PRUSA RESEARCH by JOSEF PRUSA

1. Introduction

Some tips for making the assembly easier.

Written By: Dozuki System

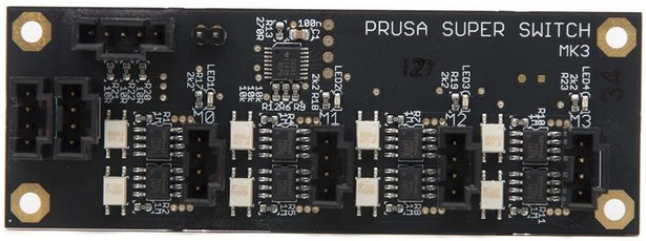
Step 1 — A few words before we start

We **HIGHLY** recommend to have a good experience with the Original Prusa i3 MK2/S printer first, proceed to upgrading after that.

We on the other hand **do not recommend** upgrading for the multi material right after getting your new printer. Neither to freshly assembled nor even building it by **skipping steps in the manual during normal assembly** and replacing them with steps for multi material. It could get complicated and would cause a lot of troubles!

Please take your time during the assembly process, don't rush it so you can enjoy printing wonderful multi coloured/material prints as shown in the picture.

Step 2 — Important notice

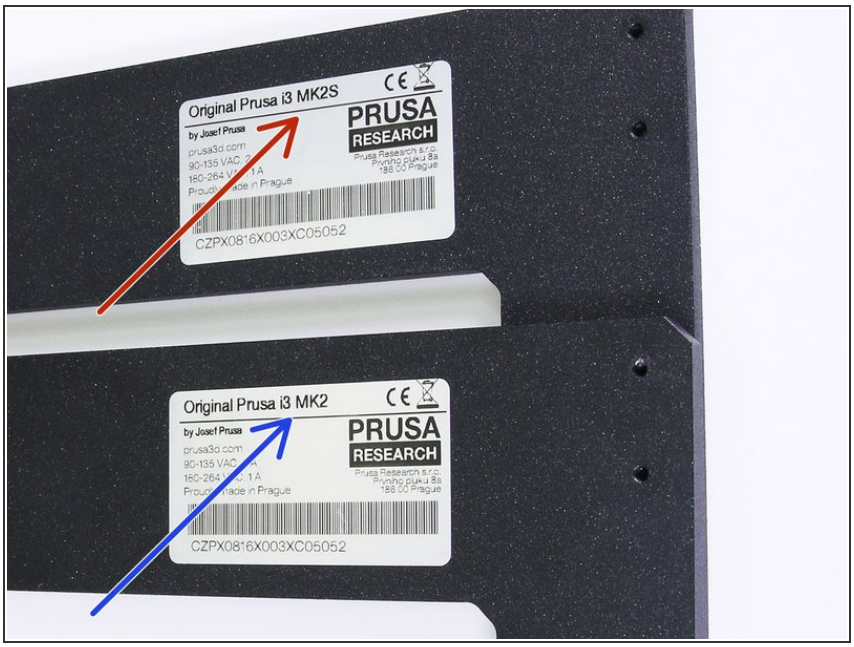


- The electronics boards, especially the super switch boards, are sensitive to ESD (Electrostatic discharge) so please keep that in mind when operating with them.

⚠ When unpacking and handling the super switch board, take extreme care and do not touch the chips on the board. Handle it by the edges or connectors!

⚠ Not following this simple rule can cause unexpected behaviour of extruders which will make it unusable! So **please follow** this simple rule so you can **enjoy** hassle free printing.

Step 3 — Original Prusa i3 MK2 vs MK2S

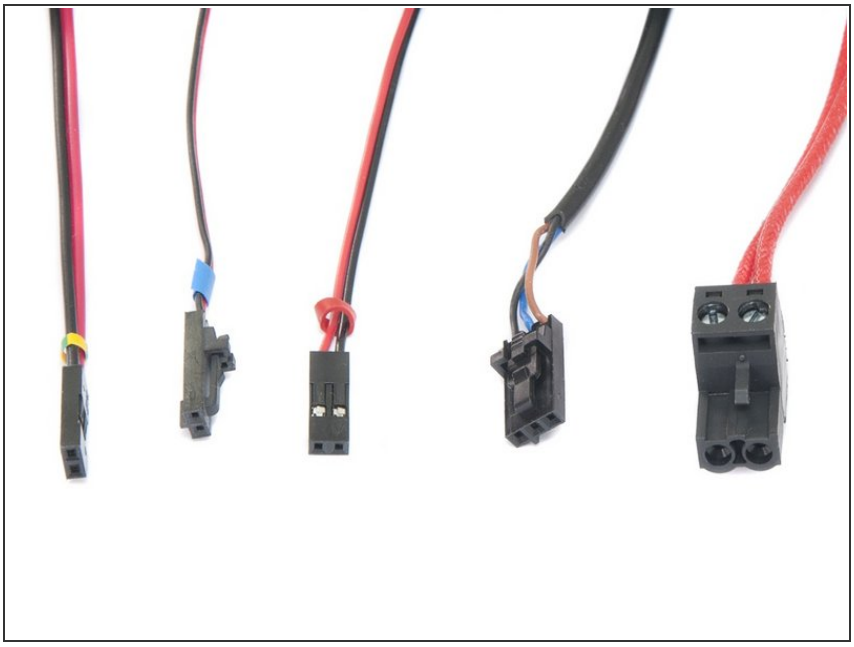


Original Prusa i3 MK2S is a successor to Original Prusa i3 MK2 with small hardware tweaks for an easier assembly and improved reliability.

- Take a look at the aluminium frame (Z axis), there is a sticker with the model name of the printer. Keep your model in mind during the assembly.

If you already upgraded your **MK2** to **MK2S** using the official upgrade kit, please treat your printer **MK2S** even though the sticker states MK2.

Step 4 — No soldering, no crimping



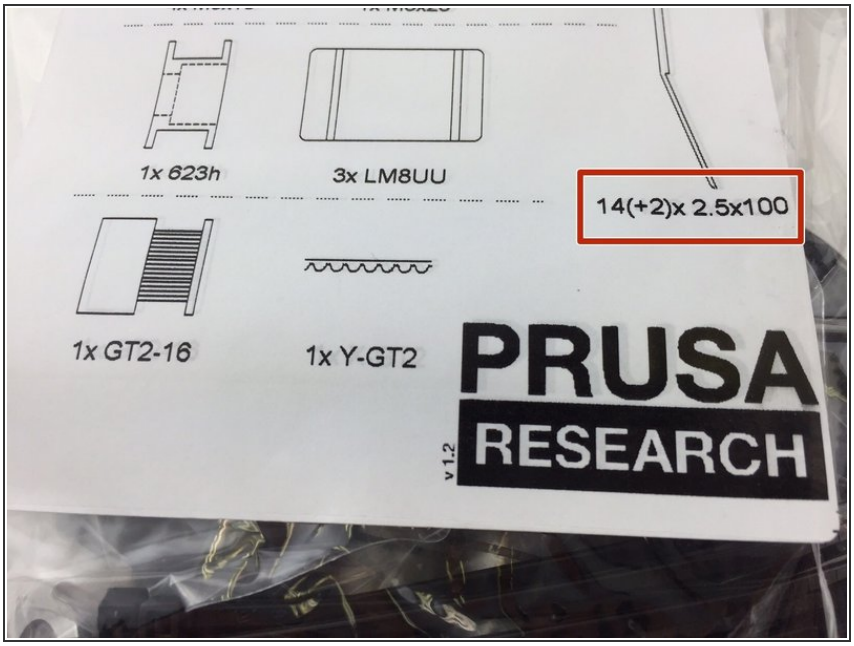
No soldering is required.

No wire crimping is required.

Step 5 — Labels guide

- All the boxes and bags including parts for build are labeled.
- Number (or numbers) in the header tells you which chapter you'll need that bag (or box) for.

Step 6 — Critical parts include spares back-up

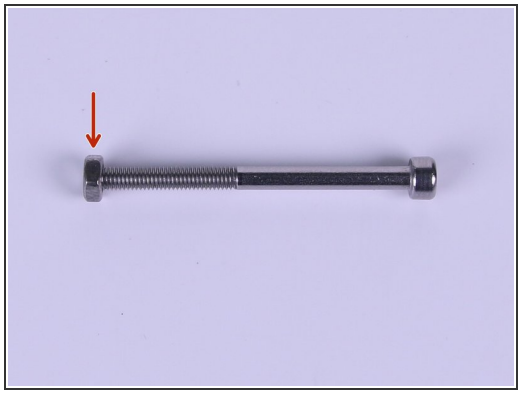


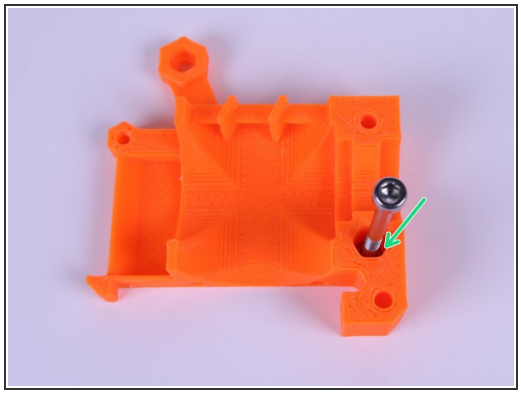
- Critical parts, like zipties, have a spare included as a back-up option. How much we included as spares is written in the bracket.
- No need to worry if you mess up during the assembly with the extras added.

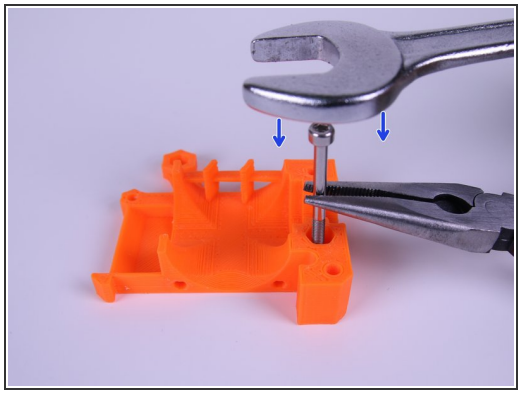
Step 7 — Use labels for reference

Most of the labels are scaled 1:1 and can be used to identify the part :-)

Step 8 — Nut insertion tip





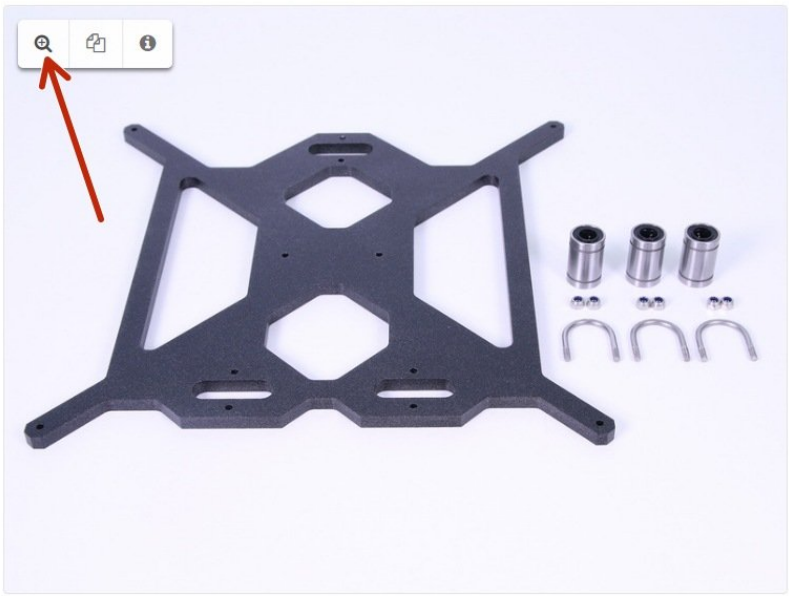


If you're experiencing troubles with getting nuts into correct places, just follow these simple steps.

- Screw M3 nut a bit on a long screw (M3x40 works in most cases).
- Push the screw with the nut into the hole where it is supposed to be.
- Grab the screw with pliers and gently hammer the nut in place using a wrench.

If you use a screw from a different bag then you are using at the moment, don't forget to return it back into the bag.

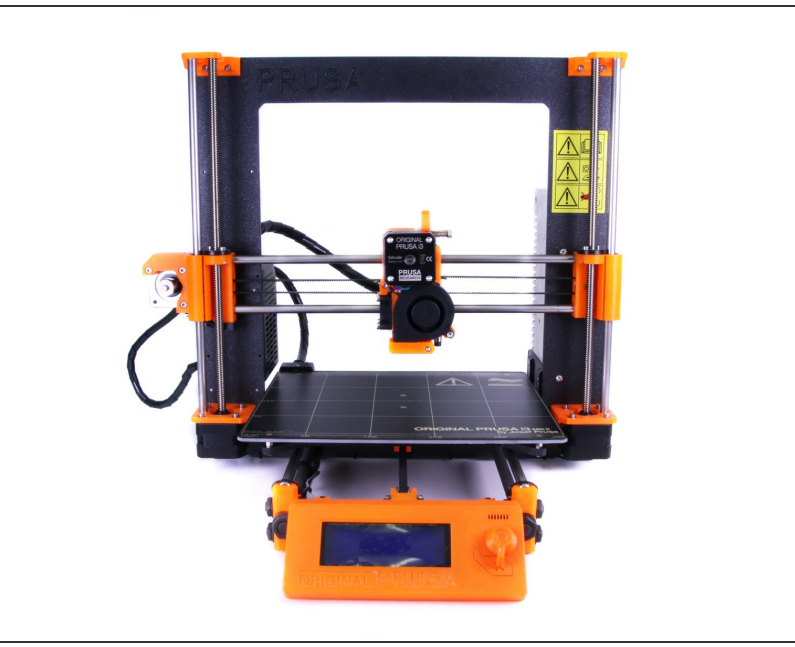
Step 9 — View high resolution images



When you browse the guide on http://manual.prusa3d.com, you can view the original images in high resolution for clarity.

- Just hover your cursor over the image and click the Magnifier button ("View original") in the top left corner.

Step 10 — Let's start with the upgrade!



- It is time to start disassembling the printer. Choose your printer below:
- For **MK2** - You can start by disassembling extruder in the next chapter - 1A. MK2 Extruder disassembly
- For **MK2S** - You can start by disassembling extruder in the next chapter - 1B. MK2S Extruder disassembly

If you are unsure, what printer version to choose from, please head back to Step 3.

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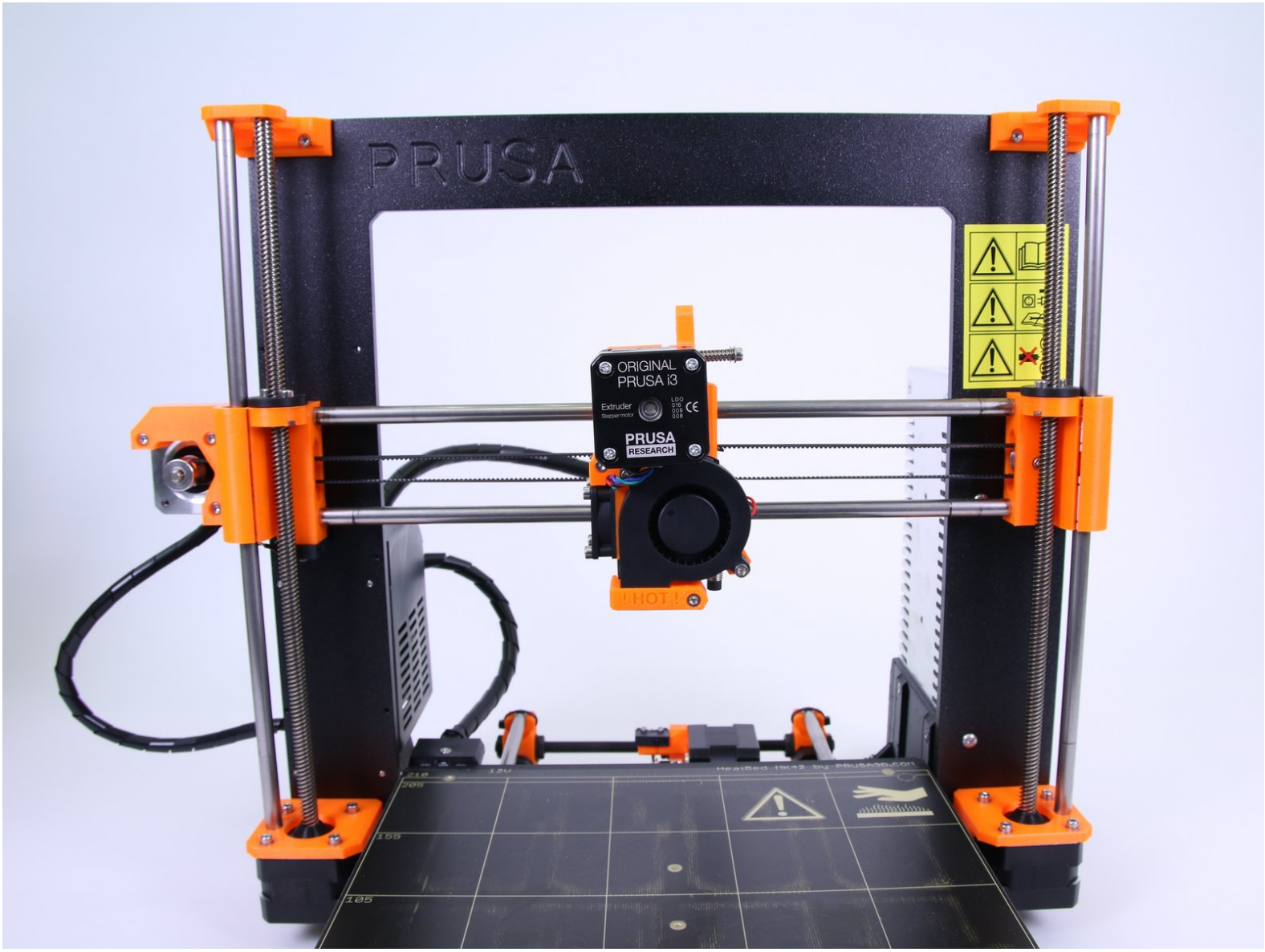
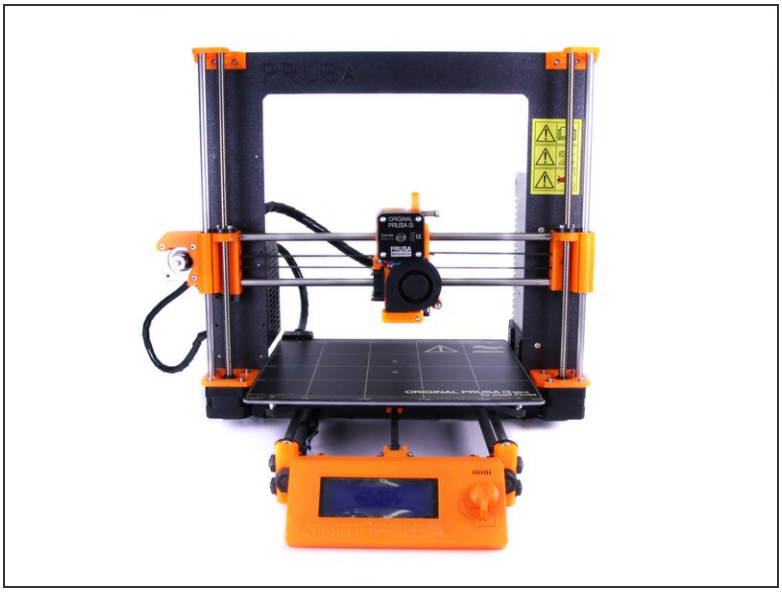
2A. MK2 Extruder disassembly

Written By: Josef Prusa



Step 1 — Preparing the printer

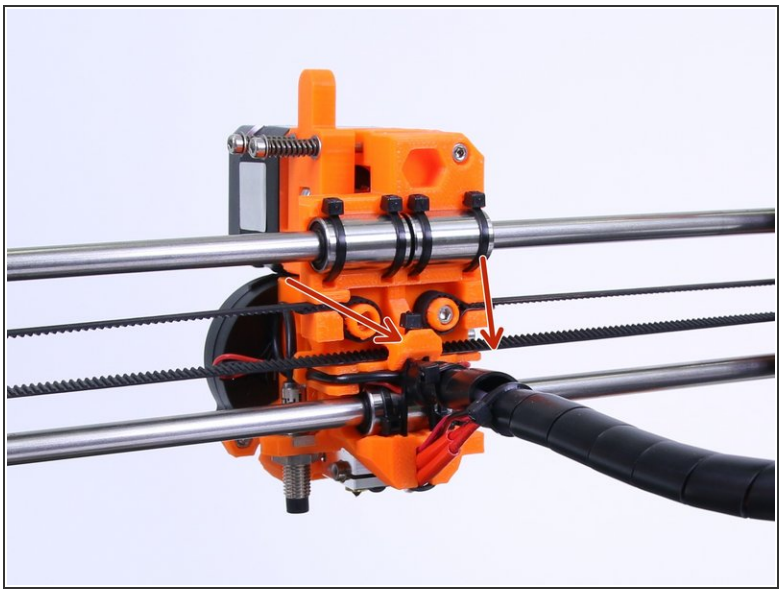


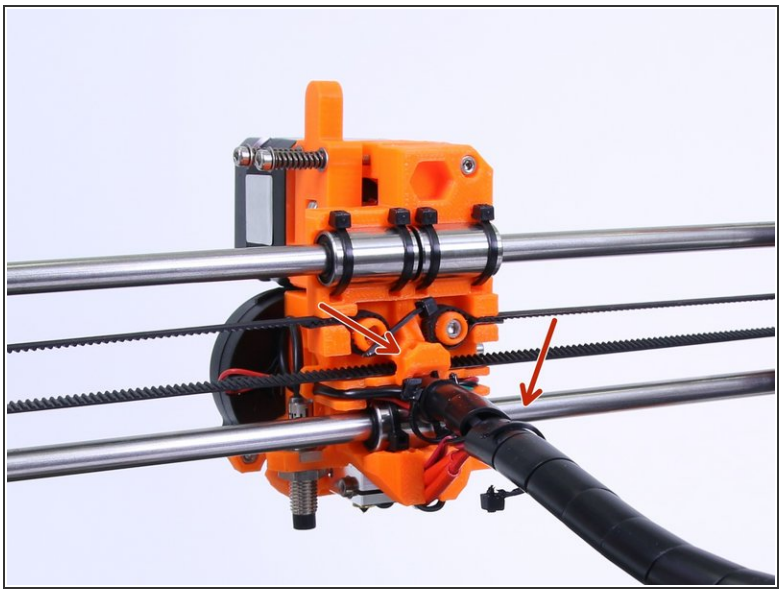
⚠ Ensure the printer is **turned off and not plugged in!!!** Also check the **filament is unloaded** from the Extruder!

- Prepare tools included in the MK2 kit or get similar set from the nearest hardware store. In the Multi Material kit you will receive a wrench and Allen keys.
- Prepare the Multi Material upgrade kit received from Prusa Research.

ⓘ We strongly recommend getting a box or a bowl for nuts and screws. You will need some of them later during the assembly.

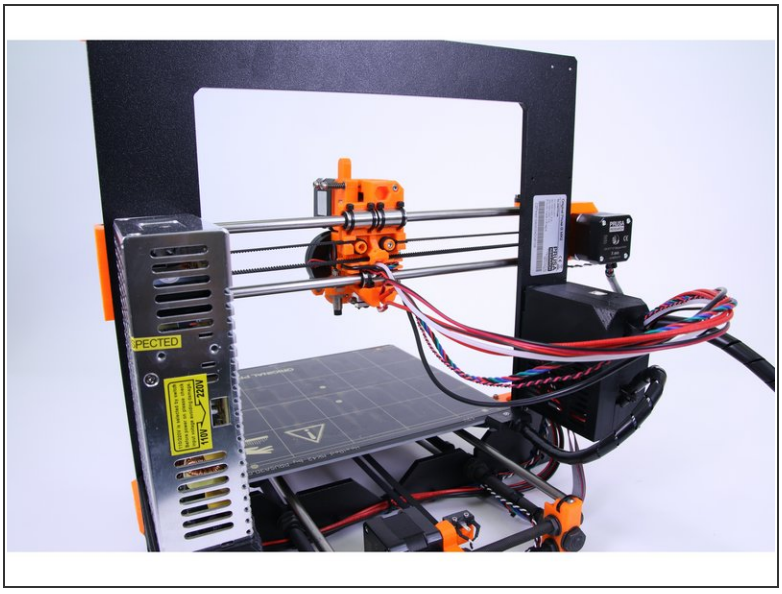
Step 2 — Undo zipties





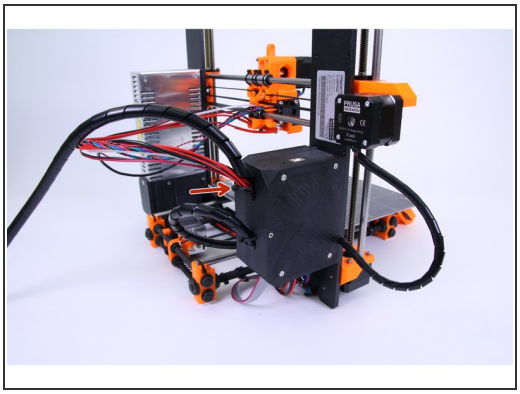
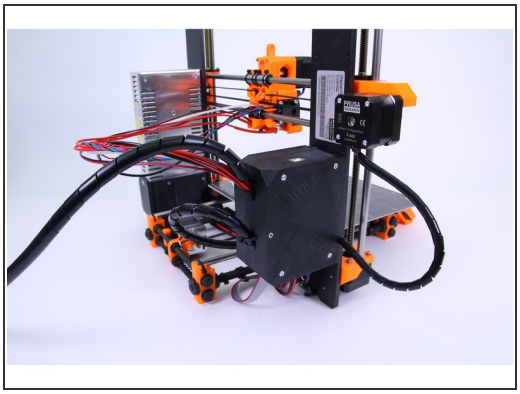
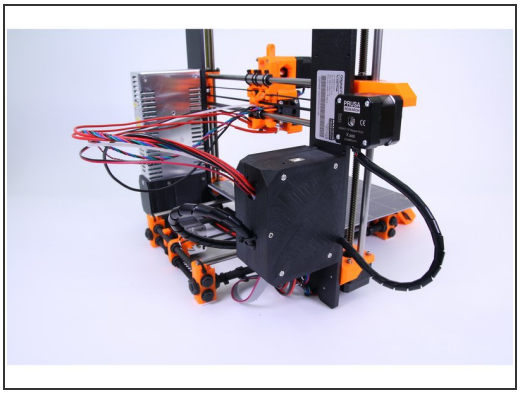
- Using pliers, cut and remove the zipties holding the spiral wrap as shown in the picture.

Step 3 — Undo spiral wrap



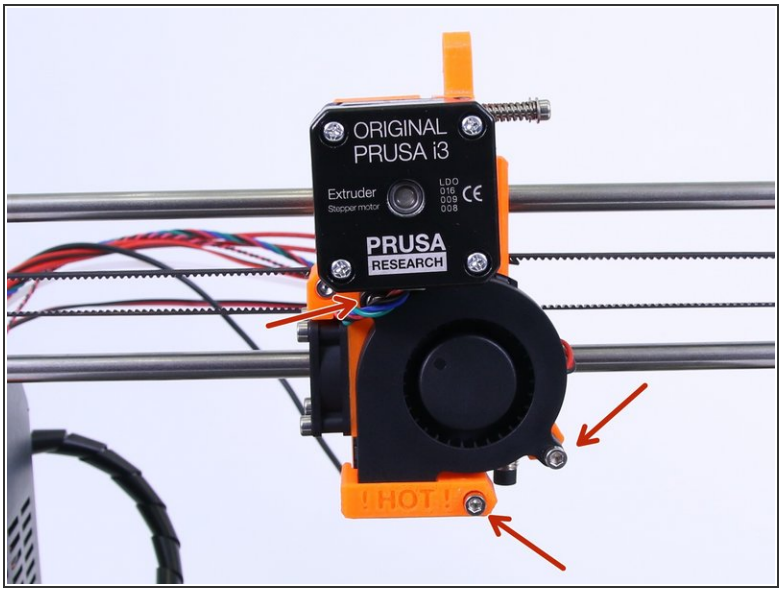
- Undo the spiral wrap as shown in the picture.

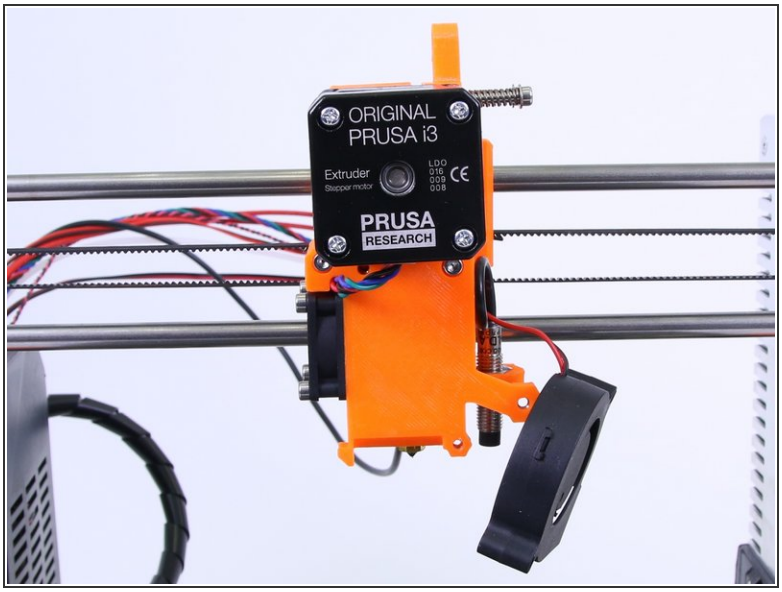
Step 4 — Remove spiral wrap

- Cut the ziptie holding the extruder wires.
- Completely remove spiral wrap as shown in the picture.

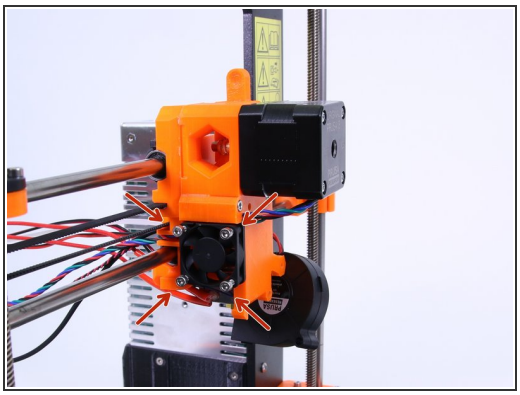
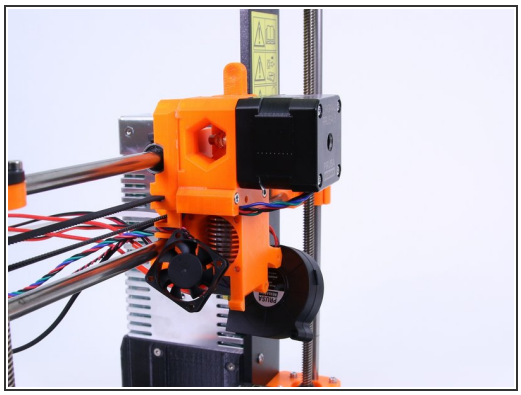
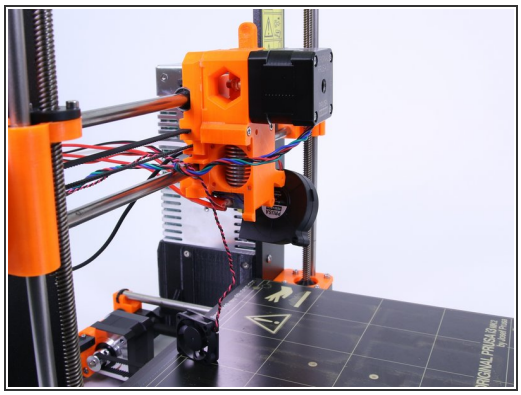
Step 5 — Remove Front print fan and nozzle





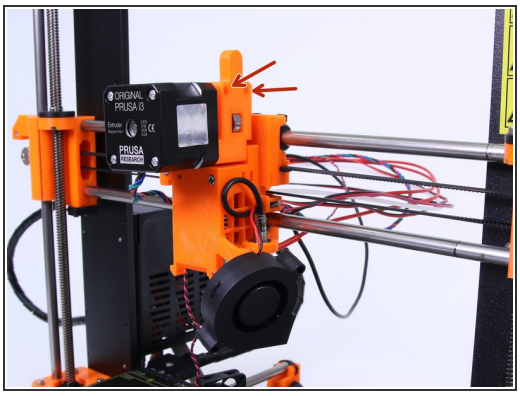
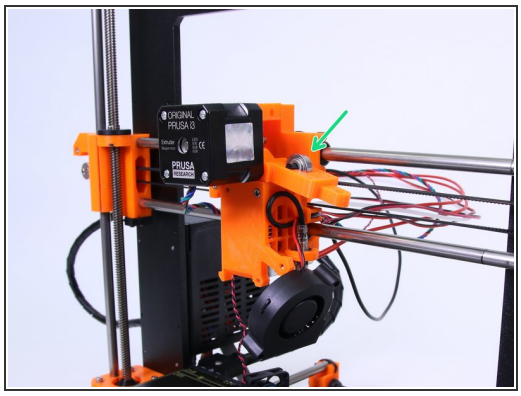
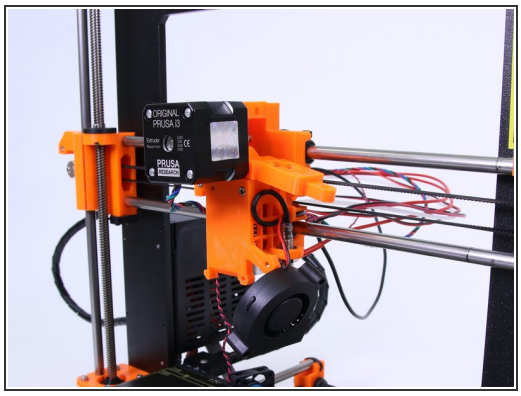
- Remove 3 M3x20 screws holding the Front print fan and the fan nozzle.

Step 6 — Remove Left hotend fan

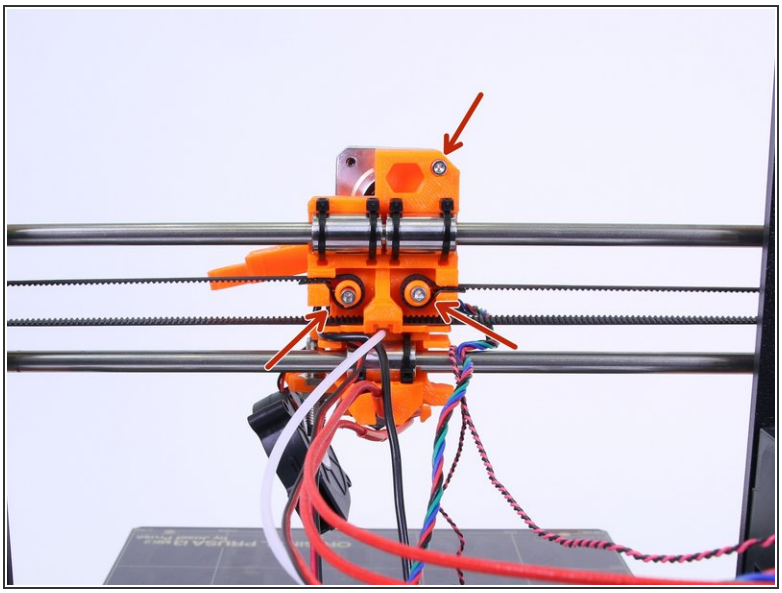
- Undo 4 M3x18 holding the Left hotend fan.
- Remove the Left hotend fan as shown in the picture.

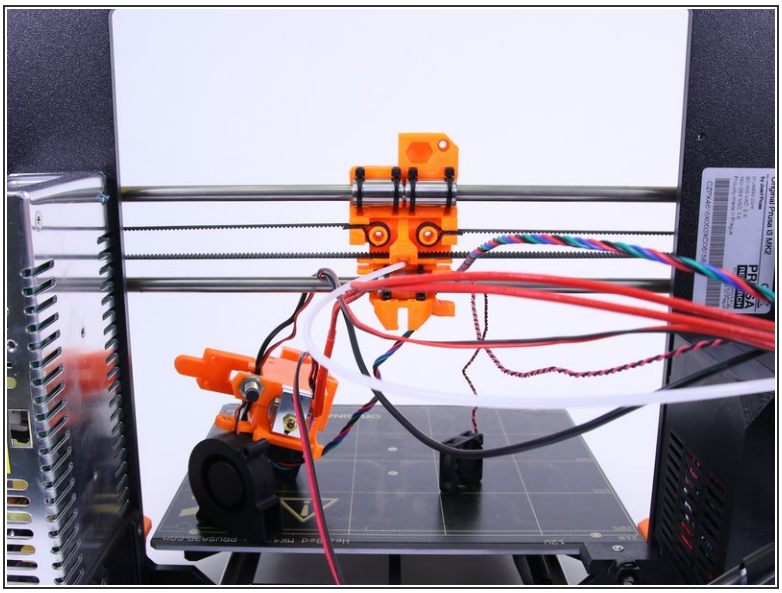
Step 7 — Extruder idler disassembly

- Remove 2 extruder idler screws.
- Open the extruder idler and remove the bearing on the shaft.

Step 8 — Remove extruder

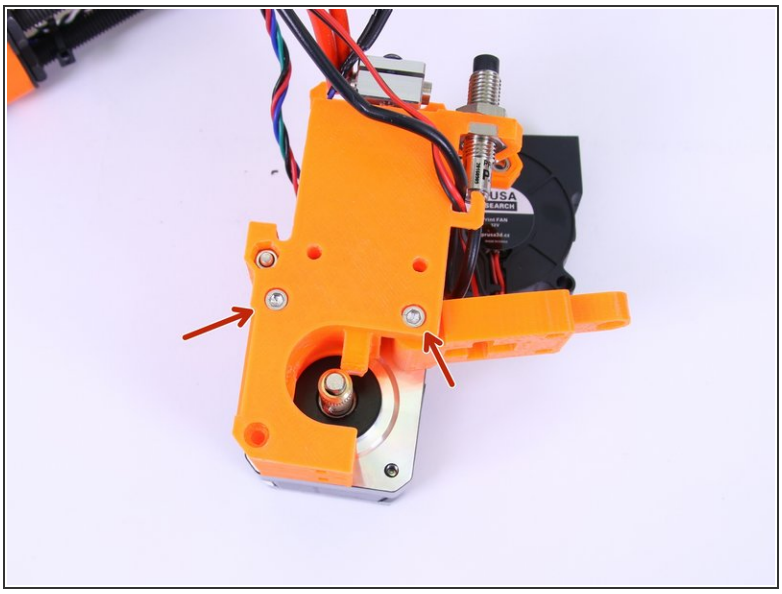


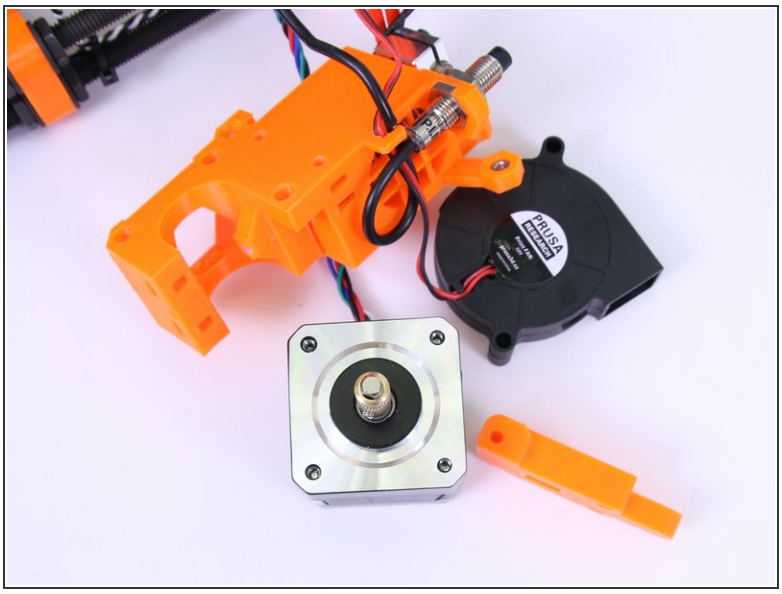


- Undo the screws holding the extruder as shown in the picture.
- Remove the extruder from the printer.

⚠ From now on, be extremely careful with the wires, they are fragile, handle them with extra care!

