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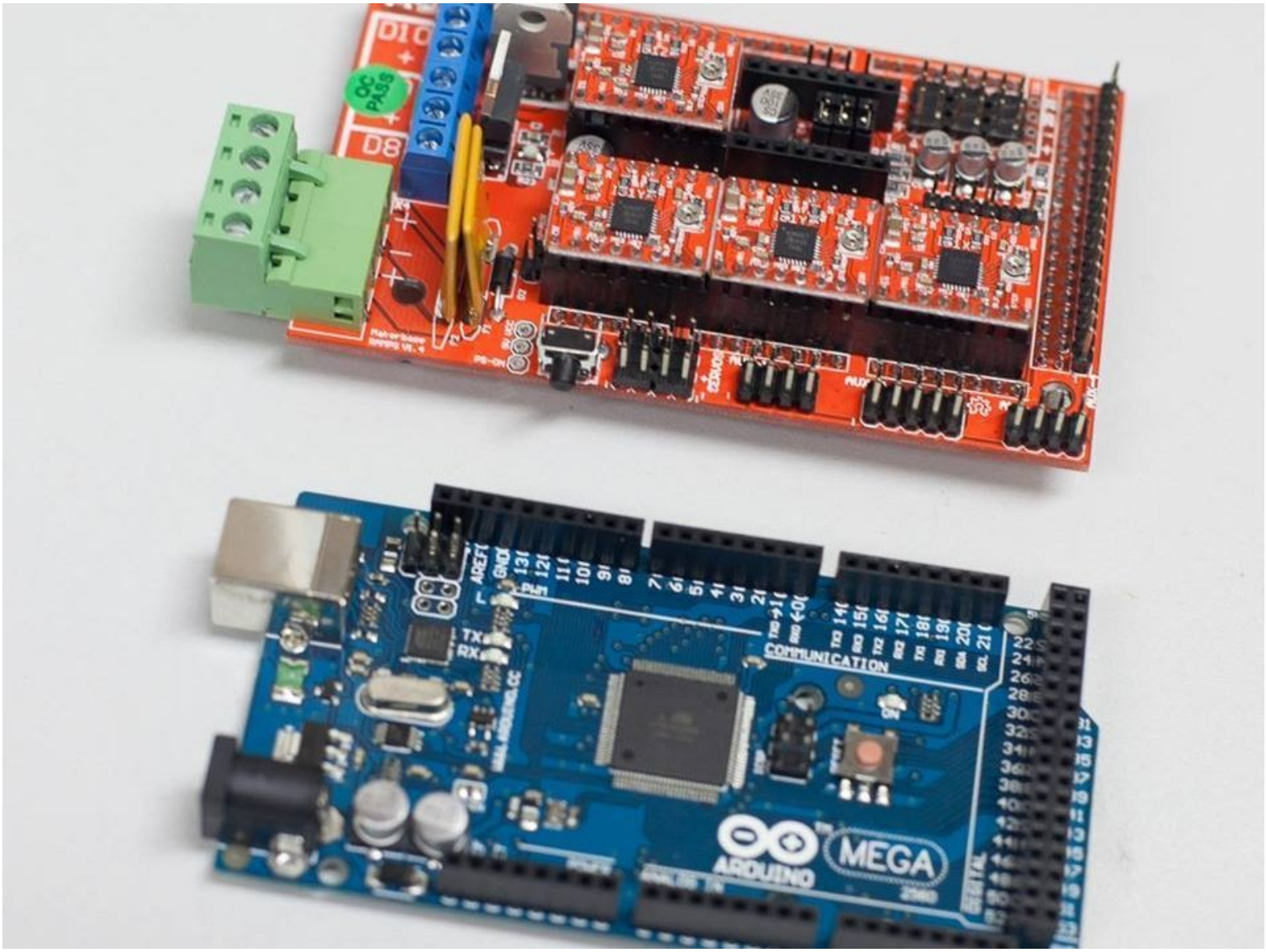
K – Wiring and Electronics

