

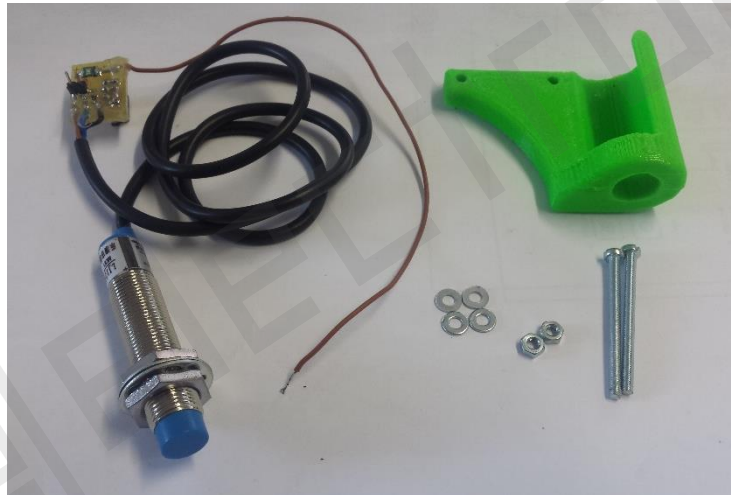
Auto Bed Levelling Instruction Manual

1. Introduction

Thank you for purchasing the DIYElectronics.co.za Auto Bed-Levelling Upgrade Kit for your Prusa i3 printer. This kit aims to rid the hassle of constant bed tweaking in-between prints, giving you perfect first layer heights every time and making your 3D printing experience easier and more efficient.

How it works? An Inductive probe replacing and acting as the new Z-endstop sends a signal to the Marlin firmware when the tip of the probe is within a couple mm range of conductive metal. A command sent by your slicing software prompts a process which measures the height of the print bed at certain points before the print begins.

2. Packing List



Parts included in your Auto Bed-Levelling Kit,

- 1x Inductive probe assembly (sensor and electronics)
- 1x 3D Printed probe mount
- 2x M3x40 machine screws
- 2x M3 washers
- 2x M3 nuts

