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SPEEDSCRIPT

The Word Processor for Atari Computers

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Foreword

SpeedScript is the most popular program ever published by COMPUTE! Publications. Ever since it first appeared in the January 1984 issue of COMPUTE!'s Gazette, the letters have been pouring in. People wanted to know more about the program and word processing, and they had countless suggestions about how to make SpeedScript better.

The result is SpeedScript 3.0, an even more powerful word processor for all eight-bit Ataris (including the 400/800, 600XL/800XL, 1200XL, and new XE series). Enhanced with additional commands and features, this all machine language word processor gives you all the things you expect from a commercial software package. You can write, edit, format, and print anything from memos to novels on your Atari. With a few keystrokes you can change the color of the screen and its text to whatever combination best suits you.

It's easy to add or delete words, letters, even whole paragraphs. You can search through an entire document and find every occurrence of a particular word or phrase, then replace it with something new. Of course, when you finish writing, you can save your work to tape or disk. The ability to quickly change the appearance of a printed document is one of the things that make word processing so efficient. SpeedScript lets you alter the margins, page length, spacing, page numbers, page width, as well as set up headers and footers at the top and bottom of the paper.

And once you've formatted your document, you'll find enough print features to make even the most demanding writer happy. With SpeedScript, you can start printing at any page, force the printer to create a new page at any time, even make it wait while you put in another sheet of paper. Underlining and centering are simple. If you want to get fancy, you can use your printer's codes to create graphics symbols or logos. And if you're writing something really long--perhaps a novel or term paper--SpeedScript lets you link any number of files so that they print out as one continuous document.

In addition to the SpeedScript program for the Atari, you'll find complete documentation and a keyboard map in this book. SpeedScript's source code has also been included for your examination. By studying it, you'll see exactly how the program is put together.

"The Machine Language Editor: MLX" makes typing in the program easier. MLX almost guarantees that you'll have an error-free copy of the program the first time you type it in. If you prefer to purchase a copy of SpeedScript on disk rather than type it in, just use the convenient coupon in the back, or call toll-free ~~1-800-334-0868~~.

SpeedScript is an exceptionally easy-to-use and powerful word processor that will meet all your writing needs.

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Chapter 1
Using SpeedScript

SpeedScript 3.0

All Machine Language Word Processor For the Atari

SpeedScript *has become one of the most popular word processors for the Commodore 64, VIC-20, and Apple computers. And now SpeedScript has been translated to run on all eight-bit Ataris with at least 24K, with either disk or cassette (including the 400, 800, 600XL with memory expansion, 800XL, 1200XL, and new XE series). SpeedScript compares favorably with commercial word processors and has some features never seen before in an Atari word processor. It represents unique value in a type-in program.*

SpeedScript 3.0, though compact in size (8K), has many features found on commercial word processors. SpeedScript is also very easy to learn and use. 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.

Typing In *SpeedScript*

Atari *SpeedScript* is the longest machine language program we've ever published, but COMPUTE!'s "MLX" entry system helps you type it right the first time. MLX can detect most errors people make when entering numbers. (See the instructions for using MLX in chapter 2.) MLX also lets you type *SpeedScript* in more than one sitting. Although the program listing is lengthy, we guarantee the effort will be worthwhile.

After you run the Atari version of MLX, answer the first two questions like this:
Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Next, you'll be asked "Tape or Disk." *SpeedScript* can be saved as either a binary file on disk or as a boot tape. Press T for use with a tape drive. If you press D for disk, you'll be asked "Boot Disk or Binary File." Press F to select the Binary File option. Although you could save *SpeedScript* as an autobooting disk, it makes no sense, because such a disk cannot contain DOS, which is necessary for file-oriented disk access.

The screen will then show the first prompt, the number 7936 followed by a colon (:). Type in each three-digit number shown in the listing. You do not need to type the comma shown in the listing. MLX inserts the comma automatically.

The last number you enter in each line is a checksum. It represents the values of the other numbers in the line summed together. If you type the line correctly, the checksum calculated by MLX and displayed on the screen should match the checksum number in the listing. If it doesn't match, you will have to retype the line. MLX is not foolproof, though. It's possible to fool the checksum by exchanging the positions of the three-digit numbers. Also, an error in one number can be offset by an error in another. MLX will help catch your errors, but you must still be careful.

Typing in Multiple Sittings

If you want to stop typing the listing at some point and pick up later, press CTRL-S and follow the screen prompts. (For disk, MLX will ask you to specify a filename; do not use AUTORUN.SYS until the entire listing is typed in.) Remember to note the line number of the last line you entered. When you are ready to continue typing, load MLX,

answer the prompts as you did before, then press CTRL-L. For a boot tape, be sure the cassette is in the tape drive and rewound. For a binary disk file, MLX asks for the filename you gave to the partially typed listing. After the LOAD is complete, press CTRL-N and tell MLX the line number where you stopped. Now continue typing as before.

When you finish all typing, MLX automatically prompts you to save the program. For disks with Atari DOS 2.0 or 3.0, save the completed program with the filename AUTORUN.SYS. This will allow SpeedScript to load and run automatically when the disk is booted.

At this point, MLX has saved either a boot tape or binary disk file. To load your boot tape, remove all cartridges, rewind the tape, and hold down the START button while turning on the power. (On the 600XL, 800XL, and XE series, disable BASIC by holding down both START and OPTION while turning on the power.) When the computer turns on, you'll 1 hear a single beep tone. (On the XL and XE series, make sure the volume is turned up on your TV or monitor.) Press PLAY on the tape drive, then press any key on the keyboard to start the load. SpeedScript will automatically run once the boot is successfully completed.

To use SpeedScript with an Atari DOS disk, you must save or copy it on a disk which also contains DOS.SYS and DUP.SYS. Since you've saved SpeedScript as AUTORUN.SYS, it will automatically load and run when you turn on your computer with this disk in the drive. (On the 600XL, 800XL, and XE series, disable BASIC by holding down OPTION when switching on the computer.) SpeedScript must always be named AUTORUN.SYS in order to load properly with Atari DOS. If you want to prevent it from automatically running for some reason, you can save it with another name, then rename it AUTORUN.SYS later.

If you're using Optimized System Software's OS/A+ DOS or a compatible successor, you can give SpeedScript any filename you like. Just use the LOAD command from DOS, and SpeedScript will automatically run. Or you can give it a filename with the extension .COM, such as SPEED.COM. Then you can start up by just typing SPEED at the DOS prompt. You can also write a simple batch file to boot up SpeedScript automatically. Some enhanced DOS packages like Optimized System Software's DOS XL may use so much memory that they conflict with SpeedScript. In this case, you'll need either to use Atari DOS instead on your SpeedScript disks or to reassemble the source code at a higher address to avoid conflicts.

Note: The AUTORUN.SYS file on your DOS master disk is responsible for booting up the 850 Interface Module for RS-232 communications. There is no easy way to combine the 850 boot program with SpeedScript, so you can't access the R: device. We'll show you later how to transfer files over a modem or print to a serial printer.

If you prefer, Atari SpeedScript is available for purchase on disk. To order the disk, use the coupon in the back of this book or call COMPUTE! Publications toll-free at ~~800-334-0868~~.

Entering Text

When you run SpeedScript, the screen colors change to black on white. The first line on the screen is black with white letters. SpeedScript presents all messages on this command line. The remaining 18 lines of the screen are used to enter, edit, and display your document. SpeedScript makes use of a special, but little-used, Atari character mode that permits larger, more readable characters with true lowercase descenders. The screen still shows up to 40 columns; only five rows are sacrificed. We think you'll agree that this is the most readable text you've ever seen on an Atari--perfect for word processing. (Technical note: SpeedScript starts at $1F00, and the ANTIC 3 character set is embedded at $2000.)

The cursor, a blinking square, 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 parsing, also helps to make your text more readable.

Scrolling And Screen Formatting

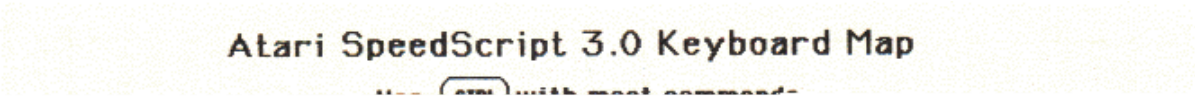
When you finish typing on the last screen line, SpeedScript automatically scrolls the text upward to make room for a new line at the bottom. Imagine the screen as an 18-line window on a long, continuous document. If you've unplugged all cartridges or disabled BASIC as described above, there's room in memory for 3328 characters of text with 24K RAM and up to 27,904 characters on a 48K machine. (Unfortunately, SpeedScript 3.0 cannot make use of the extra memory available in the XL and XE series.) An additional 2K of text memory is available if SpeedScript is loaded from a boot tape. To check at any time how much unused space is left, press CTRL-U (hold

down the CTRL key while pressing the U key). The number appearing in the command line indicates how much unused room remains for characters of text.

If you're used to a typewriter, you'll have to unlearn some habits if this is your first experience with word processing. 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. Press RETURN only when you want to force a carriage return to end a paragraph or limit the length of a line. A return-mark appears on the screen as a crooked left-pointing arrow.

Using the Keyboard

Most features are accessed with control key commands--you hold down CTRL while pressing another key. In this book, control key commands are abbreviated CTRL-x (where x is the key you press in combination with CTRL). An example is the CTRL-U mentioned above to check on unused memory. CTRL-E means hold down CTRL and press E. Sometimes you must also hold down the OPTION button to select a special option of a command, such as OPTION-CTRL-H. Other keys are referenced by name or function, such as DELETE/BACK S for the backspace key, CTRL-CLEAR for the clear-screen key, and cursor left or CTRL-+ for the cursor-left key. (See the "Keyboard Map," for a summary of the keyboard commands.)



Some keys let you move the cursor to different places in the document to make corrections or scroll text into view. You can move the cursor by character, word, sentence, or paragraph. Here's how to control the cursor:

- The cursor left/right keys (CTRL-+ and CTRL-*) work as usual; pressing CTRL-* moves the cursor right (forward) one space, and CTRL-+ moves the cursor left (backward) one space.

- The cursor up/down keys (CTRL-minus and CTRL-=) move the cursor to the beginning of either the next or previous sentence. Press CTRL-minus to move the cursor up (backward) to the beginning of the previous sentence. Press CTRL-= to move the cursor down (forward) to the beginning of the next sentence.

- SHIFT-+ moves the cursor left (backward) to the beginning of the previous word. SHIFT-* moves the cursor right (forward) to the beginning of the next word. If you get confused, just look at the arrows on the keys for a reminder.

- SHIFT-minus moves the cursor up (backward) to the beginning of the previous paragraph. SHIFT-= moves the cursor down (forward) to the beginning of the next paragraph. Again, look at the arrows on these keys for a reminder. A paragraph always ends with a return-mark.

- The START button, pressed once, moves the cursor to the top (start) of the screen without scrolling. Pressed twice, it moves the cursor to the start of the document.

- CTRL-Z moves the cursor to the end of the document, scrolling if necessary. It's easy to remember since Z is at the end of the alphabet.

For special applications, if you ever need to type the actual character represented by a command or cursor key, press ESC before typing the CTRL key. Press ESC twice to get the ESCape character, CHR$(27).

Correcting Your Typing

Sometimes you'll have to insert some characters to make a correction. Use CTRL-INSERT 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 CTRL-INSERT.

It can be tedious to use CTRL-INSERT 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. To let you know you're in insert mode, the black command line at the top of the screen turns blue.

Insert mode is the easiest way to insert text, but it can become too slow when inserting near the top of a very long document because it must move all the text following the cursor position. So SpeedScript has even more ways to insert blocks of text.

One way is to use the TAB 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 TAB. TAB always inserts; you don't need to be in insert mode. You can also use TAB to open up more space than CTRL-INSERT. (You cannot set or clear tab stops in SpeedScript as you can with the normal screen editor.) No matter how much space you want to insert, each insertion takes the same amount of time. So the TAB key can insert five spaces five times faster than pressing CTRL-INSERT five times.

There's an even better way, though. Press SHIFT-INSERT to insert 255 spaces (it does not insert a line; use RETURN for that). You can press it several times to open up as much space as you need. And SHIFT-INSERT is fast. It inserts 255 spaces as fast as CTRL-INSERT opens up one space. Now just type the text you want to insert over the blank space. (You don't want to be in CTRL-I insert mode when you use this trick; that would defeat its purpose.)

Since the DELETE/BACK S key (backspace) is also slow when working with large documents (it, too, must move all text following the cursor), you may prefer to use the cursor-left key to backspace when using this method.

After you've finished inserting, there may be some inserted spaces left over that you didn't use. Just press SHIFT-DELETE/BACK S. This instantly deletes all extra spaces between the cursor and the start of following text. It's also useful whenever you need to delete a block of spaces for some reason.

Erasing Text

Press DELETE/BACK S 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-DELETE/BACK S 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 or 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 delete 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. If there is no room left in memory for inserting the buffer, you'll see the message "Memory Full."

Important: The CTRL-E erase mode lets you erase up to the maximum size of the buffer (2K for disk, about 6K for tape), 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, hold down the OPTION key while you press CTRL-E. This preserves the buffer contents and adds newly erased text to the buffer.

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

The Wastebasket Command

If you want to start a new document or simply obliterate all your text, hold down OPTION while you press SHIFT-CLEAR (that's not a combination you're likely to press accidentally). SpeedScript asks, "ERASE ALL TEXT: 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.

Search and Replace

SpeedScript has a Find command that searches through your document to find a selected word or phrase. A Change option lets you automatically change one word to another throughout the document.

OPTION-CTRL-F (find) activates the search feature, OPTION-CTRL-C (change) lets you selectively search and replace, and CTRL-G (global) is for automatically searching and replacing.

Searching is a two-step process. First, you need to tell SpeedScript what to search for, then you trigger the actual search. Hold down OPTION and press CTRL-F. The command line prompts "Find:". Type in what you'd like to search for, the search phrase. If you press RETURN alone without typing anything, the Find command is canceled.

When you are ready to search, press CTRL-F. SpeedScript looks for the next occurrence of the search phrase starting from the current cursor position. If you want to hunt through the entire document, press START twice to move the cursor to the very top before beginning the search. Each time you press CTRL-F, 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-C works together with CTRL-F. After you've specified the search phrase with OPTION-CTRL-F, press OPTION-CTRL-C to select the replace phrase. (You can press RETURN alone at the "Change to:" prompt to select a null replace phrase. When you hunt and replace, this deletes the located phrase.) To search and replace manually, start by pressing CTRL-F. After SpeedScript finds the search phrase, press CTRL-C if you want to replace the phrase. If you don't want to replace the phrase, don't press CTRL-C. You are not in a special search and replace mode. You're free to continue writing at any time.

CTRL-G links CTRL-F and CTRL-C together. It first asks "Find:", then "Change to:", then automatically searches and replaces throughout the document, starting at the cursor position.

There are a few things to watch out for when using search and replace. First, realize that if you search for *the*, SpeedScript 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 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.

SpeedScript also 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 at replacing a word. Keep these things in mind when using CTRL-G, since you don't have a chance to stop a global search and replace.

Storing Your Document

Just press CTRL-S to store a document. You'll see the prompt "Save: (Device:Filename)>". Type C: for cassette or D: plus a legal Atari filename for disk. If you use the same name as a file already on disk, that file will be replaced by the new one. CTRL-S always saves the entire document. The cursor position within the document is not important.

When the SAVE is complete, SpeedScript reports "No errors" if all is well or gives a message like "Error #144" if not. Check your DOS or BASIC manual for a list of error numbers and their causes.

Loading a Document

To recall a previously saved document, press CTRL-L. Answer the "Load: (Device:Filename)>" prompt with the filename. Again, remember to include the C: for cassette or D: for disk. SpeedScript loads the file and should display "No errors." Otherwise, SpeedScript reports the error number.

The position of the cursor is important before loading a file. Documents start loading at the cursor position, so be sure to press START twice or OPTION-SHIFT-CLEAR (Erase All) to move the cursor to the start of text, unless you want to merge two documents. When you press CTRL-L to load, the command line turns green to warn you if the cursor is not at the top of the document.

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.

Since SpeedScript stores files in ASCII (American Standard Code for Information Interchange), you can load any ASCII file with SpeedScript. You could write a BASIC program with SpeedScript, save it on disk, then use ENTER to read the file from BASIC. In BASIC, you can store a program in ASCII form with LIST "D:filename" for disk or LIST "C:" for tape, ready to load with SpeedScript. You can even load files produced by most other word processors, and most other Atari word processors can read SpeedScript files. You can make full use of SpeedScript's editing features to prepare ASCII files for the Atari Assembler/Editor, MAC/65, and most other Atari assemblers. And SpeedScript files can be transferred via modem with your favorite telecommunications program that handles ASCII.

Disk Commands

Sometimes you forget the name of a file, or need to delete or rename a file. SpeedScript provides a unique mini-DOS for your convenience. Just press CTRL-M (menu). SpeedScript reads the entire disk directory and puts it on the screen in three columns. A large cursor shows you which file is currently selected. Use the cursor keys to move the cursor to the file you want to select. A menu at the bottom of the screen shows you what keys you need to press. Press CTRL-D to delete the selected file, R to rename, L to lock, U to unlock, or F to format the disk. You can load the selected file by pressing CTRL-L. The position of the cursor within your document is not important when loading a file from the menu--SpeedScript always erases anything you previously had in memory.

Any changes you make to the directory will not show up until you call up the directory again. Press either 1, 2, 3, or 4 to update the directory from drives 1-4. This also sets the default disk drive, the drive accessed for further changes. When you're ready to return to writing, press either ESC or the RETURN key.

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.

Press CTRL-B to change the background and border colors. Each time you press CTRL-B, one of 128 different background colors appears. Press CTRL-T (text) to cycle between one of eight text luminances. The colors are preserved until you change them or reboot SpeedScript.

If your TV suffers from overscanning, some characters on the left or right margin may be chopped off. Atari SpeedScript lets you widen and narrow the width of the screen. Press OPTION-CTRL-+ (the cursor-left key) to decrease the width of the screen. Each time you press it, the text is reformatted, and the left and right screen margins are adjusted by one character. You can decrease the width all the way down to two characters (although if your screen overscans that much, it's time to buy a new TV). To increase the width, to a maximum of 40 (the default width), press OPTION-CTRL-* (the cursor-right key).

One disadvantage of word-wrapping is that it's hard to tell exactly how many spaces are at the end of a screen line. When a word too long to fit on a line is wrapped to the next line, the hole it left is filled with "false" spaces. That is, the spaces are not actually part of your text and won't appear on paper. If you want to distinguish between true spaces and false spaces, press CTRL-O (on/of). The false spaces become tiny dots. You can write and edit in this mode if you wish, or turn off the feature by pressing CTRL-O again.

Atari SpeedScript disables the BREAK and inverse-video keys when you're entering or editing text. The inverse-video key was disabled because it is frequently pressed by accident on the 800 and 800XL models. If you want to enter inverse-video characters, hold down SELECT while typing the keys.

Atari 400 and 800 owners will notice that the action of the CAPS/LOWR key has been changed in SpeedScript. It works like the CAPS key on the XL and XE models. Press it once to switch to uppercase, and again to switch to lowercase. In other words, the CAPS/LOWR key toggles between uppercase and lowercase. You can still use SHIFT-CAPS/LOWR to force entry to all uppercase. CTRL-CAPS/LOWR has no effect.

Pressing SYSTEM RESET returns you to SpeedScript without erasing your text when using Atari DOS. With OS/A+ DOS, SYSTEM RESET returns you to the DOS command prompt. You can get back to SpeedScript without losing any text if you type RUN at the prompt.

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 which 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 it 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. (See page 19 for a summary of the formatting commands.)

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 file instead of to a printer. Other features let you 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 5, a right margin position of 75, no header or footer, single-spacing, and continuous-paper page feeding. You can change these default settings if you want (see below). Before printing, be sure the paper in your printer is adjusted to top-of-form (move the paper perforation just above the printing element). One additional note: Some printers 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.

To begin printing, simply press CTRL-P. SpeedScript prompts "Print: (Device:Filename)>". You can print to almost any device, even disk or cassette. If you enter E (for Editor), SpeedScript prints to the screen, letting you preview where lines and pages break. Enter P to Print for most printers. If your printer is attached, powered on, and selected (online), SpeedScript begins printing immediately. To cancel printing, hold down the BREAK key until printing stops. You can use CTRL-1 to pause printing. Press CTRL-1 again to continue.

If you need to print to an RS-232 printer, just print to a disk file, then boot up your DOS master disk and use the copy selection to copy the print file to the R: device. You can also write BASIC programs to read and process a printed disk file. Remember, a Print to disk is not the same as a Save to disk.

Formatting Commands

The print formatting commands must be distinguished from normal text, so they appear onscreen in inverse video with the text and background colors switched. As mentioned above, the regular inverse-video key is not used for entering inverse-video text. Instead, hold down the SELECT key while typing the format key. All lettered printer commands 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. Again, remember to hold down SELECT to enter the boldface characters shown here.

Stage 1 Commands

l Left margin. Follow with a number from 0 to 255. Use 0 for no margin. Defaults to 5.

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 8-1/2 X 11 inch paper has 66 lines. Bottom margin defaults to line 58. Don't make the bottom margin greater than the page length.

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-- 11-5/8 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 starts printing with the first page.

x Sets the page width, in columns (think across). 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 if you 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.

w Page wait. This command 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 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 such notes to yourself as the filename of the document.

h Header define and enable. The header must be a single line of text (up to 254 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 254 characters) ending in a return-mark. The footer prints two lines prior to 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 Go to (link) next file. Put this command as the last line in your document. Follow the command with the filename, including D: for disk. 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 center the line properly. 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.

e Edge right. This works in the same manner as centering, but it blocks the line flush with the right margin.

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 works 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.

Formatting Commands (Enter with SELECT)

Command (Default)
b bottom margin (58)
c centering
e edge right
f define footer
g goto linked file
h define header
i information
j select linefeeds
l left margin (5)
m margin release
n next page
p page length (66)
r right margin (75)
s spacing (1)
t top margin (5)
u underline toggle
w page wait (off)
x columns across (80)
page number
@ starting page number (1)
? print starting with # (1)

Fonts and Styles

Most dot-matrix printers are capable of more than just printing text at ten characters per inch. 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 holding down SELECT while you type them. The printkeys are like variables in BASIC.

To define a printkey, just hold down SELECT while you type the key you want to assign as the printkey, then an equal sign (=), and finally the ASCII value to be substituted for the printkey during printing. Now, whenever SpeedScript encounters the printkey embedded in text, it prints the character with the ASCII value you previously defined.

For example, to define the + key as the letter z, you first look up the ASCII value of z (in either your printer manual or in any Atari manual). The ASCII value of the letter z is 122, so the definition is

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

This would appear on paper as

Gadzooks! The zoo is zany!

More practically, here's how you could program italics on an Epson MX-80-compatible printer. You switch on italics by sending an ESC (a character with an ASCII value of 27), then the character 4. You turn off italics by sending ESC 5. So define SHIFT-E as the escape code. Anywhere you want to print a word in italics, bracket it with printkey E, then 4, and printkey E, then 5:

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. Keys 1-4 are defined as 27, 14, 15, and 18, common values for most printers. On most printers, CHR$(27) is the ESCape key, CHR$(14) starts double-width, CHR$(15) either stops double-width or starts condensed characters, and CHR$(18) usually cancels condensed characters.

SpeedScript actually lets you embed any character within text, so you may prefer to put in the actual printer codes as part of your text. To set italics, you could just press ESC twice, then 4. The ESC key appears in text as a mutant E. Double-width has a value of 14, the same value as CTRL-N. To start double-width, just embed a CTRL-N. Remember that you must press ESC before any CTRL key to get it to appear in text. CTRL keys appear as small "shadowed" capital letters. These characters, though, are counted as part of the length of a line, and excessive use within one line can result in a shorter than normal line. It can be more convenient to use the printkeys, since if you ever change printers, you have to change only the definitions of the keys.

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 out its value. 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 typestyle 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 with CTRL-E, then restore it with CTRL-R multiple times. When you are filling in the table, just use word left/word right to jump quickly between the periods. Or you can use the programmable print-keys 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 and load this file 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 unique character, such as an * or a CTRL character. When you're ready to customize the letter, use Find to locate each symbol and insert the specific information. Instead of typing an oft-used word or phrase, substitute a unique character, then use CTRL-G to globally change these characters into the actual word or phrase. You can even use SpeedScript as a simple filing program. Just type in all your data, flagging each field with a unique character. You can use Find to quickly locate any field.

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Chapter 2
Entering SpeedScript

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The Machine Language Editor: MLX

Two program-entry aids written in BASIC are included here to make typing in SpeedScript as easy as possible. The first, "MLX," is explained in this article. The second, "The Automatic Proofreader," is a short program that will help you type in MLX without typing mistakes. Read the instructions for using the Automatic Proofreader later in this chapter before you type in the MLX program.

"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). And 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 MLX, Program 2-1 (you'll want to use it in the future). When you're ready to type in SpeedScript, run MLX. MLX asks you for three numbers: the starting address, the ending address, and the run/init address. These numbers for SpeedScript are

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Next, you'll be asked "Tape or Disk." SpeedScript can be saved as either a binary file on disk or as a boot tape. Press T for use with a tape drive. If you press D for disk, you'll be asked "Boot Disk or Binary File." Press F to select the Binary File option. Although you could save SpeedScript as an auto- booting disk, it makes no sense, since such a disk cannot contain DOS, which is necessary for file-oriented disk access.

The screen will then show the first prompt, the number 7936 followed by a colon. Type in each three-digit number shown in the listing. You do not need to type the comma shown in the listing; MLX inserts the comma automatically. 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 if you 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 DELETE/BACK S 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 the comma key, the space bar, or the RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

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 made a typo when entering the MLX program itself.

Fortunately, you don't have to enter all of SpeedScript 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:

CTRL-S Save
CTRL-L Load
CTRL-N New Address
CTRL-D Display

To issue a command, hold down the CTRL key (CONTROL on the XL models) and press the indicated key. 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 (CTRL-S) 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 to make a note of the address where you stop. The next time you run MLX, answer all the prompts as you did before - regardless of where you stopped typing - then insert the disk or tape. When you get to the line number prompt, press CTRL-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 CTRL-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 MLX-format listing, or the checksum won't work. The Display command lets you display a section of your typing. After you press CTRL-D, enter two addresses within the line-number range of the listing. You can break out of the listing display and return to the prompt by pressing any key.

Refer to the "Automatic Proofreader" article before typing in this program.

Program 2-1. MLX: The Machine Language Editor Download (Saved BASIC)

The Automatic Proofreader

At last there's a way for your computer to help you check your typing. "The Automatic Proofreader" will make entering programs faster, easier, and more accurate.

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer to check your typing for you?

"The Automatic Proofreader" will help you type in "MLX" program listings without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing the MLX program.

Preparing the Proofreader

1. Type in the Proofreader (Program 2-2). Be very careful when entering the DATA statements - don't type an l instead of a 1, an O instead of a 0, extra commas, and so on.
2. Save the Proofreader on tape or disk at least twice before running it for the first time.
3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place - you'll need it again and again when typing in programs from other COMPUTE! books or COMPUTE! magazine.
4. When a correct version of the Proofreader is run, the following message will appear on the screen: "Automatic Proofreader Now Activated." Type NEW and press RETURN. You are now ready to enter the MLX program listing. If you press SYSTEM RESET, the Proofreader is disabled. To reactivate it, just type PRINT USR(1536) and press RETURN.

Using the Proofreader

The MLX program listing has a checksum found immediately to the left of each line number. Don't enter the checksum when typing in a program. It is just for your information.

When you type in a line from the program listing and press RETURN, the Proofreader displays the checksum letters at the top of your screen. These checksum letters must match the checksum letters in the printed listing. If they don't match, it means you typed the line differently from the way it is listed. Immediately recheck your typing. You can correct any mistakes you find.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience since spacing is generally not important. But occasionally proper spacing is important, so be extra careful with spaces. The Proofreader will catch practically everything else that can go wrong. Characters in inverse video will appear like this:
INVERSE VIDEO

Enter these characters with the Atari key.

