
The Word Processor for Atari Computers

Charles Brannon

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# SPEEDSCRIPT

## The Word Processor for Atari Computers

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# Contents

# 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.

# 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.*

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*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 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," page 18, 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/off*). 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 fol-

lowed 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 × 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.

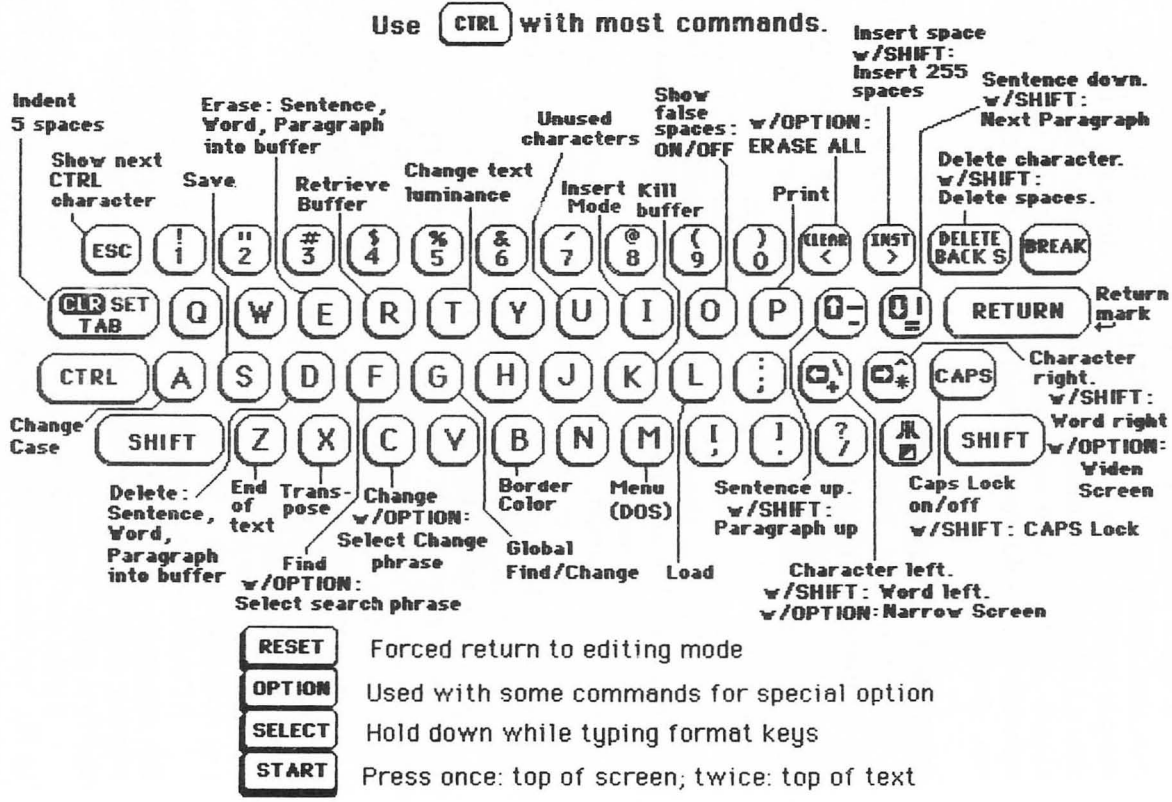
**s** Spacing. Defaults to single-spacing. Follow with a number from 1 to 255. Use 1 for single-spacing, 2 for double-spacing, 3 for triple-spacing.

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

# Atari SpeedScript 3.0 Keyboard Map



**Formatting Commands** Enter with SELECT

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

**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.

## 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

```
+=122
```

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

```
Gad+ooks! The +oo is +any!
```

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:

```
The word [4italics[5 is in italics
.
```

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 justs 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 printkeys to embed your printer's own commands for setting and jumping to tab stops.

You don't have to change or define printer commands every time you write. Just save these definitions 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.

# Chapter 2
# Entering SpeedScript

# 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 autobooting 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.

