SIMPLEST Bltouch/3Dtouch guide for Creality CR-10/CR-10s/Ender 2/Ender 3 printers created by Danny Walmsley.

The aim of this guide is to bring auto bed leveling to the masses by making it simple and affordable for everyone. You can navigate the guide by using the hyperlinks in the Contents, Hope this helps ☺

Contents

Before you start

Make sure you have already loaded a Bootloader to the mainboard if you are using the CR-10, Ender 2 or Ender 3, if you haven't already; find out how to do this HERE. This is not necessary on the CR-10s.

Download link for firmware HERE.

Mounts used for y and x offsets -

https://www.thingiverse.com/thing:2763931 - ***Fang***

https://www.thingiverse.com/thing:2493610 - ***Stock***

Wanting to install the Bltouch/3Dtouch to your CR-10 or Ender 3? This guide uses a Pin 27 adaptor you can get one here –

UK/Europe – https://www.ebay.co.uk/itm/CR-10-Pin-27-Board-for-BL-Touch-Autobed-Levelling-or-filament-sensor/173295377307?ssPageName=STRK%3AMEBIDX%3AIT&_trksid=p2057872.m2749.l2649

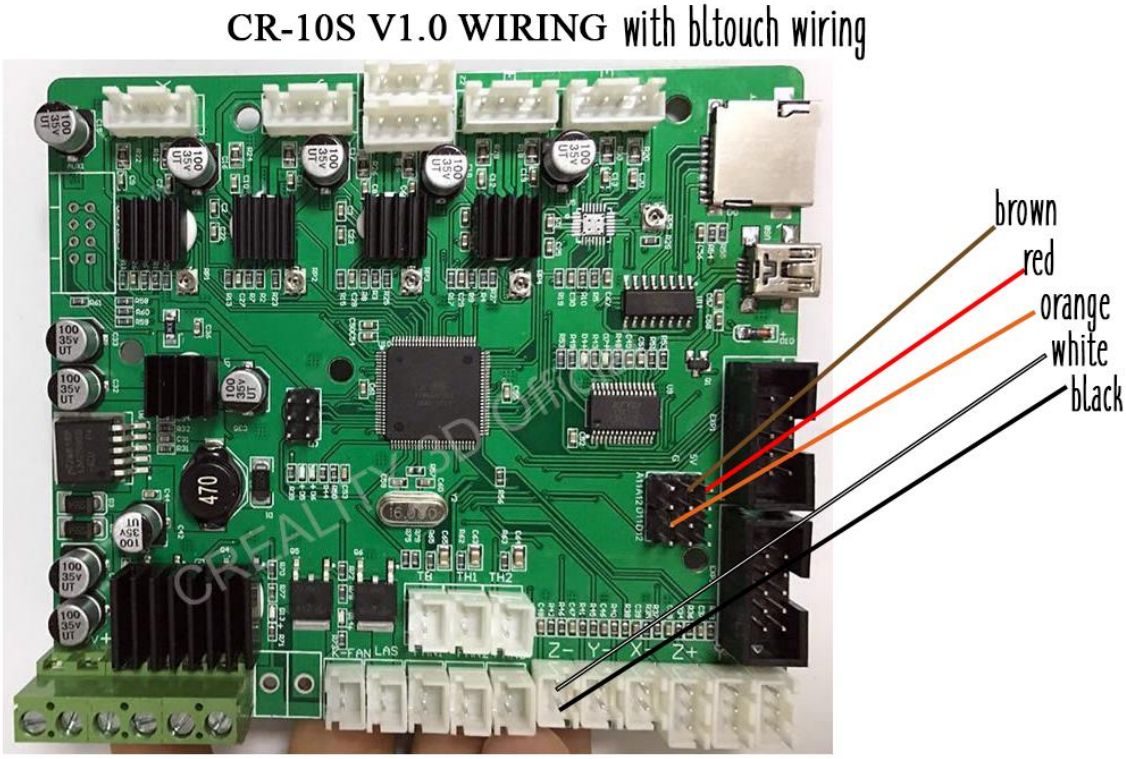
USA – https://www.th3dstudio.com/product/ezout-cr-10-filament-sensor-kit/