Due to the nature of a checksum, the Proofreader will not catch all errors. The Proofreader will not catch errors of transposition. In fact, you could type in a line in any order, and the Proofreader wouldn't notice.

There's another thing to watch out for: If you enter a line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check the line. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way. The only abbreviation that cannot be handled this way is when a question mark (?) is used instead of PRINT; they are not the same to the Proofreader.

Program 2-2. The Automatic Proofreader Download (Saved BASIC)

SpeedScript Program Listings

Before you begin typing SpeedScript, you must load and run the "MLX" program. Answer the MLX prompts as follows:

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Program 2-3. SpeedScript

To enter this program, you must use Program 2-1, MLX, found earlier in this chapter.

```
7936:173,198,002,141,197,002,201
7942:032,137,037,169,203,205,021
7948:179,066,141,179,066,240,115
7954:033,032,031,037,032,080,007
7960:042,165,012,141,118,037,027
7966:165,013,141,119,037,169,162
7972:117,133,012,169,037,133,125
7978:013,169,000,141,068,002,179
7984:169,001,133,009,032,234,114
7990:037,076,072,038,000,000,021
7996:000,000,000,000,000,000,060
8002:000,000,000,000,000,000,066
8008:000,000,000,000,000,000,072
8014:000,000,000,000,000,000,078
8020:000,000,000,000,000,000,084
8026:000,000,000,000,000,000,090
8032:000,000,000,000,000,000,096
8038:000,000,000,000,000,000,102
8044:000,000,000,000,000,000,108
8050:000,000,000,000,000,000,114
8056:000,000,000,000,000,000,120
8062:000,000,000,000,000,000,126
8068:000,000,000,000,000,000,132
8074:000,000,000,000,000,000,138
8080:000,000,000,000,000,000,144
8086:000,000,000,000,000,000,150
8092:000,000,000,000,000,000,156
8098:000,000,000,000,000,000,162
8104:000,000,000,000,000,000,168
8110:000,000,000,000,000,000,174
8116:000,000,000,000,000,000,180
8122:000,000,000,000,000,000,186
8128:000,000,000,000,000,000,192
8134:000,000,000,000,000,000,198
8140:000,000,000,000,000,000,204
8146:000,000,000,000,000,000,210
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8152:000,000,000,000,000,000,216
8158:000,000,000,000,000,000,222
8164:000,000,000,000,000,000,228
8170:000,000,000,000,000,000,234
8176:000,000,000,000,000,000,240
8182:000,000,000,000,000,000,246
8188:036,037,045,017,000,000,131
8194:000,000,000,000,000,000,002
8200:000,024,024,024,024,024,128
8206:000,024,000,102,102,102,088
8212:000,000,000,000,000,102,122
8218:255,102,102,255,102,000,074
8224:024,062,096,060,006,124,148
8230:024,000,000,204,216,048,018
8236:096,204,140,000,000,056,028
8242:108,056,112,222,204,118,102
8248:000,024,024,048,000,000,152
8254:000,000,000,024,048,096,230
8260:096,096,048,024,000,048,124
8266:024,012,012,012,024,048,206
8272:000,000,102,060,255,060,045
8278:102,000,000,000,024,024,236
8284:126,024,024,000,000,000,010
8290:000,000,000,048,048,096,034
8296:000,000,000,000,126,000,230
8302:000,000,000,000,000,000,110
8308:000,000,048,048,000,000,212
8314:006,012,024,048,096,192,244
8320:000,124,206,222,246,230,132
8326:198,124,000,024,056,024,048
8332:024,024,024,126,000,124,206
8338:198,012,024,048,096,254,010
8344:000,254,012,024,056,012,254
8350:198,124,000,028,060,108,164
8356:204,254,012,012,000,254,132
8362:192,252,006,006,198,124,180
8368:000,124,192,252,198,198,116
8374:198,124,000,126,006,012,136
8380:024,048,096,096,000,124,064
8386:198,198,124,198,198,124,210
8392:000,124,198,198,126,012,090
8398:024,048,000,000,048,048,118
8404:000,048,048,000,000,000,052
8410:048,048,000,048,048,096,250
8416:000,012,024,048,096,048,196
8422:024,012,000,000,000,126,136
8428:000,000,126,000,000,048,154
8434:024,012,006,012,024,048,112
8440:000,060,102,006,012,024,196
8446:000,024,000,124,198,222,054
8452:214,220,224,060,000,124,078
8458:198,198,198,254,198,198,230
8464:000,252,198,198,252,198,090
8470:198,252,000,124,198,192,218
8476:192,192,198,124,000,248,214
8482:204,198,198,198,204,248,004
8488:000,254,192,192,252,192,098
8494:192,254,000,254,192,192,106
8500:252,192,192,192,000,124,236
8506:198,192,222,198,198,124,166
8512:000,198,198,198,254,198,086
8518:198,198,000,126,024,024,128
8524:024,024,024,126,000,062,080
8530:012,012,012,012,204,120,198
8536:000,198,204,216,240,216,138
8542:204,198,000,192,192,192,048
8548:192,192,192,254,000,198,104
8554:238,254,214,198,198,198,126
8560:000,198,230,246,254,222,238
8566:206,198,000,124,198,198,018
8572:198,198,198,124,000,252,070
```

```
8578:198,198,198,252,192,192,080
8584:000,124,198,198,198,222,052
8590:124,014,000,252,198,198,160
8596:252,216,204,198,000,124,118
8602:198,192,124,006,198,124,228
8608:000,126,024,024,024,024,126
8614:024,024,000,198,198,198,040
8620:198,198,198,124,000,198,064
8626:198,198,198,198,108,056,110
8632:000,198,198,198,214,254,222
8638:238,198,000,198,198,108,106
8644:056,108,198,198,000,102,090
8650:102,102,060,024,024,024,026
8656:000,254,012,024,048,096,130
8662:192,254,000,030,024,024,226
8668:024,024,024,030,000,064,130
8674:096,048,024,012,006,000,156
8680:000,240,048,048,048,048,152
8686:048,240,000,008,028,054,104
8692:099,000,000,000,000,000,087
8698:000,000,000,000,000,255,249
8704:000,000,000,000,000,000,000
8710:000,000,124,194,153,153,118
8716:129,153,153,230,252,130,035
8722:153,130,153,153,131,252,222
8728:124,194,153,158,158,153,196
8734:194,124,252,130,153,153,012
8740:153,153,130,252,254,130,084
8746:158,132,156,158,130,254,006
8752:126,193,206,194,206,204,153
8758:204,120,124,194,153,158,239
8764:145,153,194,124,246,153,051
8770:153,129,153,153,153,246,029
8776:127,097,115,050,050,115,114
8782:097,127,062,050,050,050,002
8788:050,114,198,124,230,153,185
8794:146,132,146,153,153,230,026
8800:120,076,076,076,076,078,086
8806:066,124,230,153,129,129,165
8812:137,153,153,230,230,153,140
8818:137,129,145,153,153,230,037
8824:124,194,153,153,153,153,026
8830:194,124,254,195,201,201,015
8836:195,206,200,240,124,194,011
8842:153,153,153,146,201,118,038
8848:124,194,201,201,194,201,235
8854:201,247,126,195,158,194,247
8860:249,153,195,126,254,194,047
8866:102,100,100,100,100,124,020
8872:246,153,153,153,153,153,155
8878:194,124,230,153,153,153,157
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14308:240,063,142,241,063,142,095
14314:181,067,189,082,055,157,197
14320:221,063,232,224,012,208,176
14326:245,169,255,141,235,063,074
14332:141,233,063,162,004,189,020
14338:093,055,157,067,064,202,128
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14350:138,173,103,063,133,139,251
14356:160,000,140,234,063,204,053
14362:233,063,240,006,173,221,194
14368:063,141,234,063,177,138,080
14374:016,003,076,166,057,201,045
14380:094,240,041,153,179,064,047
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14392:063,205,222,063,144,230,215
14398:140,116,063,177,138,201,129
14404:000,240,017,206,234,063,060
14410:136,208,244,172,116,063,245
14416:200,177,138,201,000,240,012
14422:001,136,140,116,063,152,182
14428:056,101,138,133,138,165,055
14434:139,105,000,133,139,160,006
14440:000,173,235,063,201,255,007
14446:208,003,032,077,057,173,148
14452:233,063,240,003,032,117,036
14458:057,056,046,233,063,173,238
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14470:179,133,142,169,064,133,186
14476:143,032,220,060,032,134,249
14482:057,173,235,063,205,225,080
14488:063,144,003,032,238,056,176
14494:056,165,138,237,117,063,166
14500:133,140,165,139,237,118,072
14506:063,005,140,240,060,144,054
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14518:169,000,141,219,063,141,147
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14536:169,155,032,127,047,169,131
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14554:162,250,154,032,173,045,010
14560:169,125,032,127,047,032,244
14566:010,038,076,072,038,076,028
14572:020,056,056,173,223,063,059
14578:237,235,063,168,136,136,193
14584:240,008,048,006,032,152,222
14590:057,136,208,250,173,220,018
14596:063,240,017,141,115,063,131
14602:169,180,133,142,169,066,101
14608:133,143,032,117,057,032,018
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14620:152,057,032,152,057,238,204
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14632:063,173,227,063,208,031,037
14638:056,173,228,063,237,230,009
14644:063,173,229,063,237,231,024
14650:063,144,016,032,026,038,121
14656:169,197,160,062,032,089,005
14662:037,032,111,037,032,177,240
14668:055,173,219,063,240,017,075
14674:141,115,063,169,179,133,114
14680:142,169,065,133,143,032,004
14686:117,057,032,220,060,172,240
14692:224,063,140,235,063,136,193
14698:240,008,048,006,032,152,080
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14716:063,240,006,032,098,055,106
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14728:063,024,152,109,235,063,014
14734:141,235,063,032,152,057,054
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14752:240,003,032,098,055,096,172
14758:141,237,063,041,127,032,039
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14770:241,057,240,009,202,208,111
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14782:058,202,138,010,170,140,140
14788:236,063,169,057,072,169,194
14794:212,072,189,004,058,072,041
14800:189,003,058,072,096,056,170
14806:173,236,063,101,138,133,034
14812:138,165,139,105,000,133,132
14818:139,076,020,056,177,138,064
14824:201,094,240,001,136,140,020
14830:236,063,096,017,119,108,109
14836:114,116,098,115,110,104,133
14842:102,064,112,063,120,109,052
14848:105,103,106,097,058,115,072
14854:058,125,058,135,058,145,073
14860:058,155,058,165,058,180,174
14866:058,214,058,071,058,087,052
14872:058,055,058,045,058,036,078
14878:058,239,058,024,059,106,062
14884:058,200,169,000,141,233,069
14890:063,076,230,057,200,032,188
14896:020,054,141,232,063,076,122
14902:230,057,200,032,020,054,135
14908:141,230,063,173,208,063,170
14914:141,231,063,076,230,057,096
14920:200,032,020,054,141,228,235
14926:063,173,208,063,141,229,187
14932:063,076,230,057,200,032,230
14938:020,054,141,223,063,076,155
14944:230,057,169,000,141,227,152
14950:063,200,076,230,057,169,129
14956:010,141,181,067,200,076,015
14962:230,057,200,032,020,054,195
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14968:141,221,063,076,230,057,140
14974:200,032,020,054,141,222,027
14980:063,076,230,057,200,032,022
14986:020,054,141,224,063,076,204
14992:230,057,200,032,020,054,225
14998:141,225,063,076,230,057,174
15004:200,032,020,054,141,226,061
15010:063,076,230,057,172,236,228
15016:063,200,152,072,032,238,157
15022:056,104,168,140,236,063,173
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15034:219,063,160,001,177,138,176
15040:153,178,065,200,204,219,187
15046:063,144,245,240,243,200,053
15052:076,230,057,200,177,138,058
15058:201,094,208,249,096,032,066
15064:207,058,136,140,220,063,016
15070:160,001,177,138,153,179,006
15076:066,200,204,220,063,144,101
15082:245,240,243,076,230,057,045
15088:032,207,058,076,230,057,132
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15106:047,056,200,032,020,054,155
15112:072,173,237,063,041,127,209
15118:170,104,157,051,064,032,080
15124:230,057,076,213,057,160,045
15130:001,162,000,177,138,201,193
15136:094,240,012,032,056,055,009
15142:157,163,063,200,232,224,053
15148:014,208,238,142,120,063,061
15154:169,000,157,163,063,162,252
15160:096,142,185,067,169,004,207
15166:141,186,067,032,016,053,045
15172:016,003,076,155,055,169,030
15178:000,133,142,133,143,032,145
15184:031,037,032,126,053,016,119
15190:003,076,155,055,104,104,071
15196:162,112,141,185,067,076,067
15202:010,056,032,145,059,173,061
15208:245,063,240,022,032,060,254
15214:060,032,183,059,173,243,092
15220:063,201,255,240,009,032,148
15226:095,060,032,139,036,076,048
15232:111,059,076,010,038,169,079
15238:008,141,031,208,173,031,214
15244:208,201,003,208,038,032,062
15250:026,038,169,229,160,062,062
15256:032,089,037,032,206,046,082
15262:141,245,063,208,003,076,126
15268:010,038,160,000,185,163,208
15274:063,153,246,063,200,204,075
15280:120,063,208,244,076,010,129
15286:038,165,134,133,138,165,187
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15298:243,063,160,001,162,000,055
15304:173,245,063,240,083,189,169
15310:246,063,032,044,038,209,070
15316:138,240,005,224,000,208,003
15322:235,202,200,208,011,230,024
15328:139,165,139,205,118,063,029
15334:240,002,176,054,232,236,146
15340:245,063,208,221,024,152,125
15346:101,138,133,140,165,139,034
15352:105,000,133,141,173,117,149
15358:063,197,140,173,118,063,240
15364:229,141,144,024,056,165,251
15370:140,237,245,063,133,134,194
15376:141,242,063,165,141,233,233
15382:000,133,135,141,243,063,225
15388:032,207,039,096,032,026,204

15394:038,169,235,160,062,032,218
15400:089,037,169,001,141,113,078
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15412:208,173,031,208,201,003,108
15418:208,035,032,026,038,169,054
15424:245,160,062,032,089,037,177
15430:032,206,046,141,020,064,067
15436:240,014,160,000,185,163,070
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15448:120,063,208,244,076,010,041
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15460:237,242,063,133,140,165,056
15466:135,133,131,237,243,063,024
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15478:141,243,063,024,173,245,239
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15538:063,169,000,141,239,063,085
15544:032,146,044,160,000,185,239
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15568:064,133,134,165,135,105,176
15574:000,133,135,076,207,039,036
15580:160,000,204,115,063,240,234
15586:029,177,142,048,026,032,168
15592:056,055,032,098,055,173,189
15598:241,063,240,010,169,008,201
15604:032,098,055,169,095,032,213
15610:098,055,200,076,222,060,193
15616:096,140,236,063,041,127,191
15622:141,237,063,032,056,055,078
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15634:232,063,237,115,063,074,034
15640:056,237,221,063,168,169,170
15646:032,032,098,055,136,208,079
15652:250,172,236,063,076,252,061
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15664:173,222,063,237,115,063,153
15670:056,237,221,063,168,169,200
15676:032,076,031,061,201,117,066
15682:208,008,173,241,063,073,064
15688:001,141,241,063,201,035,242
15694:208,018,140,236,063,174,149
15700:228,063,173,229,063,032,104
15706:155,047,172,236,063,076,071
15712:252,060,174,237,063,189,047
15718:051,064,032,098,055,076,222
15724:252,060,032,026,038,056,060
15730:173,104,063,237,117,063,103
15736:170,173,105,063,237,118,218
15742:063,032,160,047,169,001,086
15748:141,113,063,096,083,112,228
15754:101,101,100,083,099,114,224
15760:105,112,116,032,051,046,094
15766:048,000,032,098,121,032,225
15772:067,104,097,114,108,101,235
15778:115,032,066,114,097,110,184
15784:110,111,110,000,066,117,170
15790:102,102,101,114,032,067,180
15796:108,101,097,114,101,100,033
15802:000,066,117,102,102,101,162
15808:114,032,070,117,108,108,229
15814:000,068,101,108,101,116,180

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15838:117,032,115,117,114,101,050
15844:063,032,040,089,047,078,065
15850:041,058,000,069,082,065,037
15856:083,069,032,065,076,076,129
15862:032,084,069,088,084,000,091
15868:069,114,097,115,101,032,012
15874:040,083,044,087,044,080,124
15880:041,058,032,210,197,212,246
15886:213,210,206,032,116,111,134
15892:032,101,120,105,116,000,238
15898:083,097,118,101,032,040,241
15904:068,101,118,105,099,101,112
15910:058,070,105,108,101,110,078
15916:097,109,101,041,062,000,198
15922:069,114,114,111,114,032,092
15928:035,000,066,082,069,065,117
15934:075,032,075,101,121,032,242
15940:065,098,111,114,116,000,060
15946:078,111,032,069,114,114,080
15952:111,114,115,000,076,111,095
15958:097,100,032,040,068,101,012
15964:118,105,099,101,058,070,131
15970:105,108,101,110,097,109,216
15976:101,041,062,000,032,080,164
15982:114,101,115,115,032,210,029
15988:197,212,213,210,206,000,130
15994:068,049,058,042,046,042,171
16000:077,101,109,111,114,121,249
16006:032,070,117,108,108,000,057
16012:078,111,032,116,101,120,186
16018:116,032,105,110,032,098,127
16024:117,102,102,101,114,000,176
16030:080,114,105,110,116,032,203
16036:040,068,101,118,105,099,183
16042:101,058,070,105,108,101,201
16048:110,097,109,101,041,062,184
16054:000,080,114,105,110,116,195
16060:105,110,103,046,046,046,132
16066:155,155,000,073,110,115,034
16072:101,114,116,032,110,101,006
16078:120,116,032,115,104,101,026
16084:101,116,044,032,112,114,219
16090:101,115,115,032,210,197,220
16096:212,213,210,206,000,070,111
16102:105,110,100,058,000,078,169
16108:111,116,032,102,111,117,057
16114:110,100,000,067,104,097,208
16120:110,103,101,032,116,111,053
16126:058,000,027,028,027,029,167
16132:027,030,027,031,032,195,090
16138:212,210,204,045,196,101,210
16144:108,101,116,101,032,204,166
16150:111,099,107,032,213,110,182
16156:108,111,099,107,032,210,183
16162:101,110,097,109,101,032,072
16168:197,211,195,198,111,114,042
16174:109,097,116,032,195,212,039
16180:210,204,045,204,111,097,155
16186:100,032,032,068,114,105,253
16192:118,101,032,091,177,032,103
16198:178,032,179,032,180,093,252
16204:058,032,000,082,101,110,203
16210:097,109,101,032,116,111,136
16216:058,000,070,111,114,109,038
16222:097,116,032,100,105,115,147
16228:107,000,000,000,000,000,207
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Chapter 2
Entering SpeedScript

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The Machine Language Editor: MLX

Two program-entry aids written in BASIC are included here to make typing in SpeedScript as easy as possible. The first, "MLX," is explained in this article. The second, "The Automatic Proofreader," is a short program that will help you type in MLX without typing mistakes. Read the instructions for using the Automatic Proofreader later in this chapter before you type in the MLX program.

"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). And 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 MLX, Program 2-1 (you'll want to use it in the future). When you're ready to type in SpeedScript, run MLX. MLX asks you for three numbers: the starting address, the ending address, and the run/init address. These numbers for SpeedScript are

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Next, you'll be asked "Tape or Disk." SpeedScript can be saved as either a binary file on disk or as a boot tape. Press T for use with a tape drive. If you press D for disk, you'll be asked "Boot Disk or Binary File." Press F to select the Binary File option. Although you could save SpeedScript as an auto- booting disk, it makes no sense, since such a disk cannot contain DOS, which is necessary for file-oriented disk access.

The screen will then show the first prompt, the number 7936 followed by a colon. Type in each three-digit number shown in the listing. You do not need to type the comma shown in the listing; MLX inserts the comma automatically. 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 if you 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 DELETE/BACK S 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 the comma key, the space bar, or the RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

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 made a typo when entering the MLX program itself.

Fortunately, you don't have to enter all of SpeedScript 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:

CTRL-S Save
CTRL-L Load
CTRL-N New Address
CTRL-D Display

To issue a command, hold down the CTRL key (CONTROL on the XL models) and press the indicated key. 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 (CTRL-S) 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 to make a note of the address where you stop. The next time you run MLX, answer all the prompts as you did before - regardless of where you stopped typing - then insert the disk or tape. When you get to the line number prompt, press CTRL-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 CTRL-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 MLX-format listing, or the checksum won't work. The Display command lets you display a section of your typing. After you press CTRL-D, enter two addresses within the line-number range of the listing. You can break out of the listing display and return to the prompt by pressing any key.

Refer to the "Automatic Proofreader" article before typing in this program.

Program 2-1. MLX: The Machine Language Editor Download (Saved BASIC)

The Automatic Proofreader

At last there's a way for your computer to help you check your typing. "The Automatic Proofreader" will make entering programs faster, easier, and more accurate.

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer to check your typing for you?

"The Automatic Proofreader" will help you type in "MLX" program listings without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing the MLX program.

Preparing the Proofreader

1. Type in the Proofreader (Program 2-2). Be very careful when entering the DATA statements - don't type an l instead of a 1, an O instead of a 0, extra commas, and so on.
2. Save the Proofreader on tape or disk at least twice before running it for the first time.
3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place - you'll need it again and again when typing in programs from other COMPUTE! books or COMPUTE! magazine.
4. When a correct version of the Proofreader is run, the following message will appear on the screen: "Automatic Proofreader Now Activated." Type NEW and press RETURN. You are now ready to enter the MLX program listing. If you press SYSTEM RESET, the Proofreader is disabled. To reactivate it, just type PRINT USR(1536) and press RETURN.

Using the Proofreader

The MLX program listing has a checksum found immediately to the left of each line number. Don't enter the checksum when typing in a program. It is just for your information.

When you type in a line from the program listing and press RETURN, the Proofreader displays the checksum letters at the top of your screen. These checksum letters must match the checksum letters in the printed listing. If they don't match, it means you typed the line differently from the way it is listed. Immediately recheck your typing. You can correct any mistakes you find.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience since spacing is generally not important. But occasionally proper spacing is important, so be extra careful with spaces. The Proofreader will catch practically everything else that can go wrong. Characters in inverse video will appear like this:
INVERSE VIDEO

Enter these characters with the Atari key.

Due to the nature of a checksum, the Proofreader will not catch all errors. The Proofreader will not catch errors of transposition. In fact, you could type in a line in any order, and the Proofreader wouldn't notice.

There's another thing to watch out for: If you enter a line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check the line. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way. The only abbreviation that cannot be handled this way is when a question mark (?) is used instead of PRINT; they are not the same to the Proofreader.

Program 2-2. The Automatic Proofreader Download (Saved BASIC)

SpeedScript Program Listings

Before you begin typing SpeedScript, you must load and run the "MLX" program. Answer the MLX prompts as follows:

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Program 2-3. SpeedScript

To enter this program, you must use Program 2-1, MLX, found earlier in this chapter.

```
7936:173,198,002,141,197,002,201
7942:032,137,037,169,203,205,021
7948:179,066,141,179,066,240,115
7954:033,032,031,037,032,080,007
7960:042,165,012,141,118,037,027
7966:165,013,141,119,037,169,162
7972:117,133,012,169,037,133,125
7978:013,169,000,141,068,002,179
7984:169,001,133,009,032,234,114
7990:037,076,072,038,000,000,021
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16102:105,110,100,058,000,078,169
16108:111,116,032,102,111,117,057
16114:110,100,000,067,104,097,208
16120:110,103,101,032,116,111,053
16126:058,000,027,028,027,029,167
16132:027,030,027,031,032,195,090
16138:212,210,204,045,196,101,210
16144:108,101,116,101,032,204,166
16150:111,099,107,032,213,110,182
16156:108,111,099,107,032,210,183
16162:101,110,097,109,101,032,072
16168:197,211,195,198,111,114,042
16174:109,097,116,032,195,212,039
16180:210,204,045,204,111,097,155
16186:100,032,032,068,114,105,253
16192:118,101,032,091,177,032,103
16198:178,032,179,032,180,093,252
16204:058,032,000,082,101,110,203
16210:097,109,101,032,116,111,136
16216:058,000,070,111,114,109,038
16222:097,116,032,100,105,115,147
16228:107,000,000,000,000,000,207
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Chapter 2
Entering SpeedScript

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The Machine Language Editor: MLX

Two program-entry aids written in BASIC are included here to make typing in SpeedScript as easy as possible. The first, "MLX," is explained in this article. The second, "The Automatic Proofreader," is a short program that will help you type in MLX without typing mistakes. Read the instructions for using the Automatic Proofreader later in this chapter before you type in the MLX program.

"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). And 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 MLX, Program 2-1 (you'll want to use it in the future). When you're ready to type in SpeedScript, run MLX. MLX asks you for three numbers: the starting address, the ending address, and the run/init address. These numbers for SpeedScript are

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Next, you'll be asked "Tape or Disk." SpeedScript can be saved as either a binary file on disk or as a boot tape. Press T for use with a tape drive. If you press D for disk, you'll be asked "Boot Disk or Binary File." Press F to select the Binary File option. Although you could save SpeedScript as an auto- booting disk, it makes no sense, since such a disk cannot contain DOS, which is necessary for file-oriented disk access.

The screen will then show the first prompt, the number 7936 followed by a colon. Type in each three-digit number shown in the listing. You do not need to type the comma shown in the listing; MLX inserts the comma automatically. 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 if you 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 DELETE/BACK S 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 the comma key, the space bar, or the RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

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 made a typo when entering the MLX program itself.

Fortunately, you don't have to enter all of SpeedScript 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:

CTRL-S Save
CTRL-L Load
CTRL-N New Address
CTRL-D Display

To issue a command, hold down the CTRL key (CONTROL on the XL models) and press the indicated key. 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 (CTRL-S) 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 to make a note of the address where you stop. The next time you run MLX, answer all the prompts as you did before - regardless of where you stopped typing - then insert the disk or tape. When you get to the line number prompt, press CTRL-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 CTRL-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 MLX-format listing, or the checksum won't work. The Display command lets you display a section of your typing. After you press CTRL-D, enter two addresses within the line-number range of the listing. You can break out of the listing display and return to the prompt by pressing any key.

Refer to the "Automatic Proofreader" article before typing in this program.

Program 2-1. MLX: The Machine Language Editor Download (Saved BASIC)

The Automatic Proofreader

At last there's a way for your computer to help you check your typing. "The Automatic Proofreader" will make entering programs faster, easier, and more accurate.

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer to check your typing for you?

"The Automatic Proofreader" will help you type in "MLX" program listings without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing the MLX program.

Preparing the Proofreader

1. Type in the Proofreader (Program 2-2). Be very careful when entering the DATA statements - don't type an l instead of a 1, an O instead of a 0, extra commas, and so on.
2. Save the Proofreader on tape or disk at least twice before running it for the first time.
3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place - you'll need it again and again when typing in programs from other COMPUTE! books or COMPUTE! magazine.
4. When a correct version of the Proofreader is run, the following message will appear on the screen: "Automatic Proofreader Now Activated." Type NEW and press RETURN. You are now ready to enter the MLX program listing. If you press SYSTEM RESET, the Proofreader is disabled. To reactivate it, just type PRINT USR(1536) and press RETURN.

Using the Proofreader

The MLX program listing has a checksum found immediately to the left of each line number. Don't enter the checksum when typing in a program. It is just for your information.