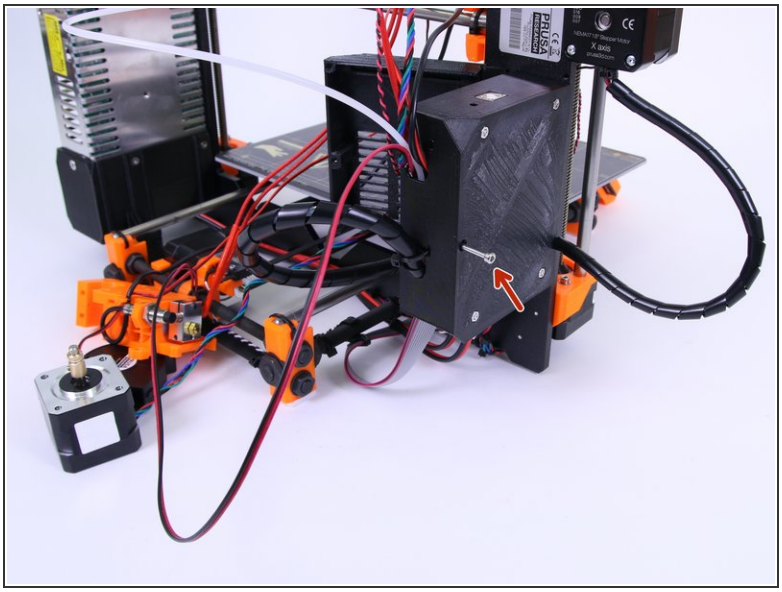
Step 9 — Remove extruder motor





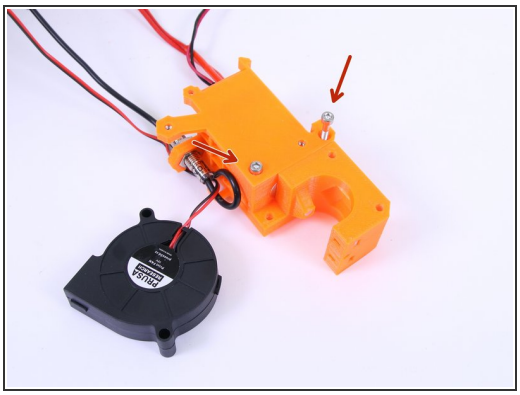
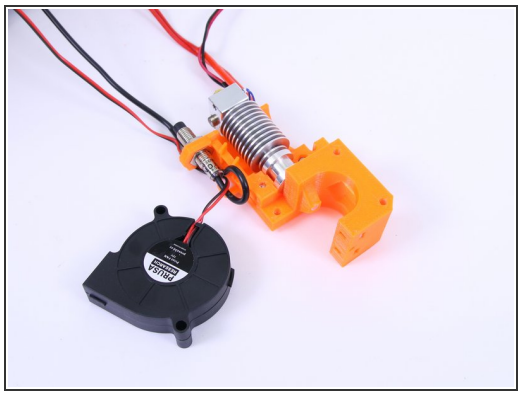
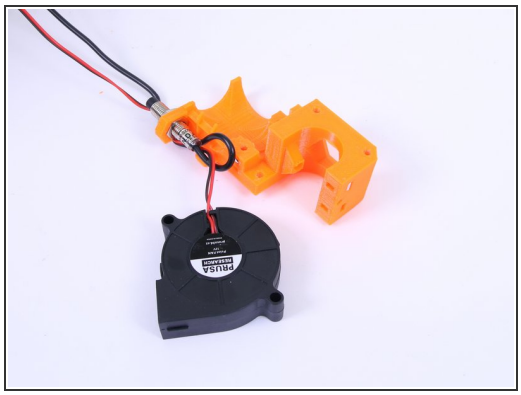
- Undo the screws holding the motor.
- Remove the motor from the extruder.

Step 10 — Disconnect the motor



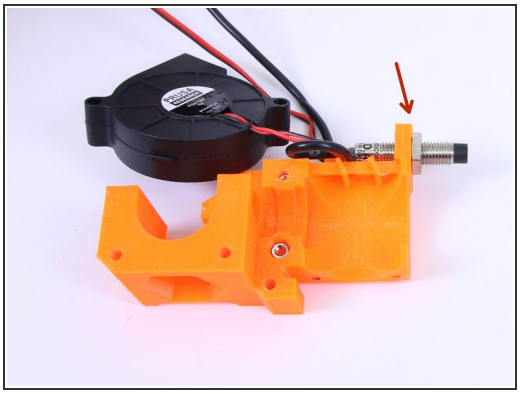
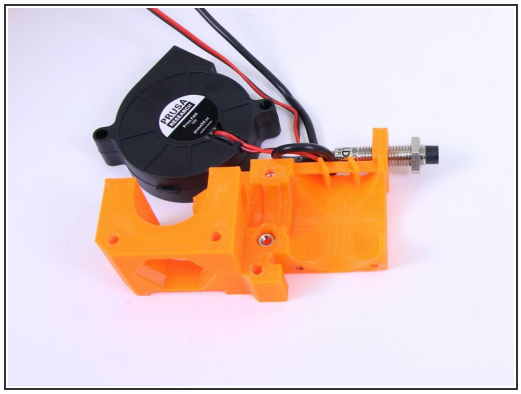
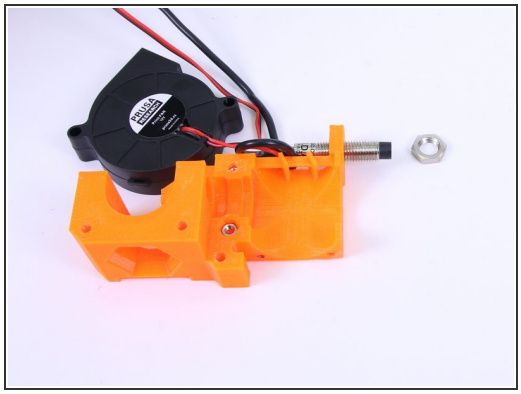
- Open up the RAMBo cover.
- Disconnect the extruder motor.

Step 11 — Remove the hotend

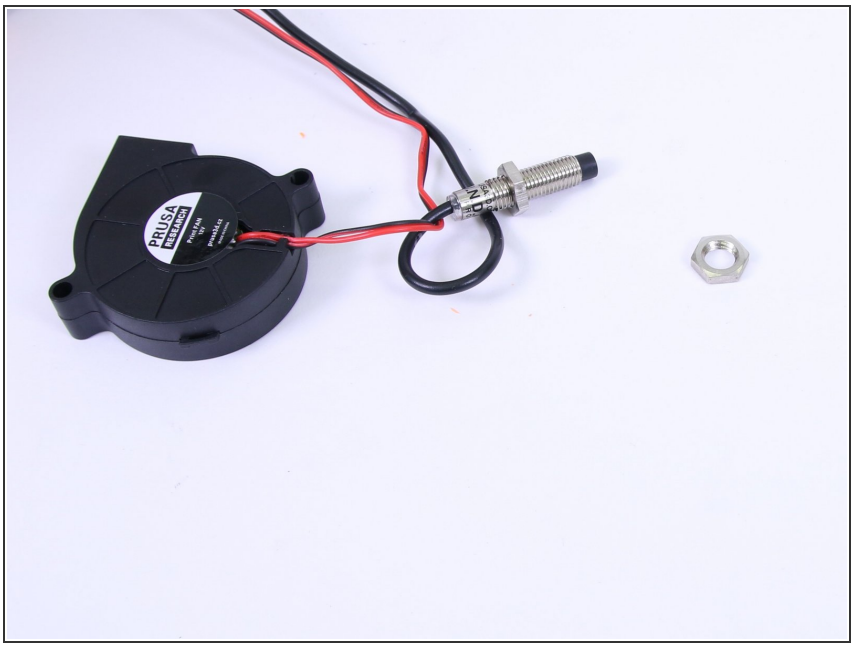
- Undo the screws holding the extruder cover.
- Remove the hotend from the extruder, disconnect it from the electronics and store it at a safe location. You're going to install a fresh one.

Step 12 — Remove P.I.N.D.A. probe

- Undo the M8x1 nut holding the P.I.N.D.A. probe.

Step 13 — Final step



- Remove the P.I.N.D.A. probe from the extruder.
- Disconnect the front print fan and the P.I.N.D.A. probe from the electronics.
- Ensure **both nuts** are taken off P.I.N.D.A. probe.
- Continue with assembling the Multiplexer: 2. Multiplexer assembly

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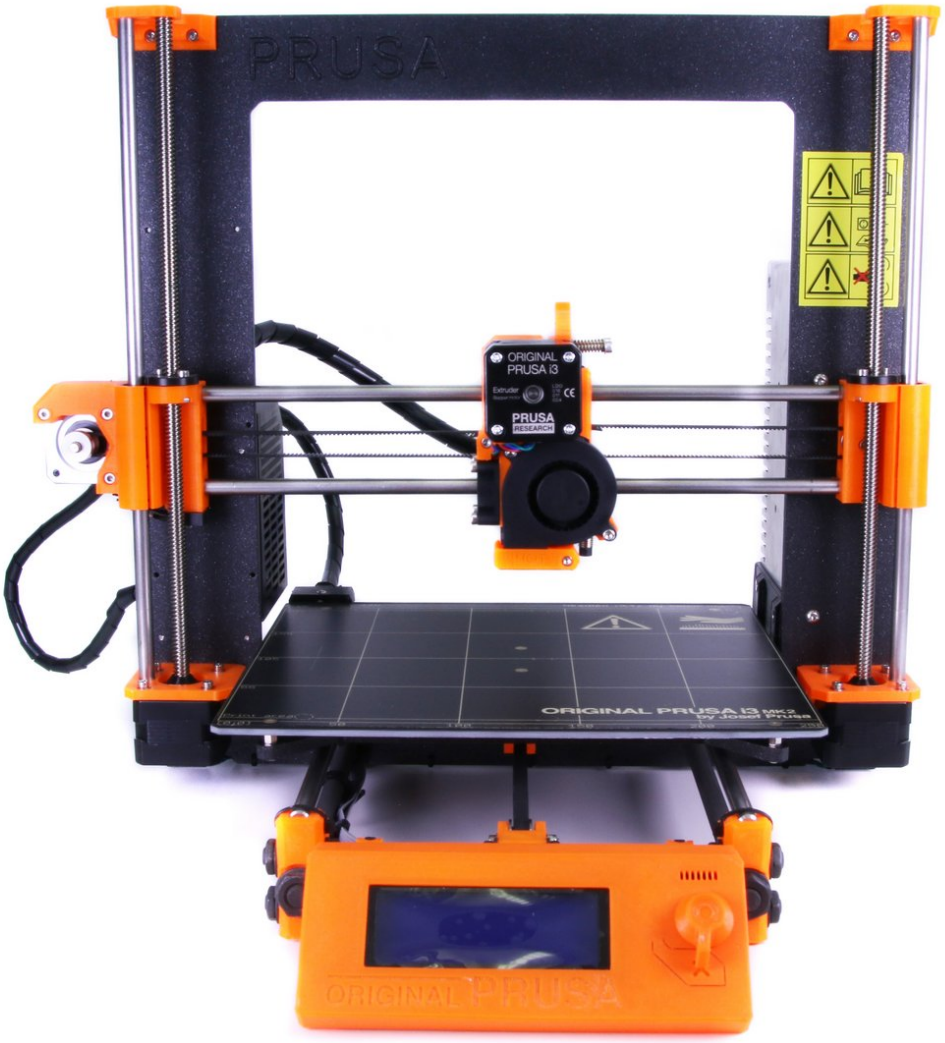
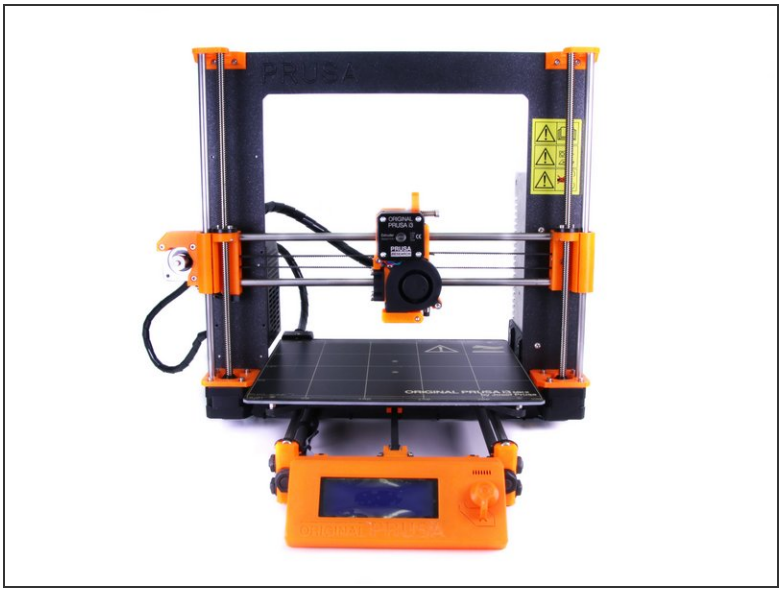
2B. MK2S Extruder disassembly

Written By: Jakub Dolezal



Step 1 — Preparing the printer

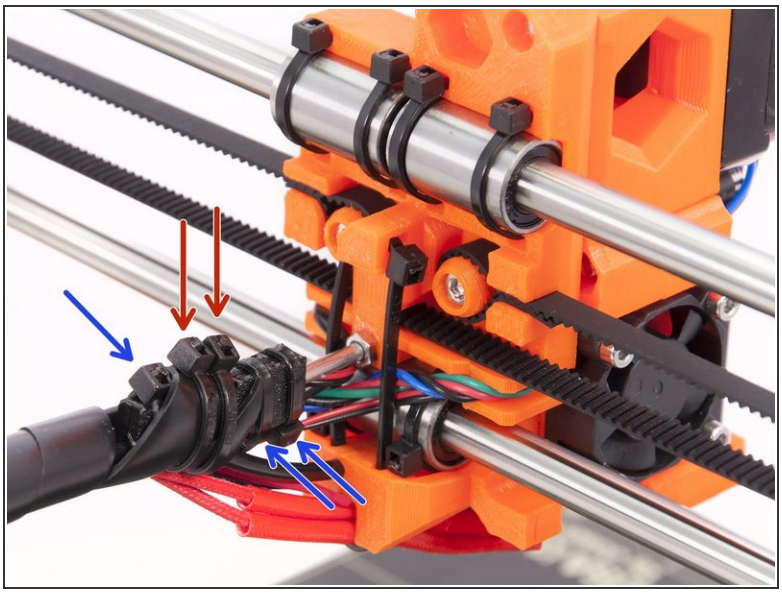


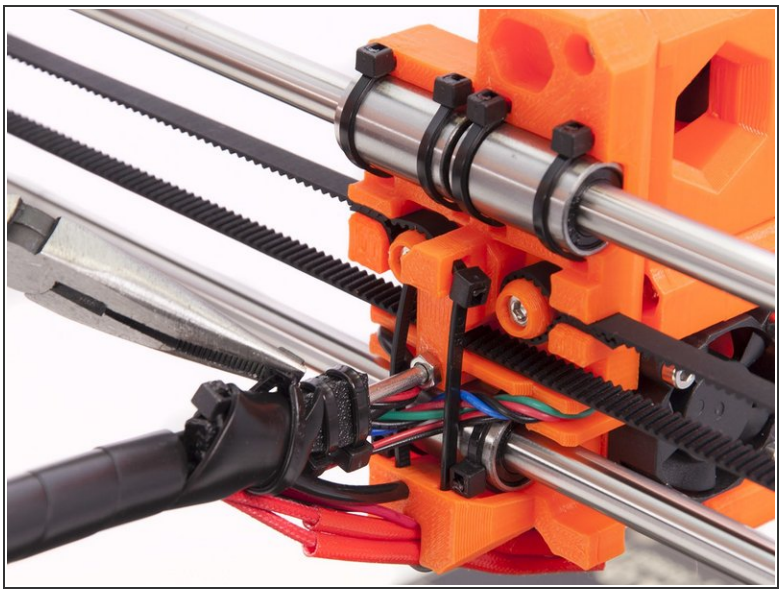
⚠ Ensure the printer is **turned off and not plugged in!!!** Also check the **filament is unloaded** from the Extruder!

- Prepare tools included in the MK2S kit or get similar set from the nearest hardware store. In the Multi Material kit you will receive a wrench and Allen keys.
- Prepare the Multi Material upgrade kit received from Prusa Research.

ⓘ We strongly recommend getting a box or a bowl for nuts and screws. You will need some of them later during the assembly.

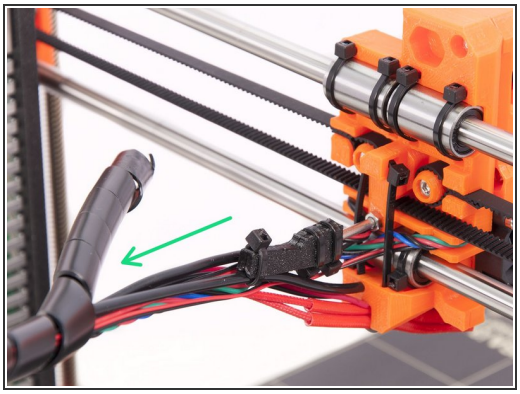
Step 2 — Removing the zip ties

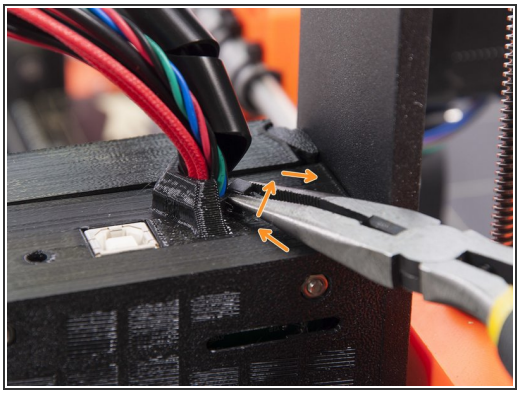


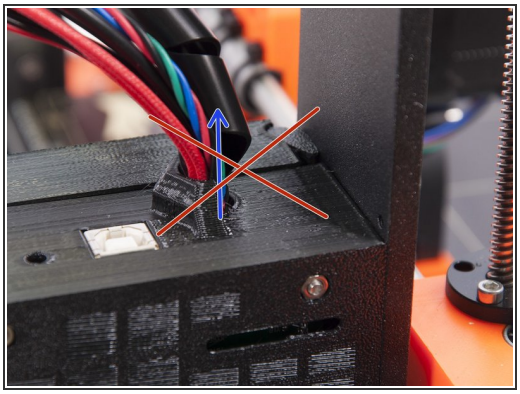


- Rotate the back of the printer towards you.
- Using pliers, cut and remove the zip ties holding the spiral wrap as shown in the picture.
- You can leave zip ties holding "black" cable holders.

Step 3 — Unwraping the spiral wrap



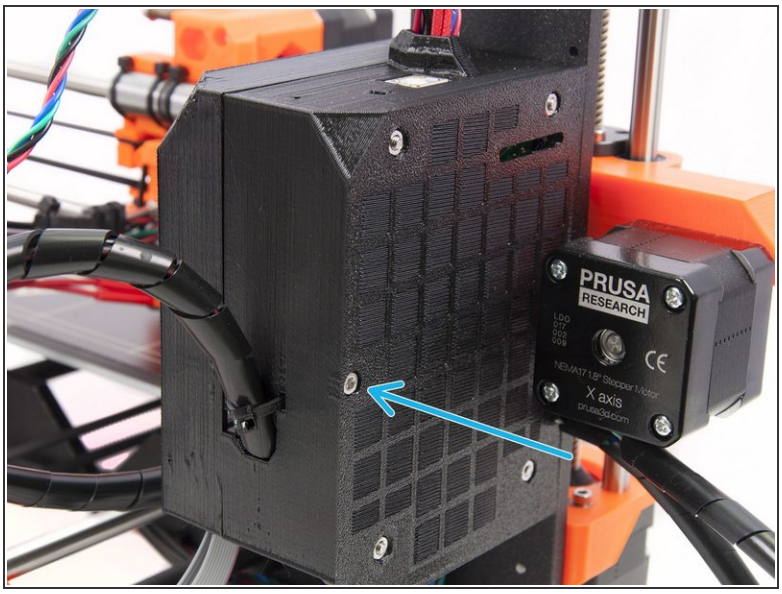


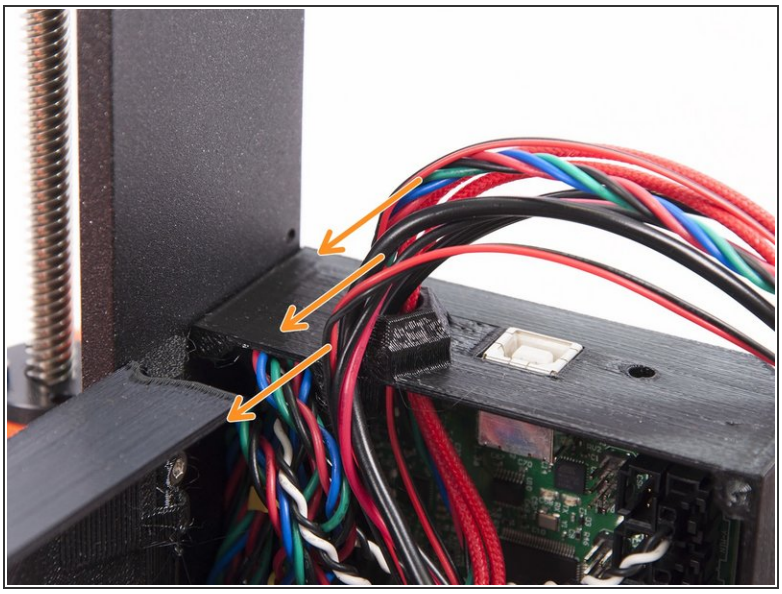


- Unwrap the spiral wrap all the way to the Rambo cover.
- Using pliers, gently twist the zip tie until it breaks, then remove it.

⚠ Don't try to remove the spiral wrap yet, it might be wrapped partly inside the cover and you can damage the cables. Wait for the next step!

Step 4 — Removing the spiral wrap

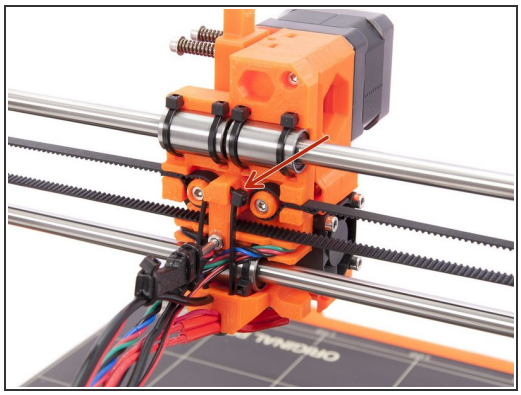
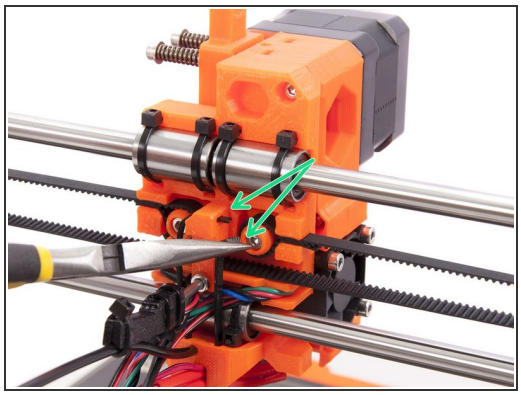
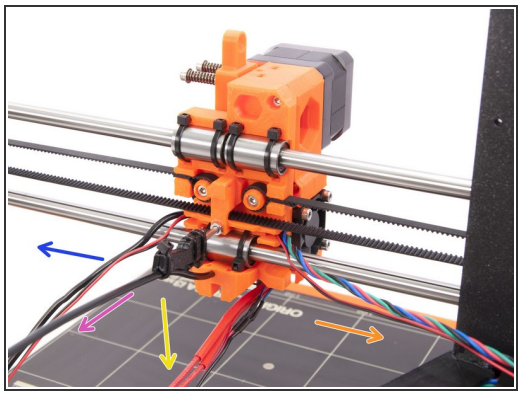




- Using 2.5 mm Allen key release the screw holding the RAMBO cover door.
- Unwrap spiral wrap inside the cover and remove it completely.
- Gently take all the cables away from the top opening. Proceed with caution and don't pull, you need to unplug the connectors first.

⚠ !!! Carefully unplug the connectors of the Extruder. **Do not pull the wires**, but reach inside the cover and grab the connector (release the safety PIN if needed first) !!!

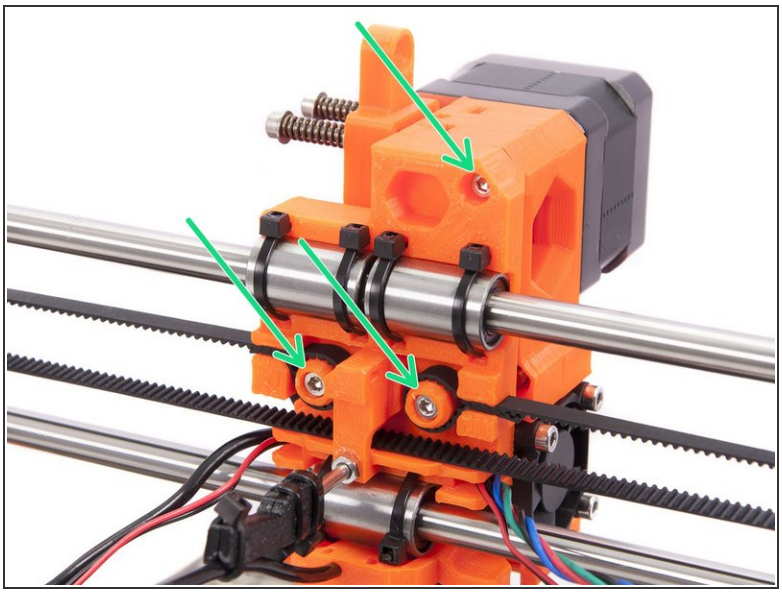
Step 5 — Preparing extruder removal

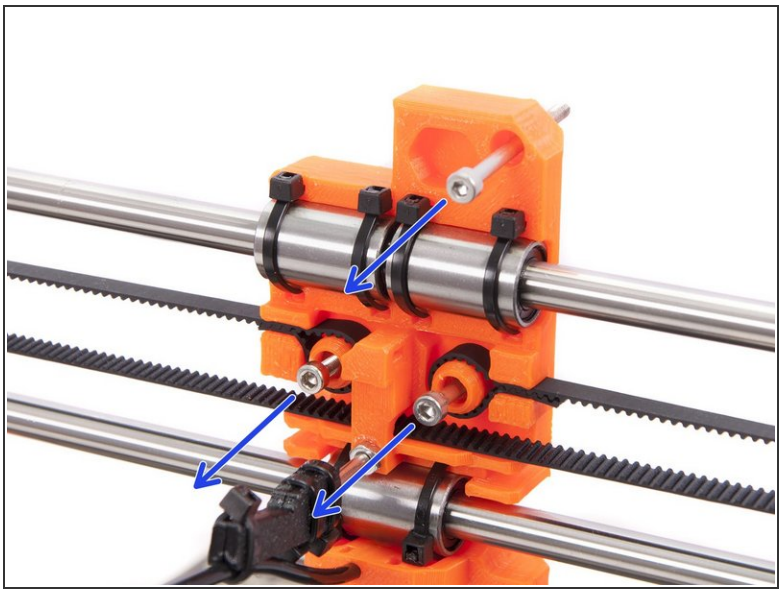




- Locate a zip tie on the back of the extruder.
- Using pliers, gently twist the zip tie until it breaks.
- Split the cables in the following order (last picture):
- The front fan and the P.I.N.D.A. probe to your left.
- Nylon leave untouched.
- Heater cables and the thermistor press slightly below the X-axis (be careful).
- The left hotend fan and the extruder motor cable go to the right.

ⓘ Ensure the ends of the cables with connectors are separated from each other properly.

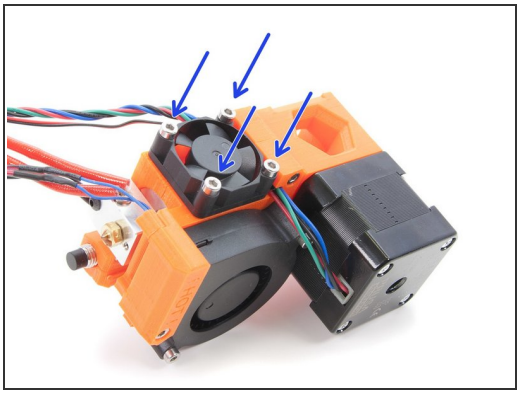
Step 6 — Removing the extruder

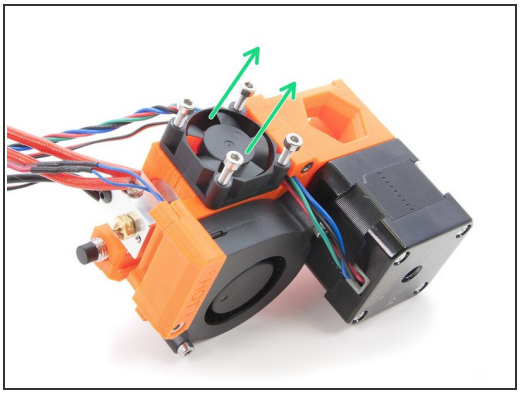


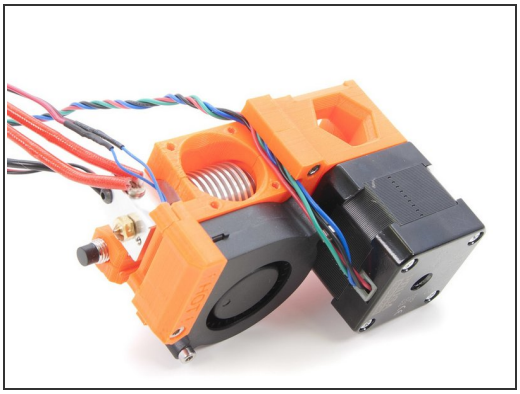


- Using the 2.5mm Allen key release all three screws. When releasing the last screw, **hold the front part of the extruder**, it will fall down!
- Take all three screws away and put them in a box, you will need some of them later.
- Leave the rest of the X-carriage untouched (in case of MK2S).

Step 7 — Extruder disassembly - Part 1

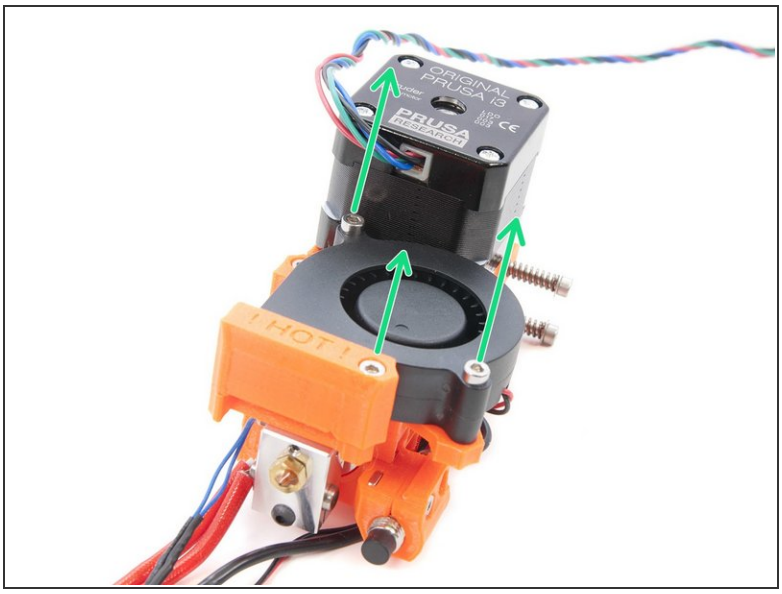


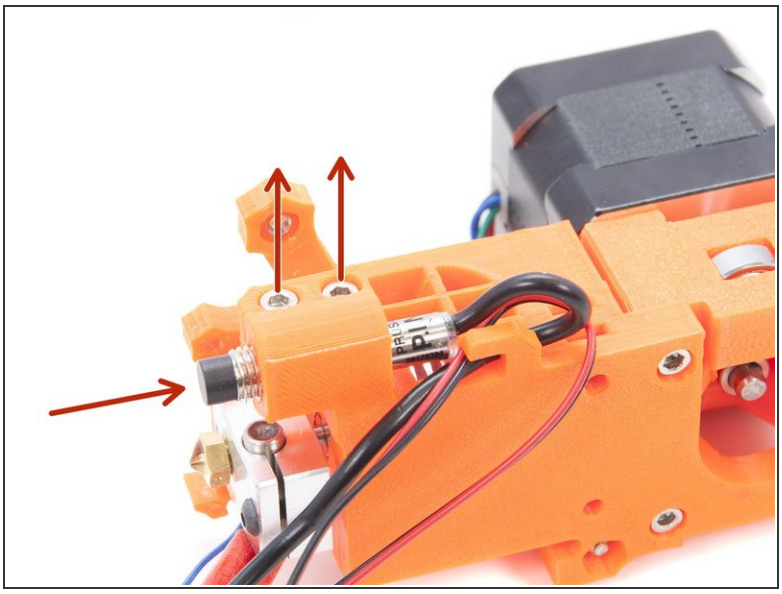




- Use 2.5mm Allen key for the entire disassembly.
- Release 4 screws on the Left hotend fan.
- Remove the fan together with screws and keep it for reassembly.

Step 8 — Extruder disassembly - Part 2

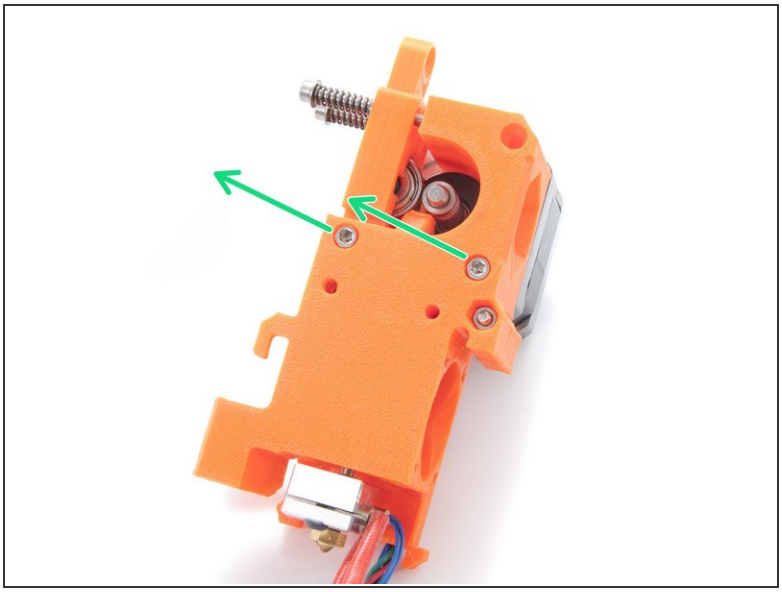


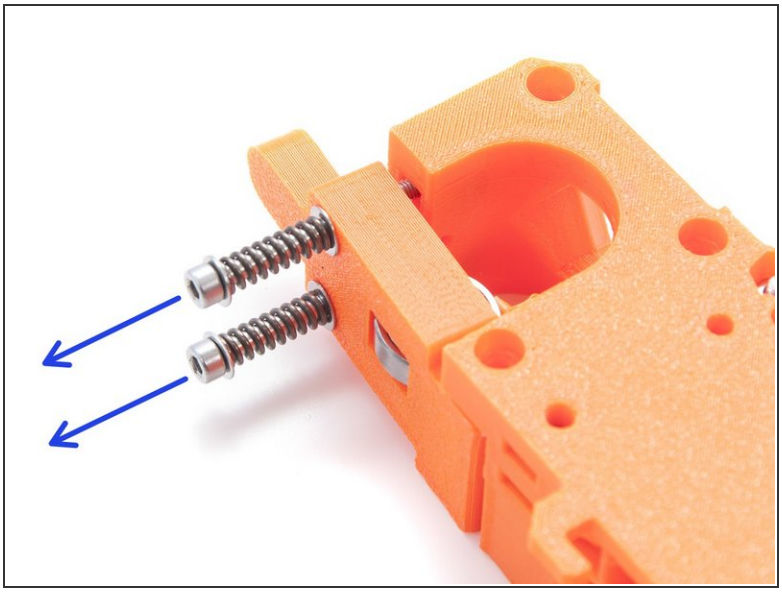


- Release the screws on the Fan nozzle and Front print fan, move it to the side. Don't try to remove the fan completely!
- Release all screws on the P.I.N.D.A. holder and gently slide the sensor upwards.
- As soon as the P.I.N.D.A. sensor is out, you can also remove the Front print fan. Keep all parts from this step for later.

There are threads inside the P.I.N.D.A. holder, if you can't push the sensor out, use screwdriver and slightly open the holder (be careful not to break it!).

Step 9 — Extruder disassembly - Part 3



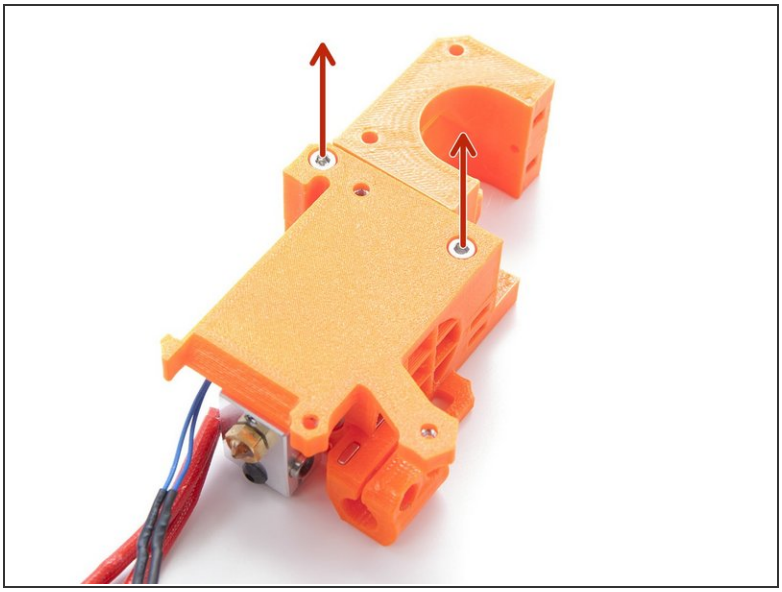


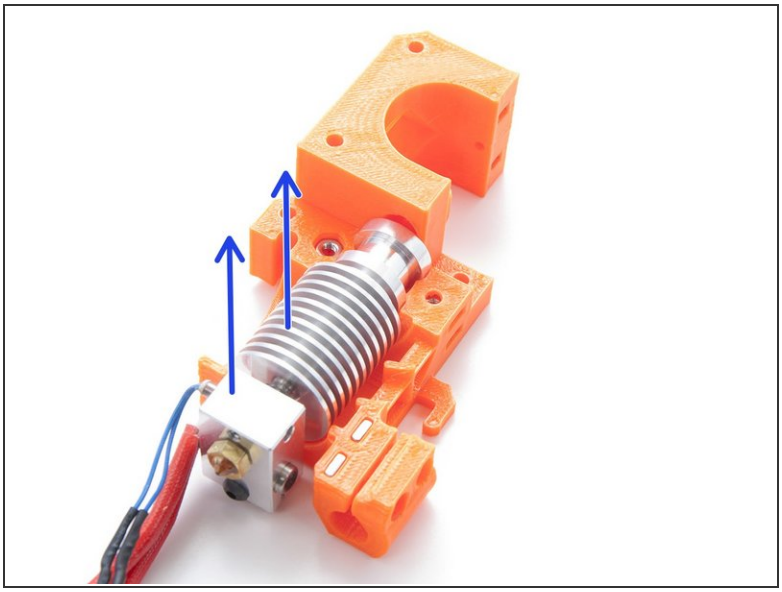
- Turn the extruder upside down and release two screws holding the Extruder motor.

⚠ Ensure the motor won't fall off and damage itself, you will need it later.

- Release two screws holding the extruder idler.

