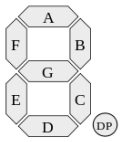
Character Code to 7-segment Encoder

A 7-segment display is a low cost way to display binary (and, BCD, for that matter) data. Each digit in the display is comprised of 7 LEDs (or other sources of illumination) formed in a figure-8 shape. Commercially available 7-segment displays typically include a decimal point as a separate LED. Each of the LEDs can be individually turned on and off to form the pattern of a number or letter. All of the numbers (0-9) can be formed, as well as many letters. In fact, if you search the Internet there are numerous examples of fonts for 7-segment displays. A 7-segment encoder such as the one we will make for this assignment translates a 5-bit binary number into 7 individual outputs. Depending on the way the 7-segment display is driven, writing a '1' or a '0' to a segment can either illuminate the segment or turn it off. The following figure and truth table can be used for the translation (the truth table assumes that a '1' illuminates the segment):

Hexadecimal Digits

Char Code	Hex	Binary	a	b	c	d	e	f	g
0	00	00000	1	1	1	1	1	1	0
1	01	00001	0	0	0	0	1	1	0
2	02	00010	1	1	0	1	1	0	1
3	03	00011	1	1	1	1	0	0	1
4	04	00100	0	1	1	0	0	1	1
5	05	00101	1	0	1	1	0	1	1
6	06	00110	1	0	1	1	1	1	1
7	07	00111	1	1	1	0	0	0	0
8	08	01000	1	1	1	1	1	1	1
9	09	01001	1	1	1	1	0	1	1
10	0A	01010	1	1	1	0	1	1	1
11	0B	01011	0	0	1	1	1	1	1
12	0C	01100	1	0	0	1	1	1	0
13	0D	01101	0	1	1	1	1	0	1
14	0E	01110	1	0	0	1	1	1	1
15	0F	01111	1	0	0	0	1	1	1



Special Characters

Char Code	Hex	Binary	a	b	c	d	e	f	g	Description
16	10	10000	1	0	0	0	0	0	0	Segment a
17	11	00001	0	1	0	0	0	0	0	Segment b
18	12	10010	0	0	1	0	0	0	0	Segment c
19	13	10011	0	0	0	1	0	0	0	Segment d
20	14	10100	0	0	0	0	1	0	0	Segment e
21	15	10101	0	0	0	0	0	1	0	Segment f
22	16	10110	0	0	0	0	0	0	1	Segment g
23	17	10111	0	0	0	0	0	0	0	BLANK
24	18	11000	0	1	1	0	1	1	1	Upper case H
25	19	11001	0	0	0	1	1	1	0	Upper case L
26	1A	11010	1	1	1	0	1	1	1	Upper case R
27	1B	11011	0	0	0	0	1	1	0	Lower case L
28	1C	11100	0	0	0	0	1	0	1	Lower case R
29	1D	11101	0	0	0	0	0	0	0	BLANK
30	1E	11110	0	0	0	0	0	0	0	BLANK
31	1F	11111	0	0	0	0	0	0	0	BLANK