
ADVi3++ User Manual - version 3.0

SEBASTIEN ANDRIVET

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ADVi3++ User Manual

Version 3.0 - May 25, 2018



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Introduction

ADVi3++ is a custom firmware for **Wanhao** Duplicator i3+ printers (and their clones like the Monoprice Select Plus). It is based on the latest stable release of Marlin and adds some new specific features. It has the following features when compared to the stock Wanhao firmwares:

- Based on **Marlin 1.1.8** (stock Wanhao firmwares are based on Marlin 1.1.4)
- New redesigned LCD screens
- Access on the LCD display to more printer parameters like Feedrate, Acceleration and Jerk settings
- Tuning of the X, Y, and Z motors as well as the extruder motor
- Temperature graphs
- 3 preheat presets
- 5 points manual bed leveling
- BLTouch support with automatic bed leveling
- Display of messages (M117 code) from external software such as OctoPrint (Detailed progress plugin for example)
- Advanced Pause (M600 support)
- An up to date User Manual

Compatibility

Currently, **ADVi3++** is only compatible with the Wanhao Duplicator i3 Plus version 1 printer and its clones. Version 2 (aka Wanhao Duplicator i3 Plus **Mark II**) will be supported in a future release.

ADVi3++ is not compatible with printers that do not have a similar LCD panel (DGUS DWIN), i.e. it is not compatible with previous versions of Duplicator i3, i3 Mini, etc.

Source Code

The full source code of **ADVi3++** is available in the following GitHub repositories:

- ADVi3pp-Marlin
- ADVi3pp-LCD
- ADVi3pp-User-Manual

Disclaimers

I am not affiliated, associated, authorized, endorsed by, or in any way officially connected with **Wanaho**, or any of its subsidiaries or its affiliates.

USE THIS CUSTOM FIRMWARE AT YOUR OWN RISK. I am not responsible for any damage done to your printer or LCD when using this firmware.

Be also aware that installing a third-party firmware like **ADVi3++** will probably **void** your **warranty** depending of your country.

Copyrights

ADVi3++

- Copyright © 2017-2018 Sebastien Andrivet GitHub ADVi3pp-Marlin project
- Copyright © 2016-2018 MarlinFirmware
- Based on Sprinter and grbl.
- Copyright © 2011 Camiel Gubbels / Erik van der Zalm

ADVi3++ User Manual

- Copyright © 2018 Sebastien Andrivet

Thanks

Thanks to Dylan xKoldx and weidercs for their forks supporting BLTouch. Thanks to Matt Cowell SureshotM6 for the fork supporting M600 and head parking.

Thanks you to Leo Lüker (Silverquark) for his i3plus+ project. I take many ideas from his code. But the project is no more active and I do not like the screens (personal taste) so I have created the **ADVi3++** fork. It is technically a fork of Marlin, not of i3plus+.

Thanks to MarlinTeam for their great work.

Licenses

ADVi3++



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ADVi3++ User Manual

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How to Flash

There are two parts to flash:

- The **LCD resources**
- The **mainboard** (custom Marlin firmware)

IMPORTANT: Do not mix different versions. Both the LCD and the mainboard must have the exact same version.

Part 1 - Flashing the LCD resources

IMPORTANT: When you flash **ADVi3++** LCD for the first time, you will not see the new screens until you flash the Mainboard part.

LCD Step 1 - Prepare a microSD card

IMPORTANT: You **have to** use a microSD card with a maximum capacity of **8GiB**. If you use a microSD card with a greater capacity, the results are **unreliable** (sometimes it flashes, sometimes not, who knows what may happen). This is a limitation of the LCD panel itself.

You have two possibilities to flash:

LCD Step 1 - Option 1 - Manual copy

- Download the LCD resources: ADVi3pp-LCD-x.x.x.zip
- Unzip the file somewhere
- Manually copy all the files and folders from the uncompressed zip file to the root of a microSD card. The microSD card **must** be formatted with the following parameters:
 - FAT32
 - 4096 bytes per cluster (i.e. 8 sectors).
- To format under Linux (and macOS with the `dosfstools` Homebrew package):

```
1 mkfs.fat -F 32 -n SD -s 8 -v /dev/disk2
```

Note: Be sure to replace `/dev/disk2` with the correct value.

- To format under Windows (Command Prompt):

```
1 format G: /FS:FAT32 /V:LCD /A:4096
```

Note: Be sure to replace *G* with the correct volume letter.

LCD Step 1 - Option 2 - SD image

- Download the microSD card image: ADVi3pp-LCD-x.x.x.img.zip
- Unzip the *.img.zip* file and use either *dd* (Linux, macOS) or Etcher (Windows, Linux, macOS).
For example with *dd*:

```
1 unzip ADVi3pp-LCD-1.0.0.img.zip
2 sudo dd if=ADVi3pp-LCD-1.0.0.img of=/dev/disk2 bs=64K
```

Note: Be sure to replace */dev/disk2* with the correct value.

If you prefer graphical applications, Etcher is a great multi-platform tool.

LCD Step 2 - Install the new version

- Disconnect the printer from power
- Remove the two screws located on the front and loosen the two M3 grub screws on top of the linear rod holders



Figure 1: front-panel-screws

- Remove the front panel carefully (don't break the flat cable)
- If you are lucky, you can insert the microSD card on the left of the panel (this is the case on the Monoprice clone)
- Otherwise, remove the four M3 screws and remove the cover
- Insert the microSD card in the slot

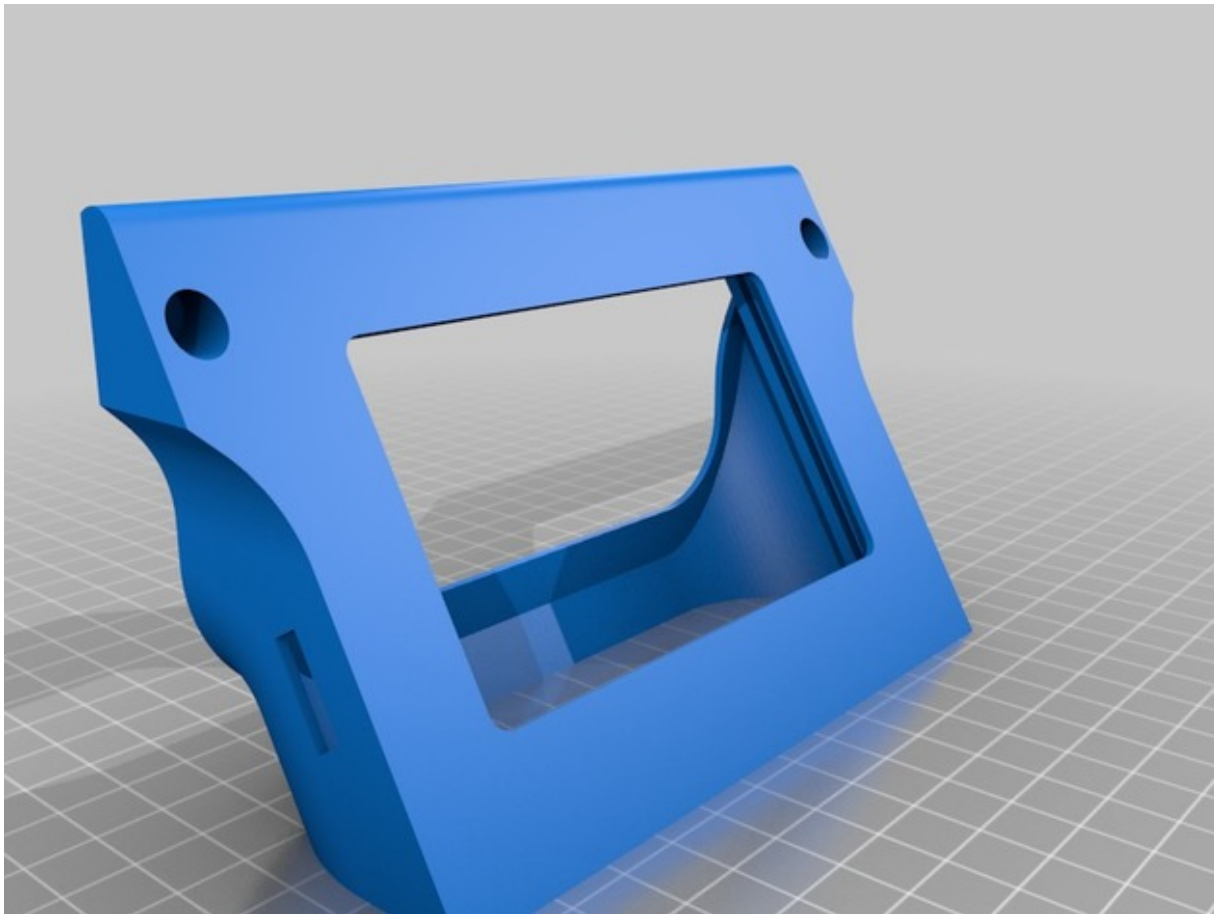


Figure 2: lcd-board-microsd

Note: You're LCD panel board may look slightly different as Wanhao uses different models depending on the phase of the moon.

- Turn on the printer; either by connecting it to power or by connecting the USB slot to the computer
- The screen will turn blue for a while, then every image will appear one by one
- After about 2 or 3 minutes, no more images will appear
- Turn off the printer and remove the microSD card
- Re-assemble the front panel. Do not forget the two M3 grub screws on top of the linear rod holders
- Turn the printer on. If you are flashing **ADVi3++** for the first time, the new screens will not appear until you flash the Mainboard part

LCD Enclosures

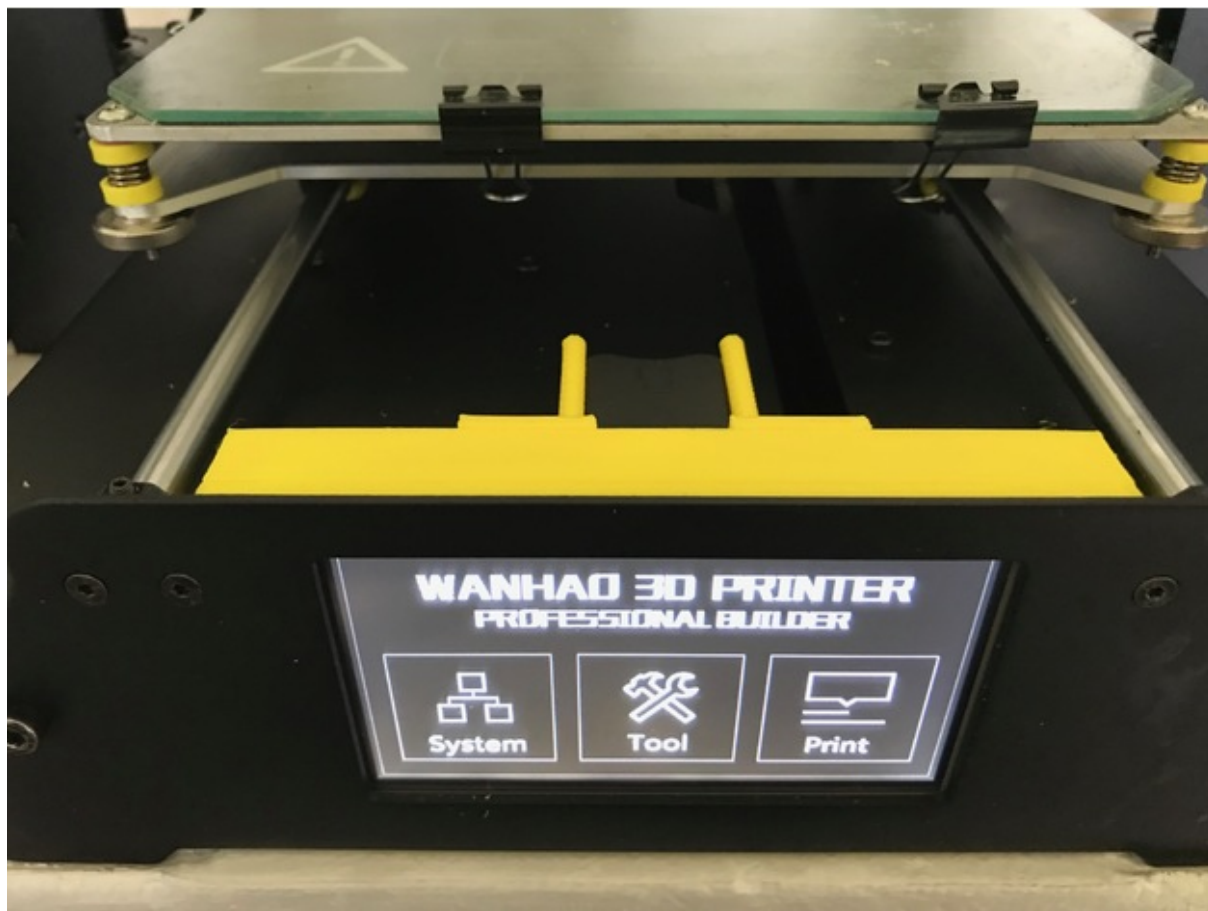


Available on Thingiverse “Wanhao Duplicator I3 Plus LCD enclosure” by bosbessenbasje:

The standard enclosure puts the LCD in a 90 degrees angle towards the table and that makes it hard to read. This enclosure will put the LCD in 60 degrees angle which improves readability at the cost of a slightly large space on the table.

Note that the new enclosure allows you to insert a **micro SD in the LCD to upgrade the LCD firmware** if you want to. You will probably need some pliers to do it though.

Another great enclosure is the following:



also available from Thingiverse “LCD Holder with Micro SD card tray” from April1.

I highly recommend these LCD enclosures. They simplify future flashing.

Part 2 - Flashing the mainboard firmware

There are several ways to flash the mainboard firmware. The first step is to download the firmware from the **Releases** page on GitHub:

ADVi3pp-Mainboard-x.x.x.hex

Then choose the option you are the most comfortable with.

Note: *It is not possible to flash the mainboard using the SD card slot of the printer.*

Mainboard Option 1 - Flashing using Cura

- if not yet done, download Cura. I recommend either:

- Cura for Wanhao if you directly connect the printer to your computer with a USB cable
- Ultimaker Cura 3 if, for example, you are using OctoPrint to print
- Start **Cura**
- In the top menu, under **Settings** → **Printer**, select **Manage Printers**
- Select your printer or **Add** your printer if it is not already done
- Select **Upgrade Firmware** and then **Upload custom Firmware**
- Select the downloaded file `ADVi3pp-Mainboard-x.x.x.hex` and click on **Open**

Mainboard Option 2 - Flashing using OctoPrint

You need `avrdude` and the **Firmware Updater** plugin.

To install `avrdude` on a Raspberry Pi:

- Connect to the Raspberry (for example through SSH) and enter the command:

```
1 sudo apt update; sudo apt install avrdude
```

To install the **Firmware Updater** plugin

- Open a navigator and connect to **OctoPrint**
- **Login** and click on the wrench icon in the toolbar
- Select **Plugin Manager** → **Get More...**
- In the **Search** box, enter **Updater**
- Click on **Install** in front of **Firmware Updater**
- Restart **OctoPrint**

To flash the firmware:

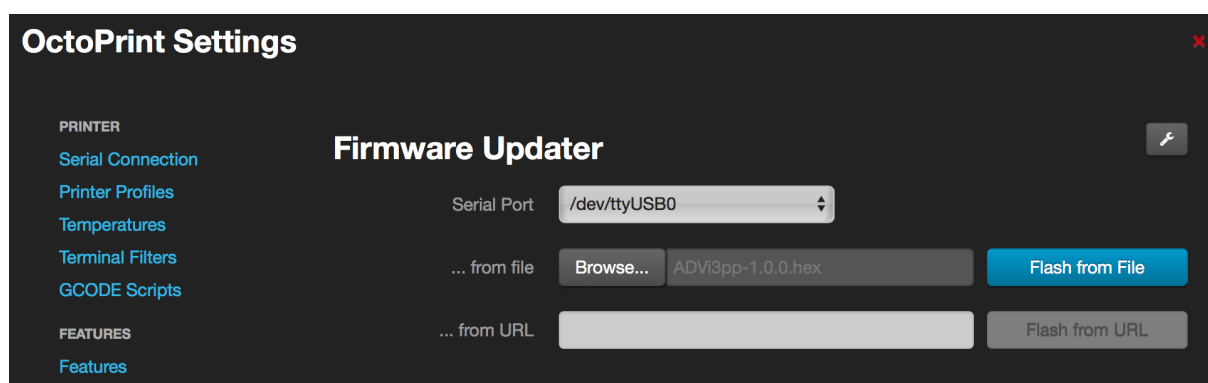
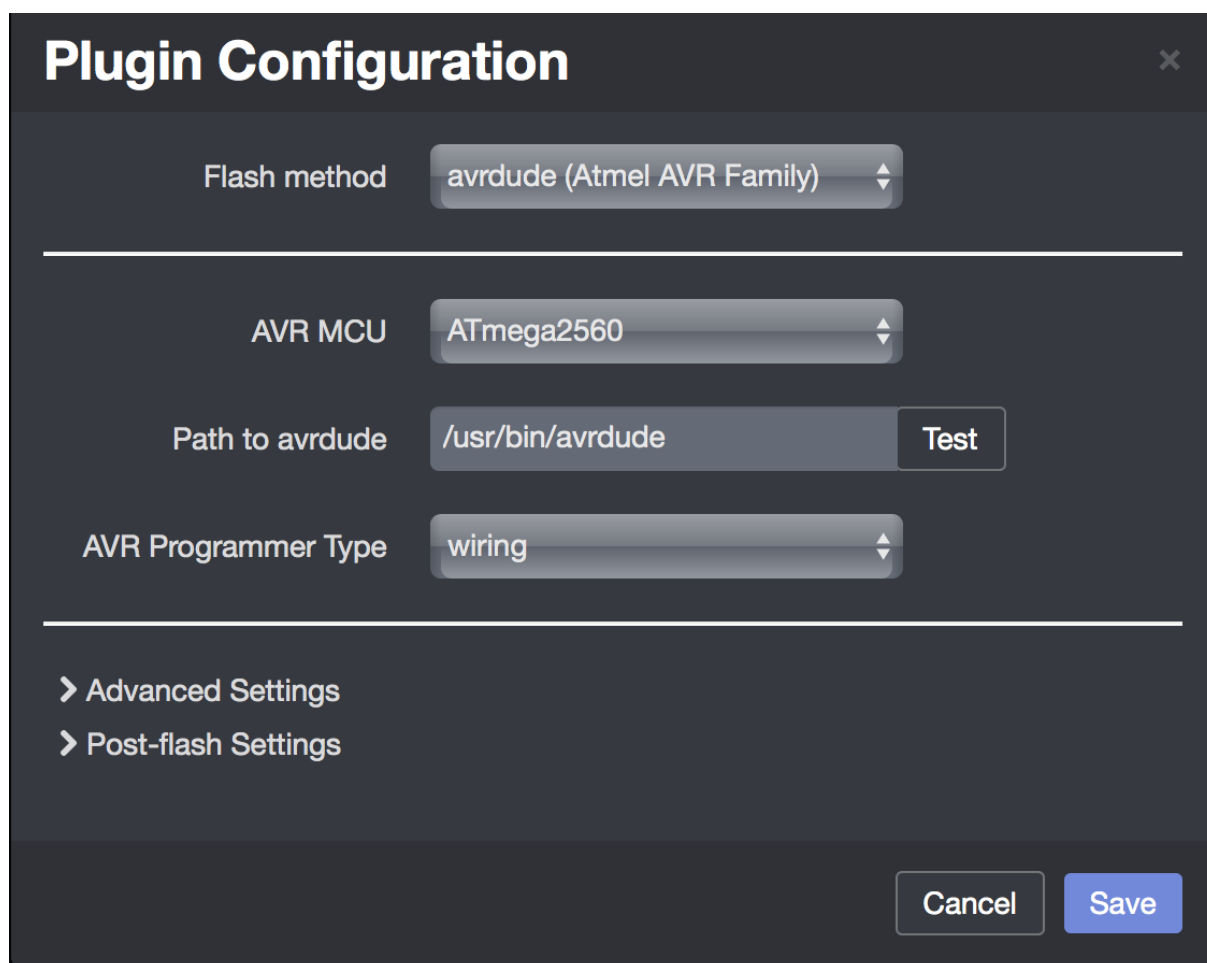


Figure 3: *firmwareupdater*

- When **OctoPrint** is rebooted and the UI reloaded, click on the wrench icon in the toolbar

- Under **Plugins**, choose **Firmware Updater**
- Click on the wrench icon, and enter the following parameters:
 - **Flash method:** avrdude
 - **AVR MCU:** ATmega2560
 - **Path to avrdude:** `/usr/bin/avrdude`
 - **AVR Programmer Type:** wiring



The screenshot shows a 'Plugin Configuration' dialog box with a dark background. It contains four configuration rows, each with a label on the left and a dropdown menu on the right. The first row is 'Flash method' with 'avrdude (Atmel AVR Family)' selected. The second row is 'AVR MCU' with 'ATmega2560' selected. The third row is 'Path to avrdude' with '/usr/bin/avrdude' entered, and a 'Test' button is to its right. The fourth row is 'AVR Programmer Type' with 'wiring' selected. Below these rows are two expandable sections: '> Advanced Settings' and '> Post-flash Settings'. At the bottom right are 'Cancel' and 'Save' buttons.

Plugin Configuration

Flash method: avrdude (Atmel AVR Family)

AVR MCU: ATmega2560

Path to avrdude: /usr/bin/avrdude **Test**

AVR Programmer Type: wiring

> Advanced Settings

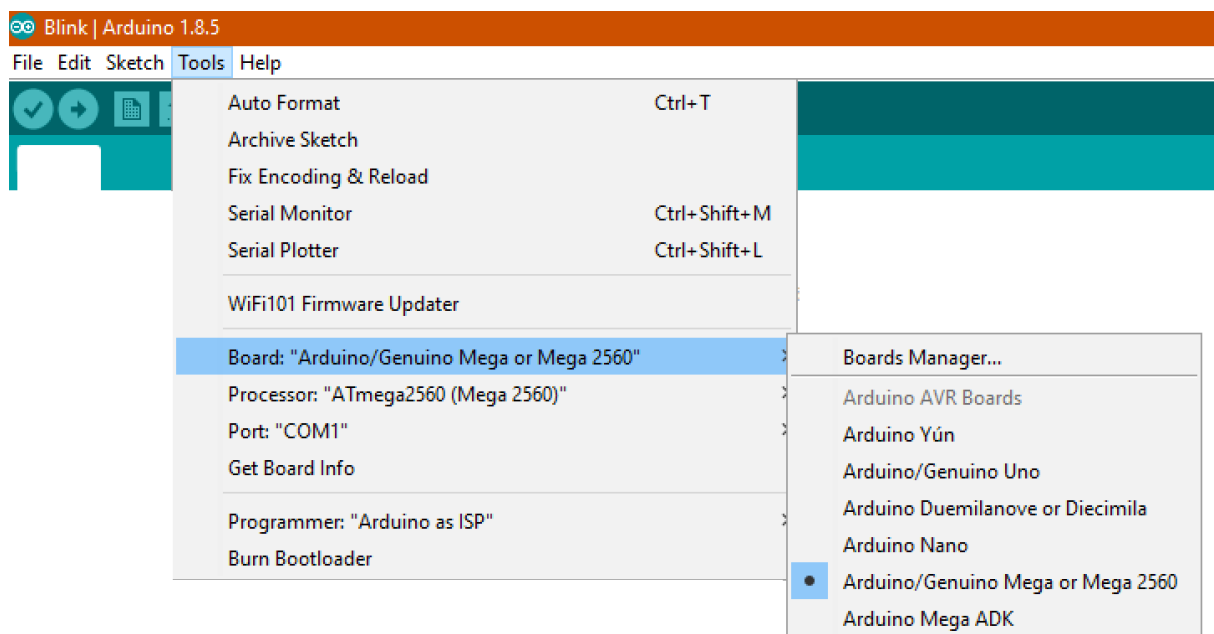
> Post-flash Settings

Cancel **Save**

- Click **Save**
- Be sure your USB port appears after **Serial Port**
- After ... **from file**, click on **Browse** and select the firmware you have downloaded such as `ADVi3pp-Mainboard-x.x.x.hex`
- Click on **Flash from File**
- The flashing process may take around 30 seconds
- When it is finished, a message appears saying **Flashing successful**. Click on **Save**
- Reconnect the printer

Mainboard Option 3 - Flashing using Arduino IDE

- Connect your printer to your PC using the USB cable
- Download Arduino IDE
- Open Arduino IDE
- Under **Tools** → **Board**, select **Arduino/Genuino Mega or Mega 2560**
- Under **Tools** → **Processor**, select **ATmega2560 (Mega 2560)**
- Under **Tools** → **Port**, select the port your printer uses



- Under **File** → **Open**, select `Marlin.ino` located in the **Marlin** folder
- Click on the **Upload** button, on press `Ctrl + U`

The firmware is compiled and uploaded. When the uploading is finished, the printer reboots.

