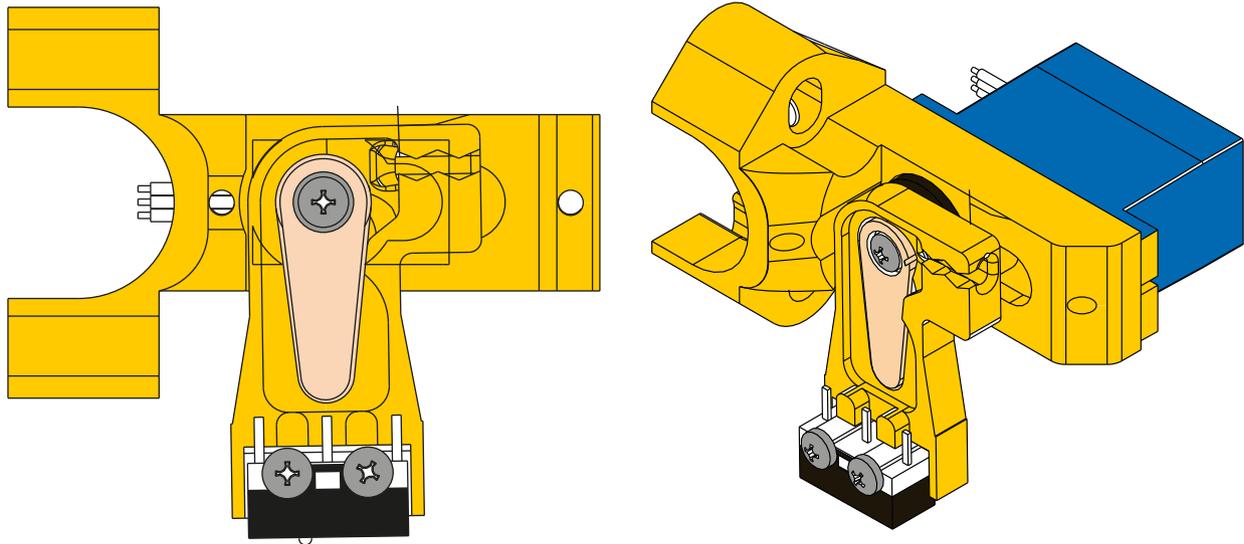




ADD-ONS



ASSEMBLY MANUAL
FOR AUTO-CALIBRATION
ADD-ON



WELCOME

Welcome, helloBEEprusa user!

This new helloBEEprusa upgrade will allow your 3D printer to correctly calibrate the table height all by itself.

1. TOOLS

You will need some simple tools:



SET OF HEX KEYS

You will need a set of hex keys for the assembly.



MARKER

You need a marker to write on the labels for better guidance while assembling the auto-calibration add-on on your helloBEEprusa.



SPOOL HOLDER

Use the spool holder which comes with your helloBEEprusa and doubles as a spanner during this assembly.