Step 10 — Extruder disassembly - Part 4



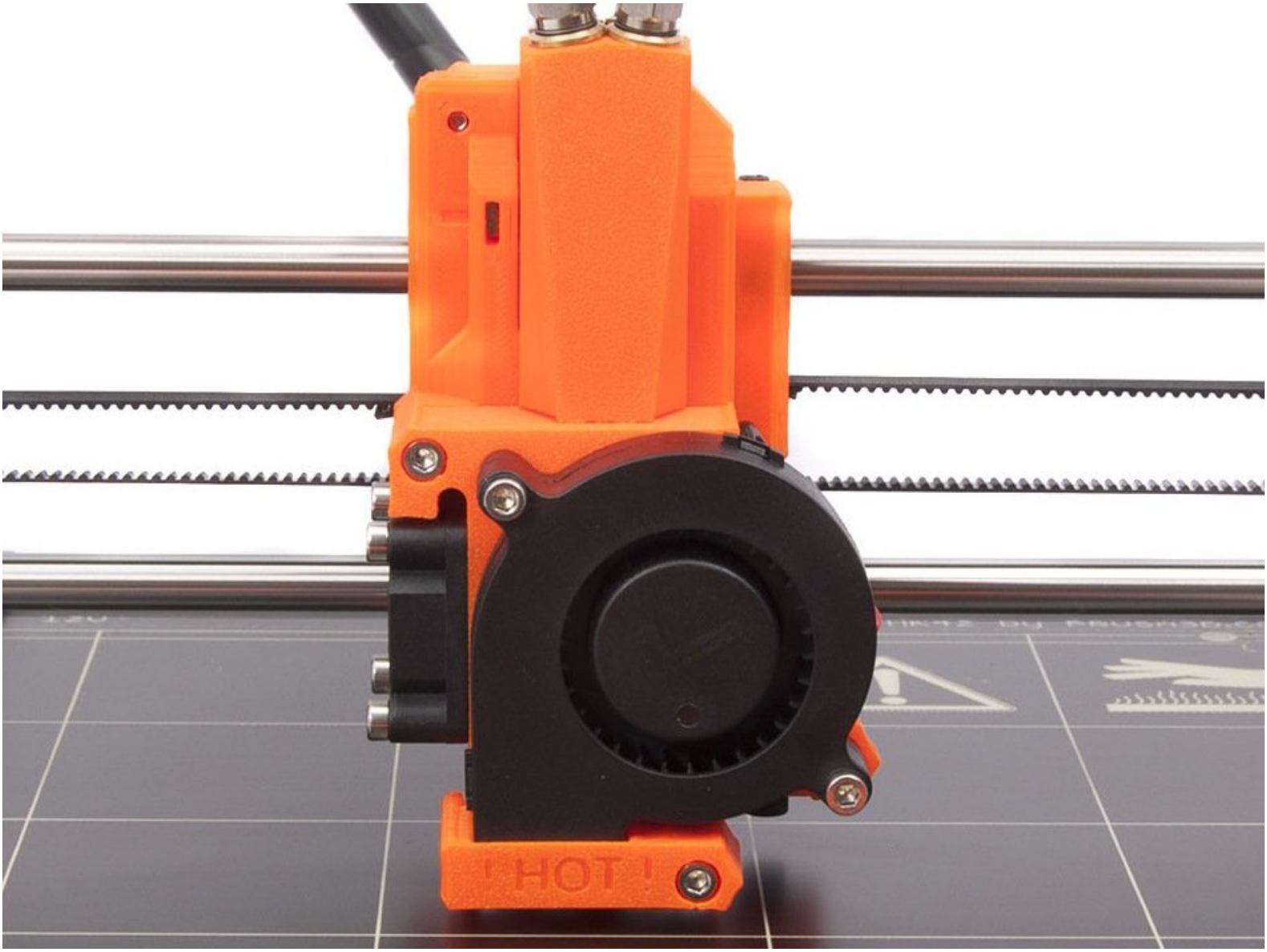


- Remove 2 screws holding the extruder cover, keep the cover including nuts for later.
- Carefully remove the hotend and store it somewhere safe, for the Multi Material you will get a new one.
- Extruder disassembly is finished! Let's start building the Multi Material! Proceed to the 2. Multiplexer assembly

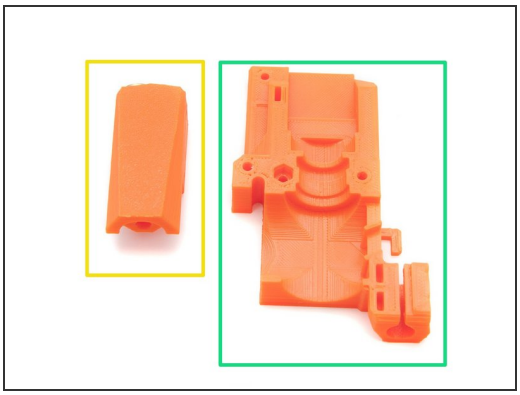
PRUSA RESEARCH by JOSEF PRUSA

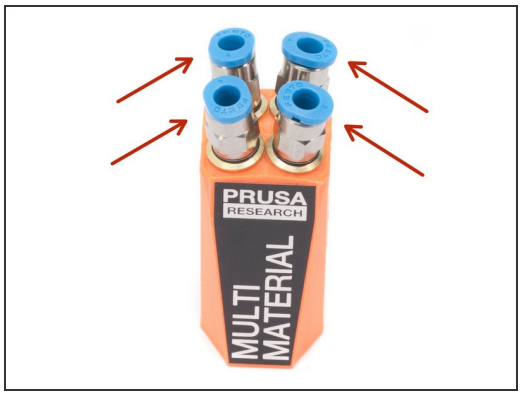
3. Multiplexer assembly

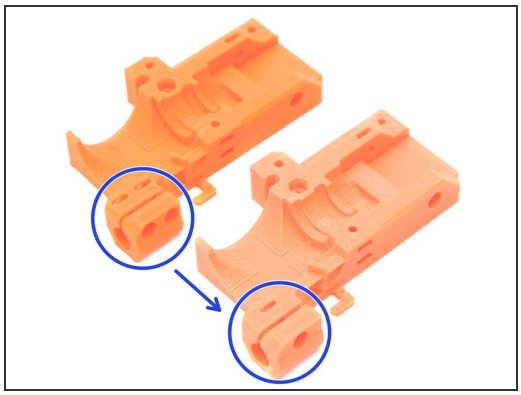
Written By: Jakub Dolezal



Step 1 — Parts identification





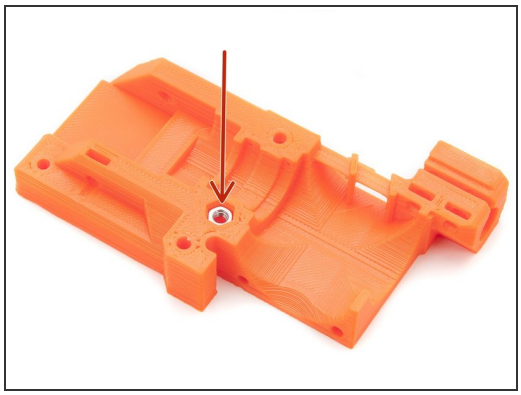
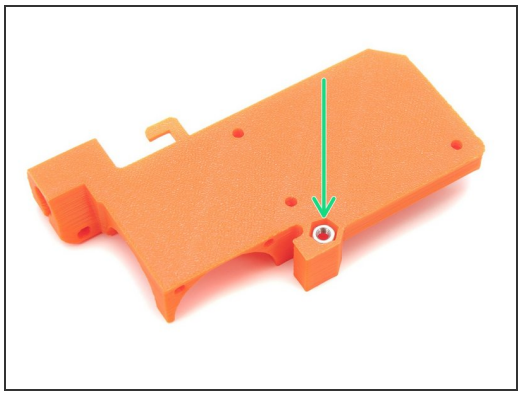
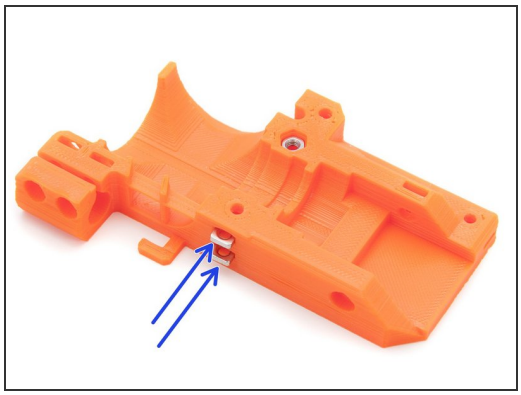


⚠ **Y-splitter (new version)** - QSM fittings and steel tubes are assembled in the factory. Use 8mm side of the wrench to tighten them.

- Y-splitter (older version)
- Extruder-adaptor-MM
- Starting August 2017, there is a small update to the design of P.I.N.D.A. probe holder, only one M3nS nut and one M3x10 is needed. See the second picture.

ⓘ 3D printed parts are in the bag 2.MULTIPLEXER

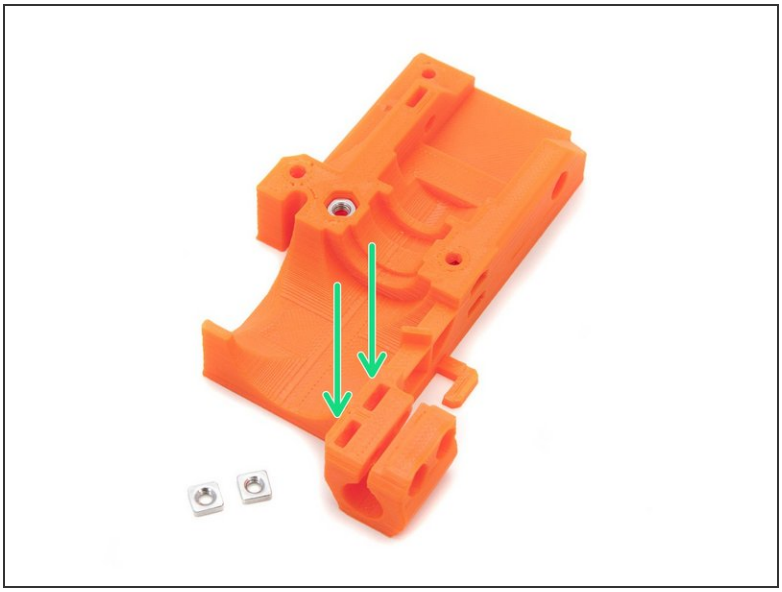
Step 2 — Inserting nuts - front, back and side

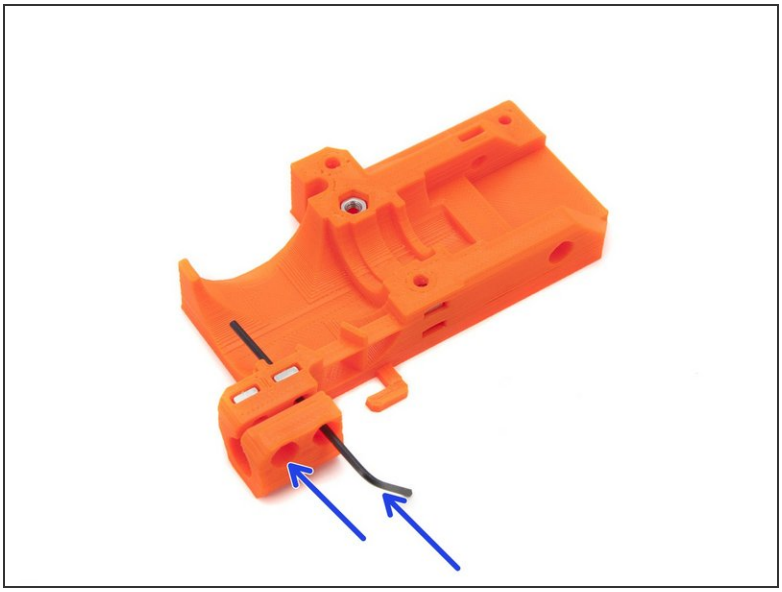




- M3n nut (2x)
- M3nS nut (2x)
- Extruder-adaptor-MM (1x)
- Insert **M3n nut** into the **front part** of Extruder-adaptor-MM all the way in.
- Insert **M3n nut** into the **rear part** of Extruder-adaptor-MM all the way in.
- Insert **M3nS nuts** into the **side slots** of Extruder-adaptor-MM all the way in.

Use nuts from MK2/MK2S extruder + take new ones from the bag 2.MULTIPLEXER

Step 3 — Inserting nuts - P.I.N.D.A. mount

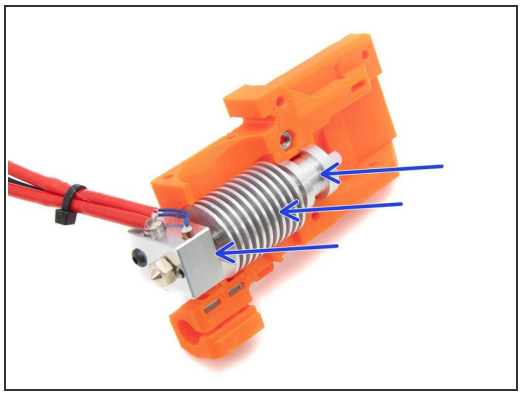
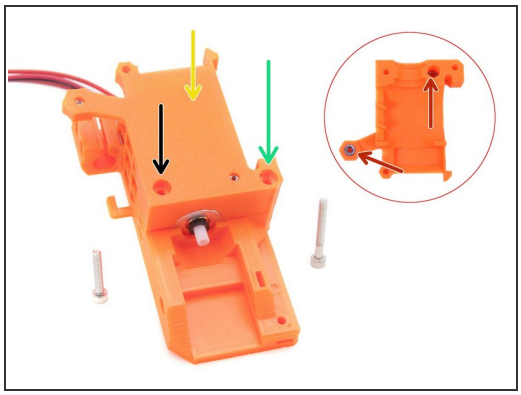
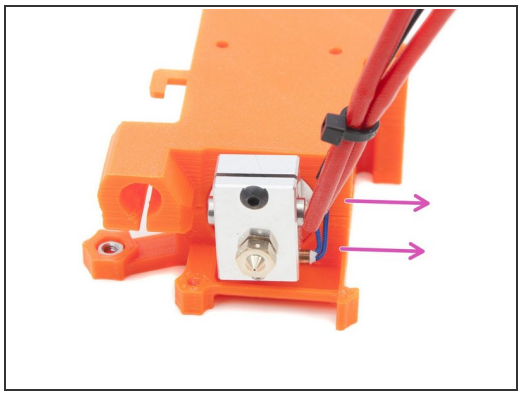




- M3nS nuts (2x)
- Insert M3nS into the P.I.N.D.A. mount.
- Check the proper alignment with 1.5mm Allen key.

Move the part carefully from now on, or the nuts will fall out.

Step 4 — Placing the new Hotend

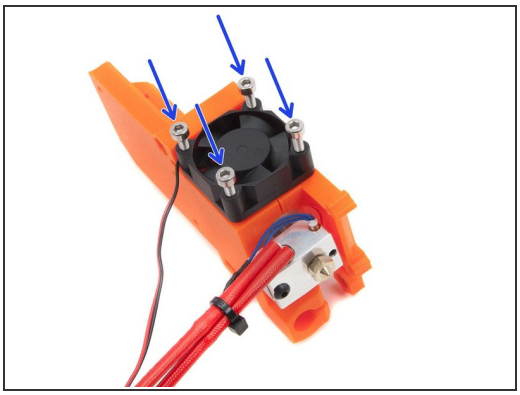
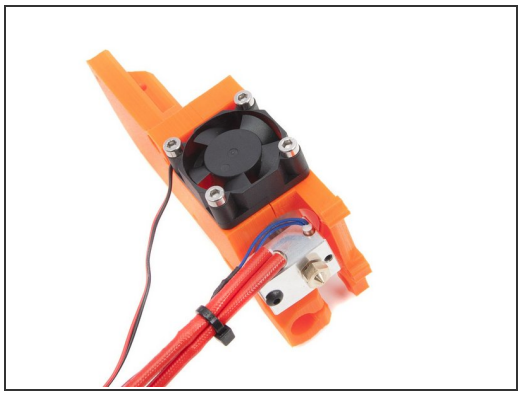
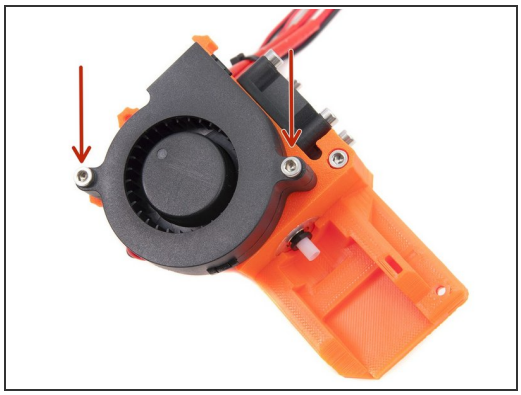
⚠ Before you start, ensure you have both nuts in the Extruder cover (from previous assembly).

⚠ Take extra CAUTION while moving with the Hotend cables!!!

- Place the new Multi Material Hotend into the Extruder-adaptor-MM.
- Close the Hotend with the Extruder cover and tighten it by:
- M3x25 (1x)
- M3x18 (1x)
- Ensure the Hotend cables are facing away from the P.I.N.D.A. mount.

ⓘ The new Hotend is in the bag 2.MULTIPLEXER. Use the Extruder cover from MK2/MK2S.

Step 5 — Mounting Left hotend and Front print fan

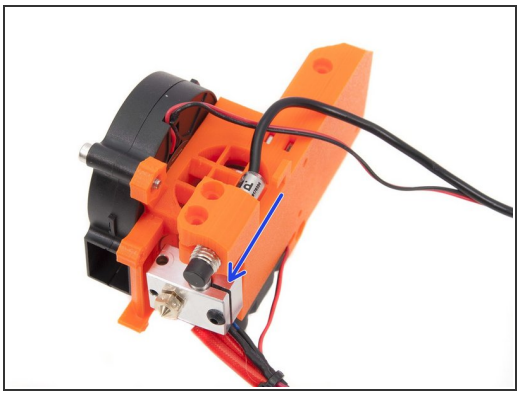
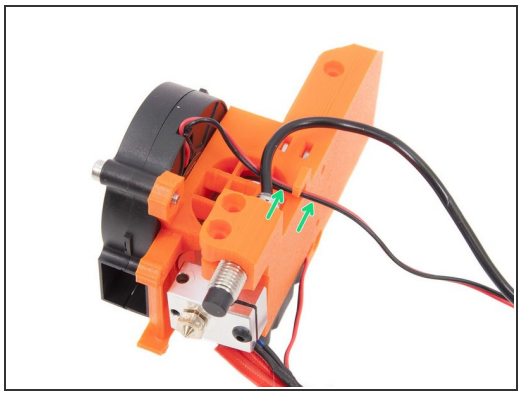
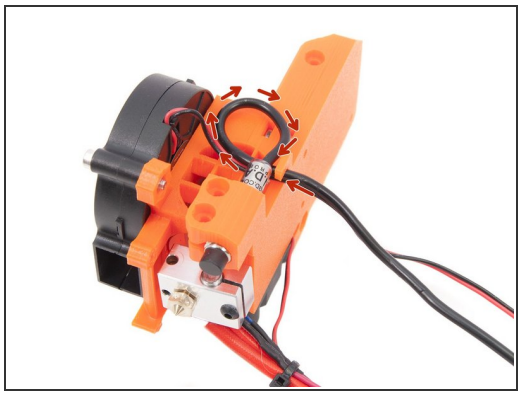




- M3x18 screws (4x)
- Take the smaller Left hotend fan and place it on the side of the Multiplexeru, tighten all 4 screws.
- M3x20 screws (2x)
- Take the larger Front print fan and place it on the front of the Multiplexer, tighten both screws.

ⓘ If you can't mount screws on the Front print fan, ensure there are nuts in the Extruder cover.

ⓘ Use the Left hotend fan and the Front print fan from MK2/MK2S

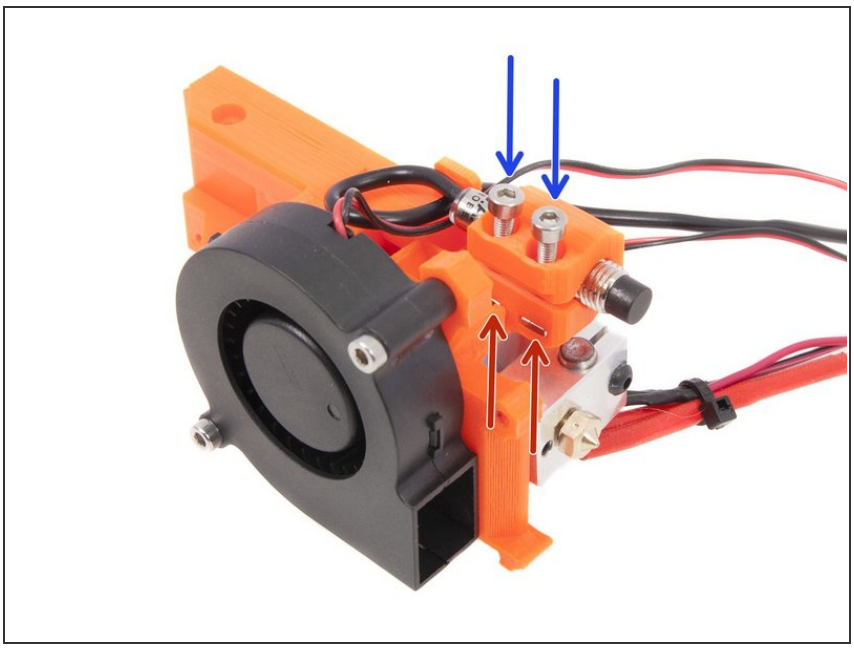
Step 6 — Inserting P.I.N.D.A. probe

- Locate the P.I.N.D.A. probe and place it in the holder, proper position doesn't matter, we will calibrate it later.
- Take the cable from the front print fan and place it as shown in the picture.
- Twist the cable from the P.I.N.D.A. probe as shown in the picture. This will enable probe movement for future calibration.

Use P.I.N.D.A. probe from MK2/MK2S.

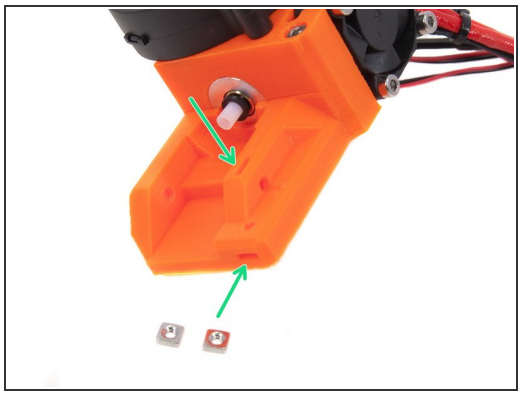
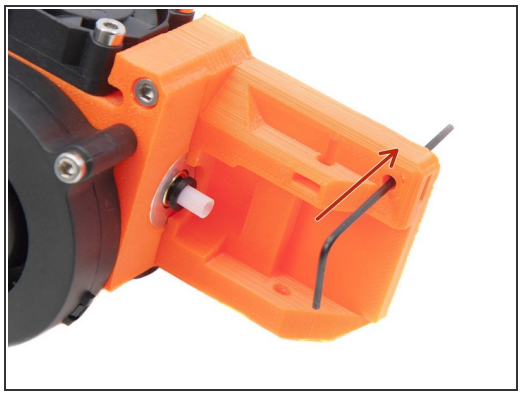
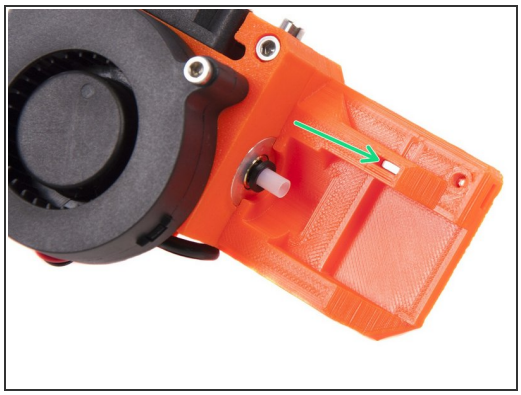
Step 7 — Mounting P.I.N.D.A. probe



- M3x10 screws (2x)
- M3nS nuts (2x) - already in the mount
- Place the screws in the mount and tighten the probe gently, we will adjust the probe later and then tighten it fully.

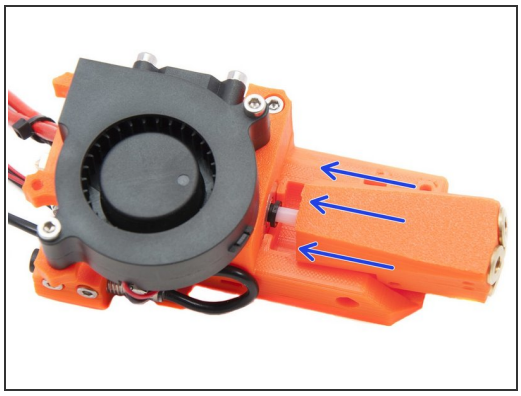
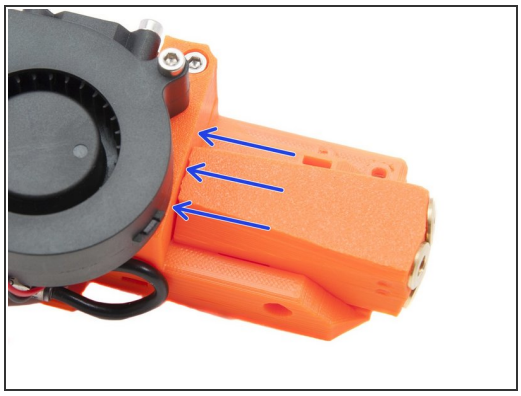
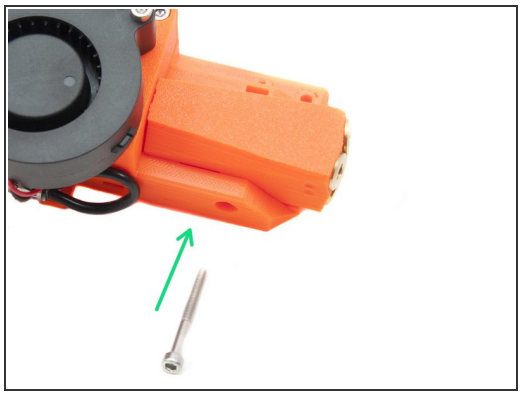
If you can't tighten the screws, ensure you have both M3nS nuts in the mount.

Step 8 — Mounting the Y-splitter: Part 1

- M3nS nuts (2x)
- Insert nuts in the traps, all the way in.
- Ensure correct placement by the 1.5mm Allen key.

Step 9 — Mounting the Y-splitter: Part 2

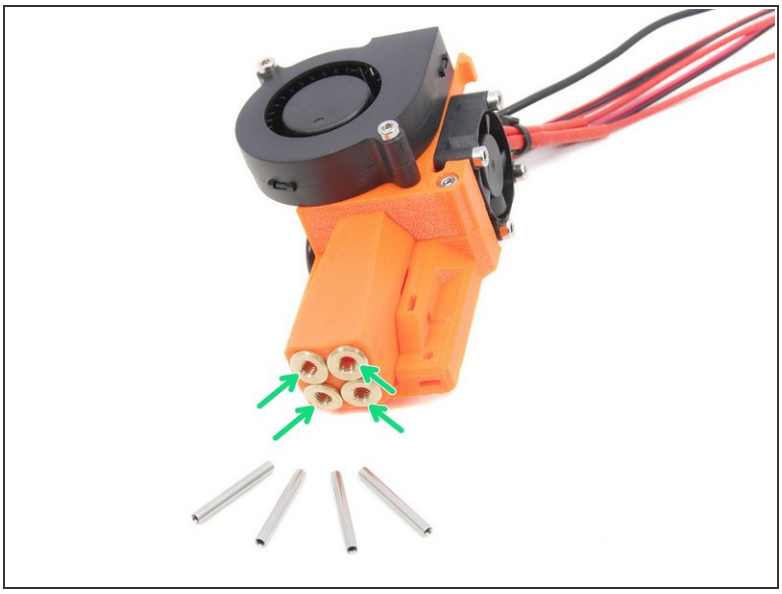




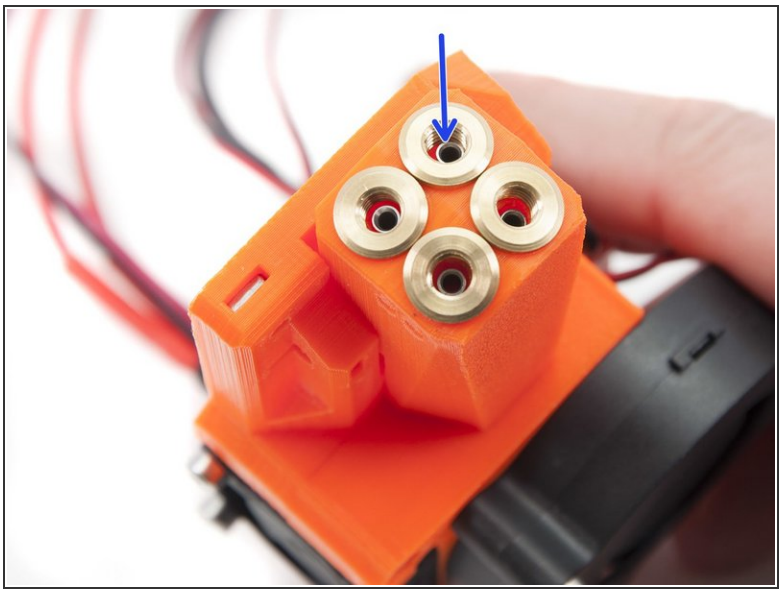
- Slide the Y-splitter into the Extruder-adaptor-MM as shown in the pictures.
- Screw the M3x30 screw to secure the Y-splitter in place.

ⓘ If you can't tighten the screw, return to the previous step and ensure the correct position of the M3nS nut.

ⓘ In case the Y-splitter isn't fitting, please check the PTFE tube in hotend has the correct length: How to trim PTFE tube - Multi Material

Step 10 — Placing the tubes in Y-splitter

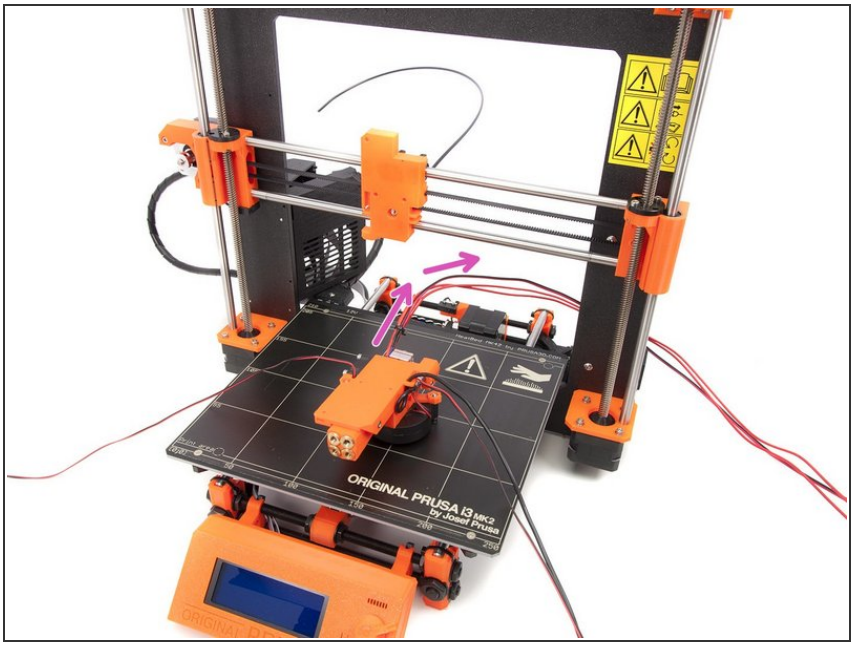




- Steel tubes 25x3x1.9 mm (4x)
- Push the tubes all the way into the Y-splitter as shown in the picture. Don't use an excessive force.

The 25x3x1.9t tubes are in the bag 2.MULTIPLEXER

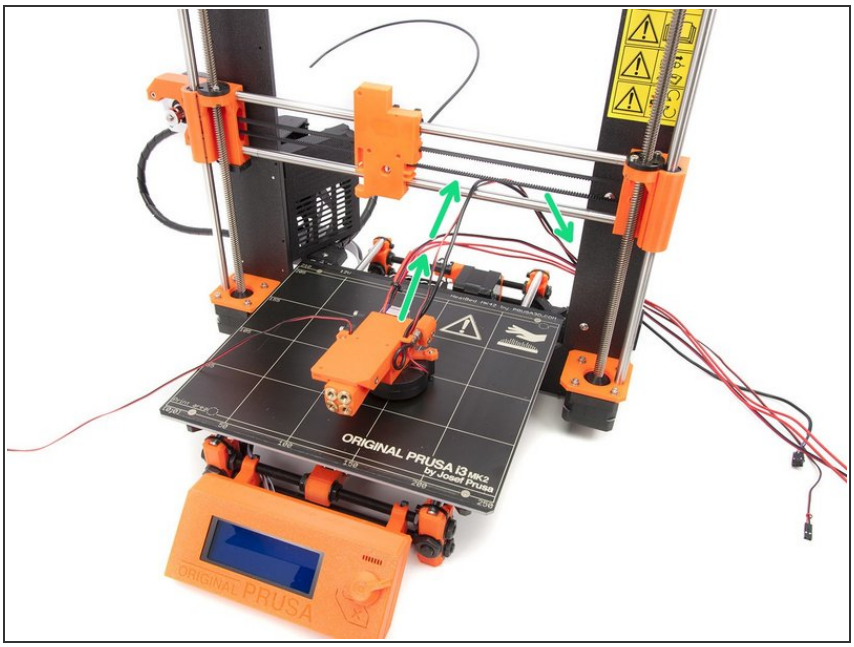
Step 11 — Mounting the Multiplexer onto the printer: Part 1



ATTENTION, follow the instructions properly. Correct position of the cables from the Multiplexer is crucial!

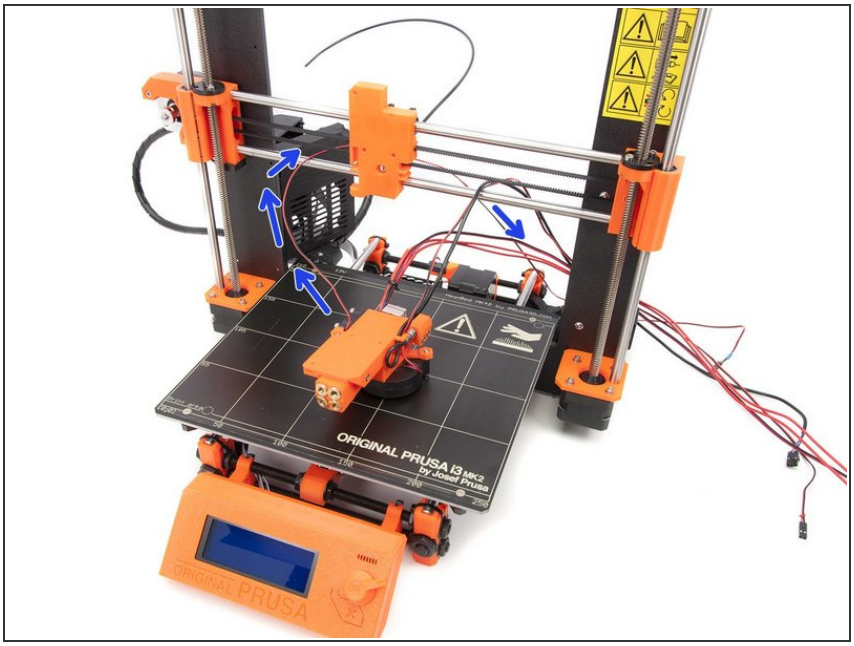
- Begin by placing the Multiplexer like shown in the picture (the Front print fan facing the heatbed).
- **First step:** Lead the cables from the hotend through the aluminium frame and below the X-axis!

Step 12 — Mounting the Multiplexer onto the printer: Part 2



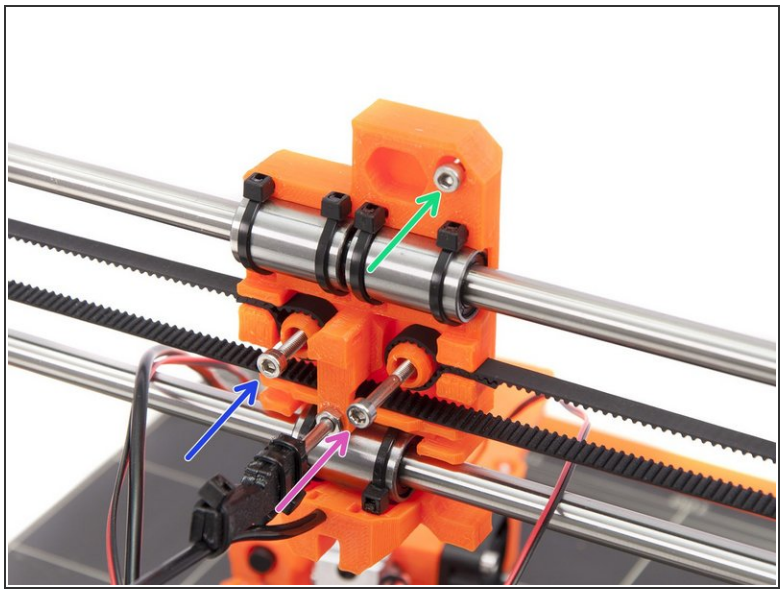
- **Second step:** Take cables from the P.I.N.D.A. probe and the print fan and place them between the lower smooth rod and belt on the X-axis!

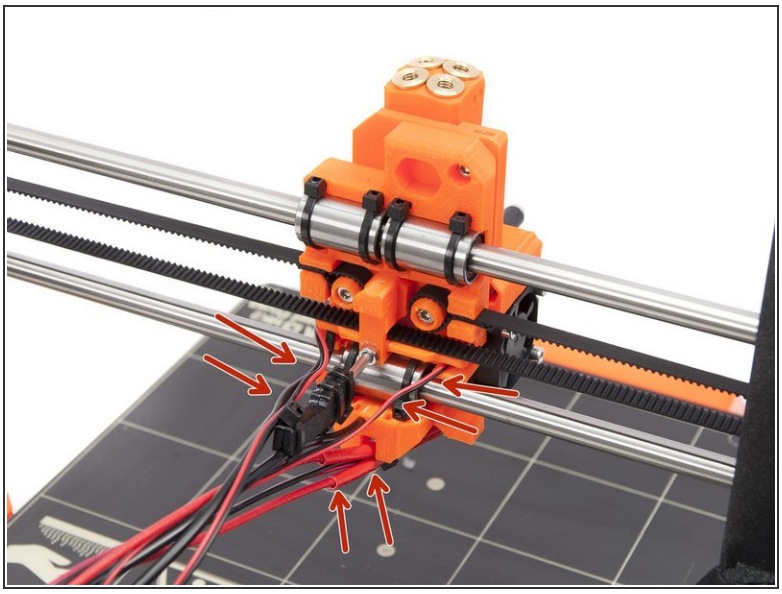
Step 13 — Mounting the Multiplexer onto the printer: Part 3



- **Third step:** Take the cable from the Left hotend fan and place it between the lower smooth rod and the belt on the X-axis!

Step 14 — Mounting the Multiplexer onto the printer: Part 4

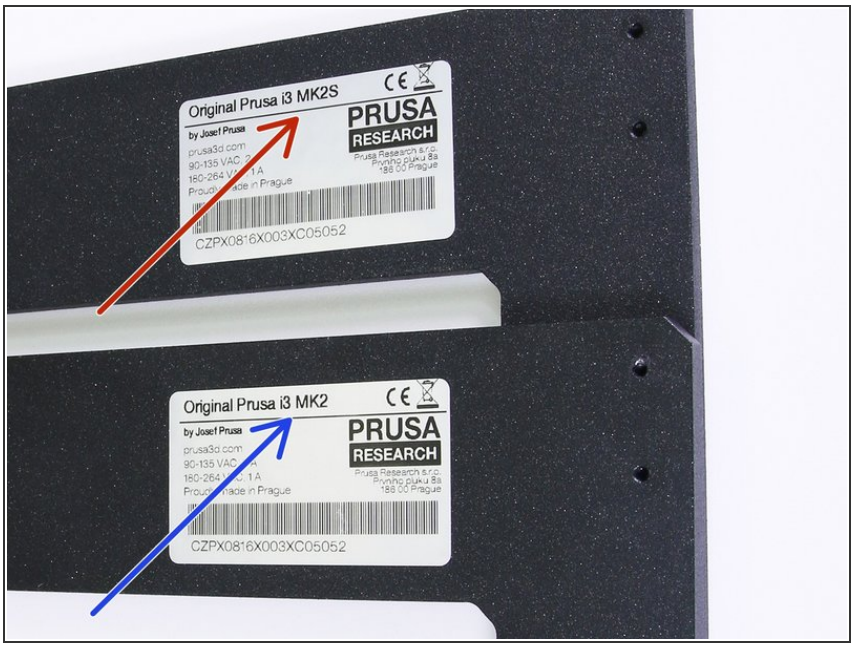




- Prepare following screws for mounting the extruder:
- M3x10 screw
- M3x30 screw
- M3x18 screw
- Tighten the screws to secure the extruder in place.

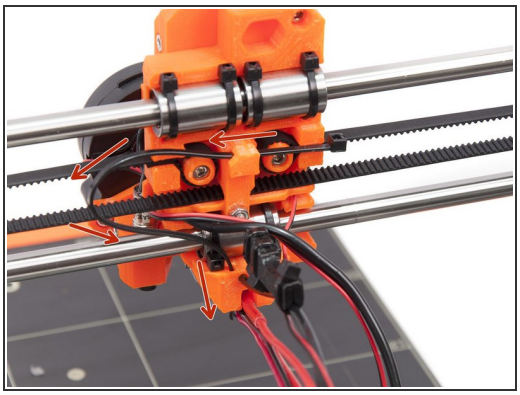
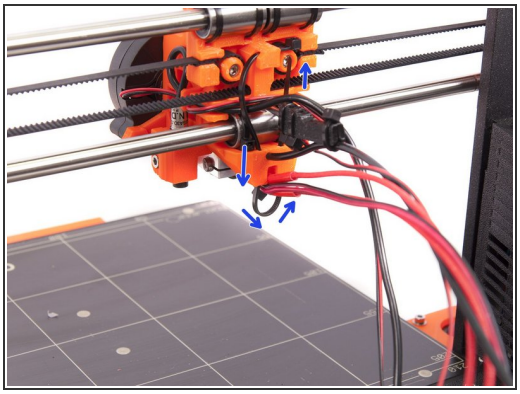
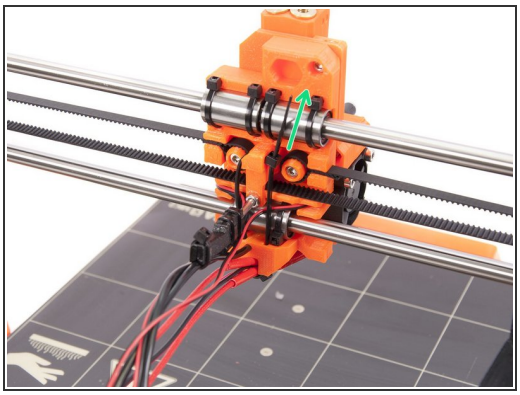
⚠ Note the cable arrangement as highlighted in the picture. The P.I.N.D.A and print fan cables have to go together through left slot. The Left Hotend fan cable has to go through the right one. Hotend (nozzle) cables have their slot below the nylon.

Step 15 — Do you have MK2 or MK2S ?