When you type in a line from the program listing and press RETURN, the Proofreader displays the checksum letters at the top of your screen. These checksum letters must match the checksum letters in the printed listing. If they don't match, it means you typed the line differently from the way it is listed. Immediately recheck your typing. You can correct any mistakes you find.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience since spacing is generally not important. But occasionally proper spacing is important, so be extra careful with spaces. The Proofreader will catch practically everything else that can go wrong. Characters in inverse video will appear like this:
INVERSE VIDEO

Enter these characters with the Atari key.

Due to the nature of a checksum, the Proofreader will not catch all errors. The Proofreader will not catch errors of transposition. In fact, you could type in a line in any order, and the Proofreader wouldn't notice.

There's another thing to watch out for: If you enter a line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check the line. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way. The only abbreviation that cannot be handled this way is when a question mark (?) is used instead of PRINT; they are not the same to the Proofreader.

Program 2-2. The Automatic Proofreader Download (Saved BASIC)

SpeedScript Program Listings

Before you begin typing SpeedScript, you must load and run the "MLX" program. Answer the MLX prompts as follows:

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Program 2-3. SpeedScript

To enter this program, you must use Program 2-1, MLX, found earlier in this chapter.

```
7936:173,198,002,141,197,002,201
7942:032,137,037,169,203,205,021
7948:179,066,141,179,066,240,115
7954:033,032,031,037,032,080,007
7960:042,165,012,141,118,037,027
7966:165,013,141,119,037,169,162
7972:117,133,012,169,037,133,125
7978:013,169,000,141,068,002,179
7984:169,001,133,009,032,234,114
7990:037,076,072,038,000,000,021
7996:000,000,000,000,000,000,060
8002:000,000,000,000,000,000,066
8008:000,000,000,000,000,000,072
8014:000,000,000,000,000,000,078
8020:000,000,000,000,000,000,084
8026:000,000,000,000,000,000,090
8032:000,000,000,000,000,000,096
8038:000,000,000,000,000,000,102
8044:000,000,000,000,000,000,108
8050:000,000,000,000,000,000,114
8056:000,000,000,000,000,000,120
8062:000,000,000,000,000,000,126
8068:000,000,000,000,000,000,132
8074:000,000,000,000,000,000,138
8080:000,000,000,000,000,000,144
8086:000,000,000,000,000,000,150
8092:000,000,000,000,000,000,156
8098:000,000,000,000,000,000,162
8104:000,000,000,000,000,000,168
8110:000,000,000,000,000,000,174
8116:000,000,000,000,000,000,180
8122:000,000,000,000,000,000,186
8128:000,000,000,000,000,000,192
8134:000,000,000,000,000,000,198
8140:000,000,000,000,000,000,204
8146:000,000,000,000,000,000,210
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8152:000,000,000,000,000,000,216
8158:000,000,000,000,000,000,222
8164:000,000,000,000,000,000,228
8170:000,000,000,000,000,000,234
8176:000,000,000,000,000,000,240
8182:000,000,000,000,000,000,246
8188:036,037,045,017,000,000,131
8194:000,000,000,000,000,000,002
8200:000,024,024,024,024,024,128
8206:000,024,000,102,102,102,088
8212:000,000,000,000,000,102,122
8218:255,102,102,255,102,000,074
8224:024,062,096,060,006,124,148
8230:024,000,000,204,216,048,018
8236:096,204,140,000,000,056,028
8242:108,056,112,222,204,118,102
8248:000,024,024,048,000,000,152
8254:000,000,000,024,048,096,230
8260:096,096,048,024,000,048,124
8266:024,012,012,012,024,048,206
8272:000,000,102,060,255,060,045
8278:102,000,000,000,024,024,236
8284:126,024,024,000,000,000,010
8290:000,000,000,048,048,096,034
8296:000,000,000,000,126,000,230
8302:000,000,000,000,000,000,110
8308:000,000,048,048,000,000,212
8314:006,012,024,048,096,192,244
8320:000,124,206,222,246,230,132
8326:198,124,000,024,056,024,048
8332:024,024,024,126,000,124,206
8338:198,012,024,048,096,254,010
8344:000,254,012,024,056,012,254
8350:198,124,000,028,060,108,164
8356:204,254,012,012,000,254,132
8362:192,252,006,006,198,124,180
8368:000,124,192,252,198,198,116
8374:198,124,000,126,006,012,136
8380:024,048,096,096,000,124,064
8386:198,198,124,198,198,124,210
8392:000,124,198,198,126,012,090
8398:024,048,000,000,048,048,118
8404:000,048,048,000,000,000,052
8410:048,048,000,048,048,096,250
8416:000,012,024,048,096,048,196
8422:024,012,000,000,000,126,136
8428:000,000,126,000,000,048,154
8434:024,012,006,012,024,048,112
8440:000,060,102,006,012,024,196
8446:000,024,000,124,198,222,054
8452:214,220,224,060,000,124,078
8458:198,198,198,254,198,198,230
8464:000,252,198,198,252,198,090
8470:198,252,000,124,198,192,218
8476:192,192,198,124,000,248,214
8482:204,198,198,198,204,248,004
8488:000,254,192,192,252,192,098
8494:192,254,000,254,192,192,106
8500:252,192,192,192,000,124,236
8506:198,192,222,198,198,124,166
8512:000,198,198,198,254,198,086
8518:198,198,000,126,024,024,128
8524:024,024,024,126,000,062,080
8530:012,012,012,012,204,120,198
8536:000,198,204,216,240,216,138
8542:204,198,000,192,192,192,048
8548:192,192,192,254,000,198,104
8554:238,254,214,198,198,198,126
8560:000,198,230,246,254,222,238
8566:206,198,000,124,198,198,018
8572:198,198,198,124,000,252,070
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8578:198,198,198,252,192,192,080
8584:000,124,198,198,198,222,052
8590:124,014,000,252,198,198,160
8596:252,216,204,198,000,124,118
8602:198,192,124,006,198,124,228
8608:000,126,024,024,024,024,126
8614:024,024,000,198,198,198,040
8620:198,198,198,124,000,198,064
8626:198,198,198,198,108,056,110
8632:000,198,198,198,214,254,222
8638:238,198,000,198,198,108,106
8644:056,108,198,198,000,102,090
8650:102,102,060,024,024,024,026
8656:000,254,012,024,048,096,130
8662:192,254,000,030,024,024,226
8668:024,024,024,030,000,064,130
8674:096,048,024,012,006,000,156
8680:000,240,048,048,048,048,152
8686:048,240,000,008,028,054,104
8692:099,000,000,000,000,000,087
8698:000,000,000,000,000,255,249
8704:000,000,000,000,000,000,000
8710:000,000,124,194,153,153,118
8716:129,153,153,230,252,130,035
8722:153,130,153,153,131,252,222
8728:124,194,153,158,158,153,196
8734:194,124,252,130,153,153,012
8740:153,153,130,252,254,130,084
8746:158,132,156,158,130,254,006
8752:126,193,206,194,206,204,153
8758:204,120,124,194,153,158,239
8764:145,153,194,124,246,153,051
8770:153,129,153,153,153,246,029
8776:127,097,115,050,050,115,114
8782:097,127,062,050,050,050,002
8788:050,114,198,124,230,153,185
8794:146,132,146,153,153,230,026
8800:120,076,076,076,076,078,086
8806:066,124,230,153,129,129,165
8812:137,153,153,230,230,153,140
8818:137,129,145,153,153,230,037
8824:124,194,153,153,153,153,026
8830:194,124,254,195,201,201,015
8836:195,206,200,240,124,194,011
8842:153,153,153,146,201,118,038
8848:124,194,201,201,194,201,235
8854:201,247,126,195,158,194,247
8860:249,153,195,126,254,194,047
8866:102,100,100,100,100,124,020
8872:246,153,153,153,153,153,155
8878:194,124,230,153,153,153,157
8884:153,194,100,056,246,153,058
8890:153,153,137,129,153,246,133
8896:230,153,153,194,153,153,204
8902:153,230,230,153,153,195,032
8908:230,100,100,124,254,193,181
8914:249,050,228,206,193,254,110
8920:120,096,120,096,126,024,030
8926:030,000,000,024,060,126,206
8932:024,024,024,000,000,024,068
8938:024,024,126,060,024,000,236
8944:000,000,000,012,012,088,096
8950:112,120,000,024,012,126,128
8956:012,024,000,000,000,000,032
8962:024,060,126,126,060,024,166
8968:000,000,000,124,006,126,008
8974:198,126,000,000,192,252,014
8980:198,198,198,252,000,000,098
8986:000,124,198,192,198,124,094
8992:000,000,006,126,198,198,048
8998:198,126,000,000,000,124,230
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9004:198,254,192,124,000,000,044
9010:062,096,252,096,096,096,236
9016:006,252,000,126,198,198,068
9022:198,126,000,000,192,192,002
9028:252,198,198,198,000,000,146
9034:024,000,056,024,024,060,006
9040:024,240,024,000,024,024,160
9046:024,024,000,000,192,204,018
9052:216,248,204,198,000,000,190
9058:056,024,024,024,024,060,054
9064:000,000,000,204,254,254,048
9070:214,198,000,000,000,252,006
9076:198,198,198,198,000,000,140
9082:000,124,198,198,198,124,196
9088:192,192,000,252,198,198,136
9094:198,252,006,006,000,126,210
9100:198,198,198,126,000,000,092
9106:000,252,198,192,192,192,148
9112:000,000,000,126,192,124,082
9118:006,252,000,000,048,254,206
9124:048,048,048,030,000,000,082
9130:000,198,198,198,198,126,064
9136:000,000,000,198,198,198,002
9142:108,056,000,000,000,198,032
9148:214,254,124,108,000,000,120
9154:000,198,108,056,108,198,094
9160:006,252,000,198,198,198,028
9166:198,126,000,000,000,254,016
9172:012,056,096,254,014,000,132
9178:014,024,024,056,024,024,128
9184:024,024,024,024,024,024,112
9190:024,024,112,000,112,024,014
9196:024,028,024,024,000,000,080
9202:000,008,024,056,024,008,106
9208:000,000,000,016,016,024,048
9214:028,024,000,000,000,000,050
9220:000,000,000,000,000,000,004
9226:000,000,000,000,000,000,010
9232:165,128,141,048,036,165,187
9238:129,141,049,036,165,130,160
9244:141,051,036,165,131,141,181
9250:052,036,166,133,240,032,181
9256:169,000,141,115,063,160,176
9262:000,185,255,255,153,255,125
9268:255,200,204,115,063,208,073
9274:244,238,049,036,238,052,147
9280:036,224,000,240,007,202,005
9286:208,224,165,132,208,222,205
9292:096,165,133,170,005,132,009
9298:208,001,096,024,138,101,138
9304:129,141,120,036,165,128,039
9310:141,119,036,024,138,101,141
9316:131,141,123,036,165,130,058
9322:141,122,036,232,164,132,165
9328:208,004,240,013,160,255,224
9334:185,255,255,153,255,255,196
9340:136,192,255,208,245,206,086
9346:120,036,206,123,036,202,085
9352:208,234,096,169,040,200,059
9358:024,109,108,068,024,101,064
9364:088,133,136,165,089,105,096
9370:000,133,137,024,173,111,220
9376:063,133,138,173,112,063,074
9382:133,139,162,001,173,114,120
9388:063,133,145,160,000,177,082
9394:138,153,123,063,200,041,128
9400:127,201,094,240,022,204,048
9406:107,068,208,239,136,177,101
9412:138,041,127,201,000,240,175
9418:007,136,208,245,172,107,053
9424:068,136,200,132,140,160,020
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9430:000,185,123,063,145,136,098
9436:200,196,140,208,246,024,210
9442:152,101,138,133,138,165,029
9448:139,105,000,133,139,224,204
9454:001,208,003,140,110,063,251
9460:204,107,068,240,008,169,016
9466:064,145,136,200,076,244,091
9472:036,024,165,136,105,040,250
9478:133,136,144,002,230,137,020
9484:232,224,019,240,003,076,038
9490:175,036,165,138,141,121,026
9496:063,165,139,141,122,063,205
9502:096,173,102,063,133,138,223
9508:141,111,063,141,117,063,160
9514:133,134,173,103,063,133,013
9520:139,141,112,063,141,118,250
9526:063,133,135,056,173,105,207
9532:063,237,103,063,170,169,097
9538:000,160,255,198,139,145,195
9544:138,200,230,139,145,138,038
9550:200,208,251,230,139,202,028
9556:208,246,145,138,096,133,026
9562:140,132,141,169,001,141,046
9568:240,002,160,000,177,140,047
9574:240,006,032,127,047,200,242
9580:208,246,096,032,204,047,173
9586:240,251,096,032,064,021,050
9592:173,106,068,240,006,160,105
9598:000,165,144,145,134,032,234
9604:234,037,076,072,038,169,246
9610:125,032,127,047,169,000,126
9616:141,114,063,141,102,063,000
9622:141,104,063,141,106,063,000
9628:141,108,063,141,245,063,149
9634:141,020,064,141,182,067,009
9640:141,190,002,141,108,068,050
9646:169,040,141,107,068,169,100
9652:068,024,105,001,141,103,110
9658:063,173,049,002,056,233,250
9664:001,141,109,063,056,233,027
9670:008,141,107,063,056,233,038
9676:001,141,105,063,169,255,170
9682:141,243,063,165,075,240,113
9688:016,173,109,063,141,105,055
9694:063,169,007,141,107,063,004
9700:169,030,141,109,063,096,068
9706:032,173,045,173,102,063,054
9712:133,134,173,103,063,133,211
9718:135,032,139,036,032,010,118
9724:038,169,152,160,061,032,096
9730:089,037,238,113,063,076,106
9736:207,039,032,026,038,169,007
9742:136,160,061,032,089,037,017
9748:169,000,141,113,063,096,090
9754:160,039,169,000,145,088,115
9760:136,016,251,169,000,133,225
9766:082,133,085,133,084,096,139
9772:072,041,128,133,140,104,150
9778:041,127,201,096,176,013,192
9784:201,032,176,006,024,105,088
9790:064,076,069,038,056,233,086
9796:032,005,140,096,160,000,245
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15226:095,060,032,139,036,076,048
15232:111,059,076,010,038,169,079
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15250:026,038,169,229,160,062,062
15256:032,089,037,032,206,046,082
15262:141,245,063,208,003,076,126
15268:010,038,160,000,185,163,208
15274:063,153,246,063,200,204,075
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15292:135,133,139,169,255,141,136
15298:243,063,160,001,162,000,055
15304:173,245,063,240,083,189,169
15310:246,063,032,044,038,209,070
15316:138,240,005,224,000,208,003
15322:235,202,200,208,011,230,024
15328:139,165,139,205,118,063,029
15334:240,002,176,054,232,236,146
15340:245,063,208,221,024,152,125
15346:101,138,133,140,165,139,034
15352:105,000,133,141,173,117,149
15358:063,197,140,173,118,063,240
15364:229,141,144,024,056,165,251
15370:140,237,245,063,133,134,194
15376:141,242,063,165,141,233,233
15382:000,133,135,141,243,063,225
15388:032,207,039,096,032,026,204

15394:038,169,235,160,062,032,218
15400:089,037,169,001,141,113,078
15406:063,096,169,008,141,031,042
15412:208,173,031,208,201,003,108
15418:208,035,032,026,038,169,054
15424:245,160,062,032,089,037,177
15430:032,206,046,141,020,064,067
15436:240,014,160,000,185,163,070
15442:063,153,021,064,200,204,019
15448:120,063,208,244,076,010,041
15454:038,056,165,134,133,130,238
15460:237,242,063,133,140,165,056
15466:135,133,131,237,243,063,024
15472:005,140,208,101,169,255,222
15478:141,243,063,024,173,245,239
15484:063,101,134,133,128,169,084
15490:000,101,135,133,129,056,172
15496:173,117,063,229,130,133,213
15502:132,173,118,063,229,131,220
15508:133,133,032,016,036,056,042
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15520:141,117,063,173,118,063,067
15526:233,000,141,118,063,173,126
15532:020,064,240,041,141,238,148
15538:063,169,000,141,239,063,085
15544:032,146,044,160,000,185,239
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15568:064,133,134,165,135,105,176
15574:000,133,135,076,207,039,036
15580:160,000,204,115,063,240,234
15586:029,177,142,048,026,032,168
15592:056,055,032,098,055,173,189
15598:241,063,240,010,169,008,201
15604:032,098,055,169,095,032,213
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15622:141,237,063,032,056,055,078
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15640:056,237,221,063,168,169,170
15646:032,032,098,055,136,208,079
15652:250,172,236,063,076,252,061
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15664:173,222,063,237,115,063,153
15670:056,237,221,063,168,169,200
15676:032,076,031,061,201,117,066
15682:208,008,173,241,063,073,064
15688:001,141,241,063,201,035,242
15694:208,018,140,236,063,174,149
15700:228,063,173,229,063,032,104
15706:155,047,172,236,063,076,071
15712:252,060,174,237,063,189,047
15718:051,064,032,098,055,076,222
15724:252,060,032,026,038,056,060
15730:173,104,063,237,117,063,103
15736:170,173,105,063,237,118,218
15742:063,032,160,047,169,001,086
15748:141,113,063,096,083,112,228
15754:101,101,100,083,099,114,224
15760:105,112,116,032,051,046,094
15766:048,000,032,098,121,032,225
15772:067,104,097,114,108,101,235
15778:115,032,066,114,097,110,184
15784:110,111,110,000,066,117,170
15790:102,102,101,114,032,067,180
15796:108,101,097,114,101,100,033
15802:000,066,117,102,102,101,162
15808:114,032,070,117,108,108,229
15814:000,068,101,108,101,116,180

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15826:044,080,041,000,058,032,209
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15838:117,032,115,117,114,101,050
15844:063,032,040,089,047,078,065
15850:041,058,000,069,082,065,037
15856:083,069,032,065,076,076,129
15862:032,084,069,088,084,000,091
15868:069,114,097,115,101,032,012
15874:040,083,044,087,044,080,124
15880:041,058,032,210,197,212,246
15886:213,210,206,032,116,111,134
15892:032,101,120,105,116,000,238
15898:083,097,118,101,032,040,241
15904:068,101,118,105,099,101,112
15910:058,070,105,108,101,110,078
15916:097,109,101,041,062,000,198
15922:069,114,114,111,114,032,092
15928:035,000,066,082,069,065,117
15934:075,032,075,101,121,032,242
15940:065,098,111,114,116,000,060
15946:078,111,032,069,114,114,080
15952:111,114,115,000,076,111,095
15958:097,100,032,040,068,101,012
15964:118,105,099,101,058,070,131
15970:105,108,101,110,097,109,216
15976:101,041,062,000,032,080,164
15982:114,101,115,115,032,210,029
15988:197,212,213,210,206,000,130
15994:068,049,058,042,046,042,171
16000:077,101,109,111,114,121,249
16006:032,070,117,108,108,000,057
16012:078,111,032,116,101,120,186
16018:116,032,105,110,032,098,127
16024:117,102,102,101,114,000,176
16030:080,114,105,110,116,032,203
16036:040,068,101,118,105,099,183
16042:101,058,070,105,108,101,201
16048:110,097,109,101,041,062,184
16054:000,080,114,105,110,116,195
16060:105,110,103,046,046,046,132
16066:155,155,000,073,110,115,034
16072:101,114,116,032,110,101,006
16078:120,116,032,115,104,101,026
16084:101,116,044,032,112,114,219
16090:101,115,115,032,210,197,220
16096:212,213,210,206,000,070,111
16102:105,110,100,058,000,078,169
16108:111,116,032,102,111,117,057
16114:110,100,000,067,104,097,208
16120:110,103,101,032,116,111,053
16126:058,000,027,028,027,029,167
16132:027,030,027,031,032,195,090
16138:212,210,204,045,196,101,210
16144:108,101,116,101,032,204,166
16150:111,099,107,032,213,110,182
16156:108,111,099,107,032,210,183
16162:101,110,097,109,101,032,072
16168:197,211,195,198,111,114,042
16174:109,097,116,032,195,212,039
16180:210,204,045,204,111,097,155
16186:100,032,032,068,114,105,253
16192:118,101,032,091,177,032,103
16198:178,032,179,032,180,093,252
16204:058,032,000,082,101,110,203
16210:097,109,101,032,116,111,136
16216:058,000,070,111,114,109,038
16222:097,116,032,100,105,115,147
16228:107,000,000,000,000,000,207
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Chapter 2
Entering SpeedScript

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The Machine Language Editor: MLX

Two program-entry aids written in BASIC are included here to make typing in SpeedScript as easy as possible. The first, "MLX," is explained in this article. The second, "The Automatic Proofreader," is a short program that will help you type in MLX without typing mistakes. Read the instructions for using the Automatic Proofreader later in this chapter before you type in the MLX program.

"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). And 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 MLX, Program 2-1 (you'll want to use it in the future). When you're ready to type in SpeedScript, run MLX. MLX asks you for three numbers: the starting address, the ending address, and the run/init address. These numbers for SpeedScript are

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Next, you'll be asked "Tape or Disk." SpeedScript can be saved as either a binary file on disk or as a boot tape. Press T for use with a tape drive. If you press D for disk, you'll be asked "Boot Disk or Binary File." Press F to select the Binary File option. Although you could save SpeedScript as an auto- booting disk, it makes no sense, since such a disk cannot contain DOS, which is necessary for file-oriented disk access.

The screen will then show the first prompt, the number 7936 followed by a colon. Type in each three-digit number shown in the listing. You do not need to type the comma shown in the listing; MLX inserts the comma automatically. 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 if you 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 DELETE/BACK S 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 the comma key, the space bar, or the RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

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 made a typo when entering the MLX program itself.

Fortunately, you don't have to enter all of SpeedScript 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:

CTRL-S Save
CTRL-L Load
CTRL-N New Address
CTRL-D Display

To issue a command, hold down the CTRL key (CONTROL on the XL models) and press the indicated key. 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 (CTRL-S) 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 to make a note of the address where you stop. The next time you run MLX, answer all the prompts as you did before - regardless of where you stopped typing - then insert the disk or tape. When you get to the line number prompt, press CTRL-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 CTRL-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 MLX-format listing, or the checksum won't work. The Display command lets you display a section of your typing. After you press CTRL-D, enter two addresses within the line-number range of the listing. You can break out of the listing display and return to the prompt by pressing any key.

Refer to the "Automatic Proofreader" article before typing in this program.

Program 2-1. MLX: The Machine Language Editor Download (Saved BASIC)

The Automatic Proofreader

At last there's a way for your computer to help you check your typing. "The Automatic Proofreader" will make entering programs faster, easier, and more accurate.

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer to check your typing for you?

"The Automatic Proofreader" will help you type in "MLX" program listings without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing the MLX program.

Preparing the Proofreader

1. Type in the Proofreader (Program 2-2). Be very careful when entering the DATA statements - don't type an l instead of a 1, an O instead of a 0, extra commas, and so on.
2. Save the Proofreader on tape or disk at least twice before running it for the first time.
3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place - you'll need it again and again when typing in programs from other COMPUTE! books or COMPUTE! magazine.
4. When a correct version of the Proofreader is run, the following message will appear on the screen: "Automatic Proofreader Now Activated." Type NEW and press RETURN. You are now ready to enter the MLX program listing. If you press SYSTEM RESET, the Proofreader is disabled. To reactivate it, just type PRINT USR(1536) and press RETURN.

Using the Proofreader

The MLX program listing has a checksum found immediately to the left of each line number. Don't enter the checksum when typing in a program. It is just for your information.

When you type in a line from the program listing and press RETURN, the Proofreader displays the checksum letters at the top of your screen. These checksum letters must match the checksum letters in the printed listing. If they don't match, it means you typed the line differently from the way it is listed. Immediately recheck your typing. You can correct any mistakes you find.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience since spacing is generally not important. But occasionally proper spacing is important, so be extra careful with spaces. The Proofreader will catch practically everything else that can go wrong. Characters in inverse video will appear like this:
INVERSE VIDEO

Enter these characters with the Atari key.

Due to the nature of a checksum, the Proofreader will not catch all errors. The Proofreader will not catch errors of transposition. In fact, you could type in a line in any order, and the Proofreader wouldn't notice.

There's another thing to watch out for: If you enter a line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check the line. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way. The only abbreviation that cannot be handled this way is when a question mark (?) is used instead of PRINT; they are not the same to the Proofreader.

Program 2-2. The Automatic Proofreader Download (Saved BASIC)

SpeedScript Program Listings

Before you begin typing SpeedScript, you must load and run the "MLX" program. Answer the MLX prompts as follows:

Starting Address? 7936
Ending Address? 16229
Run/Init Address 7936

Program 2-3. SpeedScript

To enter this program, you must use Program 2-1, MLX, found earlier in this chapter.