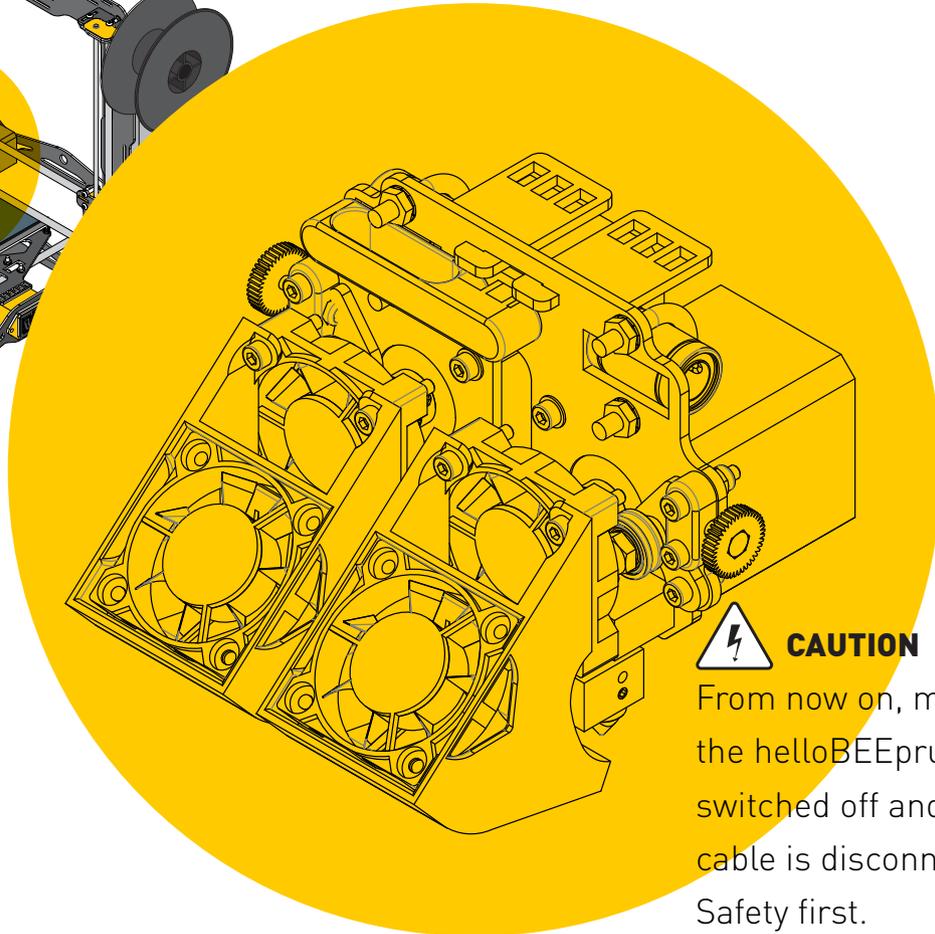
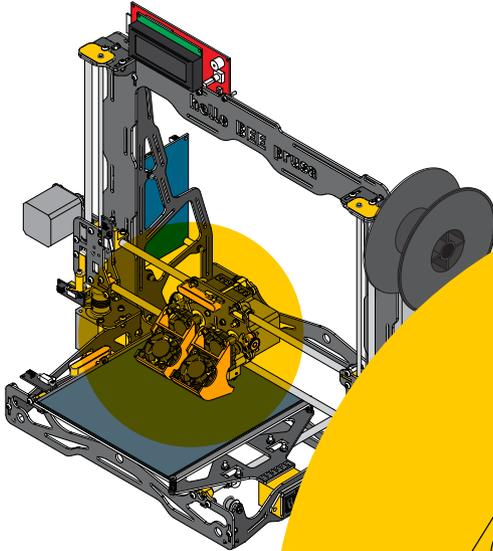


USB CABLE

A cable to connect your computer to your 3D printer and upload the latest firmware.

2. ASSEMBLY

You will be working on the extruder unit so you should move the X-axis to a height that will make it easier to work on. You can do this by hand, by winding the couplings at the base of the Z-axes, or if you prefer, use the LCD screen controls to have the helloBEEprusa do it for you. Just navigate to: Prepare→Move Axis→Move Z→Move 10mm. Move the axis to a height you will feel comfortable working on.



CAUTION

From now on, make sure the helloBEEprusa is switched off and the power cable is disconnected. Safety first.

2.1

Depending on your level of skill, you may need to remove some parts from the extruder unit for easier access.

1

Start by removing the fan by easing it out gently. With the marker, mark the fan to tell it apart from the one screwed to the heat sink. Then, undo the screws that hold the blower housing in place.