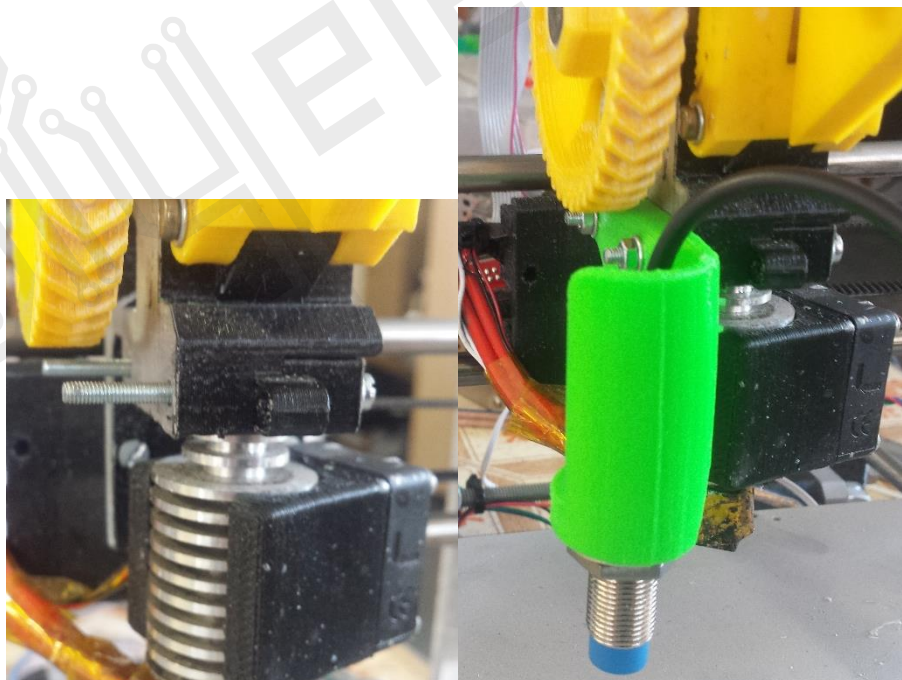
3. Mechanical Assembly

Fix the Inductive probe to the printed plastic holder as seen in below



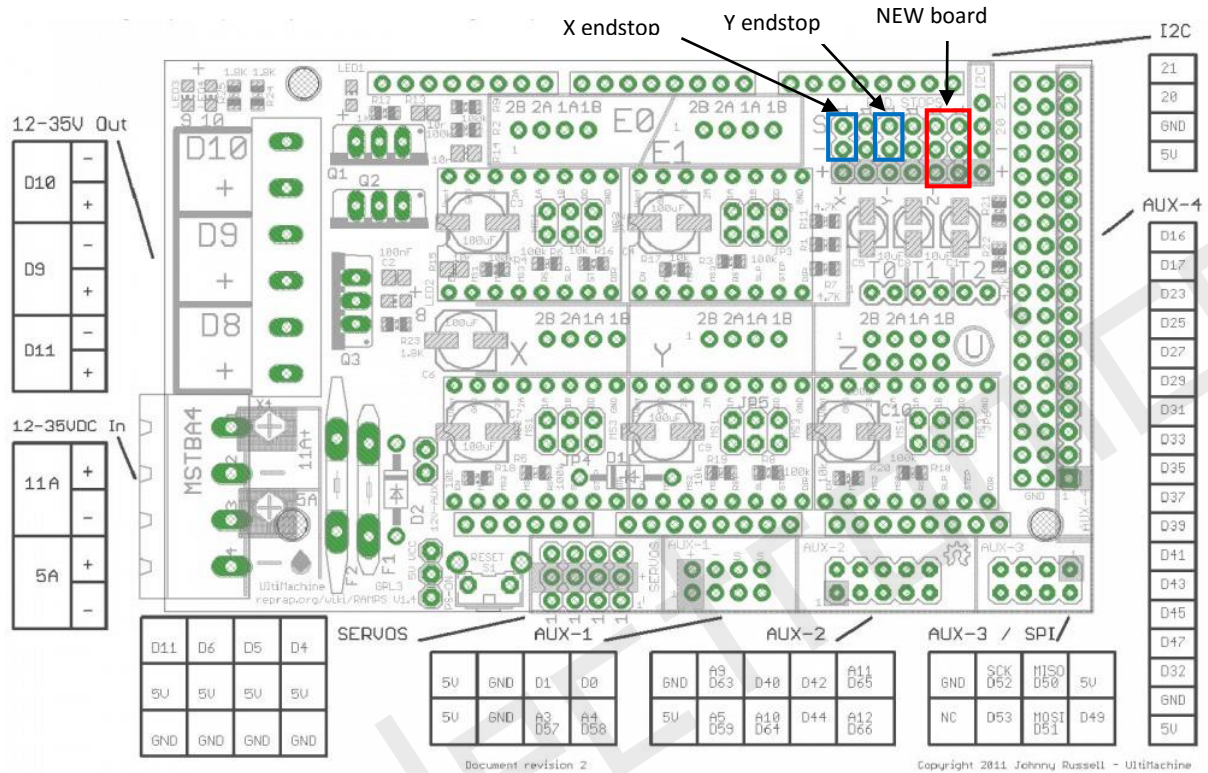
Fix this assembly onto the Charlstruder by removing the old M3x30 machine screws and replacing them with the longer M3x40 machine screws, washers and nuts.