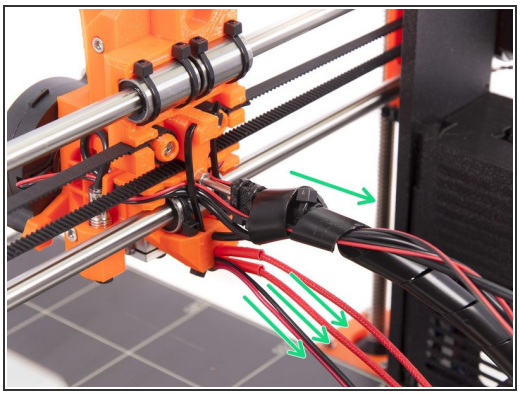
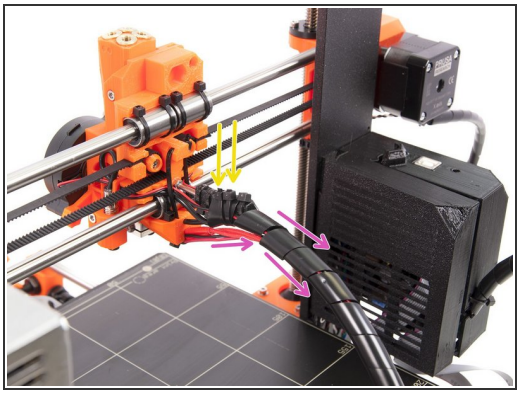
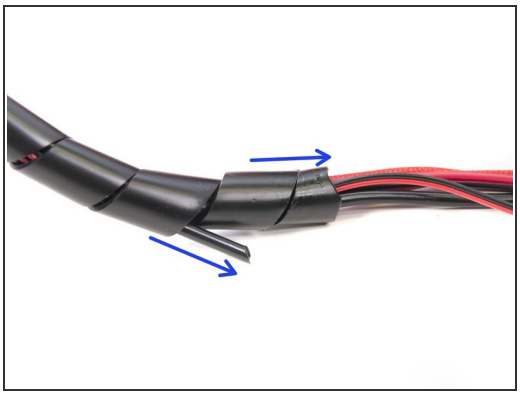
- If you have the MK2S printer, you can skip this step and continue with the next.
- If you have the MK2 printer, follow the these chapters:
  - Extruder assembly from step 28 to the end of chapter 5. Extruder Assembly (MK2 manual)
  - Electronics assembly step 13 and 14 8. Electronics assembly (MK2 manual)
  - Multiplexer is finished! Let's skip the rest of this chapter and move to the next 3. Extruders assembly (Multi Material manual)

Step 16 — Cable management

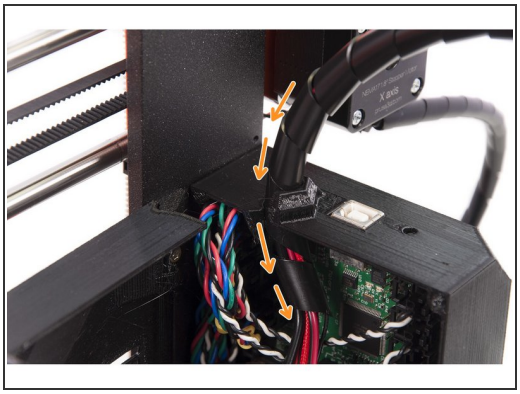
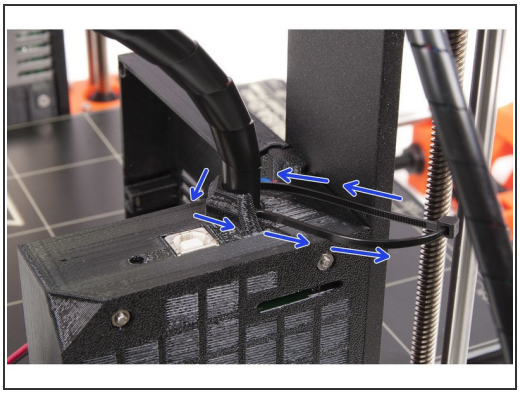
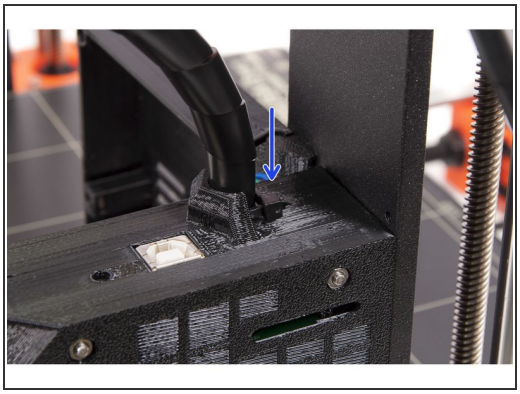
- Slide the zip tie through the left X-carriage slot as shown in the picture.
- Guide the zip tie under the hotend cables.
- Make sure that all the cables are in the correct position. The P.I.N.D.A. probe and Front print fan cables have to go in the left slot and under the zip tie. The Left hotend fan cable has to go in the right slot and under the zip tie. The hotend cables have to go in the bottom slot and have to be inside the zip tie loop.
- Tighten the zip tie and cut the remaining part.

Step 17 — Assembling the spiral wrap

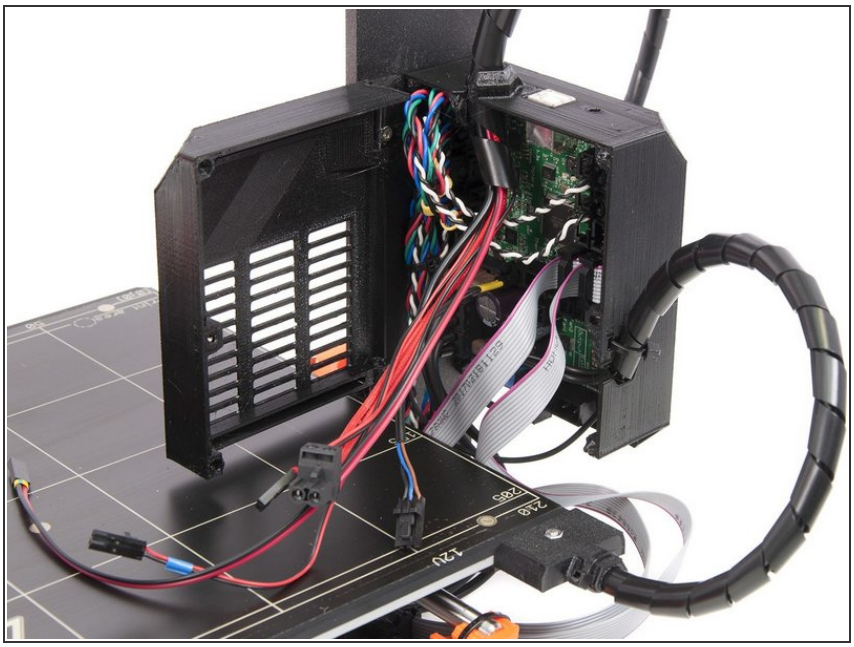
- Wrap the spiral wrap around the cables to have one turn of wrap on cables, but without the lower Hotend cables.
- Place two zip ties on the beginning of the spiral wrap and tighten them. Cut the remaining part.
- Continue by wrapping all the cables from the Multiplexer, all the way to the end.
- On the end of the wrap, take out the nylon and have at least two turns of the wrap. See the picture.

Step 18 — Placing cables in Rambo cover

- Guide the cables through the top of the Rambo cover. Ensure you have placed the nylon into the slot and the spiral wrap is going through the cover.
- Place a zip tie into the slot on the top of the Rambo cover and tighten it. Don't use an excessive force or you might damage the cables.

Step 19 — Multiplexer electronics



- Leave the cables unplugged for now, we will connect them later.
- Multiplexer is finished! Let's move on to the 3. Extruders assembly

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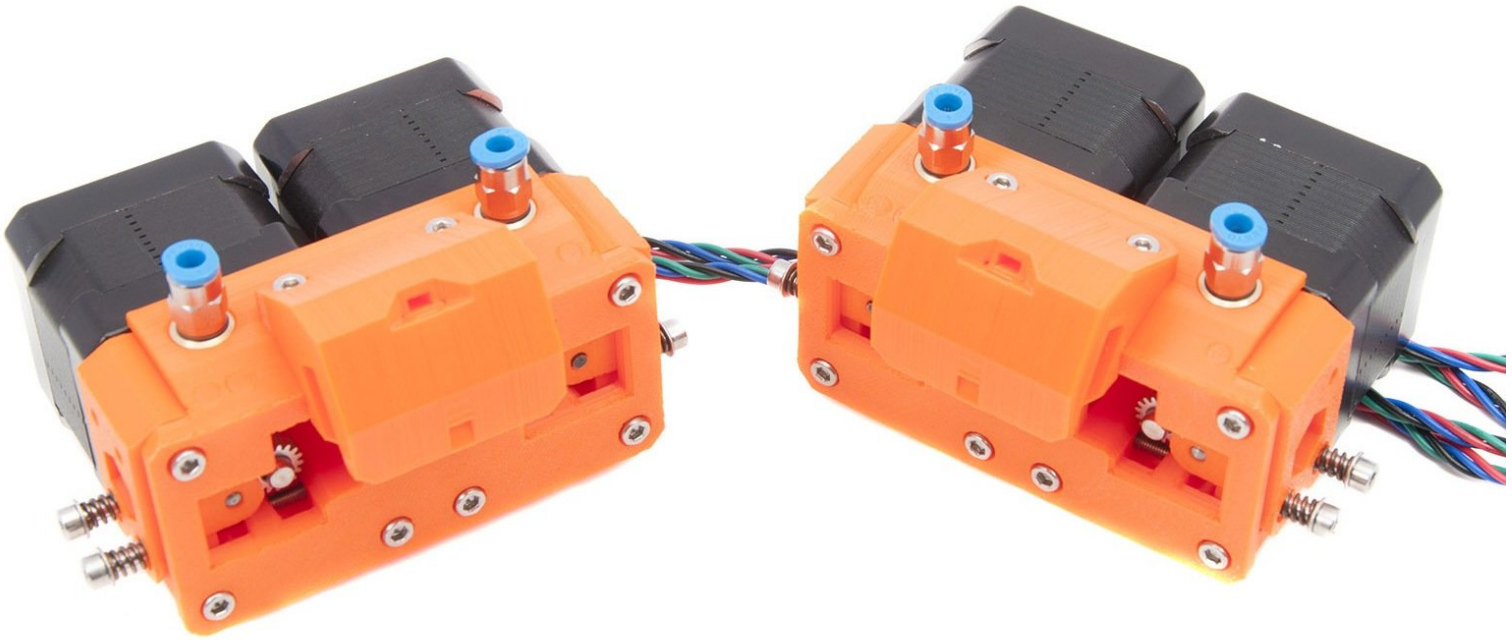
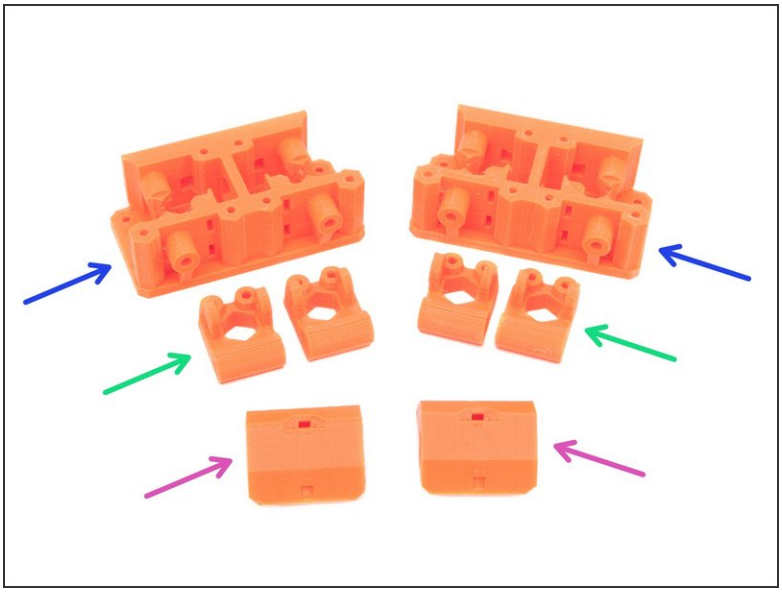
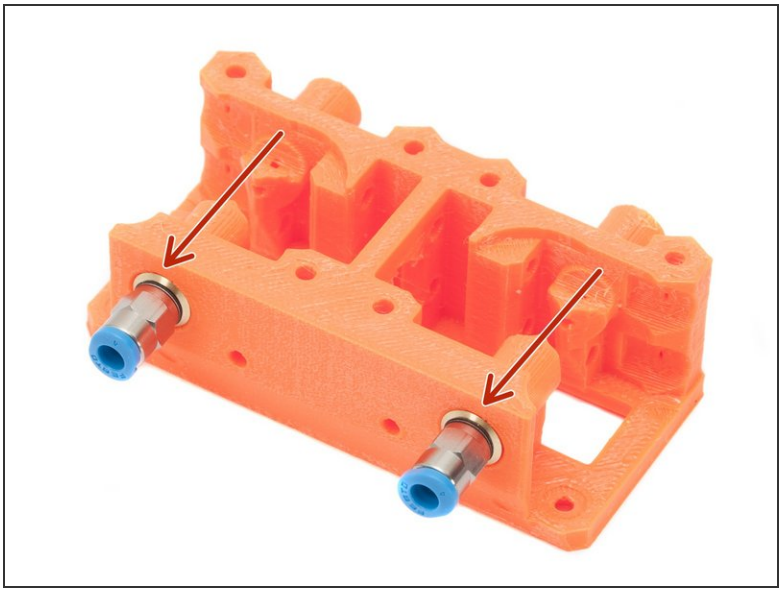
4. Extruders assembly

Written By: Jakub Dolezal



Step 1 — Parts identification



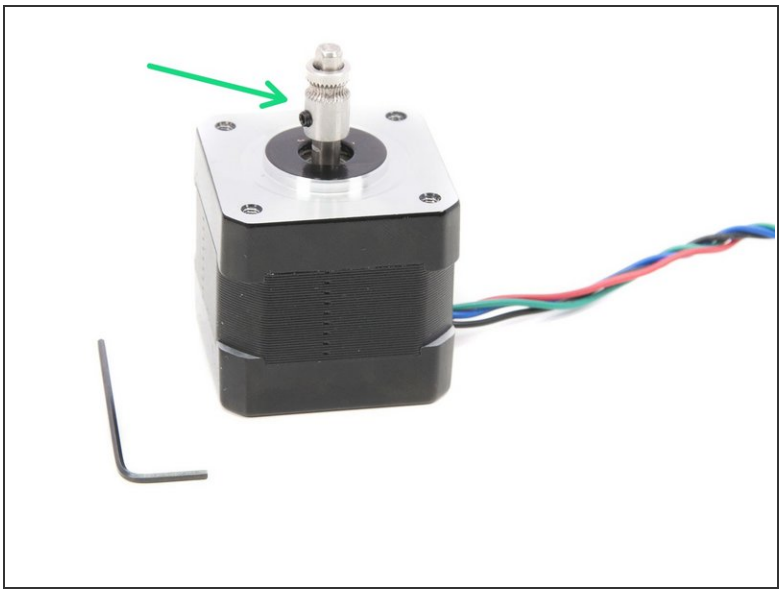


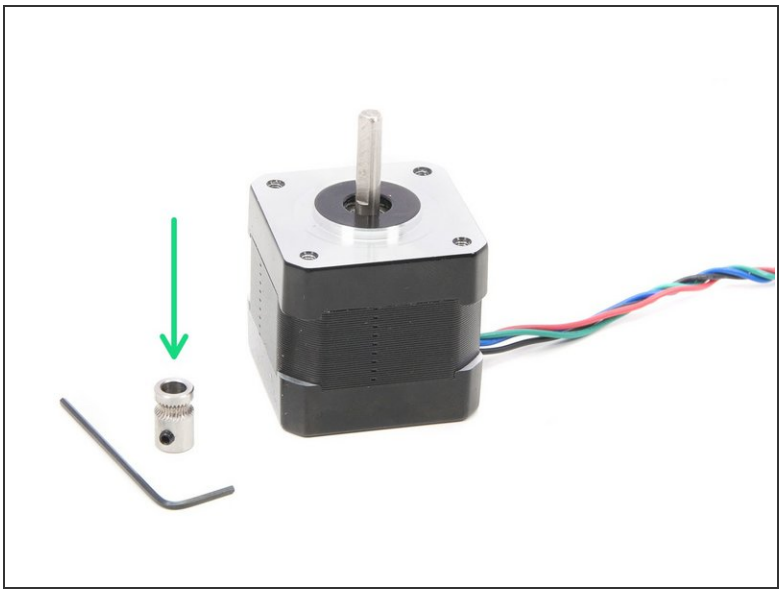
⚠ **Extruder body MM (new version)** - QSM fittings and PTFE tubes are assembled in the factory. Use 8mm side of the wrench to tighten them.

- Extruder body MM (older version)
- Extruder idler MM (Note there is "left" and "right" idler, more in Step 3).
- E-Motor-Holder

ⓘ 3D printed parts are in the bag 3.EXTRUDER

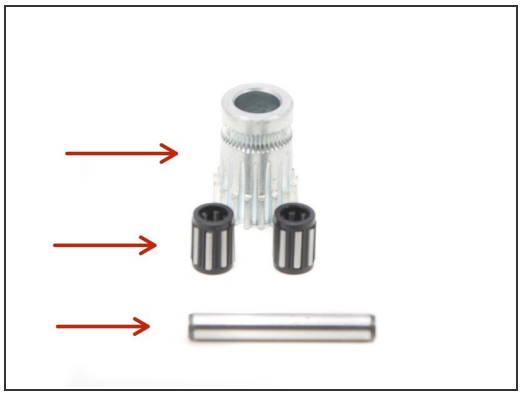
Step 2 — Removing the old pulley

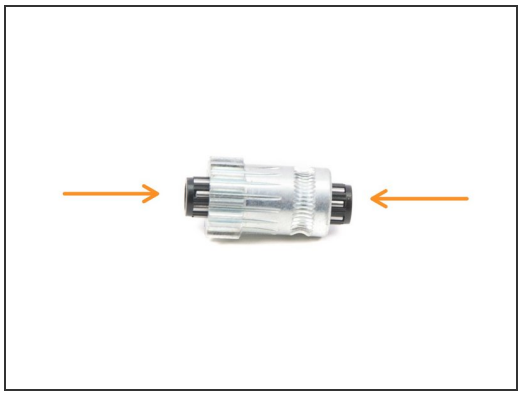


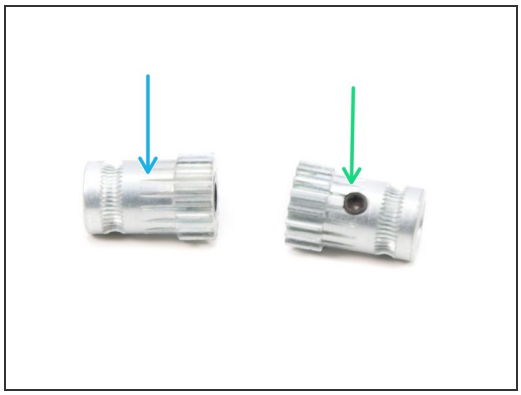


- Take the extruder motor from your disassembled printer.
- Using 1.5mm Allen key remove the old pulley.
- Keep the motor for the following steps.

Step 3 — Preparing the pulleys



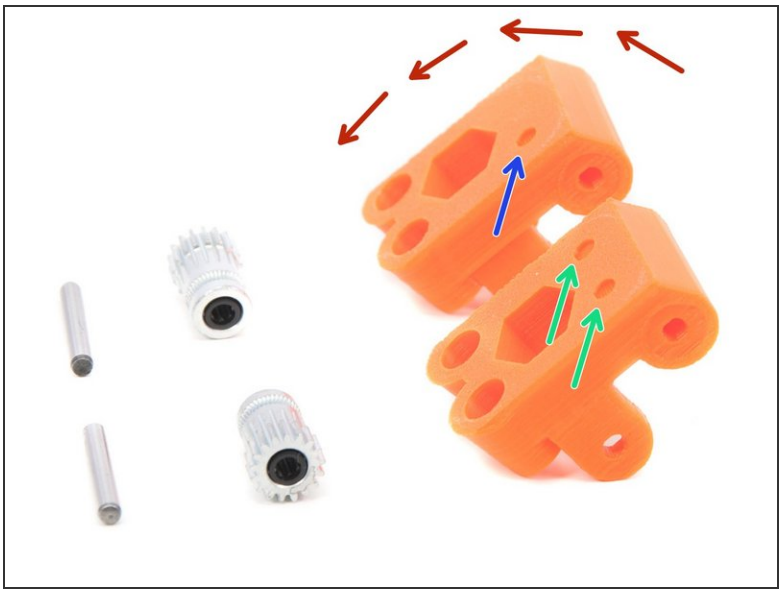


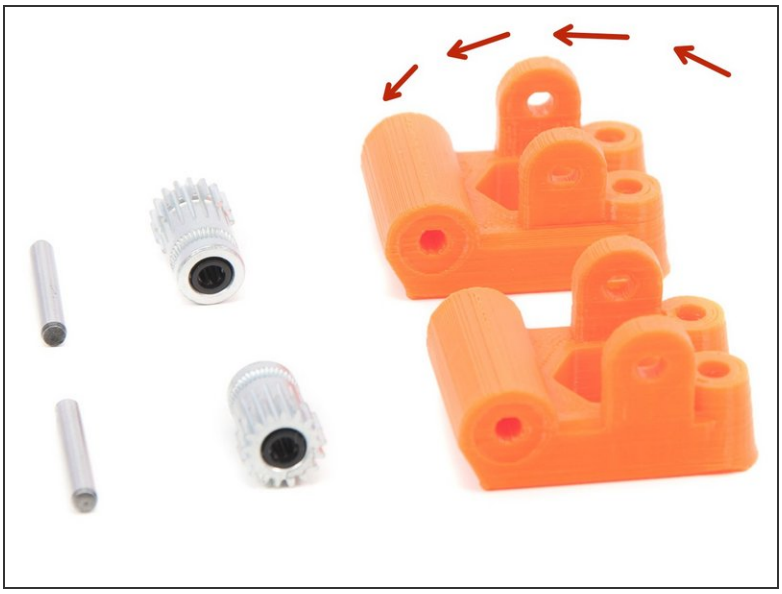


- Before installing the pulleys for idlers, ensure each consists of casing bearings and a shaft.
- Pulleys are sent as one piece, but the bearings might fall out, simply press them back in. Each pulley for idler consists of **TWO** bearings. **Don't insert the shaft** inside, we will do it later.
- Also distinguish between pulleys:
  - **without screws** (bearings inside, used on idlers)
  - **with screws** (no bearings, used on motors)

ⓘ The pulleys are in the bag 3.EXTRUDER

Step 4 — Assembling the idlers: Part 1





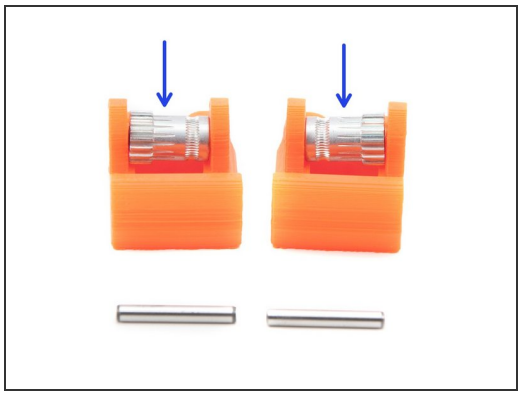
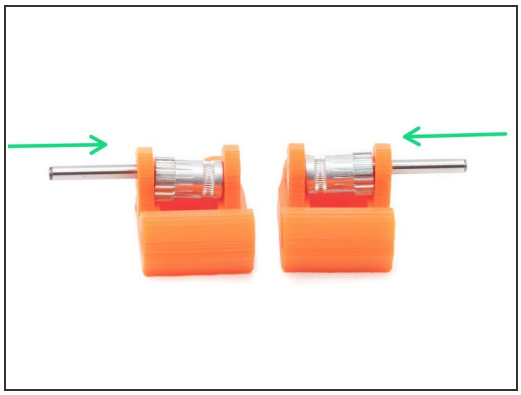
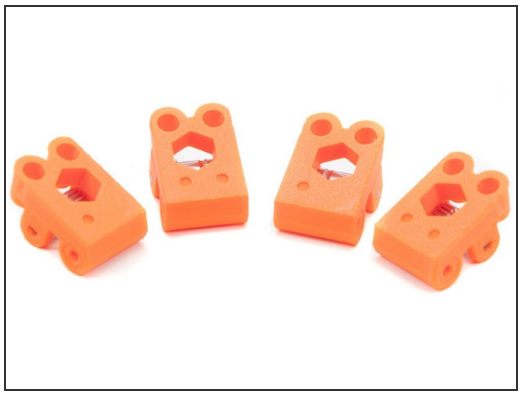
⚠ Depending on the amount of extruders you have to assemble either two or four idlers.

- Place the components like in the first picture. It is important to use the pulleys for idlers (without screws), not the ones for the motors.

ⓘ The 3D printed parts are in the bag 3.EXTRUDER

- Put an idler with **one dot** further away from you.
- Put an idler with **two dots** closer to you.
- Rotate the printed parts towards the pulleys, we will continue in the next step.

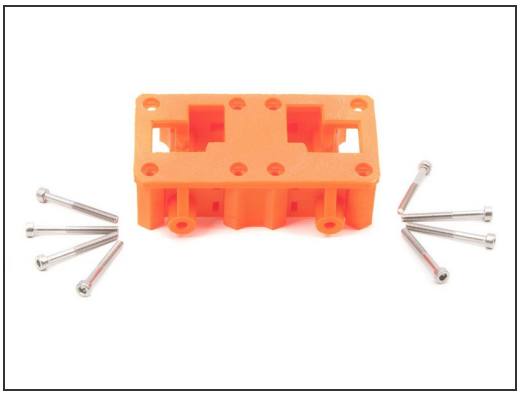
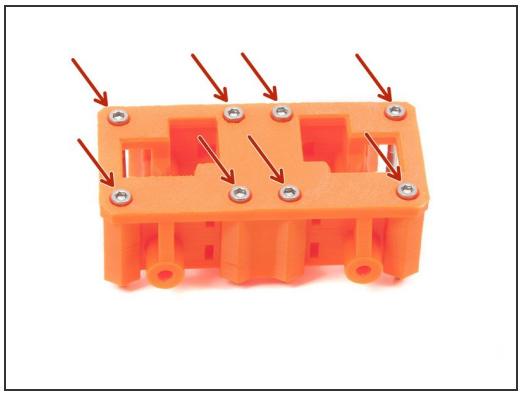
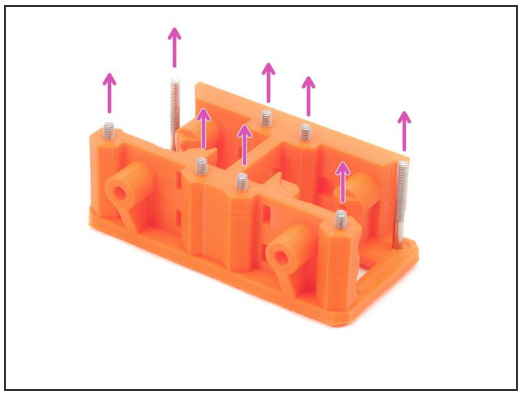
Step 5 — Assembling the idlers: Part 2

- Continuing from the previous step, take the pulleys as they are (don't rotate them) and place them in the printed parts.
- Take the shafts and place them from sides all the way in. Note that the opening for the shaft from the other side is smaller, **FOLLOW THE MANUAL** to avoid issues!

As mentioned in the previous step, you have to assemble either two or four idlers. We covered one pair, but the second is identical.

Step 6 — Preparing the extruder body: Part 1

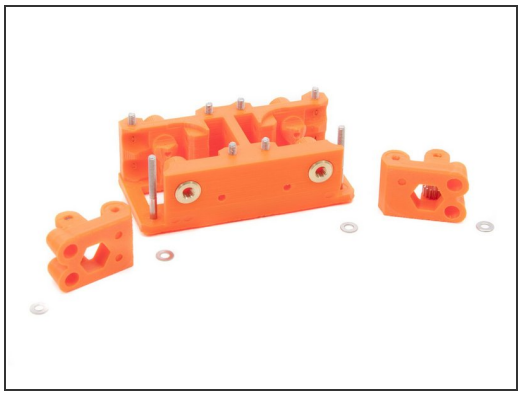
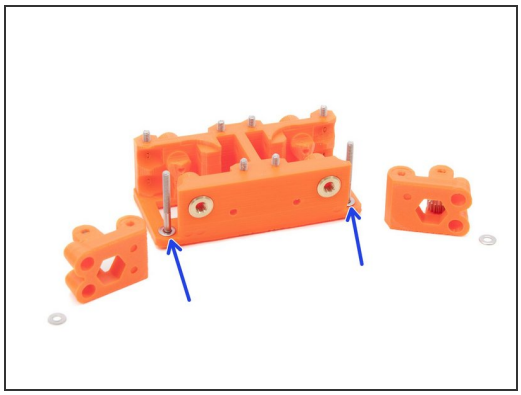
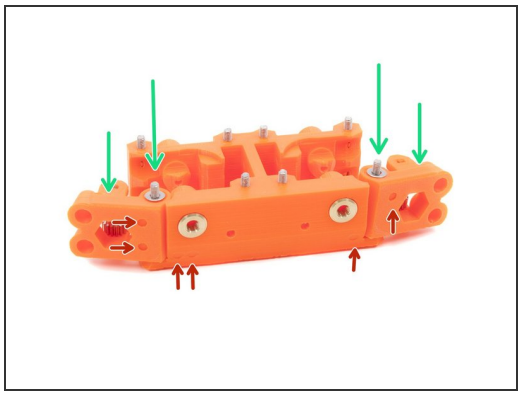
⚠ Depending on the amount of extruders you have to assemble either one or two extruder bodies.

- M3x30 screws
- Extruder-body-MM
- Place the screws into the extruder body like shown in the second picture.
- Rotate the extruder body upside down so the threads of the screws are facing up.

ⓘ The printed parts are in the bag 3.EXTRUDER

- Proceed to the next step.

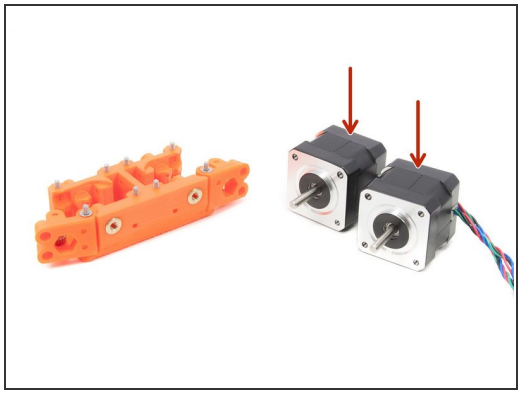
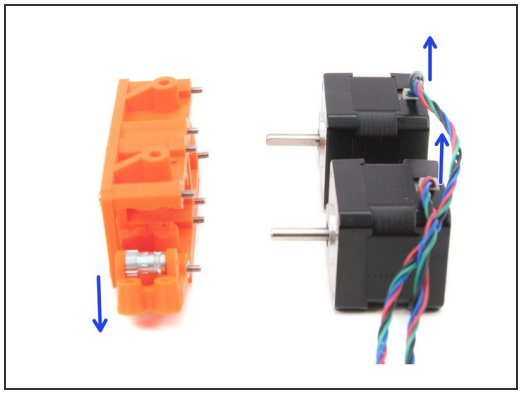
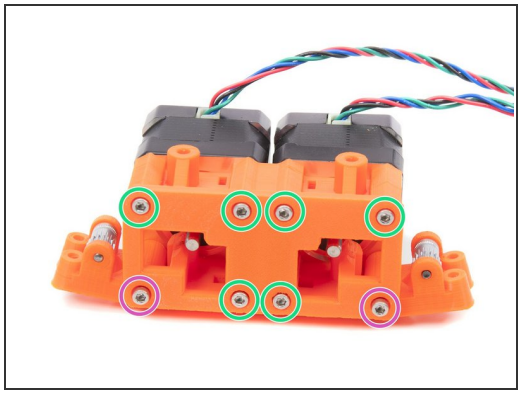
Step 7 — Preparing the extruder body: Part 2

- Prepare the extruder body, idlers and washers as shown in the first picture.
- Place washers on the screws as shown in the second picture.
- Slide on the screws the idlers following by remaining washers, third picture.

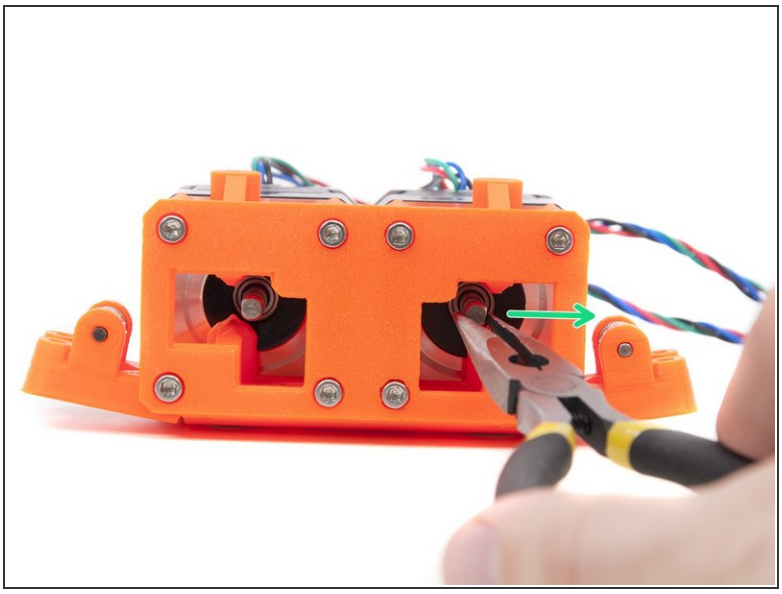
⚠ Mind the correct placement of idlers. Idler with two dots needs to be on the side of the extruder with two dots, similar for the one-dotted idler!

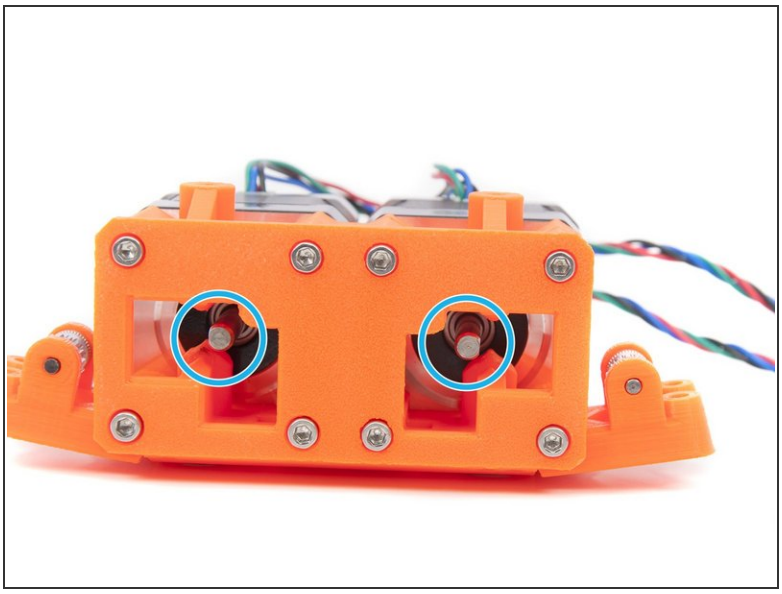
Step 8 — Assembling the motors on the extruder body

- For each extruder body prepare two motors.
- Rotate the extruder, so the **pulleys are facing down** and **motor cables up**.
- Place parts together and tighten all screws using 2.5mm Allen key.
- In case of screws holding idlers, do not tighten them too much, the idler (plastic part) must be able to rotate!

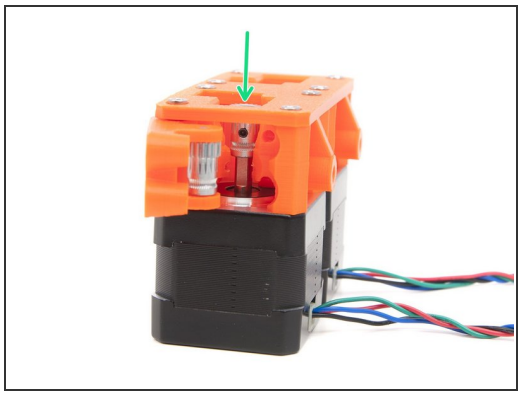
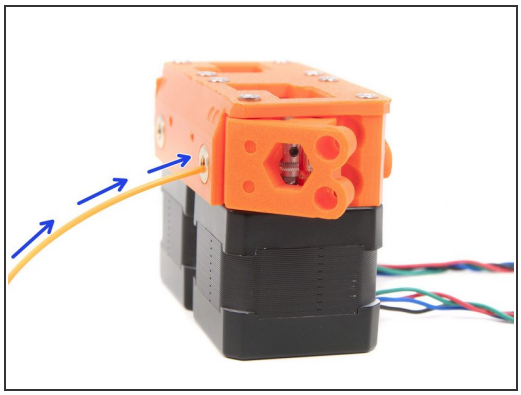
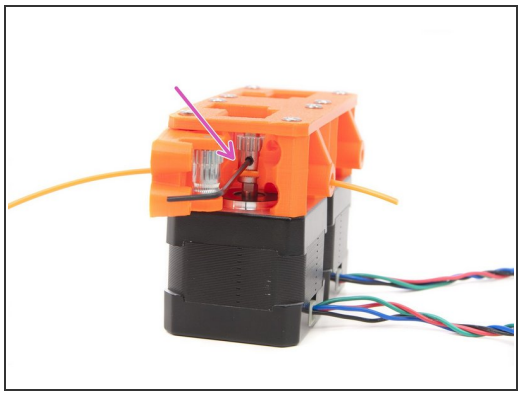
Step 9 — Assembling the pulleys: Part 1





- Before assembling the pulleys ensure you have rotated properly the motor shaft.
- Take the pliers and rotate the shaft in a way that its flat part faces the idler, see the picture.
- Repeat this step for all motor shafts.

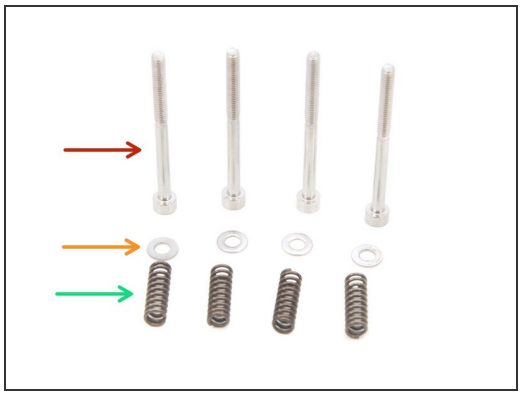
Step 10 — Assembling the pulleys: Part 2

- Locate the pulleys with screws and place them on the rotated shaft of each motor.
- Take a piece of filament (1.75 mm) and push it through the extruder body, like shown in the picture.
- Align the pulley according to the filament and tighten the screw with 1.5 mm Allen key.

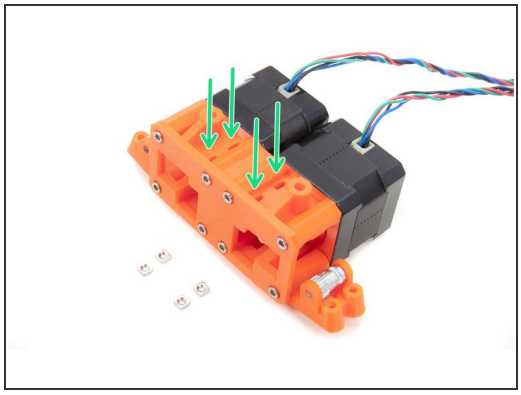
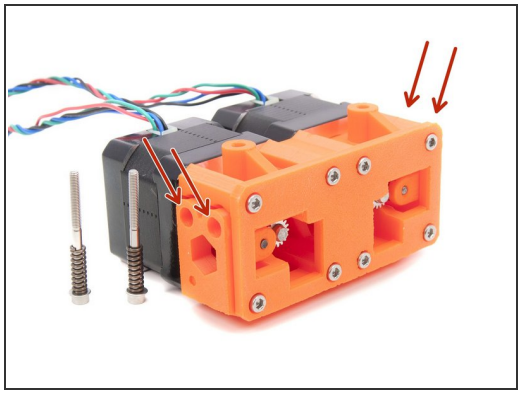
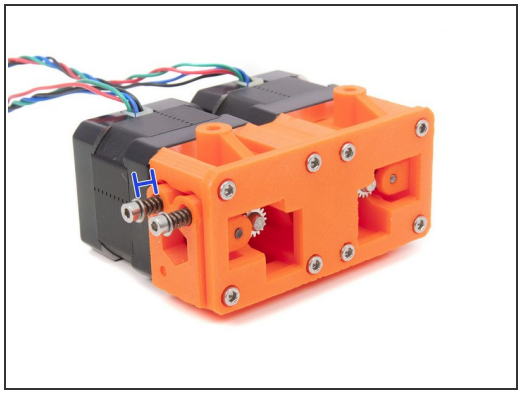
⚠ Screw on the pulley must be facing the flat part on the shaft. Otherwise, the pulley will be slipping and printer not printing!

Step 11 — Preparing idler screws



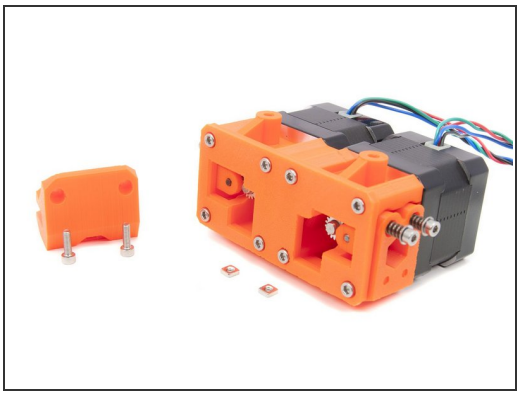
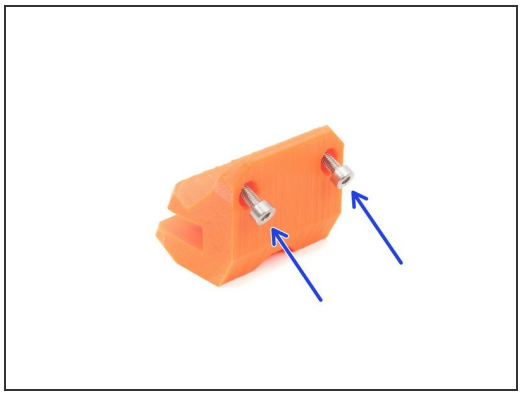
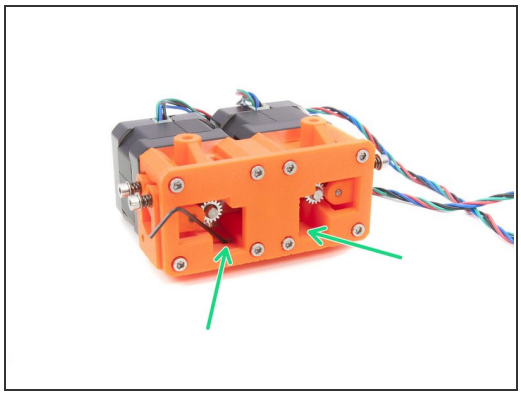
- M3x40 screw
- M3w washer
- 5x15s spring
- Place the washer and spring on M3x40 screw as shown in the pictures.
- Depending on the number of extruders prepare either 4 or 8 pieces of these screws.