### Program 2-1. MLX: The Machine Language Editor

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

```
DA 100 GRAPHICS 0:DL=PEEK(560)+256*PEEK(561)+4
       :POKE DL-1,71:POKE DL+2,6
NJ 110 POSITION 8,0:? "MLX":POSITION 23,0:? "f
       ailsafe entry":POKE 710,0:?
JK 120 ? "Starting Address";:INPUT BEG:? "  En
       ding Address";:INPUT FIN:? "Run/Init Ad
       dress";:INPUT STARTADR
DD 130 DIM A(6),BUFFER$(FIN-BEG+127),T$(20),F$
       (20),CIO$(7),SECTOR$(128),DSKINV$(6)
JJ 140 OPEN #1,4,0,"K:":? :? ,"Tape or Disk:";
BM 150 BUFFER$=CHR$(0):BUFFER$(FIN-BEG+30)=BUF
       FER$:BUFFER$(2)=BUFFER$:SECTOR$=BUFFER$
GC 160 ADDR=BEG:CIO$="hhh":CIO$(4)=CHR$(170):C
       IO$(5)="LV":CIO$(7)=CHR$(228)
EJ 170 GET #1,MEDIA:IF MEDIA<>84 AND MEDIA<>68
        THEN 170
PO 180 ? CHR$(MEDIA):? :IF MEDIA<>ASC("T") THE
       N BUFFER$="":GOTO 250
PL 190 BEG=BEG-24:BUFFER$=CHR$(0):BUFFER$(2)=C
       HR$(INT((FIN-BEG+127)/128))
KF 200 H=INT(BEG/256):L=BEG-H*256:BUFFER$(3)=C
       HR$(L):BUFFER$(4)=CHR$(H)
EC 210 PINIT=BEG+8:H=INT(PINIT/256):L=PINIT-H*
       256:BUFFER$(5)=CHR$(L):BUFFER$(6)=CHR$(
       H)
```

```
PB 220 FOR I=7 TO 24:READ A:BUFFER$(I)=CHR$(A)
       :NEXT I:DATA 24,96,169,60,141,2,211,169
       ,0,133,10,169,0,133,11,76,0,0
DP 230 H=INT(STARTADR/256):L=STARTADR-H*256:BU
       FFER$(15)=CHR$(L):BUFFER$(19)=CHR$(H)
KL 240 BUFFER$(23)=CHR$(L):BUFFER$(24)=CHR$(H)
HI 250 IF MEDIA<>ASC("D") THEN 360
OO 260 ? :? "Boot Disk or Binary File:";
LI 270 GET #1,DTYPE:IF DTYPE<>68 AND DTYPE<>70
        THEN 270
GM 280 ? CHR$(DTYPE):IF DTYPE=70 THEN 360
PJ 290 BEG=BEG-30:BUFFER$=CHR$(0):BUFFER$(2)=C
       HR$(INT((FIN-BEG+127)/128))
KG 300 H=INT(BEG/256):L=BEG-H*256:BUFFER$(3)=C
       HR$(L):BUFFER$(4)=CHR$(H)
HH 310 PINIT=STARTADR:H=INT(PINIT/256):L=PINIT
       -H*256:BUFFER$(5)=CHR$(L):BUFFER$(6)=CH
       R$(H)
AO 320 RESTORE 330:FOR I=7 TO 30:READ A:BUFFER
       $(I)=CHR$(A):NEXT I
GA 330 DATA 169,0,141,231,2,133,14,169,0,141,2
       32,2,133,15,169,0,133,10,169,0,133,11,2
       4,96
OB 340 H=INT(BEG/256):L=BEG-H*256:BUFFER$(8)=C
       HR$(L):BUFFER$(15)=CHR$(H)
DO 350 H=INT(STARTADR/256):L=STARTADR-H*256:BU
       FFER$(22)=CHR$(L):BUFFER$(26)=CHR$(H)
JP 360 GRAPHICS 0:POKE 712,10:POKE 710,10:POKE
        709,2
JK 370 ? ADDR;":";:FOR J=1 TO 6
NF 380 GOSUB 570:IF N=-1 THEN J=J-1:GOTO 380
BF 390 IF N=-19 THEN 720
OI 400 IF N=-12 THEN LET READ=1:GOTO 720
AI 410 TRAP 410:IF N=-14 THEN ? :? "New Addres
       s";:INPUT ADDR:? :GOTO 370
HO 420 TRAP 40000:IF N<>-4 THEN 480