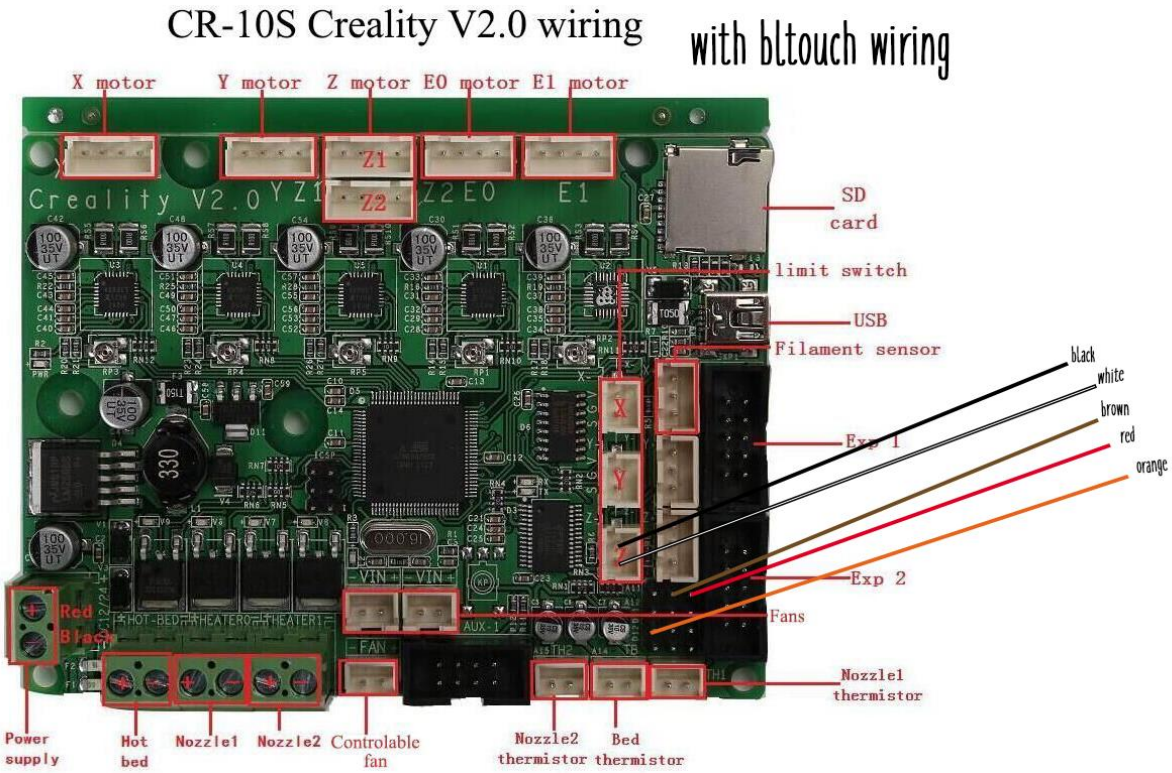
AUS –https://www.ebay.com.au/itm/Creality-Pin-27-Board-for-BL-Touch-Autobed-Levelling-or-Filament-Sensor/113097498250

A comment looks like this when editing the firmware '//', uncomment means to remove the // in front of a command. A commented command will not run where as an uncommented command will. For example if //#define CR-10 uncommented would be #define CR-10.