Important!! You need to make sure that the tip of the inductive probe is BELOW the hot-end nozzle. This is a preliminary safety step so that the Z-axis reliably stops before the nozzle crashes into the bed during testing (explained later in this guide)

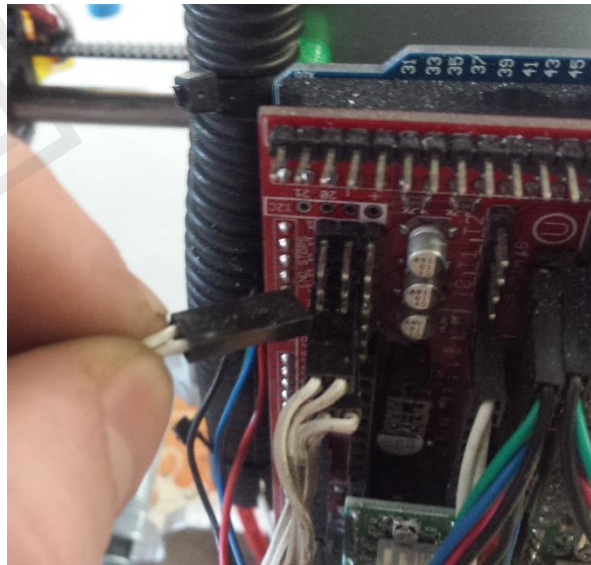


4. Electronics

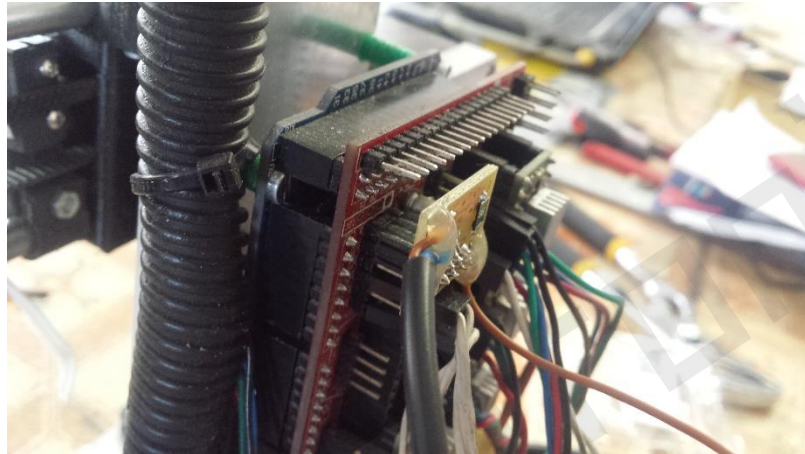
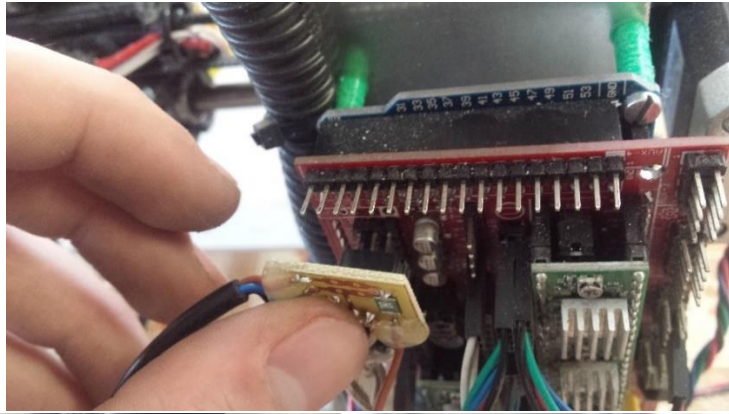
Below is a schematic showing where you want to plug the ABL board into



