1 Overview

The Driver control the display over One Wire bus. The driver can set up the luminosity and shut-down the display. When the driver shutdown the display, the display can only be startup again from power on or pushing the disable/enable-pin down.
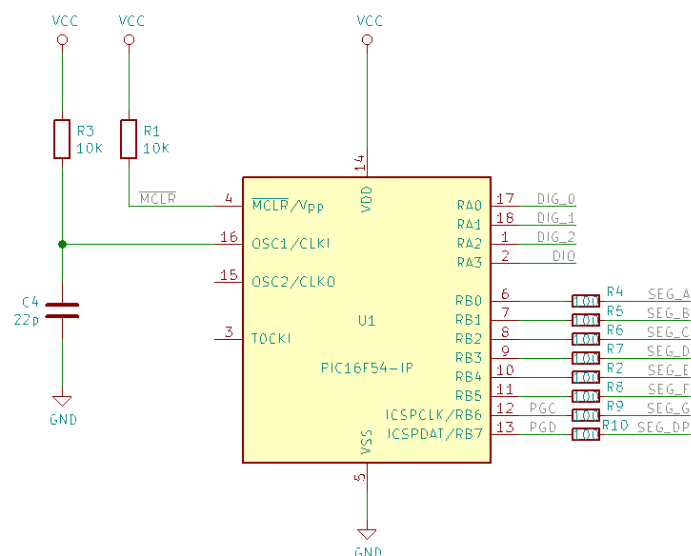
The "PIC16F54 7 segments display":

- 3 x 7 segments common cathode (5611AS)
- 1 x PIC16F54 Micro-Controller
- 3 x 2N7002 Transistors

2 Features

- One wire bus
- Disable/Enable Pin
- Dimming
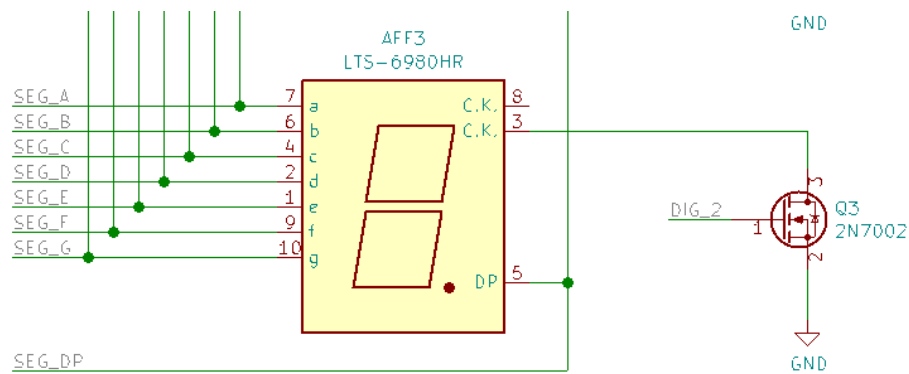- Sleep (Energy saving, Then you need two pins)
- 3 characters