3

4

2

2

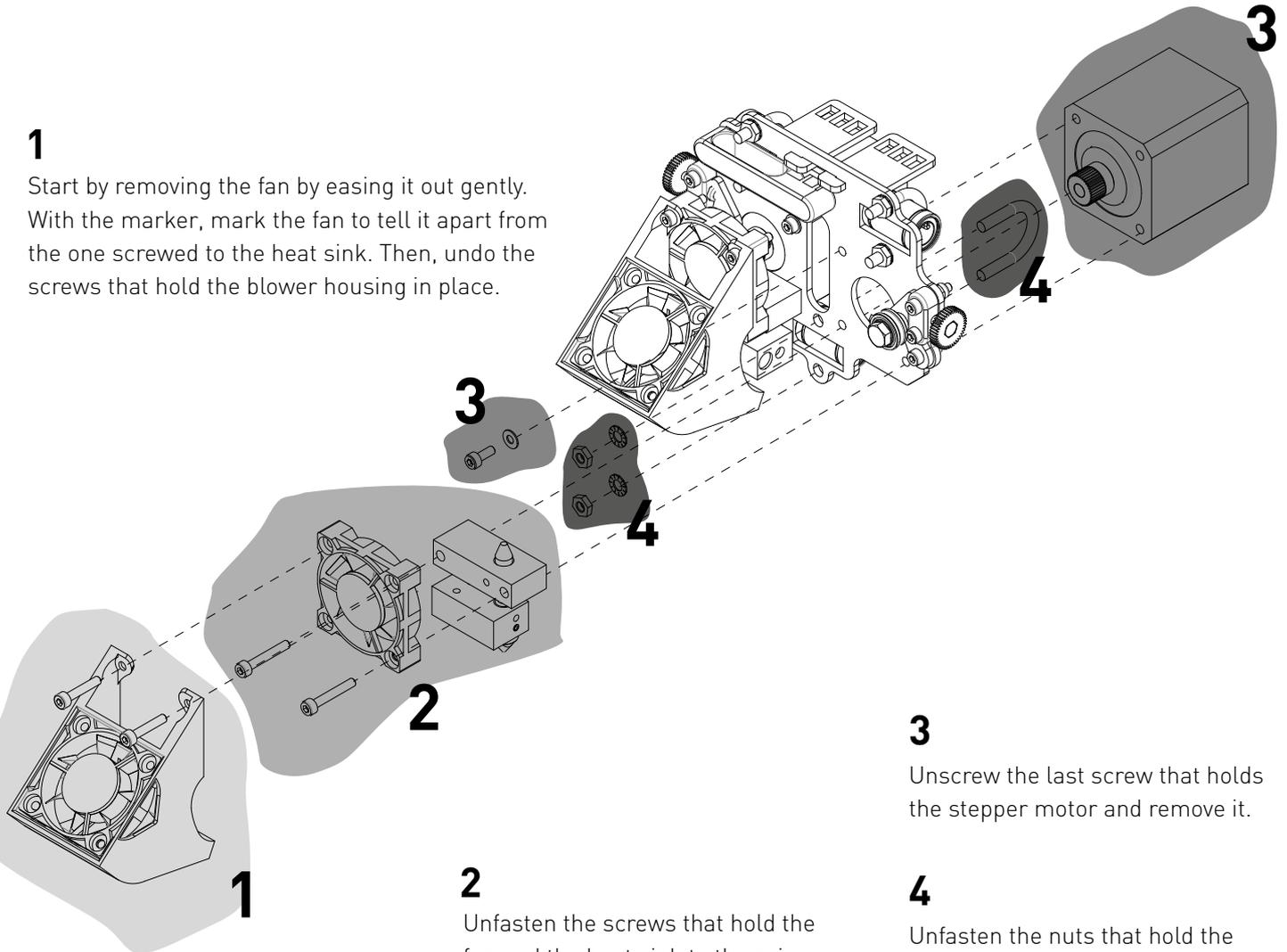
Unfasten the screws that hold the fan and the heat sink to the axis, and carefully push these components aside.