AJ 430 TRAP 430:? :? "Display:From";:INPUT F:?
        ,"To";:INPUT T:TRAP 32767
ML 440 IF F<BEG OR F>FIN OR T<BEG OR T>FIN OR
       T<F THEN ? CHR$(253);"At least ";BEG;",
        Not More Than ";FIN:GOTO 430
MH 450 FOR I=F TO T STEP 6:? :? I;":";:FOR K=0
        TO 5:N=PEEK(ADR(BUFFER$)+I+K-BEG):T$="
       000":T$(4-LEN(STR$(N)))=STR$(N)
MA 460 IF PEEK(764)<255 THEN GET #1,A:POP :POP
        :? :GOTO 370
FM 470 ? T$;",";:NEXT K:? CHR$(126);:NEXT I:?
       :? :GOTO 370
GA 480 IF N<0 THEN ? :GOTO 370
MH 490 A(J)=N:NEXT J
```

```
JM 500 CKSUM=ADDR-INT(ADDR/256)*256:FOR I=1 TO
        6:CKSUM=CKSUM+A(I):CKSUM=CKSUM-256*(CK
       SUM>255):NEXT I
KK 510 RF=128:SOUND 0,200,12,8:GOSUB 570:SOUND
        0,0,0,0:RF=0:? CHR$(126)
CN 520 IF N<>CKSUM THEN ? :? "Incorrect";CHR$(
       253);:? :GOTO 370
EK 530 FOR W=15 TO 0 STEP -1:SOUND 0,50,10,W:N
       EXT W
FL 540 FOR I=1 TO 6:POKE ADR(BUFFER$)+ADDR-BEG
       +I-1,A(I):NEXT I
HB 550 ADDR=ADDR+6:IF ADDR<=FIN THEN 370
GM 560 GOTO 710
FI 570 N=0:Z=0
PH 580 GET #1,A:IF A=155 OR A=44 OR A=32 THEN
       670
FB 590 IF A<32 THEN N=-A:RETURN
EB 600 IF A<>126 THEN 630
ML 610 GOSUB 690:IF I=1 AND T=44 THEN N=-1:? C
       HR$(126);:GOTO 690
GN 620 GOTO 570
GJ 630 IF A<48 OR A>57 THEN 580
AN 640 ? CHR$(A+RF);:N=N*10+A-48
EB 650 IF N>255 THEN ? CHR$(253);:A=126:GOTO 6
       00
EH 660 Z=Z+1:IF Z<3 THEN 580
JH 670 IF Z=0 THEN ? CHR$(253);:GOTO 570
KC 680 ? ",";:RETURN
NO 690 POKE 752,1:FOR I=1 TO 3:? CHR$(30);:GET
        #6,T:IF T<>44 AND T<>58 THEN ? CHR$(A)
       ;:NEXT I
PI 700 POKE 752,0:? " ";CHR$(126);:RETURN
KM 710 GRAPHICS 0:POKE 710,26:POKE 712,26:POKE
        709,2
FF 720 IF MEDIA=ASC("T") THEN 890
OJ 730 REM DISK
OK 740 IF READ THEN ? :? "Load File":?
IG 750 IF DTYPE<>70 THEN 1040
AE 760 ? :? "Enter AUTORUN.SYS for automatic u
       se":? :? "Enter filename":INPUT T$
GF 770 F$=T$:IF LEN(T$)>2 THEN IF T$(1,2)<>"D:
       " THEN F$="D:":F$(3)=T$
NJ 780 TRAP 870:CLOSE #2:OPEN #2,8-4*READ,0,F$
       :? :? "Working..."
JM 790 IF READ THEN FOR I=1 TO 6:GET #2,A:NEXT
        I:GOTO 820
PO 800 PUT #2,255:PUT #2,255
DJ 810 H=INT(BEG/256):L=BEG-H*256:PUT #2,L:PUT
        #2,H:H=INT(FIN/256):L=FIN-H*256:PUT #2
       ,L:PUT #2,H
```

```
NF 820 GOSUB 970:IF PEEK(195)>1 THEN 870
IF 830 IF STARTADR=0 OR READ THEN 850
FD 840 PUT #2,224:PUT #2,2:PUT #2,225:PUT #2,2
       :H=INT(STARTADR/256):L=STARTADR-H*256:P
       UT #2,L:PUT #2,H
GC 850 TRAP 40000:CLOSE #2:? "Finished.":IF RE
       AD THEN ? :? :LET READ=0:GOTO 360