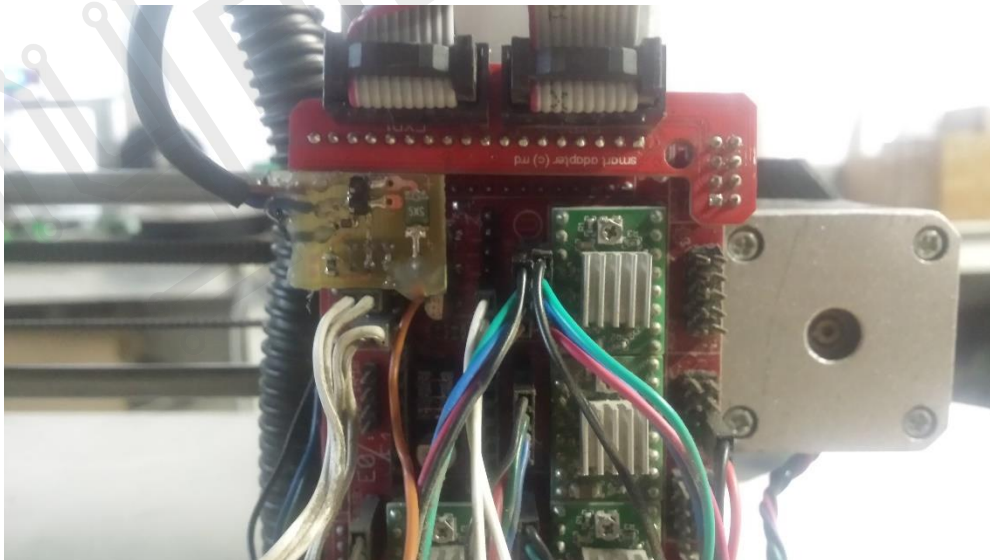
Remove the old Z-endstop 2-pin connector from your ramps board



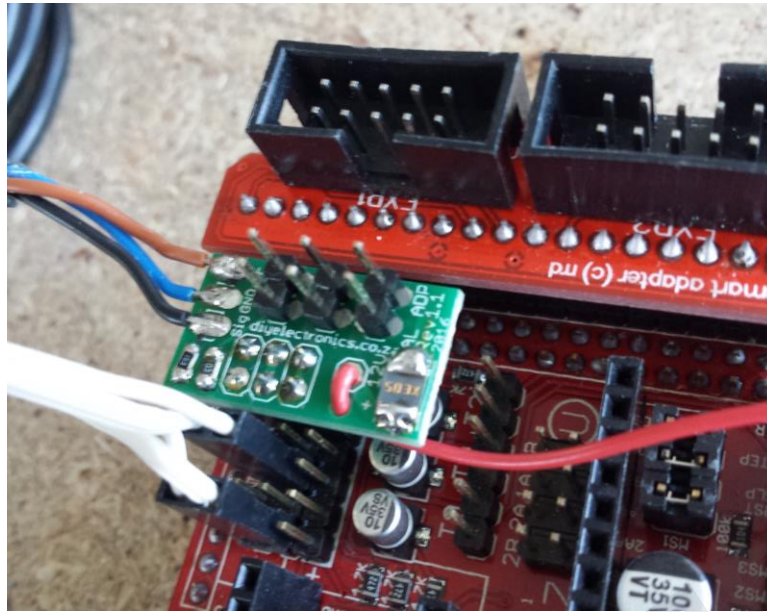
And replace with our custom DIYElectronics custom Auto-Level sensor board.



Make sure that the 6 connector pins of the custom board are aligned perfectly with the top 2 rows (6 pins) of the ramps board. The custom board needs to be aligned like the picture below:

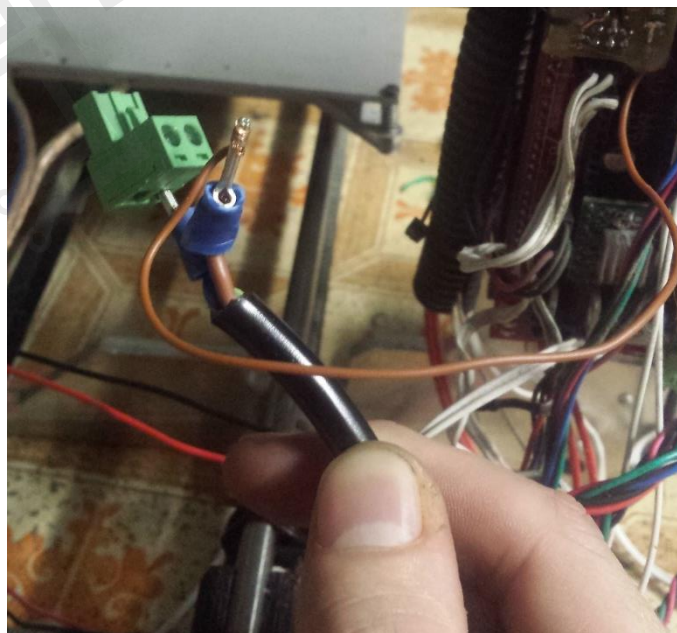


Note: We have new professionally made boards now. See the following picture:



Now connect the 12V RED wire on our custom board (previously brown as in the following pictures) to one of the BROWN wires in the green connector powering the Ramps and Arduino as seen below.