3

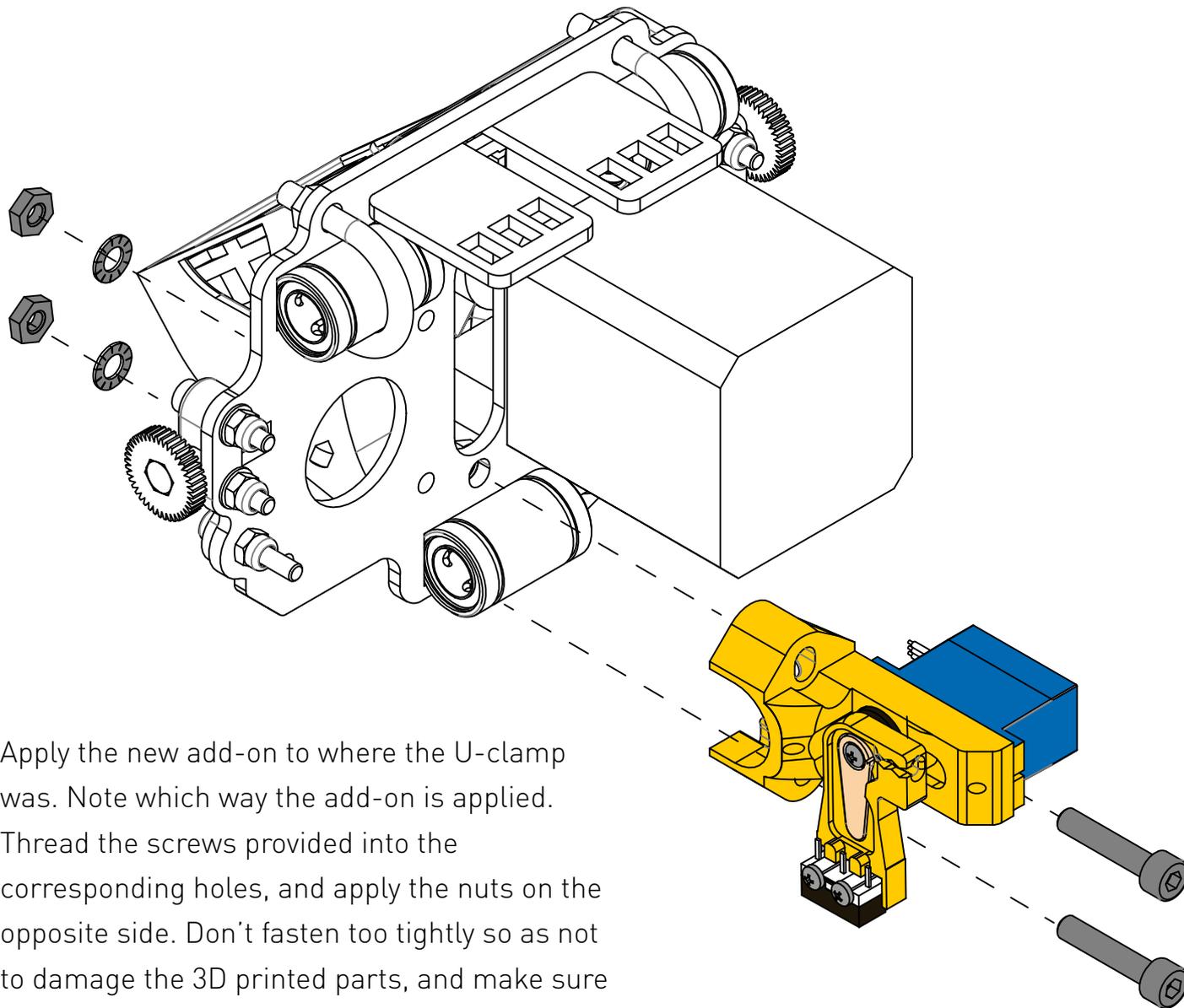
Unscrew the last screw that holds the stepper motor and remove it.

4

Unfasten the nuts that hold the U-clamp onto the axis plate.