```
7936:173,198,002,141,197,002,201
7942:032,137,037,169,203,205,021
7948:179,066,141,179,066,240,115
7954:033,032,031,037,032,080,007
7960:042,165,012,141,118,037,027
7966:165,013,141,119,037,169,162
7972:117,133,012,169,037,133,125
7978:013,169,000,141,068,002,179
7984:169,001,133,009,032,234,114
7990:037,076,072,038,000,000,021
7996:000,000,000,000,000,000,060
8002:000,000,000,000,000,000,066
8008:000,000,000,000,000,000,072
8014:000,000,000,000,000,000,078
8020:000,000,000,000,000,000,084
8026:000,000,000,000,000,000,090
8032:000,000,000,000,000,000,096
8038:000,000,000,000,000,000,102
8044:000,000,000,000,000,000,108
8050:000,000,000,000,000,000,114
8056:000,000,000,000,000,000,120
8062:000,000,000,000,000,000,126
8068:000,000,000,000,000,000,132
8074:000,000,000,000,000,000,138
8080:000,000,000,000,000,000,144
8086:000,000,000,000,000,000,150
8092:000,000,000,000,000,000,156
8098:000,000,000,000,000,000,162
8104:000,000,000,000,000,000,168
8110:000,000,000,000,000,000,174
8116:000,000,000,000,000,000,180
8122:000,000,000,000,000,000,186
8128:000,000,000,000,000,000,192
8134:000,000,000,000,000,000,198
8140:000,000,000,000,000,000,204
8146:000,000,000,000,000,000,210
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8152:000,000,000,000,000,000,216
8158:000,000,000,000,000,000,222
8164:000,000,000,000,000,000,228
8170:000,000,000,000,000,000,234
8176:000,000,000,000,000,000,240
8182:000,000,000,000,000,000,246
8188:036,037,045,017,000,000,131
8194:000,000,000,000,000,000,002
8200:000,024,024,024,024,024,128
8206:000,024,000,102,102,102,088
8212:000,000,000,000,000,102,122
8218:255,102,102,255,102,000,074
8224:024,062,096,060,006,124,148
8230:024,000,000,204,216,048,018
8236:096,204,140,000,000,056,028
8242:108,056,112,222,204,118,102
8248:000,024,024,048,000,000,152
8254:000,000,000,024,048,096,230
8260:096,096,048,024,000,048,124
8266:024,012,012,012,024,048,206
8272:000,000,102,060,255,060,045
8278:102,000,000,000,024,024,236
8284:126,024,024,000,000,000,010
8290:000,000,000,048,048,096,034
8296:000,000,000,000,126,000,230
8302:000,000,000,000,000,000,110
8308:000,000,048,048,000,000,212
8314:006,012,024,048,096,192,244
8320:000,124,206,222,246,230,132
8326:198,124,000,024,056,024,048
8332:024,024,024,126,000,124,206
8338:198,012,024,048,096,254,010
8344:000,254,012,024,056,012,254
8350:198,124,000,028,060,108,164
8356:204,254,012,012,000,254,132
8362:192,252,006,006,198,124,180
8368:000,124,192,252,198,198,116
8374:198,124,000,126,006,012,136
8380:024,048,096,096,000,124,064
8386:198,198,124,198,198,124,210
8392:000,124,198,198,126,012,090
8398:024,048,000,000,048,048,118
8404:000,048,048,000,000,000,052
8410:048,048,000,048,048,096,250
8416:000,012,024,048,096,048,196
8422:024,012,000,000,000,126,136
8428:000,000,126,000,000,048,154
8434:024,012,006,012,024,048,112
8440:000,060,102,006,012,024,196
8446:000,024,000,124,198,222,054
8452:214,220,224,060,000,124,078
8458:198,198,198,254,198,198,230
8464:000,252,198,198,252,198,090
8470:198,252,000,124,198,192,218
8476:192,192,198,124,000,248,214
8482:204,198,198,198,204,248,004
8488:000,254,192,192,252,192,098
8494:192,254,000,254,192,192,106
8500:252,192,192,192,000,124,236
8506:198,192,222,198,198,124,166
8512:000,198,198,198,254,198,086
8518:198,198,000,126,024,024,128
8524:024,024,024,126,000,062,080
8530:012,012,012,012,204,120,198
8536:000,198,204,216,240,216,138
8542:204,198,000,192,192,192,048
8548:192,192,192,254,000,198,104
8554:238,254,214,198,198,198,126
8560:000,198,230,246,254,222,238
8566:206,198,000,124,198,198,018
8572:198,198,198,124,000,252,070
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8578:198,198,198,252,192,192,080
8584:000,124,198,198,198,222,052
8590:124,014,000,252,198,198,160
8596:252,216,204,198,000,124,118
8602:198,192,124,006,198,124,228
8608:000,126,024,024,024,024,126
8614:024,024,000,198,198,198,040
8620:198,198,198,124,000,198,064
8626:198,198,198,198,108,056,110
8632:000,198,198,198,214,254,222
8638:238,198,000,198,198,108,106
8644:056,108,198,198,000,102,090
8650:102,102,060,024,024,024,026
8656:000,254,012,024,048,096,130
8662:192,254,000,030,024,024,226
8668:024,024,024,030,000,064,130
8674:096,048,024,012,006,000,156
8680:000,240,048,048,048,048,152
8686:048,240,000,008,028,054,104
8692:099,000,000,000,000,000,087
8698:000,000,000,000,000,255,249
8704:000,000,000,000,000,000,000
8710:000,000,124,194,153,153,118
8716:129,153,153,230,252,130,035
8722:153,130,153,153,131,252,222
8728:124,194,153,158,158,153,196
8734:194,124,252,130,153,153,012
8740:153,153,130,252,254,130,084
8746:158,132,156,158,130,254,006
8752:126,193,206,194,206,204,153
8758:204,120,124,194,153,158,239
8764:145,153,194,124,246,153,051
8770:153,129,153,153,153,246,029
8776:127,097,115,050,050,115,114
8782:097,127,062,050,050,050,002
8788:050,114,198,124,230,153,185
8794:146,132,146,153,153,230,026
8800:120,076,076,076,076,078,086
8806:066,124,230,153,129,129,165
8812:137,153,153,230,230,153,140
8818:137,129,145,153,153,230,037
8824:124,194,153,153,153,153,026
8830:194,124,254,195,201,201,015
8836:195,206,200,240,124,194,011
8842:153,153,153,146,201,118,038
8848:124,194,201,201,194,201,235
8854:201,247,126,195,158,194,247
8860:249,153,195,126,254,194,047
8866:102,100,100,100,100,124,020
8872:246,153,153,153,153,153,155
8878:194,124,230,153,153,153,157
8884:153,194,100,056,246,153,058
8890:153,153,137,129,153,246,133
8896:230,153,153,194,153,153,204
8902:153,230,230,153,153,195,032
8908:230,100,100,124,254,193,181
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14368:063,141,234,063,177,138,080
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14416:200,177,138,201,000,240,012
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14428:056,101,138,133,138,165,055
14434:139,105,000,133,139,160,006
14440:000,173,235,063,201,255,007
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14452:233,063,240,003,032,117,036
14458:057,056,046,233,063,173,238
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14482:057,173,235,063,205,225,080
14488:063,144,003,032,238,056,176
14494:056,165,138,237,117,063,166
14500:133,140,165,139,237,118,072
14506:063,005,140,240,060,144,054
14512:058,173,220,063,240,011,173
14518:169,000,141,219,063,141,147
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14620:152,057,032,152,057,238,204
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14632:063,173,227,063,208,031,037
14638:056,173,228,063,237,230,009
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14668:055,173,219,063,240,017,075
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14716:063,240,006,032,098,055,106
14722:136,208,250,096,172,226,194
14728:063,024,152,109,235,063,014
14734:141,235,063,032,152,057,054
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14752:240,003,032,098,055,096,172
14758:141,237,063,041,127,032,039
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14770:241,057,240,009,202,208,111
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14782:058,202,138,010,170,140,140
14788:236,063,169,057,072,169,194
14794:212,072,189,004,058,072,041
14800:189,003,058,072,096,056,170
14806:173,236,063,101,138,133,034
14812:138,165,139,105,000,133,132
14818:139,076,020,056,177,138,064
14824:201,094,240,001,136,140,020
14830:236,063,096,017,119,108,109
14836:114,116,098,115,110,104,133
14842:102,064,112,063,120,109,052
14848:105,103,106,097,058,115,072
14854:058,125,058,135,058,145,073
14860:058,155,058,165,058,180,174
14866:058,214,058,071,058,087,052
14872:058,055,058,045,058,036,078
14878:058,239,058,024,059,106,062
14884:058,200,169,000,141,233,069
14890:063,076,230,057,200,032,188
14896:020,054,141,232,063,076,122
14902:230,057,200,032,020,054,135
14908:141,230,063,173,208,063,170
14914:141,231,063,076,230,057,096
14920:200,032,020,054,141,228,235
14926:063,173,208,063,141,229,187
14932:063,076,230,057,200,032,230
14938:020,054,141,223,063,076,155
14944:230,057,169,000,141,227,152
14950:063,200,076,230,057,169,129
14956:010,141,181,067,200,076,015
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14986:020,054,141,224,063,076,204
14992:230,057,200,032,020,054,225
14998:141,225,063,076,230,057,174
15004:200,032,020,054,141,226,061
15010:063,076,230,057,172,236,228
15016:063,200,152,072,032,238,157
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15040:153,178,065,200,204,219,187
15046:063,144,245,240,243,200,053
15052:076,230,057,200,177,138,058
15058:201,094,208,249,096,032,066
15064:207,058,136,140,220,063,016
15070:160,001,177,138,153,179,006
15076:066,200,204,220,063,144,101
15082:245,240,243,076,230,057,045
15088:032,207,058,076,230,057,132
15094:200,177,138,201,029,240,207
15100:007,136,173,237,063,076,176
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15112:072,173,237,063,041,127,209
15118:170,104,157,051,064,032,080
15124:230,057,076,213,057,160,045
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15136:094,240,012,032,056,055,009
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15148:014,208,238,142,120,063,061
15154:169,000,157,163,063,162,252
15160:096,142,185,067,169,004,207
15166:141,186,067,032,016,053,045
15172:016,003,076,155,055,169,030
15178:000,133,142,133,143,032,145
15184:031,037,032,126,053,016,119
15190:003,076,155,055,104,104,071
15196:162,112,141,185,067,076,067
15202:010,056,032,145,059,173,061
15208:245,063,240,022,032,060,254
15214:060,032,183,059,173,243,092
15220:063,201,255,240,009,032,148
15226:095,060,032,139,036,076,048
15232:111,059,076,010,038,169,079
15238:008,141,031,208,173,031,214
15244:208,201,003,208,038,032,062
15250:026,038,169,229,160,062,062
15256:032,089,037,032,206,046,082
15262:141,245,063,208,003,076,126
15268:010,038,160,000,185,163,208
15274:063,153,246,063,200,204,075
15280:120,063,208,244,076,010,129
15286:038,165,134,133,138,165,187
15292:135,133,139,169,255,141,136
15298:243,063,160,001,162,000,055
15304:173,245,063,240,083,189,169
15310:246,063,032,044,038,209,070
15316:138,240,005,224,000,208,003
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15328:139,165,139,205,118,063,029
15334:240,002,176,054,232,236,146
15340:245,063,208,221,024,152,125
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15352:105,000,133,141,173,117,149
15358:063,197,140,173,118,063,240
15364:229,141,144,024,056,165,251
15370:140,237,245,063,133,134,194
15376:141,242,063,165,141,233,233
15382:000,133,135,141,243,063,225
15388:032,207,039,096,032,026,204

15394:038,169,235,160,062,032,218
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15406:063,096,169,008,141,031,042
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15418:208,035,032,026,038,169,054
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15430:032,206,046,141,020,064,067
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15448:120,063,208,244,076,010,041
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15466:135,133,131,237,243,063,024
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15478:141,243,063,024,173,245,239
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15532:020,064,240,041,141,238,148
15538:063,169,000,141,239,063,085
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15568:064,133,134,165,135,105,176
15574:000,133,135,076,207,039,036
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15586:029,177,142,048,026,032,168
15592:056,055,032,098,055,173,189
15598:241,063,240,010,169,008,201
15604:032,098,055,169,095,032,213
15610:098,055,200,076,222,060,193
15616:096,140,236,063,041,127,191
15622:141,237,063,032,056,055,078
15628:201,099,208,027,056,173,008
15634:232,063,237,115,063,074,034
15640:056,237,221,063,168,169,170
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15652:250,172,236,063,076,252,061
15658:060,201,101,208,017,056,173
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15670:056,237,221,063,168,169,200
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15688:001,141,241,063,201,035,242
15694:208,018,140,236,063,174,149
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15724:252,060,032,026,038,056,060
15730:173,104,063,237,117,063,103
15736:170,173,105,063,237,118,218
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15754:101,101,100,083,099,114,224
15760:105,112,116,032,051,046,094
15766:048,000,032,098,121,032,225
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15778:115,032,066,114,097,110,184
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15790:102,102,101,114,032,067,180
15796:108,101,097,114,101,100,033
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15808:114,032,070,117,108,108,229
15814:000,068,101,108,101,116,180

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15826:044,080,041,000,058,032,209
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15850:041,058,000,069,082,065,037
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15862:032,084,069,088,084,000,091
15868:069,114,097,115,101,032,012
15874:040,083,044,087,044,080,124
15880:041,058,032,210,197,212,246
15886:213,210,206,032,116,111,134
15892:032,101,120,105,116,000,238
15898:083,097,118,101,032,040,241
15904:068,101,118,105,099,101,112
15910:058,070,105,108,101,110,078
15916:097,109,101,041,062,000,198
15922:069,114,114,111,114,032,092
15928:035,000,066,082,069,065,117
15934:075,032,075,101,121,032,242
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15946:078,111,032,069,114,114,080
15952:111,114,115,000,076,111,095
15958:097,100,032,040,068,101,012
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15970:105,108,101,110,097,109,216
15976:101,041,062,000,032,080,164
15982:114,101,115,115,032,210,029
15988:197,212,213,210,206,000,130
15994:068,049,058,042,046,042,171
16000:077,101,109,111,114,121,249
16006:032,070,117,108,108,000,057
16012:078,111,032,116,101,120,186
16018:116,032,105,110,032,098,127
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16030:080,114,105,110,116,032,203
16036:040,068,101,118,105,099,183
16042:101,058,070,105,108,101,201
16048:110,097,109,101,041,062,184
16054:000,080,114,105,110,116,195
16060:105,110,103,046,046,046,132
16066:155,155,000,073,110,115,034
16072:101,114,116,032,110,101,006
16078:120,116,032,115,104,101,026
16084:101,116,044,032,112,114,219
16090:101,115,115,032,210,197,220
16096:212,213,210,206,000,070,111
16102:105,110,100,058,000,078,169
16108:111,116,032,102,111,117,057
16114:110,100,000,067,104,097,208
16120:110,103,101,032,116,111,053
16126:058,000,027,028,027,029,167
16132:027,030,027,031,032,195,090
16138:212,210,204,045,196,101,210
16144:108,101,116,101,032,204,166
16150:111,099,107,032,213,110,182
16156:108,111,099,107,032,210,183
16162:101,110,097,109,101,032,072
16168:197,211,195,198,111,114,042
16174:109,097,116,032,195,212,039
16180:210,204,045,204,111,097,155
16186:100,032,032,068,114,105,253
16192:118,101,032,091,177,032,103
16198:178,032,179,032,180,093,252
16204:058,032,000,082,101,110,203
16210:097,109,101,032,116,111,136
16216:058,000,070,111,114,109,038
16222:097,116,032,100,105,115,147
16228:107,000,000,000,000,000,207
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Chapter 3
SpeedScript Source Code

Atari Source Code

The source code for SpeedScript was originally developed using the MAC/65 assembler (from Optimized Systems Software, Inc.). The MAC/65 assembler uses the standard MOS source code format, so this source code can be assembled on a variety of Atari assemblers, including EASMD from OSS and the Atari Assembler/Editor cartridge. The source code was originally broken up into a number of modules, each SAVE#'d to disk. The .INCLUDE pseudo-op was used to link all the modules together. All files must be merged together to be assembled with the Atari Assembler/Editor cartridge. Line numbers are omitted.

Most pseudo-ops are in standard MOS 6502 notation: *= updates the program counter (some assemblers use .ORG instead); .BYTE assembles a list of numbers or an ATASCII character string; .WOR, or .WORD, assembles a list of addresses into low byte/high byte format; < extracts the low byte of a 16-bit expression; > extracts the high byte of a 16-bit expression (some assemblers reverse the use of < and > others, such as EASMD and the Assembler/Editor cartridge, use a suffix of &255 and /256 to achieve the same effect); and = is used to assign an expression to a label (some assemblers use .EQU).

Beginners should make sure they understand Indirect-Y addressing, as in LDA ($FB),Y or LDA (CURR),Y. This mode is used extensively in SpeedScript.

The Atari version of SpeedScript was developed by sending the Commodore 64 source code to the Atari via modem. References to Commodore 64 Kernal ROM routines were replaced with Atari CIO routines. Some routines built into the Commodore 64's ROM had to be programmed into Atari SpeedScript, with resulting code expansion. References to location 1 (which maps banks of ROM in and out in the 64) were omitted. The REFRESH routine, TOPCLR, and a few other routines were changed to compensate for Atari's floating screen memory. The raster interrupt used to highlight the command line in the 64 version became a display-list interrupt. A custom character set was added to take advantage of the Atari's special nine-line character mode. The DOS package was written to support disk functions. But much of the source code did not need to be changed at all, since SpeedScript's machine-specific code is segregated into distinct modules. These modules were rewritten. Approximately one week was required to get a primitive version running, followed by two months of testing, debugging, and refining to complete Atari SpeedScript. Because of the new character set, the DOS package, smoother input/output programming (such as Atari's device-independent I/O), and more logical keyboard layout, the Atari version may be the best version of SpeedScript yet.

SpeedScript is written in small modules. Some people think that subroutines are useful only when a routine is called more than once. I strongly believe in breaking up a problem into a number of discrete tasks. These tasks can be written as subroutines, then tested individually. Once all the modules are working, just link them together with JSRs and you have a working program.

I've also tried to use meaningful labels, but sometimes one just runs out of imagination. Comments are added below as signposts to guide you through the source code (you needn't type them in--if you do, precede each comment with a semicolon for the sake of your assembler). Modules are also set apart with blank lines. Notice that some modules are used in rather creative ways. For example, word left/word right is used both for moving the cursor and in delimiting a word to be erased in the erase mode. Also, note that memory locations are sometimes used instead of meaningful labels. In order to fit the complete source code into memory at once, I sometimes had to compromise readability for the sake of brevity.

Crucial to the understanding of SpeedScript is the REFRESH routine. Study it carefully. REFRESH is the only routine in SpeedScript that writes directly to the screen (CIO is used to print on the command line). It automatically takes care of word-wrap and carriage returns, and provides useful pointers so that the CHECK routine can easily

scroll the screen. This frees the rest of SpeedScript to just move and modify contiguous memory. Carriage returns are not padded out in memory with spaces to fill the rest of a line; the REFRESH routine takes care of this transparently.

Speedscript 3.0 Source Code for Atari

Filename: SPEED.0

```
Location $1F00 is safely above DOS 2.0S, DOS 3,
and OS/A+ DOS. Some DOS's may use more memory, so
you may need to reassemble SpeedScript at a
higher address, usually the address of LOMEM plus
256 bytes to be safe.

    *=  $1F00

Locations used by high-speed memory move
routines.

FROML = $80
FROMH = $81
DESTL = $82
DESTH = $83
LLEN =  $84
HLEN =  $85

CURR: Position of cursor within text memory. SCR:
used by the REFRESH routine.

CURR =  $86
SCR =   $88

TEX: An alternate location used in tandem with
CURR. COLR is used by REFRESH. TEMP is used
throughout as a scratehpad pointer. INDIR is also
a reusable indirect pointer. UNDERCURS stores the
value of the character highlighted by the cursor.

TEX =   $8A
TEMP =  $8C
INDIR = $8E
UNDERCURS = $90

WTNDCOLOR: Color of command line window supported
by HIGHLIGHT. RETCHAR is the screen-code value of
the return-mark (a left-pointing arrow). SPACE is
the screen-code value of the space character, RED
and BLUE are used as command-line colors

WINDCOLR = $91
RETCHAR = 94
SPACE = 0
RED =   $32
BLUE =  $74

Input/Output Control System definitions for
input/output control blocks (IOCBs). CIO is the
entry point for all file-oriented input/output.
SHFLOK is the SHiFtLOcK flag.


ICCOM = $0342
ICBADR = $0344
ICBLEN = $0348
ICAUX1 = $034A
ICAUX2 = $034B
ICSTAT = $0343
SHFLOK = $02BE
CIO =   $E456
```

Called only when run from DOS. It is assumed that the author's initials (that conveniently work out in hex) are not normally present in memory. If they are, we know that SpeedScript has been run before, so we avoid the ERASE routine to preserve the text in memory.

```
BEGIN LDA 710
    STA 709
    JSR INIT
    LDA #$CB
    CMP FIRSTRUN
    STA FIRSTRUN
    BEQ SKIPERAS
    JSR ERASE
    JSR KILLBUFF
```

We save the DOS reset vector and change this vector to point to SpeedScript's SYSTEM RESET routine. Since this routine is called at power-up, right after DOS.SYS runs, we need to disable the cold-start flag (location 580) and set location $09 to signify a successful disk boot.

```
    LDA $0C
    STA JDOS+1
    LDA $0D
    STA JDOS+2
    LDA # <JDOS
    STA $0C
    LDA # >JDOS
    STA $0D
    LDA #0
    STA 580
    LDA #1
    STA $09
SKIPERAS JSR INIT2
    JMP MAIN
```

The character set for the ANTIC 3 nine-line character mode must be on an even 512-Syte boundary, so we force the assembler's program counter to address $2000 and merge in the character set. We then link in each successive module of SpeedScript. Again, if your assembler cannot handle .INCLUDE, you'll have to merge all these files together in the order indicated.

```
    *=  $2000
    .INCLUDE #D:CHSET.SRC
    .INCLUDE #D:SPEED.1
    .INCLUDE #D:SUPPORT
    .INCLUDE #D:DOSPAK
    .INCLUDE #D:SPEED.2
    .INCLUDE #D:DATA
    .END
```

Filename: CHSET.SRC

The character set here is stored as eight bytes per line, so each line defines one character. Sheldon Leemon's INSTEDIT character editor was used to create the character set, and I wrote a special program to convert the character set into .BYTE statements. In ANTIC mode 3, each character takes up ten scan lines of vertical screen space. The characters in the lowercase portion of the character set are displayed with a blank line at the top line, then the character data from bytes

```
1-7 of the character set. Byte 0 of the
character's definition is displayed at the ninth
line of the character. The tenth line is always
blank. This lets you define characters with true
descenders. The forced blank line lets you use
more of the character matrix for defining a
character, so these characters are larger than
normal Atari characters.

.BYTE 0,0,0,0,0,0,0,0
.BYTE 0,24,24,24,24,24,0,24
.BYTE 0,102,102,102,0,0,0,0
.BYTE 0,102,255,102,102,255,102,0
.BYTE 24,62,96,60,6,124,24,0
.BYTE 0,204,216,48,96,204,140,0
.BYTE 0,56,108,56,112,222,204,118
.BYTE 0,24,24,48,0,0,0,0
.BYTE 0,24,48,96,96,96,48,24
.BYTE 0,48,24,12,12,12,24,48
.BYTE 0,0,102,60,255,60,102,0
.BYTE 0,0,24,24,126,24,24,0
.BYTE 0,0,0,0,0,48,48,96
.BYTE 0,0,0,0,126,0,0,0
.BYTE 0,0,0,0,0,0,48,48
.BYTE 0,0,6,12,24,48,96,192
.BYTE 0,124,206,222,246,230,198,124
.BYTE 0,24,56,24,24,24,24,126
.BYTE 0,124,198,12,24,48,96,254
.BYTE 0,254,12,24,56,12,198,124
.BYTE 0,28,60,108,204,254,12,12
.BYTE 0,254,192,252,6,6,198,124
.BYTE 0,124,192,252,198,198,198,124
.BYTE 0,126,6,12,24,48,96,96
.BYTE 0,124,198,198,124,198,198,124
.BYTE 0,124,198,198,126,12,24,48
.BYTE 0,0,48,48,0,48,48,0
.BYTE 0,0,48,48,0,48,48,96
.BYTE 0,12,24,48,96,48,24,12
.BYTE 0,0,0,126,0,0,126,0
.BYTE 0,48,24,12,6,12,24,48
.BYTE 0,60,102,6,12,24,0,24
.BYTE 0,124,198,222,214,220,224,60
.BYTE 0,124,198,198,198,254,198,198
.BYTE 0,252,198,198,252,198,198,252
.BYTE 0,124,198,192,192,192,198,124
.BYTE 0,248,204,198,198,198,204,248
.BYTE 0,254,192,192,252,192,192,254
.BYTE 0,254,192,192,252,192,192,192
.BYTE 0,124,198,192,222,198,198,124
.BYTE 0,198,198,198,254,198,198,198
.BYTE 0,126,24,24,24,24,24,126
.BYTE 0,62,12,12,12,12,204,120
.BYTE 0,198,204,216,240,216,204,198
.BYTE 0,192,192,192,192,192,192,254
.BYTE 0,198,238,254,214,198,198,198
.BYTE 0,198,230,246,254,222,206,198
.BYTE 0,124,198,198,198,198,198,124
.BYTE 0,252,198,198,198,252,192,192
.BYTE 0,124,198,198,198,222,124,14
.BYTE 0,252,198,198,252,216,204,198
.BYTE 0,124,198,192,124,6,198,124
.BYTE 0,126,24,24,24,24,24,24
.BYTE 0,198,198,198,198,198,198,124
.BYTE 0,198,198,198,198,198,108,56
.BYTE 0,198,198,198,214,254,238,198
.BYTE 0,198,198,108,56,108,198,198
.BYTE 0,102,102,102,60,24,24,24
.BYTE 0,254,12,24,48,96,192,254
.BYTE 0,30,24,24,24,24,24,30
.BYTE 0,64,96,48,24,12,6,0
.BYTE 0,240,48,48,48,48,48,240
```

```
.BYTE 0,8,28,54,99,0,0,0
.BYTE 0,0,0,0,0,0,0,255
.BYTE 0,0,0,0,0,0,0,0
.BYTE 124,194,153,153,129,153,153,230
.BYTE 252,130,153,130,153,153,131,252
.BYTE 124,194,153,158,158,153,194,124
.BYTE 252,130,153,153,153,153,130,252
.BYTE 254,130,158,132,156,158,130,254
.BYTE 126,193,206,194,206,204,204,120
.BYTE 124,194,153,158,145,153,194,124
.BYTE 246,153,153,129,153,153,153,246
.BYTE 127,97,115,50,50,115,97,127
.BYTE 62,50,50,50,50,114,198,124
.BYTE 230,153,146,132,146,153,153,230
.BYTE 120,76,76,76,76,78,66,124
.BYTE 230,153,129,129,137,153,153,230
.BYTE 230,153,137,129,145,153,153,230
.BYTE 124,194,153,153,153,153,194,124
.BYTE 254,195,201,201,195,206,200,240
.BYTE 124,194,153,153,153,146,201,118
.BYTE 124,194,201,201,194,201,201,247
.BYTE 126,195,158,194,249,153,195,126
.BYTE 254,194,102,100,100,100,100,124
.BYTE 246,153,153,153,153,153,194,124
.BYTE 230,153,153,153,153,194,100,56
.BYTE 246,153,153,153,137,129,153,246
.BYTE 230,153,153,194,153,153,153,230
.BYTE 230,153,153,195,230,100,100,124
.BYTE 254,193,249,50,228,206,193,254
.BYTE 120,96,120,96,126,24,30,0
.BYTE 0,24,60,126,24,24,24,0
.BYTE 0,24,24,24,126,60,24,0
.BYTE 0,0,0,12,12,88,112,120
.BYTE 0,24,12,126,12,24,0,0
.BYTE 0,0,24,60,126,126,60,24
.BYTE 0,0,0,124,6,126,198,126
.BYTE 0,0,192,252,198,198,198,252
.BYTE 0,0,0,124,198,192,198,124
.BYTE 0,0,6,126,198,198,198,126
.BYTE 0,0,0,124,198,254,192,124
.BYTE 0,0,62,96,252,96,96,96
.BYTE 6,252,0,126,198,198,198,126
.BYTE 0,0,192,192,252,198,198,198
.BYTE 0,0,24,0,56,24,24,60
.BYTE 24,240,24,0,24,24,24,24
.BYTE 0,0,192,204,216,248,204,198
.BYTE 0,0,56,24,24,24,24,60
.BYTE 0,0,0,204,254,254,214,198
.BYTE 0,0,0,252,198,198,198,198
.BYTE 0,0,0,124,198,198,198,124
.BYTE 192,192,0,252,198,198,198,252
.BYTE 6,6,0,126,198,198,198,126
.BYTE 0,0,0,252,198,192,192,192
.BYTE 0,0,0,126,192,124,6,252
.BYTE 0,0,48,254,48,48,48,30
.BYTE 0,0,0,198,198,198,198,126
.BYTE 0,0,0,198,198,198,108,56
.BYTE 0,0,0,198,214,254,124,108
.BYTE 0,0,0,198,108,56,108,198
.BYTE 6,252,0,198,198,198,198,126
.BYTE 0,0,0,254,12,56,96,254
.BYTE 14,0,14,24,24,56,24,24
.BYTE 24,24,24,24,24,24,24,24
.BYTE 112,0,112,24,24,28,24,24
.BYTE 0,0,0,8,24,56,24,8
.BYTE 0,0,0,16,16,24,28,24
*=  *+16
.END
```

Filename: SPEED.1

This module is chiefly concerned with the word processor editing functions. It contains many common subroutines, such as TOPCLR and PRMSG to clear the command line and print messages. It contains the initialization routines and takes care of memory moves (inserts and deletes). A second module, SPEED.2, is responsible for most input/output, including the printer routines. SPEED.1 is the largest file in the linked chain. UMOVE is a high-speed memory move routine. It gets its speed from selfmodifying code (the $FFFFs at MOVLOOP are replaced by actual addresses when UMOVE is called). UMOVE is used to move an overlapping range of memory upward (toward location 0), so it is used to delete. Set FROML/FROMH to point to the source area of memory, DESTL/DESTH to point to the destination, and LLEN/HLEN to hold the length of the area being moved.

```
UMOVE          LDA FROML
               STA MOVLOOP+1
               LDA FROMH
               STA MOVLOOP+2
               LDA DESTL
               STA MOVLOOP+4
               LDA DESTH
               STA MOVLOOP+5
               LDX HLEN
               BEQ SKIPMOV
MOV1           LDA #0
MOV2           STA ENDPOS
               LDY #0
MOVLOOP        LDA $FFFF,Y
    STA $FFFF,Y
    INY
    CPY ENDPOS
    BNE MOVLOOP
    INC MOVLOOP+2
    INC MOVLOOP+5
    CPX #0
    BEQ OUT
    DEX
    BNE MOV1
SKIPMOV LDA LLEN
    BNE MOV2
OUT RTS
```

