

One Wire Driver for the PIC16F54 7 segments display

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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 poweron 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

Features

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

Schematic

The schematic and the gerber files

One Wire Protocol

Bit Timing

Table 1: Bit Timing

Symbol	Description	Min	Typ	Max	Unit
EN	Enable	150	450	3100	us
TR	Time to read	350	505	680	us
TN	Time to new bit	150	1500	6600	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

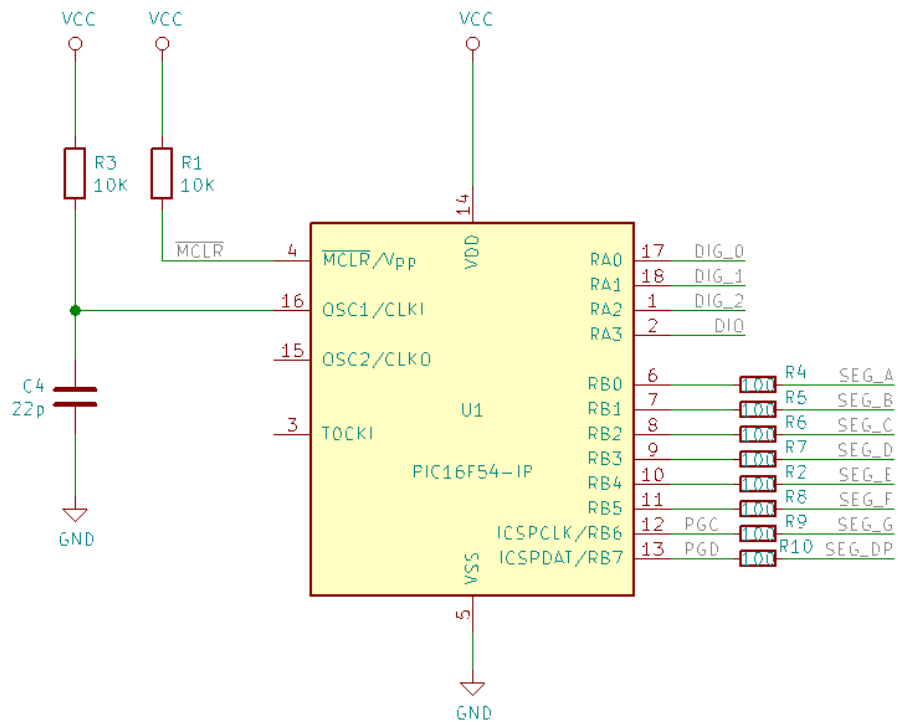


Figure 1: Schematic MCU

