hexadecimal). This location is out of BASIC's way, but a lot of other programs use this same place for their machine language subroutines. Disable the Proofreader to avoid conflicts.

Abbreviated instructions on using the Proofreader—and a listing of the Proofreader program itself—will appear each month in the section "COMPUTE!'s Guide to Typing In Programs."

How It Works

When the Applesoft BASIC interpreter needs to get a line of input from the keyboard, it calls a machine language routine in the Apple's Read Only Memory (ROM) called GETLN. GETLN, in turn, calls the operating system to get a single keypress, which it stores in an input buffer. If the RETURN key was pressed, GETLN ends, leaving one new line for the BASIC interpreter in the input buffer. Otherwise, it repeats the process, asking for another keypress.

The operating system normally gets individual keystrokes from a ROM routine called KEYIN, but the Proofreader changes this. When the Proofreader is installed, the operating system calls the checksum routine instead, and the checksum routine asks KEYIN for a character. If any key other than RETURN was pressed, the checksum routine just passes it on to the operating system, which gives it to GETLN. But if RETURN was pressed, the checksum routine examines the contents of GETLN's input buffer, which now contains an entire line of input, to calculate the checksum that it displays at the top of the screen.

One very common typing mistake is transposition: typing two successive characters in the wrong order, like PIRNT instead of PRINT. A checksum program that merely adds the codes of the characters in a line can detect only the presence or absence of a character, not transposition errors. The Commodore and Atari versions of the Automatic Proofreader—the first Proofreaders introduced—have this problem. Because the Apple Proofreader uses a more sophisticated formula to compute checksums, it alerts you to transposed keystrokes. Other versions of the Proofreader could be upgraded, but this would mean that checksums in previously published listings would be incompatible with the new Proofreader.

The Apple Automatic Proofreader detects almost every possible typing mistake, including transpositions, missing or extra characters, accidental control characters, and incorrect line numbers. Typing COMPUTE! programs into your Apple computer has never been easier.

Apple Automatic Proofreader

```
10 C = 0: FOR I = 768 TO 768 +
   68: READ A:C = C + A: POKE I
   ,A: NEXT
20 IF C < > 7258 THEN PRINT "ER
   ROR IN PROOFREADER DATA STAT
   EMENTS": END
30 IF PEEK (190 * 256) < > 76 T
   HEN POKE 56,0: POKE 57,3: CA
   LL 1002: GOTO 50
40 PRINT CHR$ (4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,1:
    VTAB 2: PRINT "PROOFREADER
   INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96
```

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