HF 860 END
FO 870 ? "Error ";PEEK(195);" trying to access
       ":? F$:CLOSE #2:? :GOTO 760
MC 880 REM BOOT TAPE
HN 890 IF READ THEN ? :? "Read Tape"
HI 900 ? :? :? "Insert, Rewind Tape.":? "Press
        PLAY ";:IF  NOT READ THEN ? "& RECORD"
LP 910 ? :? "Press RETURN when ready:";
JH 920 TRAP 960:CLOSE #2:OPEN #2,8-4*READ,128,
       "C:":? :? "Working..."
NH 930 GOSUB 970:IF PEEK(195)>1 THEN 960
GC 940 CLOSE #2:TRAP 40000:? "Finished.":? :?
       :IF READ THEN LET READ=0:GOTO 360
HF 950 END
CD 960 ? :? "Error ";PEEK(195);" when reading/
       writing boot tape":? :CLOSE #2:GOTO 890
MB 970 REM CIO Load/Save File#2 opened  READ=0
        for write, READ=1 for read
EA 980 X=32:REM File#2,$20
EF 990 ICCOM=834:ICBADR=836:ICBLEN=840:ICSTAT=
       835
MD 1000 H=INT(ADR(BUFFER$)/256):L=ADR(BUFFER$)
        -H*256:POKE ICBADR+X,L:POKE ICBADR+X+1
        ,H
FH 1010 L=FIN-BEG+1:H=INT(L/256):L=L-H*256:POK
        E ICBLEN+X,L:POKE ICBLEN+X+1,H
MD 1020 POKE ICCOM+X,11-4*READ:A=USR(ADR(CIO$)
        ,X)
BG 1030 POKE 195,PEEK(ICSTAT):RETURN
KA 1040 REM SECTOR I/O
GC 1050 IF READ THEN 1100
HE 1060 ? :? "Format Disk In Drive 1? (Y/N):";
FC 1070 GET #1,A:IF A<>78 AND A<>89 THEN 1070
EC 1080 ? CHR$(A):IF A=78 THEN 1100
CP 1090 ? :? "Formatting...":XIO 254,#2,0,0,"D
       :":? "Format Complete":?
AC 1100 NR=INT((FIN-BEG+127)/128):BUFFER$(FIN-
        BEG+2)=CHR$(0):IF READ THEN ? "Reading
        ...":GOTO 1120
LE 1110 ? "Writing..."
LI 1120 FOR I=1 TO NR:S=I
IO 1130 IF READ THEN GOSUB 1220:BUFFER$(I*128-
        127)=SECTOR$:GOTO 1160
```

```
PL 1140 SECTOR$=BUFFER$(I*128-127)
AM 1150 GOSUB 1220
DN 1160 IF PEEK(DSTATS)<>1 THEN 1200
FB 1170 NEXT I
GM 1180 IF  NOT READ THEN END
DH 1190 ? :? :LET READ=0:GOTO 360
JJ 1200 ? "Error on disk access.":? "May need
        formatting.":GOTO 1040
KI 1210 REM
BL 1220 REM  SECTOR ACCESS SUBROUTINE
IG 1230 REM Drive ONE
IH 1240 REM Pass buffer in SECTOR$
MP 1250 REM sector # in variable S
EG 1260 REM READ=1 for read,
KJ 1270 REM READ=0 for write
BN 1280 BASE=3*256
GL 1290 DUNIT=BASE+1:DCOMND=BASE+2:DSTATS=BASE
        +3
NL 1300 DBUFLO=BASE+4:DBUFHI=BASE+5
AI 1310 DBYTLO=BASE+8:DBYTHI=BASE+9
JA 1320 DAUX1=BASE+10:DAUX2=BASE+11
PN 1330 REM DIM DSKINV$(4)
CA 1340 DSKINV$="hLS":DSKINV$(4)=CHR$(228)
PF 1350 POKE DUNIT,1:A=ADR(SECTOR$):H=INT(A/25
        6):L=A-256*H
BP 1360 POKE DBUFHI,H
CO 1370 POKE DBUFLO,L
PD 1380 POKE DCOMND,87-5*READ
AA 1390 POKE DAUX2,INT(S/256):POKE DAUX1,S-PEE
        K(DAUX2)*256
KJ 1400 A=USR(ADR(DSKINV$))
KG 1410 RETURN
```