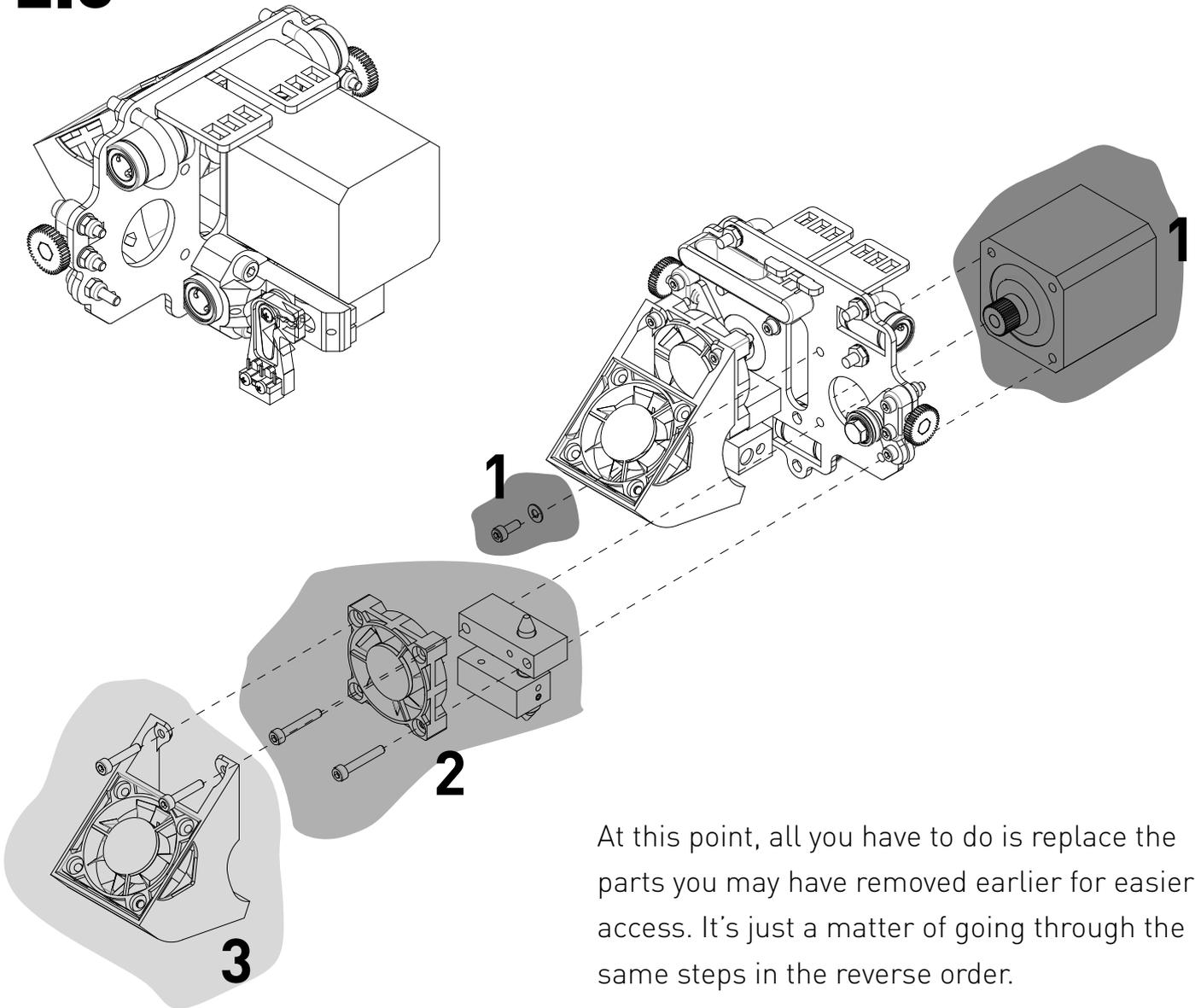


2.2



Apply the new add-on to where the U-clamp was. Note which way the add-on is applied. Thread the screws provided into the corresponding holes, and apply the nuts on the opposite side. Don't fasten too tightly so as not to damage the 3D printed parts, and make sure the linear bearing has been refitted properly.