DMOVE uses the same variables as UMOVE, but it is used to move an overlapping block of memory downward (toward location $FFFF), so it is used to insert. If the block of memory to be moved does not overlap the destination area, then either routine can be used.

```
DMOVE LDA HLEN
    TAX
    ORA LLEN
    BNE NOTNULL
    RTS
NOTNULL CLC
    TXA
    ADC FROMH
    STA DMOVLOOP+2
    LDA FROML
    STA DMOVLOOP+1
```

```
    CLC
    TXA
    ADC DESTH
    STA DMOVLOOP+5
    LDA DESTL
    STA DMOVLOOP+4
    INX
    LDY LLEN
    BNE DMOVLOOP
    BEQ SKIPDMOV
DMOV1 LDY #255
DMOVLOOP LDA $FFFF,Y
    STA $FFFF,Y
    DEY
    CPY #255
    BNE DMOVLOOP
SKIPDMOV DEC DMOVLOOP+2
    DEC DMOVLOOP+5
    DEX
    BNE DMOV1
    RTS

REFRESH copies a screenful of text from
the area of memory pointed to by
TOPLIN. It works like a printer
routine, fitting a line of text between
the screen margins, wrapping words, and
restarts at the left margin after
printing a carriage return. SpeedScript
constantly calls this routine while the
cursor is blinking, so it has to be
very fast. To eliminate flicker, it
clears out the end of each line instead
of first clearing the screen. It stores
the length of the first screen line for
the sake of the CHECK routine (which
scrolls up by adding that length to
TOPLIN) and the last text location
referenced (so CHECK can see if the
cursor has moved off the visible
screen). REFRESH can automatically
handle different screen widths.

REFRESH LDA #40
    INY
    CLC

RLM: Left margin. Location $58/$59
points to the address of screen memory.


    ADC RLM
    CLC
    ADC $58
    STA SCR
    LDA $59
    ADC #0
    STA SCR+1

TOPLIN points to the first character
within text to be printed at the
top-left comer of the screen.


    CLC
    LDA TOPLIN
    STA TEX
    LDA TOPLIN+1
    STA TEX+1
    LDX #1
    LDA INSMODE
```

```
    STA WINDCOLR
PPAGE LDY #0
PLINE LDA (TEX),Y
    STA LBUFF,Y
    INY
    AND #127
    CMP #RETCHAR
    BEQ BREAK
    CPY LINELEN
    BNE PLINE
    DEY
SLOOP LDA (TEX),Y
    AND #127
NXCUR CMP #SPACE
    BEQ SBRK
    DEY
    BNE SLOOP
    LDY LINELEN
    DEY
SBRK INY
BREAK STY TEMP
    LDY #0
COPY LDA LBUFF,Y
    STA (SCR),Y
    INY
    CPY TEMP
    BNE COPY
    CLC
    TYA
    ADC TEX
    STA TEX
    LDA TEX+1
    ADC #0
    STA TEX+1
    CPX #1
    BNE CLRLN
    STY LENTABLE
CLRLN CPY LINELEN
    BEQ CLEARED
```

Character #64 (ATASCII value of 0) fills the gap when a line is broken. It can be redefined to show or not show these false spaces.

```
    LDA #64
    STA (SCR),Y
    INY
    JMP CLRLN
CLEARED CLC
    LDA SCR
    ADC #40
    STA SCR
    BCC INCNOT
    INC SCR+1
INCNOT INX
    CPX #19
    BEQ PDONE
    JMP PPAGE
PDONE LDA TEX
    STA BOTSCR
    LDA TEX+1
    STA BOTSCR+1
    RTS
```

The following routine fills the entire text area with space characters (screen code 0), effectively erasing all text. It is called when the program is first run and when an Erase All is performed. It also initializes the cursor position

```
(CURR) and the end-of-text pointer
(LASTLINE).

ERASE LDA TEXSTART
    STA TEX
    STA TOPLIN
    STA LASTLINE
    STA CURR
    LDA TEXSTART+1
    STA TEX+1
    STA TOPLIN+1
    STA LASTLINE+1
    STA CURR+1
    SEC
    LDA TEXEND+1
    SBC TEXSTART+1
    TAX
    LDA #SPACE
CLRLOOP LDY #255
    DEC TEX+1
    STA (TEX),Y
    INY
    INC TEX+1
CLR2 STA (TEX),Y
    INY
    BNE CLR2
    INC TEX+1
    DEX
    BNE CLR2
    STA (TEX),Y
    RTS

PRMSG is used anytime we need to print
something at the top of the screen (the
command line). Pass it the address of
the message to be printed by storing
the low byte of the address in the
accumulator and the high byte in the Y
register. The message in memory must
end with a zero byte. The routine does
not add a carriage return. CHROUT
(character out) prints the character in
the accumulator to the screen. CHROUT
is a subroutine in the SUPPORT package.

PRMSG STA TEMP
    STY TEMP+1
    LDA #1
    STA 752
    LDY #0
PRLOOP LDA (TEMP),Y
    BEQ PREXIT
    JSR CHROUT
    INY
    BNE PRLOOP
PREXIT RTS
GETAKEY JSR GETIN
    BEQ GETAKEY
    RTS
JDOS JSR PREXIT
    LDA BLINK
    BEQ NOBLINK
    LDY #0
    LDA UNDERCURS
    STA (CURR),Y
NOBLINK JSR INIT2
    JMP MAIN

The initialization routine sets up the
memory map, clears out certain flags,
and enables the display-list interrupt.
```

```
INIT LDA #125
    JSR CHROUT
    LDA #0
    STA INSMODE
    STA TEXSTART
    STA TEXEND
    STA TEXBUF
    STA BUFEND
    STA HUNTLEN
    STA REPLEN
    STA ESCFLAG
    STA SHFLOK
    STA RLM
    LDA #40
    STA LINELEN
```

Label END is at the end of the source code, so it points to the last address used by the object code. We use it to calculate the start-of-text memory.

```
    LDA # >END
    CLC
    ADC #1
    STA TEXSTART+1
```

Location 561 points to the display list, which holds screen information at the top of memory. We use it as the last address available for storing text or buffer text.

```
    LDA 561
    SEC
    SBC #1
    STA BUFEND+1
    SEC
    SBC #8
    STA TEXBUF+1
    SEC
    SBC #1
    STA TEXEND+1
    LDA #$FF
    STA FPOS+1
```

If location $4B is 0, then SpeedScript is booted from disk. if we booted from cassette, we free up the DOS area ($0700-$1E00) for use as the text buffer, and free up the text memory used by disk-based SpeedScript as the text buffer.

```
    LDA $4B
    BEQ DISKBOOT
    LDA BUFEND+1
    STA TEXEND+1
    LDA #$07
    STA TEXBUF+1
    LDA #$1E
    STA BUFEND+1
DISKBOOT RTS
```

The second initialization routine turns on the display-list interrupt (HIGH-LIGHT), homes the cursor, and prints the credit line.

```
INIT2 JSR HIGHLIGHT
```

```
    LDA TEXSTART
    STA CURR
    LDA TEXSTART+1
    STA CURR+1
    JSR REFRESH
    JSR SYSMSG
    LDA # <MSG2
    LDY # >MSG2
    JSR PRMSG
    INC MSGFLG
    JMP CHECK
```

SYSMSG displays "SpeedScript 3.0." The message flag (MSGFLG) is set when a message is to be left on the screen only until the next keystroke. After that keystroke, SYSMSG is called. The INIT2 routine prints the credit line with the MSGFLG set so that you won't have to stare at the author's name while you're writing--a modesty feature.

```
SYSMSG JSR TOPCLR
    LDA # <MSG1
    LDY # >MSG1
    JSR PRMSG
    LDA #0
    STA MSGFLG
    RTS
```

TOPCLR keeps the command line clean. It is called before most messages. It's like a one-line clear-screen. It also forces the left margin (82) to 0, and homes the cursor to the beginning of the command line by zeroing out the X and Y cursor positions (84 and 85).

```
TOPCLR LDY #39
    LDA #SPACE
TOPLOOP STA ($58),Y
    DEY
    BPL TOPLOOP
    LDA #0
    STA 82
    STA 85
    STA 84
    RTS
```

Convert ATASCII to screen codes

```
ASTOIN PHA
    AND #128
    STA TEMP
    PLA
    AND #127
    CMP #96
    BCS LOWR
    CMP #32
    BCS NOTCTRL
    CLC
    ADC #64
    JMP LOWR
NOTCTRL SEC
    SBC #32
LOWR ORA TEMP
    RTS
```

The MAIN loop blinks the cursor, checks for keystrokes, converts them from

```
ATASCII to screen codes, puts them in
text at the CURRent position, and
increments the CURRent position and
LASTLINE. It also checks for special
cases like the RETURN key and passes
control characters to the CONTROL
routine. The INSMODE flag is checked to
see if we should insert a space before
a character.

MAIN LDY #0
    STY BLINK
    LDA (CURR),Y
    STA UNDERCURS
MAIN2 LDY #0
    STY SELFLAG
    LDA (CURR),Y
    EOR #$80
    STA (CURR),Y
    LDA BLINK
    EOR #1
    STA BLINK
    JSR REFRESH
WAIT JSR GETIN
    BNE KEYPRESS

We check for the START key, and if
pressed, go to the HOME cursor routine.

    LDA #8
    STA 53279
    LDA 53279
    CMP #6
    BNE FLIPIT
    LDY #0
    STY BLINK
    LDA UNDERCURS
    STA (CURR),Y
    JSR HOME
    JMP MAIN

The realtime clock (location 20), which
counts in 1/60 seconds, is checked for
16/60 seconds (about 1/5 second) to see
if it's time to blink the cursor.

FLIPIT LDA 20
    AND #16
    BEQ WAIT
    LDA #0
    STA 20
    JMP MAIN2

A key has been pressed. We check the
SELECT key to see if the keystroke
should be inverted.

KEYPRESS TAX
    LDA #8
    STA 53279
    LDA 53279
    CMP #5
    BNE NOTSEL
    LDA #128
    STA SELFLAG
NOTSEL LDY #0
    LDA UNDERCURS
    STA (CURR),Y
NOTBKS LDA MSGFLG
    BEQ NOMSG
    TXA
```

```
    PHA
    JSR SYSMSG
    PLA
    TAX
NOMSG TXA
    CMP #155
    BNE NOTCR

Change a carriage return into a back
arrow.

    LDX #30
    JMP OVERCTRL
NOTCR TXA
    BIT ESCFLAG
    BMI OVERCTRL
    CMP #156
    BCS CONTROL
    AND #127
    CMP #32
    BCC CONTROL
    CMP #123
    BCS CONTROL
    CMP #92
    BEQ CONTROL
    CMP #94
    BEQ CONTROL
    CMP #95
    BEQ CONTROL
OVERCTRL TXA
    PHA
    LDY #0
    STY ESCFLAG
    LDA (CURR),Y
    CMP #RETCHAR
    BEQ DOINS
    LDA INSMODE
    BEQ NOINST
DOINS JSR INSCHAR
NOINST PLA
    JSR ASTOIN
    AND #127
    ORA SELFLAG
    LDY #0

Put the character into memory.

    STA (CURR),Y
    JSR REFRESH
    SEC
    LDA CURR
    SBC LASTLINE
    STA TEMP
    LDA CURR+1
    SBC LASTLINE+1
    ORA TEMP
    BCC INKURR
    LDA CURR
    ADC #0
    STA LASTLINE
    LDA CURR+1
    ADC #0
    STA LASTLINE+1

Move the cursor forward.

INKURR INC CURR
    BNE NOINC2
    INC CURR+1
NOINC2 JSR CHECK
    JMP MAIN
```

```
CONTROL looks up a keyboard command in
the list of control codes at CTBL. The
first byte of CTBL is the actual number
of commands. Once the position is
found, this position is doubled as an
index to the two-byte address table at
VECT. The address of MAIN-1 is put on
the stack, simulating the return
address; then the address of the
command routine taken from VECT is
pushed. We then perform an RTS. RTS
pulls the bytes off the stack as if
they were put there by a JSR. This
powerful technique is used to simulate
ON-GOTO in machine language.

CONTROL LDX CTBL
SRCH CMP CTBL,X
    BEQ FOUND
    DEX
    BNE SRCH
    JMP MAIN
FOUND DEX
    TXA
    ASL A
    TAX
    LDA # >MAIN-1
    PHA
    LDA # <MAIN-1
    PHA
    LDA VECT+1,X
    PHA
    LDA VECT,X
    PHA
    RTS
CTBL .BYTE 35
    .BYTE 31,30,92,94,2,20,28,29
    .BYTE 126,255,4
    .BYTE 9,125,124,95,5,12,19
    .BYTE 13,18,24,26,16
    .BYTE 254,1,11,6,21,127,157
    .BYTE 3,7,156,27,15
VECT .WORD RIGHT-1,LEFT-1,WLEFT-1,WRIGHT-1,BORDER-1,LETTERS-1
    .WORD SLEFT-1,SRIGHT-1,DELCHAR-1,INSCHAR-1,DELETE-1
    .WORD INSTGL-1,CLEAR-1,PARIGHT-1,PARLEFT-1
    .WORD ERAS-1,TLOAD-1,TSAVE-1
    .WORD DOS-1,INSBUFFER-1,SWITCH-1
    .WORD ENDTEX-1,PRINT-1
    .WORD DELIN-1,ALPHA-1,KILLBUFF-1,HUNT-1,FREEMEM-1,TAB-1
    .WORD LOTTASPACE-1,REPSTART-1,SANDR-1,EATSPACE-1,ESC-1,ONOFF-1

Toggle ESCape mode.

ESC LDA ESCFLAG
    EOR #128
    STA ESCFLAG
    RTS

Change the character definition of the
character used to fill in the end of a
line. It alternates between being a
blank space, and being a blank space
with a tiny dot visible. This lets you
see which spaces are actually part of
your text and which are just used to
parse the screen. Beware of the address
$2204 if you reassemble at a different
address (sorry, I didn't use a label).

ONOFF LDA $2204
```

```
    EOR #16
    STA $2204
    RTS

The CHECK routine first prevents the
cursor from disappearing past the
beginning or end-of-text memory and
prevents us from cursoring past the
end-of-text pointer. It also checks to
see if the cursor has left the visible
screen, scrolling with REFRESH to make
the cursor visible. The double-byte
SBCs are used as a 16-bit CMP macro,
setting the Z and C flags just like CMP
does.

CHECK JSR CHECK2
    SEC
    LDA CURR
    SBC TOPLIN
    LDA CURR+1
    SBC TOPLIN+1
    BCS OK1
    SEC
    LDA TOPLIN
    SBC TEXSTART
    STA TEMP
    LDA TOPLIN+1
    SBC TEXSTART+1
    ORA TEMP
    BEQ OK1
    LDA CURR
    STA TOPLIN
    LDA CURR+1
    STA TOPLIN+1
    JSR REFRESH
OK1 SEC
    LDA BOTSCR
    SBC CURR
    STA TEX
    LDA BOTSCR+1
    SBC CURR+1
    STA TEX+1
    ORA TEX
    BEQ EQA
    BCS OK2
EQA CLC
    LDA TOPLIN
    ADC LENTABLE
    STA TOPLIN
    LDA TOPLIN+1
    ADC #0
    STA TOPLIN+1
REF JSR REFRESH
    JMP OK1
OK2 RTS
CHECK2 SEC
    LDA LASTLINE
    SBC TEXEND
    STA TEMP
    LDA LASTLINE+1
    SBC TEXEND+1
    ORA TEMP
    BCC CK3
    LDA TEXEND
    STA LASTLINE
    LDA TEXEND+1
    STA LASTLINE+1
CK3 SEC
    LDA CURR
    SBC TEXSTART
```

```
    STA TEMP
    LDA CURR+1
    SBC TEXSTART+1
    ORA TEMP
    BCS INRANGE
    LDA TEXSTART
    STA CURR
    LDA TEXSTART+1
    STA CURR+1
    RTS
INRANGE SEC
    LDA CURR
    SBC LASTLINE
    STA TEMP
    LDA CURR+1
    SBC LASTLINE+1
    ORA TEMP
    BCS OUTRANGE
    RTS
OUTRANGE LDA LASTLINE
    STA CURR
    LDA LASTLINE+1
    STA CURR+1
    RTS

Move cursor right. If the OPTION key is
held down, we instead increase the line
length.

RIGHT
    LDA #8
    STA 53279
    LDA 53279
    CMP #3
    BNE CRIGHT
    LDA LINELEN
    CMP #40
    BEQ NOBIGGER
    INC LINELEN
    INC LINELEN
    DEC RLM
    JSR REFRESH
    JSR CHECK
    LDA #125
    JSR CHROUT
NOBIGGER JMP SYSMSG
CRIGHT INC CURR
    BNE NOINCR
    INC CURR+1
NOINCR JMP CHECK

Move cursor left. If the OPTION key is
held down, we instead decrease the line
length.

LEFT LDA #8
    STA 53279
    LDA 53279
    CMP #3
    BNE CLEFT
    LDA LINELEN
    CMP #2
    BEQ TOOSMALL
    DEC LINELEN
    DEC LINELEN
    INC RLM
    JSR REFRESH
    JSR CHECK
    LDA #125
    JSR CHROUT
TOOSMALL JMP SYSMSG
```

```
CLEFT LDA CURR
    BNE NODEC
    DEC CURR+1
NODEC DEC CURR
    JMP CHECK

Word left. We look backward for a space.

WLEFT LDA CURR
    STA TEX
    LDA CURR+1
    STA TEX+1
    DEC TEX+1
    LDY #$FF
STRIP LDA (TEX),Y
    CMP #SPACE
    BEQ STRLOOP
    CMP #RETCHAR
    BNE WLOOP
STRLOOP DEY
    BNE STRIP
WLOOP LDA (TEX),Y
    CMP #SPACE
    BEQ WROUT
    CMP #RETCHAR
    BEQ WROUT
    DEY
    BNE WLOOP
    RTS
WROUT SEC
    TYA
    ADC TEX
    STA CURR
    LDA TEX+1
    ADC #0
    STA CURR+1
    JMP CHECK

Word right. We scan forward for a
space. OIDS is not a meaningful label.

WRIGHT LDY #0
RLOOP LDA (CURR),Y
    CMP #SPACE
    BEQ ROUT
    CMP #RETCHAR
    BEQ ROUT
    INY
    BNE RLOOP
    RTS
ROUT INY
    BNE OIDS
    INC CURR+1
    LDA CURR+1
    CMP LASTLINE+1
    BCC OIDS
    BNE LASTWORD
OIDS LDA (CURR),Y
    CMP #SPACE
    BEQ ROUT
    CMP #RETCHAR
    BEQ ROUT

Add the Y register to the CURRent
cursor position to move the cursor.
CHECK prevents illegal cursor movement.
LASTWORD is called if the end of the
word cannot be found before we reach
the end-of-text.

ADYCURR CLC
```

```
    TYA
    ADC CURR
    STA CURR
    LDA CURR+1
    ADC #0
    STA CURR+1
WRTN JMP CHECK
LASTWORD LDA LASTLINE
    STA CURR
    LDA LASTLINE+1
    STA CURR+1
    JMP CHECK

ENDTEX is tricky. If the end-of-text
pointer would point to an area already
visible on the screen, we just move the
cursor there and call REFRESH.
Otherwise, we step back 1K from the
end-of-text and then scroll to the end.
This is necessary since in the worst
case only 18 characters of return-marks
would fill the screen.

ENDTEX LDA #0
    STA TOPLIN
    LDA LASTLINE+1
    SEC
    SBC #4
    CMP TEXSTART+1
    BCS SAFE
    LDA TEXSTART+1
SAFE STA TOPLIN+1
    JSR REFRESH
    JMP LASTWORD

Change the border color. The display
list interrupt automatically places
SCRCOL into the hardware background
color register #2.

BORDER INC SCRCOL
    INC SCRCOL
    RTS
SCRCOL .BYTE 8

Change text luminance. TEXCOLR is
stored into hardware color register #1
during the display-list interrupt.

LETTERS INC TEXCOLR
    INC TEXCOLR
    LDA TEXCOLR
    AND #15
    STA TEXCOLR
    RTS
TEXCOLR .BYTE 2

Sentence left. We look backward for
ending punctuation or a return-mark,
then go forward until we run out of
spaces.

SLEFT LDA CURR
    STA TEX
    LDA CURR+1
    STA TEX+1
    DEC TEX+1
    LDY #$FF
PMANY LDA (TEX),Y
    CMP #'.-32
    BEQ PSRCH
```

```
    CMP #'!-32
    BEQ PSRCH
    CMP #'?-32
    BEQ PSRCH
    CMP #RETCHAR
    BNE PSLOOP
PSRCH DEY
    BNE PMANY
    RTS
PSLOOP LDA (TEX),Y
    CMP #'.-32
    BEQ PUNCT
    CMP #'!-32
    BEQ PUNCT
    CMP #'?-32
    BEQ PUNCT
    CMP #RETCHAR
    BEQ PUNCT
    DEY
    BNE PSLOOP
    DEC TEX+1
    LDA TEX+1
    CMP TEXSTART
    BCS PSLOOP
    JMP FIRSTWORD
PUNCT STY TEMP
    DEC TEMP
SKIPSPC INY
    BEQ REPEAT
    LDA (TEX),Y
    CMP #SPACE
    BEQ SKIPSPC
    DEY
    JMP WROUT
REPEAT LDY TEMP
    JMP PSLOOP
FIRSTWORD LDA TEXSTART
    STA CURR
    LDA TEXSTART+1
    STA CURR+1
    JMP CHECK

Sentence right. We look forward for
ending punctuation, then skip forward
until we run out of spaces.

SRIGHT LDY #0
SRLP LDA (CURR),Y
    CMP #'.-32
    BEQ PUNCT2
    CMP #'!-32
    BEQ PUNCT2
    CMP #'?-32
    BEQ PUNCT2
    CMP #RETCHAR
    BEQ PUNCT2
    INY
    BNE SRLP
    INC CURR+1
    LDA CURR+1
    CMP LASTLINE+1
    BEQ SRLP
    BCC SRLP
SREXIT JMP LASTWORD
PUNCT2 INY
    BNE NOFIXCURR
    INC CURR+1
    LDA CURR+1
    CMP LASTLINE+1
    BCC NOFIXCURR
    BEQ NOFIXCURR
```

```
    JMP LASTWORD
NOFIXCURR LDA (CURR),Y
    CMP #SPACE
    BEQ PUNCT2
    CMP #'.-32
    BEQ PUNCT2
    CMP #'!-32
    BEQ PUNCT2
    CMP #'?-32
    BEQ PUNCT2
    CMP #RETCHAR
    BEQ PUNCT2
    JMP ADYCURR
```

The text buffer starts at a fixed location, but the end of the buffer is changed as text is added to it. To clear the buffer, we just set the end of the buffer to the value of the start of the buffer. No text is actually erased.

```
KILLBUFF LDA TEXBUF
    STA TPTR
    LDA TEXBUF+1
    STA TPTR+1
    JSR TOPCLR
    LDA # <KILLMSG
    LDY # >KILLMSG
    JSR PRMSG
    LDA #1
    STA MSGFLG
    RTS
```

This is the second level of the general-purpose delete routines. UMOVE is the primitive core of deleting. For CTRL-D, the CURRent cursor position is the source; then a cursor command is called to update the cursor pointer. This becomes the destination. For CTRL-E, the CURRent cursor position is the destination; a cursor movement routine is called, and this becomes the source. UMOVE is then called. We actually move more than the length from the source to the end-of-text. Some extra text is moved from past the end-of-text. Since everything past the end-of-text is spaces, this neatly erases everything past the new end-of-text position. Naturally, the end-of-text pointer is updated. Before the actual delete is performed, the text to be deleted is stored in the buffer so that it can be recalled in case of error. The buffer doubles as a fail-safe device, and for moving and copying text. Checks are made to make sure that the buffer does not overflow.

```
DEL1 SEC
    LDA CURR
    SBC TEXSTART
    STA TEMP
    LDA CURR+1
    SBC TEXSTART+1
    ORA TEMP
    BNE DEL1A
DELABORT PLA
    PLA
```

```
    RTS
DEL1A LDA CURR
    STA FROML
    LDA CURR+1
    STA FROMH
    RTS
DEL2 SEC
    LDA CURR
    STA DESTL
    EOR #$FF
    ADC FROML
    STA GOBLEN
    LDA CURR+1
    STA DESTH
    EOR #$FF
    ADC FROMH
    STA GOBLEN+1
DELC LDA FROML
    STA FROMSAV
    LDA FROMH
    STA FROMSAV+1
    LDA DESTL
    STA DESTSAV
    STA FROML
    LDA DESTH
    STA DESTSAV+1
    STA FROMH
    SEC
    LDA GOBLEN+1
    ADC TPTR+1
    CMP BUFEND+1
    BCC GOSAV
    JSR TOPCLR
    LDA # <BUFERR
    LDY # >BUFERR
    JSR PRMSG
    LDA #1
    STA MSGFLG
    RTS
GOSAV LDA TPTR
    STA DESTL
    LDA TPTR+1
    STA DESTH
    LDA GOBLEN
    STA LLEN
    CLC
    ADC TPTR
    STA TPTR
    LDA GOBLEN+1
    STA HLEN
    ADC TPTR+1
    STA TPTR+1
    JSR UMOVE
    LDA FROMSAV
    STA FROML
    LDA FROMSAV+1
    STA FROMH
    LDA DESTSAV
    STA DESTL
    LDA DESTSAV+1
    STA DESTH
    SEC
    LDA LASTLINE
    SBC DESTL
    STA LLEN
    LDA LASTLINE+1
    SBC DESTH
    STA HLEN
    JSR UMOVE
    SEC
    LDA LASTLINE
```

```
    SBC GOBLEN
    STA LASTLINE
    LDA LASTLINE+1
    SBC GOBLEN+1
    STA LASTLINE+1
    RTS
```

Most delete commands end up calling the above routines. The single-character deletes must subtract 1 from the buffer pointer so that single characters are not added to the buffer. But note how short these routines are.