Mainboard Option 4 - Flashing using avrdude

All the previous options are using `avrdude` underneath. `avrdude` is an utility to download/upload/-manipulate the ROM and EEPROM contents of AVR microcontrollers. It can be downloaded from your favorite repository or from Savannah Non-GNU web site.

- For Debian/Ubuntu:

```
1 sudo apt install avrdude
```

- For macOS (Homebrew):

```
1 brew install avrdude
```

- For Windows, download `avrdude-6.3-mingw32.zip` or a higher version.

The command line is the following:

```
1 avrdude -v -p m2560 -c wiring -P <printer_port> -U flash:w:<firmware.
  hex>:i -D
```

Replace `<printer_port>` and `<firmware.hex>` with the right values. For example (Windows):

```
1 avrdude -v -p m2560 -c wiring -P COM3 -U flash:w:ADVi3pp-Mainboard
  -2.0.0.hex:i -D
```

or (Linux):

```
1 avrdude -v -p m2560 -c wiring -P /dev/ttyUSB0 -U flash:w:ADVi3pp-
  Mainboard-2.0.0.hex:i -D
```

Troubleshooting

The LCD part does not flash properly

Be sure to use a 8 GiB microSD and not with a higher capacity. The LCD panel is not able to read reliably high capacity cards.

The LCD panel behave strangely: When you press somewhere, it activates an element at a different place

You probably enter calibration mode. There are two ways to solve this:

- Press the screen very rapidly 20 times
- Create a `CONFIG.TXT` file in the root of a microSD card with the following content:

After reassembly, the LCD displays nothing

Be sure the flat cable between the LCD and the mainboard is properly inserted in its connectors. This cable and the connectors are very fragile.

The cable is a standard flat flexible (FFC) jumper cable, 1.0 mm pitch, 10 way. You can buy some from a local reseller. For example from RS-Online, manufactured by Würth Elektronik.

When trying to flash the motherboard, the computer does not see the printer

The most common reasons are the following:

- **Wrong baudrate.** Your computer may have selected a wrong baudrate such as 9600. The default baudrate for this printer is 115200
- **Missing USB driver.** Most of the time, the operating system installs the right USB driver for the printer. But sometimes, the installation fails. The i3 Plus printer uses a cheap USB-to-Serial bridge WCH CH340G. The driver can be downloaded from the web site of the manufacturer (in Chinese). The file to download is CH341SER.EXE for Windows and CH341SER_MAC.ZIP for macOS.
- **Bad USB cable.** Try to use another, shorter, USB cable

LCD Touch Screen

Main panel

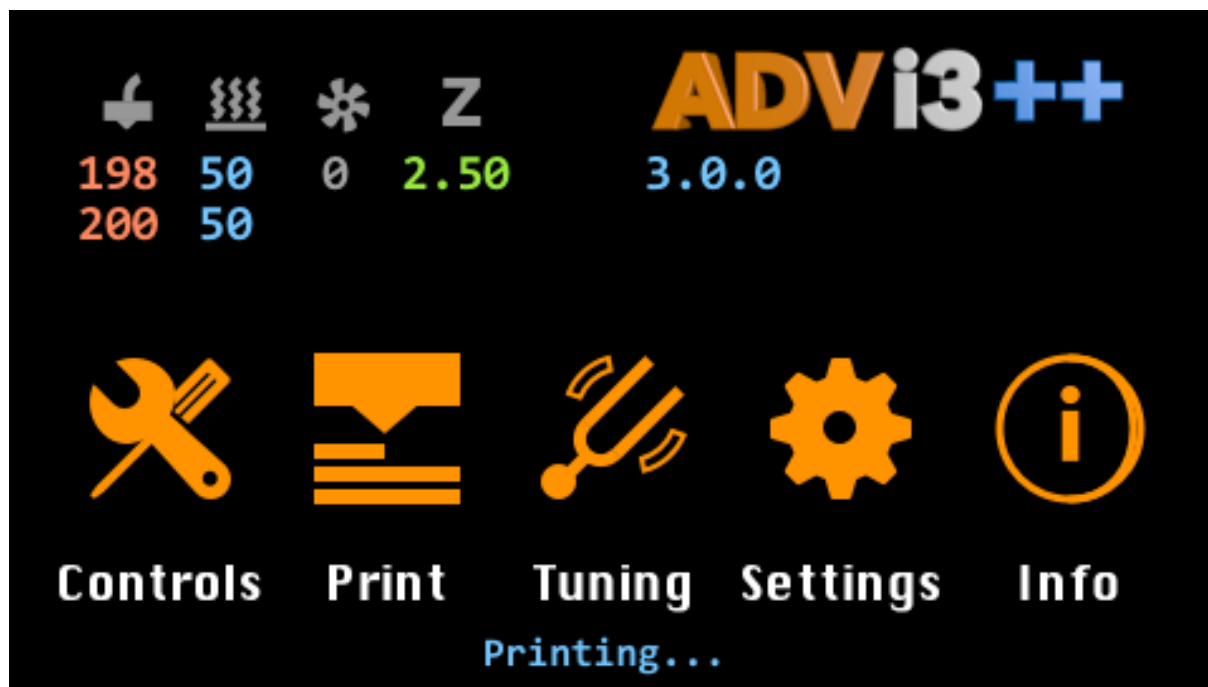


Figure 4: Main

- **Temperatures:** Displays the current temperature of the extruder (red) and of the bed (blue). Displays also the current speed of the extruder's fan (gray) and the z-height in mm (green). Tap on this area to show a graph of temperatures.
- **Version:** Displays the version number of **ADVi3++**. Taps on this area to show an About panel with information about the release installed.
- **Controls:** Taps on this button to display the **Controls** panel with tools such as Load and Unload Filament, Move, etc.
- **Print:** Taps on this button to display the **Print** panel (if your are printing) or the Temperature graph (if you are not).
- **Tuning:** Taps on this button to display the **Tuning** panel with tools to help you adjust some parameters of your printer.
- **Settings:** Taps on this button to display the **Settings** panel. In this panel, you can view and modify several parameters of the printer.
- **Info:** Taps on this button to display the **Information** panel with access to information such as **Statistics**, **Versions** and **Copyrights**.

Controls

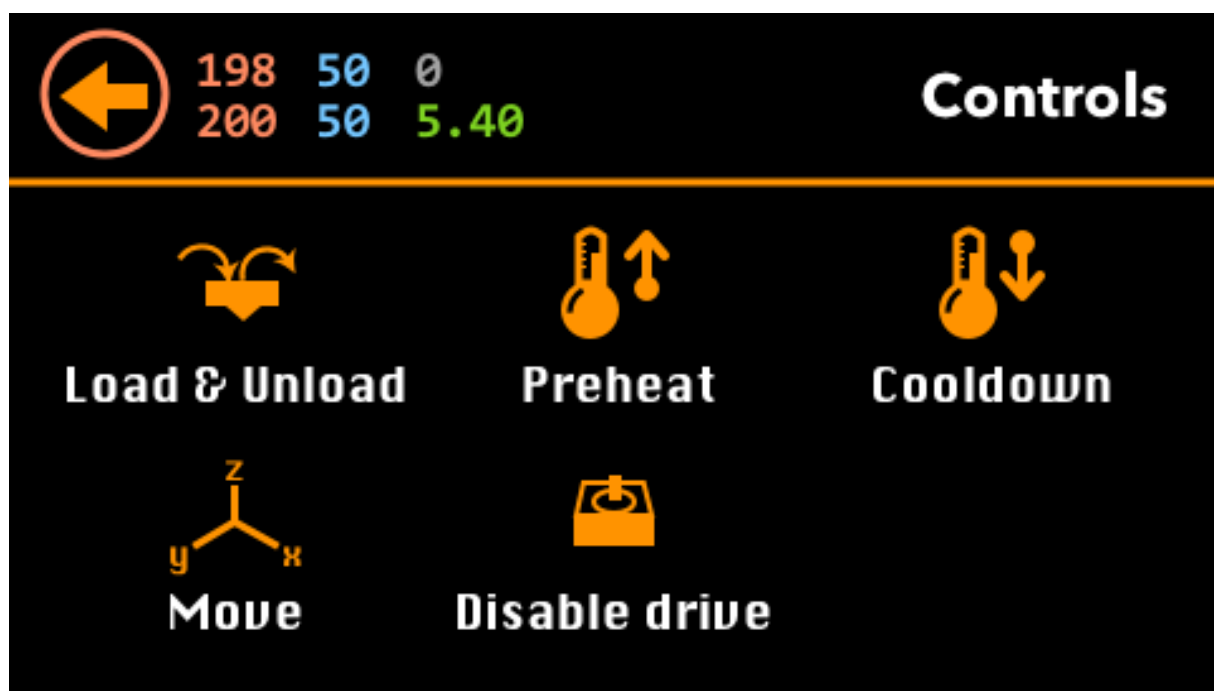


Figure 5: Controls

This panel gives you access to tools to control your printer.

- **Load & Unload:** Tools to Load or Unload Filament (see below).
- **Preheat:** Set of preheat settings (both Hot-end and Bed - see below).
- **Cooldown:** Disable both heated bed and Hot-end.
- **Move:** Tools to move the head of the printer, and to extrude or unextrude filament (see below).
- **Disable drive:** Disables all motors so you are able to move the head manually.

Load & Unload

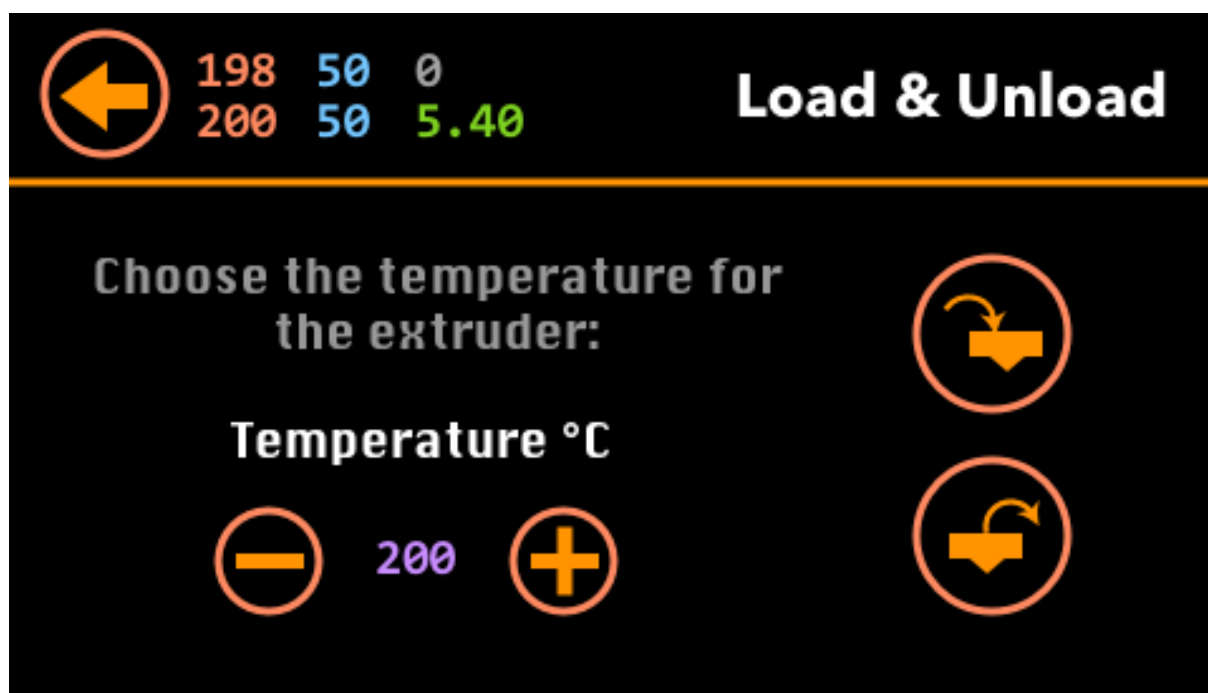


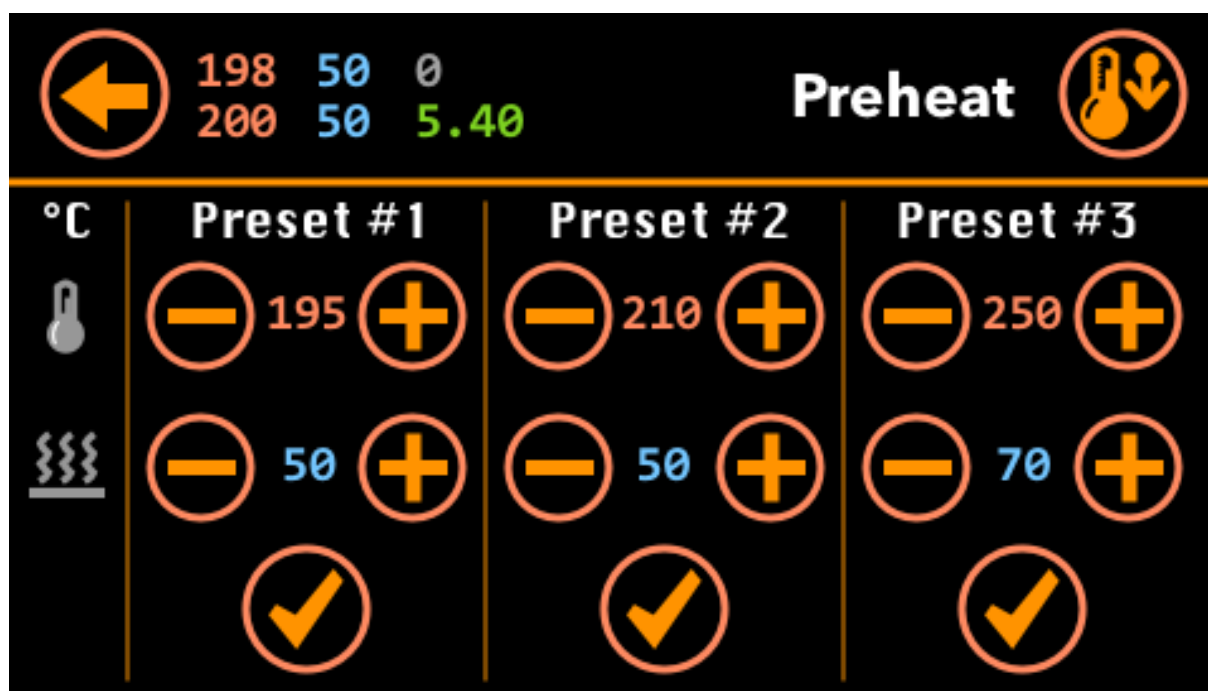
Figure 6: Load & Unload

Select the extruder's target temperature you want to use (with the plus and minus buttons) and press either the **Load** or **Unload** button.

Tip: Keep the button pressed to quickly increment or decrement the temperature.

When the target temperature is almost reached, the extruder motor starts extruding or extruding filament. When the filament comes out of, press the **Back** button.

Preheat

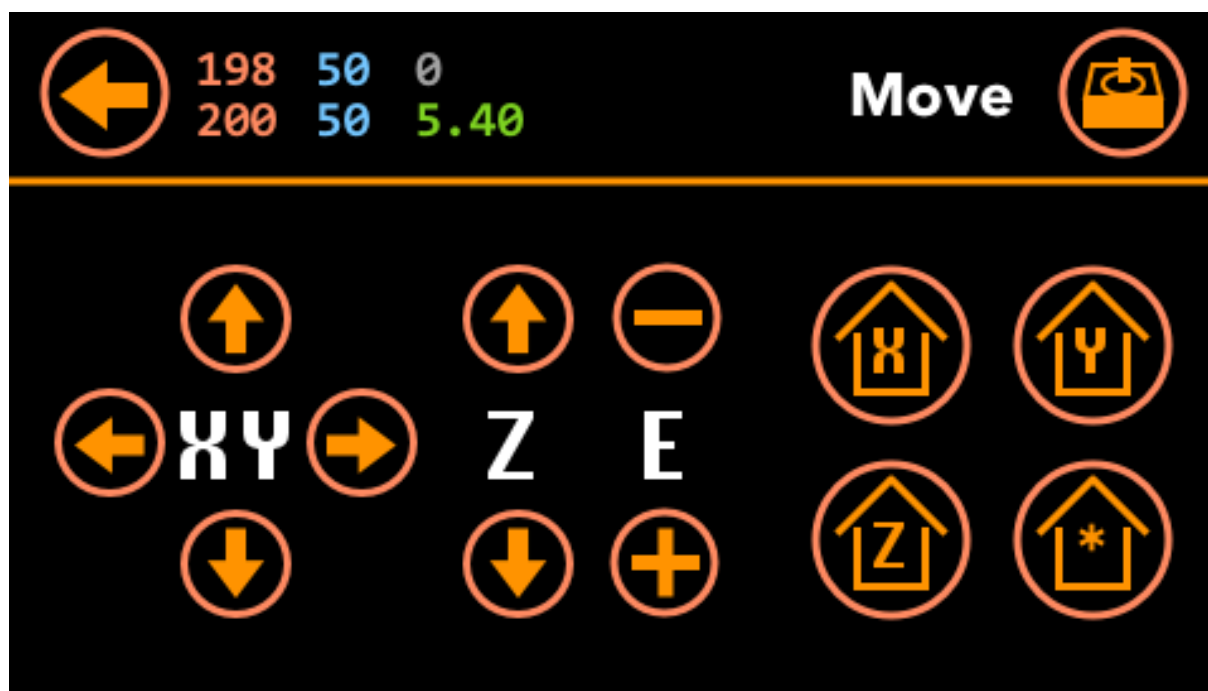


You have the choice of three presets (both bed and hot-end temperatures). You can adjust each value by pressing the plus and minus buttons. To start heating bed and hot-end, press one of the checkmark button. To stop heating, press the cooldown button on the top right corner.

Tip: Keep the button pressed to quickly increment or decrement a temperature.

Important: If you press the **Back** button, the printer continues to heat the bed and the hot-end. Press **Cooldown** on this screen or on the **Tools** screen to stop heating.

Move



- You can move the head (X & Z) and the bed (Y) by pressing the buttons with arrows.

Tip: Keep the button pressed to quickly move the head or the bed.

- Press the **E** + button to extrude some filament; press the **E** – button to un-extrude.

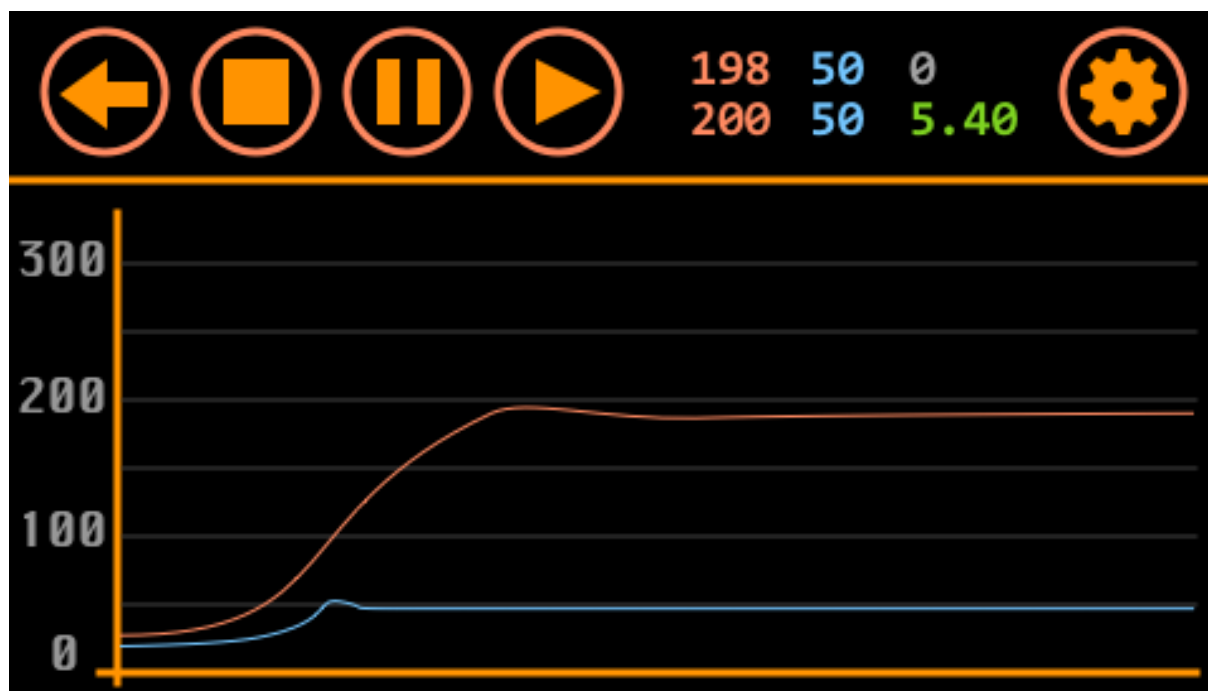
Important: The printer will extrude or un-extrude only if the temperature of the hot-end has reached a minimal value.

- Press a button with a house icon to home the head (X & Z) or the bed (Y). Press the button with the star (*) to return both bed and hot-end to their home positions.
- Press the button with the motor icon (top-right corner) to disable all motors so they are free to move by hand.

