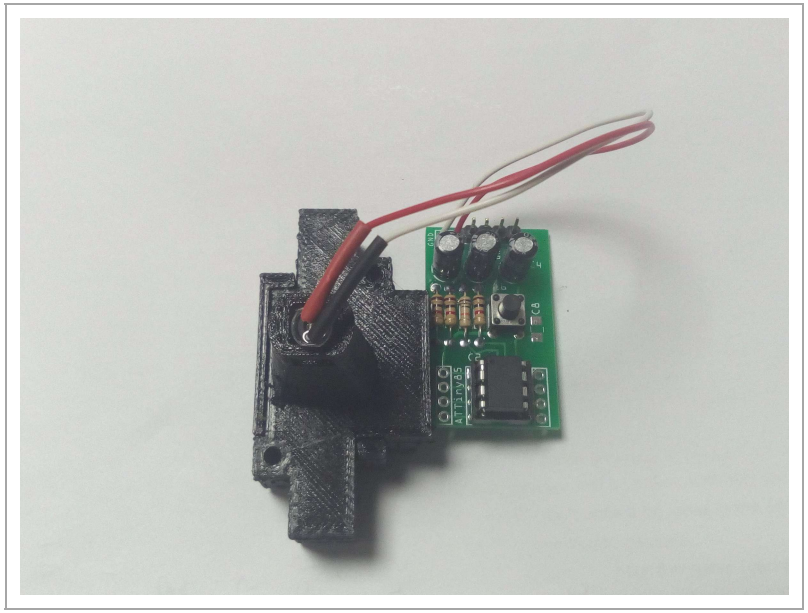
JASONKITS

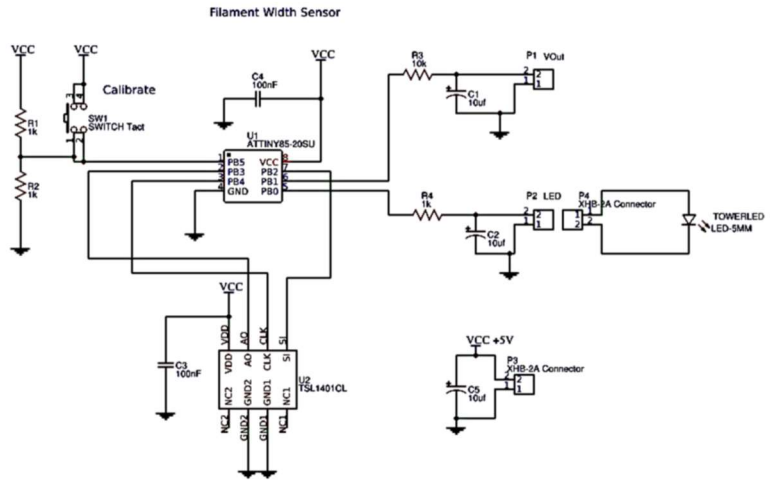
3D Printer Filament Width Sensor



JASONKITS

Version 3.2

Table of Contents



Calibration

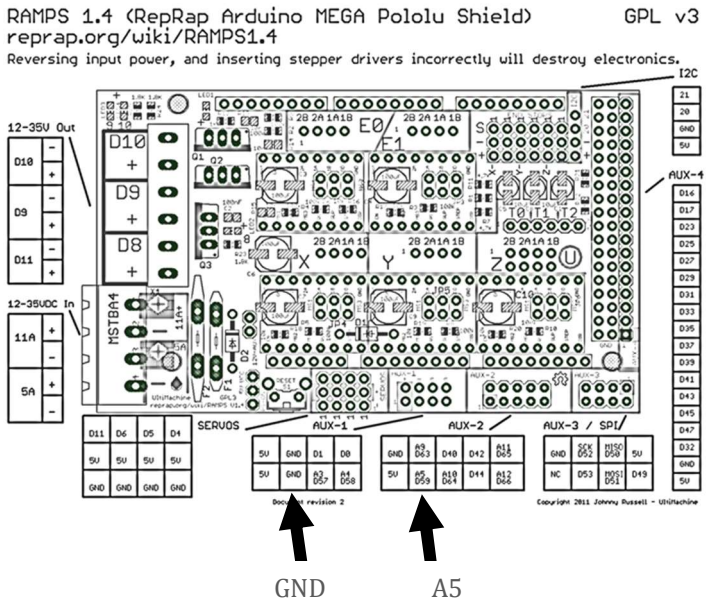
To perform calibration, Please follow these simple steps.