Delete character (BACK S)

```
DELCHAR JSR DEL1
    JSR LEFT
    JSR DEL2
FIXTP SEC
    LDA TPTR
    SBC #1
    STA TPTR
    LDA TPTR+1
    SBC #0
    STA TPTR+1
    RTS
```

CTRL-BACK S

```
DELIN JSR RIGHT
    JSR DEL1
    JSR LEFT
    JSR DEL2
    JMP FIXTP
```

Called by CTRL-D. As mentioned, it stores CURR into FROML/FROMH, moves the cursor either by sentence, word, or paragraph, then stores the new position of CURR into DESTL and DESTH. The above routines perform the actual delete. CTRL-D always discards the previous contents of the buffer, for deleting text backward creates a buffer of out-of-order text. Notice how we change the color of the command window to red to warn the user of the impending deletion.

```
DELETE JSR KILLBUFF
    LDA #RED
    STA WINDCOLR
    JSR TOPCLR
    LDA # <DELMSG
    LDY # >DELMSG
    JSR PRMSG
    JSR GETAKEY
    PHA
    JSR SYSMSG
    PLA
    AND #95
    ORA #64
    CMP #'W
    BNE NOTWORD
DELWORD JSR DEL1
    JSR WLEFT
    JMP DEL2
NOTWORD CMP #'S
    BNE NOTSENT
DELSENT JSR DEL1
```

```
    JSR SLEFT
    JMP DEL2
NOTSENT CMP #'P
    BNE NOTPAR
    JSR DEL1
    JSR PARLEFT
    JMP DEL2
NOTPAR RTS

Home the cursor. This is called by the
START key. We check to see if START is
held down for at least 1/2 second. If
it is, we move the cursor to the top of
text.

HOME SEC
    LDA CURR
    SBC TOPLIN
    STA TEMP
    LDA CURR+1
    SBC TOPLIN+1
    ORA TEMP
    BEQ TOPHOME
    LDA TOPLIN
    STA CURR
    LDA TOPLIN+1
    STA CURR+1
WAITST LDA #0
    STA 20
    STA 53279
HOMEPAUSE LDA 20
    CMP #30
    BNE HOMEPAUSE
OUTHOME JMP CHECK
TOPHOME LDA TEXSTART
    STA CURR
    LDA TEXSTART+1
    STA CURR+1
    JMP WAITST

This deletes all spaces between the
cursor and following nonspace text.
Sometimes inventing labels can be fun.

EATSPACE LDA CURR
    STA TEX
    STA DESTL
    LDA CURR+1
    STA TEX+1
    STA DESTH
    LDY #0
SPCSRCH LDA (TEX),Y
    CMP #SPACE
    BNE OUTSPACE
    INY
    BNE SPCSRCH
    LDA TEX+1
    CMP LASTLINE+1
    BCC GOINC
    LDA LASTLINE
    STA TEX
    LDA LASTLINE+1
    STA TEX+1
    LDY #0
    JMP OUTSPACE
GOINC INC TEX+1
    JMP SPCSRCH
OUTSPACE CLC
    TYA
    ADC TEX
    STA FROML
```

```
    LDA #0
    ADC TEX+1
    STA FROMH
    SEC
    LDA LASTLINE
    SBC DESTL
    STA LLEN
    LDA LASTLINE+1
    SBC DESTH
    STA HLEN
    SEC
    LDA FROML
    SBC DESTL
    STA GOBLEN
    LDA FROMH
    SBC DESTH
    STA GOBLEN+1
    JSR UMOVE
    SEC
    LDA LASTLINE
    SBC GOBLEN
    STA LASTLINE
    LDA LASTLINE+1
    SBC GOBLEN+1
    STA LASTLINE+1
    RTS

Insert 255 spaces. Notice how it and
other insert routines use TAB2.

LOTTASPACE LDA #255
    STA INSLEN
    JMP TAB2
TAB LDA #5
    STA INSLEN
    JSR TAB2
    LDA (CURR),Y
    CMP #SPACE
    BNE NOINCY
    INY
NOINCY JMP ADYCURR
TAB2 LDA #0
    STA INSLEN+1
    JSR INSBLOCK
    LDA #SPACE
    LDX INSLEN
    LDY #0
FILLSP STA (CURR),Y
    INY
    DEX
    BNE FILLSP
    RTS

Insert a single space.

INSCHAR LDA #1
    STA INSLEN
    LDA #0
    STA INSLEN+1
    JSR INSBLOCK
    LDA #SPACE
    LDY #0
    STA (CURR),Y
    JMP CHECK

A general routine to insert as many
spaces as are specified by INSLEN.

INSBLOCK CLC
    LDA LASTLINE
    ADC INSLEN
```

```
    LDA LASTLINE+1
    ADC INSLEN+1
    CMP TEXEND+1
    BCC OKINS
    PLA
    PLA
    JMP INOUT
OKINS CLC
    LDA CURR
    STA FROML
    ADC INSLEN
    STA DESTL
    LDA CURR+1
    STA FROMH
    ADC INSLEN+1
    STA DESTH
    SEC
    LDA LASTLINE
    SBC FROML
    STA LLEN
    LDA LASTLINE+1
    SBC FROMH
    STA HLEN
    JSR DMOVE
    CLC
    LDA LASTLINE
    ADC INSLEN
    STA LASTLINE
    LDA LASTLINE+1
    ADC INSLEN+1
    STA LASTLINE+1
INOUT RTS

Toggle insert mode. The INSMODE nag
doubles as the color of the command
line.

INSTGL LDA INSMODE
    EOR #BLUE
  STA INSMODE
  RTS

Another example of modular code. This
is called anytime a yes/no response is
called for. It prints "Are you sure?
(Y/N)," then returns with the zero flag
set to true if Y was pressed, ready for
the calling routine to use BEQ or BNE
as a branch for yes or no. We trap out
the clear-screen key in case this
routine is called by Erase All, since
otherwise repeating keys may instantly
cancel the command. The AND #223 zaps
out the distinction between uppercase
and lowercase Y.

YORN LDA # <YMSG
  LDY # >YMSG
  JSR PRMSG
YORNKEY JSR GETIN
  AND #127
  BEQ YORNKEY
  CMP #125
  BEQ YORNKEY
  AND #223
  CMP #'Y
  RTS

Erase all text. Allowed only if the
OPTION key is held down with
SHIFT-CLEAR. It calls YORN to affirm
```

```
the deadly deed, then calls ERASE to
erase all text, INIT2 to reset some
flags, then jumps back to the MAIN
loop. LDX #$FA / TXS is used to clean
up the stack.

CLEAR LDA #8
  STA 53279
  LDA 53279
  CMP #3
  BEQ OKCLEAR
  RTS
OKCLEAR LDA #RED
  STA WINDCOLR
  JSR TOPCLR
  LDA # <CLRMSG
  LDY # >CLRMSG
  JSR PRMSG
  JSR YORN
  BEQ DOIT
  JMP SYSMSG
DOIT LDX #$FA
  TXS
  JSR ERASE
  JSR INIT2
  JMP MAIN

Paragraph right.

PARIGHT LDY #0
PARLP LDA (CURR),Y
  CMP #RETCHAR
  BEQ RETFOUND
  INY
  BNE PARLP
  INC CURR+1
  LDA CURR+1
  CMP LASTLINE+1
  BCC PARLP
  BEQ PARLP
  JMP LASTWORD
RETFOUND INY
  BNE GOADY
  INC CURR+1
GOADY JMP ADYCURR

Paragraph left. Notice the trick of
decrementing the high byte of the
pointer, then starting the index at 255
in order to search backward.

PARLEFT LDA CURR
  STA TEX
  LDA CURR+1
  STA TEX+1
  DEC TEX+1
  LDY #$FF
PARLOOP LDA (TEX),Y
  CMP #RETCHAR
  BEQ RETF2
PARCONT DEY
  CPY #255
  BNE PARLOOP
  DEC TEX+1
  LDA TEX+1
  CMP TEXSTART+1
  BCS PARLOOP
  JMP FIRSTWORD
RETF2 SEC
  TYA
  ADC TEX
```

```
  STA TEX
  LDA #0
  ADC TEX+1
  STA TEX+1
  SEC
  LDA TEX
  SBC CURR
  STA TEMP
  LDA TEX+1
  SBC CURR+1
  ORA TEMP
  BNE TEXTOCURR
  STY TEMP
  CLC
  LDA TEX
  SBC TEMP
  STA TEX
  LDA TEX+1
  SBC #0
  STA TEX+1
  JMP PARCONT
TEXTOCURR LDA TEX
  STA CURR
  LDA TEX+1
  STA CURR+1
  JMP CHECK
```

This enables the display-list interrupt (DLI). The DLI allows separate background colors for the command line and the rest of the screen. It lets us change the color of the top line to flag insert mode or to warn the user with a red color that he/she should be careful. Since it is an interrupt, it is always running in the background. Interrupt routines must always be careful not to corrupt the main program.

HIGHLIGHT turns off any DLIs (by storing #64 into $D40E), sets the NMI pointer ($200/$201), creates a custom display list of IRG mode 3 (lowercase descenders, GRAPHICS 0 1/2) With DLI set in one line, then enables DLIs ($C0 into $D40E) and returns. The routine DLI is now running constantly in the background, changing the screen color of all text below the DLI.

```
HIGHLIGHT LDA #64
  STA $D40E
  LDA # <DLI
  STA $0200
  LDA # >DLI
  STA $0201
  LDA 560
  STA TEMP
  LDA 561
  STA TEMP+1
  LDY #0
DLOOP LDA DLIST,Y
  STA (TEMP),Y
  INY
  CPY #28
  BNE DLOOP
  LDY #4
  LDA $58
  STA (TEMP),Y
  LDA $59
```

```
  INY
  STA (TEMP),Y
  LDY #26
  LDA TEMP
  STA (TEMP),Y
  LDA TEMP+1
  INY
  STA (TEMP),Y
  LDA #$C0
  STA $D40E
  RTS
```

The custom display list.

```
DLIST .BYTE 112,112,112,3+64+128,0,0
  .BYTE 3,3,3,3,3,3,3,3,3,3,3,3,3
  .BYTE 3,3,3,3,3,16,65,0,0
```

The display-list interrupt routine stores the SCReen COLor and TEXt COLoR into the appropriate hardware registers, then stores the WINDow COLoR into 710, and #10 into 709 to set the color of the top line of the screen. This line is automatically set by the normal vertical- blank interrupt. We also force the character-set pointer to keep our character set in place whenever we're on the editing screen.

```
DLI PHA
  LDA SCRCOL
  STA $D40A
  STA $D018
  STA 712
  LDA TEXCOLR
  STA $D017
  LDA WINDCOLR
  STA 710
  LDA #10
  STA 709
  LDA #$20
  STA 756
  LDA #0
  STA $02B6
  PLA
  RTI
```

ERAS is called by CTRL-E. It works much like CTRL-D. Notice that the ORA #64 allows users to press either S, W, P, or CTRL-S, CTRL-W, CTRL-P, in case they have a habit of leaving the control key held down. It must call RE- FRESH after each move and adjust the new position of the cursor. If OPTION is held down with CTRL-E, we don't erase the previous contents of the buffer, letting the user chain non-contiguous sections into the buffer for later recall.

```
ERAS LDA #8
  STA 53279
  LDA 53279
  CMP #3
  BEQ ERAS1
  JSR KILLBUFF
ERAS1 JSR TOPCLR
  LDA # <ERASMSG
```

```
  LDY # >ERASMSG
  JSR PRMSG
ERASAGAIN LDY #0
  LDA (CURR),Y
  EOR #$80
  STA (CURR),Y
  JSR REFRESH
  LDY #0
  LDA (CURR),Y
  EOR #$80
  STA (CURR),Y
  LDA #RED
  STA WINDCOLR
  JSR GETAKEY
  AND #95
  ORA #64
  CMP #'W
  BNE NOWORD
ERASWORD JSR ERA1
  JSR WRIGHT
  JMP ERA2
NOWORD CMP #'S
  BNE UNSENT
ERASENT JSR ERA1
  JSR SRIGHT
  JMP ERA2
UNSENT CMP #'P
  BNE NOPAR
  JSR ERA1
  JSR PARIGHT
  JMP ERA2
NOPAR JSR CHECK
  JMP SYSMSG
ERA1 LDA CURR
  STA DESTL
  STA SAVCURR
  LDA CURR+1
  STA DESTH
  STA SAVCURR+1
  RTS
ERA2 SEC
  LDA CURR
  STA FROML
  SBC SAVCURR
  STA GOBLEN
  LDA CURR+1
  STA FROMH
  SBC SAVCURR+1
  STA GOBLEN+1
  JSR DELC
  LDA SAVCURR
  STA CURR
  LDA SAVCURR+1
  STA CURR+1
  JSR REFRESH
  JMP ERASAGAIN
```

The INPUT routine is used to get responses from the command line. It returns the complete line in INBUFF. INLEN is the length of the input. A zero byte is stored at INBUFF+INLEN after the user presses RETURN. This routine is foolproof (I know...), since no control keys other than BACK S are allowed, unless preceded by ESCape. The SELECT key can be held down to enter inverse-video characters. The system cursor is turned on for this routine (by putting #0 into 752), then turned off when we exit (by putting #1 into

752). This routine also prevents the
user from typing past the end of the
command line. If the limit of typing
length must be set arbitrarily, LIMIT
is preset and INPUT is called at INP1.
CURSIN is the MAIN loop.

```
INPUT LDA #39
  SBC 85
  STA LIMIT
INP1 LDY #0
  STY INLEN
  STY 752
  LDA #32
  JSR CHROUT
  LDA #126
  JSR CHROUT
CURSIN STY INLEN
  JSR GETAKEY
  LDY INLEN
  BIT ESCFLAG
  BMI ESCKEY
  CMP #27
  BNE NOESC
  LDA #128
  STA ESCFLAG
  STA $02A2
  JMP CURSIN
NOESC CMP #155
  BEQ INEXIT
  CMP #126
  BNE NOBACK
  DEY
  BPL NOTZERO
  INY
  JMP CURSIN
NOTZERO LDA #126
  JSR CHROUT
  JMP CURSIN
NOBACK STA TEMP
  AND #127
  CMP #32
  BCC CURSIN
  CMP #125
  BCS CURSIN
  CPY LIMIT
  BEQ CURSIN
  LDA TEMP
ESCKEY AND #127
  LDX #8
  STX 53279
  LDX 53279
  CPX #5
  BNE SKIPSEL
  ORA #128
SKIPSEL STA INBUFF,Y
  JSR CHROUT
  LDA #0
  STA ESCFLAG
  INY
  JMP CURSIN
INEXIT LDX #1
  STX 752
  LDA #0
  STA INBUFF,Y
  TYA
  RTS
  .END
```

Filename: SUPPORT

```
This module supports most primitive
input/output functions, including a
routine to clear the screen and reset
the screen editor (OPENEDITOR), print a
character (CHROUT), and get a key from
the keyboard (GETAKEY).

OPENEDITOR LDX #0
      LDA #12
      STA ICCOM
      JSR CIO
      LDX #0
      LDA # <ENAME
      STA ICBADR
      LDA # >ENAME
      STA ICBADR+1
    LDA #2
    STA ICBLEN
    STX ICBLEN+1
    LDA #3
    STA ICCOM,X
    JMP CIO

Put the ATASCII value of the character
into the accumulator and call CHROUT
to print a character. The Y register is
preserved. We call CIO with a buffer
length of zero.

CHROUT STY CHRYSAVE
    LDX #0
    STX ICBLEN
    STX ICBLEN+1
    STX $02FF
    LDY #11
    STY ICCOM
    JSR CIO
    LDY CHRYSAVE
    RTS

The filename of the Editor device.

ENAME .BYTE "E:"

OUTNUM and PROUTNUM print decimal
numbers to the display or printer. The
integer to be printed is passed with
the low byte in the X register and the
high byte in the accumulator. The
integer to floating-point routine
($D9AA) is called first, followed by
floating-point to ATASCII routine,
which creates a string of ATASCII
digits. The last digit of the number
has bit 7 set, which we use to
terminate printing.

PROUTNUM LDY #128
    JMP OVERZAP
OUTNUM LDY #0
OVERZAP STY WHICHFLAG
    STX $D4
    STA $D5
    JSR $D9AA
    JSR $D8E6
    LDY #0
ONUMLOOP LDA ($F3),Y
    PHA
    AND #$7F
    BIT WHICHFLAG
    BMI GOPCHR
```

```
    JSR CHROUT
    JMP OVERPCHR
GOPCHR JSR PCHROUT
OVERPCHR PLA
    BMI ONUMEXIT
    INY
    BNE ONUMLOOP
ONUMEXIT RTS
CHRYSAVE .BYTE 0
```

The system keyboard fetch routine interferes with the display-list interrupt, since the blip of each key is timed with WSYNC, which freezes the ANTIC chip for one line. This causes annoying flicker. This routine uses POKEY sound decaying from volume 15 to 0 for the keyboard feedback tone. It's not hard to create any sound effect you want for the keyboard blip. This routine mimics the system routine fairly closely. It's easy to expand it to allow many more keyboard functions and full processing of new keystrokes just by changing some of this code and the keyboard table.

```
GETIN LDA 764
    CMP #$FF
    BNE GETCHAR
    LDA #0
    RTS
GETCHAR LDA 764
    CMP #$FF
    BEQ GETCHAR
    STA KEYVAL
    LDA #$FF
    STA 764
```

Clear break flag.

```
    STA $11
    JSR BLIP
    LDA KEYVAL
```

Check for SHIFT+CTRL.

```
    CMP #$C0
    BCS GXIT
    AND #63
    CMP #60
    BNE NOTCAPS
    LDA KEYVAL
    AND #64
    BEQ NOTSET
    STA SHFLOK
GXIT LDA #0
    RTS
```

The CAPS/LOWR key toggles the SHiFtLOcK flag to allow either only uppercase, or both uppercase and lowercase.

```
NOTSET LDA SHFLOK
    EOR #64
    STA SHFLOK
    LDA #0
    RTS
NOTCAPS LDX KEYVAL
    LDA KEYBOARD,X
    BIT SHFLOK
```

```
    BVC NOTLOCKED
    CMP #'a
    BCC NOTLOCKED
    CMP #'z+1
    BCS NOTLOCKED
    AND #223
NOTLOCKED CMP #$80
    BEQ GXIT
    RTS

The sound effect for the keyboard
"blip."

BLIP PHA
    LDA #50
    STA $D200
    LDX #$AF
SNDLOOP STX $D201
    LDY #128
SLOW DEY
    BNE SLOW
    DEX
    CPX #$9F
    BNE SNDLOOP
    PLA
    RTS
KEYBOARD .BYTE 108,106,59,128,128,107
    .BYTE 43,42,111,128,112,117
    .BYTE 155,105,45,61,118,128
    .BYTE 99,128,128,98,120,122
    .BYTE 52,128,51,54,27,53
    .BYTE 50,49,44,32,46,110
    .BYTE 128,109,47,$80,114,128
    .BYTE 101,121,127,116,119,113
    .BYTE 57,128,48,55,126,56
    .BYTE 60,62,102,104,100,128
    .BYTE 130,103,115,97,76,74
    .BYTE 58,128,128,75,92,94
    .BYTE 79,128,80,85,155,73
    .BYTE 95,124,86,128,67,128
    .BYTE 128,66,88,90,36,128
    .BYTE 35,38,27,37,34,33
    .BYTE 91,32,93,78,128,77
    .BYTE 63,$80,82,128,69,89
    .BYTE 159,84,87,81,40,128
    .BYTE 41,39,156,64,125,157
    .BYTE 70,72,68,128,131,71
    .BYTE 83,65,12,10,123,128
    .BYTE 128,11,30,31,15,128
    .BYTE 16,21,155,9,28,29
    .BYTE 22,128,3,128,128,2
    .BYTE 24,26,128,128,133,128
    .BYTE 27,128,253,128,0,32
    .BYTE 96,14,128,13,128,$80
    .BYTE 18,128,5,25,158,20
    .BYTE 23,17,128,128,128,128
    .BYTE 254,128,125,255,6,8
    .BYTE 4,128,132,7,19,1
    .END
```

Filename: DOSPAK

DOSPAK is a self-contained substitute for the DOS menu, although it uses several routines built into SpeedScript. The concept of DOSPAK is that all directory entries should fit on one screen. A large cursor is used to move from filename to filename. At any time, you can delete, rename, lock, unlock, or load the selected filename,

just by pressing one key, or a CTRL key combination. Except for Rename, you don't have to type the filename. You can also format the entire disk or redisplay the directory.

CATALOG fits the entire disk directory onto the screen by skipping over the sector counts, trimming up spacing, and placing three items per line. The cursor position of each filename is saved into a slot in memory so that the cursor routine can quickly and easily skip about.

```
CATALOG JSR CLOSE7
      LDX #$70
      LDA # <DIRNAME
      STA ICBADR,X
      LDA # >DIRNAME
      STA ICBADR+1,X
      LDA #5
      STA ICBLEN,X
      LDA #0
    STA ICBLEN+1,X
    LDA #6
    STA ICAUX1,X
    LDA #3
    STA ICCOM,X
    JSR CIO
    BMI CLOSE7
    LDA #0
    STA XPTR
REDIR LDX XPTR
    LDA $64
    STA SLOT,X
    LDA $65
    STA SLOT+1,X
    INC XPTR
    INC XPTR
    JSR GET7
    BMI CLOSE7
    CMP #'*+1
    BCS ENDIR
    JSR CHROUT
    JSR GET7
    BMI CLOSE7
    LDA #0
    STA DIRCOUNT
DIRLOOP JSR GET7
    BMI CLOSE7
DNOTCR JSR CHROUT
    INC DIRCOUNT
    LDA DIRCOUNT
    CMP #8
    BNE DNOT8
    LDA #'.
    JSR CHROUT
    JMP DIRLOOP
DNOT8 CMP #11
    BNE DIRLOOP
    LDA #5
    STA TEMP
THROW5 JSR GET7
    DEC TEMP
    LDA TEMP
    BNE THROW5
    JMP REDIR
CLOSE7 LDX #$70
    LDA #12
    STA ICCOM,X
```

```
    JSR CIO
    LDX #$70
    LDY ICSTAT,X
    RTS
ENDIR PHA
    LDA #155
    JSR CHROUT
    PLA
    JSR CHROUT
ENDLP JSR GET7
    BMI CLOSE7
    JSR CHROUT
    JMP ENDLP
GET7 LDX #$70
    LDA #0
    STA ICBLEN,X
    STA ICBLEN+1,X
    LDA #7
    STA ICCOM,X
    JMP CIO
```

The main DOS routine calls the CATALOG routine to fill the screen with filenames, then puts the cursor on the current filename, waiting for a keypress.

```
DOS JSR DELITE
    JSR OPENEDITOR
    JSR DELITE
    LDA #1
    STA 752
    STA 82
    LDA #125
    JSR CHROUT
    JSR CATALOG
    JSR DOSMSG
GETNAME LDA SLOT
    STA SCR
    LDA SLOT+1
    STA SCR+1
    LDA #0
    STA XSLOT
    DEC XPTR
    DEC XPTR
NAMELP JSR INVNAME
    JSR GETAKEY
    LDX #1
    STX 752
```

Now that we've got a keypress, we look it up in the keypress table, then vector to the appropriate routine. This is the same ML ON-GOTO routine that we've used in several places in SpeedScript, including the CONTROL routine.

```
    LDX DOSTABLE
    CMP #97
    BCC NOPROB
    AND #95
NOPROB STA TEMP
FINDIT CMP DOSTABLE,X
    BEQ FOUNDIT
    DEX
    BNE FINDIT
    JMP JNAME
FOUNDIT DEX
    TXA
    ASL A
```

```
    TAX
    LDA DOSADR+1,X
    PHA
    LDA DOSADR,X
    PHA
    RTS

The braces surround control characters,
some entered with the ESCape key:
cursor-left, cursor-right, cursor-up,
cursor-down, CTRL-D, ESCape, and
CTRL-L.

DOSTABLE .BYTE 15
    .BYTE "{LEFT}{RIGHT}{UP}{DOWN}{D}RLUF1234{ESC}{L}"
DOSADR .WORD DLEFT-1,DRIGHT-1,DUP-1,DDOWN-1,DELFILE-1,RENAME-1
    .WORD LOCK-1,UNLOCK-1,FORMAT-1,DRIVE-1,DRIVE-1,DRIVE-1
    .WORD DRIVE-1,ESCDOS-1,LOADIT-1

Move bar cursor left by decrementing
slot pointer.


DLEFT JSR INVNAME
    LDX XSLOT
    BEQ NRANGE
    DEX
    DEX
    JMP RESLOT

Move bar cursor right by incrementing
slot pointer.

DRIGHT JSR INVNAME
    LDX XSLOT
    INX
    INX
    CPX XPTR
    BCS NRANGE

Store new slot index.

RESLOT STX XSLOT
    LDA SLOT,X
    STA SCR
    LDA SLOT+1,X
    STA SCR+1
NRANGE JMP NAMELP

Move bar cursor up by subtracting 6
from the slot pointer (each slot is two
bytes).

DUP JSR INVNAME
    LDA XSLOT
    CMP #6
    BCC NRANGE
    SEC
    SBC #6
    TAX
    JMP RESLOT

Move bar cursor down by adding 6 to
the slot pointer.

DDOWN JSR INVNAME
    LDA XSLOT
    CLC
    ADC #6
    CMP XPTR
    BCS NRANGE
```

```
    TAX
    JMP RESLOT

This routine turns a filename pointed
to by the bar cursor into a legal CIO
filename, complete with Dx: and legal
extension.

NAMER LDX #0
COPYD LDA DIRNAME,X
    STA FNBUFF,X
    INX
    CPX #3
    BNE COPYD
    LDY #1
COPYNAME LDA (SCR),Y
    AND #127
    JSR INTOAS
    CMP #32
    BEQ NOSTOR
    STA FNBUFF,X
    INX
NOSTOR INY
    CPY #13
    BNE COPYNAME
    LDA FNBUFF-1,X
    CMP #'.
    BNE NOTDOT
    DEX
NOTDOT STX FNLEN
    LDA #0
    STA FNBUFF,X
    RTS

This routine passes any CIO command
along with a formed filename.

XIO LDX #$70
    STA ICCOM,X
    LDA FNLEN
    STA ICBLEN,X
    LDA #0
    STA ICBLEN+1,X
    LDA # <FNBUFF
    STA ICBADR,X
    LDA # >FNBUFF
    STA ICBADR+1,X
    JMP CIO

The DOS functions are quite short.
NAMER builds the name; then we simply
pass the number of the DOS CIO function
unto XIO. If there's no error, we
return to waiting for the next
keystroke; otherwise, print the DOS
error message and wait for a keystroke.

DELFILE JSR NAMER
    LDA #33

Jump to the XIO routine.

GOXIO JSR XIO
    BPL JNAME
    JMP DOSERR
JNAME JSR INVNAME
    JMP NAMELP

Lock a file.

LOCK JSR NAMER
```

```
    LDA #35
    JMP GOXIO

Unlock a file.

UNLOCK JSR NAMER
    LDA #36
    JMP GOXIO

We ask for the new name of the file,
build the rename string, then jump to
the XIO routine.

RENAME JSR BOTCLR
    LDA # <RENMSG
    LDY # >RENMSG
    JSR PRMSG
    LDA #64
    STA $02BE
    JSR INPUT
    LDA #0
    STA $02BE
    LDA INLEN
    BEQ NONAME
    JSR NAMER
    LDX #0
    LDY FNLEN
    LDA #',
    STA FNBUFF,Y
    INY
COPYR LDA INBUFF,X
    STA FNBUFF,Y
    INY
    INX
    CPX INLEN
    BNE COPYR
    STY FNLEN
    LDA #0
    STA FNBUFF,Y
    JSR DOSMSG
    LDA #32
    JMP GOXIO
NONAME JSR DOSMSG
    JMP JNAME

Format routine. We use YORN to af firm
this operation, which erases an entire
disk. BOTCLR clears the bottom line of
the screen.

FORMAT JSR BOTCLR
    LDA # <FORMSG
    LDY # >FORMSG
    JSR PRMSG
    JSR YORN
    BNE NONAME
    JSR DOSMSG
    JSR NAMER
    LDA #254
    JMP GOXIO

Select new drive number and redisplay
directory.

DRIVE LDA TEMP
    STA DIRNAME+1
    JMP DOS

The Load-from-directory routine opens
the file, then jumps into the SpeedScript
Load routine.
```

```
LOADIT LDX #$70
    STX IOCB
    LDA #4
    STA ICAUX1,X
    LDA #0
    STA INDIR
    STA INDIR+1
    JSR NAMER

Command 3 is for OPEN file.

    LDA #3
    JSR XIO
    BMI DOSERR
    JSR ERASE
    JSR LOADLINK

If the load ended with an error, we
display the error; otherwise, we exit
the DOSPAK at ESCDOS.

    BMI DOSERR

The ESCape DOS routine clears the
stack, clears the screen, reenables the
display-list interrupt, prints the
"SpeedScript" message, then jumps back
to the editing loop.

ESCDOS LDX #$FA
    TXS
    LDA #125
    JSR CHROUT
    JSR HIGHLIGHT
    JSR SYSMSG
    JMP MAIN

BOTCLR erases the bottom two lines of
the screen by positioning the cursor on
the next-to-the-last line, then
printing two INSERT LINE characters
that push any text on these lines off
the bottom of the screen. Nifty, eh?

BOTCLR LDA #22
    STA 84
    LDA #157
    JSR CHROUT
    JMP CHROUT

This is the error routine for the
DOSPAK. We print "ERROR #", then print
the error number with OUTNUM, a bell
character (actually sounds like an
annoying buzzer, appropriate Pavlovian
treatment), then "Press RETURN." We
wait for a keystroke, then return to
getting keys for the DOSPAK commands.

DOSERR STY YSAVE
    JSR CLOSE7
    JSR BOTCLR
    LDA # <ERRMSG
    LDY # >ERRMSG
    JSR PRMSG
    LDX YSAVE
    LDA #0
    JSR OUTNUM
    LDA #253
    JSR CHROUT
```

```
    LDA # <DIRMSG
    LDY # >DIRMSG
    JSR PRMSG
    JSR GETAKEY
    JSR DOSMSG
    JMP JNAME

Inverse the filename field of the
currently selected filename. Used to
create the bar cursor.

INVNAME LDY #12
INVLP LDA (SCR),Y
    EOR #128
    STA (SCR),Y
    DEY
    BPL INVLP
    RTS

DOSMSG erases the bottom line of the
screen and prints the DOSPAK command
line, an abbreviated menu.

DOSMSG JSR BOTCLR
    LDA # <DIRINS
    LDY # >DIRINS
    JSR PRMSG
    LDA DIRNAME+1
    JMP CHROUT
    .END
```

Filename: SPEED.2

```
This is the main input/output portion
of SpeedScript, responsible for loading,
saving, and all printing functions.

CAST and CINSTOAS (standing for Convert
to ASCII and Convert INTernal code to
ASCII) translate the way SpeedScript
stores text in memory (internal screen
codes) into ASCII so that disk files
will be compatible with most other
software. In addition, the return- mark
is changed to character 155, and vice
versa. This is why you can't load a
machine language file into SpeedScript,
edit it, then save it back as a
runnable modification. All back-arrows
are turned into carriage returns on
output, and all carriage returns
(155's) are turned into back-arrows
(30's) on input.

CAST  LDA #0
      STA CONVFLAG
      JMP CAST1
CINTOAS LDA #128
      STA CONVFLAG
CAST1 LDA TEXSTART
      STA TEX
      LDA TEXSTART+1
      STA TEX+1
    JMP CIN
CASTOIN LDA #0
    STA CONVFLAG
    LDA CURR
    STA TEX
    LDA CURR+1
    STA TEX+1
CIN SEC
```

```
    LDA LASTLINE+1
    SBC TEX+1
    TAX
    INX
    LDY #0
CVLOOP LDA (TEX),Y
    BIT CONVFLAG
    BMI COTHER
    CMP #155
    BNE NOTRTN
    LDA #RETCHAR
    JMP OVEROTHER
NOTRTN JSR ASTOIN
    JMP OVEROTHER
COTHER CMP #RETCHAR
    BNE NOTRC
    LDA #155
    JMP OVEROTHER
NOTRC JSR INTOAS
OVEROTHER STA (TEX),Y
    INY
    BNE CVLOOP
    INC TEX+1
    DEX
    BNE CVLOOP
    RTS
```

Here is where most of the input/output routines start. TSAVE saves the entire document area using the CIO block output routine (PUT TEXT). TOPEN is called by both TSAVE and TLOAD to get the filename and open the file. The device specification (D: or C:) must be typed in by the user.