Step 12 — Assembling idler screws

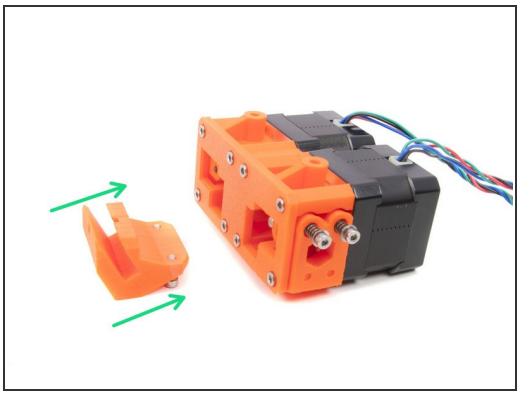
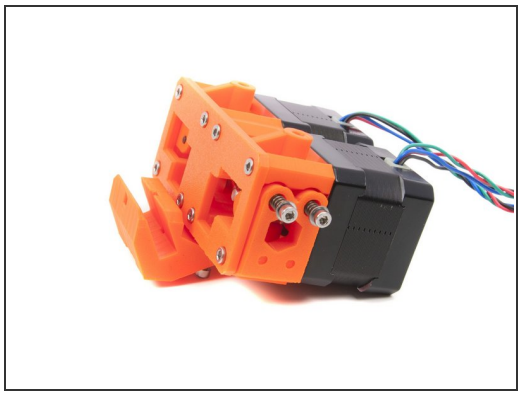
- M3nS nuts (4x)
- Place M3nS nuts in the traps.
- Insert idler screws into openings on the idlers. Repeat this step from the other side.
- Tighten all screws, the gap between washer and idler (printed part) should be 4-5 mm.

Step 13 — Assembling the extruder holder: Part 1

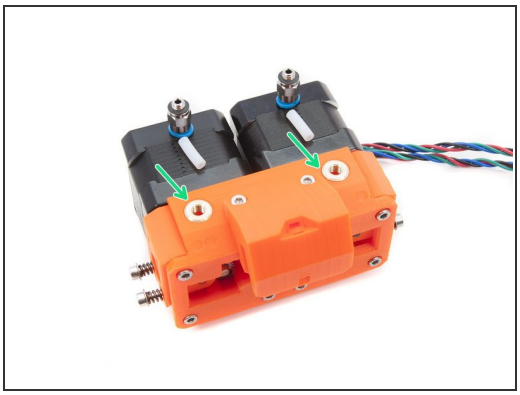
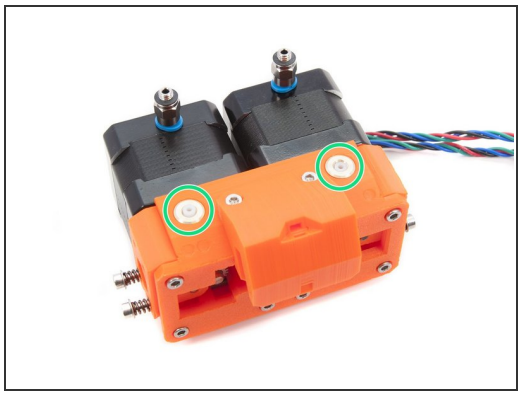
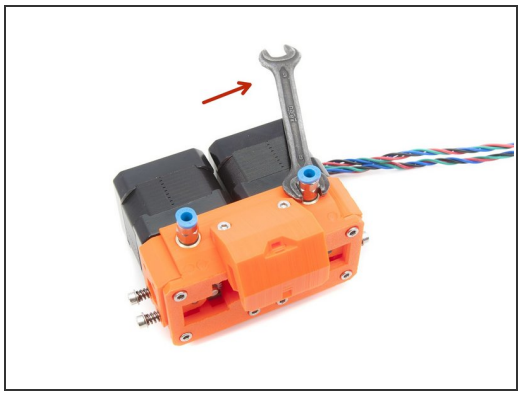
- Locate printed extruder holder, M3nS nuts and screws M3x10.
- Place screws M3x10 into the holder.
- Place M3nS nuts into traps, use 1.5mm Allen key if necessary.

Step 14 — Assembling the extruder holder: Part 2

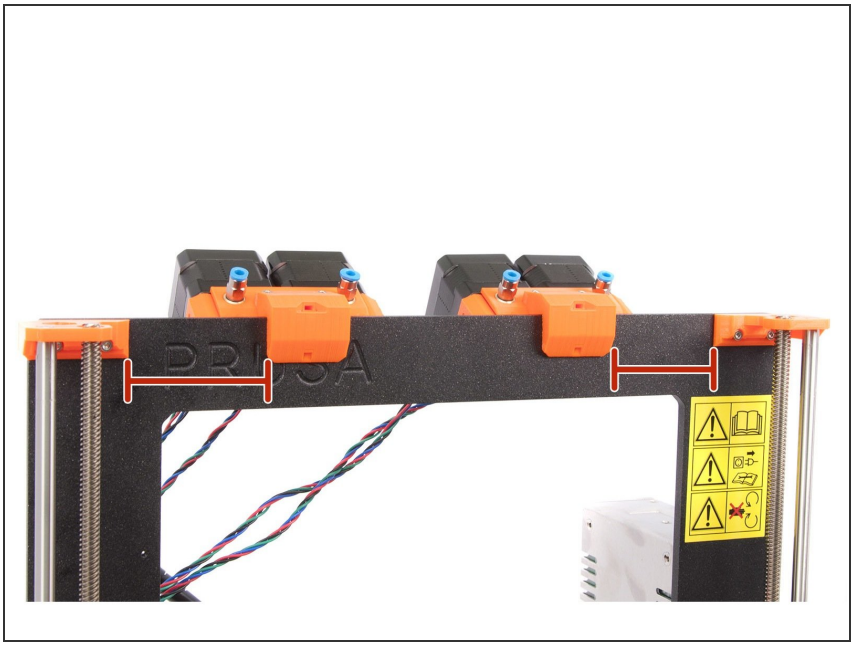

- Place the holder like shown in the first picture.
- Ensure the holder is in the middle of the extruder body.
- Use a thumb to fix the holder in its position and using 2.5mm Allen key tighten the screws.

Step 15 — Assembling the extruder holder: Part 3

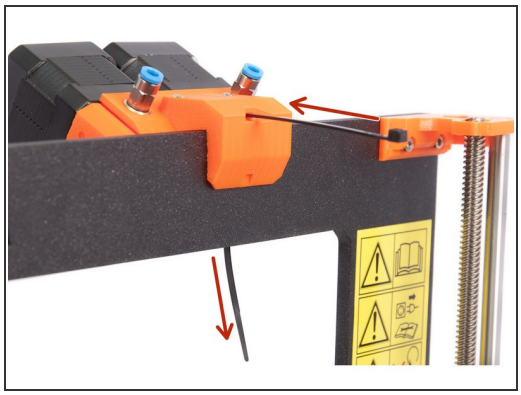
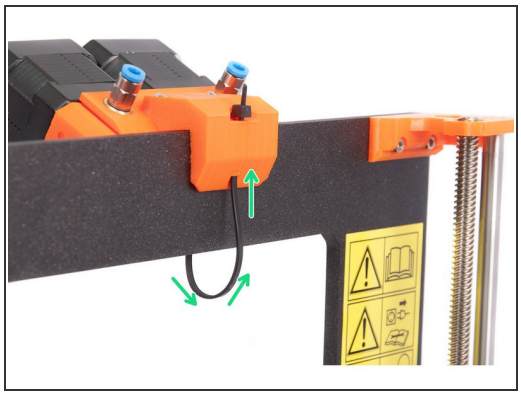
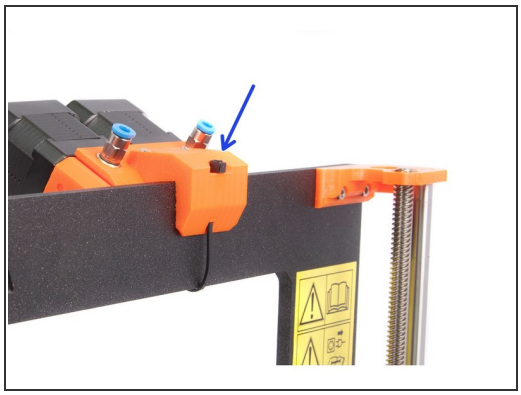
- PTFE tubes (2x)
- QSM-M5 fitting (2x)
- Place the PTFE tubes into the extruder as shown in the picture. Do not trim the tubes!
- Assemble the QSM-M5 fittings.
- Tighten the fittings using the 8mm side of the wrench, be very careful when tightening, don't use an excessive force!

Step 16 — Assembling the extruder holder: Part 4



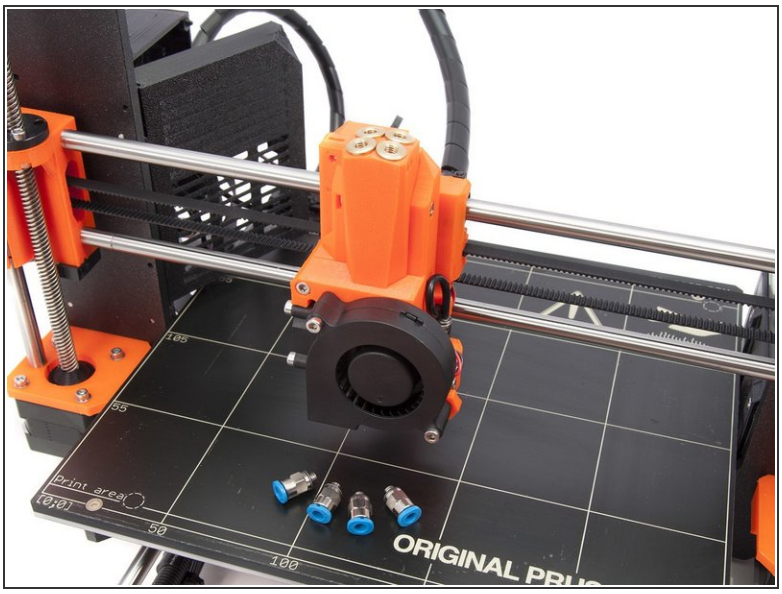
- Place finished extruder(s) on the Z-axis frame, ensure the extruder is "seated" properly.
- Our recommendation is 60 mm from the edge of the Z-axis top holder to the edge of the extruder holder.

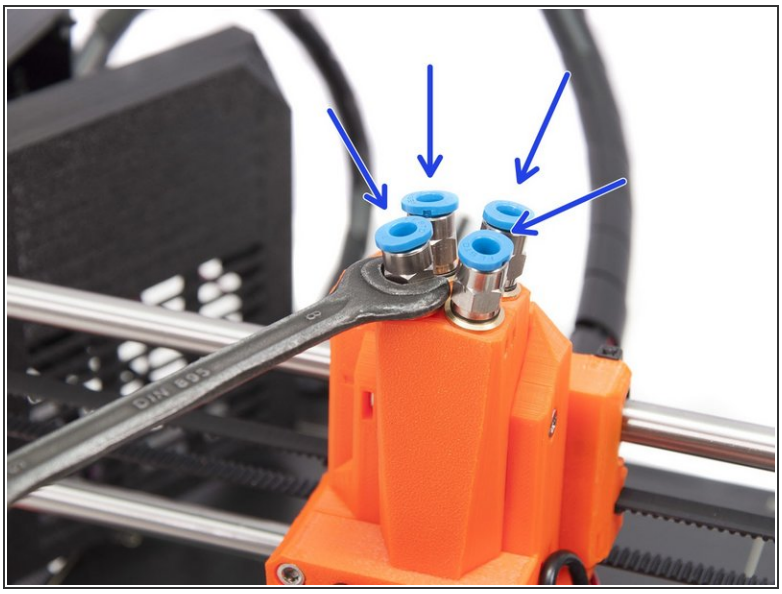
Step 17 — Assembling the extruder holder: Part 5

- Using a zip tie fix the extruder to the frame.
- Start on the front face of the frame and push the zip tie all the way in.
- Wrap the zip tie around the frame and push it through the extruder holder.
- Tighten the zip tie and cut the remaining part with the pliers.

Step 18 — Assembling fittings on the multiplexer



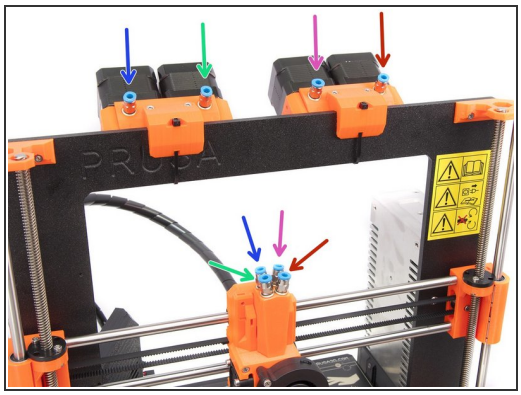
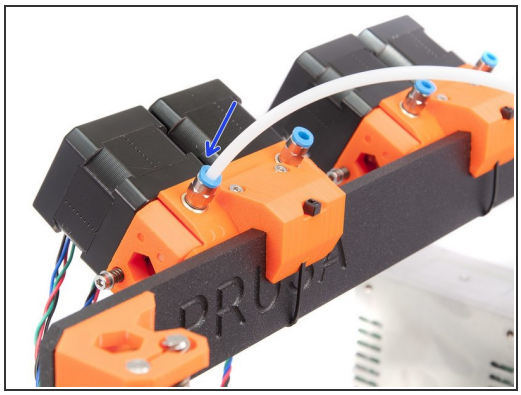
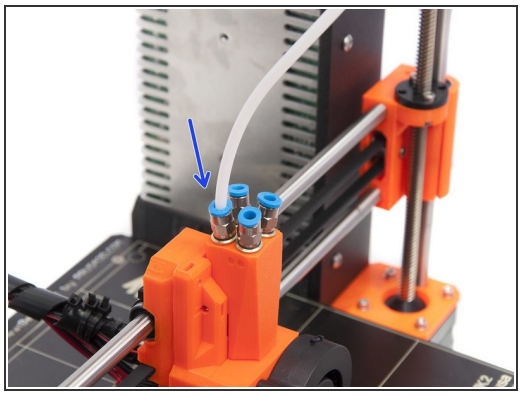


- Prepare QSM-M5 fittings (4x)

⚠ Before placing the fittings, ensure there are steel tubes in the multiplexer.

- Place the fittings on the top of the multiplexer and tighten them using the 8mm side of the wrench.

Step 19 — Assembling the PTFE tubes

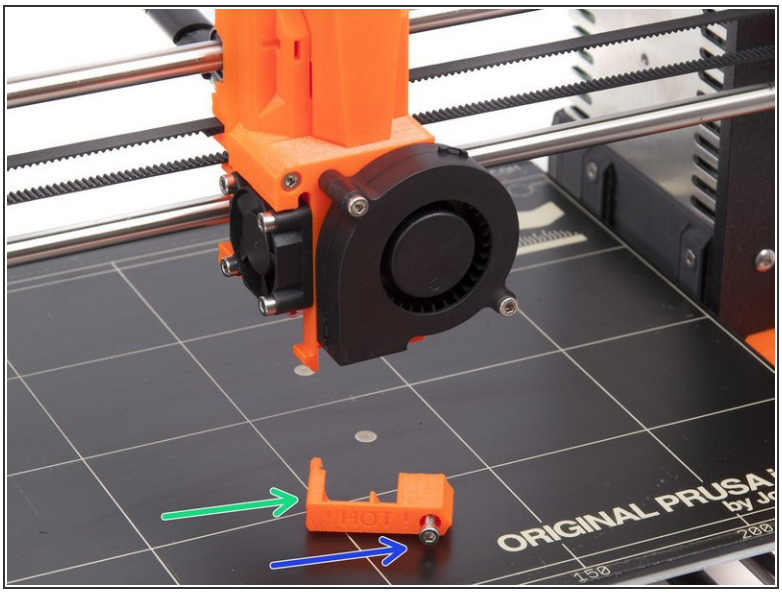




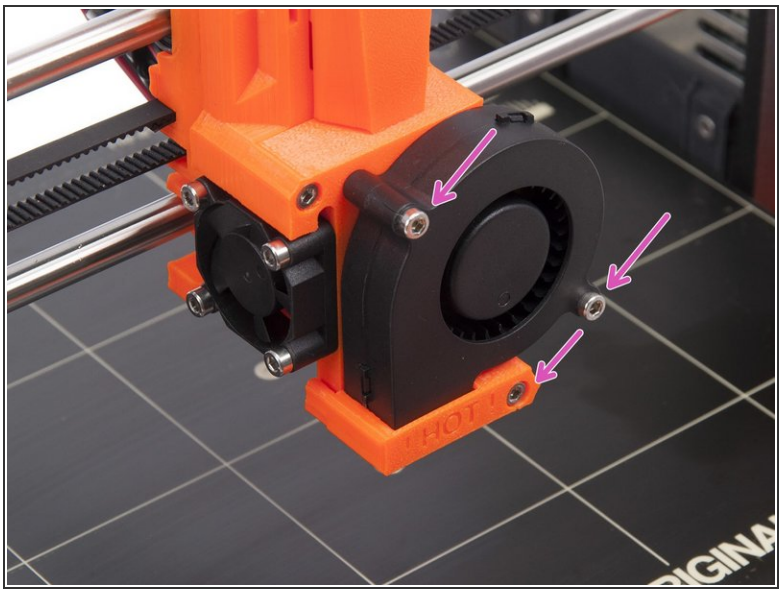
⚠ Assemble the tubes in the exact order as in this manual. It will be much easier for us to troubleshoot your issues with Multiprint!

- The proper order of extruders and tubes in multiplexer is:
- Extruder 1
- Extruder 2
- Extruder 3
- Extruder 4

ⓘ Connect all tubes, photos are showing a connection of just one tube for illustrational purposes.

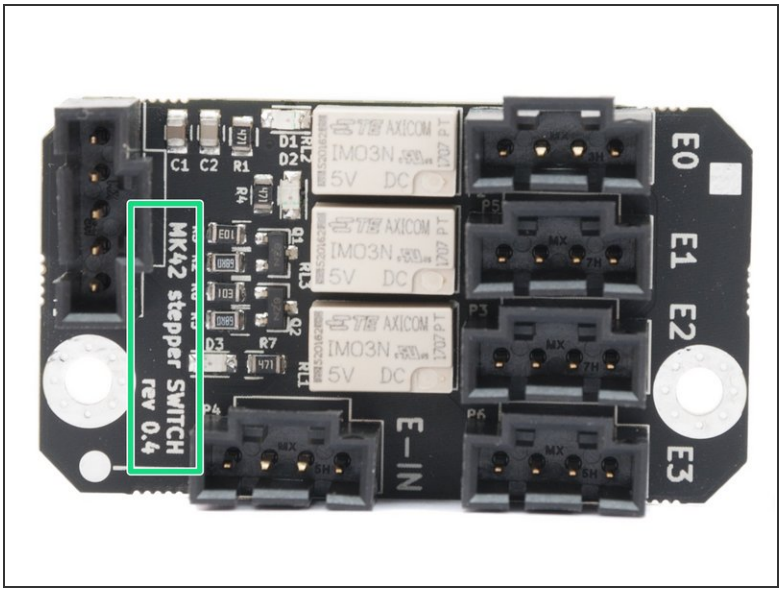
Step 20 — Place the fan nozzle

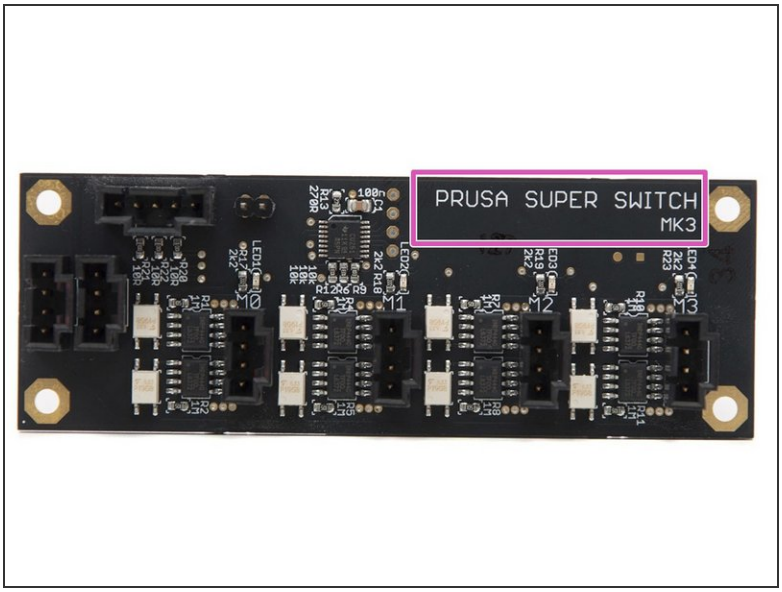




- Fan nozzle
- M3x20 screw (1x)
- Tighten the fan nozzle using the 2.5 mm Allen key. Gently tighten screws holding up the fan in place.

Step 21 — Different Extruder electronics





⚠ **Starting 3rd of August 2017 the Multi Material upgrade is shipped with new a electronics board** for the Extruders. Main difference is in the size and layout of the connectors. Functionality is the same.

- Locate your board in the package and choose following guide:
- Stepper Switch board - 4A. Electronics assembly (newer version)
- Prusa Super Switch board - 4B. Electronics assembly (older version)

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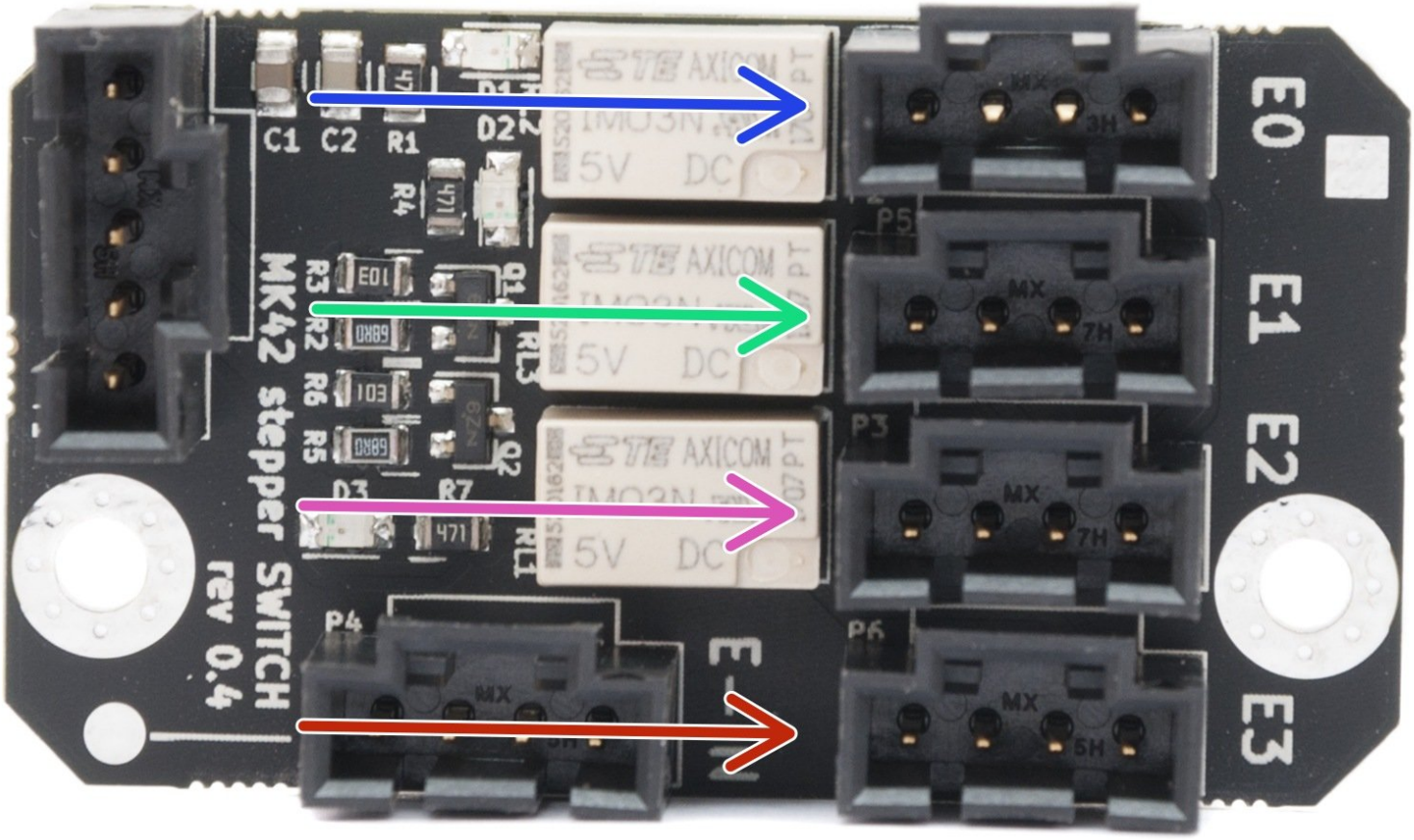
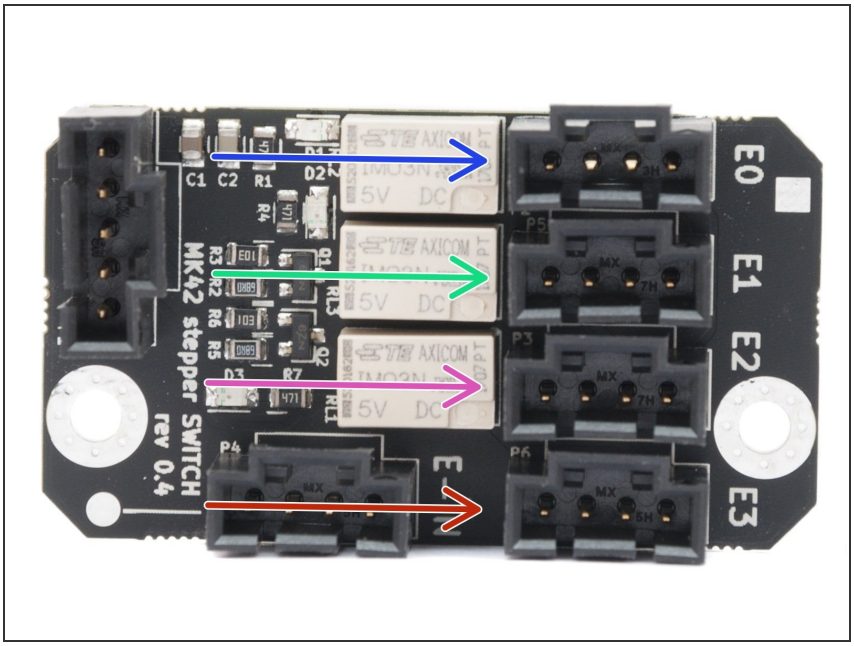
5A. Electronics assembly (newer version)

Written By: Jakub Dolezal



Step 1 — Proper order of the Extruders



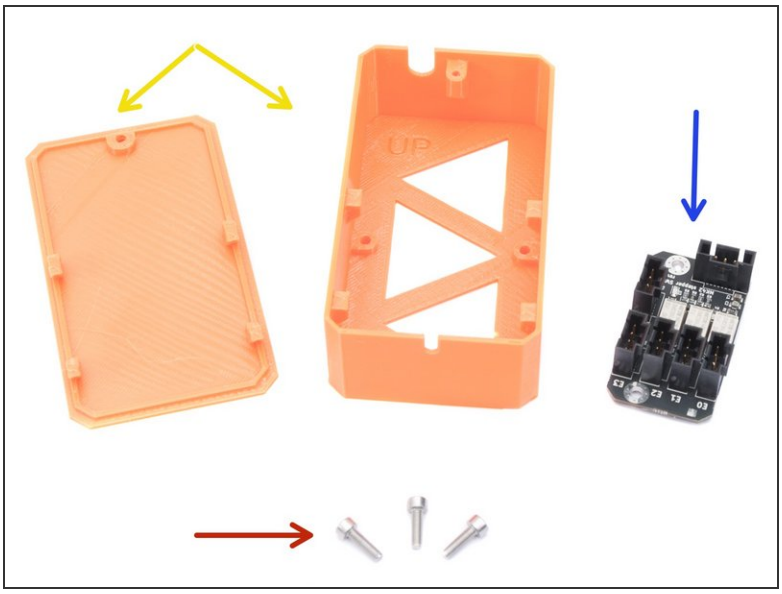
⚠ Following the previous chapter, you have to connect extruder motors in a specific order. Otherwise, it will be complicated to troubleshoot any issues.

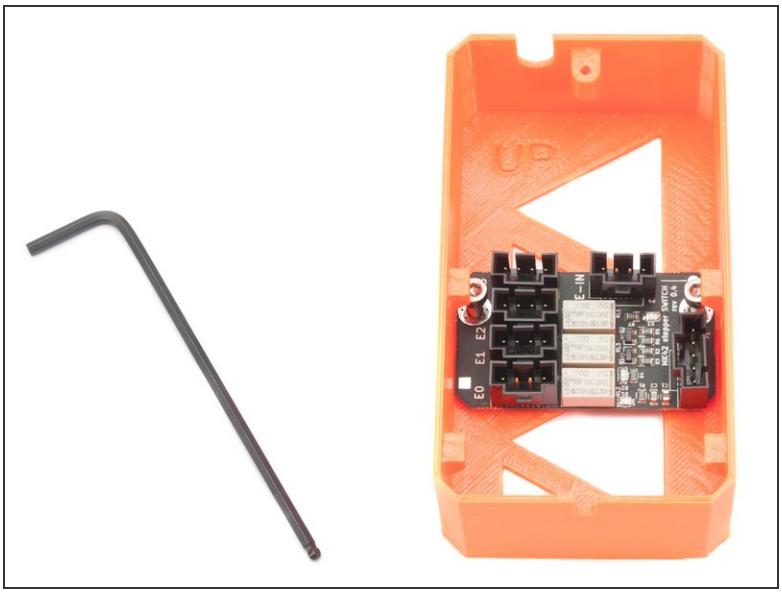
⚠ !!! CAUTION, the board is very sensitive to electrostatic discharge (ESD), please proceed with caution and do not touch the chips on the board !!!

- Each port on the board is labeled with a letter E and a number, the proper order is as follows:
- Port E0 - Extruder 1
- Port E1 - Extruder 2
- Port E2 - Extruder 3
- Port E3 - Extruder 4

ⓘ The board is in the box "MOTORS & MULTIPLEXER".

Step 2 — Preparing Stepper Switch board





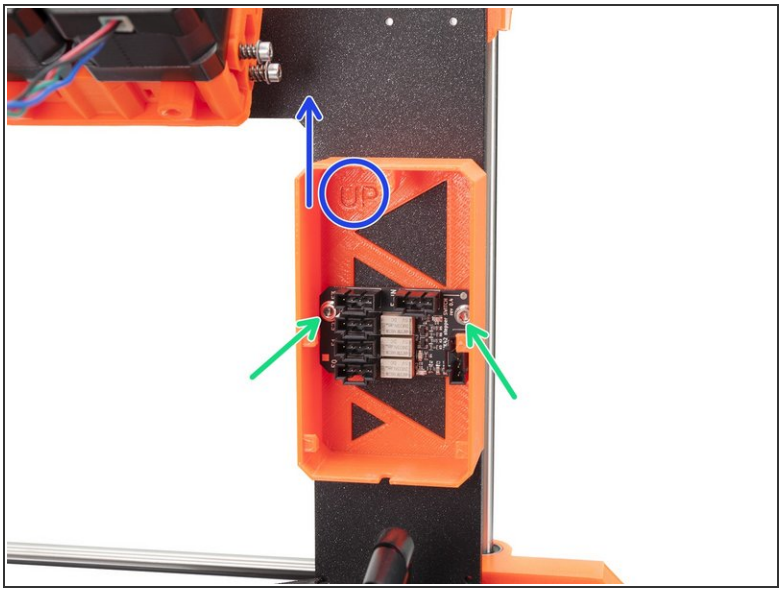
- M3x10 screws (3x)
- Stepper Switch case (1x)
- Stepper Switch board (1x)
- Place the board into the case and secure it **with two M3x10 screws**. You will use the same screws to mount the case on the frame, so don't tighten them fully now.

Use 2.5mm Allen key.

The printed parts are in the bag 4.ELECTRONICS.

Starting mid of August 2017 the case will be shipped in black colour only, the function and assembly are the same.

Step 3 — Mounting the case on the frame

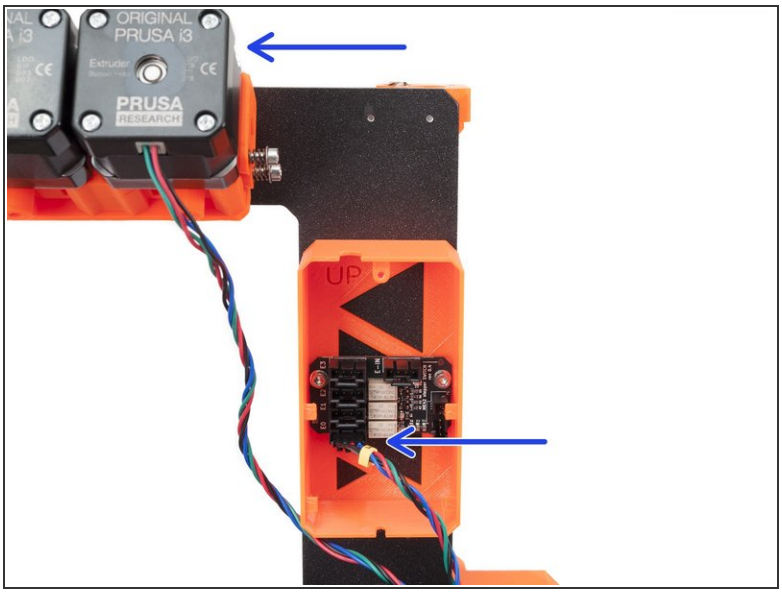


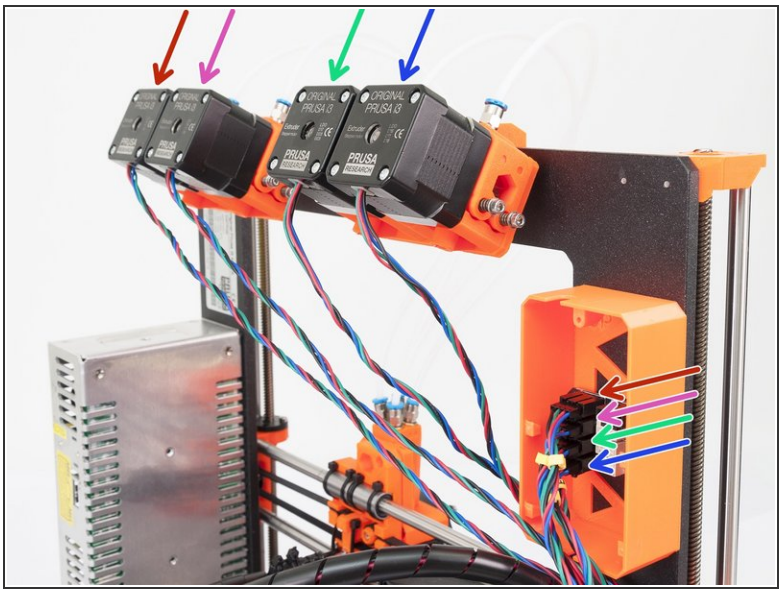
- M3x10 screws (2x)
- Find the drilled holes on the frame (above Rambo cover).
- Place the case in a way, that the **"UP"** sign is facing upwards.
- Tighten the screws fully using the 2.5mm Allen key.

⚠ When tightening proceed with caution, if you use an excessive force and miss the hole in the frame you can break the screw.

ⓘ Note that if you have MK2 printer, your multiplexer cables will be entering from the side of the RAMBO cover and not from above.

Step 4 — Connecting extruder motors





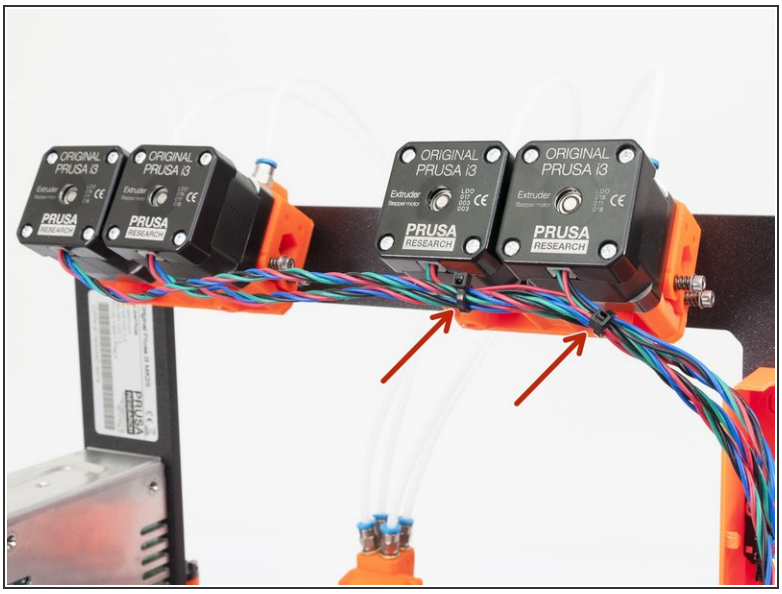
⚠ Following the previous chapter, you have to connect extruder motors in a specific order. Otherwise, it will be complicated to troubleshoot any issues.

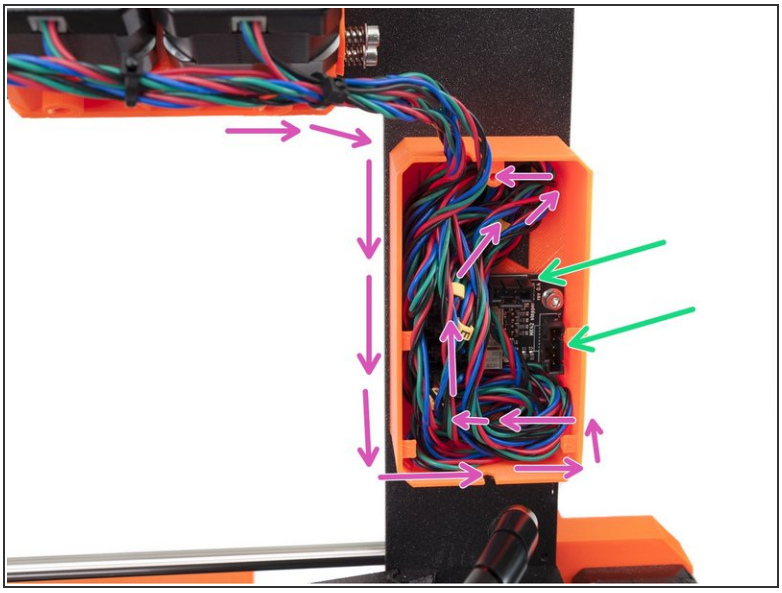
- Start with the Extruder 1 (closest to the case), take the cable, locate the proper connector and connect it. Ensure it is plugged all the way in!

⚠ Reminder: the proper order of the extruders is following (see the last picture):

- Port E0 - Extruder 1
- Port E1 - Extruder 2
- Port E2 - Extruder 3
- Port E3 - Extruder 4

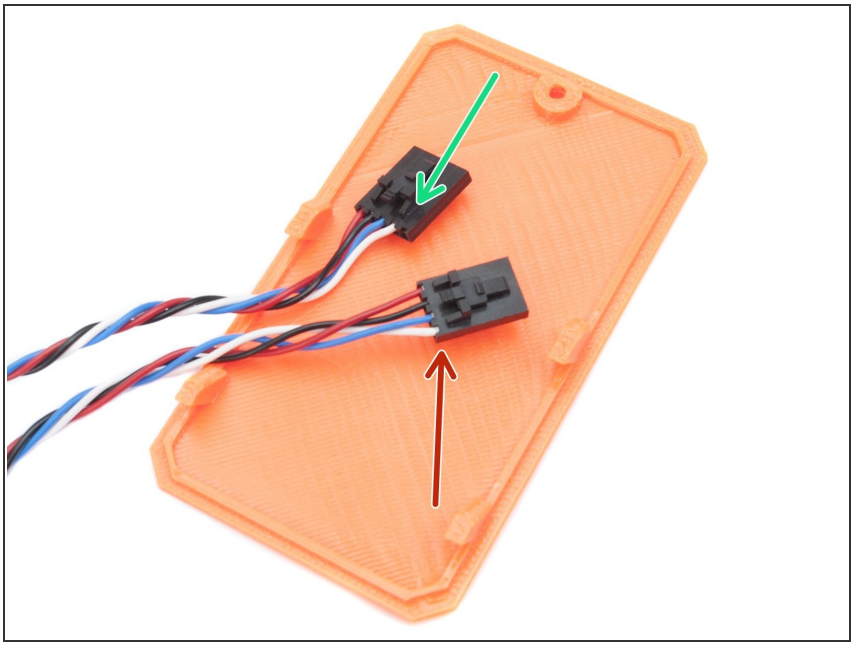
Step 5 — Cable management





- Use zip ties to manage the cables outside the Stepper Switch case. Two are enough.
- Use the inner volume of the Stepper Switch case to manage cables from all extruders. Arrange them similarly as shown with the arrows.
- **Don't cover these two ports** with the cables from extruders!

