

Seven Segment Display

One of the most common *output* interfaces used in commodity electronic devices is the 7-segment display. This is because the display can be used to output various values, including the decimal digits 0 through 9 and the hexadecimal digits A through F. Shown pictorially in Fig. 1a, a 7-segment display consists of 7 segments, labeled *a*, *b*, *c*, *d*, *e*, and *f*. Each of these segments can be selected and turned on/off to display a numeric value, as shown in Fig. 1b.

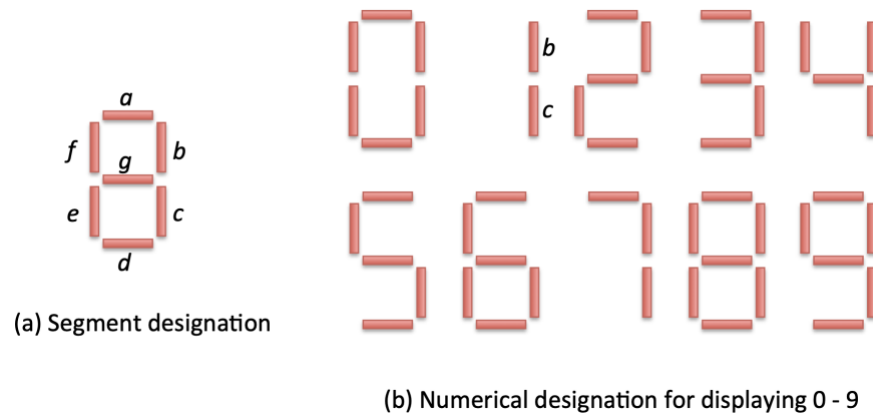


Figure 1: 7-segment display segment designation.

As shown in Fig. 2b, to display the number 1 on the 7-segment display it is necessary to select and turn on segments *b* and *c*. The first thing to observe is that the Easy68K supports an 8-digit 7-segment display, where each 7-segment display can be used to display a digit. Each of the eight 7-segment displays has its own memory-mapped address: the first 7-segment display is located at address 0xE00000, the second at 0xE00002, the third at 0xE00004, and so on. (Notice that the 7-segment displays are located at consecutive *even* addresses.) The bytes at each even address are used to write to the 7-segment displays. For example, to display the number 1 on digit 1 (leftmost digit) the binary code 00000110₂ must be written to address 0xE00000 in order to select and turn on segments *b* and *c*. Notice that the most-significant bit in the previous byte is set to 0. The most-significant bit is used to display a decimal sign if set to 1.

Download the sample program called **7-seg-demo.X68** from the course website. Assemble, and then run the program. You should see the numbers 0 through 7 displayed on digits 0 through 7.