Print

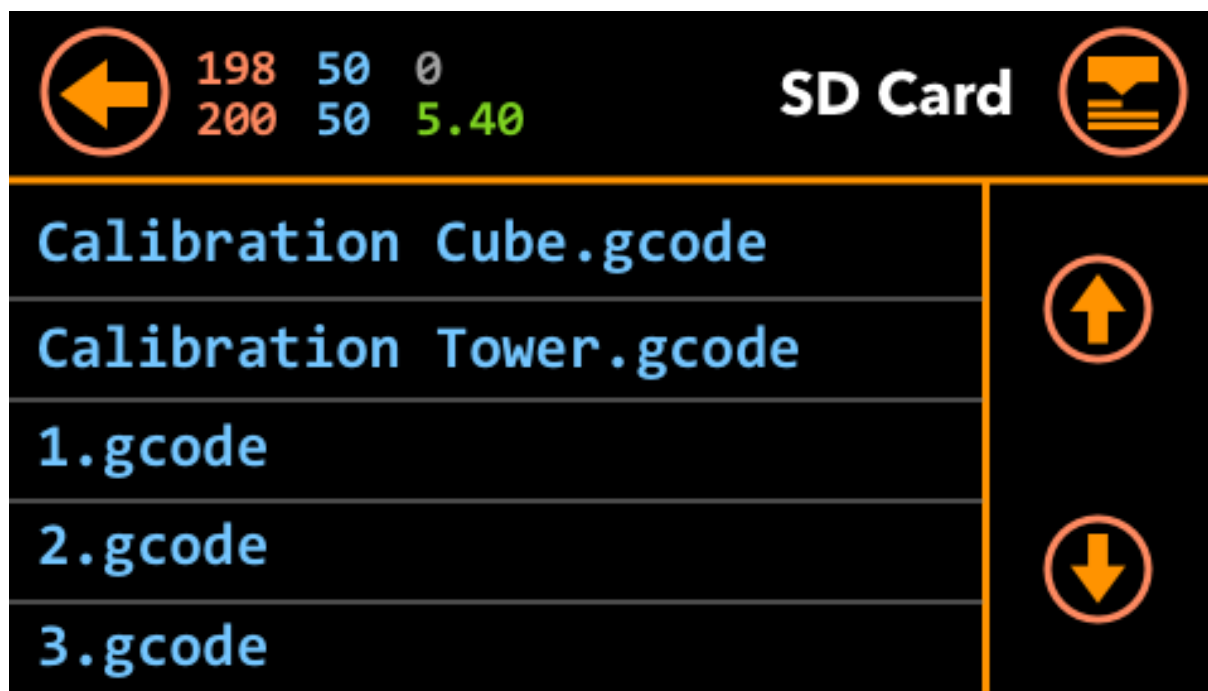
The exact screen displayed is dependent of the context (in this order):

- If you are printing from the SD card or through USB (i.e. from Cura, OctoPrint, ...), the **Print** screen is displayed (see above).
- If you are not printing and a SD card is inserted in the SD slot (and readable), the **SD Card** screen is displayed (see below).
- Otherwise, the **Temperature Graph** is displayed.

SD or USB PrintFigure 7: *Print*

The **Print** screen is displayed only when a print is running.

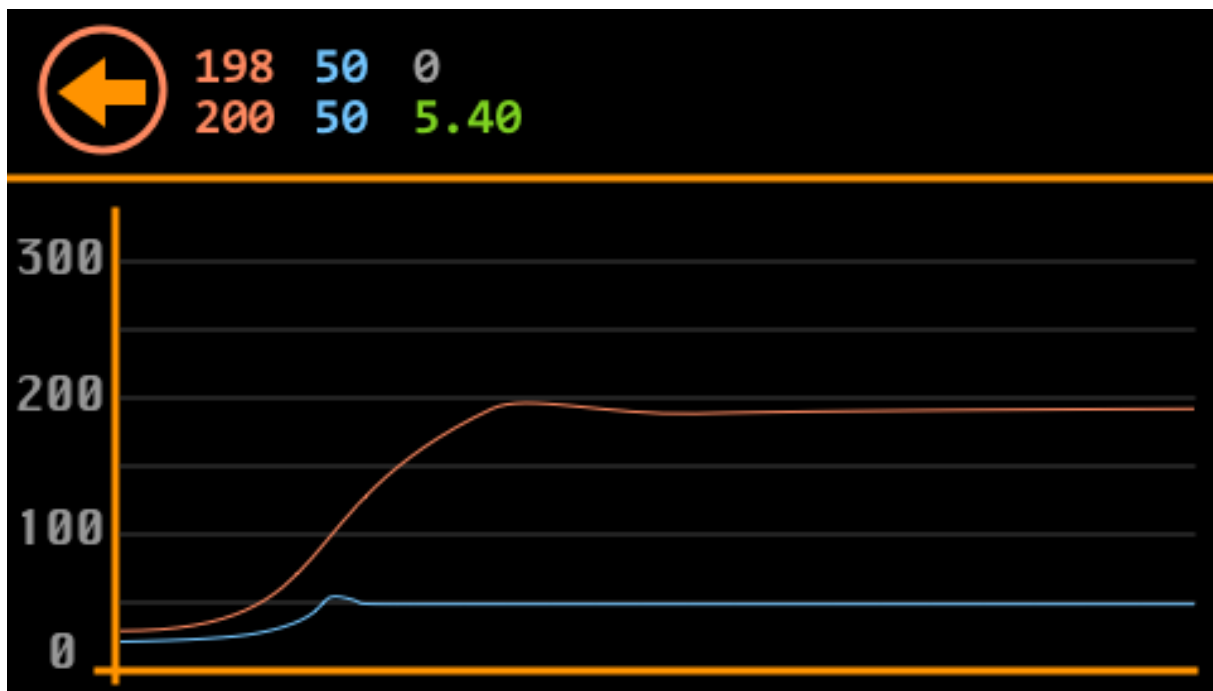
- It displays a graph of the temperatures (bed in blue, hot-end in red).
- **Stop**: Press the **Stop** button to stop the current printing. It also goes back to the previous screen. In case of a **USB Print**, it **disconnect the printer** as it is currently the only universal way to stop such print.
- **Pause**: Press the **Pause** button to temporary stop the printing.
- **Resume**: Press the **Resume** button to resume a paused printing.
- **Print Settings**: Press on the gear button to display and modify the **Print Settings** like the temperature, the fan speed, etc.
- **Back**: If you press the **Back** button, the printing continues and it goes back to the previous screen.

SD CardFigure 8: *SD Card*

The **SD Card** screen is displayed only when a SD card is inserted in the SD slot of the printer and is readable. It displays all the files in the root of the SD card.

- If there are more than 5 files, use the two arrow button to display the files page per page.
- To print a file, press its name. The **Print** is displayed and the printing starts.

Temperature



- The extruder graph and temperature are in **red**
- The bed graph and temperature and in **blue**
- The fan speed in in **gray**
- The z-axis position is in **green**

Print Settings

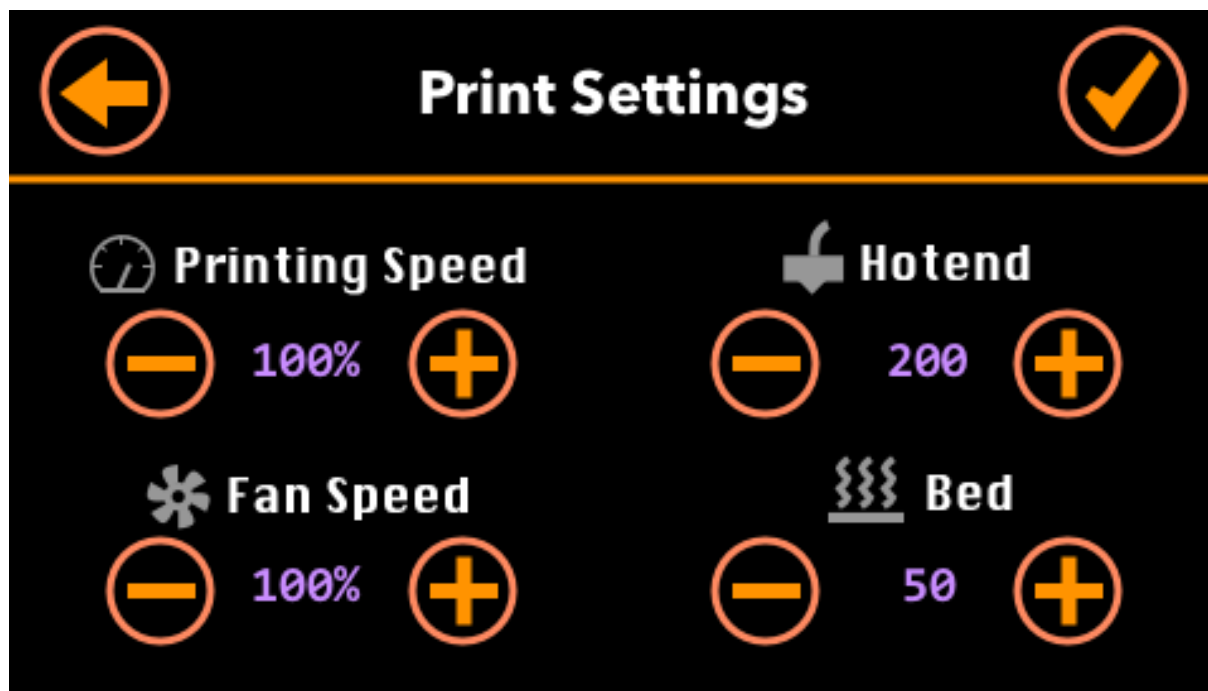
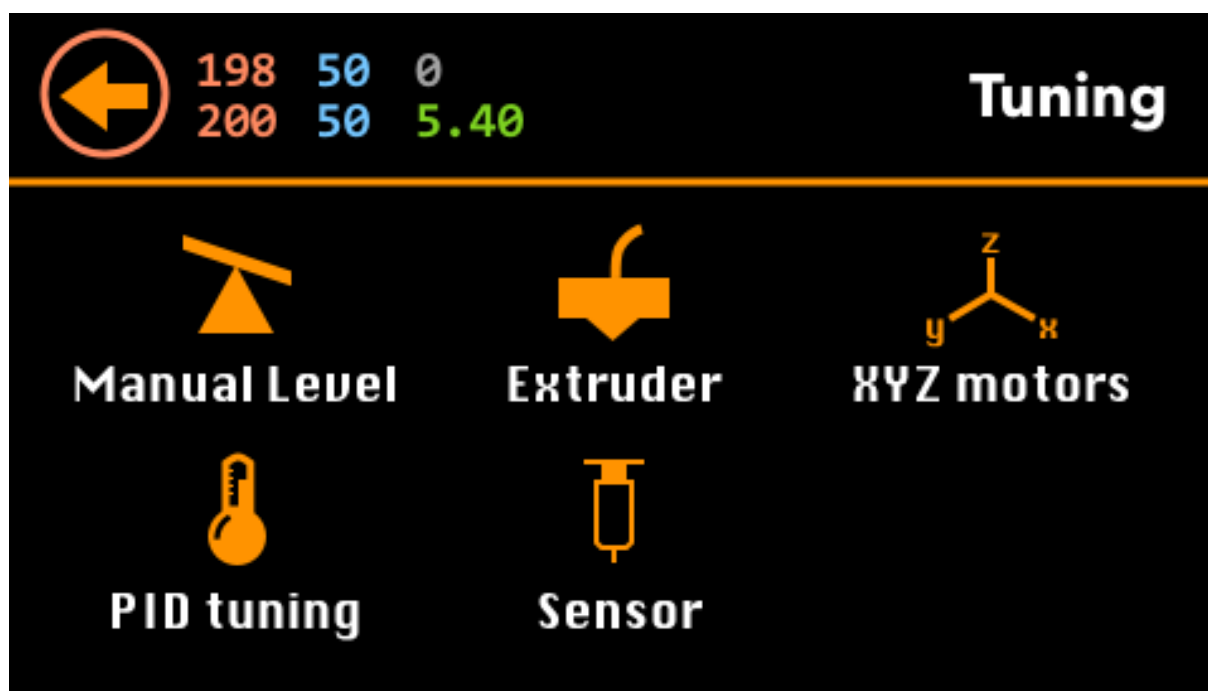


Figure 9: *print Settings*

In this screen, you can adjust print parameters during a print:

- **Printing Speed:** The motor speed multiplier. Speed of motors is multiplied by this rate.
- **Fan Speed:** The fan speed multiplier. Speed of the fan (in the front) is multiplied by this rate.
- **Hot-end:** Temperature of the hot-end.
- **Bed:** Temperature of the bed.

Tuning



This panel gives you access to tools to help you adjust some parameters of your printer.

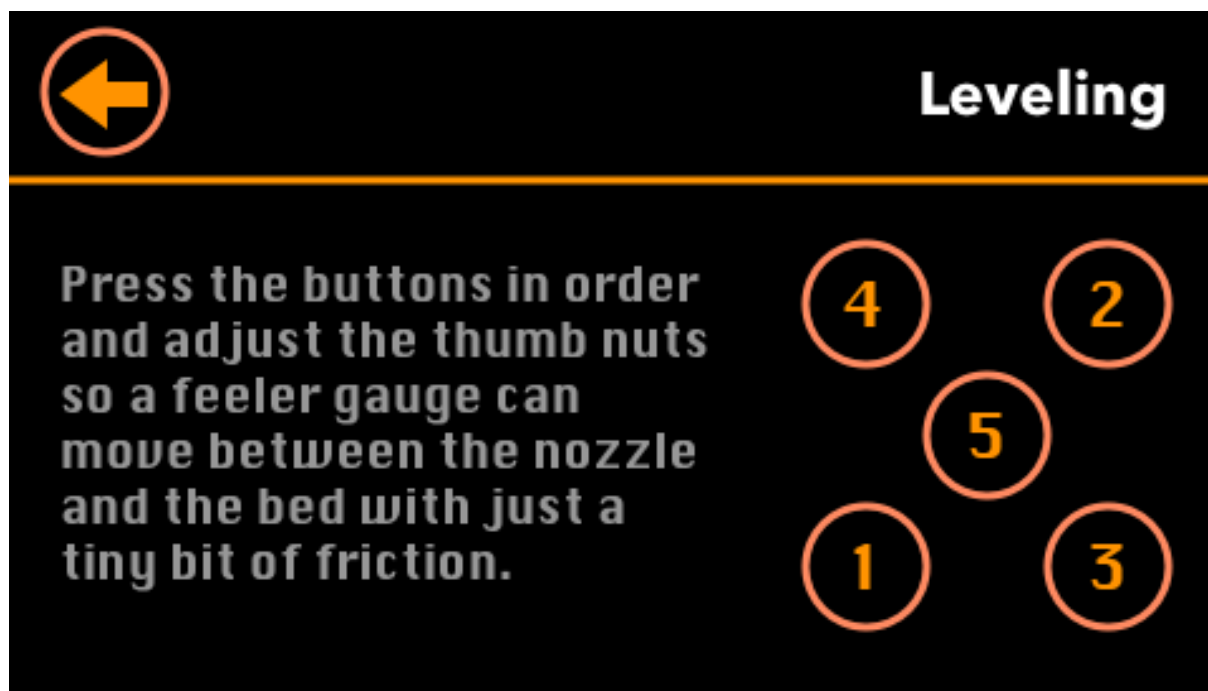
Important: Some parameters are directly derived from the mechanical parts of the printer. Unless you change these parts (like the stepper motors), there is no need to change them.

- **Manual Level:** Tool to help you level your bed manually.
- **Extruder:** Tool to help you adjust the number of steps per millimeter for the extruder motor.
- **XYZ motors:** Tool to help you adjust the number of steps per millimeter for X and Y motors.
- **PID tuning:** Tool to help you adjust the PID parameters (proportional-integral-derivative control algorithm).
- **Sensor:** Tools related to your sensor (if you have one), such as measuring Z-height and automatic bed leveling.

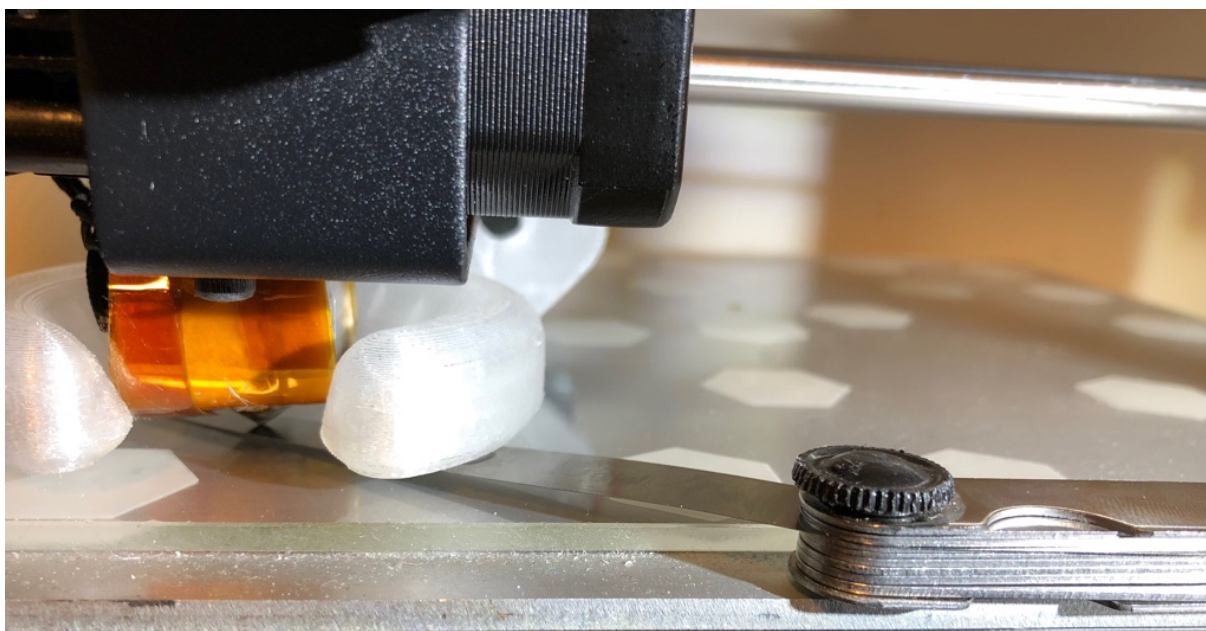
Manual Level

This tool helps you level your bed manually.

- First, the head and bed return to their home position.
- Then, press one of the button with a number to go to each position:



- Adjust each thumb nut so a feeler gauge (0.1 mm) can move between the nozzle and the bed with just a tiny bit of friction:



- If you do not have a feeler gauge, you can also use a sheet of paper but it is less accurate.
- Press the 5th button to check that your leveling is good. Press any of the other button to level again the corresponding corner.
- Once you are satisfied with the leveling, press the **Back** button.

Tip: A feeler gauge are cheap and you can buy one for a few dollars on Amazon, Banggood, etc. For example (randomly chosen items):



amazon.com

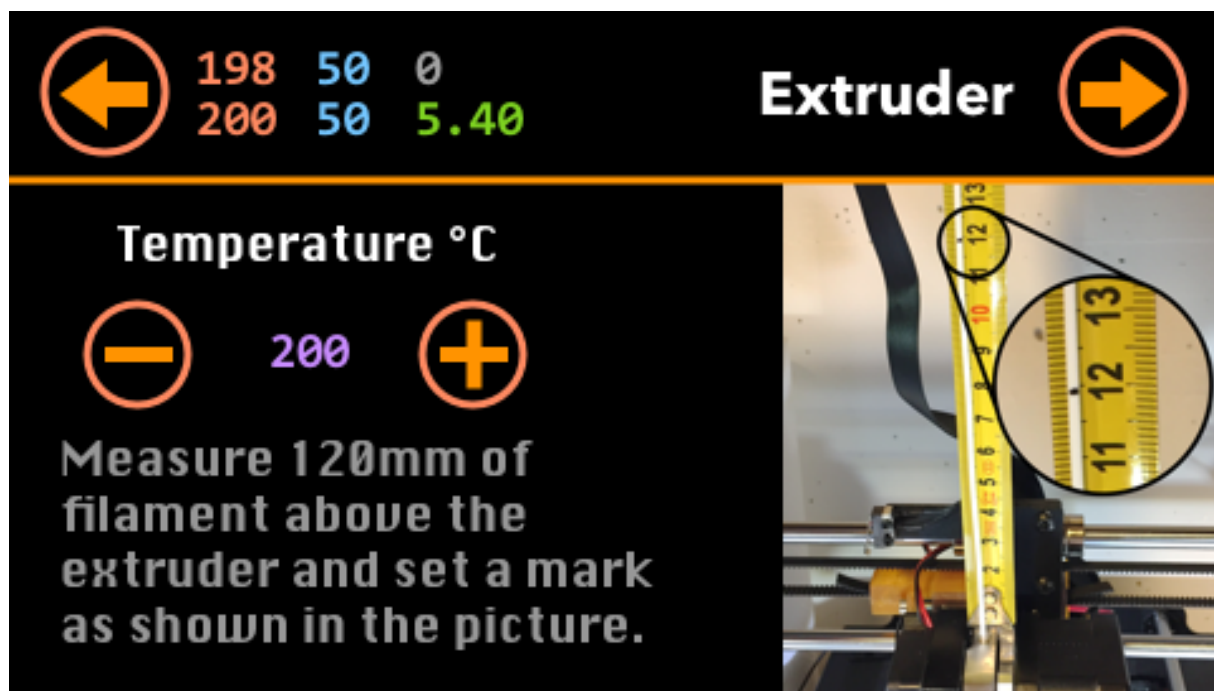


banggood.com

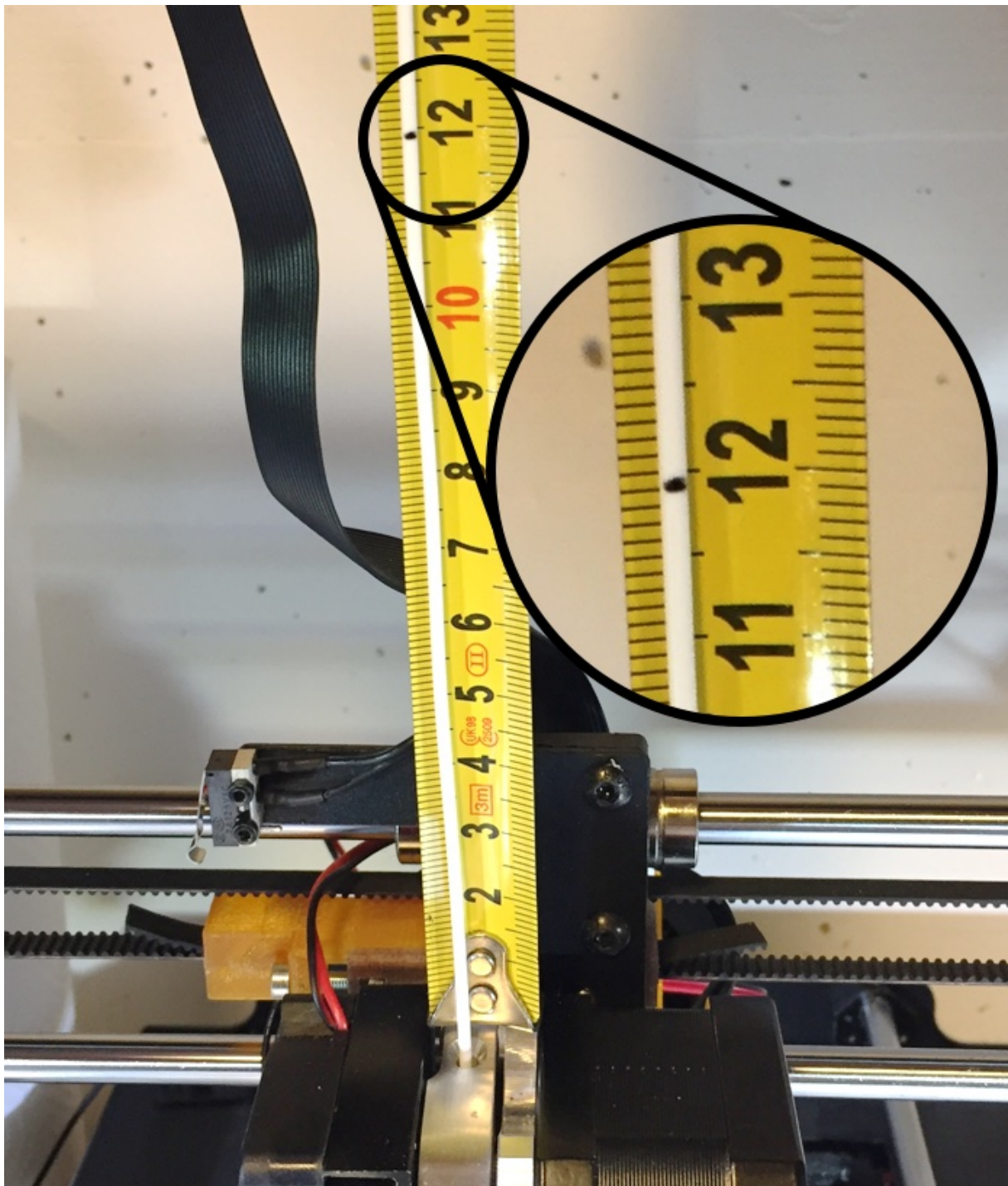
Extruder

This tool helps you adjust the number of steps per millimeter for the extruder motor. There is no need to do this more than once, except if you change some mechanical parts.