Printers

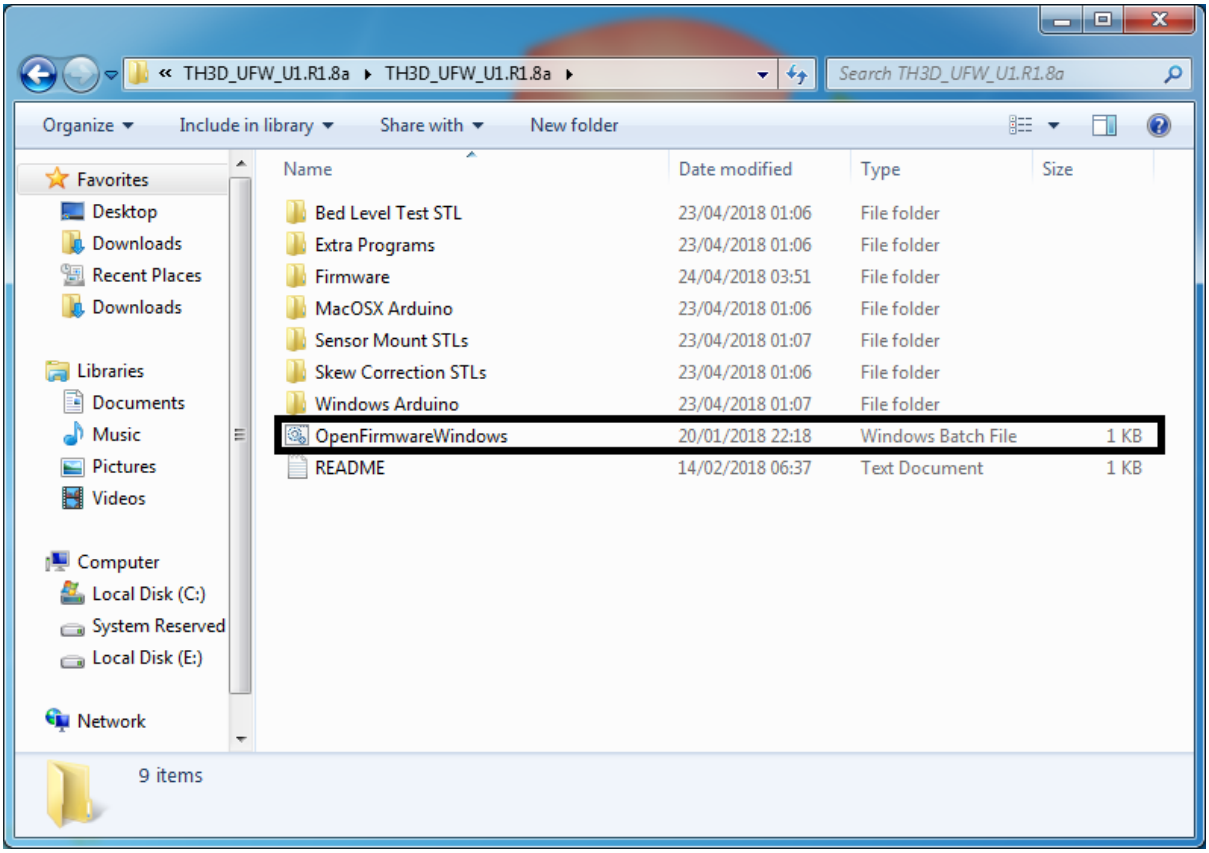
CR-10s /S4/S5/Mini





If you connect your bltouch and when auto homing the sensor doesn't register & the z axis keeps dropping pressing into your bed, turn your printer off, disconnect the power and invert the black and white connectors in the z limit switch header (put black where white was, put white where black was).

Extract the firmware you have downloaded and open the .bat file named '**OpenFirmwareWindows**'.



In **Configuration.h** tab:

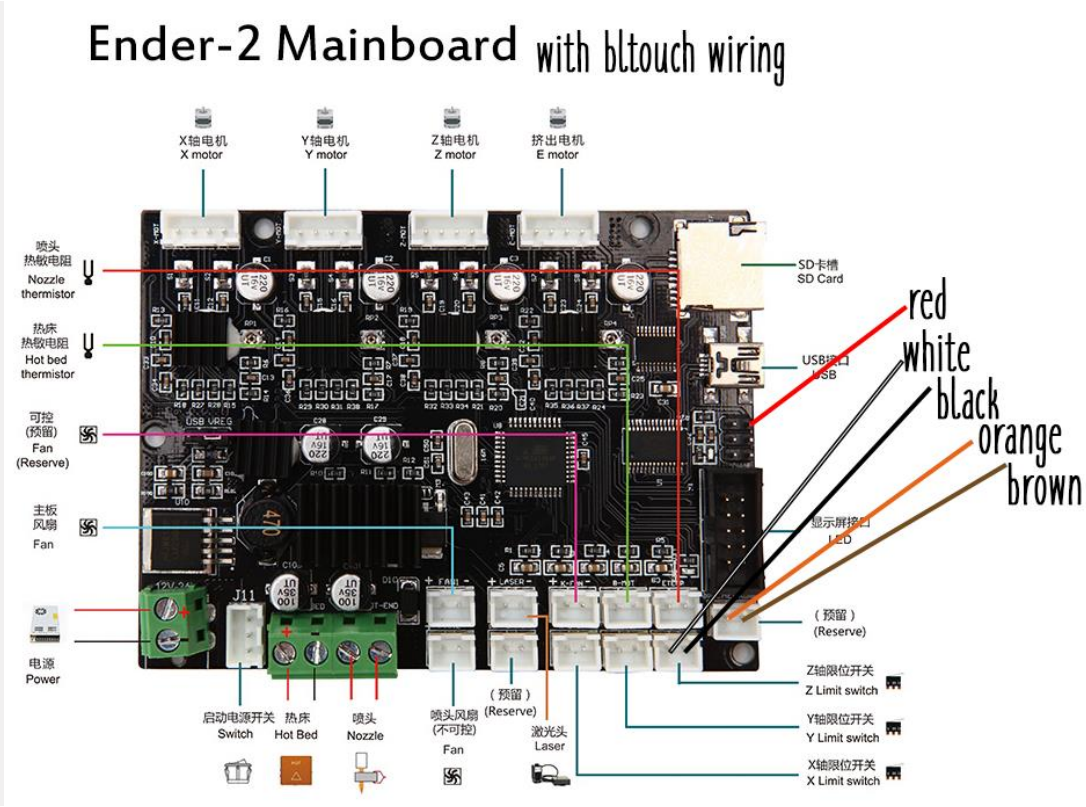
- Go to lines **72-75** and un-comment which suits your configuration.
- Make sure line **96** is commented out.
- Click line **97** and hit enter twice, now paste this into line 98:

  #define AUTO_BED_LEVELING_BILINEAR
  #define BLTOUCH
  #define SERVO0_PIN 11
  #define Z_SAFE_HOMING

- Uncomment line **110** - **#define CUSTOM_PROBE**

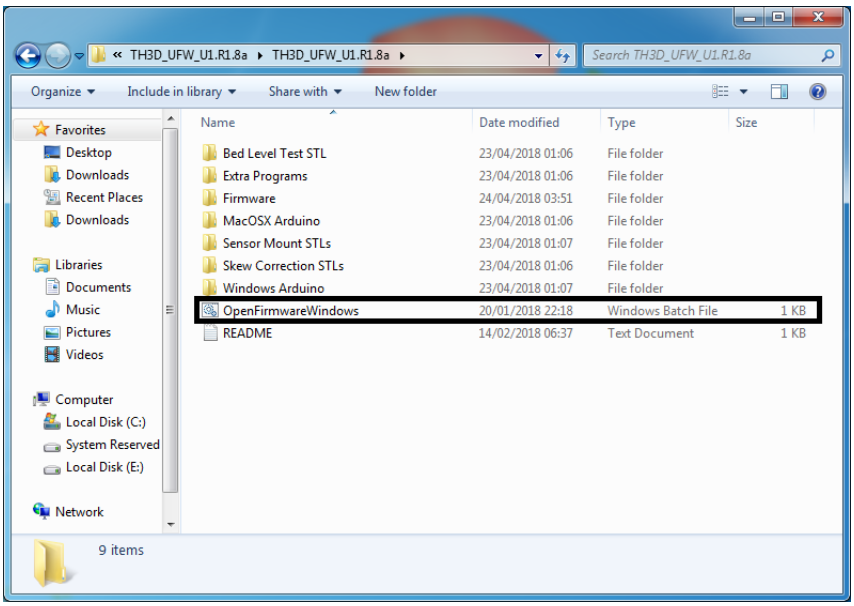
- Go to line **401** and set **X** offset to mount offset (recommended mounts use **-40** for the **X** offset.)
- Go to line **402** and set Y offset to mount offset (Recommended mounts use **-10** for the **Y** offset.)
- Go to line **356** if you want to set printer name to display on printer LCD
- You should be done! Click upload in the top left of Arduino IDE.

