Table 6-1

Mode	# of Bytes per Horiz. Line
0,7,8,9,10,11,12,13,15	48
1,2,5,6,14	24
3,4	12

Full vertical scrolling is possible only if the number of scroll lines exceeds the number of display lines. Suppose, for example, that you specify 15 display lines and 36 scroll data lines. (Because of the way ATARI hardware is set up, only 14 lines plus the top screen line of the bottom display line will be visible). You can choose which 14 scroll lines you want to be visible. For example, you could display the last part of line 9, all of lines 10 through 22, and the top part of line 23.

Full horizontal scrolling is possible only if the number of bytes per line exceeds the standard number of bytes for a display line. For example, if you are using mode 2 and specify 24 bytes per line, no horizontal scrolling is possible (see Table 6-1). If you specify 50 bytes per line, however, you can choose which 24 bytes will be displayed. For example, for each display line in the scrolling region, you might display five eighths of the twentieth line byte, bytes 21 through 43, and three eighths of the forty fourth line byte. (Actually, most TVs will cut off part of the left and right edges of the line.)

Now let's set up a sample scrolling display. Suppose you want to use mode 2 for the entire screen and you want to be able to scroll the entire screen. First, select graphics mode 256. When the program asks what graphics mode you want to use for display line 0, type B. When the program asks how many blank lines, type 4. Few, if any, TVs have the first four screen lines visible, and so there won't be a border at the top of the screen. Next, the program says you are on screen line 4 and asks what graphics mode you want for display line one. Type 2, a space, an S, and RETURN. The program says that each mode 2 display line uses 16 screen lines, and asks how many mode 2 lines. You want the display to go below the bottom of the screen on a typical TV, so that there will be no border on the bottom. If you choose 15 display lines, you will be down to screen line 229 (=16*14+1+4), which is well below the bottom of the typical TV. So you type 15.

The program now asks the number of bytes per line. Suppose you type 50. Next, you are asked the number of scroll lines. You might type 36. The actual numbers you choose will depend on the size of the scroll data area you want. For the numbers shown above, the scroll area is 1800 bytes (=50*36). The display is using about 336 bytes (=24*14), so that only about one fifth of the scroll data is being displayed at a time. Next, the program says that you are on screen line 229, and asks what mode to use for display line 16. At this point you are done and you can type D. This will send you to the display you have just designed, and you can begin plotting data to the display.

In the above example, the whole display will be scrolled. There can't be more than one full scrolling area, but you can have areas above and/or below it that are non-scrolling. For example, you could have put a mode 0