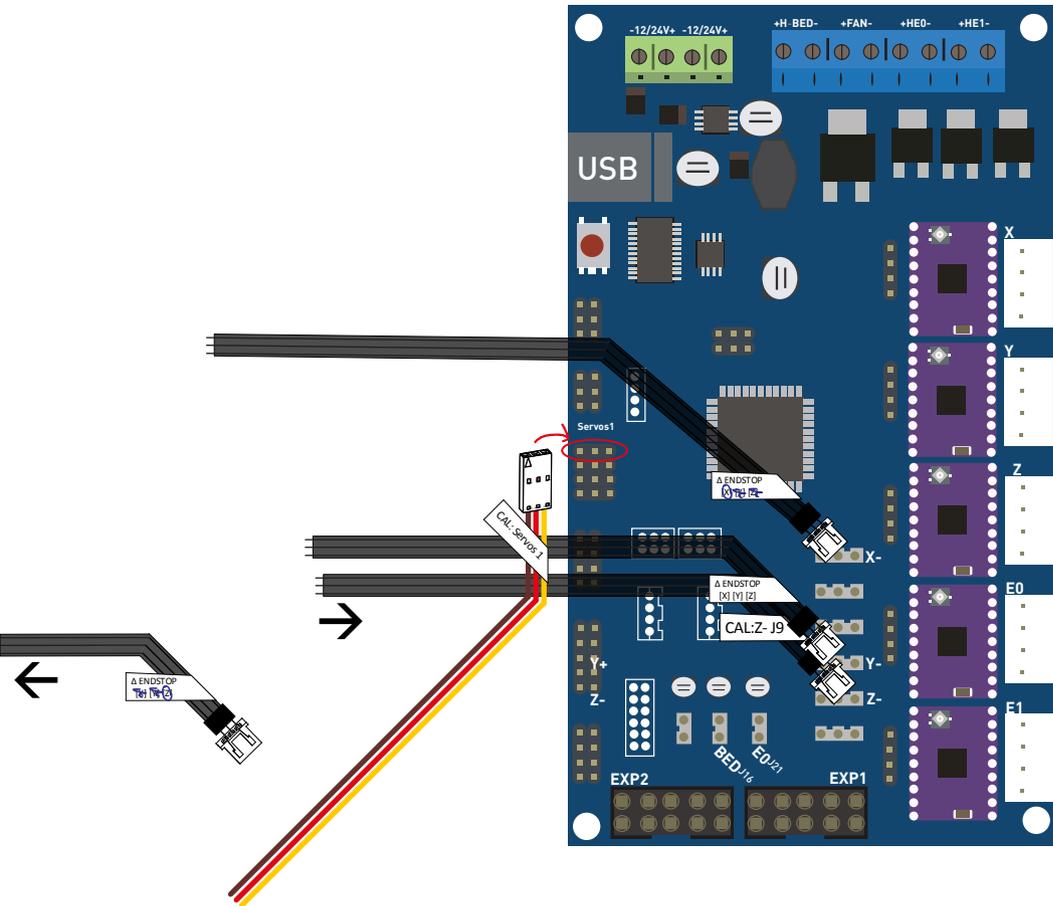
2.3



At this point, all you have to do is replace the parts you may have removed earlier for easier access. It's just a matter of going through the same steps in the reverse order.

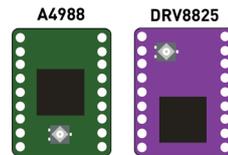
2.4

Don't forget to plug in the wires coming from the new end-stop. One simply replaces the old Z-end-stop wire on the motherboard, as you see below. The other slots into where it says "Servos1". Take careful note: the brown wire is to the left.



NOTE:

If you want to replace your DVR8825 drivers with A4988 drivers, please pay attention to their correct position.



After this, you can remove the old Z-axis end-stop and the corresponding cable. You can tidy the new cables by fitting them into the existing cable casing.

3. UPGRADE FIRMWARE

Before you try out your new upgrade, you will need to upload the most recent firmware. First, go to the links below to download Arduino version 1.8.5 and the latest helloBEEprusa firmware available.

Arduino - <https://www.arduino.cc/en/Main/Software>

Firmware - <https://github.com/beeverycreative/Marlin-BEEVERYCREATIVE.git>

helloBEEprusa Marlin fork

The screenshot shows the GitHub interface for the 'helloBEEprusa Marlin fork' repository. At the top, it displays repository statistics: 7,772 commits, 8 branches, 5 releases, 303 contributors, and GPL-3.0 license. Below this, there are buttons for 'Branch: 1.1.x', 'New pull request', 'Find file', and 'Clone or download'. A dropdown menu is open for 'Clone or download', showing options to 'Clone with HTTPS' (with a URL: https://github.com/beeverycreative/Marlin-), 'Open in Desktop', and 'Download ZIP'. The main content area shows a list of files and folders with their descriptions and commit dates:

File/Folder	Description	Commit Date
Marlin	Bugfixes & filament change optimization	
buildroot	Simplify mfdoc, mfpub	
.gitattributes	Add hidden option to output Bilinear grids in JSON	9 months ago
.gitignore	Update .gitignore	7 months ago
.travis.yml	Shut down autotemp in disable_all_heaters	8 months ago
LICENSE	Update LICENSE	2 years ago
README.md	Link to users in README.md	8 months ago
platformio.ini	platformio.ini env_default=xxxx has to match one of the labels in th...	7 months ago

