

Seven Segment Board

User Manual

1.0, Oct 2011



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Chapter 1. Seven segment board

1. Overview

Seven segment display board has 8 seven segment LEDs. It can be used as a display device for displaying decimal numerals as an alternative for more complex dot-matrix displays.

This multiplexed display board has a built-in decoder needs only 3 control lines to select the required digit and 8 data lines shared to all 7 segments. All segments including decimal points are available for control, so that customized readout is made possible. The TTL compatible inputs allows this board work with most micro-controllers and control systems.

2. Features

- Standard 0.56" 7-Segment LED Display
- 8 Digits for counter/timer applications
- Supports decimal point
- Powered from motherboard via FRC header
- TTL compatible inputs
- Standard 0.1" FRC header for connection to control logic/MCU
- Ready to go with Zilogic mother boards.

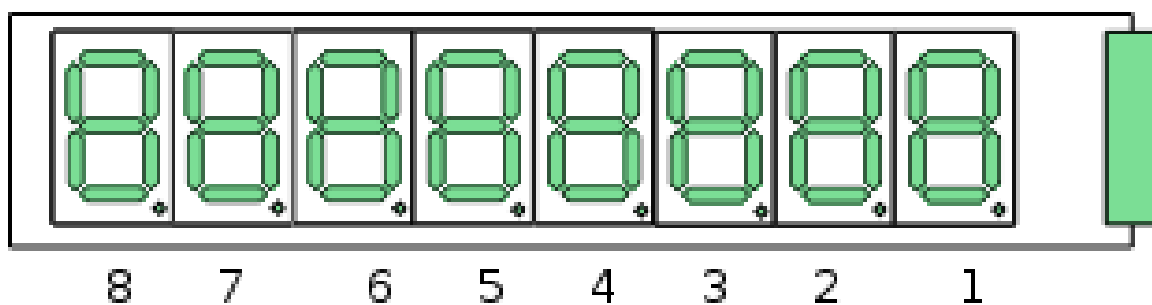
3. Applications

- Digital clocks and calendars.
- Electronic meters
- Weighing machines
- Currency displays
- and other numerical digital read-outs.

4. Locating components

Below diagram explains the location of components on the board

Figure 1.1. Front View



5. Power Supply

The seven segment display board is powered by the motherboard using a FRC-14 connector. The 1st and 14th pin is connected to VCC and GND respectively.

6. Connectivity

The seven segment display board can be interfaced to the mother board using a FRC-14 connector. The connection details are explained in the below diagram.

The SEG pins are used to drive the value to be displayed on a 7-segment and the DSEL used to select the digit position on which the value has to be displayed.

Figure 1.2. Signal connection diagram

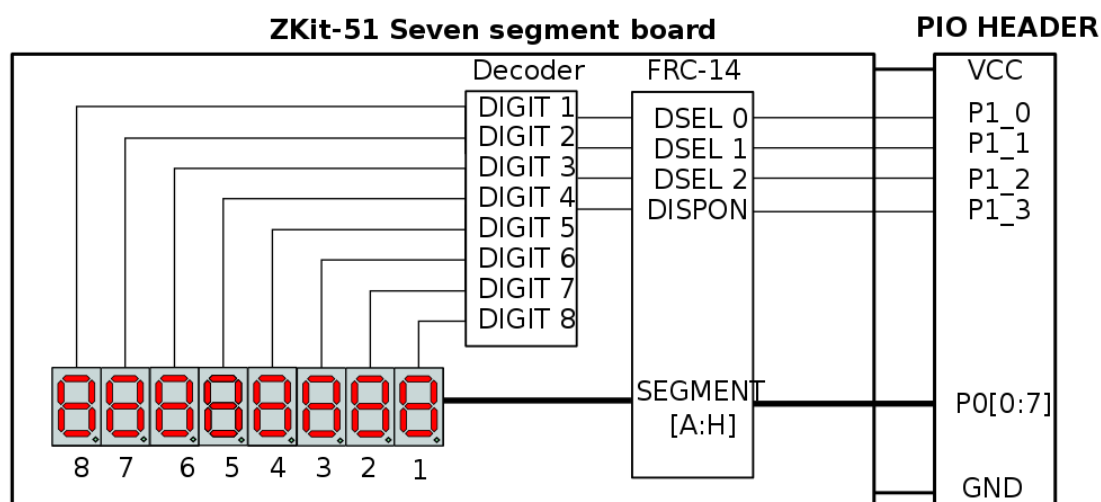


Table 1.1. header to display signal mapping table

Pin#	Motherboard	Display	Pin#	Motherboard	Display
1	VCC	VCC	8	DIO_6	SEG G
2	DIO_0	SEG A	9	DIO_7	SEG H
3	DIO_1	SEG B	10	DIO_8	DSEL 0
4	DIO_2	SEG C	11	DIO_9	DSEL 1
5	DIO_3	SEG D	12	DIO_10	DSEL 2
6	DIO_4	SEG E	13	DIO_11	DISPON#
7	DIO_5	SEG F	14	GND	GND

7. Algorithm

Since the signals that drive the segments are shared by the 8 displays, the segments of only one display can be driven at a time. Each display is turned on successively for a small period of time (1.5ms, to avoid flicker), and by persistence of vision all of them appear to be on simultaneously.

Persistence of vision is the phenomenon of the eye by which even nanoseconds of exposure to an image result in milliseconds of sight. — Wikipedia.org

7.1. Selecting a digit on the board

A digit of the seven segment display board can be selected by using three control lines DSEL 0, DSEL 1 and DSEL 2. Below table explains how to select a digit using the 3 control lines

Table 1.2. Digit Selection

DSEL0	DSEL1	DSEL2	DIGIT-NO
0	0	0	DIGIT 1
0	0	1	DIGIT 2
0	1	0	DIGIT 3

DSEL0	DSEL1	DSEL2	DIGIT-NO
0	1	1	DIGIT 4
1	0	0	DIGIT 5
1	0	1	DIGIT 6
1	1	0	DIGIT 7
1	1	1	DIGIT 8

7.2. 7-Segment Display

The algorithm for displaying a 7-segment digit is given below.

1. Turn off all the 7-segment displays.
2. Turn on/off segments by driving the segment signals (SEGx). The segment signals to be driven for each hexadecimal digit is given in the following table.
3. Select the 7-segment display by driving one of DIGIT1, DIGIT2,
 - i. DIGIT8

Character	SEG[A:H]
0	0x3F
1	0x06
2	0x5B
3	0x4F
4	0x66
5	0x6D
6	0x7D
7	0x07
8	0x7F
9	0x67

The MSB of segment signals (7th bit) is used to switch on the dot separator.

7.3. Multiplexed 7-segment Display

The algorithm for displaying multiple 7-segment digits simultaneously is given below.

- a. select the 7-segment
- b. Turn off leds in the selected 7-segment.
- c. Drive the segment data pins corresponding to the value to be displayed.
- d. Generate a 1.5ms delay using a timer.
- e. select next digit
- f. Goto step b.