Important: This parameter (number of steps per millimeter) is directly derived from the mechanical parts of the printer (the stepper motor, the gear, ...) Unless you change these parts (like the gear), there is no need to change this parameter. Its default value is $400 . 5$.



- Measures 120 mm of filament above the extruder and set, with a pen, a mark on the filament:



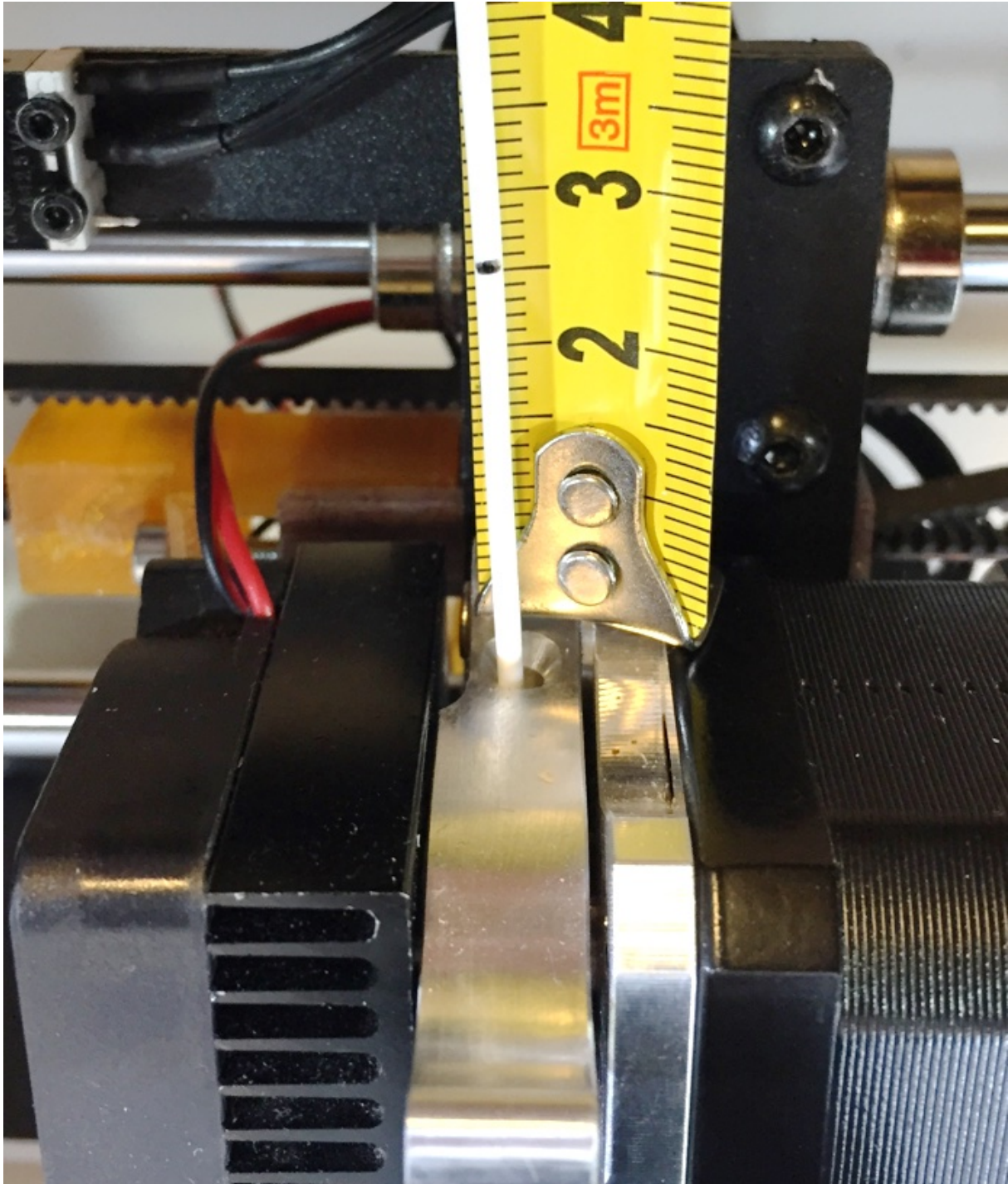
- Select the extruder's target temperature you want to use (with the plus and minus buttons) and press the arrow button (top-right corner).

Tip: *Keep the button pressed to quickly increment or decrement the temperature.*

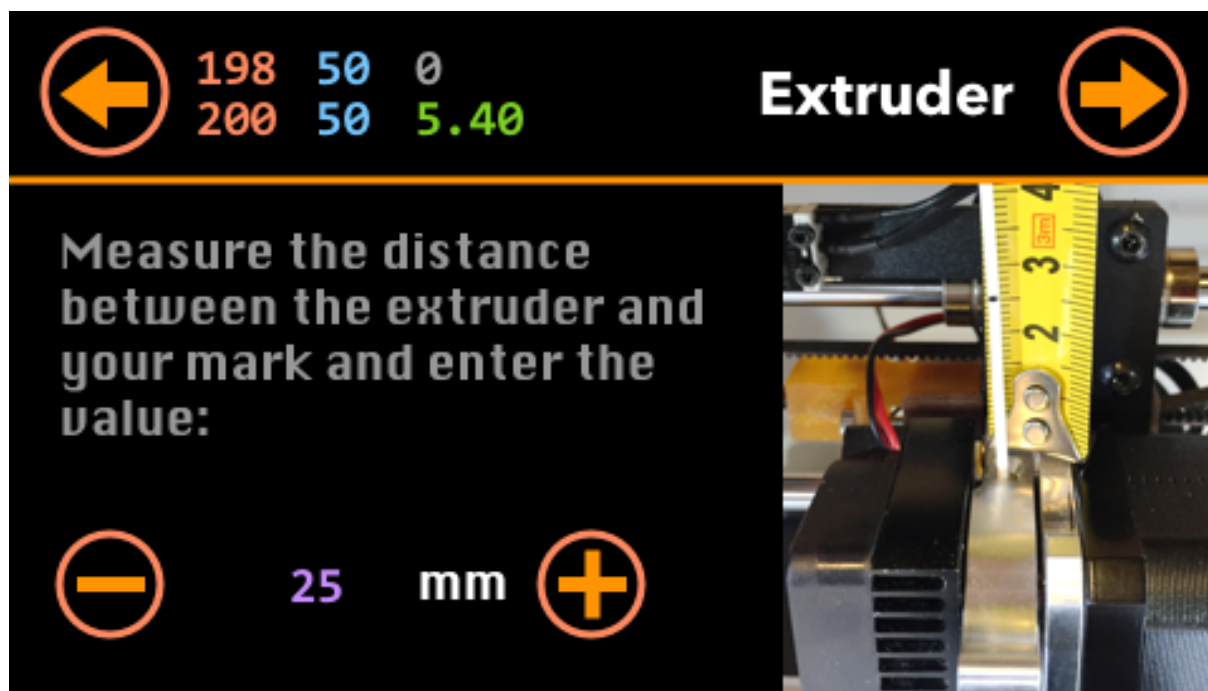
- The printer starts heating the hot-end and when the target temperature is reached, it extrudes

100 mm of filament.

- Once the extrusion is finished (it takes around a minute), measures the filament remaining between the extruder and your mark:

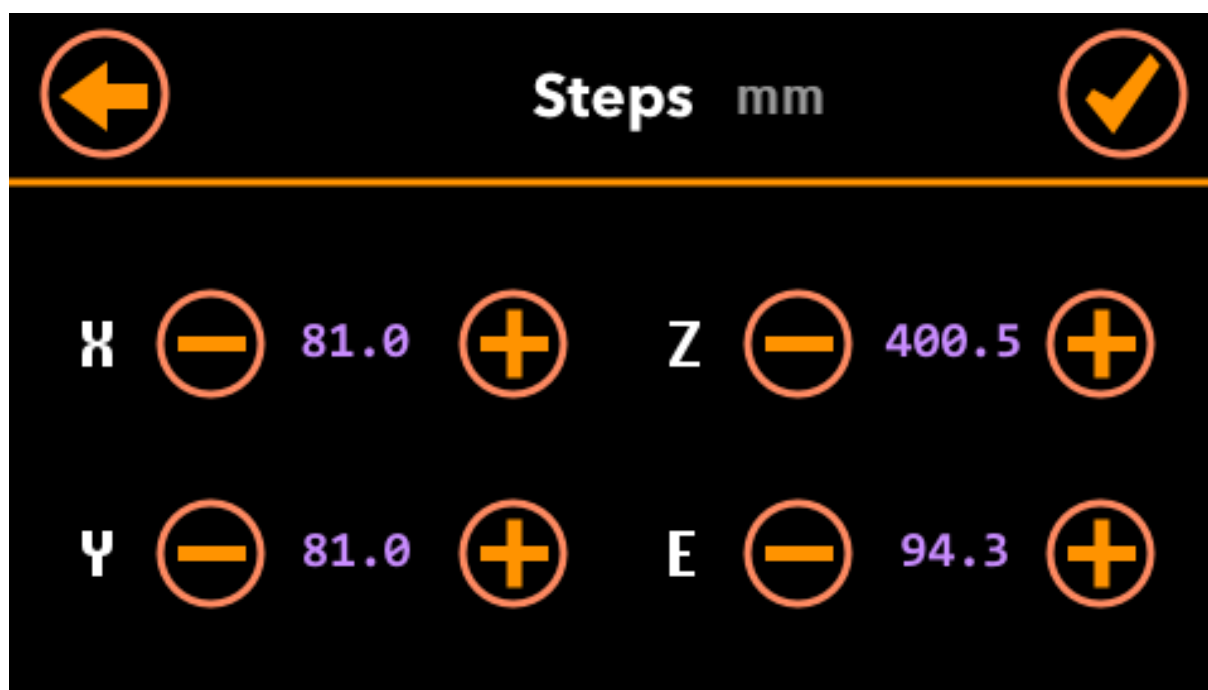


- Enter the value in mm:



Tip: Keep the button pressed to quickly increment or decrement the value.

- The computed value (E) is displayed and you can adjust it manually if you want:



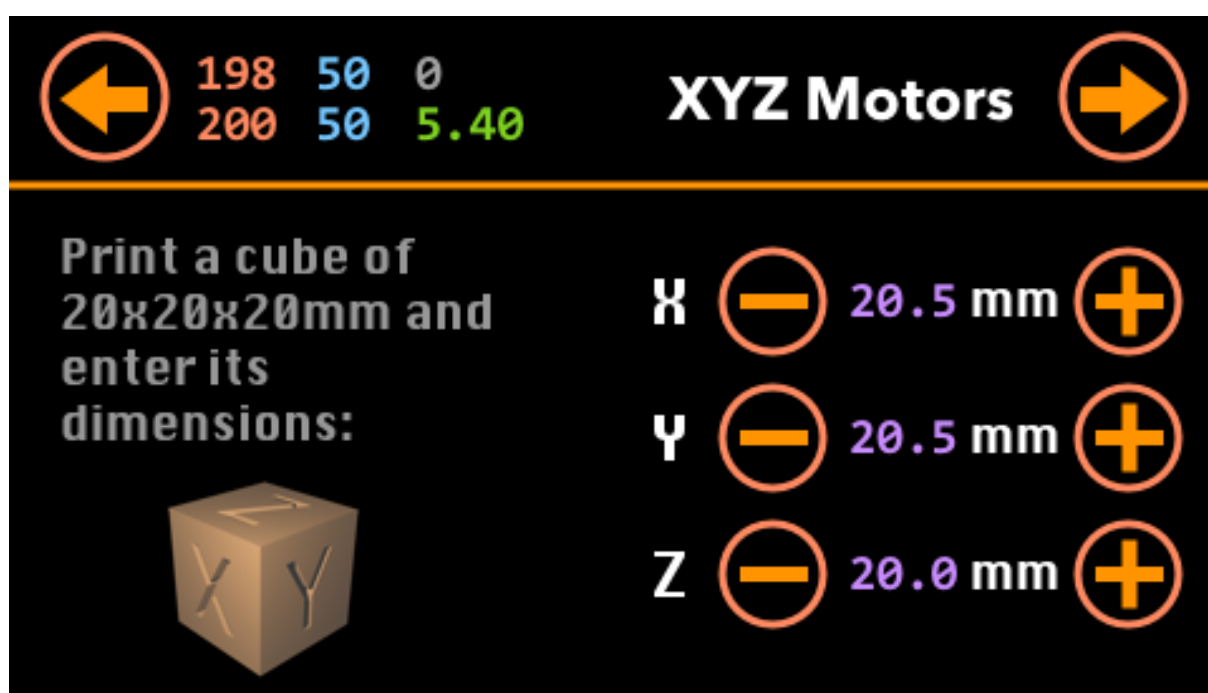
- Press the **Back** button the restart the process, or on the **Checkmark** button to save the settings. They are saved in the EEPROM memory of the motherboard.

XYZ motors

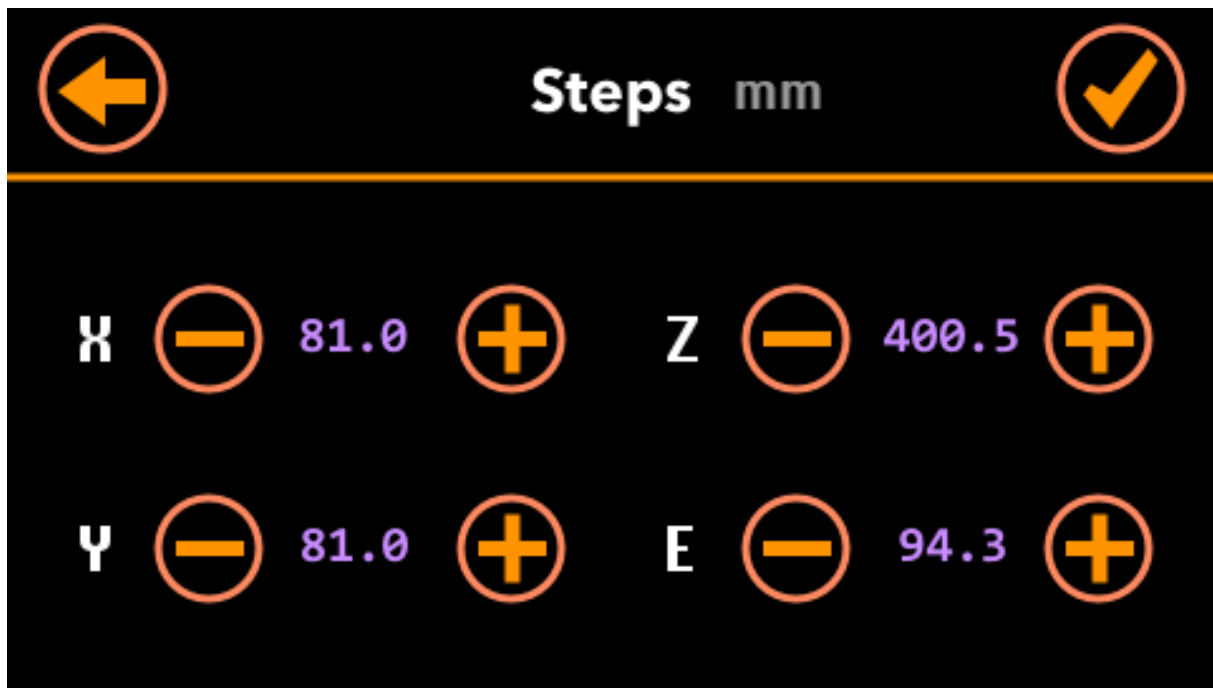
This tool helps you to adjust the number of steps per millimeter for the X, Y and Z motors. There is no need to do this more than once, except if you change some mechanical parts.

Important: *These parameters (number of steps per millimeter) are directly derived from the mechanical parts of the printer (the stepper motor, ...) Unless you change these parts (like the motors), there is no need to change this parameter. The default values are 81, 81, and 400 . 5.*

- Print a cube 20x20x20 mm and enter its actual dimensions (make more than one measure for each side and take the average):

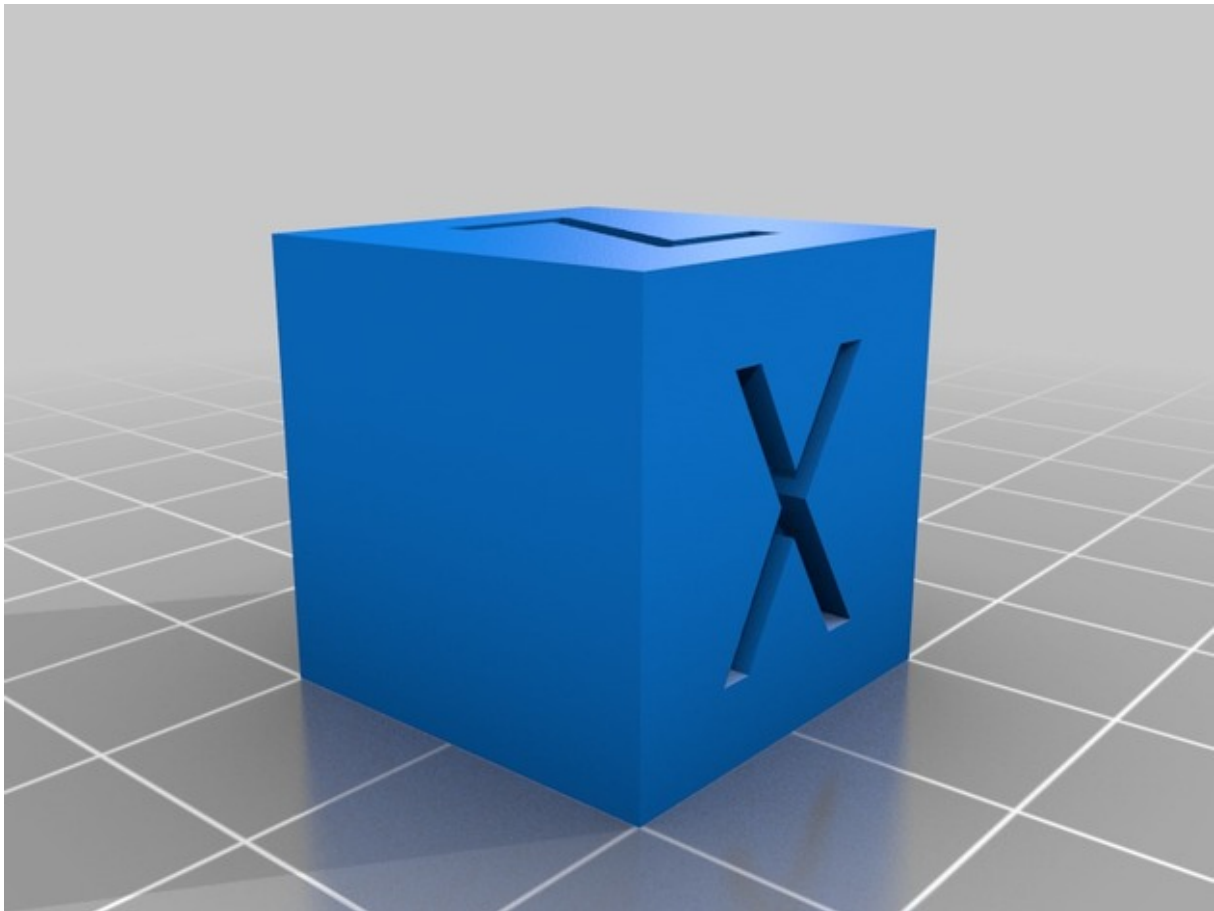


- The computed values (X, Y and Z) are displayed and you can adjust them manually if you want:



- Press the **Back** button to restart the process, or on the **Checkmark** button to save the settings. They are saved in the EEPROM memory of the motherboard.

Tips: *There are several calibration cubes on Thingiverse. For example:*



XYZ 20mm Calibration Cube by iDig3Dprinting

Measure X:



Measure Y:



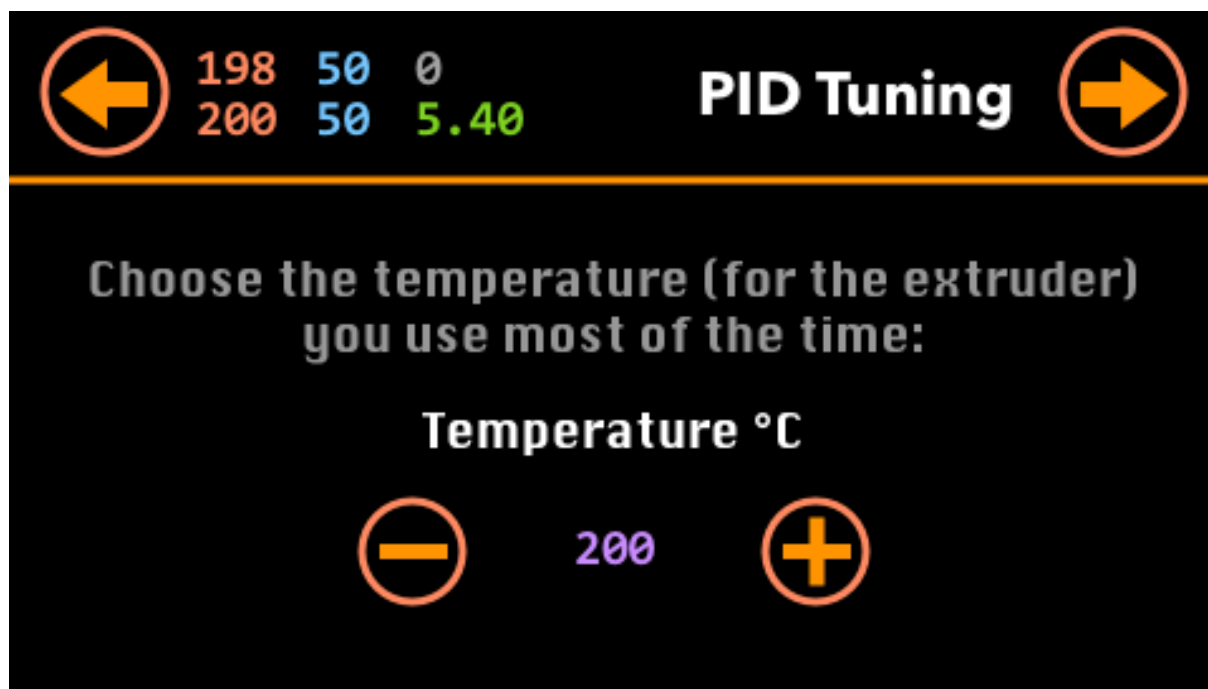
Measure Z:



PID tuning

PID tuning refers to the parameters adjustment of a proportional-integral-derivative control algorithm used in most reprints for hot ends and heated beds.