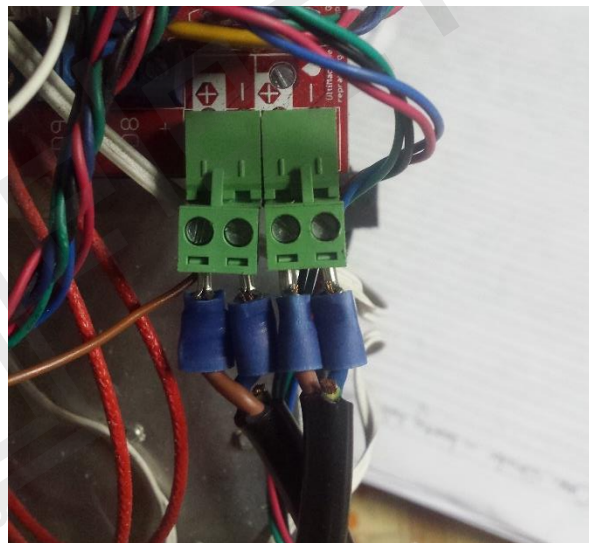
Unplug one of the two green power connectors and unscrew the left BROWN live 12V power wire. Wrap the exposed wire around end of the male connector.



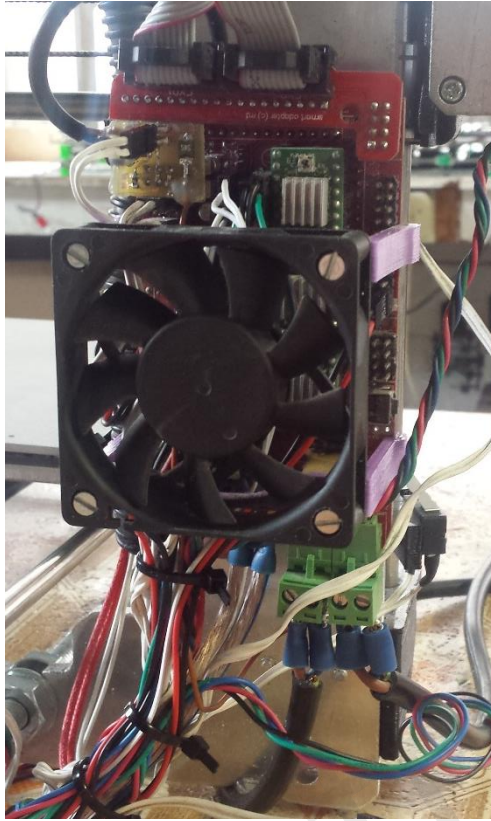
Fit the brown live wires back into the green connector and screw tight.



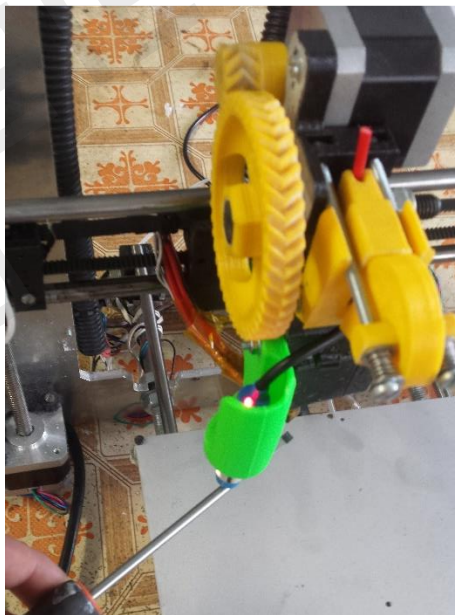
Fit the green connector back into its housing.