1. Insert a piece of 1.75mm filament in the enclosure
2. Hold the button for a few seconds to initiate calibration of the sensor. The micro controller will switch off the led and slowly light it up to measure the filament and will output the corresponding width in a voltage i.e. 1.75volts.

Marlin:

Configure marlin by uncommenting the filament width sensing section

NOTE: Sensor output connects to A5 on Ramps, and use a 5-volt supply that is filtered, as the microcontroller does not initiate sensing.



IC2 –

Although TSL1401CL is a surface mount component, it is very easy to solder it with a regular soldering iron. Apply some solder flux to each pad and place the component in the white solder mask rectangle. Heat one pad in the corner with some solder and soldering iron without touching the sensor. Align it and do the other corner the same way. Verify that the white rectangle is visible with the part and continue to solder the rest of the pads.

C3,C4

Capacitors are far easier to solder, align the capacitor 100nf on the pads, with the soldering tip heat one end, and apply some solder. Repeat the process for the other pad.

IC1 – Install 8-pin chip, if you prefer you can install an ic socket.

R1,R2,R4 – Install Resistors 1k

R3 – Install Resistor 10k

S1- Install Tact switch

H1 – Install 4 pin header

C1,C2, C5 – Install 10uf capacitors

Take 15 cms of wire, tin it with solder on both ends, and then solder the wire to the LED observing the anode and cathode terminals. Use a piece of heat shrink to cover LED connection, and then solder the wire on the respective pads marked LED on the PCB.

Filament width sensor

Overview

The filament width sensor uses the TSL1401CL linear sensor array Photodiode array 128 x 1 sensor pitch which has a 400 Dots Per Inch. The sensor also has an internal pixel data hold function.

These pixels measure incident light over a user-defined exposure time and generate a voltage or digital output that represents the exposure of light to each pixel. The analogue output can be interfaced directly to an ADC for digital processing or comparison of black / white thresholds

Concept

The filament width sensor uses an LED on top of the tower to cast the shadow of the filament on the TSL1401CL sensor. The photodiodes. Sensor output is read by the processor namely an ATtiny85 MCU and processed accordingly.

Analog output signal (1.75 volts = 1,75mm) can be read by newest Marlin version for filament width compensation, that is adjusting extruding speed according to filament diameter variations.

Getting Started

What is Included?

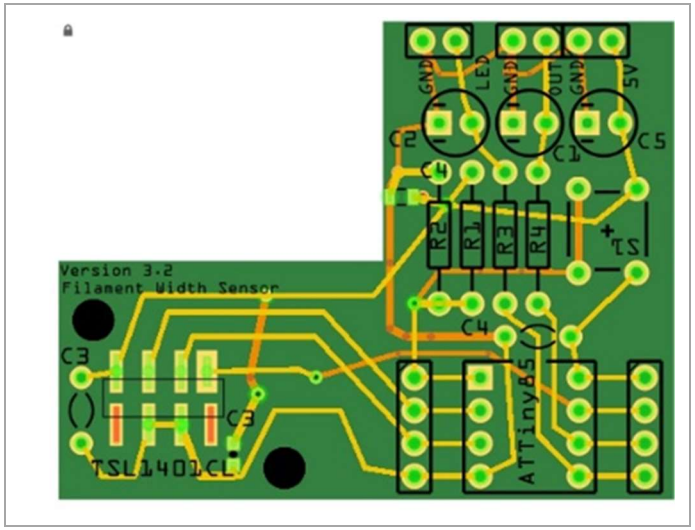
If you ordered the Ready assembled unit , then you should have an ESD bag with an assembled module which has been calibrated and ready to go and the PLA printed tower and pcb holder. Please refer to page XX for connection details.

If you ordered the Kit Version, then you should have an ESD bag with all the necessary parts and the PLA printer tower and pcb holder. Please refer to page ++ for assembly instructions

Kit Version Components List

Resistors R3 – 10K R2, R1,R4 – 1K	Mechanical S1 – Tact Switch 4pin SIL Header
Semiconductors IC1, ATTINY85 programmed and tested. IC2 – TSL1401CL * D1- WHITE LED	Capacitors C4, C3 100nf SMD 0805 C1, C2, C5 10uf 35v

Kit Assembly Instructions



PCB Board

Start construction with the smd parts, C3.C4 and IC2. See notes