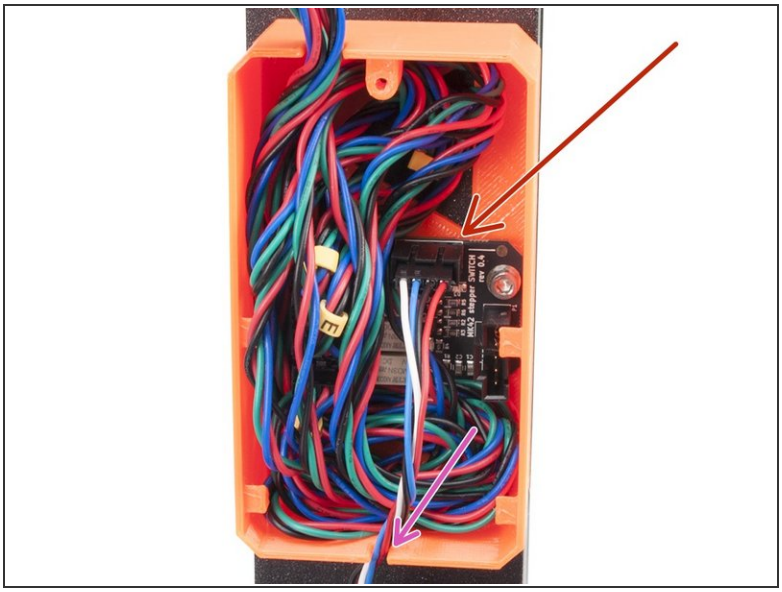
Step 6 — Distinguishing between cables

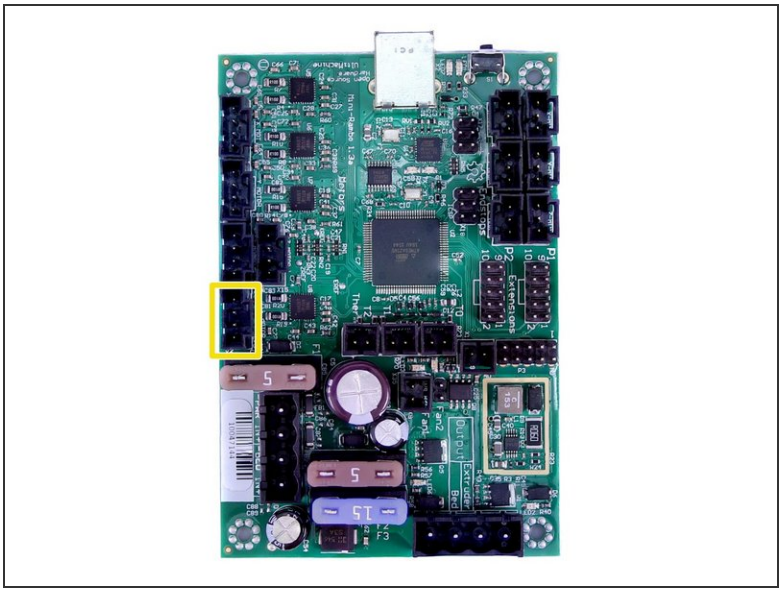


- For connecting the Stepper Switch board and the Rambo board, there are two cables prepared. The difference between them is the number of pins in the connector.
- Cable nr. 1: 5 pins on one end and 4 pins on the other
- Cable nr. 2: 4 pins on both ends

ⓘ The case cover is not necessary in this step, it is used to increase the cable visibility.

Step 7 — Connecting the cables: Part 1



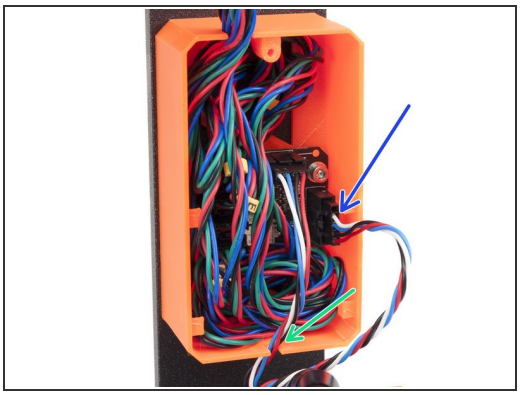
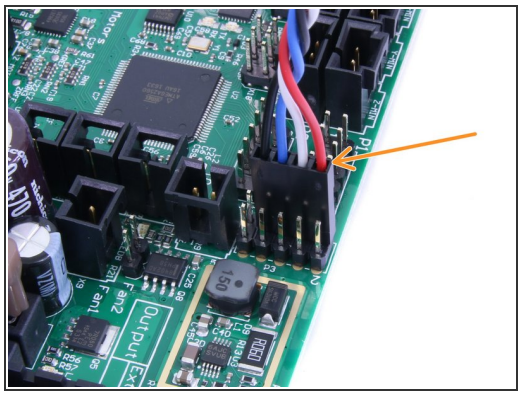
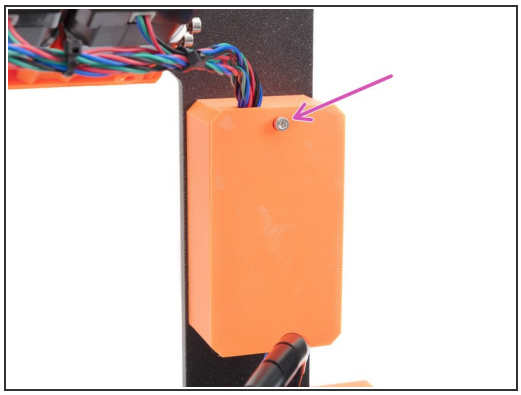


- Take the cable with 4-pin connectors on both ends and connect it to the Stepper Switch board.
- Proceed to the other end of the cable and connect the 4-pin connector to the Rambo board as shown in the picture.

⚠ Ensure the connectors are plugged all the way in on both ends!

- Use the opening in the bottom of the case to guide the cable.

Step 8 — Connecting the cables: Part 2

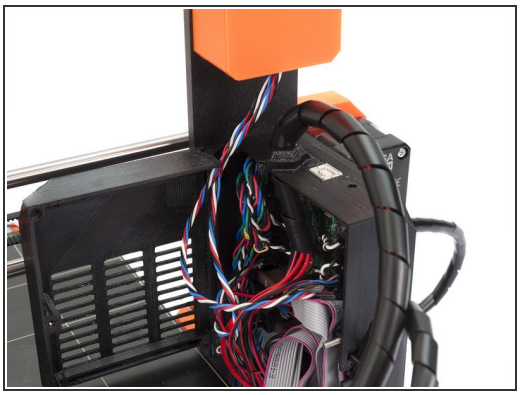




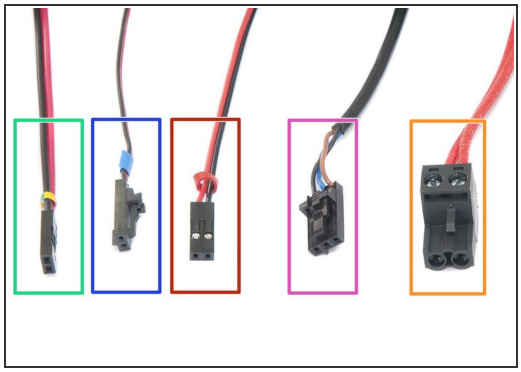
- Take the cable with 5-pin connector on one end and connect it to the Stepper Switch board.
- Proceed to the other end of the cable and connect the 4-pin connector to the **upper row of 2x 5 pin socket** as shown in the picture (**RED** wire is on the right facing "out" from the board).

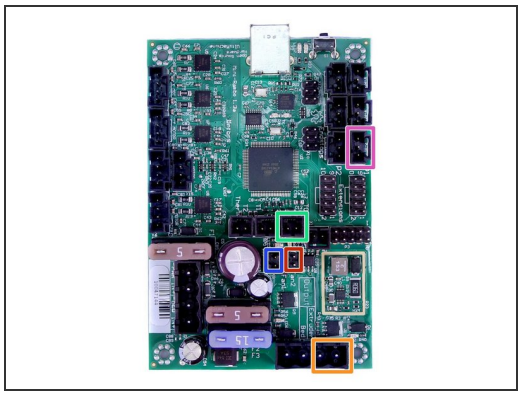
⚠ Ensure the connectors are plugged all the way in on both ends!

- Use the opening in the bottom of the case to guide the cable.
- Close the case using the cover and M3x10 screw.

Step 9 — Connecting the cables: Part 3



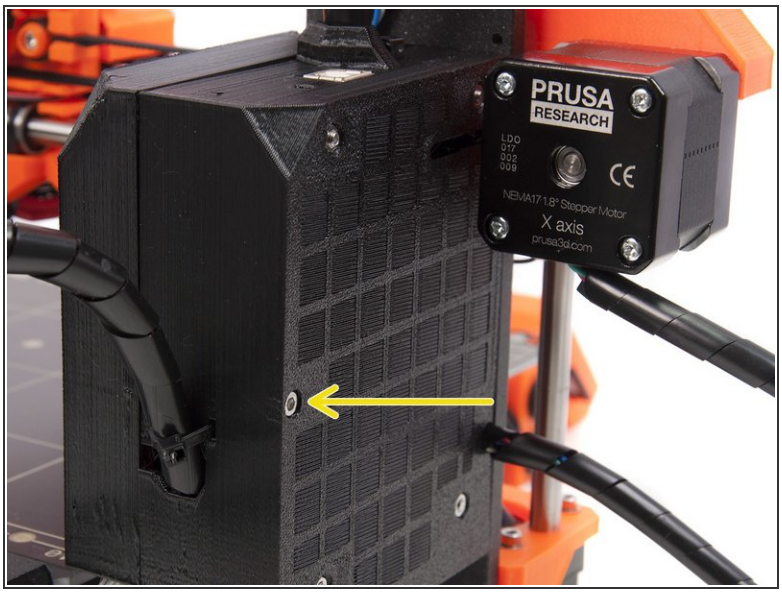


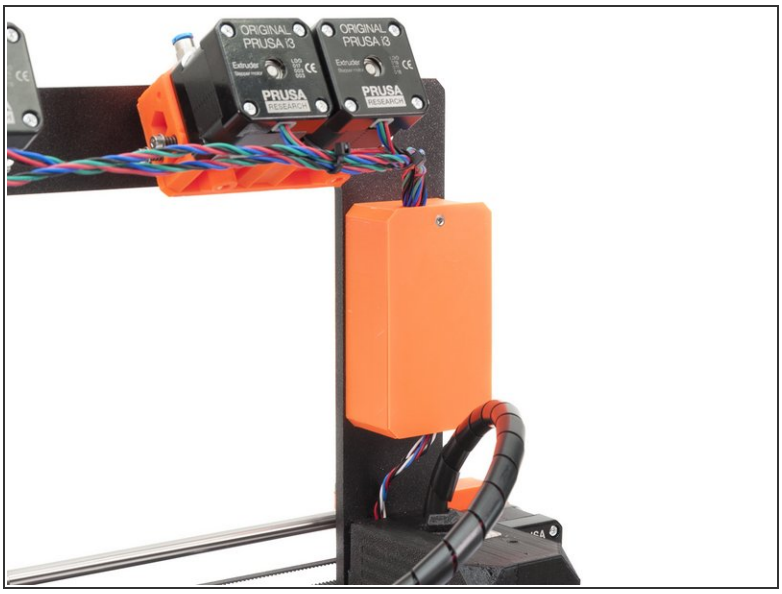


- In this step we will finish the Rambo electronics, take all the cables from the multiplexer and connect them as shown in the picture.
- Multiplexer thermistor (cable going from the Multiplexer labeled with Yellow/Green heat shrink) [Orientation does not matter].
- Left hotend fan (cable going from the Multiplexer labeled with Blue heat shrink).
- Front print fan (cable going from the Multiplexer labeled with Red heat shrink)[make sure that the red wire is closer to the thermistor].
- P.I.N.D.A. probe
- Multiplexer heater

⚠ DOUBLE CHECK the connection! It is very important to ensure the correct connections!

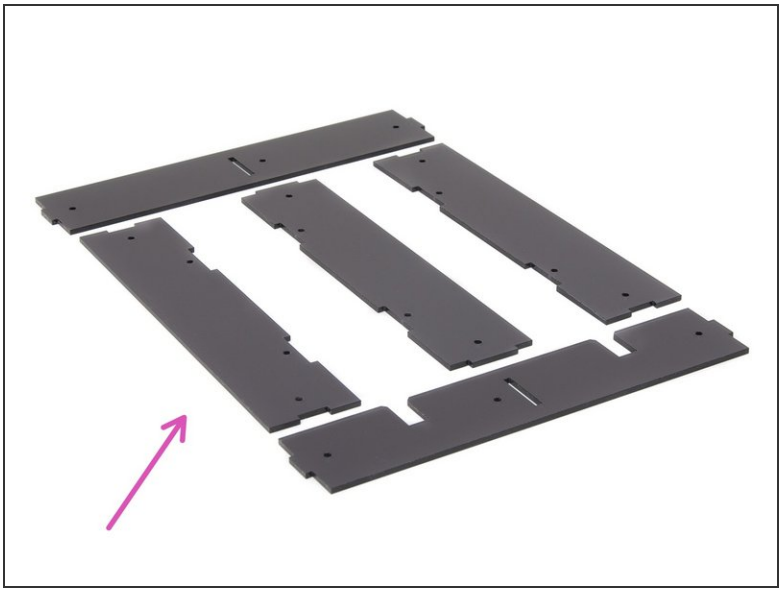
Step 10 — Closing RAMBO cover





- When all the cables are plugged, close the Rambo cover and tighten the screw M3x40 (1x).

Step 11 — Different spool holders



- Electronics are done! Let's move to the next chapter.

⚠ Starting November 2017 the Multi Material upgrade is shipped with new spool holders.

- Locate the spool holders in the package and choose following guide:
- Black plastic base - 5A. Spool holder assembly (newer version)
- Transparent plastic parts - 5B. Spool holder assembly (older version)

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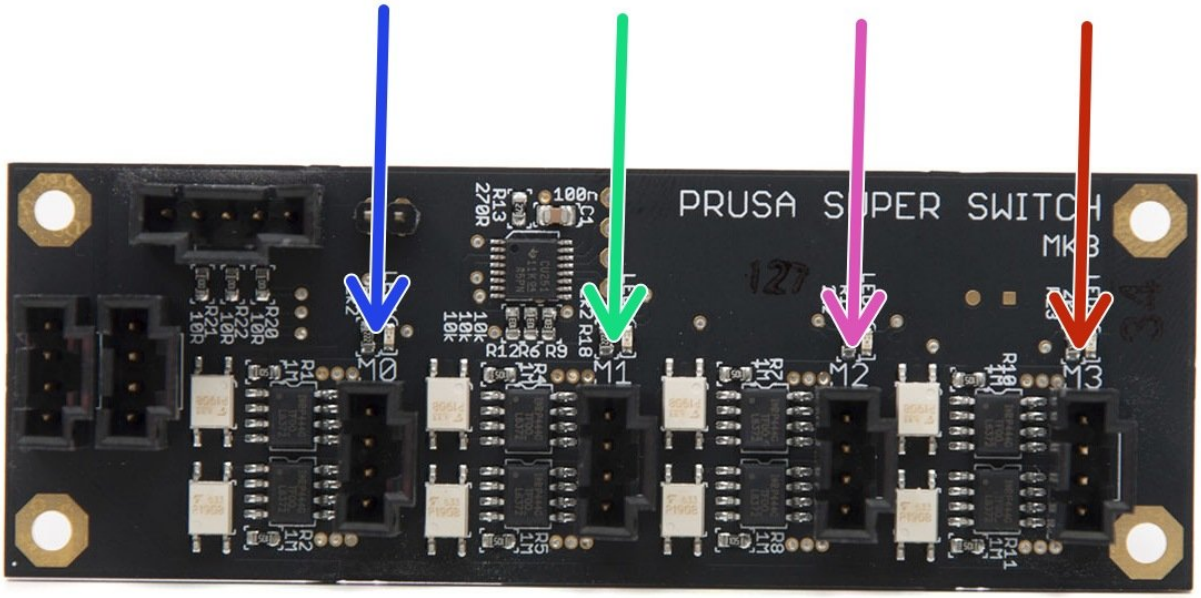
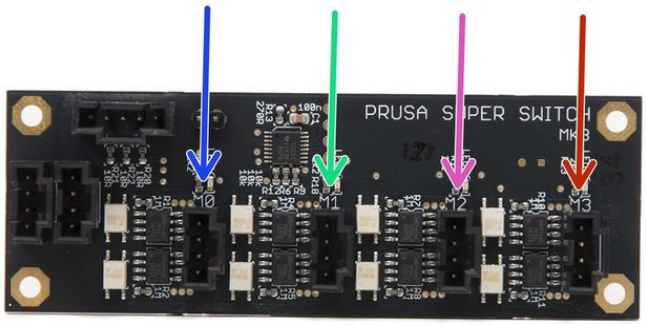
5B. Electronics assembly (older version)

Written By: Jakub Dolezal



Step 1 — Proper order of the Extruders



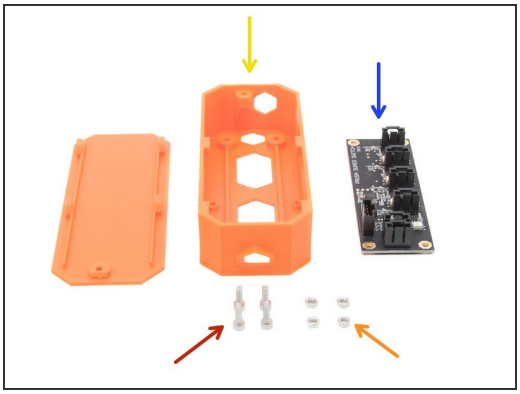
⚠ Following the previous chapter, you have to connect extruder motors in a specific order. Otherwise, it will be complicated to troubleshoot any issues.

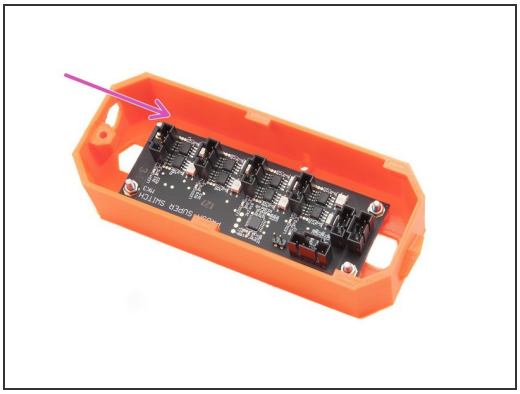
⚠ !!! CAUTION, the board is very sensitive to electrostatic discharge (ESD), please proceed with caution and do not touch the chips on the board !!!

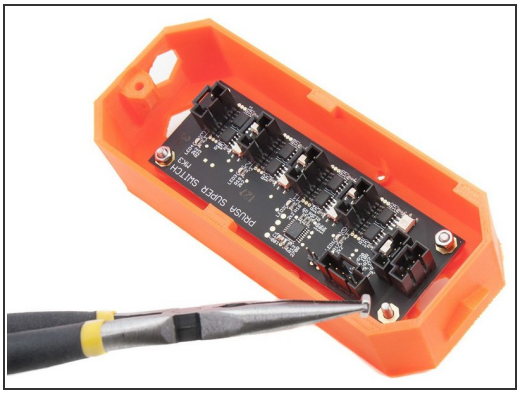
- Each port on the board is labeled with a letter M and a number, the proper order is as follows:
- Port M0 - Extruder 1
- Port M1 - Extruder 2
- Port M2 - Extruder 3
- Port M3 - Extruder 4

ⓘ The board is in the box "MOTORS & MULTIPLEXER".

Step 2 — Mounting the Prusa Super Switch board





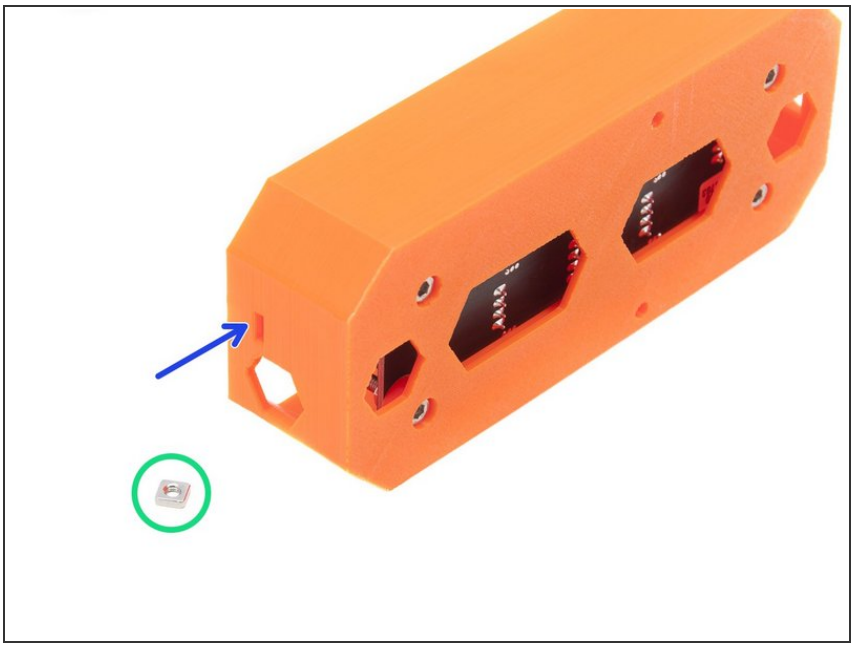


- M3x10 screws (4x)
- M3n nuts (4x)
- SuperSwitch-case (1x)
- Prusa Super Switch (1x)
- Place the board into the case and secure it with the screws and nuts as shown in the picture.
- The board orientation in the case is recommended as shown in the picture. Connectors for the extruders should be in line with hexagonal opening.

ⓘ In case you can't place the nut with your fingers, use pliers.

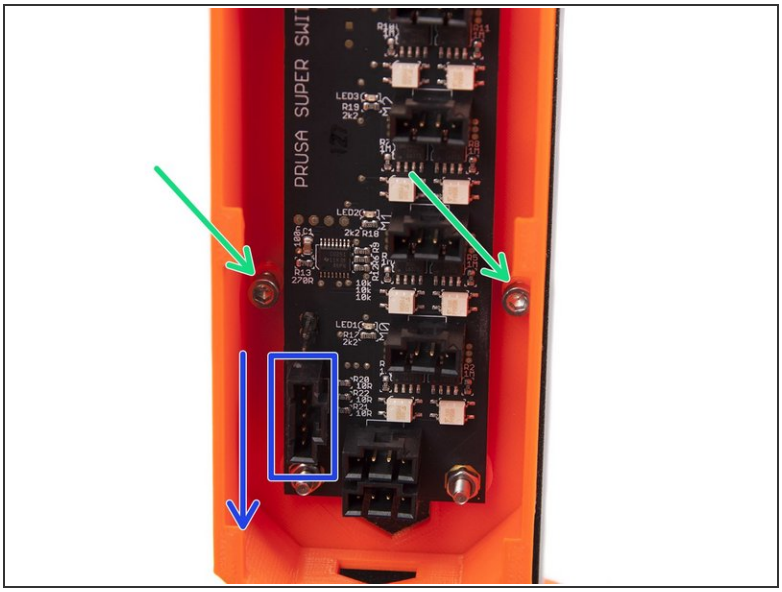
ⓘ The printed parts are in the bag 4.ELECTRONICS.

Step 3 — Inserting a nut for the case door



- M3nS nut (1x)
- Insert the nut to the slot all the way in.

Step 4 — Mounting the case on the frame

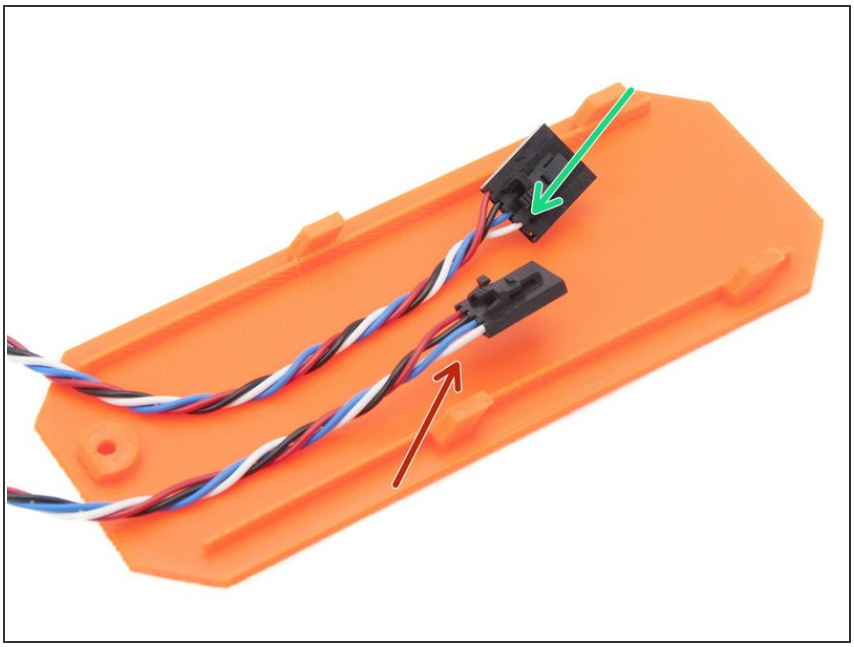


- M3x10 screws (2x)
- Find the drilled holes on the frame (above Rambo cover).
- Place the case in a way, that the five pin connector is facing downwards.
- Place the screws in the case and tighten them.

⚠ When tightening proceed with caution, if you use an excessive force and miss the hole in the frame you can break the screw.

ⓘ Note that if you have MK2 printer, your multiplexer cables will be entering from the side of the RAMBO cover and not from above.

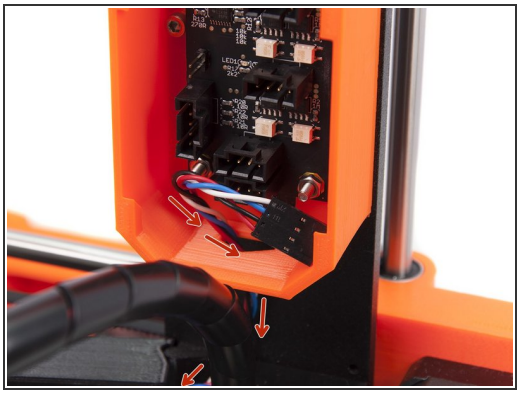
Step 5 — Distinguishing between cables

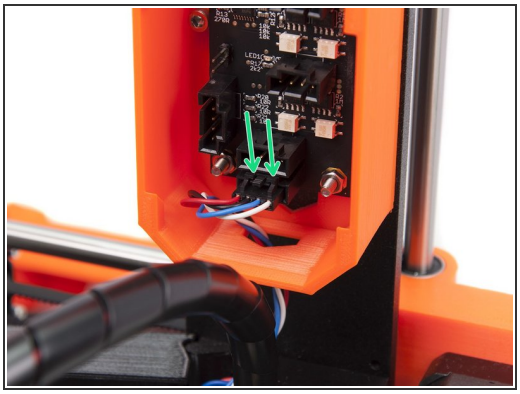


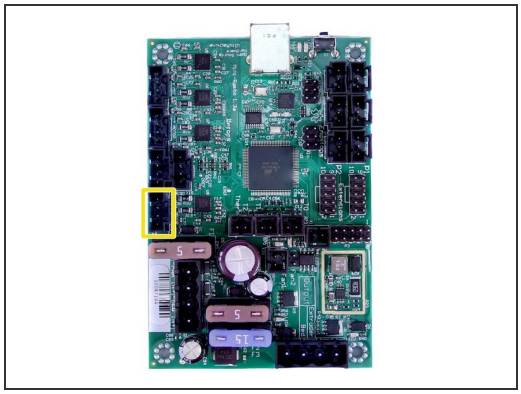
- For connecting the Prusa Super Switch board and the Rambo board, there are two cables prepared. The difference between them is the number of pins in the connector.
- Cable nr. 1: 5 pins on one end and 4 pins on the other
- Cable nr. 2: 4 pins on both ends

The case cover is not necessary at this step, it is used to increase the cable visibility.

Step 6 — Connecting the cables: Part 1



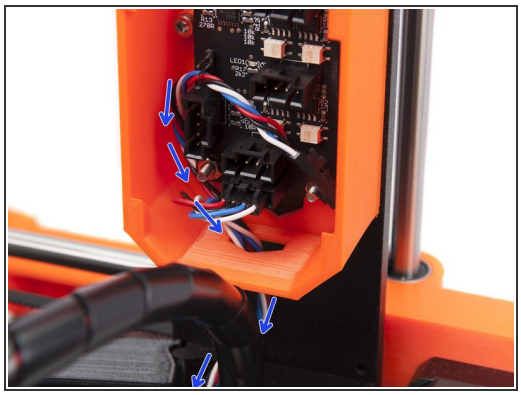
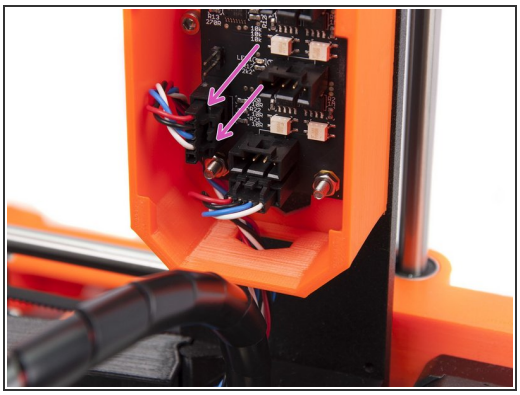
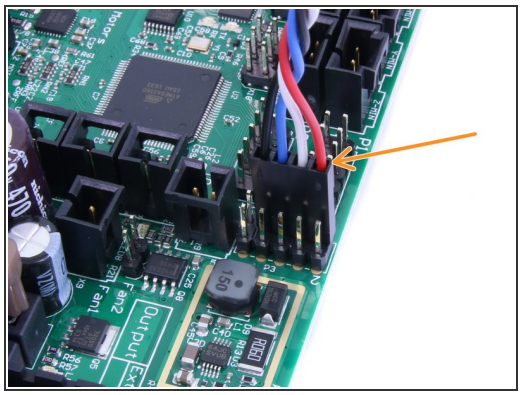




- Take the cable with 4-pin connectors on both ends and push most of the length through the opening in the case.
- Locate the lowest 4-pin connector available and connect the cable.
- Proceed to the other end of the cable and connect the 4-pin connector as shown in the picture.

Ensure the connectors are plugged all the way in on both ends!

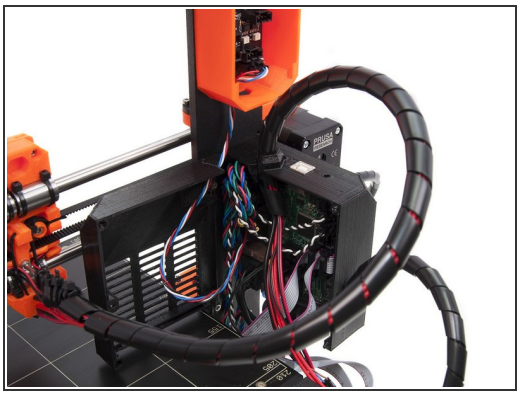
Step 7 — Connecting the cables: Part 2

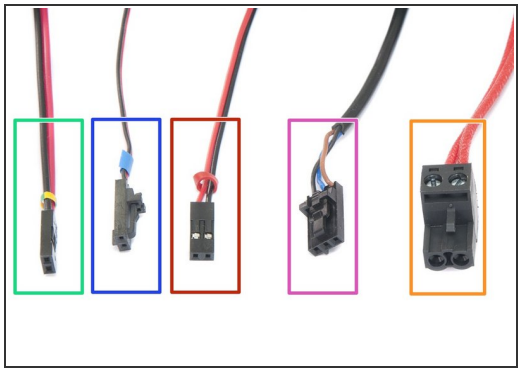




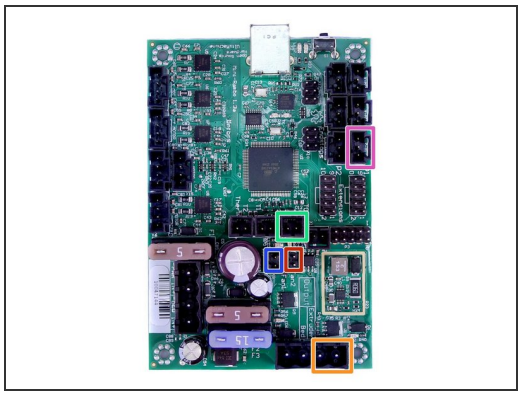
- Take the cable with 5-pin connector on one end and push the other 4-pin connector through the opening in the case. Also push through most of the length of the cable.
- Locate the 5-pin connector on the board (left side) and connect the cable with 5-pin connector.
- Proceed to the other end of the cable and connect the 4-pin connector to the **upper row of 2x 5 pin socket** as shown in the picture (**RED** wire is on the right facing "out" from the board).

⚠ Ensure the connectors are plugged all the way in on both ends!

Step 8 — Connecting the cables: Part 3



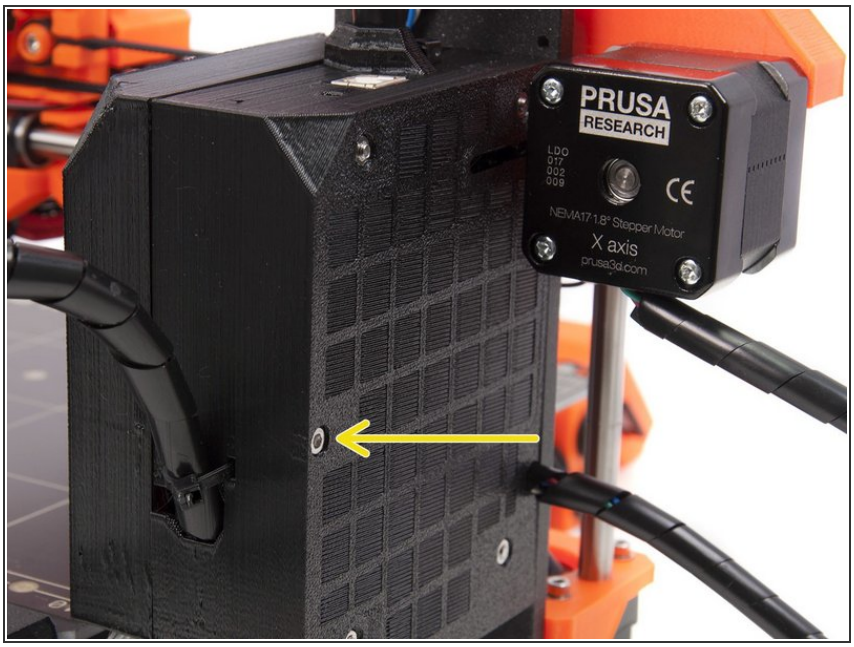




- In this step we will finish the Rambo electronics, take all the cables from the multiplexer and connect them as shown in the picture.
- Multiplexer thermistor (cable going from the Multiplexer labeled with Yellow/Green heat shrink) [Orientation does not matter].
- Hotend fan (cable going from the Multiplexer labeled with Blue heat shrink).
- Print fan (cable going from the Multiplexer labeled with Red heat shrink)[make sure that the red wire is closer to the thermistor].
- P.I.N.D.A. probe
- Multiplexer heater

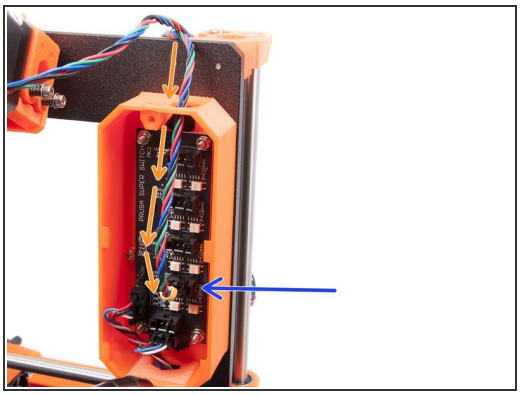
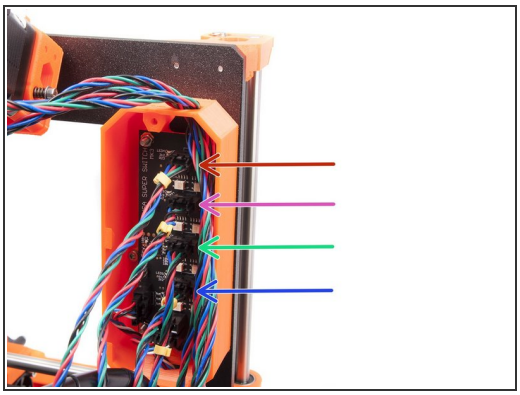
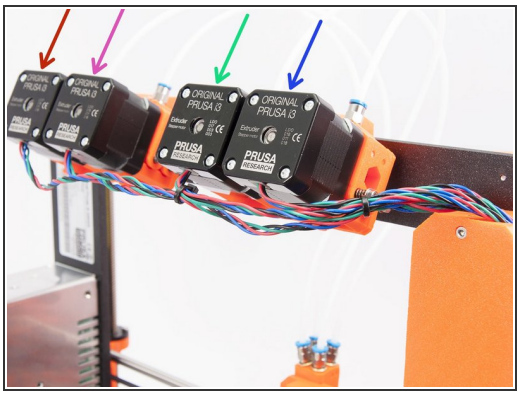
⚠ DOUBLE CHECK the connection! It is very important to ensure the correct connections!

Step 9 — Closing RAMBO cover



- When all the cables are plugged, close the Rambo cover and tighten the screw M3x40 (1x).

Step 10 — Connecting extruder motors

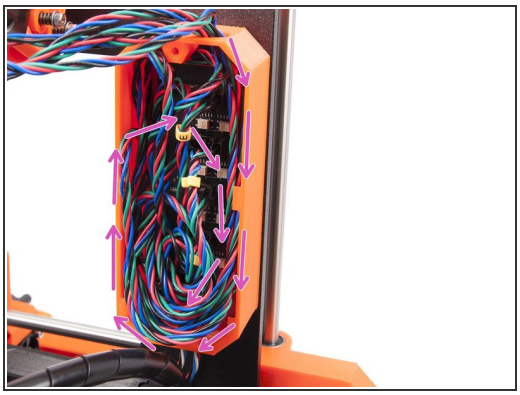
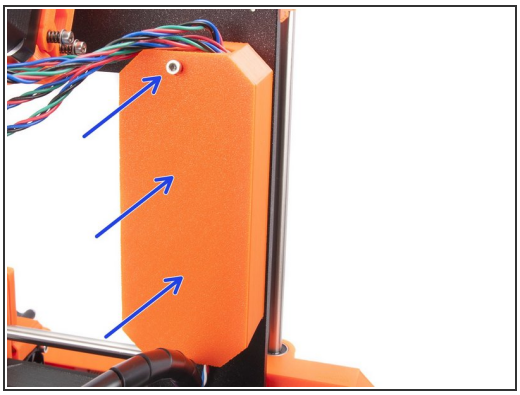
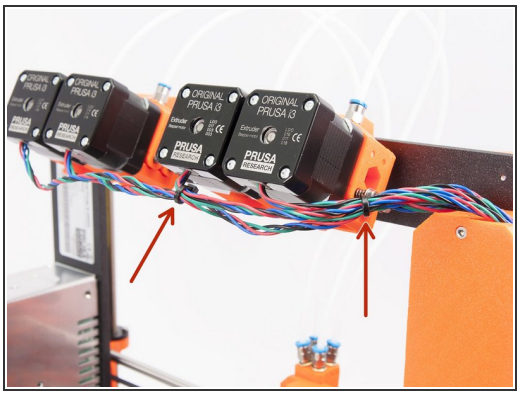
⚠ Following the previous chapter, you have to connect extruder motors in a specific order. Otherwise, it will be complicated to troubleshoot any issues.

- Start with the Extruder 1 (closest to the case), take the cable and push it through the case.
- Locate the proper connector and connect it, ensure it is plugged all the way in!

⚠ Reminder: the proper order of the extruders is following (see the last picture):

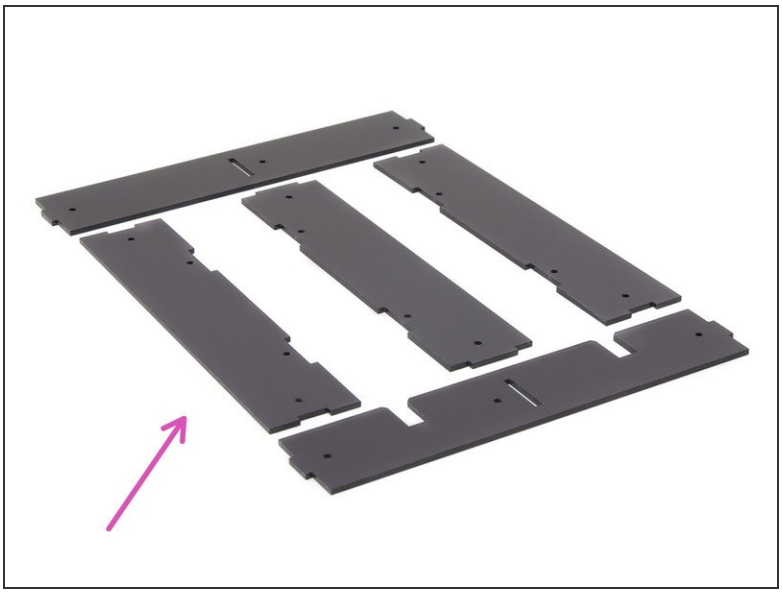
- Port M0 - Extruder 1
- Port M1 - Extruder 2
- Port M2 - Extruder 3
- Port M3 - Extruder 4

Step 11 — Closing the case and cable management

- Use the inner volume of the Super Switch case to manage cables from all extruders. Rotating them clock-wise is recommended.
- Close the case with the Super Switch cover and using 2.5 Allen key tighten M3x10 screw on the top.
- Use zip ties to manage the cables outside the Super Switch case. Two are enough.

Step 12 — Different spool holders



- Electronics are done! Let's move to the next chapter.
- ⚠ Starting November 2017 the Multi Material upgrade is shipped with new spool holders.
- Locate the spool holders in the package and choose following guide:
- Black plastic base - 5A. Spool holder assembly (newer version)
- Transparent plastic parts - 5B. Spool holder assembly (older version)

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6A. Spool holder assembly (newer version)

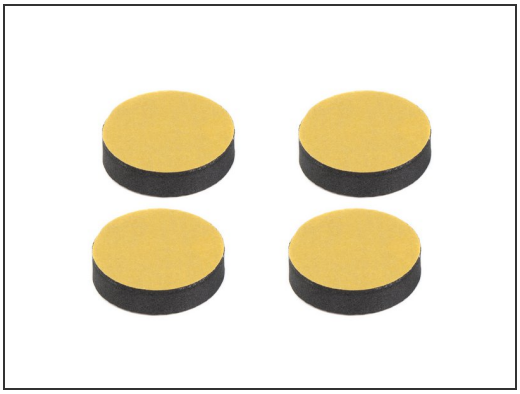
Written By: Jakub Dolezal

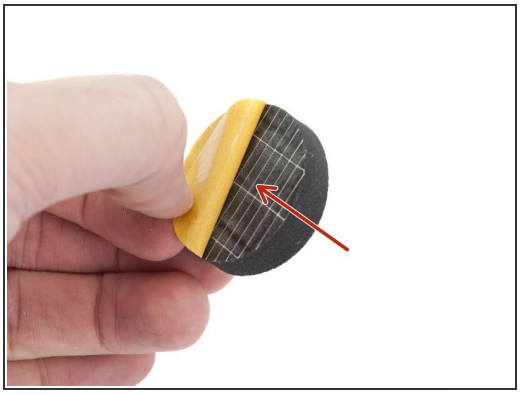
Step 1 — Cleaning the spool holder base

⚠ This guide is describing an assembly of a single spool holder. Your package should include 4, simply repeat all the steps again until you finish all spool holders.