And you're nearly done with the mechanical assembly!! All you need to do now is tidy up the cables, ensuring that nothing will get caught during printing. Also replace the electronics fan that you removed.



Now, when your printer is powered up, the red LED on the probe should light up when anything metal comes into contact or near the bottom of the probe. Check this with a screw driver or something metal.



Our custom engineered sensor board has a few benefits worth mentioning! It features a poly-fuse to prevent any damage in the case of a mishap or short (potentially ending in fire). There is also a 12v break out 2 pin connector allowing you to connect your electronics fan at 12volts instead of 5v (more volts = more fan speed = happier electronics).

5. Firmware and setup

So all of your mechanics are set up and it is time to get the firmware and software set up. If you bought this kit as an upgrade kit to an existing setup you are going to have to flash upgraded firmware onto your Arduino. If this is your initial printer setup, your Marlin would have come preconfigured with the correct firmware already setup.

Now you can flash the firmware appropriate to your printer setup. There are 8 different firmware configurations available:

Prusa i3 (standard, 20tooth pulleys)

Prusa i3 (XL bed upgrade only, 20tooth pulleys)

Prusa i3 (Leadscrew upgrade, 20tooth pulleys)

Prusa i3 (XL bed upgrade & Leadscrew upgrade, 20tooth pulleys)

Prusa i3 (standard, 16tooth pulleys)

Prusa i3 (XL bed upgrade only, 16tooth pulleys)

Prusa i3 (Leadscrew upgrade, 16tooth pulleys)

Prusa i3 (XL bed upgrade & Leadscrew upgrade, 16tooth pulleys)

If you are unaware how to flash firmware onto marlin you need to follow the standard procedure that is explained in our main build guide.

The firmware is preconfigured for your printer's spec so you don't need to touch or edit it. Just flash it to your Arduino as explained in the build guide.

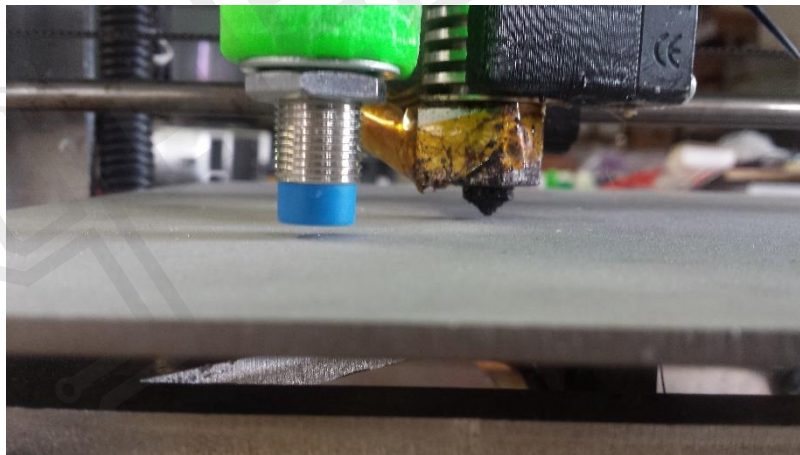
Now you need to connect your printer in Repetier Host and test that the Z- probe endstop works:

- Manually home the X and Y axes individually (you won't be able to home the Z axis before this has been done - another safety feature)
- Then manually jog the X and Y axes so that the probe and nozzle are above the aluminium bed
- Raise the Z axis about 10cm

- Get out something metal (a screwdriver will do)
- Home the Z axis and then place the screwdriver under the probe to verify the probe works and thus a working Z-endstop
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- If this is successful, home ALL of the axis at once (Keep your hand near the printer power switch in case of an emergency)
- The printer should end up and stop when the probe is close enough to the bed, with the probe in the middle of the bed.
- If this is successful, type G29 in the G-code command line (above the manual control buttons) and click send. The Autobed levelling procedure should start and measure nine points along the surface of the bed.

At this point you also need to keep your hand near the power switch incase something goes wrong. What you are doing here is making sure that each of the nine probe points is on the bed. IF some of them are off the bed, you will need to adjust the X and Y endstops, thus shifting all of the probe points to be on the bed.