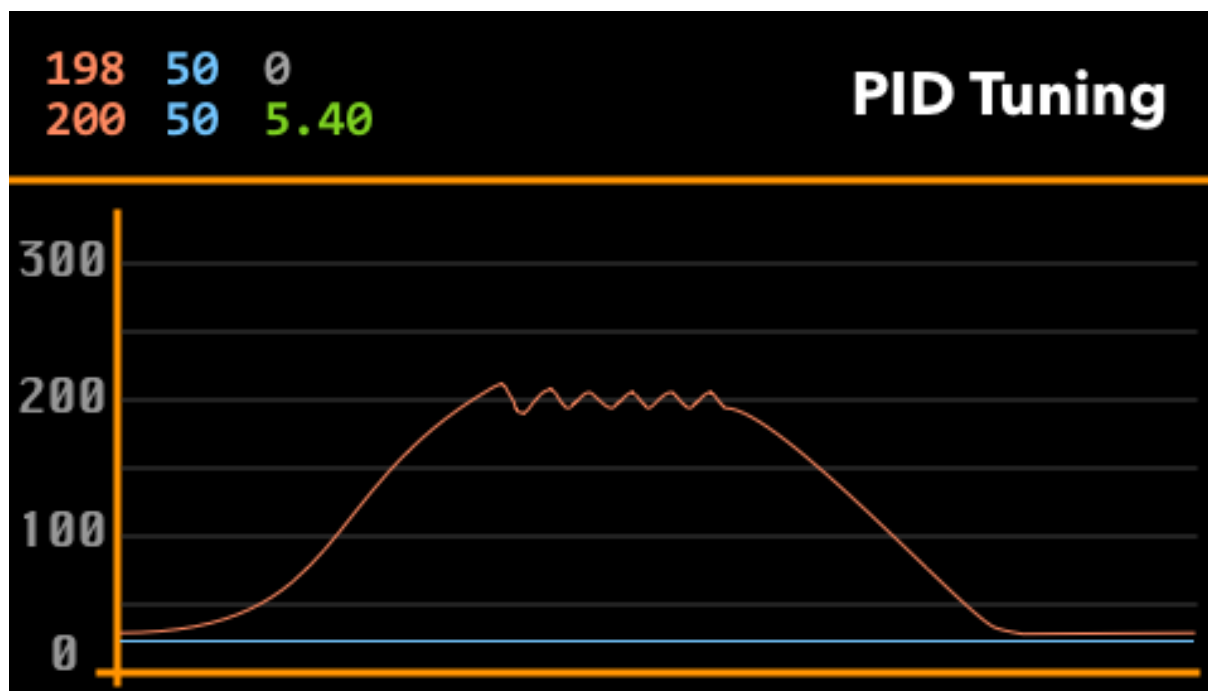
RepRap web site



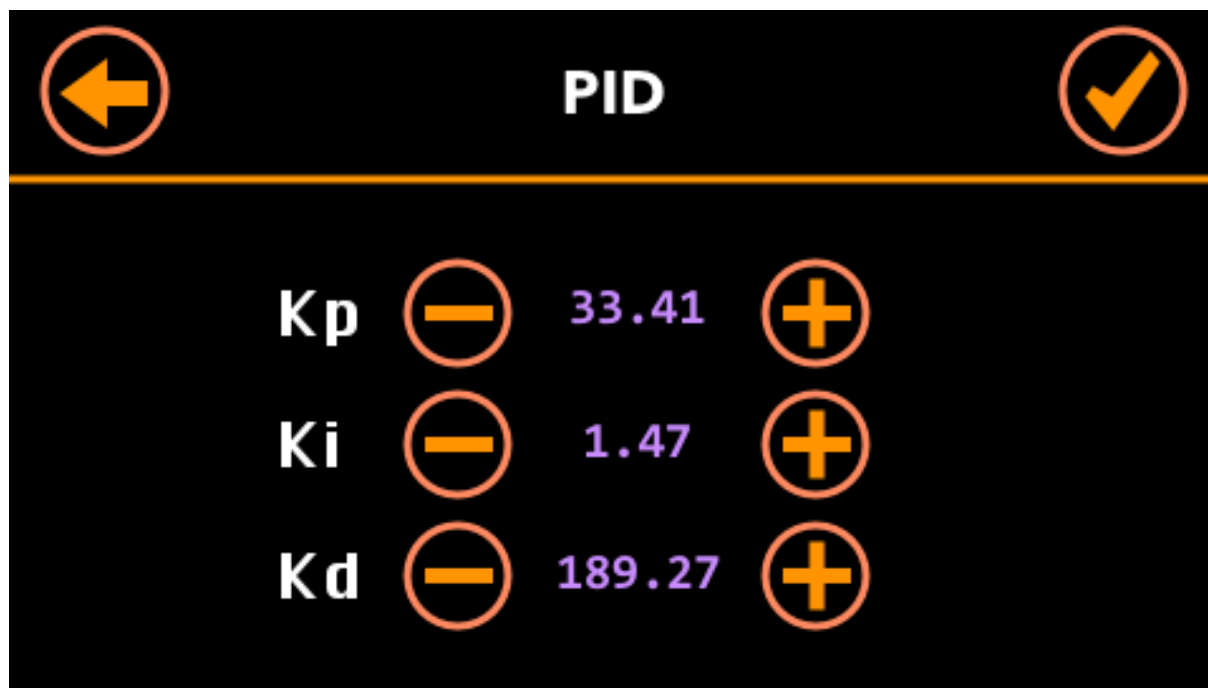
- Select the extruder's target temperature you want to use (with the plus and minus buttons) and press the arrow button (top-right corner).

Tip: *Keep the button pressed to quickly increment or decrement the temperature.*

- The PID tuning process starts. The printer increase and decrease the temperature of the hot-end around the target value:



- When the PID tuning is finished (after some minutes), the new PID values are displayed:



- Press the **Back** button the restart the process, or on the **Checkmark** button to save the settings. They are saved in the EEPROM memory of the motherboard.

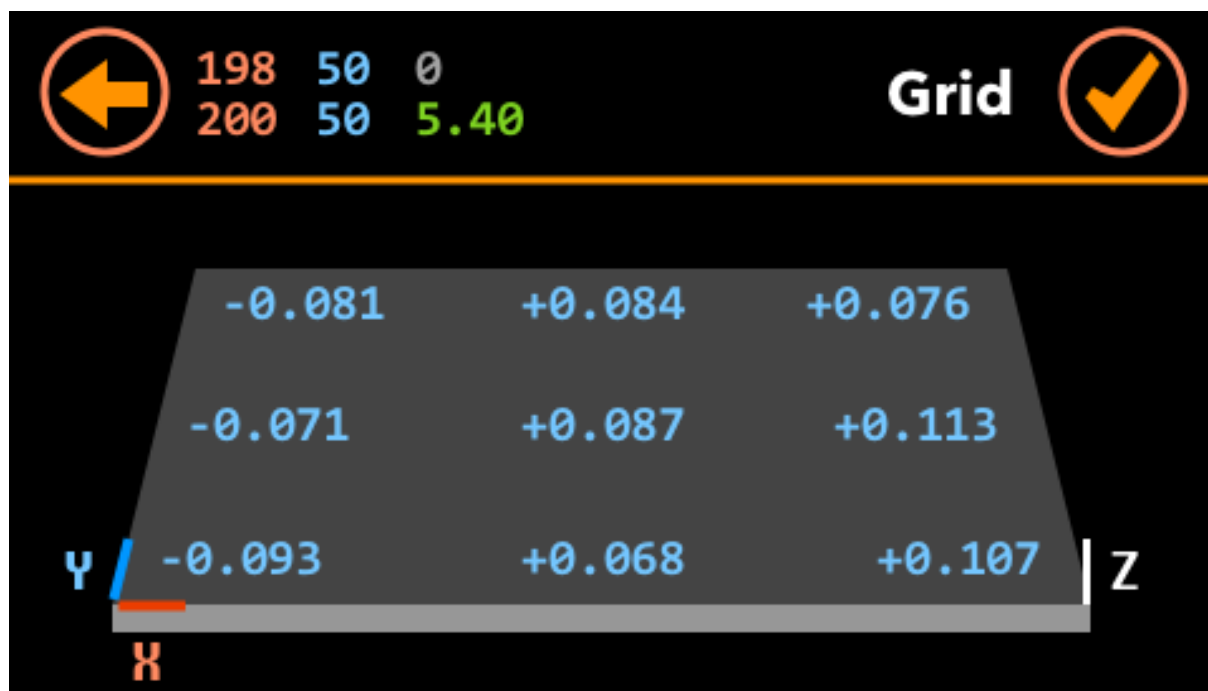
Sensor

This panel gives you access to tools to control your sensor.

Note: If you have flashed a version without sensor support, it will display instead a **No Sensor** panel.

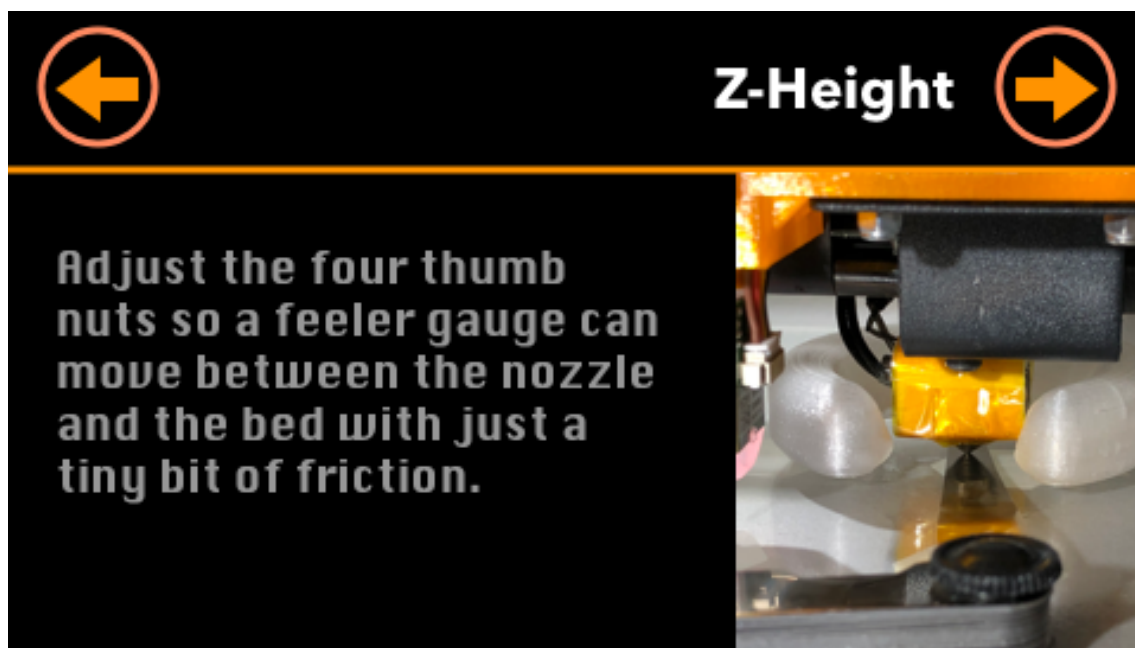


- **Leveling:** This starts the automatic leveling process. It measures 9 points of the bed and takes some minutes. Once the measuring is finished, it displays the result in a grid.
- Press the checkmark to accept these measures.

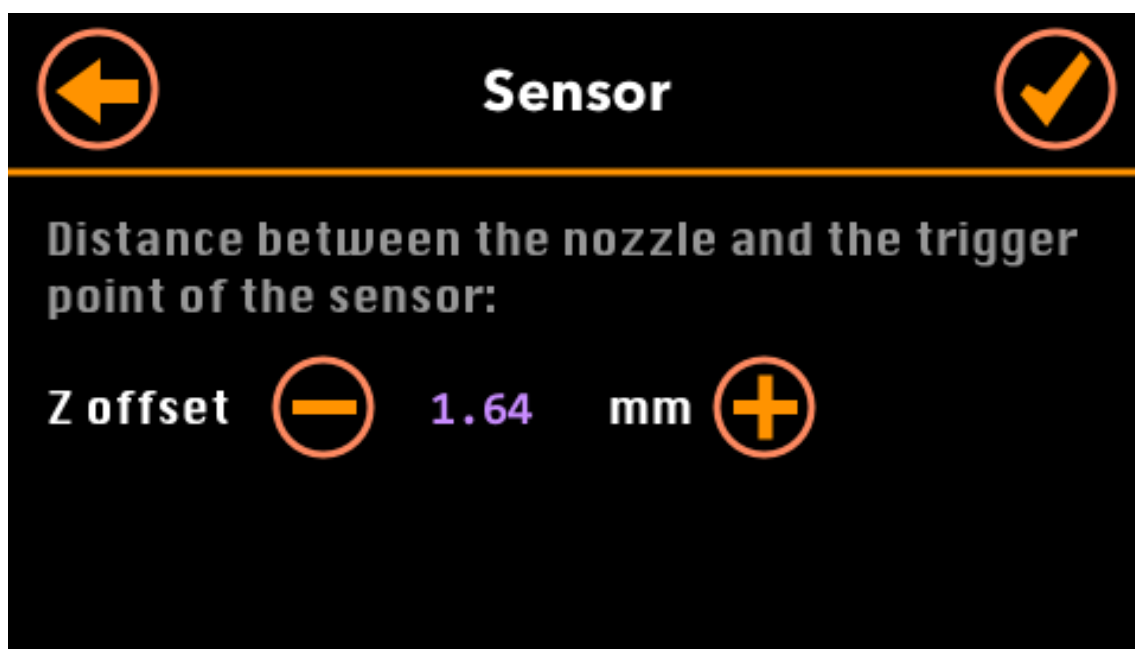


IMPORTANT: For an accurate leveling, you have to measure the **Z-height** first (see below)

- **Self-test:** Start the self-test of the probe. To stop the test, press **Reset**
- **Reset:** Reset the sensor in case of an error (when the LED of the sensor is flashing)
- **Deploy:** Deploy the push-pin
- **Stow:** Slow the push-pin
- **Z-height:** The sensor has no way to know the distance between itself and the nozzle. For X and Y offsets, it depends of the sensor's support and it does not have to be precise. But for the Z axis, it has to be very precise. This tool helps you measure the Z-height:
 - Taps on **Z-height**.
 - The head with move to its home position (at the center of the bed)

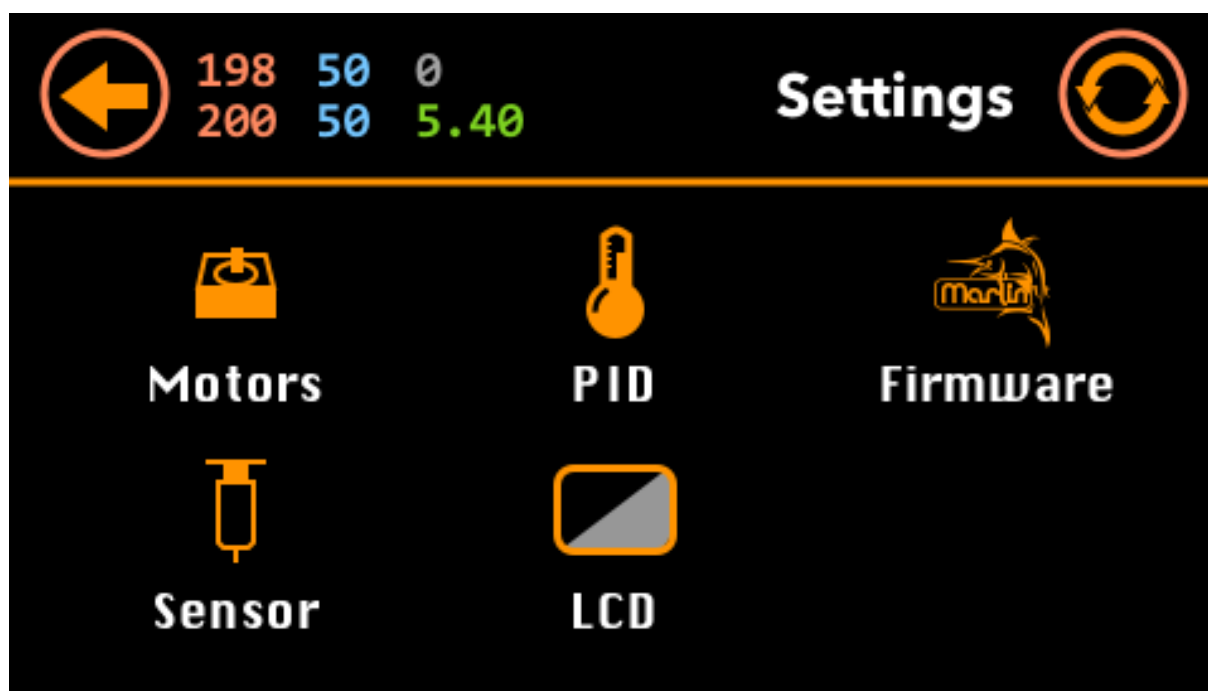


- Adjust the bed's four thumb nuts so a feeler gauge can move between the nozzle and the bed with just a tiny bit of friction. Contrary to the Manual bed leveling, you just have to adjust this location.
- Press the **Continue** button and the probe will move at the center of the bed and measure the Z-height. Once it is done, the result is displayed:



- You can adjust the Z offset (most of the time, there is no need to adjust the measured value)
- Tap on the checkmark to save this setting.

Settings

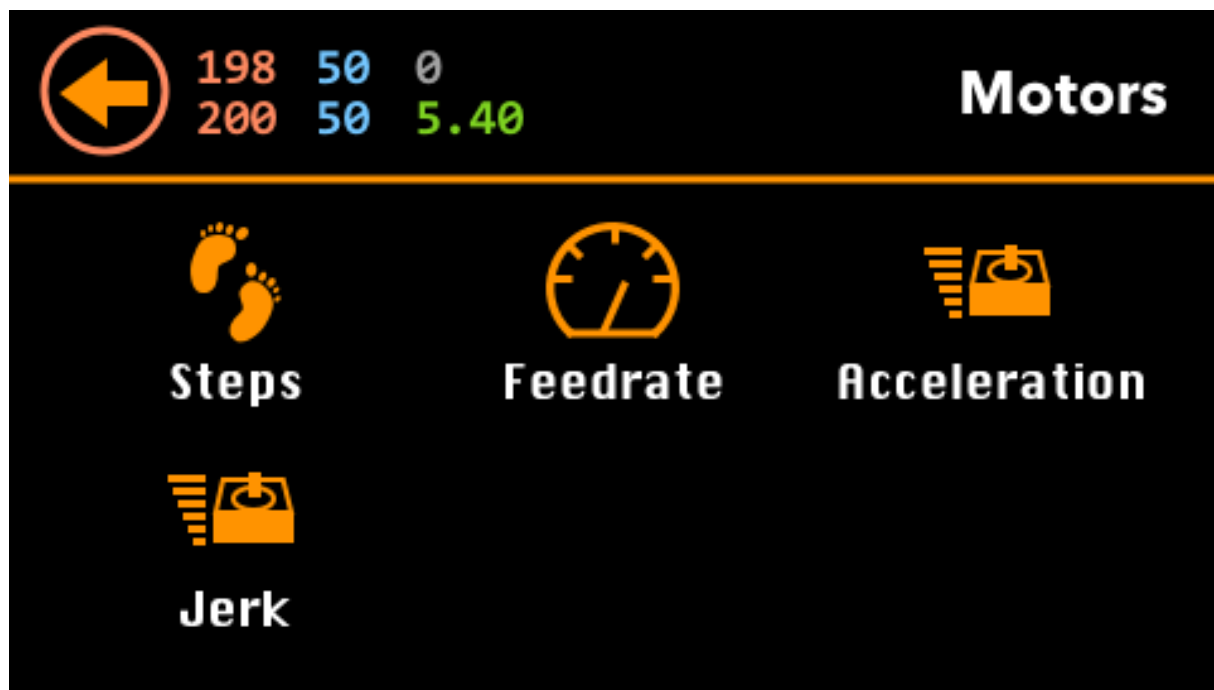


- **Motors:** Displays several settings related to the stepper motors (see bellow).
- **PID:** Displays the current PID settings.
- **Firmware:** Change parameters controlled the firmware such as the thermal protection and the baud rate.
- **Sensor:** Displays and let you adjust sensor's settings.
- **LCD:** Change LCD parameters such as the dimming and the buzzer.
- **Reset** (in the top-right corner): Resets all the parameters stored in EEPROM to their factory values.



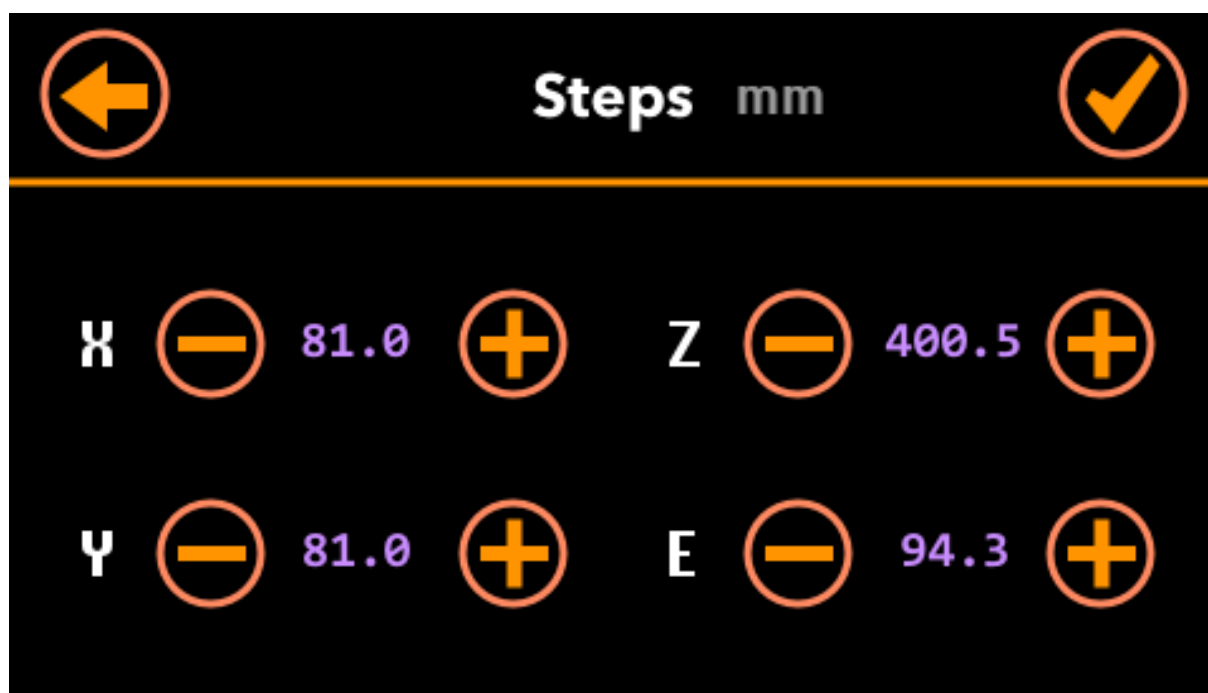
- Before resetting all the settings to their default, you have to confirm it by pressing the **Checkmark** button.
- If you do not want to reset the settings, press the **Back** button.
- Once confirmed, all settings are reset to their default and saved in the EEPROM memory of the motherboard.

Motors



- **Steps:** Displays the step settings of the motors.
- **Feedrate:** Displays the feedrate (speed) settings of the motors.
- **Acceleration:** Displays the acceleration settings of the motors.
- **Jerk:** Displays the jerk settings of the motors.