# 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:

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

```
100 GRAPHICS 0
110 FOR I=1536 TO 1700:READ A:POKE I,A:CK=C
    K+A:NEXT I
120 IF CK<>19072 THEN ? "ERROR IN DATA STAT
    EMENTS.  CHECK TYPING.":END
130 A=USR(1536)
```

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

# 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
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
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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
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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
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
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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
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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
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
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9355 BEGINS "REFRESH"

LOA #40

24 25 26 27 28 29

end of Refresh

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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
9802:140,106,068,177,134,133,064
9808:144,160,000,140,184,067,007
9814:177,134,073,128,145,134,109
9820:173,106,068,073,001,141,142
9826:106,068,032,139,036,032,255
9832:204,047,208,040,169,008,012
9838:141,031,208,173,031,208,134
9844:201,006,208,015,160,000,194
9850:140,106,068,165,144,145,122
9856:134,032,161,043,076,072,134
9862:038,165,020,041,016,240,142
9868:218,169,000,133,020,076,244
9874:081,038,170,169,008,141,241
9880:031,208,173,031,208,201,236
9886:005,208,005,169,128,141,046
9892:184,067,160,000,165,144,116
9898:145,134,173,113,063,240,014
9904:007,138,072,032,010,038,217
9910:104,170,138,201,155,208,134
9916:005,162,030,076,226,038,213
9922:138,044,182,067,048,026,187
9928:201,156,176,102,041,127,235
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9934:201,032,144,096,201,123,235
9940:176,092,201,092,240,088,077
9946:201,094,240,084,201,095,109
9952:240,080,138,072,160,000,146
9958:140,182,067,177,134,201,107
9964:094,240,005,173,114,063,157
9970:240,003,032,124,044,104,021
9976:032,044,038,041,127,013,031
9982:184,067,160,000,145,134,176
9988:032,139,036,056,165,134,054
9994:237,117,063,133,140,165,097
10000:135,237,118,063,005,140,202
10006:144,014,165,134,105,000,072
10012:141,117,063,165,135,105,242
10018:000,141,118,063,230,134,208
10024:208,002,230,135,032,207,086
10030:039,076,072,038,174,083,016
10036:039,221,083,039,240,006,168
10042:202,208,248,076,072,038,134
10048:202,138,010,170,169,038,023
10054:072,169,071,072,189,120,251
10060:039,072,189,119,039,072,094
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10096:127,157,003,007,156,027,077
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10126:044,001,045,048,045,081,150
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10138:052,186,049,124,054,016,123
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10150:043,032,055,079,042,132,037
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10180:067,096,173,004,034,073,131
10186:016,141,004,034,096,032,013
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10198:111,063,165,135,237,112,013
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10270:173,112,063,105,000,141,112
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10294:173,118,063,237,105,063,045
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10306:063,141,117,063,173,105,216
10312:063,141,118,063,056,165,166
10318:134,237,102,063,133,140,119
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10330:140,176,011,173,102,063,243
10336:133,134,173,103,063,133,067
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10654:138,165,135,133,139,198,042
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10708:165,139,205,102,063,176,038
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10726:138,201,000,240,247,136,168
10732:076,020,041,164,140,076,241
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10744:134,173,103,063,133,135,221
10750:076,207,039,160,000,177,145
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11062:184,040,032,137,042,056,033
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11074:209,063,173,210,063,233,249
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11272:076,231,043,024,152,101,123
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11404:000,145,134,076,207,039,229
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11512:249,201,125,240,245,041,069
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11536:050,133,145,032,026,038,184
11542:169,237,160,061,032,089,002
11548:037,032,235,044,240,003,107
11554:076,010,038,162,250,154,212
11560:032,031,037,032,234,037,187
11566:076,072,038,160,000,177,057
11572:134,201,094,240,017,200,170
11578:208,247,230,135,165,135,154
11584:205,118,063,144,238,240,048
11590:236,076,090,041,200,208,153
11596:002,230,135,076,075,041,123
11602:165,134,133,138,165,135,184
11608:133,139,198,139,160,255,088
11614:177,138,201,094,240,017,193
11620:136,192,255,208,245,198,054
11626:139,165,139,205,103,063,152
11632:176,236,076,244,041,056,173
11638:152,101,138,133,138,169,181
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11650:165,138,229,134,133,140,045
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11680:100,045,165,138,133,134,107
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11710:002,133,140,173,049,002,177
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11788:138,041,141,010,212,141,183
11794:024,208,141,200,002,173,254
11800:154,041,141,023,208,165,244
11806:145,141,198,002,169,010,183
11812:141,197,002,169,032,141,206
11818:244,002,169,000,141,182,012
11824:002,104,064,169,008,141,024
11830:031,208,173,031,208,201,138
11836:003,240,003,032,080,042,204
11842:032,026,038,169,252,160,231
11848:061,032,089,037,160,000,195
11854:177,134,073,128,145,134,101
11860:032,139,036,160,000,177,116
11866:134,073,128,145,134,169,105
11872:050,133,145,032,111,037,092
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11902:032,001,042,076,166,046,233
11908:201,080,208,009,032,151,045
11914:046,032,049,045,076,166,040
11920:046,032,207,039,076,010,042
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11932:203,063,165,135,133,131,218
11938:141,204,063,096,056,165,119
11944:134,133,128,237,203,063,042
11950:141,213,063,165,135,133,000
11956:129,237,204,063,141,214,144
11962:063,032,160,042,173,203,091
11968:063,133,134,173,204,063,194
11974:133,135,032,139,036,076,237
11980:076,046,169,039,229,085,080
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12070:192,204,119,063,240,187,019
12076:165,140,041,127,162,008,175
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12094:153,163,063,032,127,047,135
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12124:012,141,066,003,032,086,176
12130:228,162,000,169,153,141,183
12136:068,003,169,047,141,069,089
12142:003,169,002,141,072,003,244
12148:142,073,003,169,003,157,151
12154:066,003,076,086,228,140,209
12160:203,047,162,000,142,072,242
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12268:068,201,192,176,016,041,162
12274:063,201,060,208,024,173,203
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12292:173,190,002,073,064,141,135
12298:190,002,169,000,096,174,129
12304:109,068,189,064,048,044,026
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12322:041,223,201,128,240,217,060
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12370:099,128,128,098,120,122,009
12376:052,128,051,054,027,053,197
12382:050,049,044,032,046,110,169
12388:128,109,047,128,114,128,242
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12436:128,066,088,090,036,128,172
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12532:254,128,125,255,006,008,252
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12586:141,103,068,174,103,068,187
12592:165,100,157,229,067,165,163
12598:101,157,230,067,238,103,182
12604:068,238,103,068,032,169,226
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12616:075,032,127,047,032,169,042
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12670:140,208,247,076,045,049,123
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12682:003,032,086,228,162,112,249
12688:188,067,003,096,072,169,227
12694:155,032,127,047,104,032,135
12700:127,047,032,169,049,048,116
12706:225,032,127,047,076,158,059
12712:049,162,112,169,000,157,049
12718:072,003,157,073,003,169,139
12724:007,157,066,003,076,086,063
12730:228,032,255,053,032,089,107
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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
15514:173,117,063,237,245,063,028
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
15550:021,064,032,044,038,145,022
15556:134,200,204,020,064,208,002
15562:242,024,165,134,109,020,128
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
15628:201,099,208,027,056,173,008
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
15658:060,201,101,208,017,056,173
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
15820:101,032,040,083,044,087,079
15826:044,080,041,000,058,032,209
15832:065,114,101,032,121,111,248
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
```

16,234
7,936
8,298

# 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: D: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 scratchpad 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
```