Written By: Dozuki System



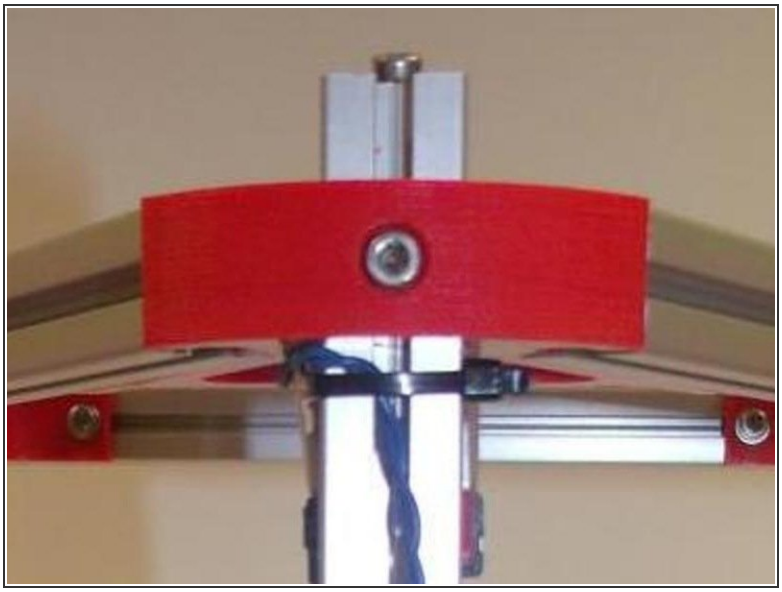
TOOLS:

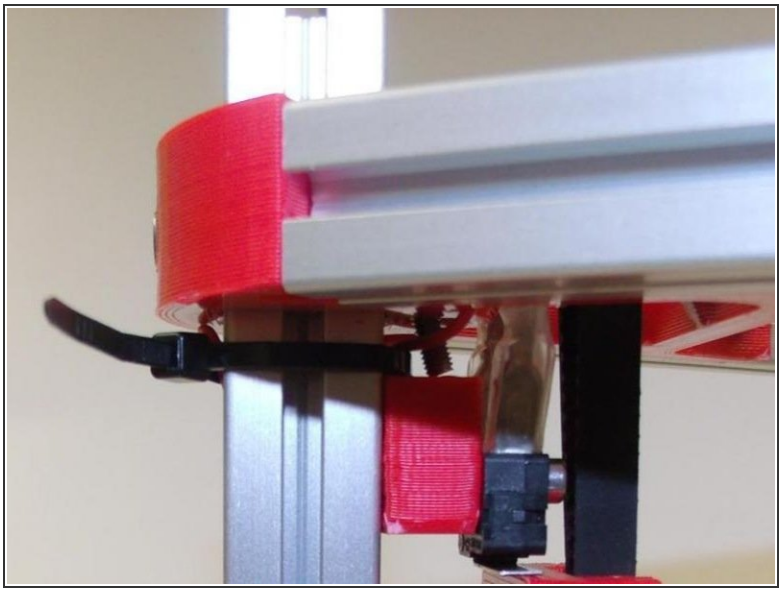
- Hex key; ball ended, long arm, 2.5mm (1)

PARTS:

- Arduino Mega (blue) (1)
- RAMPS board (red) (1)
- glass tabs (3)
- retractor (1)
- M3x8 screws (4)
- t-slot nuts (4)
- LCD Display assembly (1)
- LCD ribbon cable (already in the base) (2)
- LCD frame (1)
- LCD holder (2)
- M3x16 screws (4)

Step 1 — Secure endstop cables

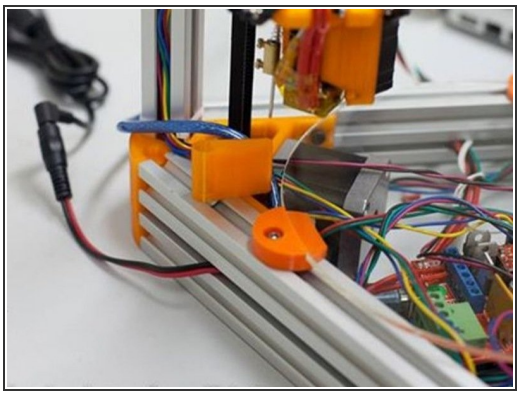




- Route the endstop cables around the towers and into the channel on the outer or side face of each tower. Make sure you don’t accidentally break the soldering points! Zip-tie in place.
- Tighten the X, Y and Z endstop cables and zip-tie at the bottom of the towers.