If you are happy with the above G29 autolevel step you can move on to physically adjust the probe so that it is just SLIGHTLY above the tip of the nozzle (about 1-2mm).



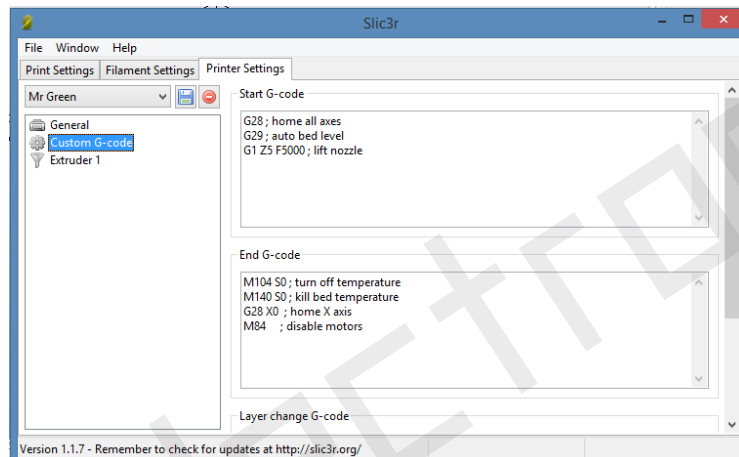
IMPORTANT!! If the probe is below the nozzle or at the same level as it, it will crash into the prints. If it is too high then it won't activate in time and the nozzle will crash into the bed. When you are happy with the position of the probe, tighten it up.

You are nearly done so bear with me!

With the final adjustment of the probe height done, test that the autolevel probe procedure works: Home all the axes, then type in G29 in the command line. If this works you are happy.

There are two things left to do:

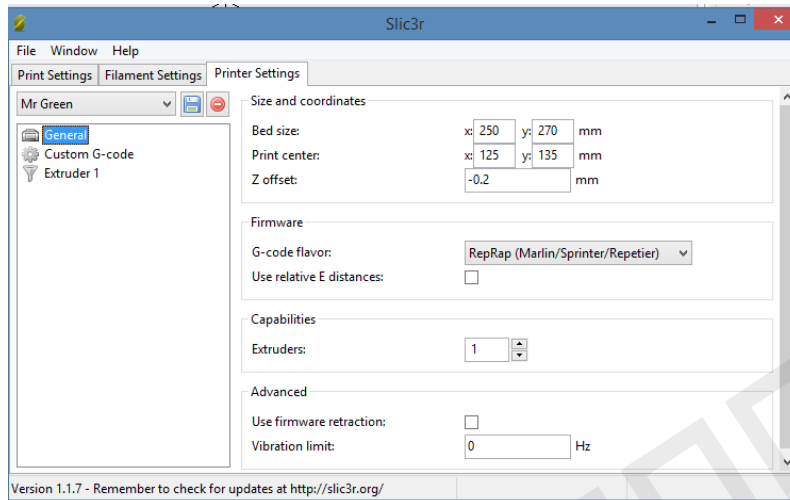
Make sure that the G29 auto bed level command is included in the Slic3r settings Start code. You find this in Slic3r configuration > Printer Settings > General > Start G - code. You need to type in "G29 ;" AFTER the G28 command, and BEFORE the other commands. See the picture below. If you are using a different slicing program you need to do the same procedure relative to whatever software you are using



At this stage you need to start a test print with the G29 start code setting inclusion. The print should home as usual, then do the auto bed level procedure and stop in the back right hand corner as the bed and nozzle heat up to your chosen temperatures. Then the print will start.

The first layer height probably won't be perfect just yet so take note if it is too high or too low (you may still adjust this with 'Babystepping' on your LCD panel).

- The last step is to adjust the Z-offset with in Slic3r configuration - giving you the perfect layer height all around and hopefully after fine tuning this setting, not having to touch anything after you start the print. See the attached picture showing where this Z-offset setting is.



You should finally be done!!