Ender 2



If you connect your bltouch and when auto homing the sensor doesn't register & the z axis keeps dropping pressing into your bed, turn your printer off, disconnect the power and invert the black and white connectors in the z limit switch header (put black where white was, put white where black was).

Extract the firmware you have downloaded and open the .bat file named '**OpenFirmwareWindows**'.



In **Configuration.h** tab:

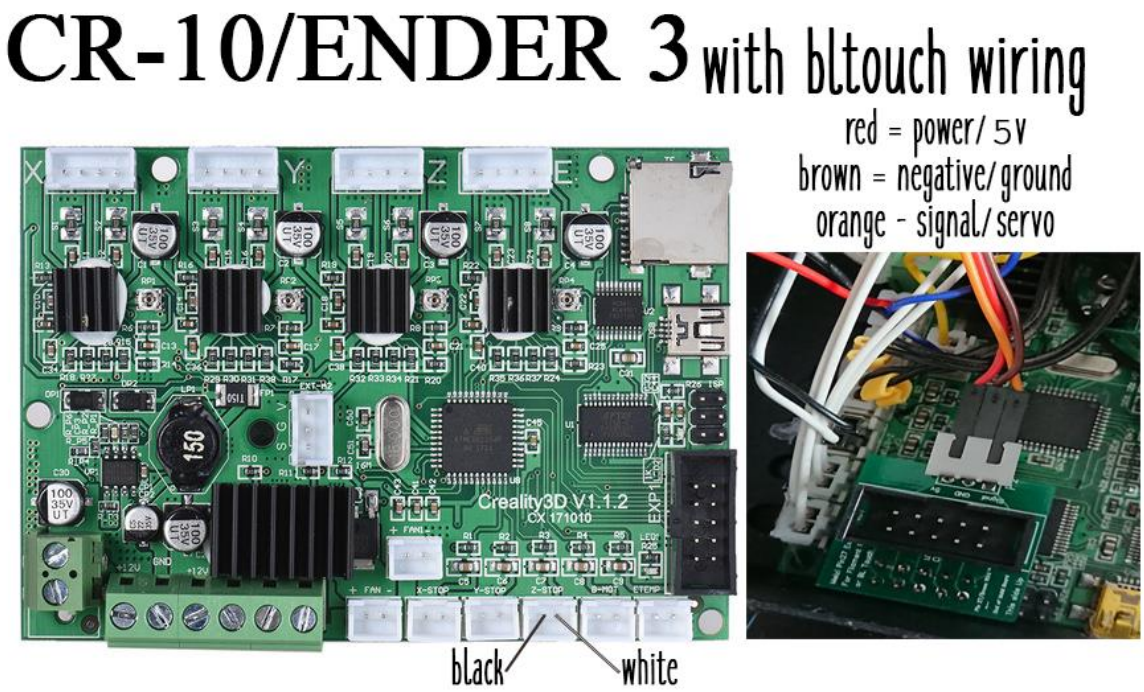
- Go to lines **120-140** and un-comment which suits your configuration.
- Make sure line **96** is commented out.
- Click line **97** and hit enter twice, now paste this into line 98:

  #define AUTO_BED_LEVELING_BILINEAR
  #define BLTOUCH
  #define SERVO0_PIN 29
  #define Z_SAFE_HOMING

- Uncomment line **110 - #define CUSTOM_PROBE**
- Go to line **401** and set **X** offset to mount offset (recommended mounts use **-40** for the **X** offset.)
- Go to line **402** and set Y offset to mount offset (Recommended mounts use **-10** for the **Y** offset.)
- Go to line **356** if you want to set printer name to display on printer LCD
- Go to line **1319** in **config.backend** and comment out **#define SDSUPPORT**
- You should be done! Click **upload** in the top left of Arduino IDE.