WINDCOLR: 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-byte 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 D: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 D: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 self-modifying 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 corner of the screen.

```
                CLC
                LDA   TOPLIN
                STA   TEX
                LDA   TOPLIN+1
                STA   TEX+1
                LDX   #1
                LDA   INSMODE
                STA   WINDCOLR
                LDY   #0
PPAGE
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
                CPY   LINELEN
CLRLN           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 (HIGHLIGHT), 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
2664            JSR   REFRESH
2667 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   NOTINST
DOINS           JSR   INSCHAR
                PLA
NOTINST         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,LET
              TER,S−1
        .WORD SLEFT−1,SRIGHT−
              1,DELCHAR−1,INSC
              HAR−1,DELETE−1
        .WORD INSTGL−1,CLEAR
              −1,PARIGHT−1,PA
              RLEFT−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,HUN
              T−1,FREEMEM−1,T
              AB−1
        .WORD LOTTASPACE−1,RE
              PSTART−1,SANDR
              −1,EATSPACE−1,E
              SC−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
        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
2914 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
2A7D  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.

```
2B5C 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
2C63  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 flag 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   PRESG
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/$201), creates a custom display list of IRG mode 3 (lowercase descenders, GRAPHICS 0½) with DLI set in one line, then enables DLIs ($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 REFRESH 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
        SVA  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.

```
2ECE  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 D: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).

```
2F59  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.

```
2F3F  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.

```
2F99  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 D: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   XXTR
        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   XXVR
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}R
                        LUF1234{ESC}{L}"
DOSADR          .WORD   DLEFT-1,DRIGH
                        T-1,DUP-1,DDO
                        WN-1,DELFILE-
                        1,RENAME-1
                .WORD   LOCK-1,UNLOCK
                        -1,FORMAT-1,D
                        RIVE-1,DRIVE-1
                        ,DRIVE-1
                .WORD   DRIVE-1,ESCDO
                        S-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.

```
3282 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 affirm this operation, which erases an entire disk. BOTCLR clears the bottom line of the screen.

3355

```
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 D: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.

```
33FF  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   #$C4
                STA   WINDCOLR
3554 LOAD2      JSR   TOPCLR
                LDA   # <LOADMSG
                LDY   # >LOADMSG
                JSR   PRMSG
                LDA   #4
                JSR   TOPEN
                BPL   OKLOD
GOERROR         JMP   ERROR
OKLOD           LDA   WINDCOLR
                CMP   #$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
3653
3654
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 printer codes.