ⓘ Optional: If you want, you can later print these cable holders: http://www.thingiverse.com/thing:655787

Step 2 — Fit Glass tabs and Z-probe retractor

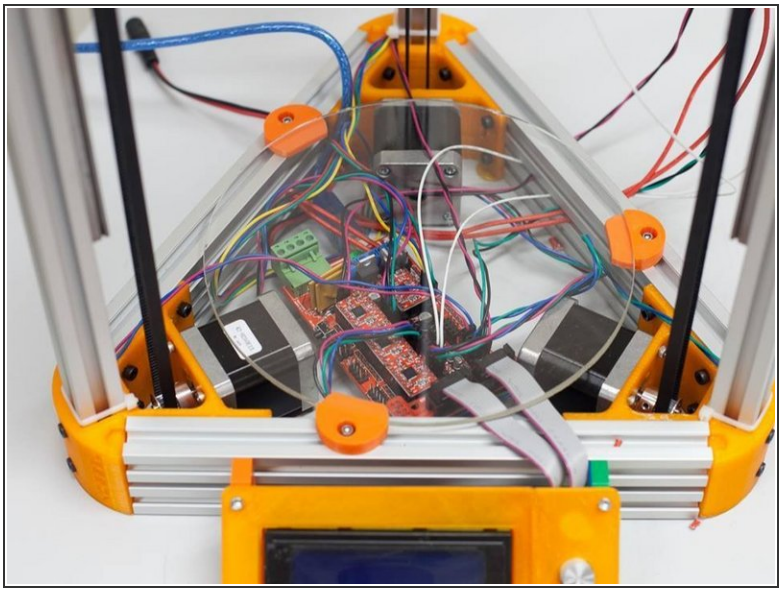


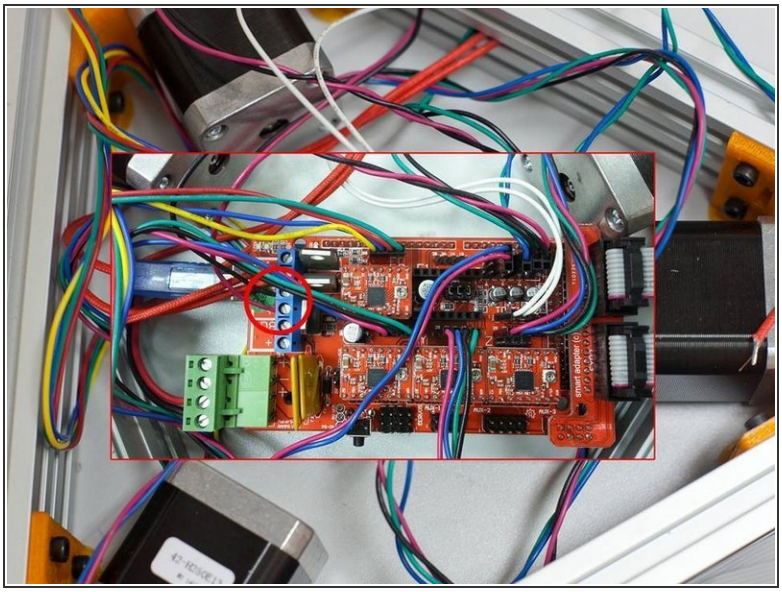
- Before routing the cables the rest of the way to the electronics, you need to fit the printed support tabs for the glass print-bed and the Z-probe retractor.
- Fit the 3 glass tabs and retractor loosely to the base.

ⓘ Retractor should be on the left of the Z tower.

ⓘ Do not yet tighten; you will measure this exactly later!

Step 3 — Hot-end wiring, spool holder and LCD screen

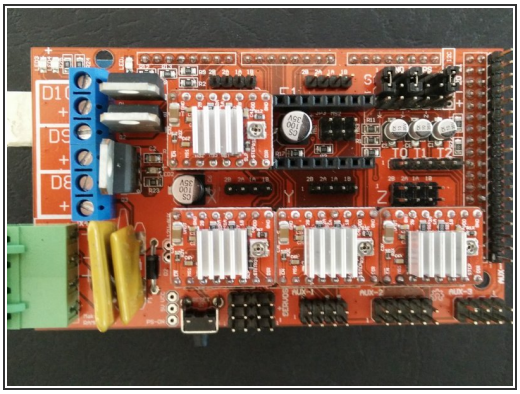
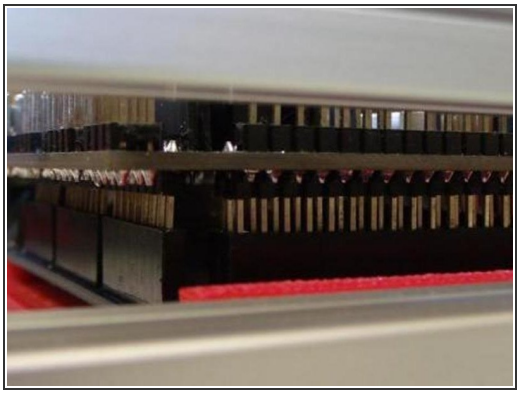
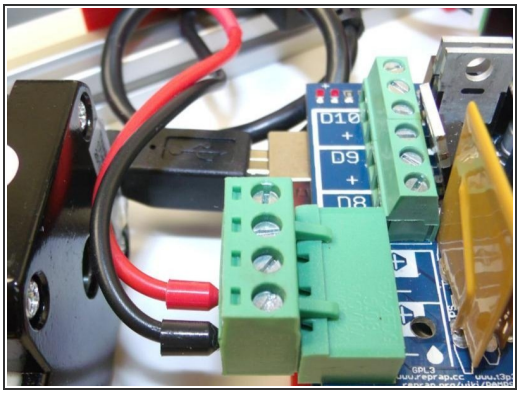