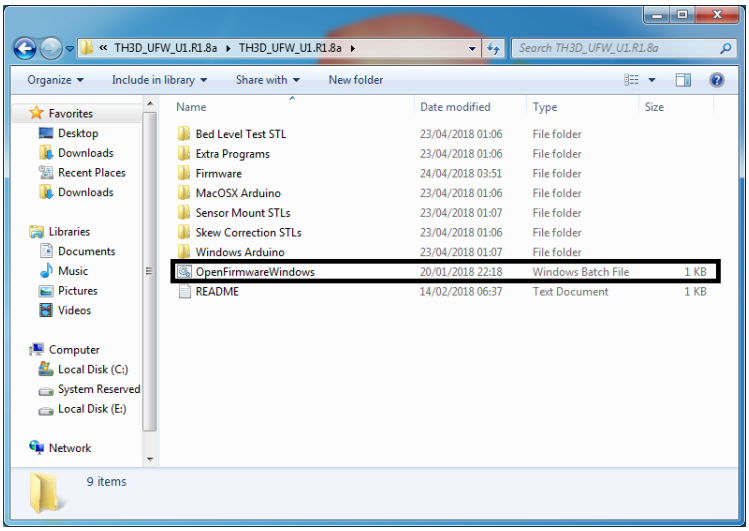
Ender 3/CR-10

Since the Ender 3 and CR-10 use the same main board with the pin 27 adaptor this should work fine for both printers.



If you connect your bltouch and when auto homing the sensor doesn't register & the z axis keeps dropping pressing into your bed, turn your printer off, disconnect the power and invert the black and white connectors in the z limit switch header (put black where white was, put white where black was).

Extract the firmware you have downloaded and open the .bat file named '**OpenFirmwareWindows**'.



In **Configuration.h** tab:

- Go to lines **142-162** and un-comment which suits your configuration.
- Make sure line **96** is commented out.
- Click line **97** and hit enter twice, now paste this into line 98:

  #define AUTO_BED_LEVELING_BILINEAR
  #define BLTOUCH
  #define SERVO0_PIN 29
  #define Z_SAFE_HOMING

- Uncomment line **110** - **#define CUSTOM_PROBE**
- Go to line **401** and set **X** offset to mount offset (recommended mounts use **-40** for the **X** offset.)
- Go to line **402** and set Y offset to mount offset (Recommended mounts use **-10** for the **Y** offset.)
- Go to line **356** if you want to set printer name to display on printer LCD
- Go to line **1319** in **config.backend** and comment out **#define SDSUPPORT**
- You should be done! Click **upload** in the top left of Arduino IDE.

Configuring Z offset

Connect your printer over USB and Through your chosen terminal (Octoprint is my favourite but you can use cura, S3D, slicer, pronterface whatever is best for you) enter these commands -

M502 – Reset settings in printers EEPROM

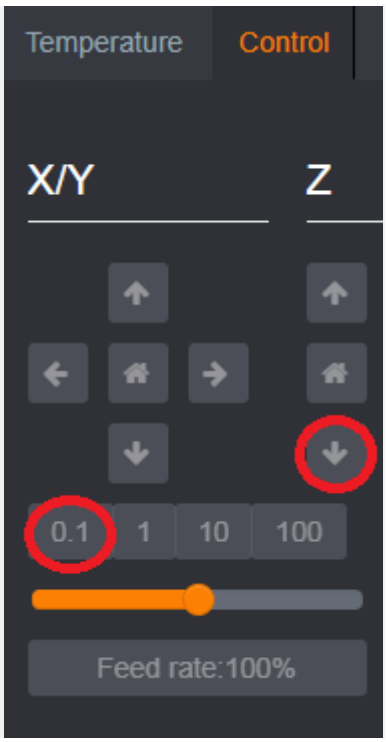
M500 – Save settings in printers EEPROM

G28 – Auto home, this should home your printers axis's then move to the middle of the bed.

