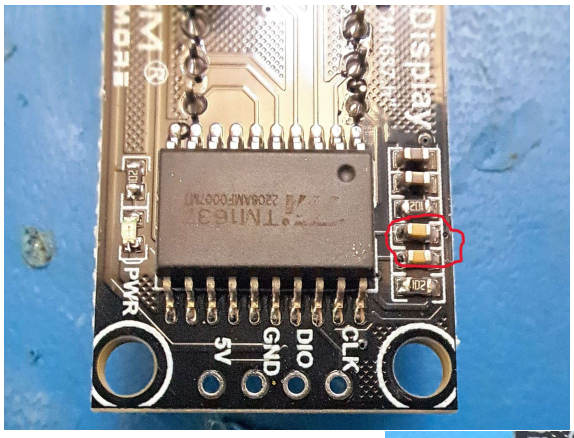
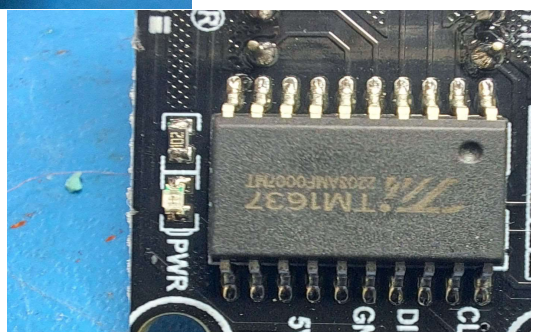
TM1637 Display Modules – Go faster mode, capacitor removal

The commonly available TM1637 4 digit display modules used here have two capacitors to ground on their DIO and CLK lines. This is to reduce the effects of noise when using longer lines between a controller and the display. Capacitors on data lines are however a fairly bad thing in higher speed serial data systems and will limit max communications speed drastically. The TM1637 is rated for up to 500kHz clock speed according to the datasheet, or 250 kHz if key switches are also scanned. Nothing like maximum frequency can be achieved from commercial modules as usually supplied. I tested one using my demo code and once the bit time was reduced much below 100us then comms became unreliable. This is why that figure is used in the Arduino library derived code which is blocking in nature, soaking up huge numbers of cycles during the comms process. I therefore tested the display with he capacitors removed, connected to the PIC via lines of up to about 15cm. Communication speed was transformed and a bit time of 5us worked fine in test. I suggest modifying the TM1637 comms code to use a configurable bitTime variable and if you do this so you can easily vary clock frequency and test what works with your hardware. Long data/clock lines likely won't work well at faster speed though. Removal of the capacitors is detailed below:

The capacitors on the commercial module were the bottom two in the view shown, ringed in red. Test this with a multimeter, the outermost pads should be grounded, the innermost connect to data(DIO) or clock(CLK).

Before Removal





After removal

You don't need fancy tools to remove the two SMD capacitors. Just lay a fine soldering bit along between the two of them, avoiding heating other components, then flick them off. Getting rid of them certainly helps make the code run more efficiently

Steve 11/23