Steps



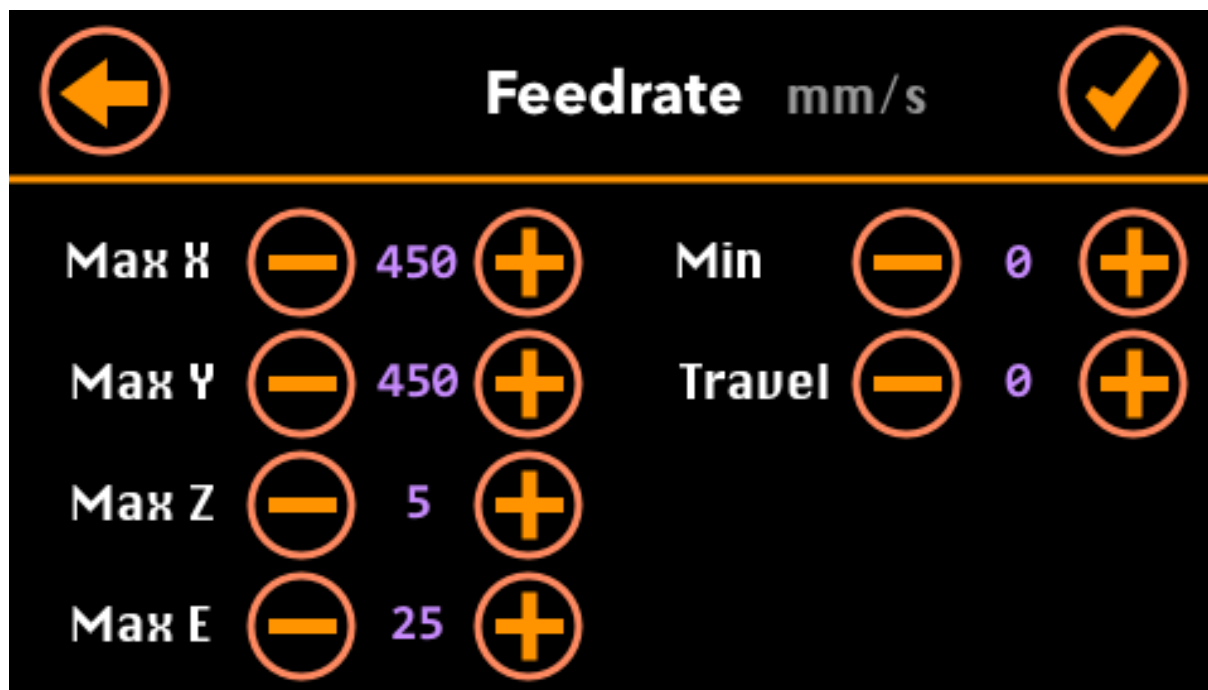
This screen display the step settings of the motors.

- To adjust them manually, press the minus or plus buttons.

Tip: Keep the button pressed to quickly increment or decrement the temperature.

- To save them, press the **Checkmark** button. The settings are saved in the EEPROM memory of the motherboard.
- The cancel any changes, press the **Back** button. It goes back to the previous screen.

Feedrate



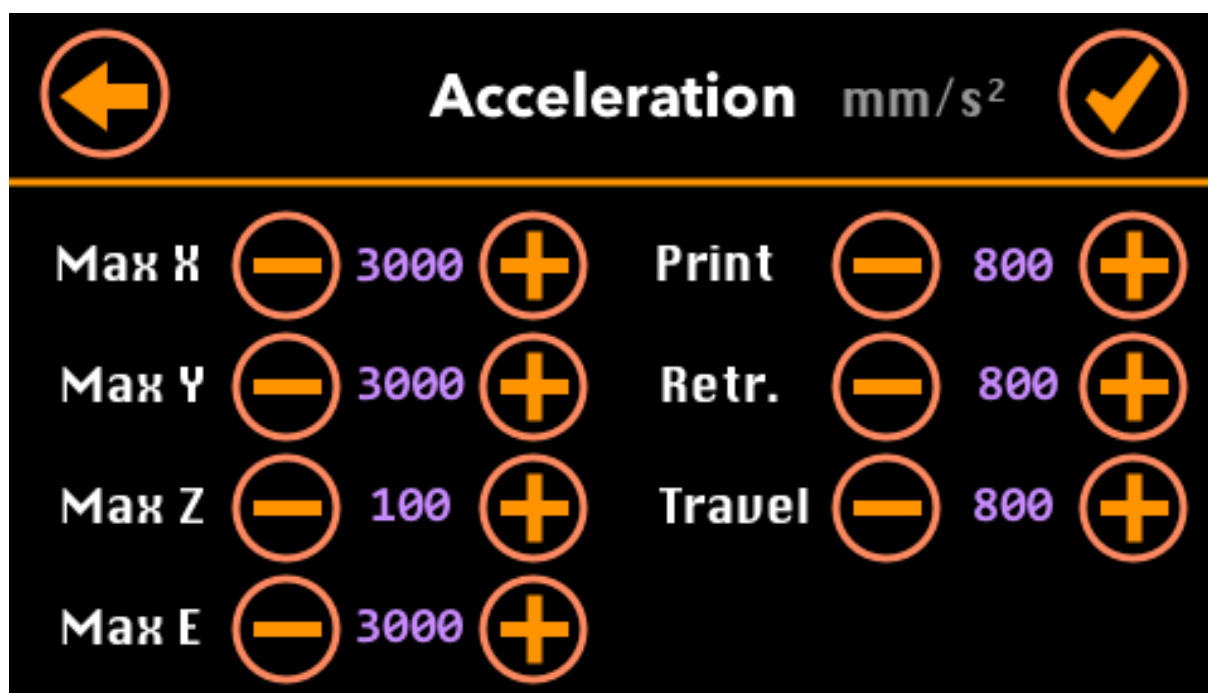
This screen display the feedrate (speed) settings of the motors.

- To adjust them manually, press the minus or plus buttons.

Tip: Keep the button pressed to quickly increment or decrement the temperature.

- To save them, press the **Checkmark** button. The settings are saved in the EEPROM memory of the motherboard.
- To cancel any changes, press the **Back** button. It goes back to the previous screen.

Acceleration



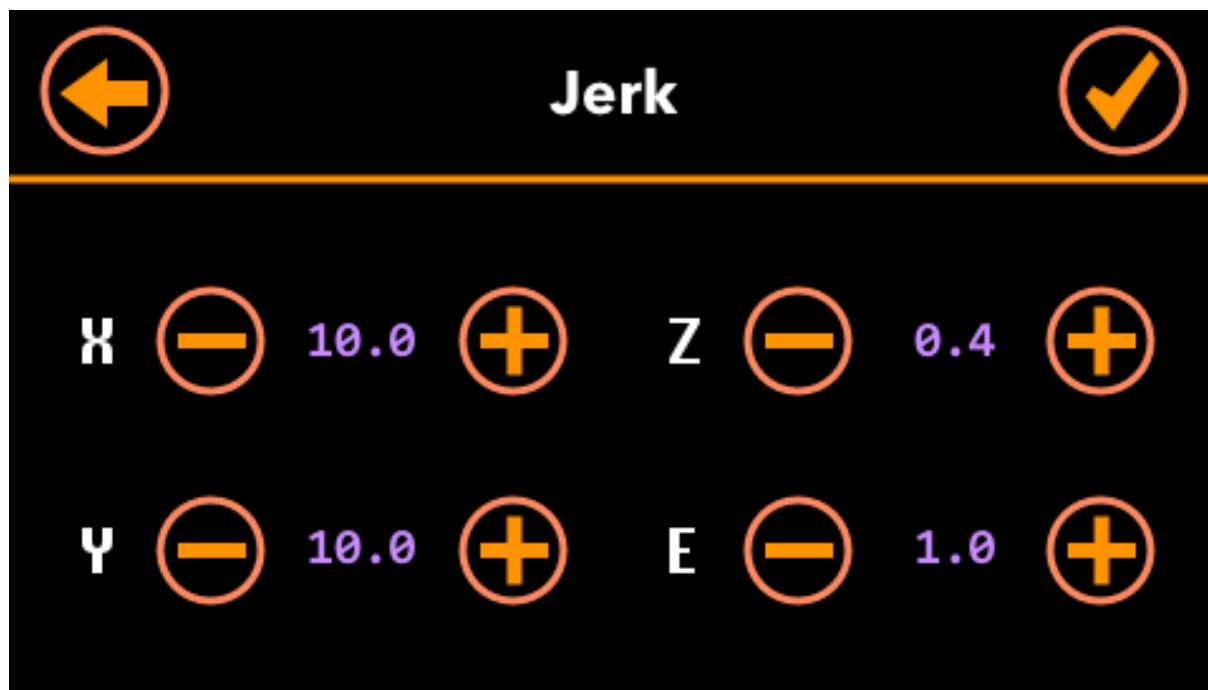
This screen display the acceleration settings of the motors.

- To adjust them manually, press the minus or plus buttons.

Tip: Keep the button pressed to quickly increment or decrement the temperature.

- To save them, press the **Checkmark** button. The settings are saved in the EEPROM memory of the motherboard.
- To cancel any changes, press the **Back** button. It goes back to the previous screen.

Jerk



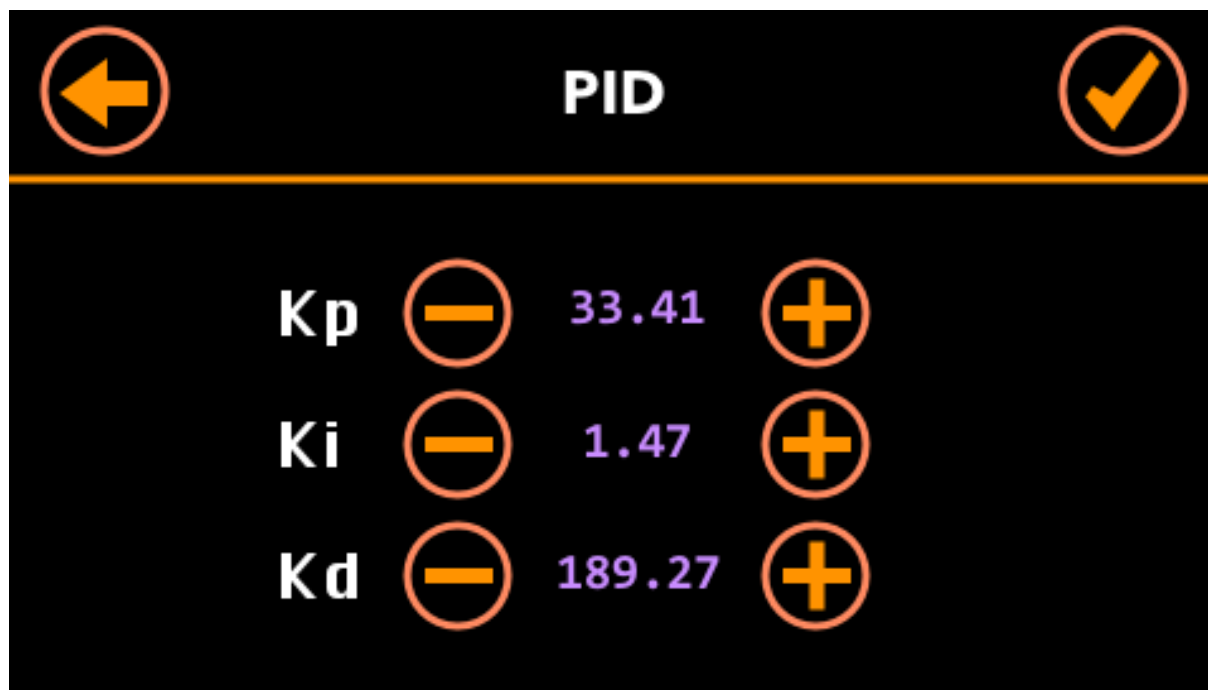
This screen displays the jerk settings of the motors. The (maximum) jerks are the instantaneous change of speed that can be made. In other words, it is the (maximum) speed that the printer will immediately jump to before taking acceleration into account.

- To adjust them manually, press the minus or plus buttons.

Tip: *Keep the button pressed to quickly increment or decrement the temperature.*

- To save them, press the **Checkmark** button. The settings are saved in the EEPROM memory of the motherboard.
- To cancel any changes, press the **Back** button. It goes back to the previous screen.

PID



PID tuning refers to the parameters adjustment of a proportional-integral-derivative control algorithm used in most repraps for hot ends and heated beds.

RepRap web site

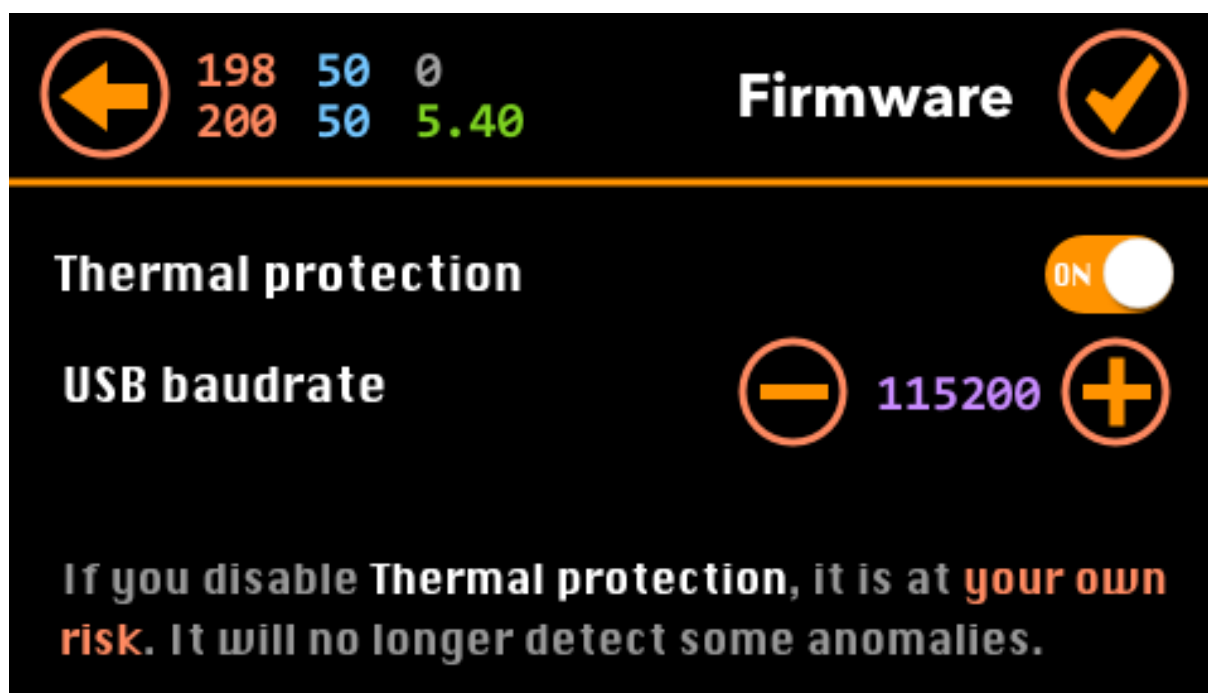
This screen display the jerk settings of the motors. The (maximum) jerks are the instantaneous change of speed that can be made. In other words, it is the (maximum) speed that the printer will immediately jump to before taking acceleration into account.

- To adjust the PID settings manually, press the minus or plus buttons.

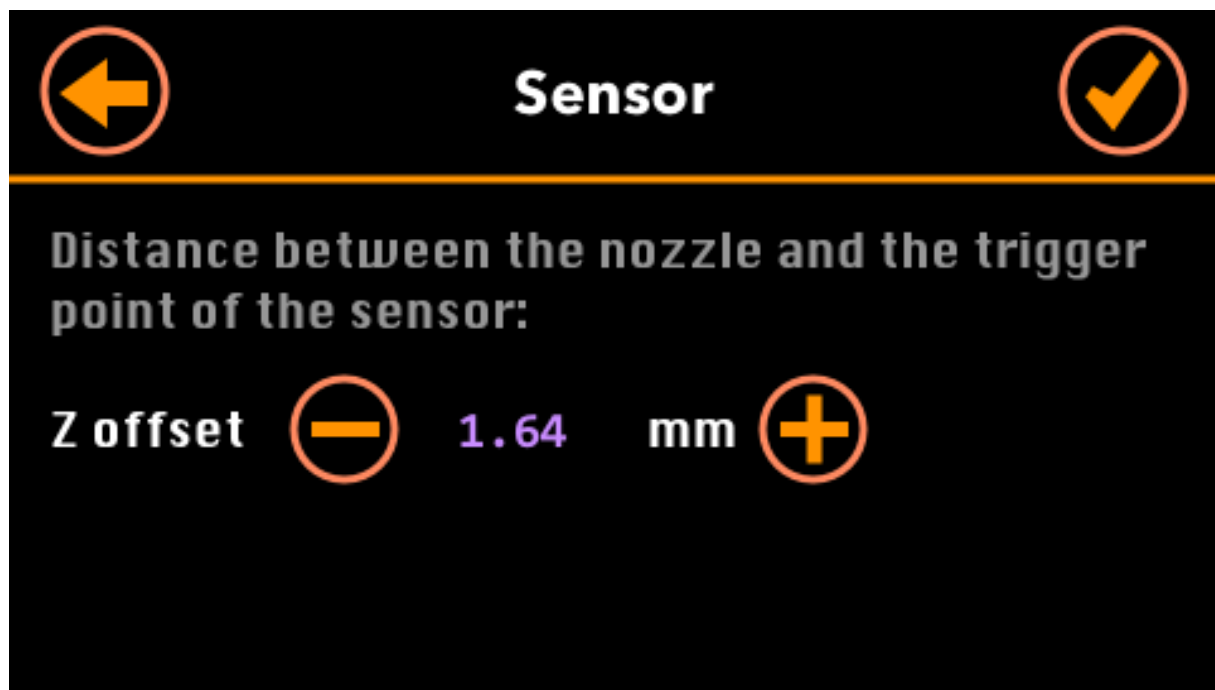
Tip: *Keep the button pressed to quickly increment or decrement the temperature.*

- To save them, press the **Checkmark** button. The settings are saved in the EEPROM memory of the motherboard.
- To cancel any changes, press the **Back** button. It goes back to the previous screen.

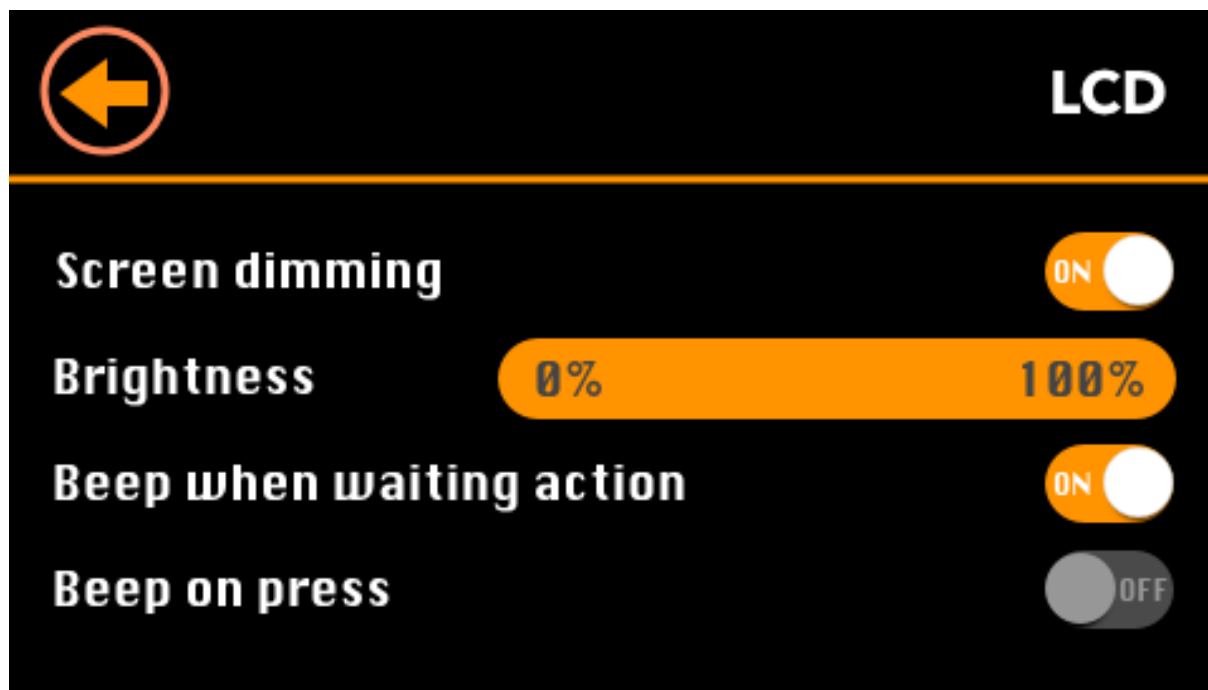
Firmware



- **Thermal protection:** Can can disable or enable **Thermal protection**. Thermal protection is a feature of Marlin firmware that can detect anomalies such as a broken thermistor. In some cases, it can save your printer and even your house from fire. However, if you get several **Thermal Runaway Errors** and you are sure your printer is OK, you can disable here the protection. **AT YOUR OWN RISK.**
- **USB baudrate:** By default, the firmware uses 115200 bps to communicate with your computer. You can adjust the baud rate here. I have had good results with 250000 bps and OctoPrint.

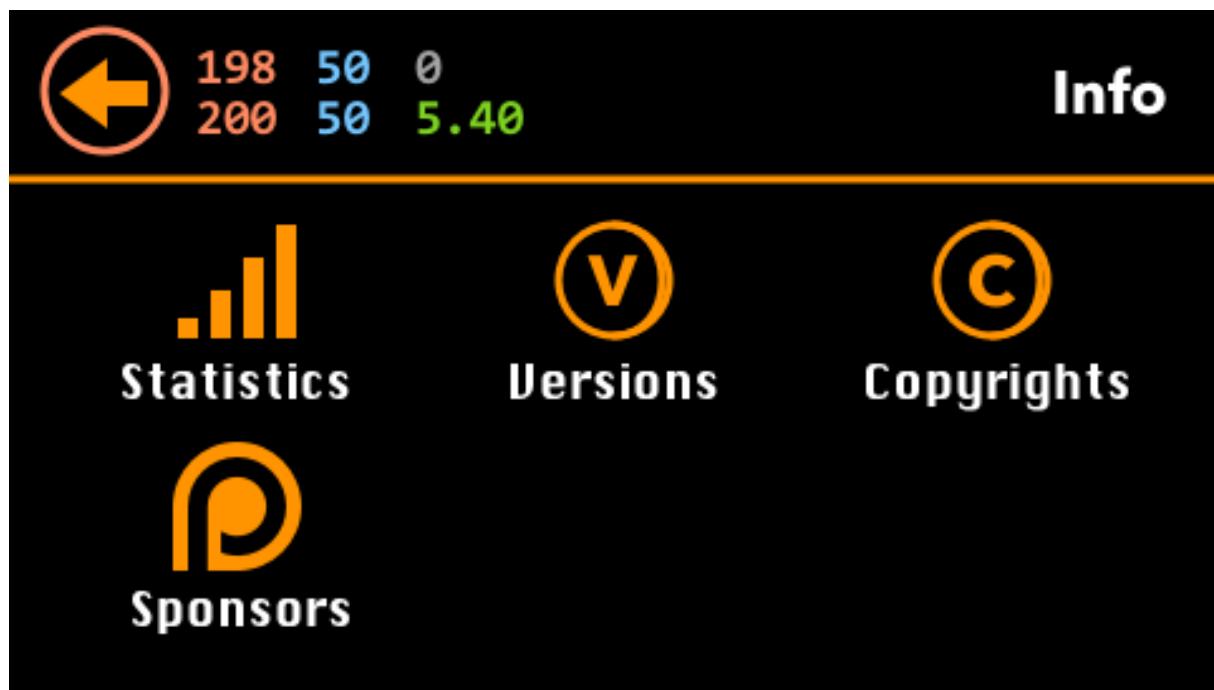
Sensor

- You can adjust the **Z offset** here. This offset is the difference between the nozzle and the trigger point of the sensor in mm.
- Tap on the **Checkmark** button to save this setting.