- Take the black plastic spool holder base and turn it upside down.
- Using cloth + detergent or IPA clean all four edges from dust and grease.
- Let the surface fully dry and proceed to the next step.

Step 2 — Sticking felt pads

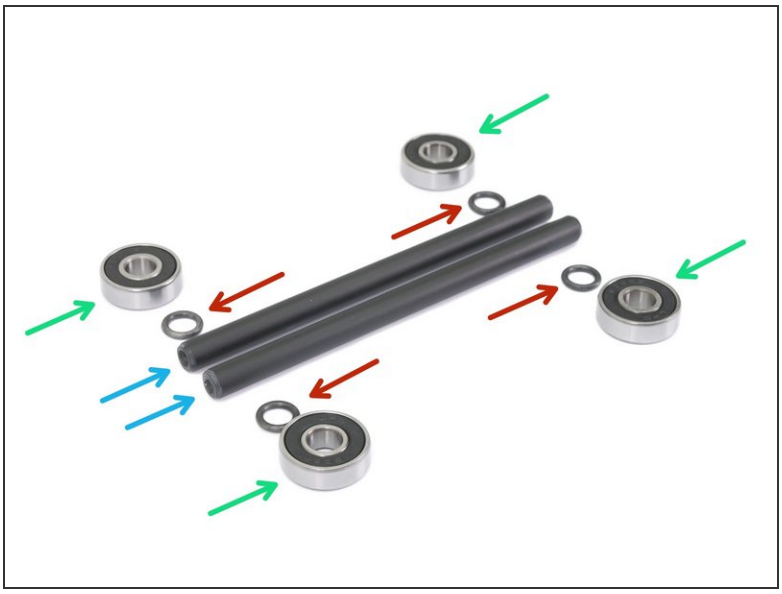




- For each spool holder base prepare 4 felt pads.
- Peel off the yellow foil completely.
- Stick the felt pad on the bottom of the spool holder base and hold it for a while. **DON'T** use too much force, you might deform the plastic shell.

ⓘ The felt pads are important to increase contact between the spool holder base and the surface underneath and reduce the spool holder from moving.

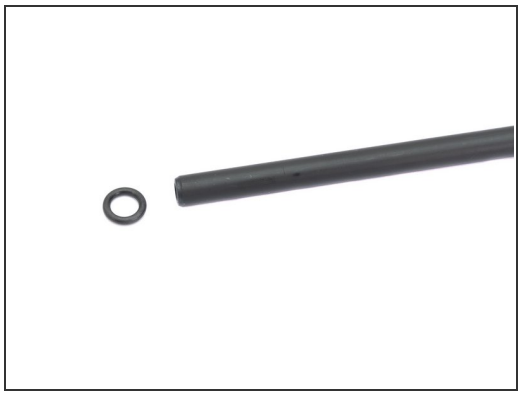
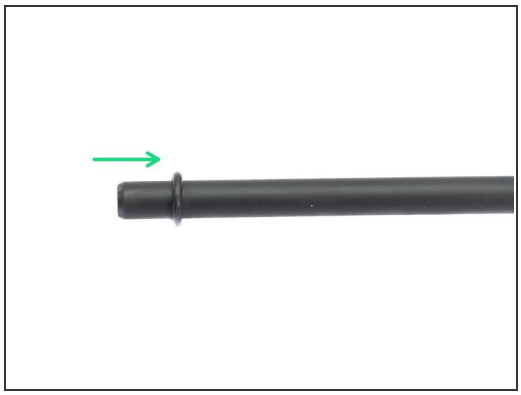
Step 3 — Assembling the spool shafts 1/3



- Let's assemble the shafts holding the spools, you will need:
- Bearings (4x)
- Rubber seal (4x)
- Shaft (2x)

ⓘ Shafts can be black or silver, the dimensions are the same.

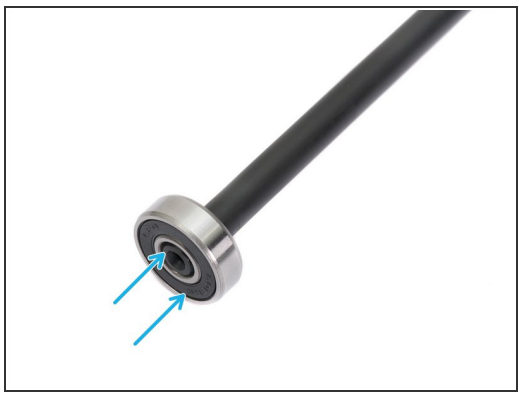
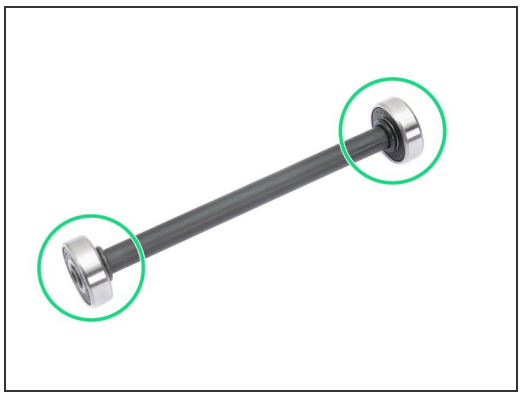
Step 4 — Assembling the spool shafts 2/3


- Prepare two rubber seals and a shaft.
- Push the rubber seal on the shaft from both ends. The distance between shaft's end and rubber seal should be around 5 mm.
- Take two bearings and press it on the shaft from both ends. Ensure the rubber seal is right behind the bearing.

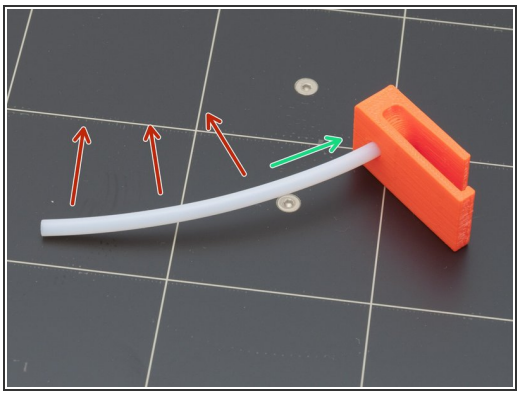
ⓘ Repeat these steps for the second shaft.

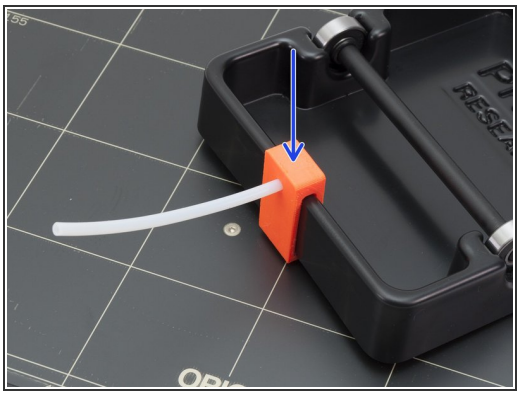
Step 5 — Assembling the spool shafts 3/3


- Align the bearing with the end of the shaft.
- Correctly assembled shaft with bearings. Ensure both bearings are in a contact with rubber seal.
- Place both shafts into the plastic spool holder base.

Step 6 — Assembling the PTFE trap





- Take the PFTE tube and press it through the 3D printed PTFE trap. The overhang on the other side should be around 1-2 mm.

⚠ ENSURE the tube is facing up as in the picture, different orientation might cause issues !!!

- Prepare the spool holder base and rotate the part with cutout towards you.
- Press the PTFE trap in the cutout.

ⓘ The heatbed is used just for the purpose of the photography. Don't use your heatbed for the assembly to avoid damages to the surface.

Step 7 — Assembly is done!

- Hooray! Assemble remaining 3 spool holders and the hardware part is ready!!! Then proceed to P.I.N.D.A. calibration 6. Preflight check

Filaments aren't part of the package, though you can purchase them on our e-shop ;)

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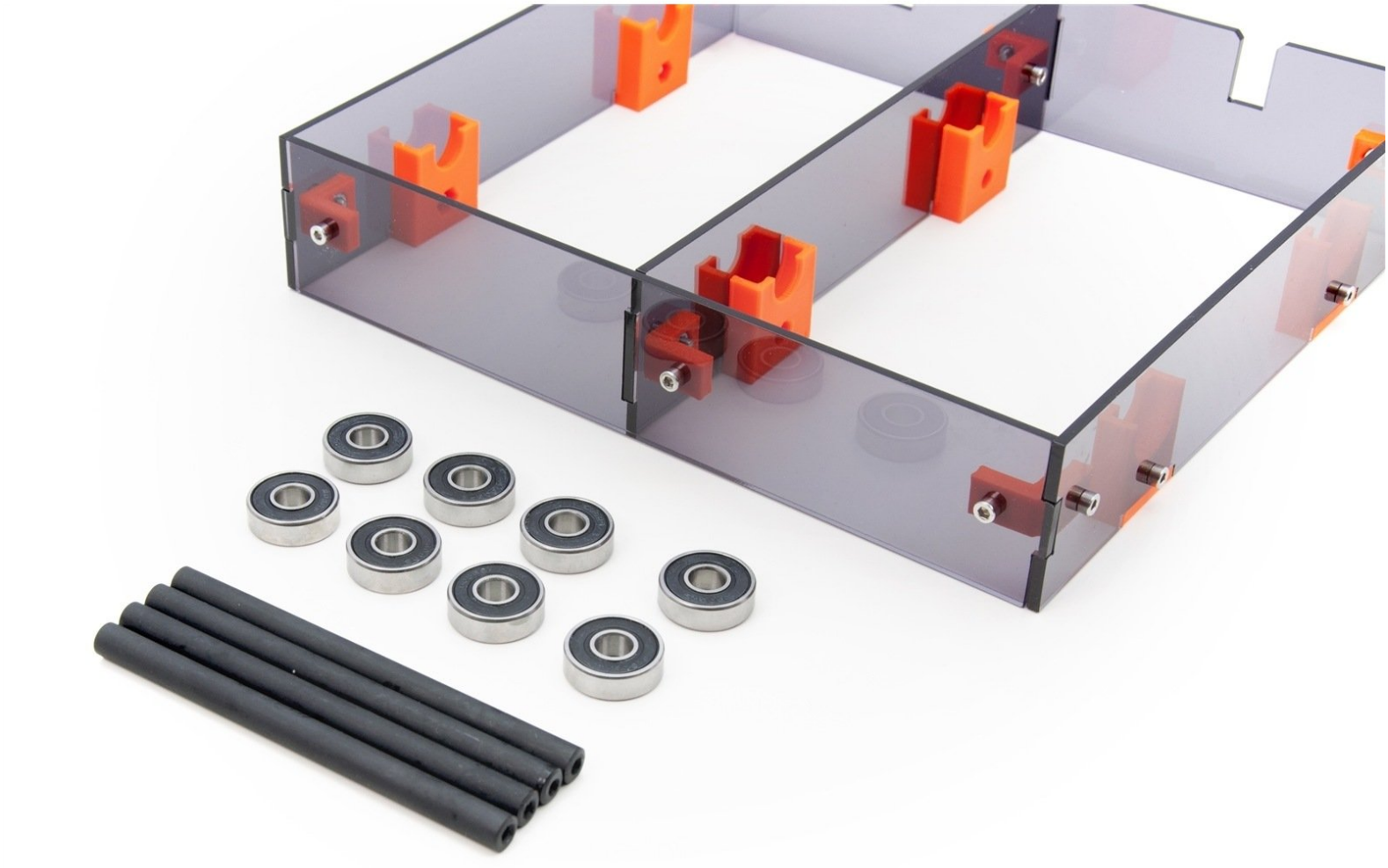
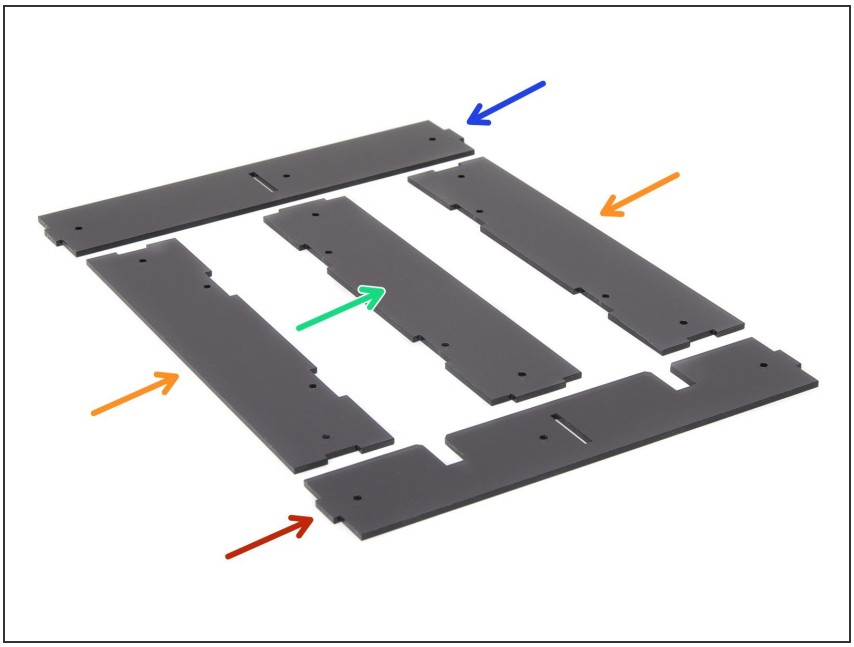
6B. Spool holder assembly (older version)

Written By: Jakub Dolezal



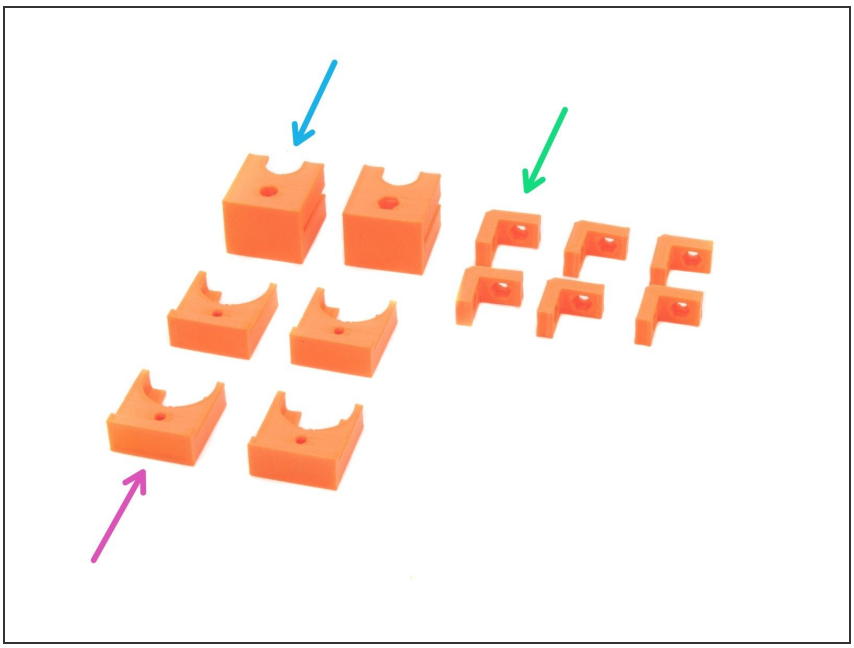
Step 1 — Preparing the parts: Part 1



⚠ This guide is covering an assembly of one spool holder. Depending on your type of Multimaterial you might need to assemble one more. Simply repeat these steps again.

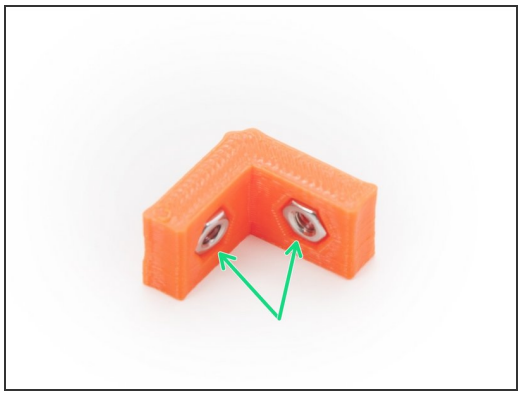
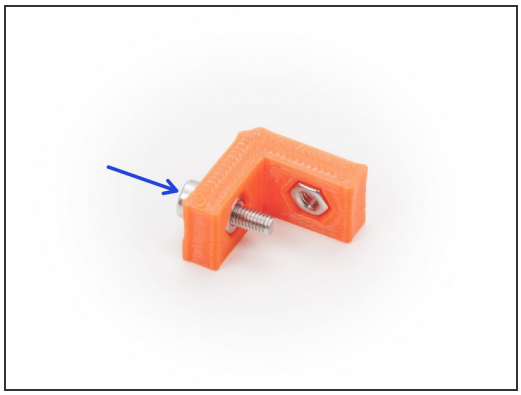
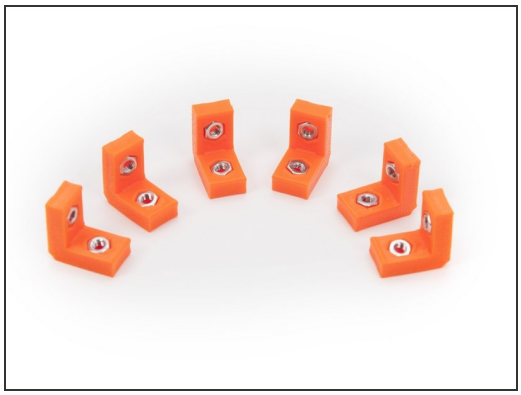
- Unwrap one package of laser cut parts.
- Take out the protective foil from both sides.
- SH-front
- SH-side
- SH-back
- SH-mid

Step 2 — Preparing the parts: Part 2



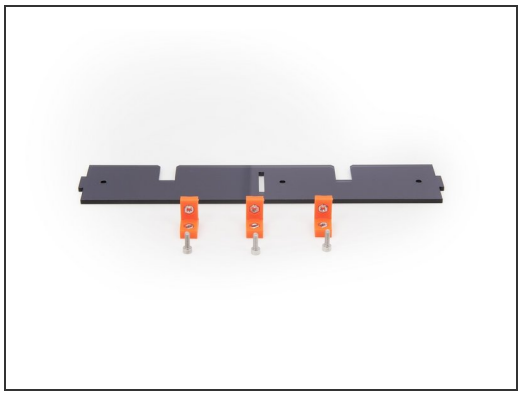
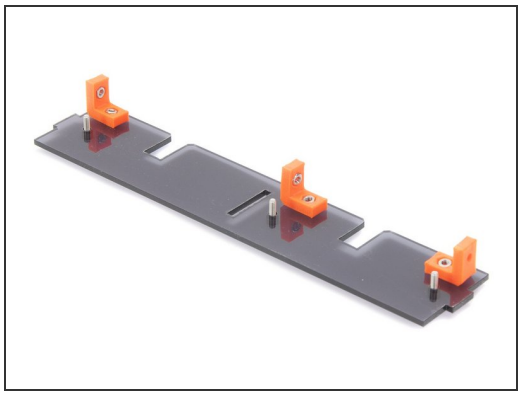
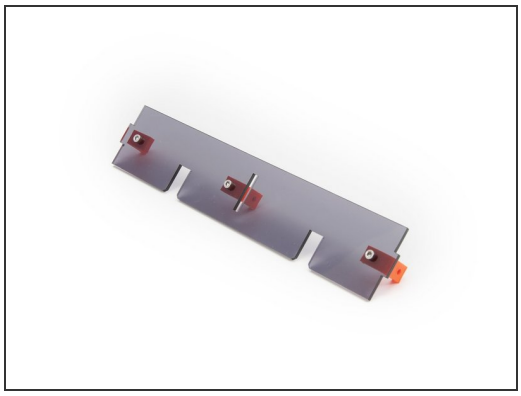
- SH-corner
- SH-bearing-corner
- SH-bearing mid

Step 3 — Preparing the corners

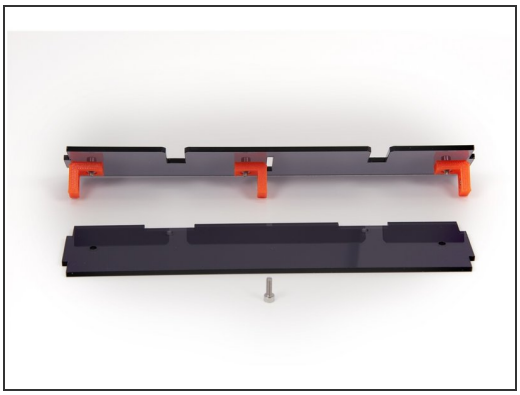
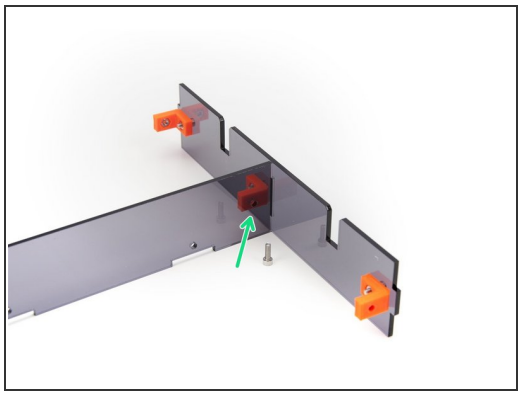
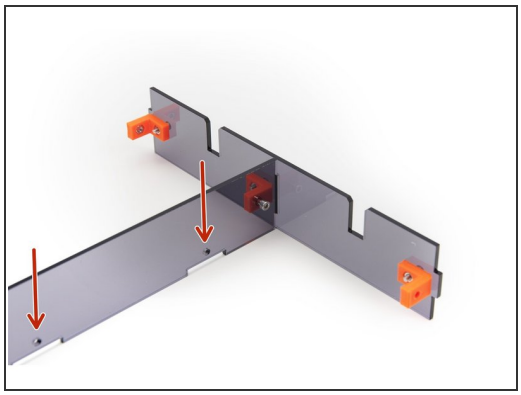
- Insert the M3n nut into the SH-corners.
- You can insert them by screwing, tightening and removing M3x10 screw as shown in the picture.

Step 4 — Preparing SH-front

- Using M3x10 screws assemble the SH-corners onto the SH-front as shown in the pictures.

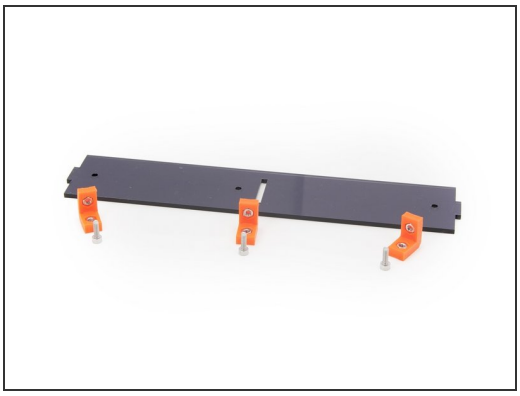
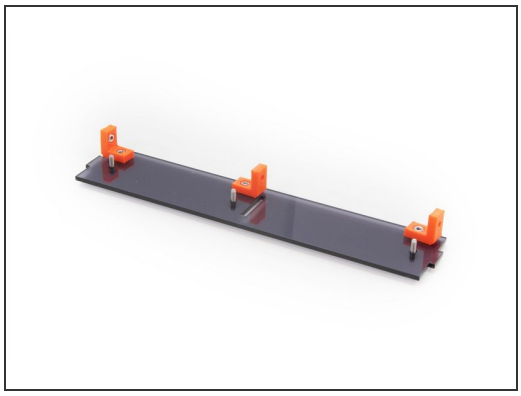
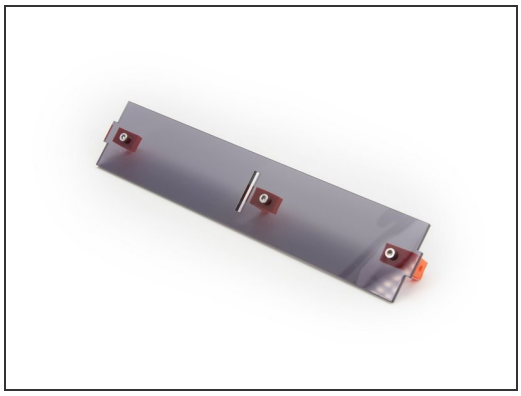
Step 5 — Connecting SH-mid to SH-front

- Using M3x10 screw, assemble the SH-mid onto the SH-front as shown in the picture.

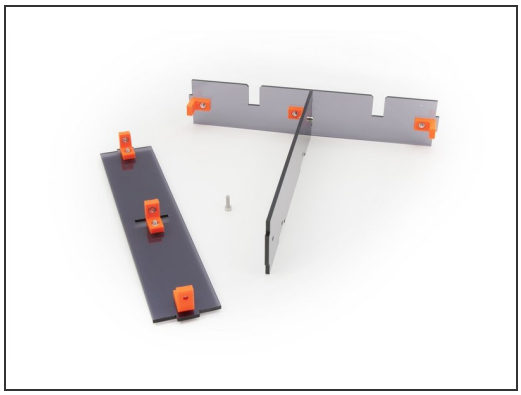
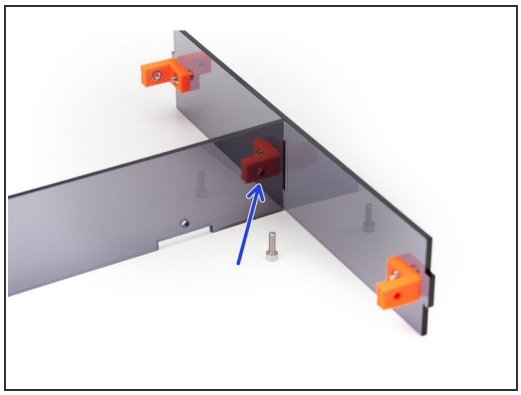
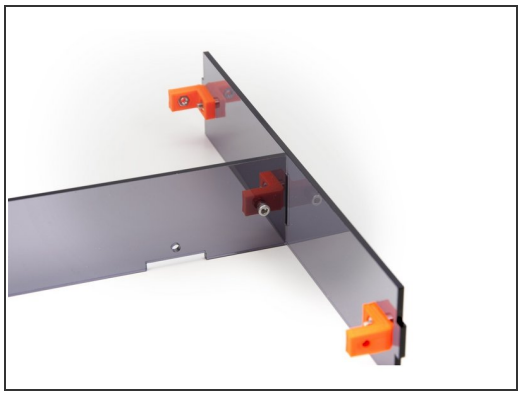
⚠ Note the correct orientation of key in laser cut parts.

Step 6 — Preparing SH-back

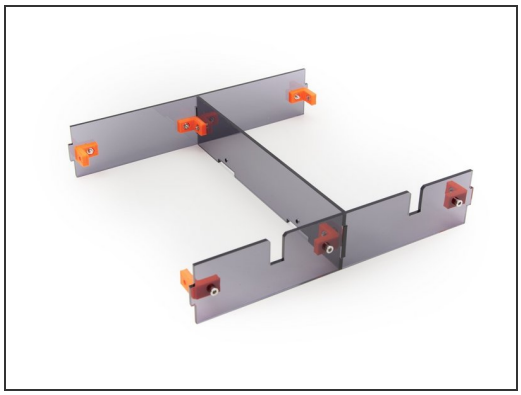
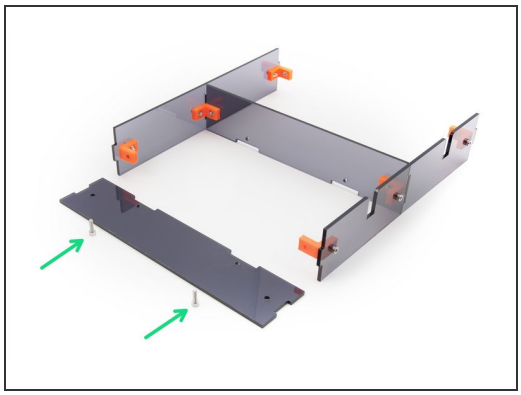
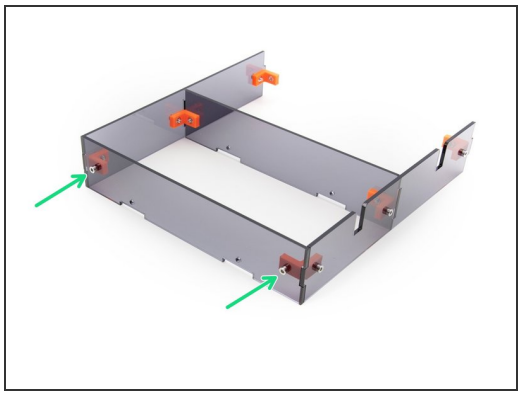
- Using M3x10 screws assemble the SH-corners onto the SH-back as shown in the picture.

Step 7 — Connecting SH-back to the rest

- Using M3x10 screw assemble the SH-back onto the assembled part from previous steps.

Step 8 — Assembling the SH-sides

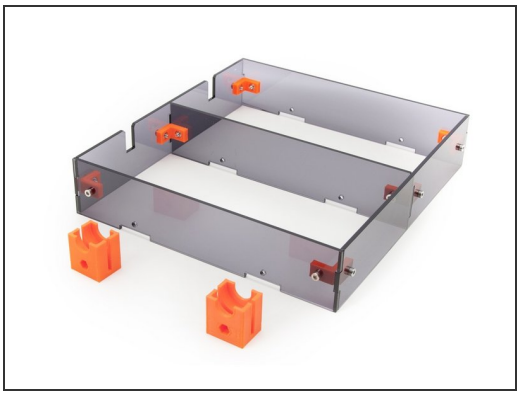
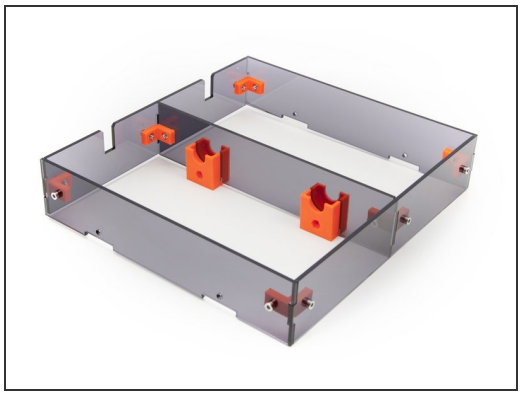
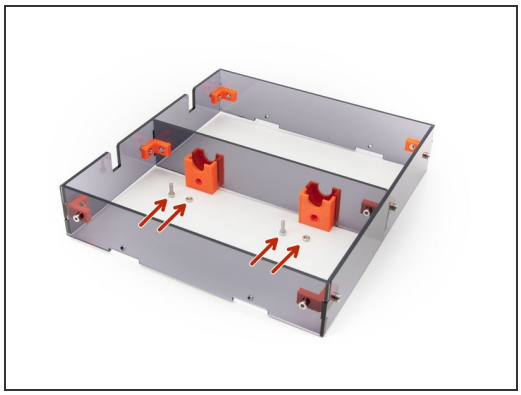




- Using M3x10 screw, assemble the SH-side onto the prepared part from previous steps as shown in the picture.

⚠ Note the correct orientation of key in laser cut parts.

- Repeat this approach for the other side as well.

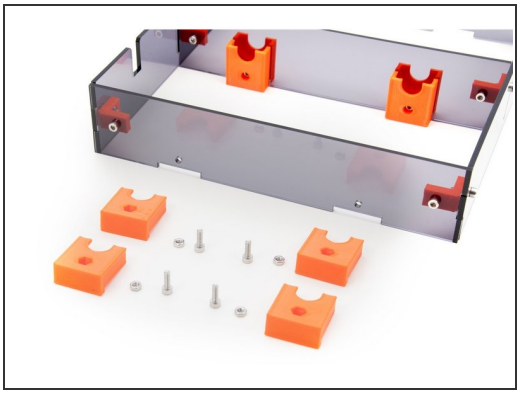
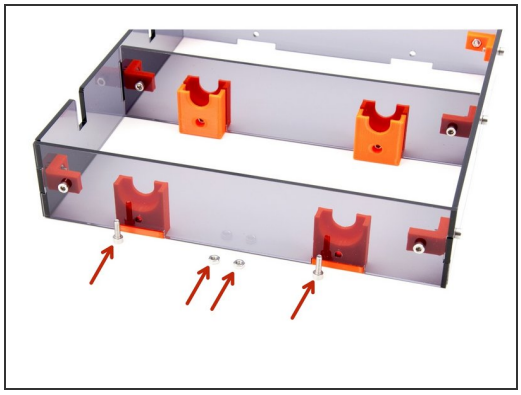
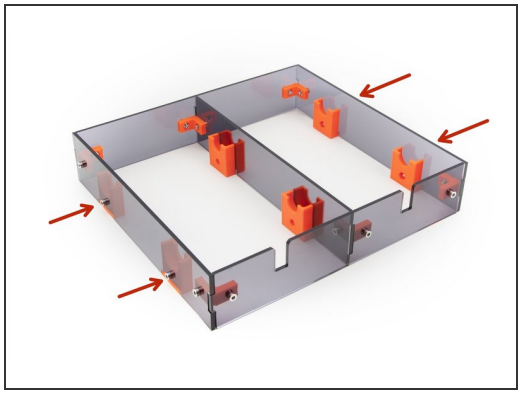
Step 9 — Assembling the SH-bearing-mid

- Rotate the assembled spool holder. (The keys should face towards you.)
- Press the SH-bearing-mid parts all the way onto the SH-mid.
- Using M3x10 screws and M3n nuts tighten the SH-bearing-mid to the SH-mid.

⚠ Take extra care when tightening, remember that you are working with laser cut parts. No super human tightening required.

Step 10 — Assembling SH-bearing-corners

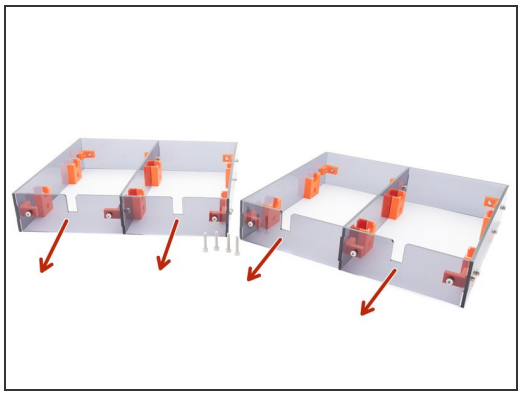
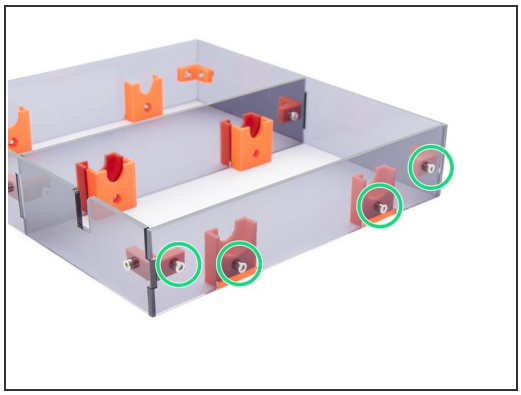
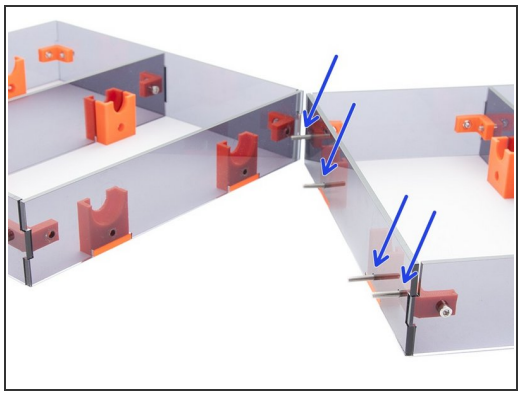




- Press the SH-bearing-corners onto the SH-sides as shown in the picture.

⚠ Note the correct orientation. The hole for the nut should face the SH-mid part.

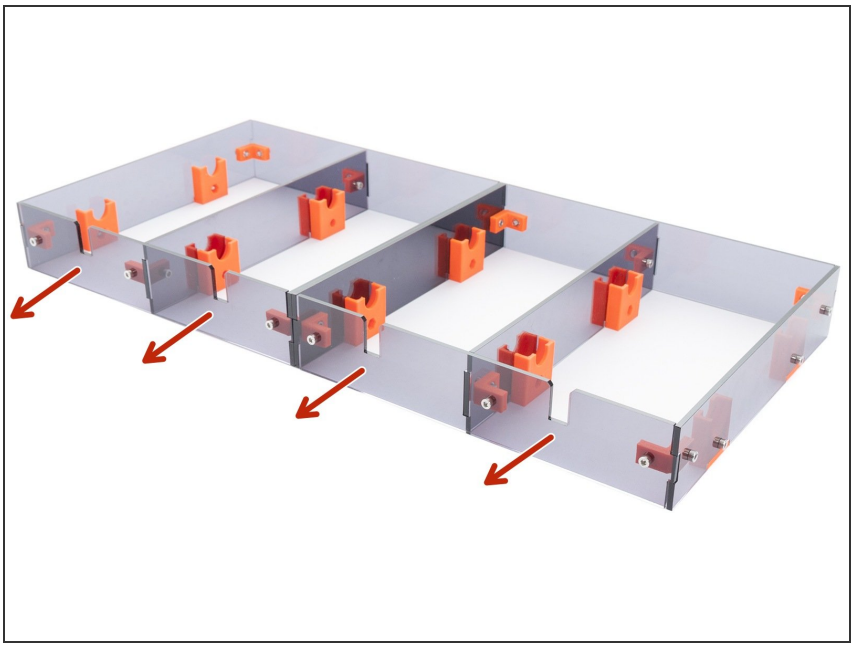
- Using M3x10 screws and M3n nuts tighten the SH-bearing-corners to the SH-sides.

Step 11 — Connecting spool holders together (OPTIONAL)

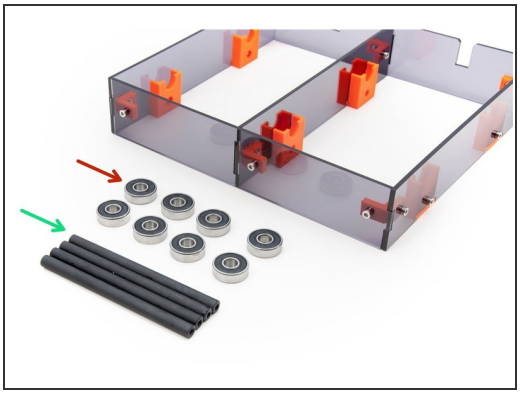
- In case your ordered Multi Material upgrade with 2 spool holders, it is possible to connect them together for greater stability.
- You will need 4 pcs of M3x18 screws which are included in the kit.
- Note the openings must be facing towards you on both frames!
- Take the first frame and release 4 screws holding the SH-side panel. Keep the nuts in place, you will need them later.
- Take the second frame, release again 4 screws, this time remove the nuts and insert 4x M3x18 screws.
- Connect the frames together and tighten the screws.

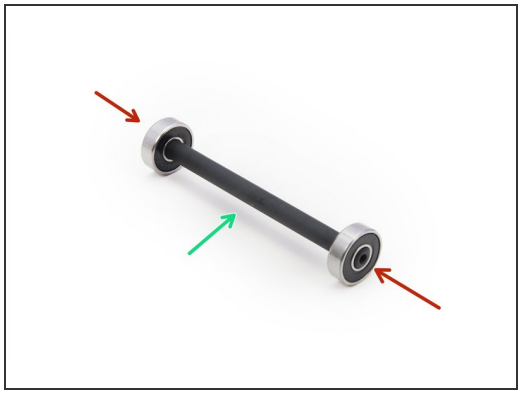
Step 12 — Connected spool holders (OPTIONAL)

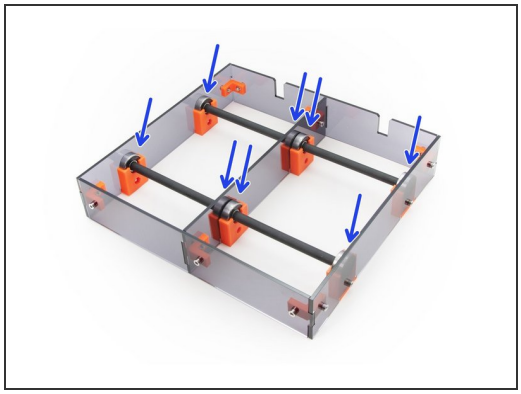


- Your connected spool holders should look like in the picture.
- Check again the openings are facing in one direction!
- The assembly proceeds with one spool holder, but you can apply the same approach on this joint version.