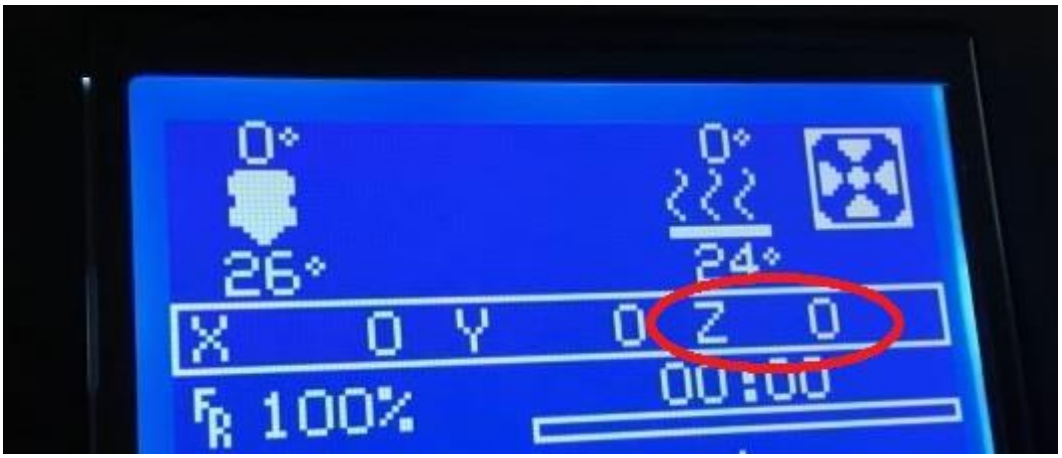
G1 F60 Z0 – This takes the nozzle to the printer's absolute Z position defined by the EEPROM.

From here in your chosen software find where you can control the printer and start to move the **Z** down in **0.1** increments, put a piece of paper under the nozzle and keep moving the Z down until the nozzle just scrapes the piece of paper, just like how you usually level your bed.

For example I will show you how to do this in my chosen software, Octoprint.



When you're at the correct height check the front of your printers LCD screen where it says Z on the right hand side, make a note of this.



Now to set that as your Z offset by going back to your terminal and entering M851 followed by your offset you noted down in the last step, in the photo above the command would be **M851 Z0.00** but yours will look more **like M851 Z-0.90**.

M500 – Saves our offset we have just input to the printers EEPROM and you are finished setting your Z offset, the offset can also be accessed by the printers LCD under the motion tab for quick adjustments just be sure to save them afterwards via **M500** or Save to EEPROM on the printer.

Start-up GCODE

Once you have done all of the above you're so close to auto bed levelling prints but you need to add some GCODE to your Start-up script that your printer uses, this is done through your slicer.

Here is my Start-up GCODE for the the CR-10/s, Ender 2 and Ender 3, copy and paste this directly into your Start-up script in your slicer;

CR-10/s:

G21 ; (metric values)
G90 ; (absolute positioning)
M82 ; (set extruder to absolute mode)
M203 E80 ; (set extruder max to 80)
G28 ; (home all axis)
G29 ; (Auto Level)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)
G1 X0.1 Y20 Z0.2 F5000.0 ; (move to start-line position)
G1 X0.1 Y200.0 Z0.2 F1500.0 E15 ; (draw 1st line)
G1 X0.4 Y200.0 Z0.2 F5000.0 ; (move to side a little)
G1 X0.4 Y20 Z0.2 F1500.0 E30 ; (draw 2nd line)
; G1 E27 F1000 ; (retract filament 1mm)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)
M117 Printing...

Ender 2:

G21 ; (metric values)
G90 ; (absolute positioning)
M82 ; (set extruder to absolute mode)
M203 E80 ; (set extruder max to 80)
G28 ; (home all axis)
G29 ; (Auto Level)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)
G1 X0.1 Y20 Z0.2 F5000.0 ; (move to start-line position)
G1 X0.1 Y100.0 Z0.2 F1500.0 E15 ; (draw 1st line)
G1 X0.4 Y100.0 Z0.2 F5000.0 ; (move to side a little)
G1 X0.4 Y20 Z0.2 F1500.0 E30 ; (draw 2nd line)
; G1 E27 F1000 ; (retract filament 1mm)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)

M117 Printing...

Ender 3:

G21 ; (metric values)
G90 ; (absolute positioning)
M82 ; (set extruder to absolute mode)
M203 E80 ; (set extruder max to 80)
G28 ; (home all axis)
G29 ; (Auto Level)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)
G1 X0.1 Y20 Z0.2 F5000.0 ; (move to start-line position)
G1 X0.1 Y150.0 Z0.2 F1500.0 E15 ; (draw 1st line)
G1 X0.4 Y150.0 Z0.2 F5000.0 ; (move to side a little)
G1 X0.4 Y20 Z0.2 F1500.0 E30 ; (draw 2nd line)
; G1 E27 F1000 ; (retract filament 1mm)
G92 E0 ; (reset extruder)
G1 Z1.0 F3000 ; (move z up little to prevent scratching of surface)
M117 Printing...