TSAVE prints the Save: prompt, goes to TOPEN with an 8 (for output, the same number in OPEN 1,8,0,"D:file"), and uses IOCB #7 (LDX #$70) to send a PUT TEXT command (11). Text is written from the start-of-text with a length of LASTLINE - TEXSTART.

```
TSAVE JSR TOPCLR
    LDA # <SAVMSG
    LDY # >SAVMSG
    JSR PRMSG
    LDA #8
    JSR TOPEN
    BMI ERROR
    JSR CINTOAS
    LDX #$70
    LDA TEXSTART
    STA ICBADR,X
    LDA TEXSTART+1
    STA ICBADR+1,X
    SEC
    LDA LASTLINE
    SBC TEXSTART
    STA ICBLEN,X
    LDA LASTLINE+1
    SBC TEXSTART+1
    STA ICBLEN+1,X
    LDA #11
    STA ICCOM,X
    JSR CIO
```

The N (negative) bit is set when an error occurs after a call to CIO or a routine that ends up calling CIO.

Therefore, we can use BMI to branch on an error condition.

```
    BMI ERR1
    JSR CAST
    JSR CLOSE7
    BMI ERROR
    JMP FINE
ERR1 TYA
    PHA
    JSR CAST
    PLA
    TAY
```

The error routine uses the error number found in the Y register, prints the error message with PRMSG, and the error number with OUTNUM. The open file is closed. If the BREAK key was used to stop the operation, we distinguish this from an ordinary error, and print "BREAK Abort" instead.

```
ERROR CPY #128
    BEQ STOPPED
    TYA
    PHA
    LDA #125
    JSR CHROUT
    LDA # <ERRMSG
    LDY # >ERRMSG
    JSR PRMSG
    PLA
    TAX
    LDA #0
    JSR OUTNUM
ERXIT JSR IOCLOSE
    JSR HIGHLIGHT
    LDA #1
    STA MSGFLG
    RTS
STOPPED JSR TOPCLR
    LDA # <BRMSG
    LDY # >BRMSG
    JSR PRMSG
    JMP ERXIT
```

General file closing routine. IOCB contains the channel number times 16.

```
IOCLOSE LDX IOCB
    LDA #12
    STA ICCOM,X
    JMP CIO
```

TOPEN is used to get a filename, including the device specification. It's used by Save, Load, and Print. It forces the CAPS key to uppercase for the filename, which is not quite as satisfactory as converting the filename if lowercase was used. It does return the CAPS key to its former value, though. TOPEN opens the file and returns with the error code in the Y register.

```
TOPEN LDX #$70
    STX IOCB
    STA ACCESS
```

```
Save current CAPS value.

    LDA SHFLOK
    PHA

CAPS On.

    LDA #64
    STA SHFLOK
    JSR INPUT

Restore CAPS value.

    PLA
    STA SHFLOK
    LDA INLEN
    BNE OPCONT
OPABORT JSR SYSMSG
    PLA
    PLA
    JMP HIGHLIGHT
OPCONT JSR IOCLOSE
    LDX IOCB
    LDA # <INBUFF
    STA ICBADR,X
    LDA # >INBUFF
    STA ICBADR+1,X
    LDA INLEN
    STA ICBLEN,X
    LDA #0
    STA ICBLEN+1,X
    LDA ACCESS
    STA ICAUX1,X
    LDA #3
    STA ICCOM,X
    JMP CIO

The Load routine checks the cursor
position. If the cursor is at the
top-of-text (CURR=TEXSTART), we call
the ERASE routine to wipe out memory
before the load. Otherwise, the load
starts at the cursor position,
performing an append, and we change the
command line to green ($C4, sorry about
not using a label) to warn the user. We
open the file for reading by passing a
4 to TOPEN, then at LOADLINK use GET
TEXT (command 7) to get no more than
the length of the text area. The actual
length loaded is found in ICBLEN, so we
add this to TEXSTART and the offset
between the cursor position and
TEXSTART to get the position of the
end-of-text (LASTLINE).

A funny thing happens, though. Up to
255 garbage characters appear following
an otherwise normal load, after the
end-of-text. I was never able to figure
out why (and I puzzled over it for a
week), so I wrote a stopgap routine to
just clear out one page past the
end-of-text. The bug is not fixed per
se, but it has no effect anymore! I
still think it must be the fault of the
operating system (I know...).

TLOAD SEC
    LDA CURR
    SBC TEXSTART
```

```
    STA TEX
    STA INDIR
    LDA CURR+1
    SBC TEXSTART+1
    STA TEX+1
    STA INDIR+1
    ORA TEX
    BEQ LOAD2
    LDA #$C4
    STA WINDCOLR
LOAD2 JSR TOPCLR
    LDA # <LOADMSG
    LDY # >LOADMSG
    JSR PRMSG
    LDA #4
    JSR TOPEN
    BPL OKLOD
GOERROR JMP ERROR
OKLOD LDA WINDCOLR
    CMP #$C4
    BEQ NOER
    JSR ERASE
NOER JSR LOADLINK
    CPY #128
    BCC JFINE
    JMP ERROR
JFINE JMP FINE

Entry point for linked files loading.

LOADLINK LDX IOCB
    LDA CURR
    STA ICBADR,X
    LDA CURR+1
    STA ICBADR+1,X
    SEC
    LDA TEXEND
    SBC CURR
    STA ICBLEN,X
    LDA TEXEND+1
    SBC CURR+1
    STA ICBLEN+1,X
    LDA #7
    STA ICCOM,X
    JSR CIO
    BPL TEXOK
    CPY #136
    BEQ TEXOK
    RTS
TEXOK LDX IOCB
    CLC
    LDA ICBLEN,X
    ADC TEXSTART
    STA LASTLINE
    LDA ICBLEN+1,X
    ADC TEXSTART+1
    STA LASTLINE+1
    CLC
    LDA LASTLINE
    ADC INDIR
    STA LASTLINE
    LDA LASTLINE+1
    ADC INDIR+1
    STA LASTLINE+1
    JSR CASTOIN
    LDA LASTLINE
    STA TEX
    LDA LASTLINE+1
    STA TEX+1
    LDA #0
    TAY
```

```
NOGARBAGE STA (TEX),Y
    INY
    BNE NOGARBAGE
    RTS
FINE JSR IOCLOSE
    BPL PROKMSG
    JMP ERROR
PROKMSG LDA #125
    JSR CHROUT
    LDA # <OKMSG
    LDY # >OKMSG
    JSR PRMSG
    JMP ERXIT
```

Disable display-list interrupt and restore screen colors.

```
DELITE LDA #$40
    STA $D40E
    LDA SCRCOL
    STA 710
    STA 712
    LDA TEXCOLR
    STA 709
    RTS
```

A rather short routine that converts a string of ASCII digits into a number in hex and the accumulator. It takes advantage of decimal mode. In decimal mode, the accumulator is adjusted after additions and subtractions so that it acts like a two-digit decimal counter. We shift BCD over a nybble and add in the left nybble of the ASCII number until we reach the end of the ASCII number. We then subtract 1 from BCD and increment X (which doesn't conform to decimal mode) until BCD is down to 0. The X register magically holds the converted number. Naturally, decimal mode is cleared before this routine exits, or it would wreak major havoc. ASCHEX is used to convert the parameters of printer commands like left margin.

```
ASCHEX LDX #0
    STX BCD
    STX BCD+1
    STX HEX
    STX HEX+1
DIGIT SEC
    LDA (TEX),Y
    SBC #16
    BCC NONUM
    CMP #10
    BCS NONUM
    ASL BCD
    ROL BCD+1
    ASL BCD
    ROL BCD+1
    ASL BCD
    ROL BCD+1
    ASL BCD
    ROL BCD+1
    ORA BCD
    STA BCD
    INY
    BNE DIGIT
    INC TEX+1
```

```
    JMP DIGIT
NONUM SED
DECHEX LDA BCD
    ORA BCD+1
    BEQ DONENUM
    SEC
    LDA BCD
    SBC #1
    STA BCD
    LDA BCD+1
    SBC #0
    STA BCD+1
    INC HEX
    BNE NOHEXINC
    INC HEX+1
NOHEXINC JMP DECHEX
DONENUM LDA HEX
    CLD
    RTS

Insert the buffer. This is the recall
routine called by CTRL-R. It must not
allow an insertion that would overfill
memory. It calls DMOVE to open a space
in memory, then UMOVE (which is a
little faster than DMOVE) to copy the
buffer to the empty space.

INSBUFFER SEC
    LDA TPTR
    SBC TEXBUF
    STA BUFLEN
    LDA TPTR+1
    SBC TEXBUF+1
    STA BUFLEN+1
    ORA BUFLEN
    BNE OKBUFF
    JSR TOPCLR
    LDA # <INSMSG
    LDY # >INSMSG
    JSR PRMSG
    LDA #1
    STA MSGFLG
    RTS
OKBUFF CLC
    LDA CURR
    STA FROML
    ADC BUFLEN
    STA DESTL
    LDA CURR+1
    STA FROMH
    ADC BUFLEN+1
    STA DESTH
    SEC
    LDA LASTLINE
    SBC FROML
    STA LLEN
    LDA LASTLINE+1
    SBC FROMH
    STA HLEN
    CLC
    ADC DESTH
    CMP TEXEND+1
    BCC OKMOV
    JSR TOPCLR
    LDA # <INSERR
    LDY # >INSERR
    JSR PRMSG
    LDA #1
    STA MSGFLG
    RTS
```

```
OKMOV JSR DMOVE
    CLC
    LDA BUFLEN
    STA LLEN
    ADC LASTLINE
    STA LASTLINE
    LDA BUFLEN+1
    STA HLEN
    ADC LASTLINE+1
    STA LASTLINE+1
    LDA CURR
    STA DESTL
    LDA CURR+1
    STA DESTH
    LDA TEXBUF
    STA FROML
    LDA TEXBUF+1
    STA FROMH
    JSR UMOVE
    JMP CHECK

Exchange the character highlighted by
the cursor with the character to the
right of it. Not a vital command, but
it was included due to the brevity of
the code.

SWITCH LDY #0
    LDA (CURR),Y
    TAX
    INY
    LDA (CURR),Y
    DEY
    STA (CURR),Y
    INY
    TXA
    STA (CURR),Y
    RTS

Change the case of the character
highlighted by the cursor.

ALPHA LDY #0
    LDA (CURR),Y
    AND #63
    CMP #33
    BCC NOTALPHA
    CMP #59
    BCS NOTALPHA
    LDA (CURR),Y
    EOR #64
    STA (CURR),Y
NOTALPHA JMP RIGHT

Convert internal (screen code) format
to Atari ASCII (ATASCII). Used to
convert the screen-code format of
SpeedScript documents to ASCII for the
sake of printing.

INTOAS PHA
    AND #128
    STA TEMP
    PLA
    AND #127
    CMP #96
    BCS XINT
INCONT CMP #64
    BCC INT1
    SBC #64
    JMP XINT
```

```
INT1 ADC #32
XINT ORA TEMP
    RTS

The start of the printer routines. This
part could logically be called a
separate program, but many variables
are common to the above code.

DEFTAB: Table of default settings for
left margin, right margin, page length,
top margin, bottom margin, etc. See the
table starting at LMARGIN at the end of
this source code.

DEFTAB .BYTE 5,75,66,5,58,1,1,1,0,1,0,80

Table of default printer codes.

PRCODES .BYTE 27,14,15,18

Another advantage of modular coding is
that you can change the behavior of a
lot of code by just changing one small
common routine. This is a substitute
for the normal CHROUT routine. It
checks to see if the current page
number equals the page number specified
by the user to start printing. It also
checks for the BREAK to abort the
printing and permits printing to be
paused with CTRL-1.

PCHROUT STA PCR
    TXA
    PHA
    TYA
    PHA
    SEC
    LDA PAGENUM
    SBC STARTNUM
    LDA PAGENUM+1
    SBC STARTNUM+1
    BCC SKIPOUT
    LDA #1
    STA 766
    LDX #$70
    LDA #0
    STA ICBLEN,X
    STA ICBLEN+1,X
    LDA #11
    STA ICCOM,X
    LDA PCR
    JSR CIO
    PHP
    LDA #0
    STA 766
    PLP
    BPL SHIFTFREEZE
ERRLINK JSR ERROR
    LDX #$FA
    TXS
    JMP MAIN
SHIFTFREEZE LDA $02FF ;CTRL-1
    BNE SHIFTFREEZE
SKIPOUT PLA
    TAY
    PLA
    TAX
    LDA PCR
    RTS
```

```
Displays "Printing..."

PRIN JSR TOPCLR
    LDA # <PRINMSG
    LDY # >PRINMSG
    JMP PRMSG
PBORT JMP PEXIT

Called by CTRL-P. We get the filename
to print to (usually P:, although you
can use E: to print to the screen) with
ICAUX1 set to 8 for output. We exit on
any error. The DELITE routine turns off
the display-list interrupt, which might
otherwise interfere with output timing.

PRINT JSR TOPCLR
    LDA # <FNMSG
    LDY # >FNMSG
    JSR PRMSG
    JSR DELITE
    LDA #8
    JSR TOPEN
    BPL PROK
    JMP PEXIT

Reset several flags (footer length,
header length, true ASCII, underline
mode, and linefeed mode). Notice how
DELITE is called again. This isn't a
mistake. The first time we called
DELITE, we then may have opened a file
to the Editor device. This reset the
screen to the default colors, so the
second DELITE retains the user's true
color choice.

PROK JSR DELITE
    JSR PRIN
    LDX #0
    STX FTLEN
    STX HDLEN
    STX NEEDASC
    STX UNDERLINE
    STX LINEFEED

Copy definition tables and default
printercodes.

COPYDEF LDA DEFTAB,X
    STA LMARGIN,X
    INX
    CPX #12
    BNE COPYDEF
    LDA #$FF
    STA LINE
    STA NOMARG
    LDX #4
COPYDEFS LDA PRCODES-1,X
    STA CODEBUFFER+16,X
    DEX
    BNE COPYDEFS

Reentry point for printing after linked
files.

RETEX LDA TEXSTART
    STA TEX
    LDA TEXSTART+1
    STA TEX+1
```

```
Main printing loop. We print the left
margin, grab a line of text, scan
backward until we find a space or a
carriage return, then break the line
there. If printer codes are
encountered, they're passed on to the
SPECIAL routine. Otherwise, we end up
calling BUFPRT to print the line and
process some other control codes.

PLOOP LDY #0
    STY POS
    CPY NOMARG
    BEQ PLOOP1
    LDA LMARGIN
    STA POS
PLOOP1 LDA (TEX),Y
    BPL NOTSP
    JMP SPECIAL
NOTSP CMP #RETCHAR
    BEQ FOUNDSPACE
NOTRET STA PRBUFF,Y
    INY
    INC POS
    LDA POS
    CMP RMARGIN
    BCC PLOOP1
    STY FINPOS
FINDSPACE LDA (TEX),Y
    CMP #SPACE
    BEQ FOUNDSPACE
    DEC POS
    DEY
    BNE FINDSPACE
    LDY FINPOS
FSPACE INY
    LDA (TEX),Y
    CMP #SPACE
    BEQ FOUNDSPACE
    DEY
FOUNDSPACE STY FINPOS
OVERSTOR TYA
    SEC
    ADC TEX
    STA TEX
    LDA TEX+1
    ADC #0
    STA TEX+1
    LDY #0

If this is the first page, we need to print
the header, if any, with JSR TOP.

DOBUFF LDA LINE
    CMP #$FF
    BNE DOBUF2
    JSR TOP
DOBUF2 LDA NOMARG
    BEQ OVERMARG
    JSR LMARG
OVERMARG SEC
    ROL NOMARG
    LDA FINPOS
    STA ENDPOS
    LDA # <PRBUFF
    STA INDIR
    LDA # >PRBUFF
    STA INDIR+1
    JSR BUFPRT
```

```
A line has been printed. We check to
see if we've hit the bottom margin and,
if so, go to PAGE, which goes to the
end of the page, prints the footer (if
any), and feeds to the next page.

ZBUFF JSR CRLF
    LDA LINE
    CMP BOTMARG
    BCC NOTPAGE
    JSR PAGE

Have we reached the end-of-text?

NOTPAGE SEC
    LDA TEX
    SBC LASTLINE
    STA TEMP
    LDA TEX+1
    SBC LASTLINE+1
    ORA TEMP
    BEQ DORPT
    BCC DORPT

If so, we check for a footer. If there
is one, we set HDLEN and TOPMARG to 0
(so that the printhead will end up at
the right place on the last page) and
call PAGE, which prints the footer. If
there is no footer, we leave the
printhead on the same page so that
paper isn't wasted.

    LDA FTLEN
    BEQ PXIT
    LDA #0
    STA HDLEN
    STA TOPMARG
    JSR PAGE

Exit routines. If screen output was
selected, we wait for a keystroke
before going back to editing mode.

PXIT LDA INBUFF
    CMP #'E
    BNE PEXIT
    LDA #155
    JSR CHROUT
    LDA # <DIRMSG
    LDY # >DIRMSG
    JSR PRMSG
    JSR GETAKEY
PEXIT JSR CLOSE7
    LDX #$FA
    TXS
    JSR HIGHLIGHT
    LDA #125
    JSR CHROUT
    JSR SYSMSG
    JMP MAIN
DORPT JMP PLOOP

Paging routines. We skip (PAGELENGTH -
LINE) -- two blank lines to get to the
bottom of the page, print a footer (if
there is one) or a blank line (if not),
then page to the beginning of the next
page, skipping over the paper
perforation. If the wait mode is
enabled, we wait for the user to insert
```

```
a new sheet of paper.

PAGE SEC
    LDA PAGELENGTH
    SBC LINE
    TAY
    DEY
    DEY
    BEQ NOSK
    BMI NOSK
NEXPAGE JSR CR
    DEY
    BNE NEXPAGE
NOSK LDA FTLEN
    BEQ SKIPFT
    STA ENDPOS
    LDA # <FTBUFF
    STA INDIR
    LDA # >FTBUFF
    STA INDIR+1
    JSR LMARG
    JSR BUFPRT
SKIPFT JSR CR
    JSR CR
    JSR CR

Increment the page number.

    INC PAGENUM
    BNE NOIPN
    INC PAGENUM+1

The page wait mode is inappropriate
when printing to the screen or to disk,
or when skipping over pages with the ?
format command.

NOIPN LDA CONTINUOUS
    BNE TOP
    SEC
    LDA PAGENUM
    SBC STARTNUM
    LDA PAGENUM+1
    SBC STARTNUM+1
    BCC TOP
    JSR TOPCLR
    LDA # <WAITMSG
    LDY # >WAITMSG
    JSR PRMSG
    JSR GETAKEY
    JSR PRIN

Print the header; skip to the top
margin.

TOP LDA HDLEN
    BEQ NOHEADER
    STA ENDPOS
    LDA # <HDBUFF
    STA INDIR
    LDA # >HDBUFF
    STA INDIR+1
    JSR LMARG
    JSR BUFPRT
NOHEADER LDY TOPMARG
    STY LINE
    DEY
    BEQ SKIPTOP
    BMI SKIPTOP
TOPLP JSR CR
    DEY
```

```
    BNE TOPLP
SKIPTOP RTS

Left margin routine. This routine is not
called if NOMARG is selected (margin
release).

LMARG LDA #32
    LDY LMARGIN
    STY POS
    BEQ LMEXIT
LMLOOP JSR PCHROUT
    DEY
    BNE LMLOOP
LMEXIT RTS

CRLF is called at the end of most
printed lines. It increments the LINE
count and takes into account the
current line spacing mode set by the a
format command.

CRLF LDY SPACING
    CLC
    TYA
    ADC LINE
    STA LINE
CRLOOP JSR CR
    DEY
    BNE CRLOOP
    RTS

CR just prints a single carriage return
and linefeed (if specified).

CR  LDA #155
    JSR PCHROUT
    LDA LINEFEED
    BEQ NOLF
    JSR PCHROUT
NOLF RTS

Handle special printer codes like left
margin. This looks up the printer code
using a routine similar to CONTROL.

SPECIAL STA SAVCHAR
    AND #127
    JSR INTOAS
    LDX SPTAB
SRCHSP CMP SPTAB,X
    BEQ FSP
    DEX
    BNE SRCHSP
    DEC POS
    JMP DEFINE
FSP DEX
    TXA
    ASL A
    TAX
    STY YSAVE
    LDA # >SPCONT-1
    PHA
    LDA # <SPCONT-1
    PHA
    LDA SPVECT+1,X
    PHA
    LDA SPVECT,X
    PHA
    RTS
```

```
After the format code is processed, we
must skip over the format command
and its parameter so that it's not
printed.

SPCONT SEC
    LDA YSAVE
    ADC TEX
    STA TEX
    LDA TEX+1
    ADC #0
    STA TEX+1
    JMP PLOOP

If the format command ends with a
return-mark, we must skip over the
return-mark as well.


SPCEXIT LDA (TEX),Y
    CMP #RETCHAR
    BEQ NOAD
    DEY
NOAD STY YSAVE
    RTS

Special format code table. It starts with
the number of format commands, then
the characters for each format
command.

SPTAB .BYTE 17
    .BYTE "wlrtbsnhf@p?xmigj"

The address-1 of each format routine.

SPVECT .WORD PW-1,LM-1,RM-1,TP-1
    .WORD BT-1,SP-1,NX-1,HD-1,FT-1
    .WORD PN-1,PL-1,SPAGE-1,ACROSS-1
    .WORD MRELEASE-1,COMMENT-1,LINK-1
    .WORD LFSET-1

m Margin release. INY is used to skip
over the format character.

MRELEASE INY
    LDA #0
    STA NOMARG
    JMP SPCEXIT

x Columns across, used by centering.

ACROSS INY
    JSR ASCHEX
    STA PAGEWIDTH
    JMP SPCEXIT

? Start printing at specified page.

SPAGE INY
    JSR ASCHEX
    STA STARTNUM
    LDA HEX+1
    STA STARTNUM+1
    JMP SPCEXIT

@ Set starting default page number.

PN  INY
    JSR ASCHEX
    STA PAGENUM
```

```
    LDA HEX+1
    STA PAGENUM+1
    JMP SPCEXIT

p Page length.

PL  INY
    JSR ASCHEX
    STA PAGELENGTH
    JMP SPCEXIT

w Set page wait mode.

PW  LDA #0
    STA CONTINUOUS
    INY
    JMP SPCEXIT

j Set linefeed mode.

LFSET LDA #10
    STA LINEFEED
    INY
    JMP SPCEXIT

l Left margin.

LM  INY
    JSR ASCHEX
    STA LMARGIN
    JMP SPCEXIT

r Right margin.

RM  INY
    JSR ASCHEX
    STA RMARGIN
    JMP SPCEXIT

t Top margin.

TP  INY
    JSR ASCHEX
    STA TOPMARG
    JMP SPCEXIT

b Bottom margin.

BT  INY
    JSR ASCHEX
    STA BOTMARG
    JMP SPCEXIT

s Set line spacing.

SP  INY
    JSR ASCHEX
    STA SPACING
    JMP SPCEXIT

n Jump to next page.

NX  LDY YSAVE
    INY
    TYA
    PHA
    JSR PAGE
    PLA
    TAY
    STY YSAVE
    RTS
```

```
h Define header. Copy header into
header buffer.

HD  JSR PASTRET
    DEY
    STY HDLEN
    LDY #1
HDCOPY LDA (TEX),Y
    STA HDBUFF-1,Y
    INY
    CPY HDLEN
    BCC HDCOPY
    BEQ HDCOPY
    INY
    JMP SPCEXIT

Skip just past the return-mark.

PASTRET INY
    LDA (TEX),Y
    CMP #RETCHAR
    BNE PASTRET
    RTS

f Define footer.

FT  JSR PASTRET
    DEY
    STY FTLEN
    LDY #1
FTCOPY LDA (TEX),Y
    STA FTBUFF-1,Y
    INY
    CPY FTLEN
    BCC FTCOPY
    BEQ FTCOPY
    JMP SPCEXIT

i Ignore a line of information.

COMMENT JSR PASTRET
    JMP SPCEXIT

Define programmable printkeys. We
check for =. If not found, this is not an
assignment, so we just skip past the
code. Otherwise, we use the screen
code value as the index into the
CODEBUFFER and put the value there,
ready to be called during printing by
BUFPRT.

DEFINE INY
    LDA (TEX),Y
    CMP #'=-32
    BEQ DODEFINE
    DEY
    LDA SAVCHAR
    JMP NOTRET
DODEFINE INY
    JSR ASCHEX
    PHA
    LDA SAVCHAR
    AND #127
    TAX
    PLA
    STA CODEBUFFER,X
    JSR SPCEXIT
    JMP SPCONT
```

```
g Link to next file. We get the
filename from text and put it into the
input buffer, just as if the filename
were typed in with INPUT. We then jump
into the TOPEN routine to open the
file, and into the Load routine to load
the file. After the load, we check for
a load error, then jump to RETEX to
continue printing.

LINK LDY #1
    LDX #0
FNCOPY LDA (TEX),Y
    CMP #RETCHAR
    BEQ FNEND
    JSR INTOAS
    STA INBUFF,X
    INY
    INX
    CPX #14
    BNE FNCOPY
FNEND STX INLEN
    LDA #0
    STA INBUFF,X
    LDX #$60
    STX IOCB
    LDA #4
    STA ACCESS
    JSR OPCONT
    BPL LNOERR
    JMP ERRLINK
LNOERR LDA #0
    STA INDIR
    STA INDIR+1
    JSR ERASE
    JSR LOADLINK
    BPL LCONT
    JMP ERRLINK
LCONT PLA
    PLA
    LDX #$70
    STA IOCB
    JMP RETEX

Global search and replace. This just
links together the search-specify
routine, the replace-specify routine,
then repeatedly calls Hunt and Replace,
until Hunt returns "Not Found." (FPOS+1
is $FF after a search failure.)

SANDR JSR RESET
    LDA HUNTLEN
    BEQ NOSR
    JSR ASKREP
SNR JSR CONTSRCH
    LDA FPOS+1
    CMP #$FF
    BEQ NOSR
    JSR REPL
    JSR REFRESH
    JMP SNR
NOSR JMP SYSMSG

If OPTION is held down with CTRL-F, we
ask for and store the search phrase. If
OPTION is not down, we perform the
actual search. The line in the INBUFF
is compared with characters in text. If
at any point the search fails, we
continue the comparison with the first
```

```
character of INBUFF. The search is a
failure if we reach the end-of-text. If
the entire length of INBUFF matches,
the search succeeds, so we change the
CURRent cursor position to the found
position, save the found position for
the sake of the replace routine, then
call CHECK to scroll to the found
position.

HUNT LDA #8
    STA 53279
    LDA 53279
    CMP #3
    BNE CONTSRCH
RESET JSR TOPCLR
    LDA # <SRCHMSG
    LDY # >SRCHMSG
    JSR PRMSG
    JSR INPUT
    STA HUNTLEN
    BNE OKSRCH
    JMP SYSMSG
OKSRCH LDY #0
TOBUFF LDA INBUFF,Y
    STA HUNTBUFF,Y
    INY
    CPY INLEN
    BNE TOBUFF
    JMP SYSMSG
CONTSRCH LDA CURR
    STA TEX
    LDA CURR+1
    STA TEX+1
    LDA #$FF
    STA FPOS+1
    LDY #1
SRCH0 LDX #0
    LDA HUNTLEN
    BEQ NOTFOUND
SRCH1 LDA HUNTBUFF,X
    JSR ASTOIN
    CMP (TEX),Y
    BEQ CY
    CPX #0
    BNE SRCH0
    DEX
CY  INY
    BNE NOVFL
    INC TEX+1
    LDA TEX+1
    CMP LASTLINE+1
    BEQ NOVFL
    BCS NOTFOUND
NOVFL INX
    CPX HUNTLEN
    BNE SRCH1
    CLC
    TYA
    ADC TEX
    STA TEMP
    LDA TEX+1
    ADC #0
    STA TEMP+1
    LDA LASTLINE
    CMP TEMP
    LDA LASTLINE+1
    SBC TEMP+1
    BCC NOTFOUND
    SEC
    LDA TEMP
```

```
    SBC HUNTLEN
    STA CURR
    STA FPOS
    LDA TEMP+1
    SBC #0
    STA CURR+1
    STA FPOS+1
    JSR CHECK
    RTS
NOTFOUND JSR TOPCLR
    LDA # <NFMSG
    LDY # >NFMSG
    JSR PRMSG
    LDA #1
    STA MSGFLG
    RTS

The change (replace) routine checks to
see if OPTION is held down with CTRL-C.
If it is, we ask for a replace phrase,
and exit. If not, we check to see if
the cursor is at the position
previously located by the search
routine. If it is, we delete the found
phrase, then insert the replace phrase.
The cursor is moved past the replace
phrase for the sake of the next search.
This also prevents endless recursion,
as in replacing in with winner.

REPSTART LDA #8
    STA 53279
    LDA 53279
    CMP #3
    BNE REPL
ASKREP JSR TOPCLR
    LDA # <REPMSG
    LDY # >REPMSG
    JSR PRMSG
    JSR INPUT
    STA REPLEN
    BEQ NOREP
    LDY #0
REPMOV LDA INBUFF,Y
    STA REPBUFF,Y
    INY
    CPY INLEN
    BNE REPMOV
NOREP JMP SYSMSG
REPL SEC
    LDA CURR
    STA DESTL
    SBC FPOS
    STA TEMP
    LDA CURR+1
    STA DESTH
    SBC FPOS+1
    ORA TEMP
    BNE NOREPL
    LDA #$FF
    STA FPOS+1
    CLC
    LDA HUNTLEN
    ADC CURR
    STA FROML
    LDA #0
    ADC CURR+1
    STA FROMH
    SEC
    LDA LASTLINE
    SBC DESTL
```

```
    STA LLEN
    LDA LASTLINE+1
    SBC DESTH
    STA HLEN
    JSR UMOVE
    SEC
    LDA LASTLINE
    SBC HUNTLEN
    STA LASTLINE
    LDA LASTLINE+1
    SBC #0
    STA LASTLINE+1
    LDA REPLEN
    BEQ NOREPL
    STA INSLEN
    LDA #0
    STA INSLEN+1
    JSR INSBLOCK
    LDY #0
REPLOOP LDA REPBUFF,Y
    JSR ASTOIN
    STA (CURR),Y
    INY
    CPY REPLEN
    BNE REPLOOP
    CLC
    LDA CURR
    ADC REPLEN
    STA CURR
    LDA CURR+1
    ADC #0
    STA CURR+1
NOREPL JMP CHECK

Suddenly, we're back to a PRINT
subroutine. This examines the buffer as
it's being printed, checking for
printkeys and Stage 2 commands like
centering.

BUFPRT LDY #0
BUFLP CPY ENDPOS
    BEQ ENDBUFF
    LDA (INDIR),Y
    BMI SPEC2
    JSR INTOAS
    JSR PCHROUT

In underline mode, after we print the
character, we backspace the printhead
and print an underline character.

    LDA UNDERLINE
    BEQ NOBRK
    LDA #8
    JSR PCHROUT
    LDA #95
    JSR PCHROUT
NOBRK INY
    JMP BUFLP
ENDBUFF RTS

Stage 2 format commands.

SPEC2 STY YSAVE
    AND #127
    STA SAVCHAR
    JSR INTOAS
OTHER CMP #'c
    BNE NOTCENTER
```

```
c Centering looks at the length of the
line, then sends out extra spaces (the
left margin has already been printed) to
move the printhead to the right place.

    SEC
    LDA PAGEWIDTH
    SBC ENDPOS
    LSR A
    SEC
    SBC LMARGIN
  TAY
  LDA #32
CLOOP JSR PCHROUT
  DEY
  BNE CLOOP
  LDY YSAVE
  JMP NOBRK
NOTCENTER CMP #'e
  BNE NOTEDGE

e Edge right. This subtracts the length
of the line from the right margin
position and moves the printhead to
this position.

EDGE SEC
  LDA RMARGIN
  SBC ENDPOS
  SEC
  SBC LMARGIN
  TAY
  LDA #32
  JMP CLOOP
NOTEDGE CMP #'u
  BNE NOTOG

u Toggle underline mode. L

  LDA UNDERLINE
  EOR #1
  STA UNDERLINE
NOTOG CMP #'#
  BNE DOCODES

# Substitute the current page number
for the # symbol.

DOPGN STY YSAVE
  LDX PAGENUM
  LDA PAGENUM+1
  JSR PROUTNUM
  LDY YSAVE
  JMP NOBRK

Do special format codes. This just uses
the screen-code value of the character
as an index into the CODEBUFFER, then
sends out the code. SpeedScript makes
no judgment on the code being sent out.

DOCODES LDX SAVCHAR
  LDA CODEBUFFER,X
  JSR PCHROUT
  JMP NOBRK

Display free memory using OUTNUM.

FREEMEM JSR TOPCLR
  SEC
  LDA TEXEND
```

```
  SBC LASTLINE
  TAX
  LDA TEXEND+1
  SBC LASTLINE+1
  JSR OUTNUM
  LDA #1
  STA MSGFLG
  RTS
  .END
```