Step 13 — Preparing spool shafts

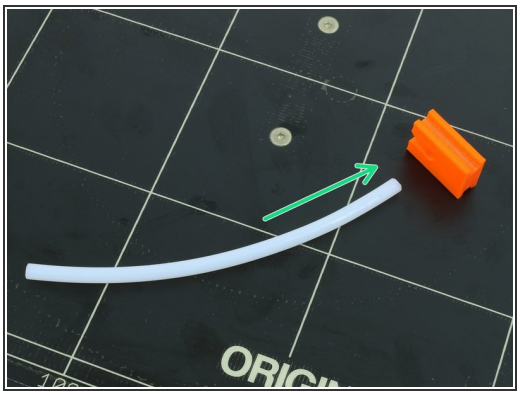
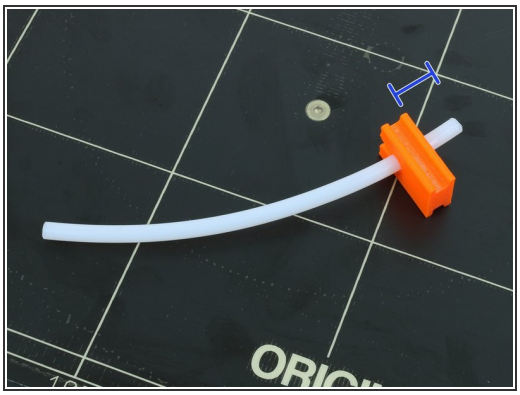
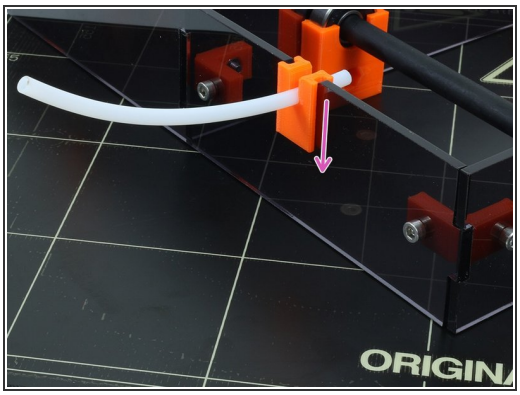






- 608b bearing (8x)
- 106sh shaft (4x)
- Press the bearings onto the ends of each shafts as shown in the picture.
- Press the prepared shafts with bearings into the assembled spool holder as shown in the picture.

Step 14 — Assembling PTFE traps (new version)

⚠ **This is a newer version of PTFE traps**, you might have older version in your kit, if your parts look different from these photos, please skip to the **Step 15**.

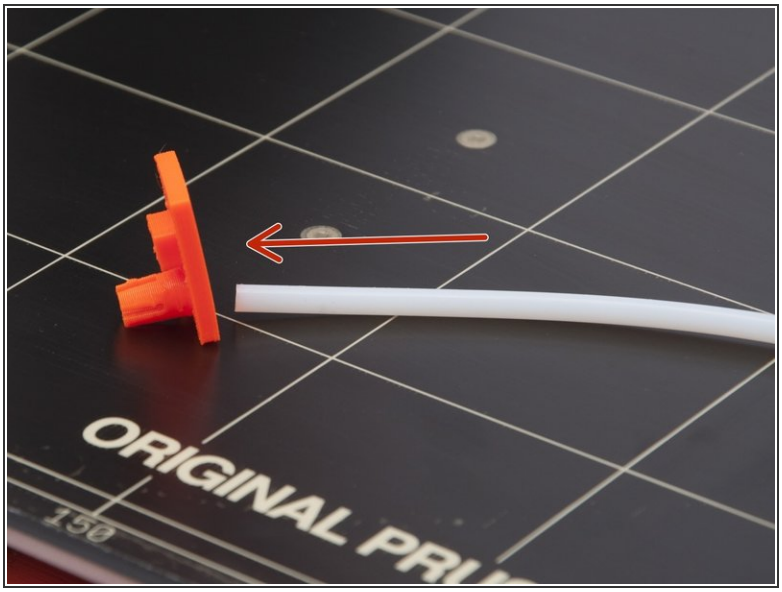
- Insert the white teflon tube in the circular opening on PTFE trap as shown in the picture. The PTFE trap can be in orange or black color.
- Push the tube through the printed part. Overhang 0,5 - 1 cm is enough.
- Slide the PTFE trap on the assembled spool holder. The upper edge of printed part and spool holder should be approximately at the same level.

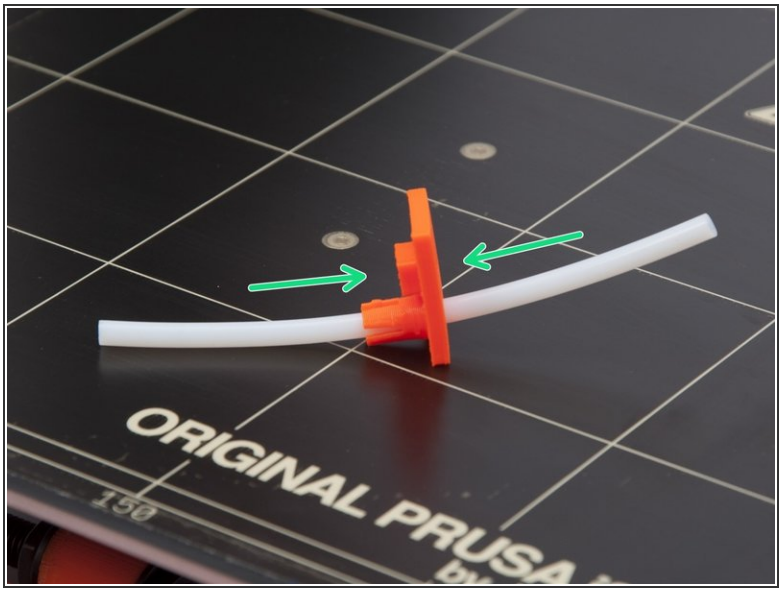
⚠ Depending on the amount of spool holders you have assemble 2 or 4 PTFE traps.

⚠ Next steps (15/16/17) are for older PFTE traps, if you already assembled your spool holder including white teflon tubes, please proceed to P.I.N.D.A. calibration 6. Preflight check

ⓘ The heatbed is used just for the purpose of the photography. Don't use your heatbed for the assembly to avoid damages to the surface.

Step 15 — Assembling PTFE traps: Part 1 (older version)



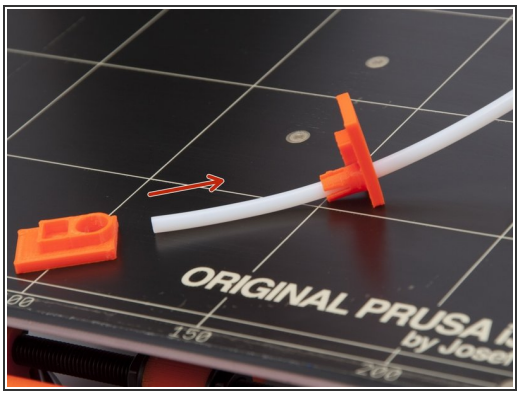


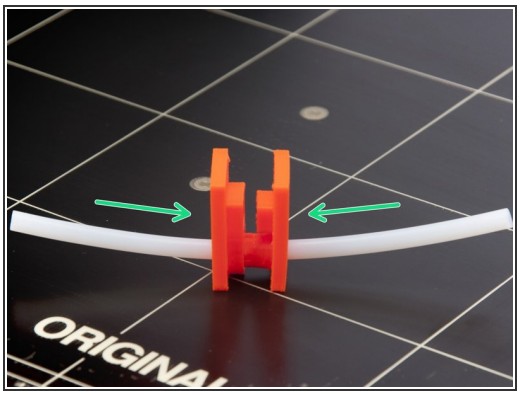
⚠ Following steps are for older PFTE traps, if you already assembled your spool holder including white teflon tubes, please proceed to P.I.N.D.A. calibration 6. Preflight check

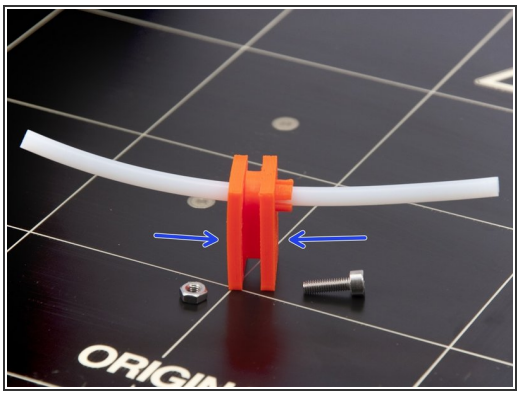
- Insert PTFE-trap-A onto the tube as shown in the picture.
- Place the printed part approximately in the middle. We will set the correct position later.
- Repeat this step for the other PTFE trap.

ⓘ The heatbed is used just for the purpose of the photography. Don't use your heatbed for the assembly to avoid damages to the surface.

Step 16 — Assembling PTFE traps: Part 2 (older version)



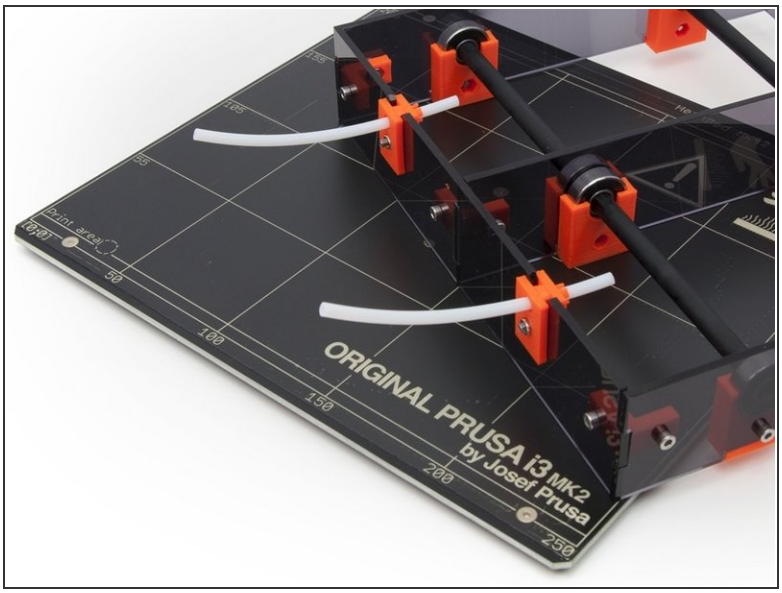




- Insert PTFE-trap-B onto the tube as shown in the picture.
- Press the parts together as close as possible as shown in the picture. **Use gentle force!!!**
- Using M3x10 screw and M3n nut tighten the parts together as shown in the picture.
- Repeat this step for the other PTFE trap.

ⓘ The heatbed is used just for the purpose of the photography. Don't use your heatbed for the assembly to avoid damages to the surface.

Step 17 — Assembling PTFE traps: Part 3 (older version)



- Insert both PTFE traps on the Spool holder frame
- Hooray! The hardware part is ready!!! Now proceed to P.I.N.D.A. calibration 6. Preflight check

ⓘ The heatbed is used just for the purpose of the photography. Don't use your heatbed for the assembly to avoid damages to the surface.

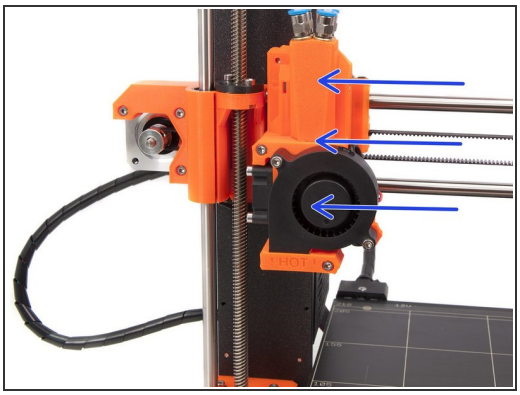
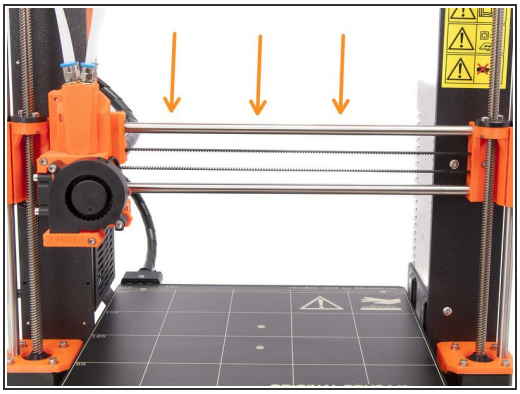
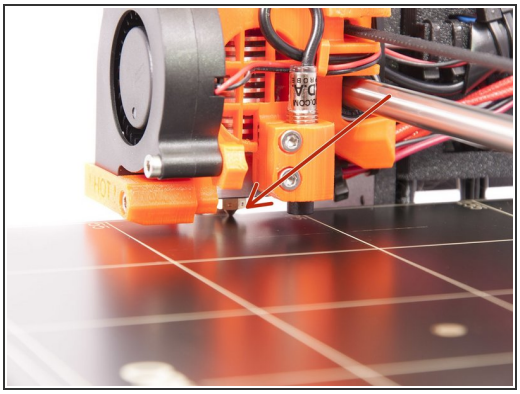
PRUSA RESEARCH by JOSEF PRUSA

7. Preflight check

The last things you should check before the first print

Written By: Josef Prusa

Step 1 — P.I.N.D.A. adjustment, phase 1

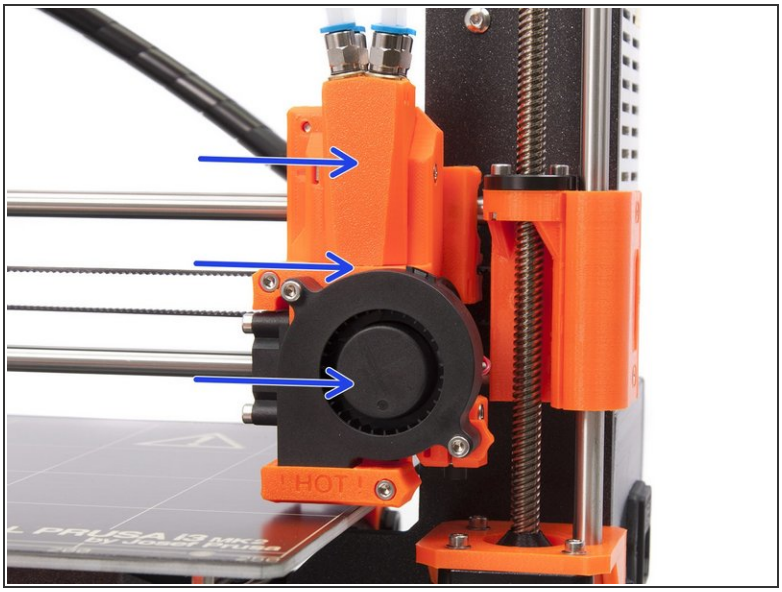
⚠ Ensure the printer is turned off and not plugged in!

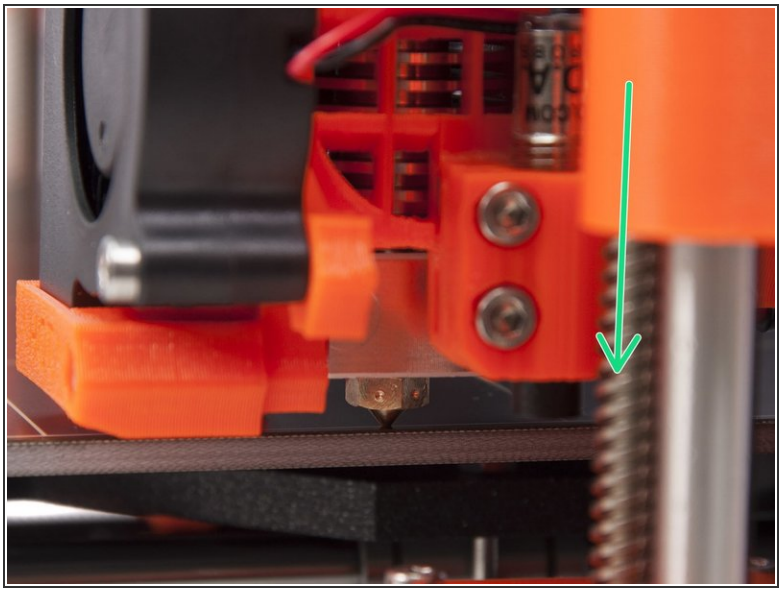
ⓘ While moving with the extruder, the X-axis motor works as a generator. You will create a small amount of electricity and the LCD might flicker. Move with the extruder reasonably slowly and in the future always use the printer's controls.

- Move the extruder manually all the way to the left.
- By rotating BOTH threaded rods at the same time on the Z-axis move the nozzle until you reach the heatbed. Try rotating both the rods equally!

⚠ Check again from a different angle the nozzle is **slightly** touching the heatbed. Don't bend the heatbed!

Step 2 — P.I.N.D.A. adjustment, phase 2



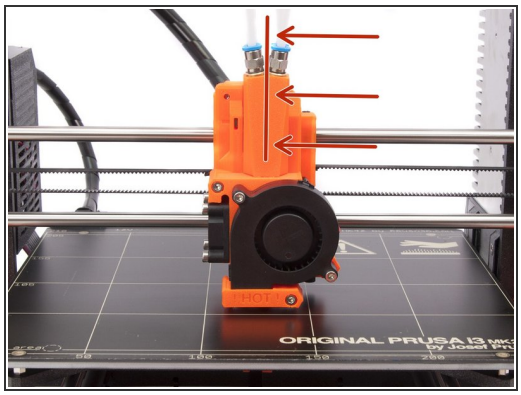
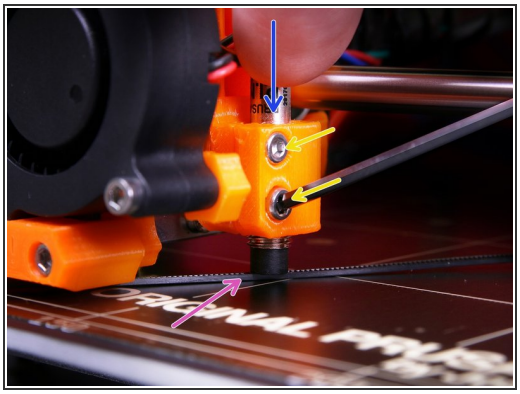
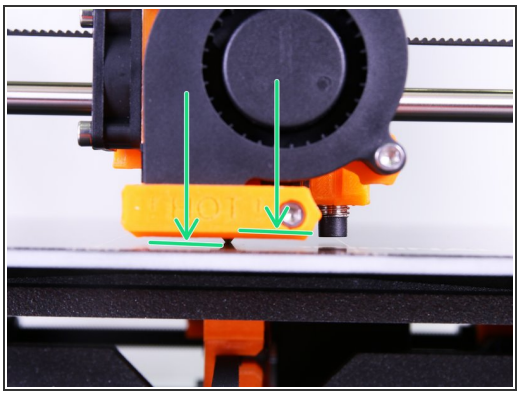


- Move the extruder carefully all the way to the right.

⚠ Make sure that the nozzle is not scratching the print surface during the movement! If it does, rise the right side of the X axis by rotating the right Z motor slightly clockwise.

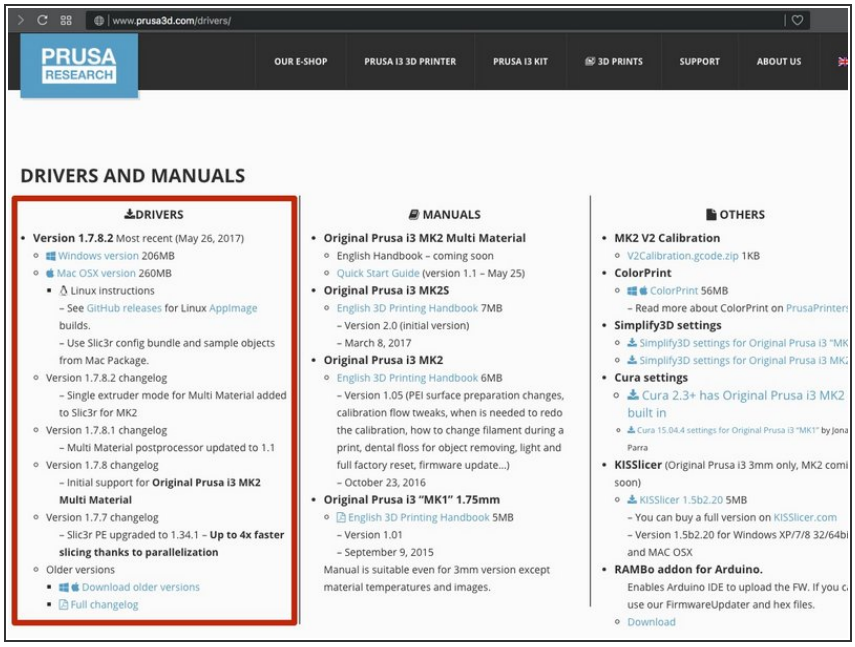
- If an adjustment is needed, you can lower the nozzle height by rotating the right Z motor counter-clockwise.

Step 3 — P.IN.D.A. adjustment, phase 3

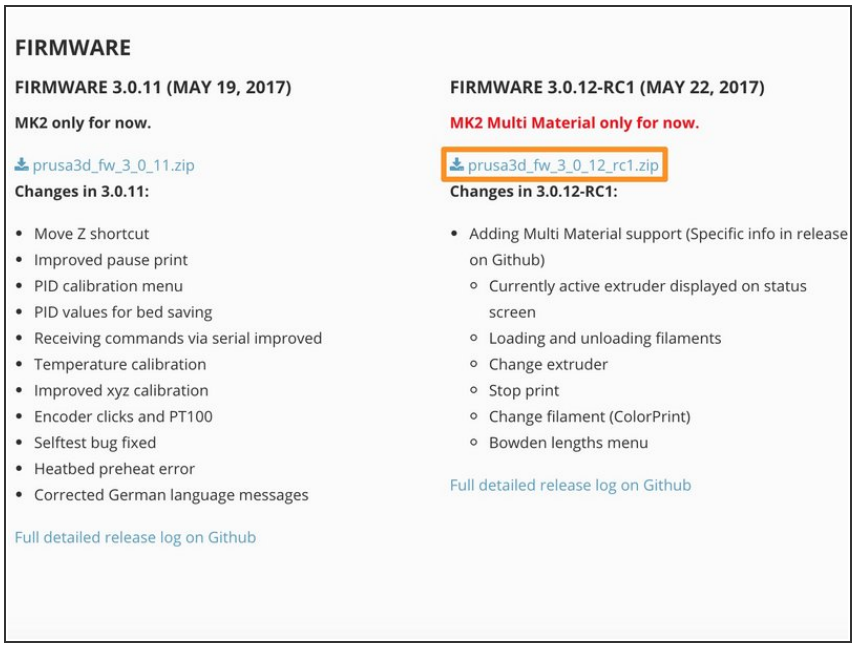
- Move the extruder to the center of the X-axis.
- Locate the spare parts package, take the longest zip tie and place it under the P.I.N.D.A. sensor.
- Release two screws holding the P.I.N.D.A. sensor and gently press it against the zip tie.
- Tighten screws on the P.I.N.D.A. holder again.
- A correct height of the P.I.N.D.A. sensor compared to the nozzle should be similar to the last picture.

Step 4 — Update drivers



- Go to www.prusa3d.com/drivers and download latest PRUSA3D drivers.
- Drivers revision must be 1.7.8 or latest.
- Install the drivers.

Step 5 — Download new Firmware

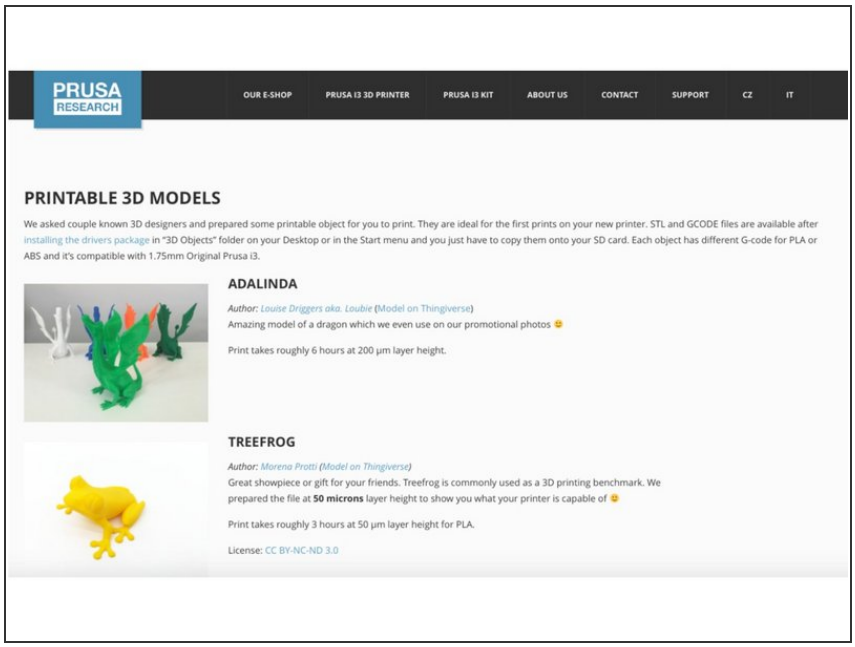


⚠ **YOU MUST UPDATE YOUR FIRMWARE** to Multi Material version, otherwise your printer won't work !!!

- Scroll down to the Firmware section and locate **Multi Material**.
- Firmware revision has to be 3.0.12 or later.
- Download the zip file and extract it, the firmware file (*.hex file) is inside.

ⓘ Inside the folder is also a guide to choose correct version of the firmware according to the type of your RAMBO board.

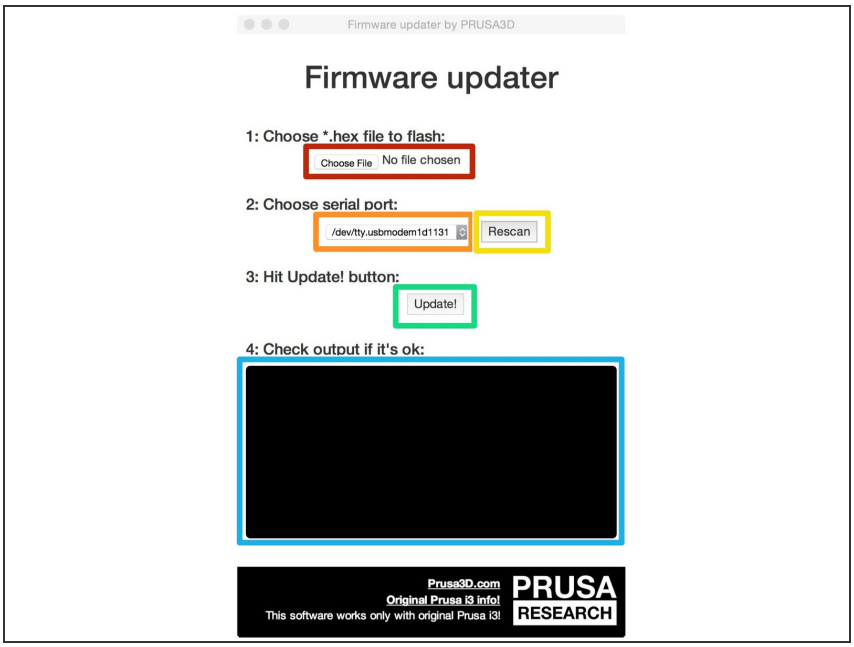
Step 6 — Print the sample objects first



⚠ For the best results and experience, it's good to start with **our pre-sliced** g-codes. Once you get up and running those, it'll make printing your own objects easier.

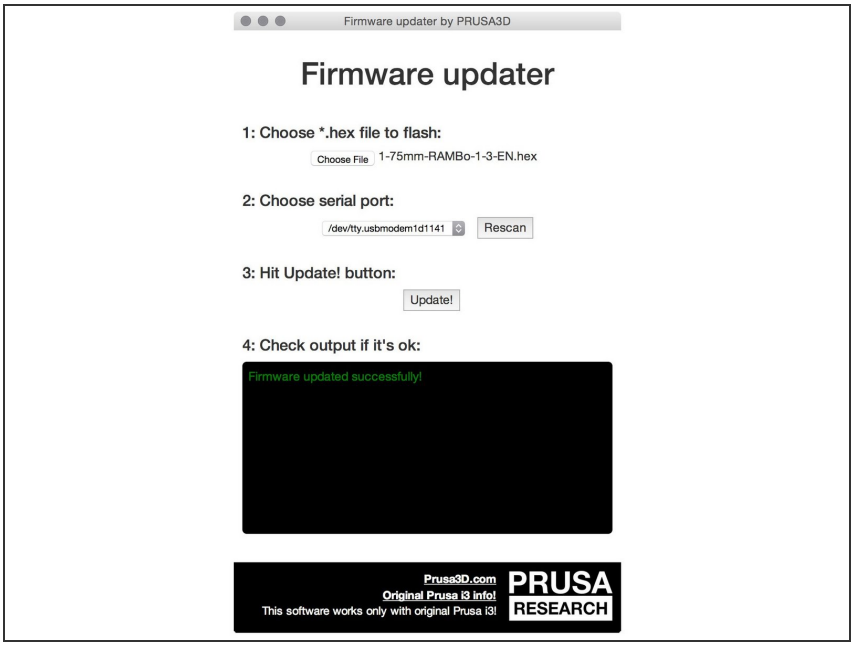
- Open Multi Material sample objects installed with your drivers package.
- Copy them to the SD card.

Step 7 — Update firmware



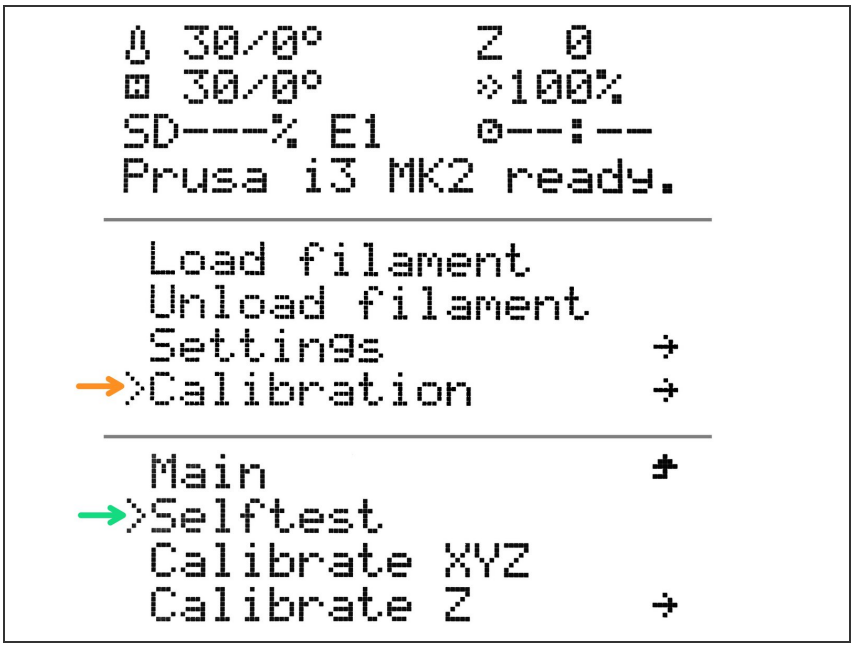
- Connect your printer to the computer and turn it on.
- Launch the FirmwareUpdater application.
- Choose your firmware .*hex file for the Multi Material.
- Choose the serial port of your printer.
- If you don't see your printer on the left, hit this button and wait around 2 seconds.
- Hit Update! button.
- Monitor the status of updating.

Step 8 — Check update status



- If you can see **"Firmware updated successfully"** you did everything perfectly and can continue.

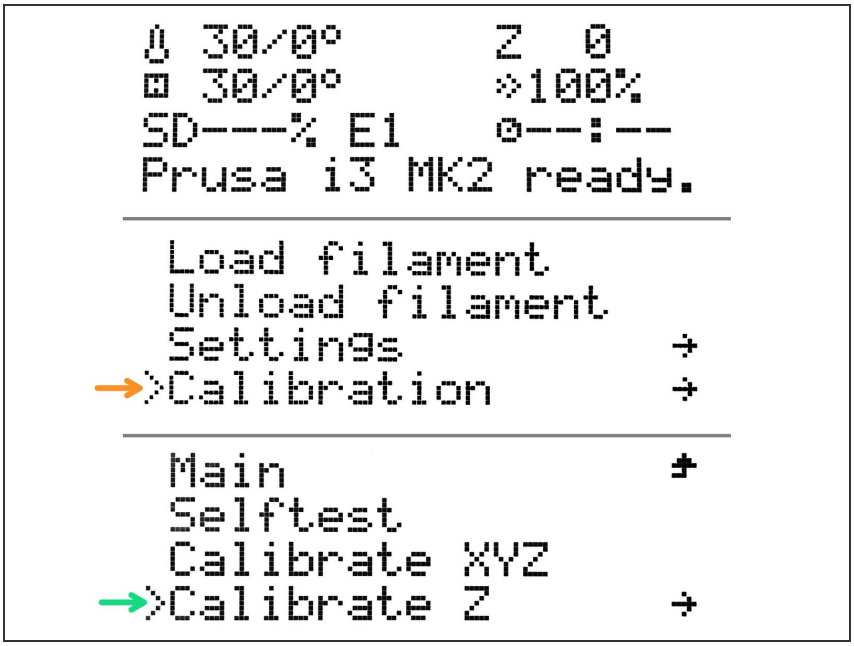
Step 9 — Selftest



- Press the operation knob.
- Select **Calibration**.
- Select **Selftest**.
- Follow the instructions on the screen.
  - If the selftest was successful, continue.
  - If some error popped out, use normal procedure as for standard MK2/S.

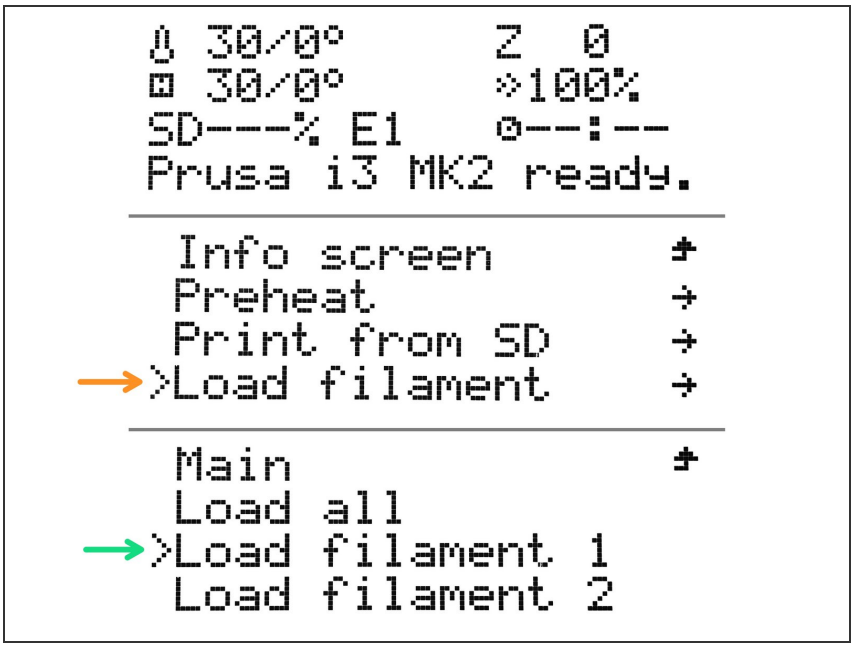
For more informations about sefltest, check out our knowledge base Self Test.

Step 10 — Calibrate Z



- Press the operation knob.
- Select **Calibration**.
- Select **Calibrate Z**.
- Follow the instructions on the screen.

Step 11 — Load filament!

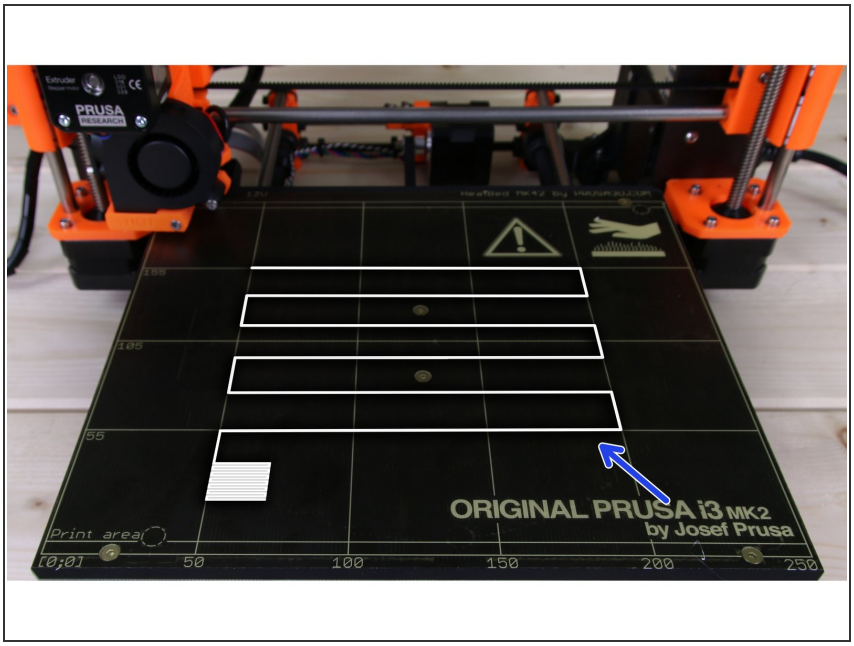


- Prepare PLA filament (or ABS if you don't want to use PLA).
- Press the operation knob.
- Select **Load filament**.
- Select **Load filament 1**.
- Follow instructions on the screen.

Loading filament now has slightly changed behaviour:

- First phase is **slow feed** (In this phase you just push the filament to the entry hole of the extruder and as soon as you feel that the extruder grabs it, press the knob).
- Second phase is **fast feed** (This phase just loads the filament to the cooling tube and prepare it for the operation).

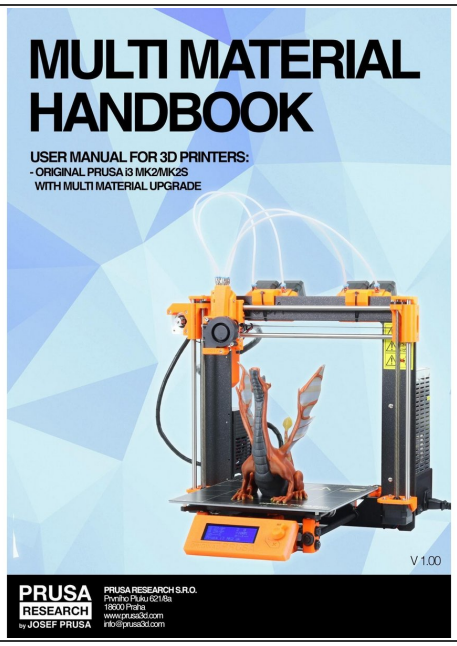
Step 12 — V2calibration



⚠ **Attention:** The V2 calibration pattern was updated and it is now part of the firmware (starting FW 3.1.0).

- Enter the menu and select **Calibration** -> **First layer calibration**
- Dial the right Z height just like you did with normal MK2/S.

Step 13 — Multi Material handbook



- Do not forget to read our Multi Material Handbook - it contains all the information needed to start printing with more materials! http://prusa3d.com/downloads/manual/prus...

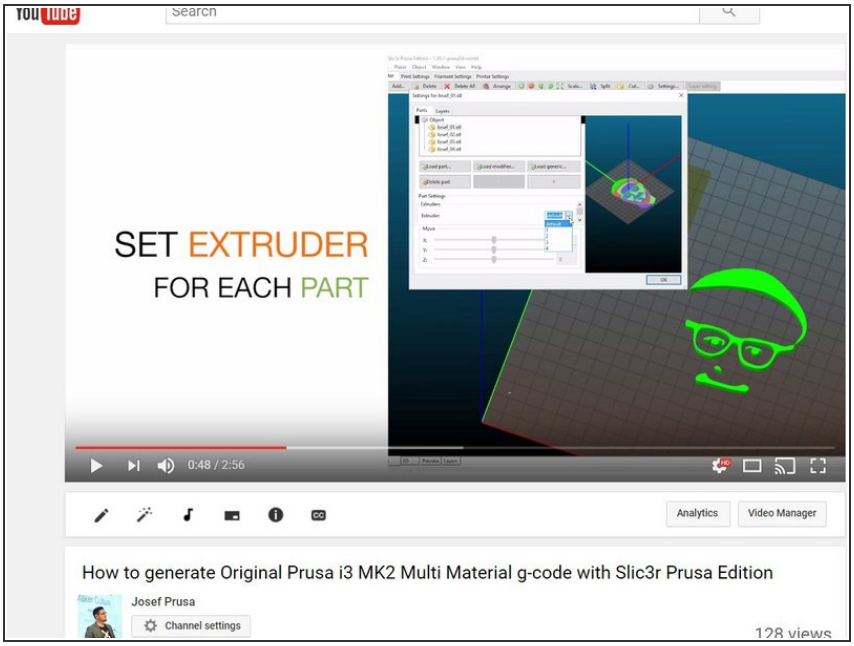
Step 14 — Troubleshooting

- If you will have any troubles or are unsatisfied with your prints, just like the kitty on the left, please follow these **simple steps:**
- Check out troubleshooting hints and guides here: manual.prusa3d.com/c/troubleshooting
- Check our Knowledgebase help.prusa3d.com for additional details.
- Check our forum at forum.prusa3d.com, if somebody had same problem, there'll be solution for that.
  - Account is shared with http://shop.prusa3d.com/
- If you'll still have troubles or are unhappy, use our live chat or write us an email to info@prusa3d.com

Step 15 — GCode preparation / custom models preparation

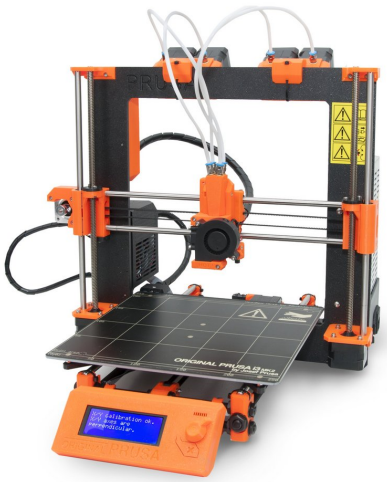
- After you'll be tired of printing sample objects, you can follow Gcode preparation for Multi Material v2.0 and prepare your own :)

Step 16 — How to generate and print Original Prusa i3 MK2 Multi Material



- Please watch video how to generate Multi Material gcode on Youtube - http://www.prusa3d.com/mmuvideo. It is quite easy. ;)

Step 17 — Finish Line!



- Alright, now you're all set.
- Happy printing!