LCD

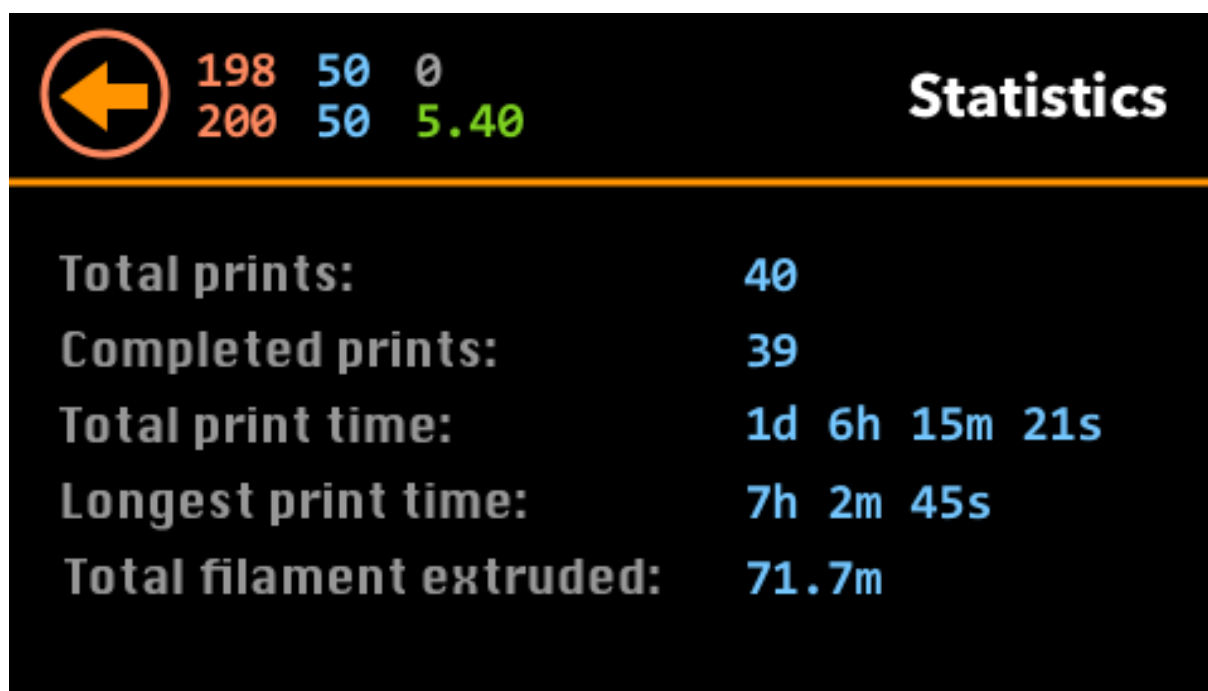
- **Screen dimming:** By default, the LCD displays lower its brightness after one minute. Here, you can disable or enable this dimming.
- **Brightness:** Adjust the brightness of the LCD display.
- **Beep when waiting action:** Enable or disable the buzzer when the printer is waiting for an action. It is in particular the case when loading or unloading filament, and with Advanced Pause (M600)
- **Beep on press:** Enable or disable the buzzer when you tap on the LCD panel

Info



- Displays information about the past prints, the versions of the different components and the copyrights.

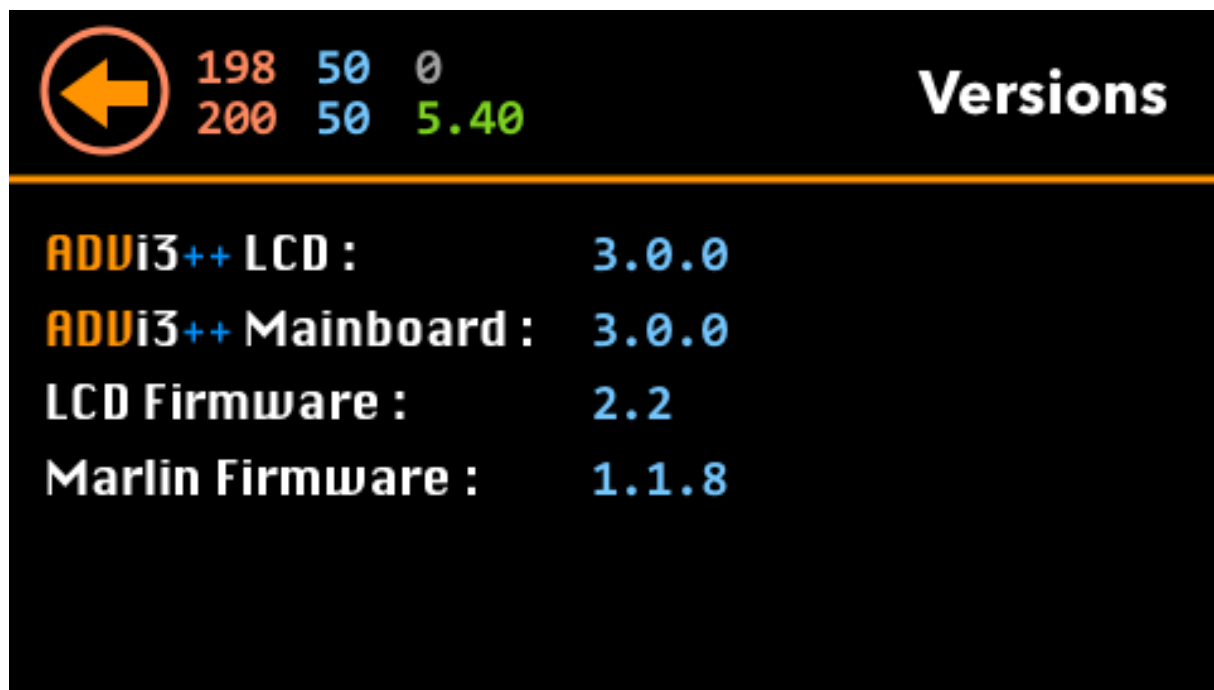
Statistics



This screen display various statistics:

- **Total prints:** The number of prints send to the printer.
- **Completed prints:** The number of prints completed.
- **Total print time:** The total time spend on printing.
- **Longest print time:** The longest print.
- **Total filament extruded:** The total number of meters of filament extruded.

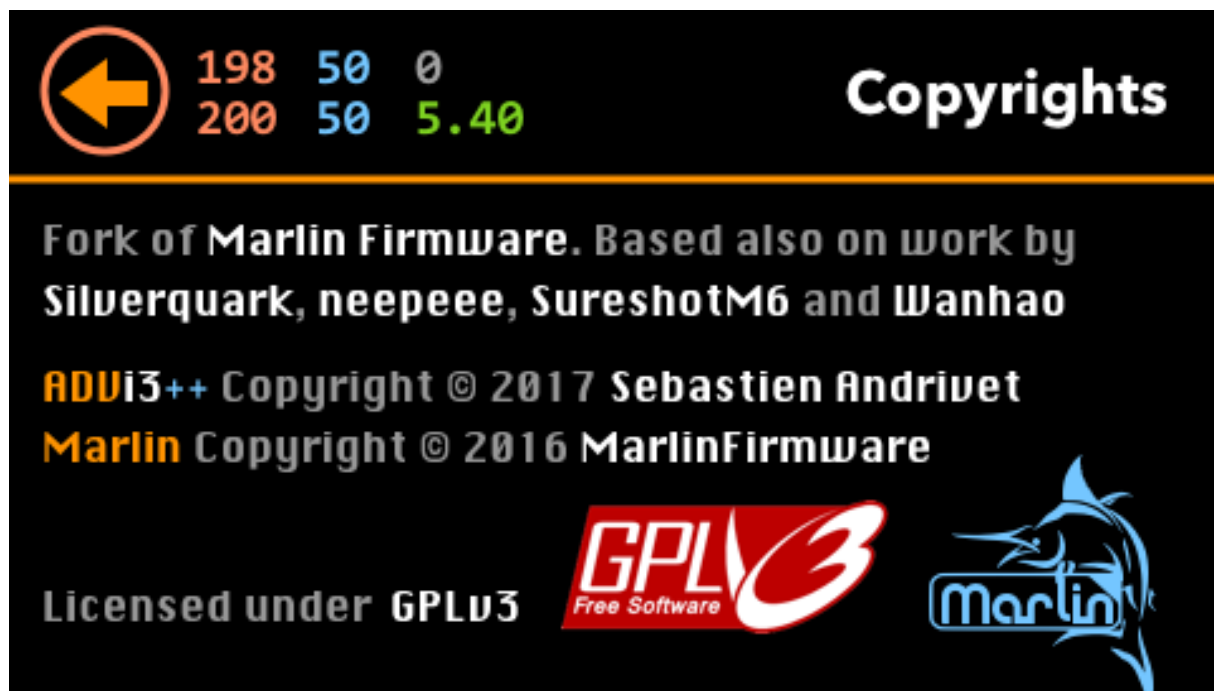
Versions



This screen display the version of several software components:

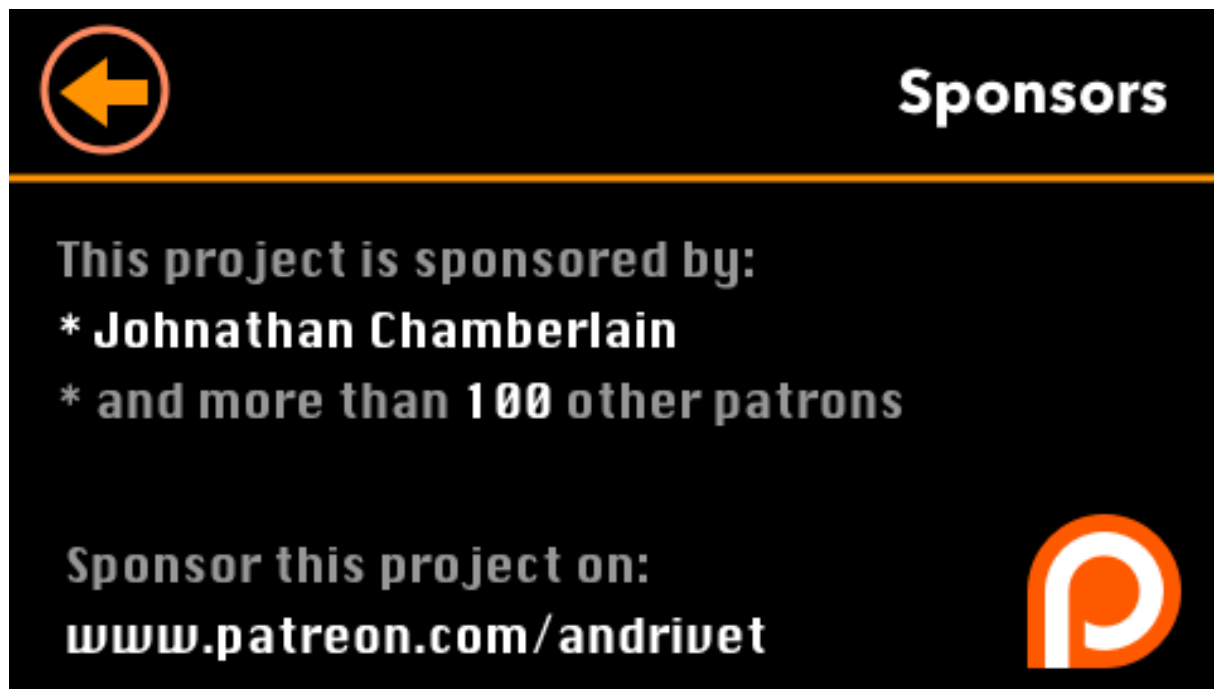
- **ADVi3++ LCD:** The version of the LCD part of **ADVi3++**.
- **ADVi3++ Motherboard:** The version of the Motherboard part of **ADVi3++**.
- **LCD firmware:** The version of the (internal) LCD touch screen display.
- **Marlin:** The version of the Marlin sources used by **ADVi3++**.

Copyrights



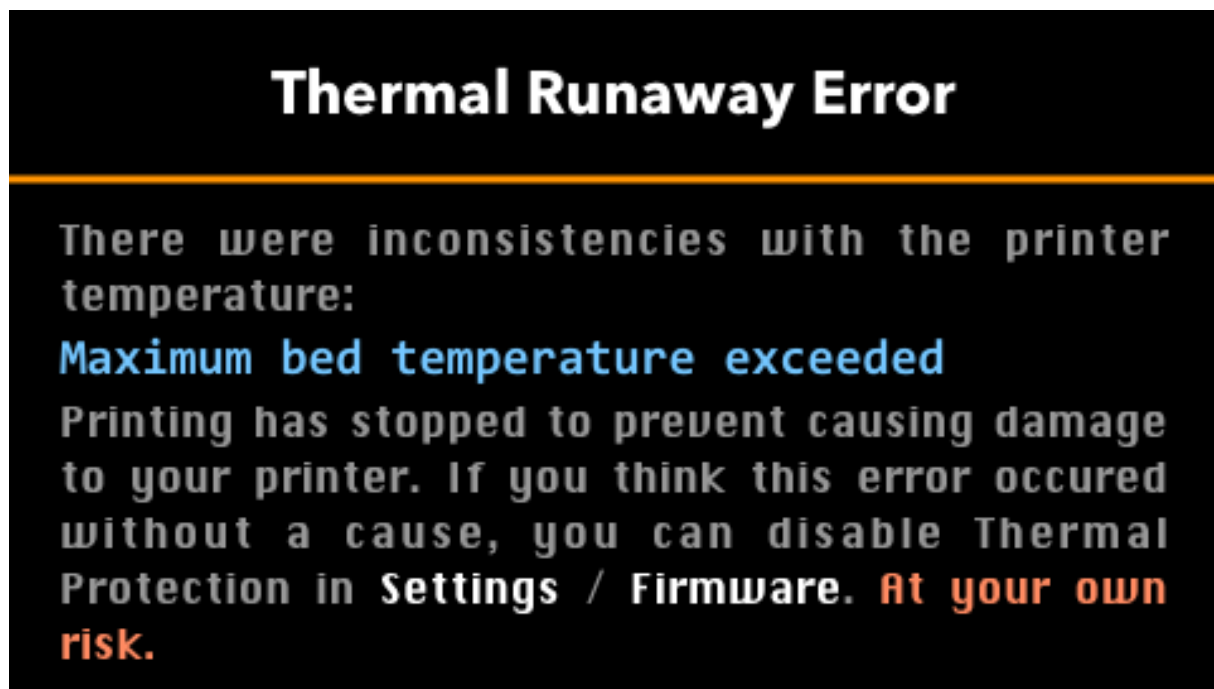
- Copyrights and licences. Both **Marlin** and **ADVi3++** are released under GPLv3 license.

Sponsors



You can sponsor **ADVi3++** on Patreon. As part of the \$16 reward and if you agree, your name (or pseudo) will be mentioned on this screen, in the documentation of ADVi3++, its web site, in the binaries and your name will even be displayed when the firmware boots (on the COM port).

Thermal Runaway Error



ADVi3++ (thanks to Marlin Firmware) has an important safety feature enabled by default and that is not present in the stock firmware: **thermal protection**.

If your thermistor fails for a reason, it will give a wrong value to the firmware (around 0) and if the bed or the hotend are heating, they will continue to heat and heat (believing that the temperature is not increasing) until... it eventually **burns**. This is why Marlin has introduced a safety feature: if some abnormal occurs, the firmware will stop heating, display this message and shutdown.

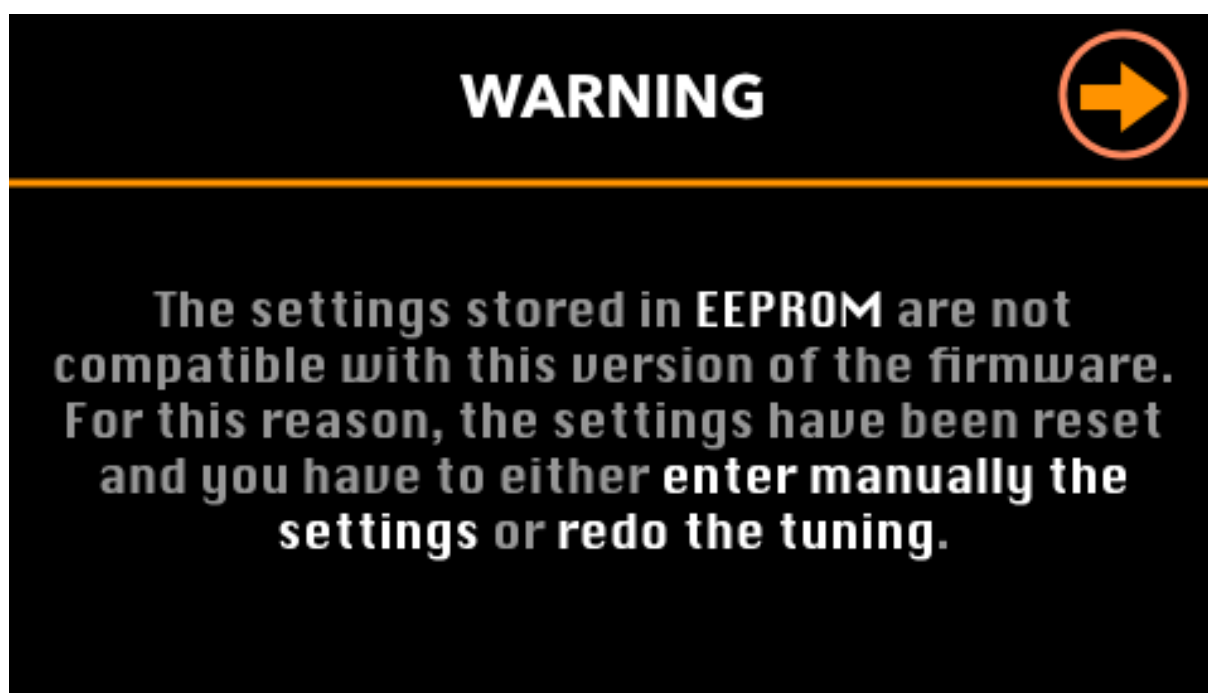
When this screen is displayed, it indicates in blue the anomaly detected:

- **Maximum temperature exceeded:** When the temperature of the hotend is higher than the maximum allowed (currently 275°C)
- **Maximum bed temperature exceeded:** When the temperature of the bed is higher than the maximum allowed (currently 150°C)
- **Minimum temperature exceeded:** When the temperature of the hotend is lower than the minimum allowed (currently 5°C)
- **Minimum bed temperature exceeded:** When the temperature of the bed is lower than the minimum allowed (currently 5°C)
- **Heating failed:** When the hotend or the bed is too slow to heat
- **The temperature has deviated too much:** After reaching the target temperature, the temperature is not stable and has deviated too much

In case of an error, I highly recommend that you check your printer, especially the thermistors. They can become loose with the movement of the bed and of the head and give wrong measures. Your thermistors can also fail.

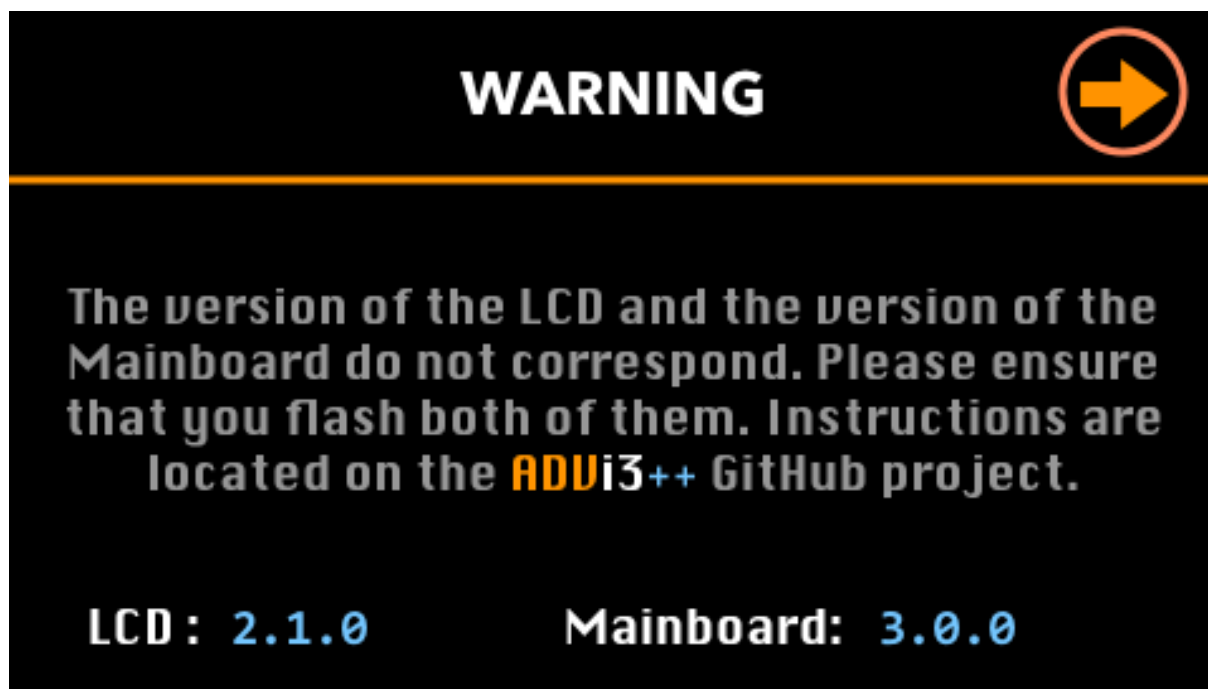
If you are absolutely sure that nothing is wrong and you still have errors, you have the possibility to disable Thermal Protection in **Settings / Firmware**. **But this is AT YOUR OWN RISK.**

EEPROM Settings Reset Warning



When you upgrade **ADVi3++**, this message may appear one time on boot. This is because the settings of the new version are not compatible with those of the old one. So the settings are reset and you have to either enter settings manually or redo the tuning.

Version Warning



When you upgrade **ADVi3++**, this message may appear if you have a version of the LCD part that is not compatible with the mainboard part. You have to use compatible versions (i.e. the same version for both).