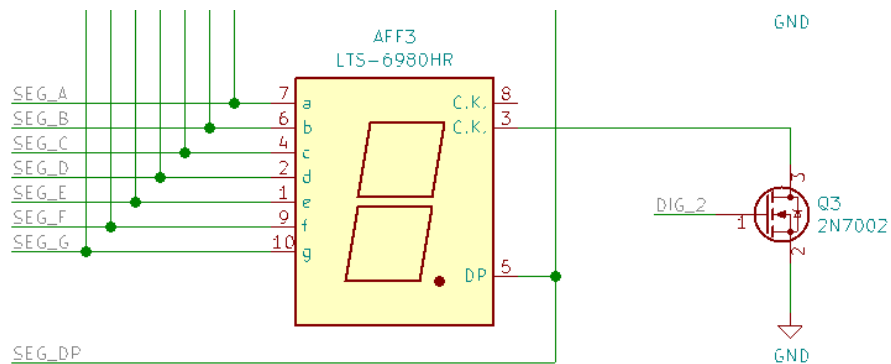


Figure 2: Schematic Seven-Segments

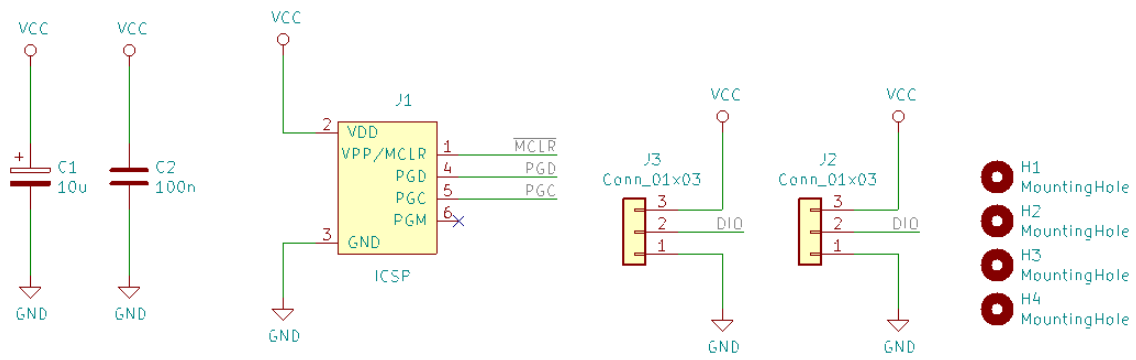


Figure 3: Schematic Programmer and Header

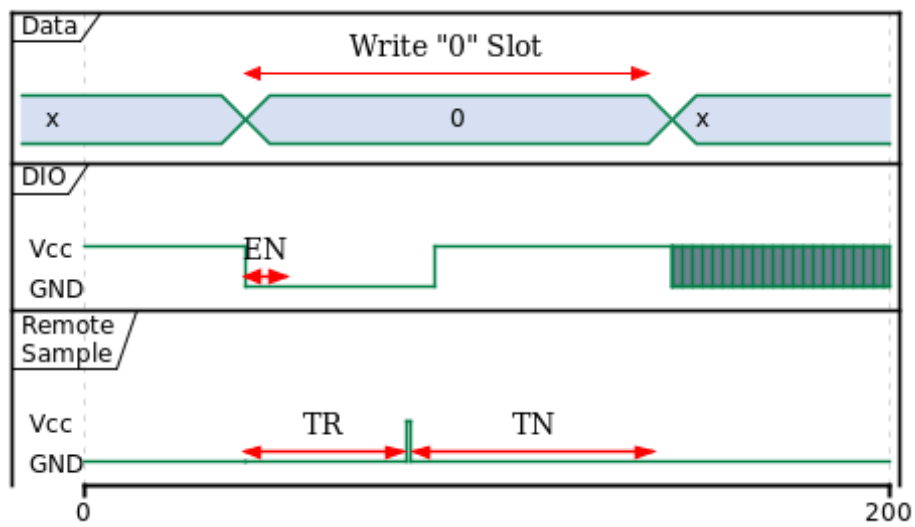


Figure 4: Master Write "0" Slot

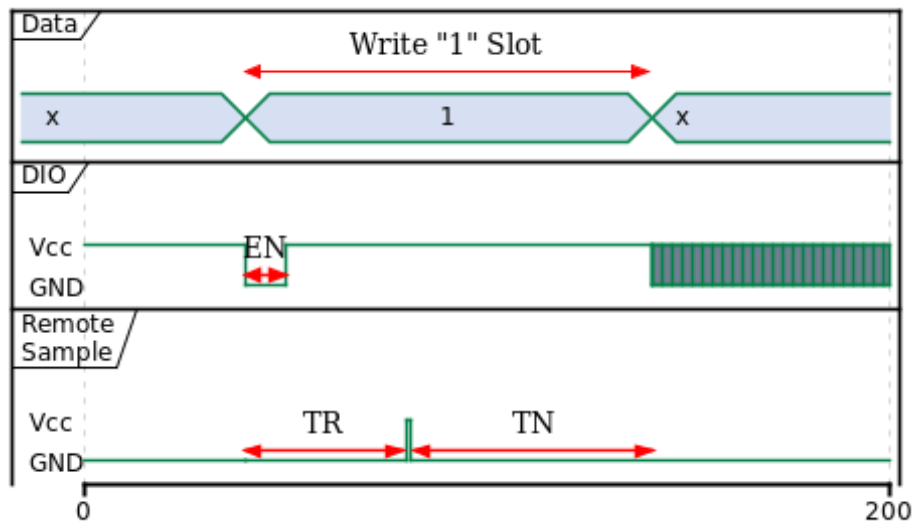


Figure 5: Master Write "1" Slot

Command Operation

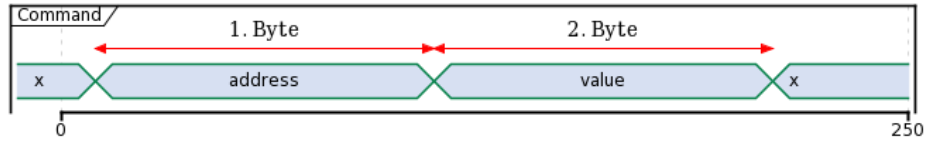


Figure 6: Command Operation

Registers

Table 2: Driver Registers

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

Option Register Bit Assignment

This register acts as setting register.

Table 3: 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.