Filename: DATA

```
Data tables

Messages are stored in ATASCII, with a
zero byte for a delimiter.

MSG1 .BYTE "SpeedScript 3.0"
    .BYTE 0
MSG2 .BYTE " by Charles Brannon"
    .BYTE 0
KILLMSG .BYTE "Buffer Cleared"
    .BYTE 0
BUFERR .BYTE "Buffer Full"
    .BYTE 0
DELMSG .BYTE "Delete (S,W,P)"
    .BYTE 0
YMSG .BYTE ": Are you sure? (Y/N):"
    .BYTE 0
CLRMSG .BYTE "ERASE ALL TEXT"
    .BYTE 0
ERASMSG .BYTE "Erase (S,W,P): {inv}RETURN{inv} to exit"
    .BYTE 0
SAVMSG .BYTE "Save (Device:Filename)>"
    .BYTE 0
ERRMSG .BYTE "Error #"
    .BYTE 0
BRMSG .BYTE "BREAK Key Abort"
    .BYTE 0
OKMSG .BYTE "No Errors"
    .BYTE 0
LOADMSG .BYTE "Load (Device:Filename)>"
    .BYTE 0
DIRMSG .BYTE " Press {inv}RETURN{inv}"
    .BYTE 0
DIRNAME .BYTE "D1:*.*"
INSERR .BYTE "Memory Full"
    .BYTE 0
INSMSG .BYTE "No text in buffer"
    .BYTE 0
FNMSG .BYTE "Print (Device:Filename)>"
    .BYTE 0
PRINMSG .BYTE "Printing..."
    .BYTE 155,155,0
WAITMSG .BYTE "Insert next sheet, press {inv}RETURN{inv}"
    .BYTE 0
SRCHMSG .BYTE "Find:"
    .BYTE 0
NFMSG .BYTE "Not found"
    .BYTE 0
REPMSG .BYTE "Change to:"
    .BYTE 0

The {ESC}'s represent the ESCape key.
The arrows are the cursor keys, which
must be preceded by ESC to be entered
into text. There is actually only one
space between the e of Rename and the
E of ESC.

DIRINS .BYTE "{ESC}{up}{ESC}{down}{ESC}{left}
```

```
        {ESC}{right} {inv}CTRL-D{inv}elete
        {inv}L{inv}ock {inv}U{inv}nlock
        {inv}R{inv}ename {inv}ESC{inv}
        {inv}CTRL-L{inv}oad Drive [
        {inv}1{inv} {inv}2{inv}
        {inv}3{inv} {inv}4{inv}
        ]: ",0
RENMSG .BYTE "Rename to:",0
FORMSG .BYTE "Format disk",0

The .OPT NO OBJ and .OPT OBJ pseudo-ops
turn on and off object code generation.
This insures that no object code is
generated for the variable table.

    .OPT NO OBJ

TEXSTART *= *+2         ; Start-of-text area
TEXEND *= *+2           ; End-of-text area
TEXBUF *= *+2           ; Start of buffer
BUFEND *= *+2           ; End-of-buffer area
LENTABLE *= *+1         ; Length of first screen line
TOPLIN *= *+2           ; Home position in text
MSGFLG *= *+1           ; Messageflag
INSMODE *= *+1          ; Insertmode
ENDPOS *= *+1           ; Used by delete routines
FINPOS *= *+1           ; "
LASTLINE *= *+2         ; End-of-text position
LIMIT *= *+1            ; Used by INPUT
INLEN *= *+1            ; "
BOTSCR *= *+2           ; Bottom of screen in text
LBUFF *= *+40           ; Linebuffer (REFRESH)
INBUFF *= *+40          ; INPUT buffer
SAVCURR *= *+2          ; Used by delete routines
BCD *=  *+2             ; Usedby ASCHEX
HEX *=  *+2             ; "
TPTR *= *+2             ; Last character in buffer
BUFLEN *= *+2           ; Buffer length
GOBLEN *= *+2           ; Size of deleted text
FROMSAV *= *+2          ; Used by delete routines
DESTSAV *= *+2          ; "
HDLEN *= *+1            ; Header length
FTLEN *= *+1            ; Footer length
LMARGIN *= *+1          ; Holds left margin
RMARGIN *= *+1          ; Right margin
PAGELENGTH *= *+1       ; Pagelength
TOPMARG *= *+1          ; Topmargin
BOTMARG *= *+1          ; Bottom margin
SPACING *= *+1          ; Linespacing
CONTINUOUS *= *+1       ; Pagewait mode
PAGENUM *= *+2          ; Page number
STARTNUM *= *+2         ; Start printing at #
PAGEWIDTH *= *+1        ; Columns across
NOMARG *= *+1           ; Margin release flag
POS *=  *+1             ; POSition within line
LINE *= *+1             ; Linecount
YSAVE *= *+1            ; Preserves Y register
SAVCHAR *= *+1          ; Preserves accumulator
INSLEN *= *+1           ; Length of an insertion
DEVNO *= *+1            ; Device number
NEEDASC *= *+1          ; True ASCII flag
UNDERLINE *= *+1        ; Underline mode flag
FPOS *= *+2             ; Found position
PCR *=  *+1             ; Usedby PCHROUT
HUNTLEN *= *+1          ; Length of hunt phrase
HUNTBUFF *= *+30        ; Holds hunt phrase
REPLEN *= *+1           ; Length of replacephrase
REPBUFF *= *+30         ; Holds replace phrase
CODEBUFFER *= *+128     ; Holds definable printkeys
PRBUFF *= *+256         ; Printer line buffer
HDBUFF *= *+256         ; Holds header
```

```
FIRSTRUN *= *+1         ; Has program been run before?
FTBUFF *= *+256         ; Holds footer
SAVCOL *= *+1           ; Save SCRCOL
LINEFEED *= *+1         ; Linefeed mode flag
ESCFLAG *= *+1          ; Was ESC pressed?
CONVFLAG *= *+1         ; Used by CAST and CINTOAS
SELFLAG *= *+1          ; The SELECT key flag
IOCB *= *+1             ; Which IOCB is OPEN
ACCESS *= *+1           ; Direction of ACCESS (read/write)
FNBUFF *= *+40          ; Filename buffer
FNLEN *= *+1            ; Filename Length
XSLOT *= *+1            ; Number of filename slots (DOSPAK)
SLOT *= *+130           ; Slot positions (DOSPAK)
XPTR *= *+1             ; Current filename slot (DOSPAK)
WHICHFLAG *= *+1        ; Which key is pressed
DIRCOUNT *= *+1         ; Directory count
BLINK *= *+1            ; Cursor blink flag
LINELEN *= *+1          ; Length of screen lines
RLM *=  *+1             ; REFRESH Left margin value
KEYVAL *= *+1           ; Which key is pressed
END =   *               ; High byte of this +$100 is TEXSTART

    .OPT OBJ

Autorun vector

    *=  $02E2
    .WORD BEGIN
    .END
```

Label Cross Reference. This chart makes it easier to find your place in the object code while looking at the source code. The number to the left of each label is its value or position within the object code. Labels preceded by an = mark are equates. Others are internal labels for object code positions.

```
43BA ACCESS
3A2E ACROSS
294B ADYCURR
3721 ALPHA
3614 ASCHEX
3C3C ASKREP
262C ASTOIN
3FCD BCD
1FOO BEGIN
446A BLINK
3029 BLIP
= 0074 BLUE
2983 BORDER
33AA BOTCLR
3FEI BOTMARG
3F79 BOTSCR
24D3 BREAK
3E3A BRMSG
3A92 BT
3F6C BUFEND
3DBB BUFERR
3FD3 BUFLEN
3CDE BUFLP
3CDC BUFPRT
33FF CAST
340C CAST1
3419 CASTOIN
3100 CATALOG
27CF CHECK
282D CHECK2
2F7F CHROUT
2FCB CHRYSAVE
3426 CIN
3407 CINTOAS
= E456 CIO
284C CK3
```

```
2D02 CLEAR
2501 CLEARED
28E2 CLEFT
3DIF CLOOP
3184 CLOSE7
254C CLR2
24F4 CLRLN
2543 CLRLOOP
3DED CLRMSG
4033 CODEBUFFER
3AFO COMMENT
3FE3 CONTINUOUS
2732 CONTROL
3BB7 CONTSRCH
43B7 CONVELAG
24D7 COPY
3296 COPYD
37EC COPYDEF
3801 COPYDEFS
32A3 COPYNAME
3332 COPYR
3446 COTHER
3998 CR
2SAF CRIGHT
3986 CRLF
3991 CRLOOP
2753 CTBL
= 0086 CURR
2EE7 CURSIN
3430 CVLOOP
3BDC CY
3282 DDOWN
3654 DECHEX
3AF6 DEFINE
3752 DEFTAB
2A6C DELI
2A80 DELlA
2A89 DEL2
2A7D DELABORT
2AAO DELC
2B32 DELCHAR
2B5C DELETE
32E5 DELFILE
2B4D DELIN
35FF DELITE
3DC7 DELMSG
288A DELSENT
2B7D DELWORD
= 0083 DESTH
= 0082 DESTL
3FD9 DESTSAV
3FEF DFVNO
3622 DIGIT
4469 DIRCOUNT
3F00 DIRINS
3156 DIRLOOP
3E6C DIRMSG
3E7A DIRNAME
25E9 DISKBOOT
3247 DLEFT
2EOA DLI
2DEE DUST
2DC8 DLOOP
2474 DMOVI
244D DMOVE
2476 DMOVLOOP
3170 DNOT8
315B DNOTCR
3873 DOBUF2
3869 DOBUFF
3D62 DOCODIIS
```

```
3B04 DODEFINE
26F4 DOINS
2D25 DOLT
3678 DONENUM
3D50 DOPGN
38EB DORPT
3IBB DOS
3229 DOSADR
33B6 DOSERR
33FF DOSMSG
3219 DOSTABLE
3254 DRIGHT
336F DRIVE
3271 DUP
2BD9 EATSPACE
3D2F EDGE
2F99 ENAME
= 446E END
31300 ENDBUFF
3194 ENDIR
319E ENDLP
3F73 ENDPOS
2967 ENDTEX
2814 EQA
2E97 ERAI
2EA6 ERA2
2E33 ERAS
2E42 ERAS1
2E4C ERASAGAIN
251F ERASE
2E7B ERASENT
3DFC ERASMSG
2E6E ERASWORD
34A7 ERR1
379B ERRLINK
3E32 ERRMSG
34AE ERROR
34C7 ERXIT
27BD ESC
3399 ESCDOS
43B6 ESCFLAG
2F2E ESCKEY
2C75 FILLSP
3201 FINDIT
3841 FINDSPACE
35E8 FINE
3F74 FINPOS
4283 FLRSTRUN
29F4 FIRSTWORD
2B3B FIXTP
2687 FLIPIT
43BB FNBUFF
3B1D FNCOPY
3B2F FNEND
43E3 FNLEN
3E9E FNMSG
3355 FORMAT
3F5A FORMSG
2740 FOUND
320C FOUNDIT
3858 FOUNDSPACE
3FF2 FPOS
3D6E FREEMEM
= 0081 FROMH
0080 FROML
3FD7 FROMSAV
39BF FSP
3850 FSPACE
3AD7 FT
42B4 FTBUFF
3AEO FTCOPY
```

```
3FDC FTLEN
31A9 GET7
256F GETAKEY
2FD6 GETCHAR
2FCC GETIN
31D6 GETNAME
2D4F GOADY
3FD5 GOBLEN
3565 GOERROR
2C06 GOINC
2FC1 GOPCHR
2AD4 GOSAV
32EA GOXIO
3001 GXIT
3AB5 HD
4183 HDBUFF
3ABE HDCOPY
3FDB HDLEN
3FCF HEX
2DAD HIGHLIGHT
= 0085 HLEN
2BAI HOME
2BC3 HOMEPAUSE
3B85 HUNT
3FF6 HUNTBUFF
3FF5 HUNTLEN
= 034A ICAUX1
= 034B ICAUX2
= 0344 ICBADR
= 0348 ICBLEN
= 0342 ICCOM
= 0343 ICSTAT
3FA3 INBUFF
250C INCNOT
3744 INCONT
= 008E INDIR
2F4D INEXIT
2589 INIT
25EA INIT2
2726 INKURR
3F78 INLEN
2CEI INOUT
2ED5 INP1
2ECE INPUT
2868 INRANGE
2C92 INSBLOCK
367D INSBUFFER
2C7C INSCHAR
3E80 INSERR
3FEE INSLEN
3F72 INSMODE
3E8C INSMSG
2CE2 INSTGL
374D INTl
3738 INTOAS
33E5 INVLP
33E3 INVNAME
3B9  IOCB
34E0 IOCLOSE
2575 JDOS
357B JFINE
32F2 JNAME
3040 KEYBOARD
2694 KEYPRESS
446D KEYVAL
2A50 KILLBUFF
3DAC KILLMSG
3F75 LASTLINE
295A LAST WORD
3F7B LBUFF
3B5A LCONT
```

```
28B8 LEFT
3F6E LENTABLE
298B LETTERS
3A68 LFSET
3F77 LIMIT
3FEB LINE
43B5 LINEFEED
446B LINELEN
3B19 LINK
= 0084 LLEN
3A74 LM
3975 LMARG
3FDD LMARGIN
3985 LMEXIT
397F LMLOOP
3B49 LNOERR
3554 LOAD2
3377 LOADIT
357E LOADLINK
3E54 LOADMSG
32F8 LOCK
2C4C LOTTASPACE
2645 LOWR
2648 MAIN
2651 MAIN2
2428 MOV1
242A MOV2
242F MOVLOOP
3A25 MRELEASE
3D88 MSG1
3D98 MSG2
3F71 MSGFLG
31E5 NAMELP
3294 NAMER
3FFO NEEDASC
38FC NEXPAGE
3EEB NFMSG
39ED NOAD
2F1B NOBACK
28AC NOBIGGER
2583 NOBLINK
3CFC NOBRK
28E8 NODEC
3571 NOER
2F04 NOESC
2A37 NOFIXCURR
35E2 NOGARBAGE
3963 NOHEADER
3675 NOHEXINC
272C NOINC2
28B5 NOINCR
2C63 NOINCY
3929 NOIPN
39A5 NOLF
3FE9 NOMARG
26B8 NOMSG
334F NONAME
3653 NONUM
2E91 NOPAR
31FF NOPROB
3C5C NOREP
3CD9 NOREPL
3902 NOSK
3B82 NOSR
32B2 NOSTOR
3735 NOTALPHA
26AC NOTBKS
300F NOTCAPS
3D2B NOTCENTER
26C2 NOTCR
2642 NOTCTRL
```

```
32BF NOTDOT
3D40 NOTEDGE
3C20 NOTFOUND
26F7 NOTINST
3024 NOTLOCKED
2455 NOTNULL
3D4C NOTOG
389E NOTPAGE
2BAO NOTPAR
344F NOTRC
382F NOTRET
3440 NOTRTN
26A6 NOTSEL
2B93 NOTSENT
3004 NOTSET
382B NOTSP
2B86 NOTWORD
2F13 NOTZERO
3BEA NOVFL
2E77 NOWORD
326E NRANGE
3AA6 NX
24C7 NXCUR
2941 OIDS
27FF OK1
282C OK2
36A5 OKBUFF
2DOF OKCLEAR
2CA9 OKINS
3568 OKLOD
36DF OKMOV
3E4A OKMSG
3BA6 OKSRCH
27C6 ONOFF
2FCA ONUMEXIT
2FBI ONUMLOOP
3508 OPABORT
3510 OPCONT
2F59 OPENEDITOR
3DOC OTHER
244C OUT
2BC9 OUTHOME
2FAO OUTNUM
287A OUTRANGE
2COB OUTSPACE
26E2 OVERCTRL
387B OVERMARG
3452 OVEROTHER
2FC4 OVERPCHR
385B OVERSTOR
2FA2 OVERZAP
38EE PAGE
3FDF PAGELENGTH
3FE4 PAGENUM
3FE8 PAGEWIDTH
2D64 PARCONT
2D31 PARIGHT
2D52 PARLEFT
2D5E PARLOOP
2D33 PARLP
3ACF PASTRET
37BB PBORT
3762 PCHROUT
3FF4 PCR
2514 PDONE
38D7 PEXIT
3A58 PL
24B1 PLINE
3814 PLOOP
3824 PLOOPI
29A7 PMANY
```

```
3A48 PN
3FEA POS
24AF PPAGE
40B3 PRBUFF
375E ERCODES
256E PREXIT
37B1 PRIN
3EB7 PRINMSG
37BE PRINT
2564 PRLOOP
2559 PRMSG
37D5 PROK
35F0 PROKMSG
2F9B PROUTNUM
29BD PSLOOP
29B9 PSRCH
29DE PUNCT
2A26 PUNCT2
3A62 PW
38C1 PXIT
= 0032 RED
312D REDIR
2826 REF
248B REFRESH
3308 RENAME
3F4F RENMSG
4015 REPBUFF
29EF REPEAT
3C5F REPL
4014 REPLEN
3USD REPLOOP
3C50 REPMOV
3EF5 REPMSG
3C30 REPSTART
3B91 RESET
3261 RESLOT
= 005E RETCHAR
380A RETEX
2D75 RETF2
2D4A RETFOUND
2885 RIGHT
446C RLM
2925 RLOOP
3A7E RM
3FDE RMARGIN
2933 ROUT
297A SAFE
3B64 SANDR
3FED SAVCHAR
43B4 SAVCOL
3FCB SAVCURR
3E1A SAVMSG
24D2 SBRK
= 0088 SCR
298A SCRCOL
43B8 SELFLAG
= O2BE SHFLOK
37A4 SHIFTFREEZE
2481 SKIPDMOV
1F34 SKIPERAS
3918 SKIPFT
2448 SKIPMOV
37A9 SKIPOUT
2F3E SKIPSEL
29E2 SKIPSPC
3974 SKIPTOP
299B SLEFT
24C3 SLOOP
43E5 SLOT
3036 SLOW
3031 SNDLOOP
```

```
3B6F SNR
3A9C SP
= 0000 SPACE
3FE2 SPACING
3A38 SPACE
39E6 SPCEXIT
39D5 SPCONT
2BE7 SPCSRCH
3D01 SPEC2
39A6 SPECIAL
39F1 SPTAB
3A03 SPVECT
2735 SRCH
3BC6 SRCHO
3BCD SRCH1
3EE5 SRCHMSG
39B1 SRCHSP
2A23 SREXIT
2A01 SRIGHT
2A03 SRLP
3FE6 STARTNUM
34D3 STOPPED
28F9 STRIP
2903 STRLOOP
37B1 SWITCH
260A SYSMSG
2C54 TAB
2C66 TAB2
= 008C TEMP
= 008A TEX
3F6A TEXBUF
299A TEXCOLR
3F68 TEXEND
35AB TEXOK
3F66 TEXSTART
2DA2 TEXTOCURR
3178 THROWS
3539 TLOAD
3BA8 TOBUFF
28DF TOOSMALL
394D TOP
261A TOPCLR
34EB TOPEN
2BCC TOPHOME
3F6F TOPLIN
261E TOPLOOP
396E TOPLP
3FEO TOPMARG
3A88 TP
3FD1 TPTR
345D TSAVE
2410 UMOVE
= 0090 UNDERCURS
3FF1 UNDERLINE
3300 UNLOCK
2E84 UNSENT
2777 VECT
2667 WAIT
3EC5 WAITMSG
2BBC WAITST
4468 WHICHFLAG
= 0091 WINDCOLR
28ED WLEFT
2906 WLOOP
2923 WRIGHT
2914 WROUT
2957 WRTN
374F XINT
32C8 XIO
4467 XPTR
43E4 XSLOT
```

```
3DD6 YMSG
2CEB YORN
2CF2 YORNKEY
3FEC YSAVE
3890 ZBUFF
```

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