- Zip-tie the cables and PTFE tube from the effector at equal intervals and route them to the RAMPS board in the bottom frame.
- Zip-tie the extruder/hot-end/endstop cables at the base of the Z-tower and divide the cables, routing the fan, Z-probe, thermistor and Z-endstop cables along the Y-Z channel and the motor and hot-end resistor cables along the X-Z channel - these can only go as far as the Z-probe retractor. Zip-tie in place and route into the base of the printer.
- Fit spool holder to the top frame between Y and Z tower.
- Connect the two flat cables with the LCD screen and assemble the screen, frame and the two LCD panel holders with the help of 4 M3x16 screws.

⚠ Note which of the cables is EXP1 and which is EXP2!

Step 4 — Electronics installation

Make sure you take precautions not to build up electrostatic charge while handling the electronics

- Check if there are 3 jumpers under each of the motor shields, and then carefully fit the 4 motor shields onto the X, Y, Z and E0 sockets on the RAMPS. E1 Socket remains empty.

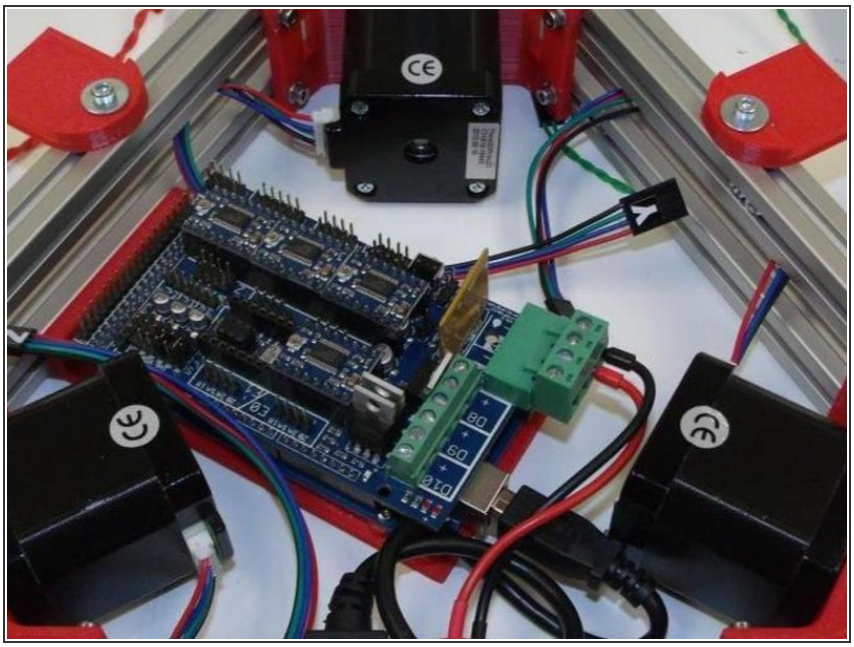
Make sure the small silver potentiometer face AWAY from the green power connector of the RAMPS! Also make sure that all the pins are properly aligned with the RAMPS sockets.

- Add the cooler grills to the motor shield ICs.
- Now connect the RAMPS with the Arduino Mega, checking that all the mating pins are properly aligned. Push down firmly and progressively to seat it fully.
- Screw the power cable into the RAMPS.

Note the polarization! Red cable goes into (+) and black cable goes into (-) connector of the RAMPS board.

- Plug the USB cable into the USB socket on the Arduino Mega.