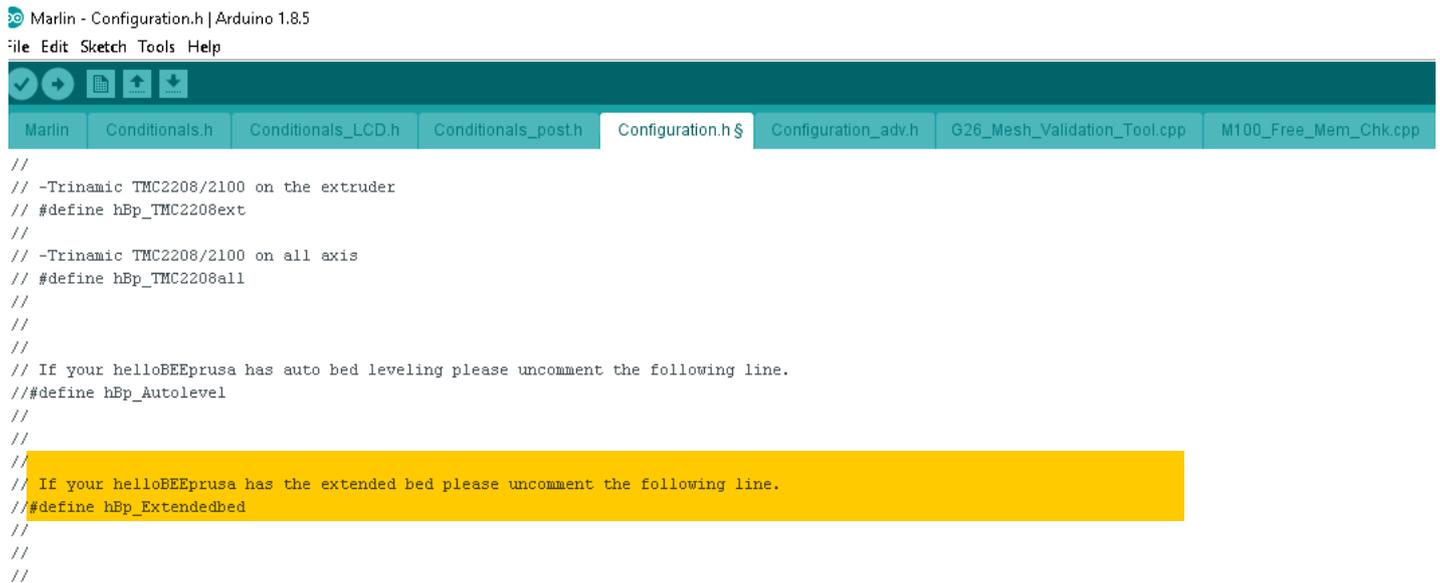
At the bottom, there is a button for 'README.md'.

Install Arduino.

With this done, unzip the contents of the Marlin folder.

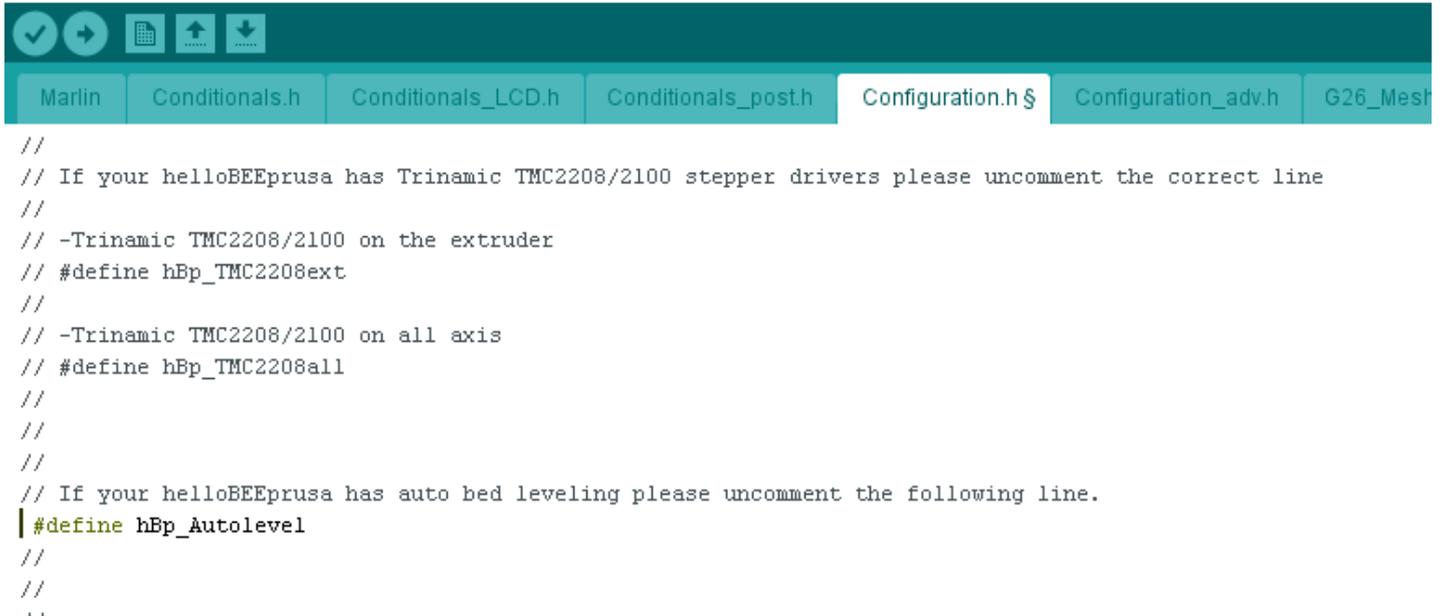
open the Marlin sub-folder, and double-click on **Marlin.ino**. You will need to edit a variable in the “Configuration.h” tab.