```
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
            SVA   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   # <PZBUFF
            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   STARTOUM
            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   BUFPZV
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).

```
3975 LMARG    LDA  #32
              LDY  LMARGIN
              STY  POS
              BEQ  LMEXIT
397F 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 **s** 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,T
              P-1
       .WORD  BT-1,SP-1,NX-1,HD
              -1,FT-1
       .WORD  PN-1,PL-1,SPAGE-1
              ,ACROSS-1
       .WORD  MRELEASE-1,COMME
              NT-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.

```
                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 D: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): RE
                 TURN 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 RETURN"
          .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 RETURN"
          .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}↑{ESC}↓{ESC}←
                 {ESC}→ CTRL-Delete
                 Lock Unlock Rename
                 ESC Format CTRL-
                 Load Drive [1 2 3 4]: ",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 po-
                   sition in text
MSGFLG    *=  *+1  ;Message flag
INSMODE   *=  *+1  ;Insert mode
ENDPOS    *=  *+1  ;Used by de-
                   lete 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 ;Line buffer
                   (REFRESH)
INBUFF    *=  *+40 ;INPUT
                   buffer
SAVCURR   *=  *+2  ;Used by de-
                   lete routines
BCD       *=  *+2  ;Used by
                   ASCHEX
HEX       *=  *+2  ;" "
TPTR      *=  *+2  ;Last charac-
                   ter in buffer
BUFLEN    *=  *+2  ;Buffer
                   length
GOBLEN    *=  *+2  ;Size of de-
                   leted text
FROMSAV   *=  *+2  ;Used by de-
                   lete routines
DESTSAV   *=  *+2  ;" "
HDLEN     *=  *+1  ;Header
                   length
```