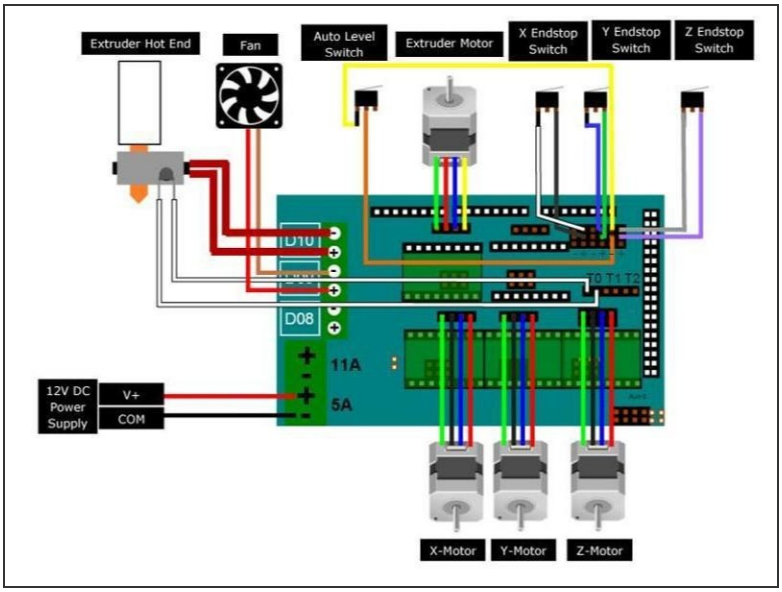
Step 5 — Motor wiring

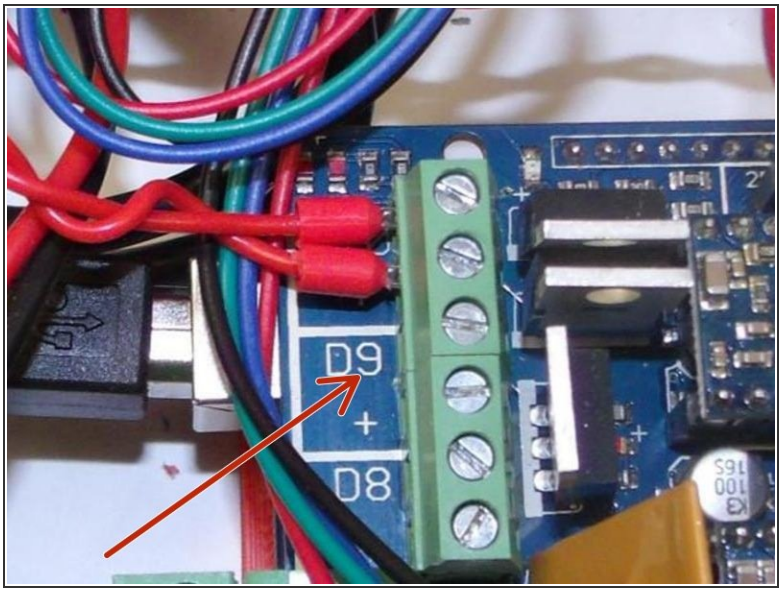


- Fit the motor cables from the X, Y Z and extruder motors, ensuring the correct cables match the right pins next to the X, Y, Z and E0 Shields. For the Z-connector, there are two sets of pins; use either one.

⚠ The GREEN motor cables needs to face TOWARDS the green power plug on the RAMPS!

Step 6 — RAMPS wiring





- Bring all the loose wires together around the RAMPS board.

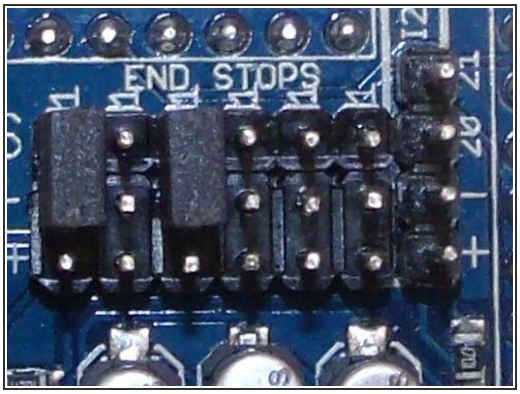
ⓘ If in any doubt about the wiring, consult the official RAMPS wiring instructions and diagram shown opposite. The diagram is from http://reprap.org/wiki/RAMPS_1.4#Pre-Fli... (click on the wiring diagram at that link to enlarge).