You're now all set to hit print and enjoy auto bed leveling prints.

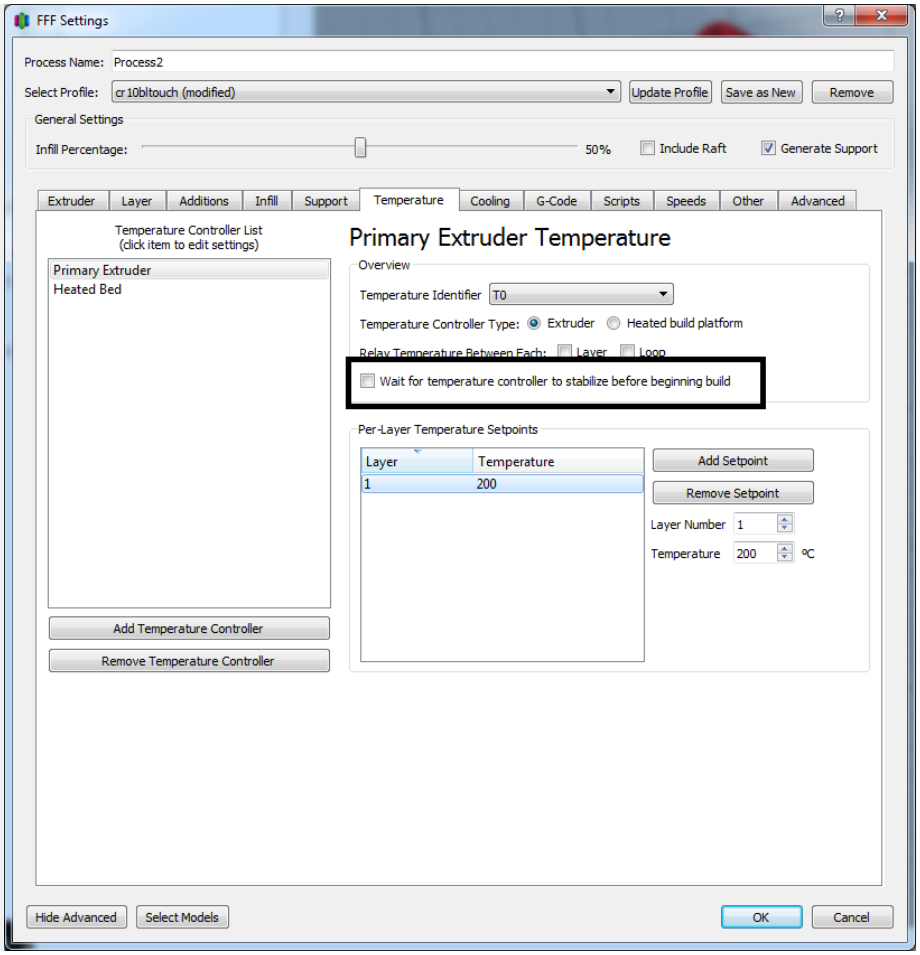
Misc & Extras

Remove all boot screens for faster boot times

In **Configuration_backend.h**

- Comment out line **1004**
- Comment out line **1010**

Control ooze while bed levelling runs (Simplify3D)



By un-checking this check box the auto leveling probing will begin before waiting for the nozzle to heat up avoiding oozing while your nozzle heats up. Only do this for the **Primary Extruder**.

CR-10 stock to CR-10s board

By un-checking this check box the auto leveling probing will begin before waiting for the nozzle to heat up avoiding oozing while your nozzle heats up. Only do this for the **Primary Extruder**.

If you are using a CR-10 with a CR-10s board in it you can use the stock screen and disable the none existent filament sensor easily.

In **Configuration.h** tab:

Uncomment Line **80** to disable the board looking for the sensor.

Uncomment line **92** and rotate your display cable 180 degrees and force into the LCD slot, this will work and has been tested.