3 Schematic

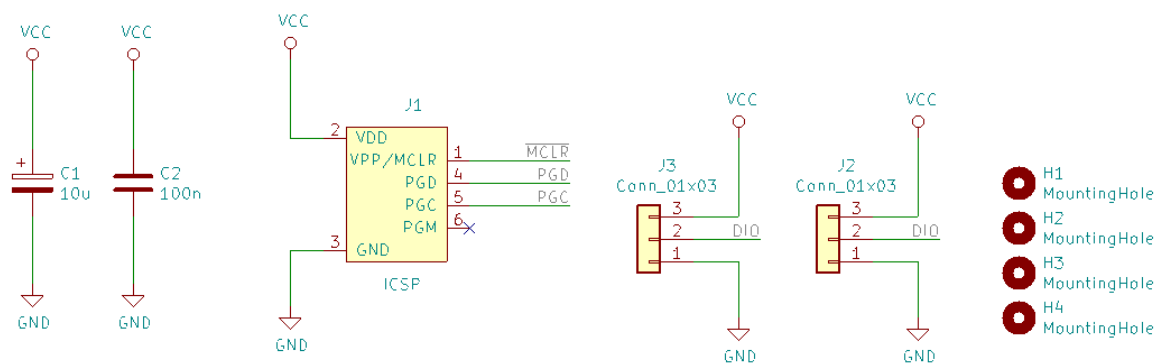The schematic[1] and the gerber[2] files

Figure 1: Schematic MCU

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[1]documents/images/pic16f54-7-segments-display-schematic.pdf
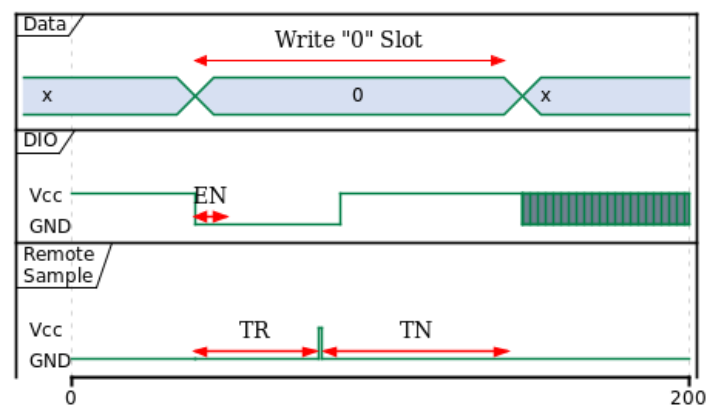[2]documents/gerber.zip
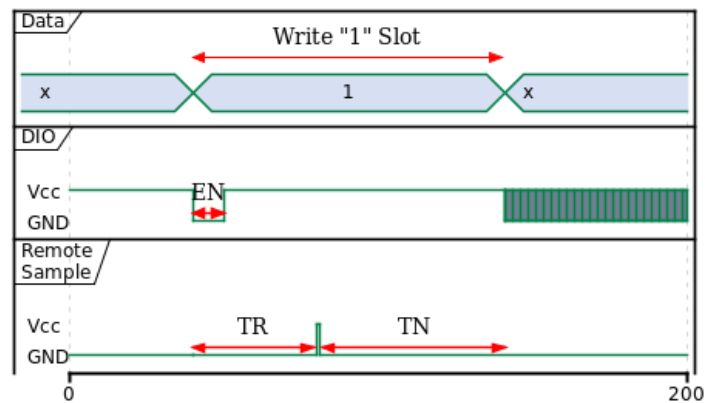
Figure 2: Schematic Seven-Segments

Figure 3: Schematic Programmer and Header

4 One Wire Protocol

4.1 Bit Timing

Figure 4: Master Write "0" Slot

Figure 5: Master Write "1" Slot
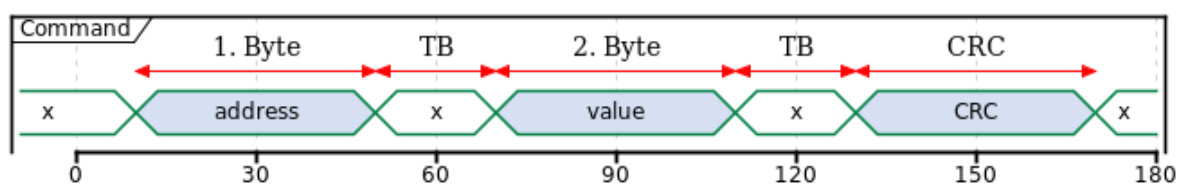
Table 1: Bit Timing

Symbol	Description	Min	Typ	Max	Unit
EN	Enable	144	450	360	us
TR	Time to read	380	500	720	us
TN	Time to new bit	144	1500	7500	us

EN Start of new bit

TR Time between start of EN and the remote sample the DIO

TN Time the remote spend wait for new Data, this should be bigger than the minimum allowed time for EN

4.2 Command Operation

Figure 6: Command Operation

address 1.Byte of the command, determines which register to be updated.

value 2.Byte of the command, the value to be updated.

CRC The CRC, actually the crc8 with polynomial 0x1D of the 1. and 2. byte.

x Timeslot leave to calculate the crc8 of the actual byte.

Table 2: Byte Timing

Symbol	Description	Min	Typ	Max	Unit
TB	Time to calcul the crc8 of the actual byte	144	450	7500	us

4.3 Registers

Table 3: Driver Registers

Adresse	Description	Default
0x00	Option	0x00
0x01	Digit 1	0x00
0x02	Digit 2	0x00
0x03	Digit 3	0x00

4.3.1 Option Register Bit Assignement

This register acts as setting register.

Table 4: Option Register

Option	7	6	5	4	3	2	1	0
	SLEEP	EN	DIM5	DIM4	DIM3	DIM2	DIM1	DIM0
Default	0	0	0	0	0	0	0	0

DIM<5-0> Dimmer, '0b000000' is full power and '0b111111' is dark.

EN Writing '1' to this position will power off the segments. All segments are off, but the controller is still running.
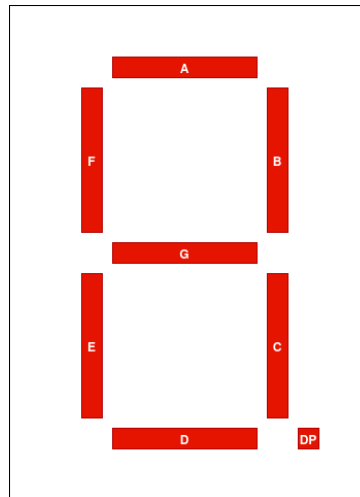
SLEEP The controller go in sleep. Can only be restart push the MCLR pin down. All registers will be reset to theirs default value.

4.3.2 Digit x Register Bit Assignement

Registers describing the segments that should light on. Writing '1' to a position will light on this segments.

Table 5: Digit Register Bit Assignement

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DP	G	F	E	D	C	B	A

Figure 7: Seven Segments