Digit x Register Bit Assignment

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

Table 4: Digit Register Bit Assignment

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

State Machine

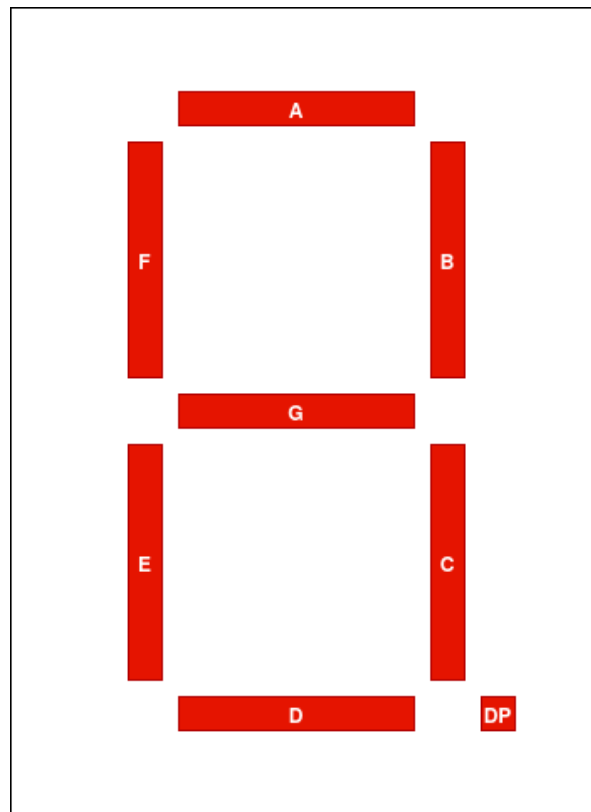


Figure 7: Seven Segments

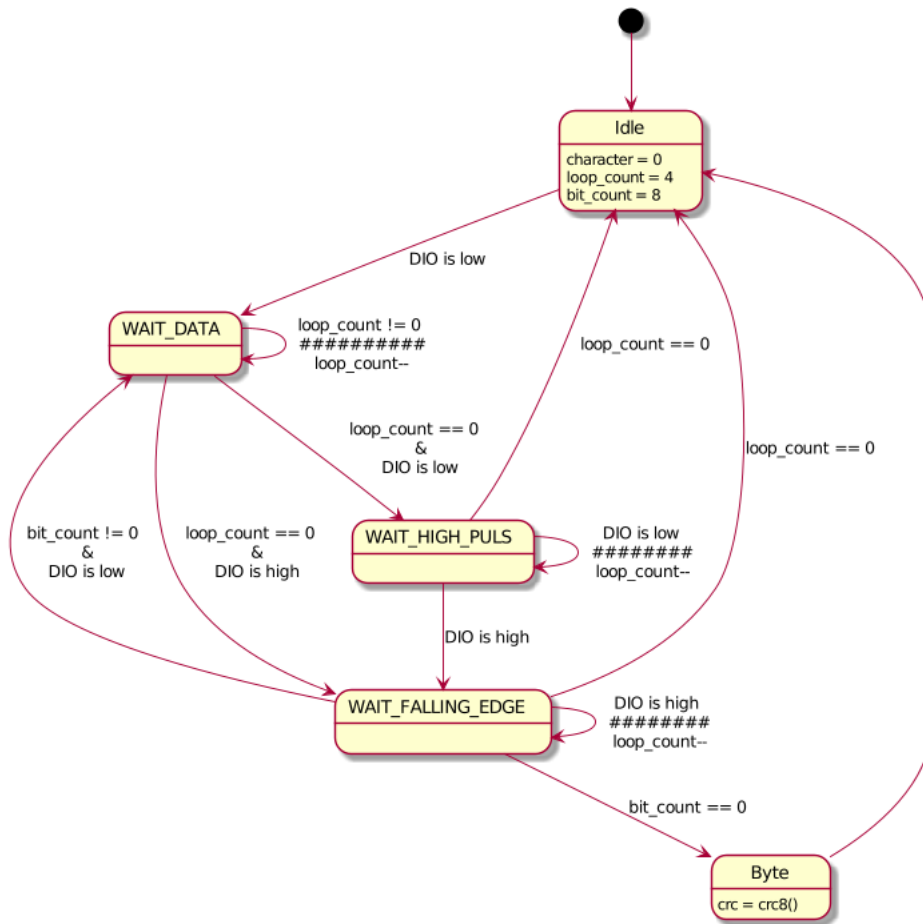


Figure 8: State Machine