Find the line shown here. You can press Ctrl+F to search if you prefer.



```
Marlin - Configuration.h | Arduino 1.8.5
File Edit Sketch Tools Help
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h$ Configuration_adv.h G26_Mesh_Validation_Tool.cpp M100_Free_Mem_Chk.cpp
//
// -Trinamic TMC2208/2100 on the extruder
// #define hBp_TMC2208ext
//
// -Trinamic TMC2208/2100 on all axis
// #define hBp_TMC2208all
//
//
//
// If your helloBEEprusa has auto bed leveling please uncomment the following line.
// #define hBp_Autolevel
//
//
//
// If your helloBEEprusa has the extended bed please uncomment the following line.
// #define hBp_Extendedbed
//
//
//
```

Erase the two forward strokes and the line should change colour.



```
//  
// If your helloBEEprusa has Trinamic TMC2208/2100 stepper drivers please uncomment the correct line  
//  
// -Trinamic TMC2208/2100 on the extruder  
// #define hBp_TMC2208ext  
//  
// -Trinamic TMC2208/2100 on all axis  
// #define hBp_TMC2208all  
//  
//  
//  
// If your helloBEEprusa has auto bed leveling please uncomment the following line.  
#define hBp_Autolevel  
//  
//  
..
```

Press save, and connect a USB cable from your computer to the helloBEEprusa's board. Select the correct board and corresponding COM port under "Tools". The board you want is "Arduino/Genuino Mega or Mega 2560". Then just press Upload and wait for the process to be over.

With the new firmware uploaded, go to Control→Restore failsafe on the LCD menu on your helloBEEprusa. Then, navigate upwards to Store Memory and click on it too.



4. CALIBRATE NOZZLE HEIGHT

Before printing, you will need to calibrate the nozzle height.

Just navigate to Set nozzle height→Calibrate and use a piece of paper to check the clearance between the nozzle and the build surface.

```
Print From SD >
Change Filament >
Level bed >
>Set nozzle height >
```

```
Nozzle height
Main *
>Calibrate >
Reset >
```

Rotate the switch from one side to the other to adjust the nozzle height. The paper should be neither too loose nor too tight. When you're happy with the clearance, press to save as prompted.

```
Nozzle height
Main *
Calibrate >
>Reset >
```

If you want to readjust the clearance, first reset the Z height as you see here, then just repeat these previous steps.

```
-- START GCODE --
G21 ;set units to millimetres
G90 ;set to absolute positioning
M107 ;set fan speed to zero (turned off)
G28 X0 Y0 ;move to the X/Y origin (Home)
G28 Z0 ;move to the Z origin (Home)
G29 ;execute auto calibration
G92 E0 ;zero the extruded length
M420 S1 ;enable bed leveling
-- end of START GCODE --
```

To finish, go to your slicer software (Cura, Slic3r, Simplify 3D, or other) and change your START GCODE. Just copy and paste this START GCODE.

That's it! You can auto-calibrate straight away by going to "Level Bed" on the LCD menu, or you can simply 3D print something and your helloBEEprusa will calibrate automatically before printing. To skip automatic calibration before each print, just go to your START GCODE and delete the line that starts with G29.



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