```
3F0C  FTLEN       *=  *+1  ;Footer length
      LMARGIN     *=  *+1  ;Holds left margin
      RMARGIN     *=  *+1  ;Right margin
      PAGELENGTH  *=  *+1  ;Page length
      TOPMARG     *=  *+1  ;Top margin
      BOTMARG     *=  *+1  ;Bottom margin
      SPACING     *=  *+1  ;Line spacing
      CONTINUOUS  *=  *+1  ;Page wait mode
      PAGENUM     *=  *+2  ;Page number
      STARTNUM    *=  *+2  ;Start printing at #
3FDF  PAGEWIDTH   *=  *+1  ;Columns across
      NOMARG      *=  *+1  ;Margin release flag
      POS         *=  *+1  ;POSition within line
      LINE        *=  *+1  ;Line count
      YSAVE       *=  *+1  ;Preserves Y register
      SAVCHAR     *=  *+1  ;Preserves accumulator
      INSLEN      *=  *+1  ;Length of an insertion
      DEVNO       *=  *+1  ;Device number
      NEEDASC     *=  *+1  ;True ASCII flag
3FF1  UNDERLINE   *=  *+1  ;Underline mode flag
      FPOS        *=  *+2  ;Found position
      PCR         *=  *+1  ;Used by PCHROUT
      HUNTLEN     *=  *+1  ;Length of hunt phrase
      HUNTBUFF    *=  *+30 ;Holds hunt phrase
      REPLEN      *=  *+1  ;Length of replace phrase
      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
446D  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
1F00    BEGIN
446A    BLINK
3029    BLIP
= 0074  BLUE
2983    BORDER
33AA    BOTCLR
3FE1    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
3D1F    CLOOP
3184    CLOSE7
254C    CLR2
24F4    CLRLN
2543    CLRLOOP
3DED    CLRMSG
4033    CODEBUFFER
3AF0    COMMENT
3FE3    CONTINUOUS
2732    CONTROL
3BB7    CONTSRCH
43B7    CONVFLAG
24D7    COPY
3296    COPYD
37EC    COPYDEF
3801    COPYDEFS
32A3    COPYNAME
3332    COPYR
3446    COTHER
3998    CR
28AF    CRIGHT
3986    CRLF
3991    CRLOOP
2753    CTBL
= 0086  CURR
2EE7    CURSIN
3430    CVLOOP
3BDC    CY
3282    DDOWN
3654    DECHEX
3AF6    DEFINE
3752    DEFTAB
2A6C    DEL1
2A80    DEL1A
2A89    DEL2
2A7D    DELABORT
2AA0    DELC
2B32    DELCHAR
2B5C    DELETE
32E5    DELFILE
2B4D    DELIN
35FF    DELITE
3DC7    DELMSG
2B8A    DELSENT
2B7D    DELWORD
= 0083  DESTH
= 0082  DESTL
3FD9    DESTSAV
3FEF    DEVNO
3622    DIGIT
4469    DIRCOUNT
3F00    DIRINS
3156    DIRLOOP
3E6C    DIRMSG
3E7A    DIRNAME
25E9    DISKBOOT
3247    DLEFT
2E0A    DLI
2DEE    DLIST
2DC8    DLOOP
2474    DMOV1
244D    DMOVE
2476    DMOVLOOP
3170    DNOT8
315B    DNOTCR
3873    DOBUF2
3869    DOBUFF
3D62    DOCODES
3B04    DODEFINE
26F4    DOINS
2D25    DOIT
3678    DONENUM
3D50    DOPGN
38EB    DORPT
31BB    DOS
3229    DOSADR
33B6    DOSERR
33EF    DOSMSG
3219    DOSTABLE
3254    DRIGHT
336F    DRIVE
3271    DUP
2BD9    EATSPACE
3D2F    EDGE
2F99    ENAME
= 446E  END
3D00    ENDBUFF
3194    ENDIR
319E    ENDLP
3F73    ENDPOS
2967    ENDTEX
```

2814 EQA
2E97 ERA1
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
42B3 FIRSTRUN
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
3AE0 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
41B3 HDBUFF
3ABE HDCOPY
3FDB HDLEN
3FCF HEX
2DAD HIGHLIGHT
= 0085 HLEN
2BA1 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
2CE1 INOUT
2ED5 INP1
2ECE INPUT
2868 INRANGE
2C92 INSBLOCK
367D INSBUFFER
2C7C INSCHAR
3E80 INSERR
3FEE INSLEN
3F72 INSMODE
3E8C INSMSG
2CE2 INSTGL
374D INT1
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 LASTWORD
3F7B LBUFF
3B5A LCONT
28B8 LEFT
3F6E LENTABLE
298B LETTERS
3A6B 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
 31EB NAMELP
 3294 NAMER
 3FF0 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
 2BA0 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
 2D0F OKCLEAR
 2CA9 OKINS
 3568 OKLOD
 36DF OKMOV
 3E4A OKMSG
 3BA6 OKSRCH
 27C6 ONOFF
 2FCA ONUMEXIT
 2FB1 ONUMLOOP
 3508 OPABORT
 3510 OPCONT
 2F59 OPENEDITOR
 3D0C OTHER
 244C OUT
 2BC9 OUTHOME
 2FA0 OUTNUM
 287A OUTRANGE
 2C0B 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 | PLOOP1 |
| 29A7 | PMANY |
| 3A48 | PN |
| 3FEA | POS |
| 24AF | PPAGE |
| 40B3 | PRBUFF |
| 375E | PRCODES |
| 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 |
| 3CBD | 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 |
| = 02BE | 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 | SPAGE |
| 39E6 | SPCEXIT |
| 39D5 | SPCONT |
| 2BE7 | SPCSRCH |
| 3D01 | SPEC2 |
| 39A6 | SPECIAL |
| 39F1 | SPTAB |
| 3A03 | SPVECT |
| 2735 | SRCH |
| 3BC6 | SRCH0 |
| 3BCD | SRCH1 |
| 3EE5 | SRCHMSG |
| 39B1 | SRCHSP |
| 2A23 | SREXIT |
| 2A01 | SRIGHT |
| 2A03 | SRLP |
| 3FE6 | STARTNUM |
| 34D3 | STOPPED |
| 28F9 | STRIP |
| 2903 | STRLOOP |
| 3711 | SWITCH |
| 260A | SYSMSG |
| 2C54 | TAB |
| 2C66 | TAB2 |
| = 008C | TEMP |
| = 008A | TEX |
| 3F6A | TEXBUF |
| 299A | TEXCOLR |
| 3F68 | TEXEND |
| 35AB | TEXOK |
| 3F66 | TEXSTART |
| 2DA2 | TEXTOCURR |
| 3178 | THROW5 |
| 3539 | TLOAD |
| 3BA8 | TOBUFF |
| 28DF | TOOSMALL |
| 394D | TOP |
| 261A | TOPCLR |
| 34EB | TOPEN |
| 2BCC | TOPHOME |
| 3F6F | TOPLIN |
| 261E | TOPLOOP |

```
396E    TOPLP
3FE0    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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