No Sensor

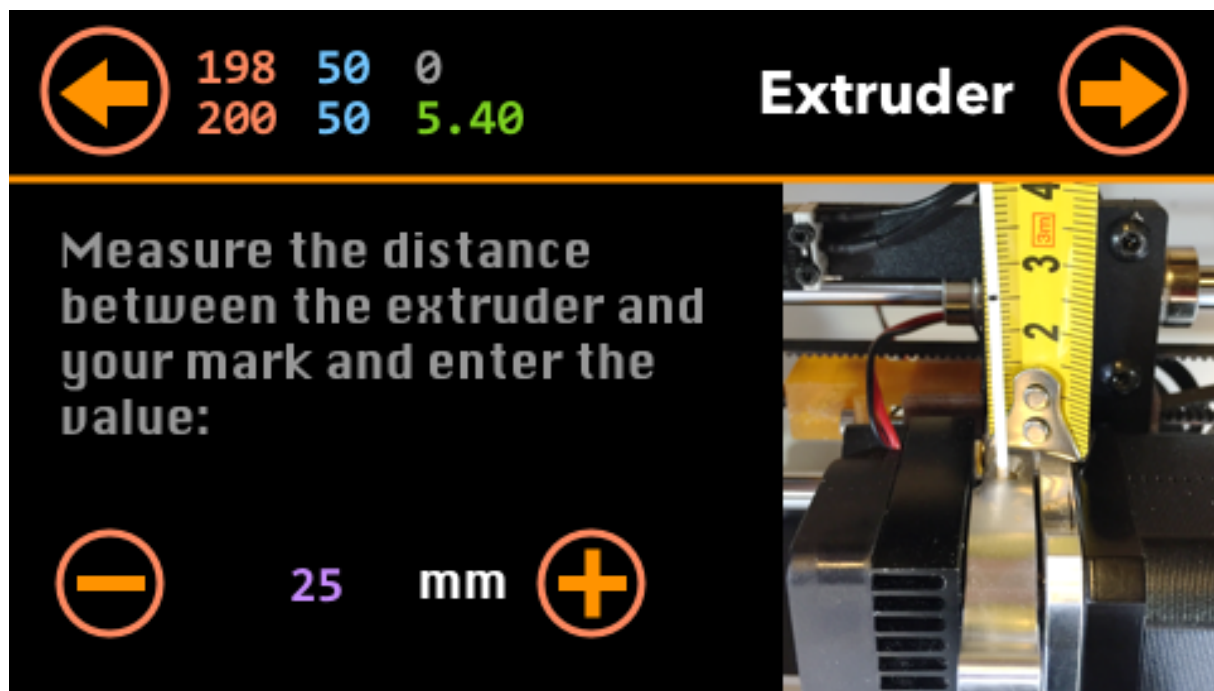


There are currently two binaries for the Mainboard part of **ADVi3++**: one for the stock i3 Plus printer, and one for the printer with BLTouch. If you press a sensor function with a mainboard for the stock printer, this message is displayed.

Tuning

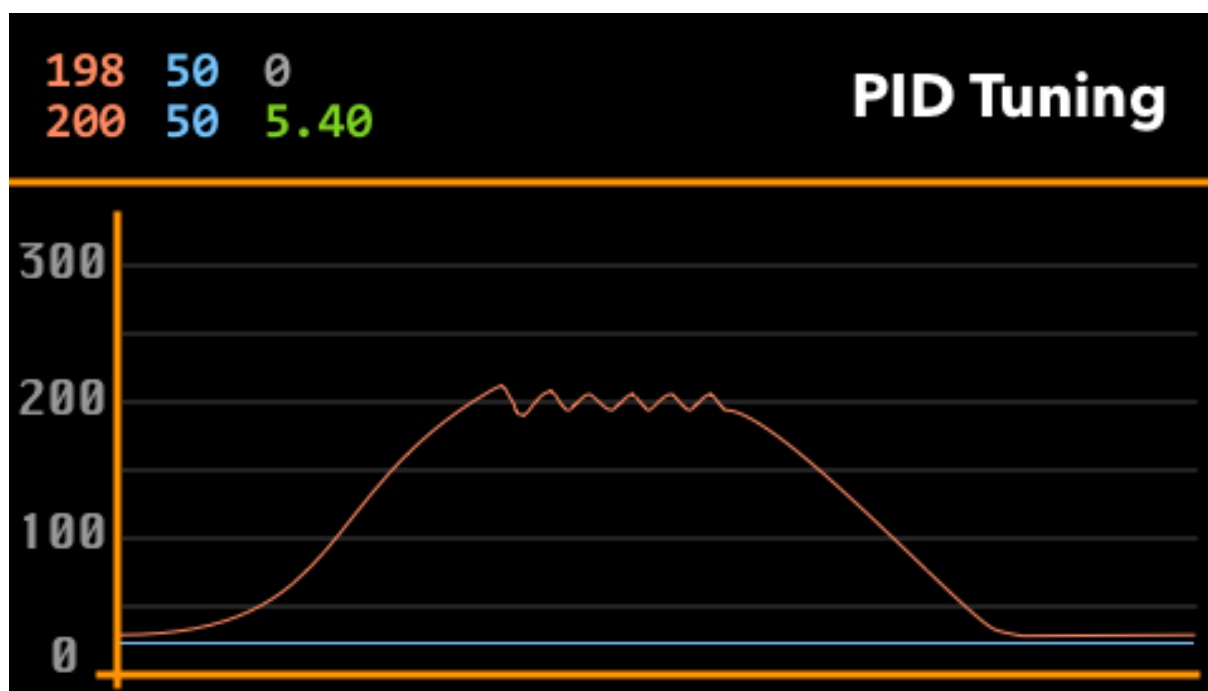
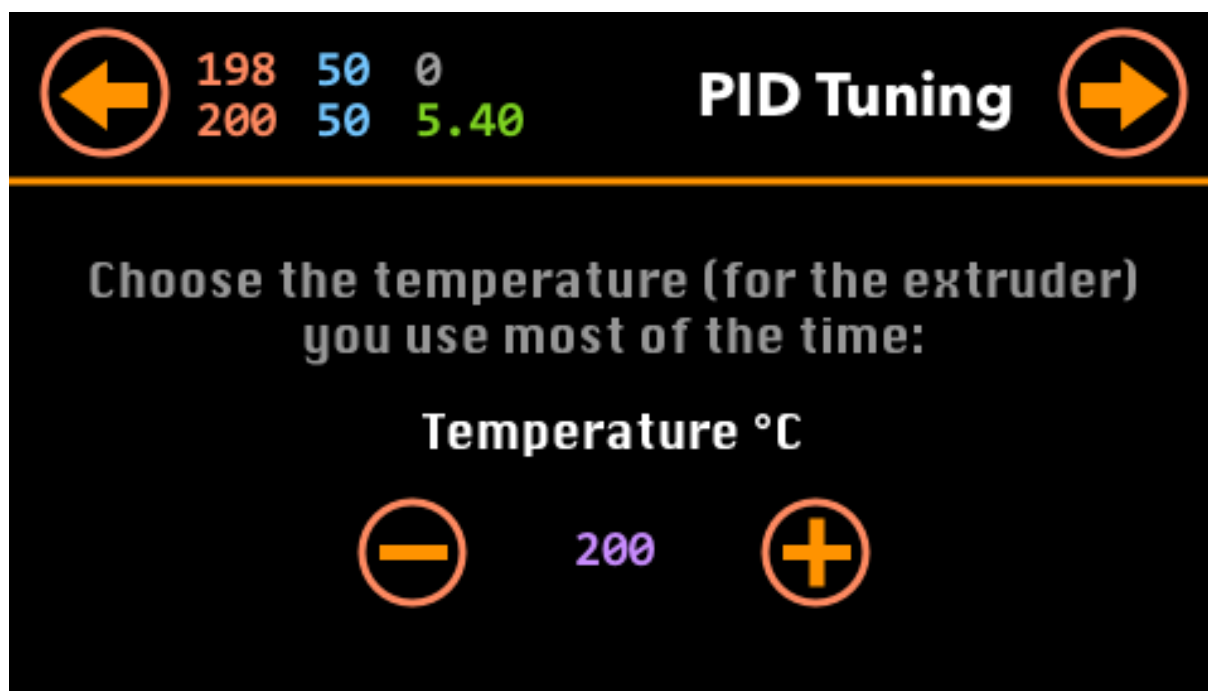
ADVi3 includes tools to help you tune some aspects of your printer.

Extruder Tuning

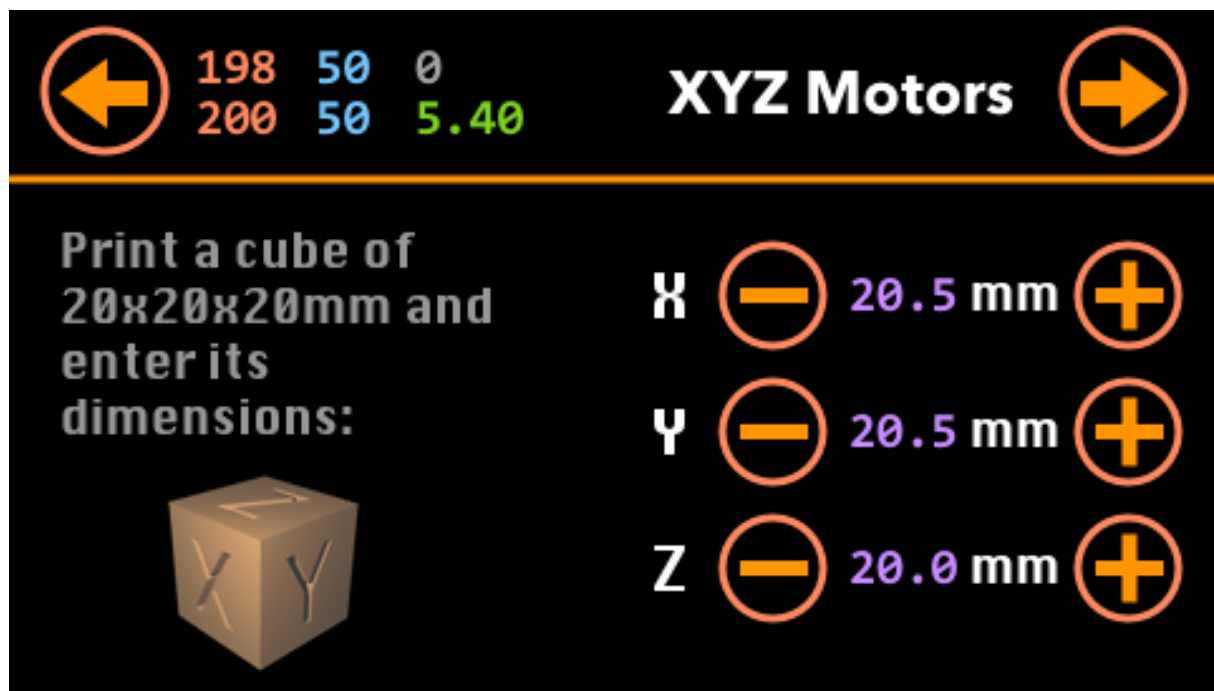


In general, you only have to do this **once** except if you change radically your extruding temperature or if your environmental conditions change, such as humidity, or if you change the insulation on the heater block, such as switching to a silicone sock.

PID Tuning

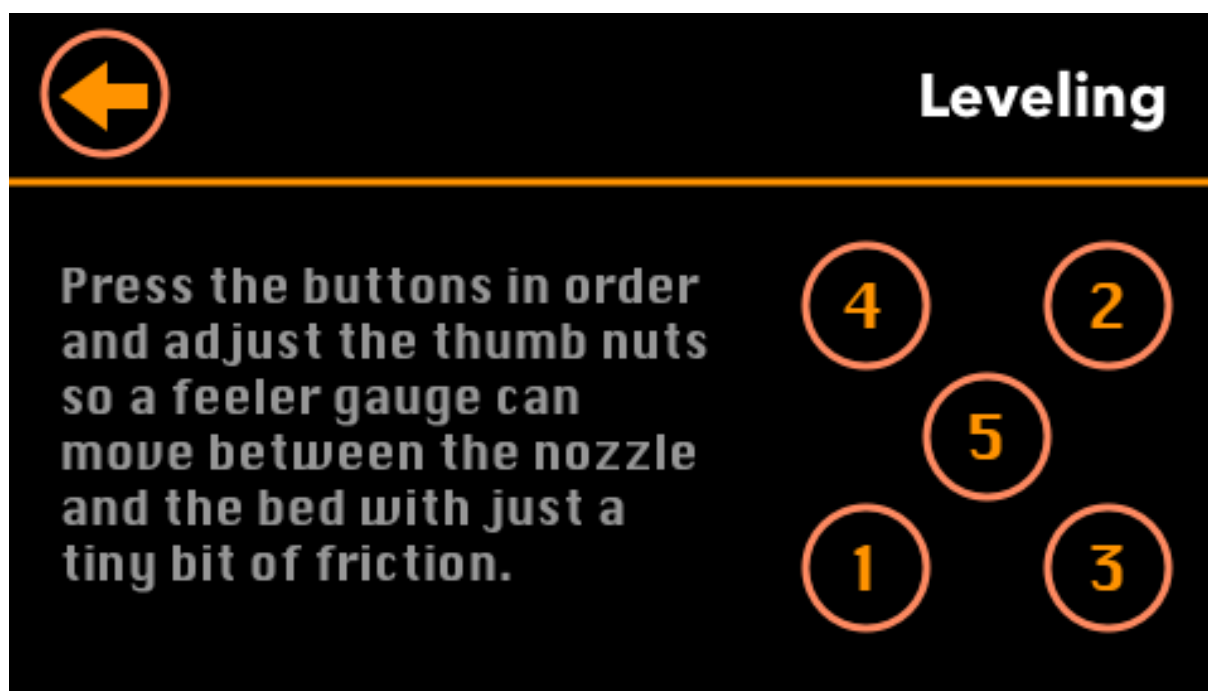


In general, you only have to do this **once** except if you change radically your extruding temperature or if your environmental conditions change (such as humidity).

XYZ motors Tuning

In general, you only have to do this **once** because these parameters do not change with time. You have to redo this if you change the stepper motors or if you adjust the drivers current (on the mainboard).

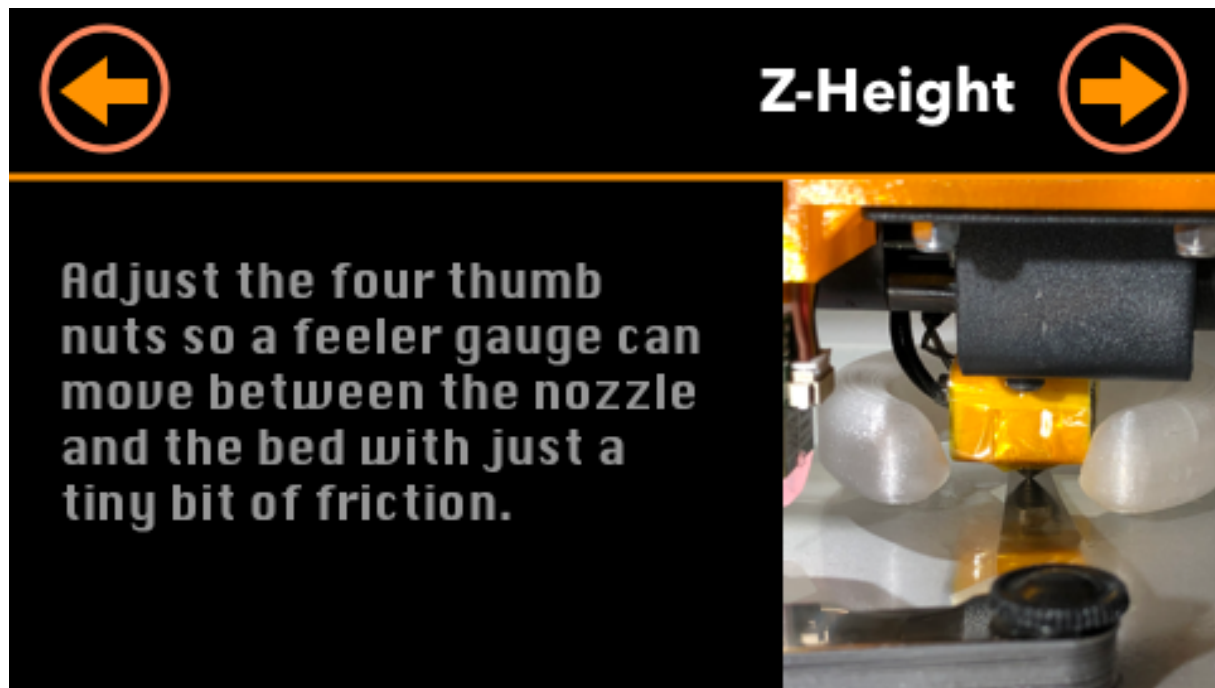
Manual leveling



You only have to do this if you do not have a sensor (such as BLTouch).

You have to do this frequently (almost before each print) and it is sometimes difficult to level all the points if your bed or other parts, such as linear rods, are bent.

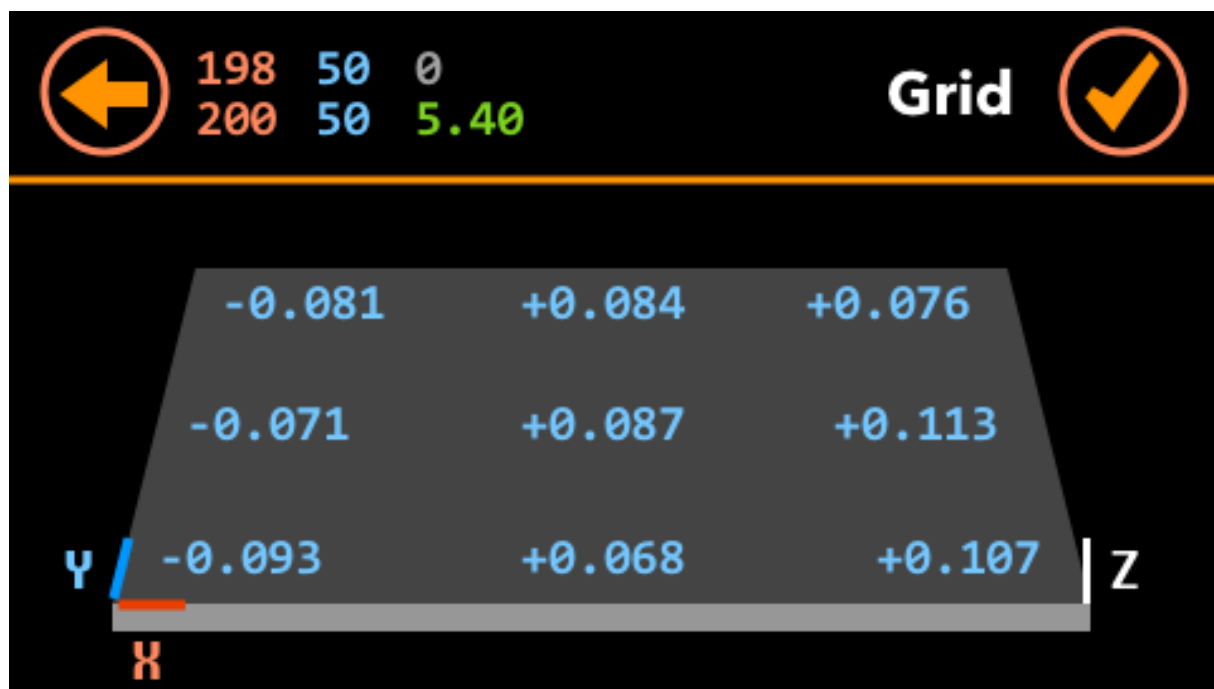
Sensor Z-height



You only have to do this if you have a sensor (such as BLTouch).

You only have to do this from time to time especially if you move or disassemble parts such as the extruder.

Sensor Bed Leveling



You only have to do this if you have a sensor, such as the BLTouch. You can also do this, without displaying the grid, using the [G29](#) command either from a G-code start script or manual command.

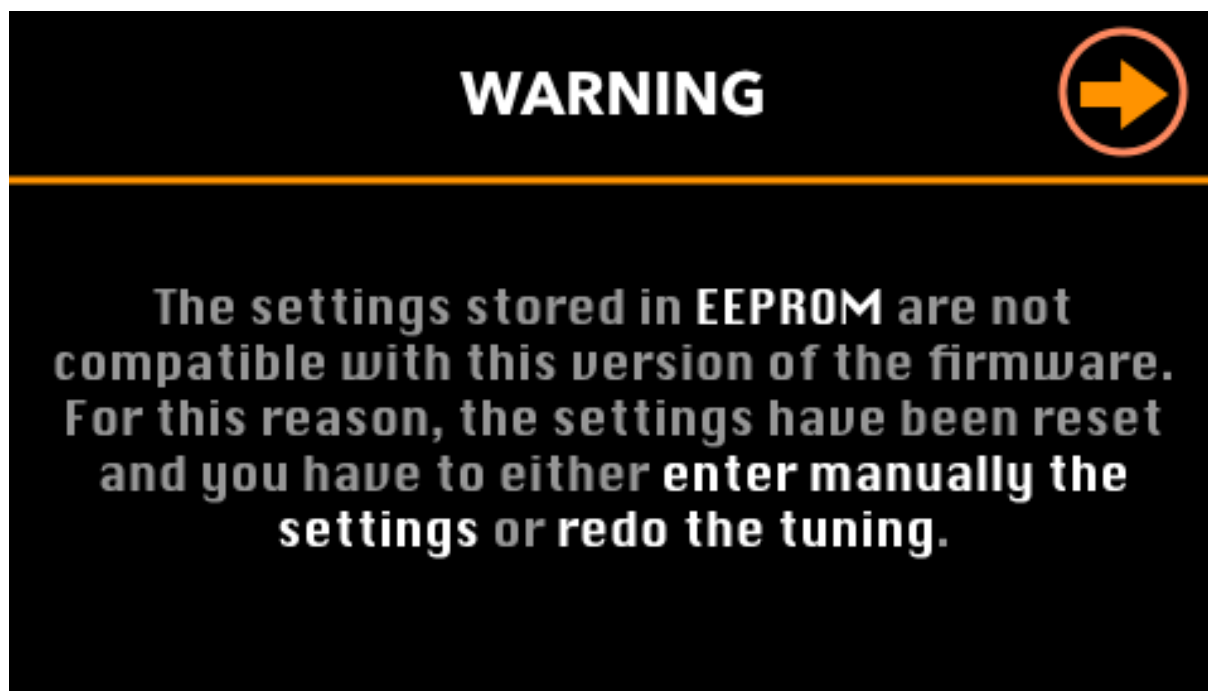
Reset Settings



If you reset settings, you will have to either perform the tunings again or reenter each of the settings.

Flashing of new firmware version

If you flash a new firmware (especially a major version number), you may lose your settings and you have to either perform again the tunings or reenter the different settings.



Default Configuration

The default parameters of this firmware are the following:

Settings	Default values
Step Settings	
X	81
Y	81
Z	400.5
E	94.30
PID Settings	
P	33.41
I	1.47
D	189.27
Feedrate Settings	
Max X	450

Settings	Default values
Max Y	450
Max Z	5
Max E	25
Min	0
Travel	0
Acceleration Settings	
Max X	1000
Max Y	1000
Max Z	100
Max E	1000
Print	800
Retract	800
Travel	800
Jerk Settings	
X	8
Y	8
Z	0.4
E	1.0

Resources

- [ADVi3++ Source Code](#)
- [ADVi3++ Patreon Project](#)
- [ADVi3++ Facebook Page](#)
- [Marlin - Open Source 3D Printer Firmware](#)
- [RepRap, humanity's first general-purpose self-replicating manufacturing machine.](#)
- [Duplicator i3 Plus Facebook Group](#)
- [PrusaPrinters Calculator](#)
- [ANTCLABS web site](#)

Note: *In the past, it was possible to download the following resources directory from the dwin.com.cn website. That is no more the case so I have copied them into the **ADVi3++** repository.*

- DMT48270M043_05W (LCD Touch Display) Datasheet
- DWIN DGUS Display Development Guide version 4.0 - 2014
- DGUS SDK User Guide 5.1
- DGUS SDK 5.1 Setup - Windows only