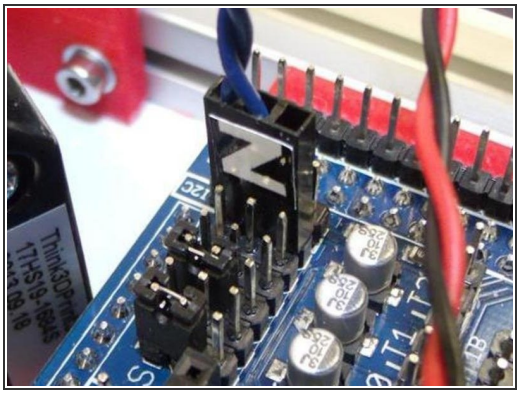
ⓘ Note that the diagram is for a conventional printer, not a Delta, so shows 2 Z-motors. It also shows a second extruder and a heated print-bed - just ignore these.

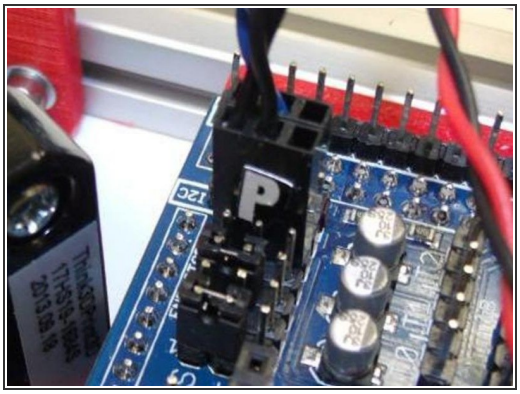
- Connect the hot-end fan to the D9 connector on the RAMPS.

⚠ Check for the correct polarization; red cable goes into (+), brown cable into (-)!

Step 7 — Connect End-Stops







- Next connect the endstops. The RAMPS board has 6 three-pin headers labeled ENDSTOPS at the top right corner of the board next to the 4-pin I2C header, which is not used. The endstop headers are, from left to right: X-min, X-max, Y-min, Y-max, Z-min and Z-max.

ⓘ Only the outer (S) and centre pin (-) of each 3-pin header are used with mechanical endstops. As the Kossel has maximum endstops only, the X-min and Y-min endstops are not used. The Z-min position is used for the Z-probe.

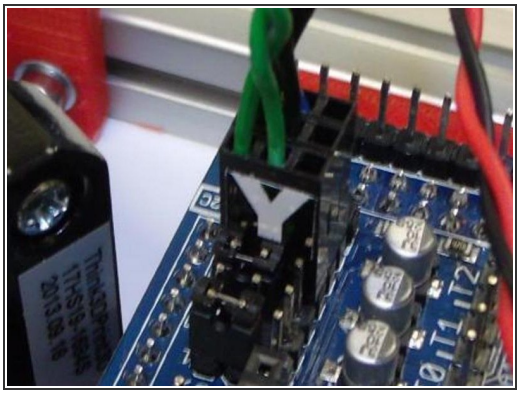
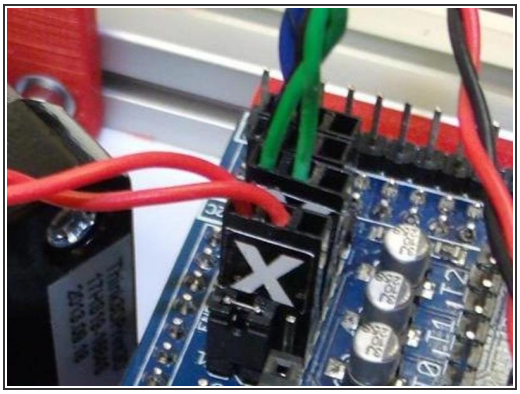
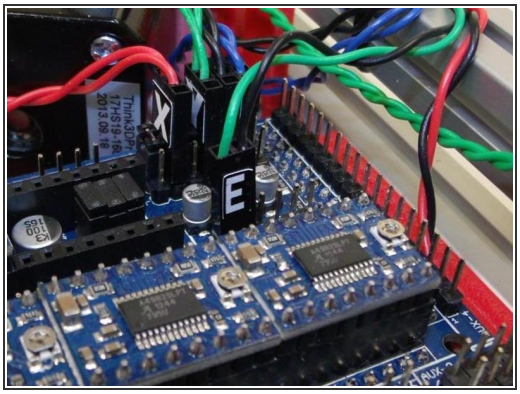
ⓘ The jumpers on the picture are not needed.

- Begin with the Z-endstop on row 6 (Z-max), as shown.

⚠ If I2C header is present on your RAMPS, be careful NOT to put it on the 4-pin I2C header by mistake!

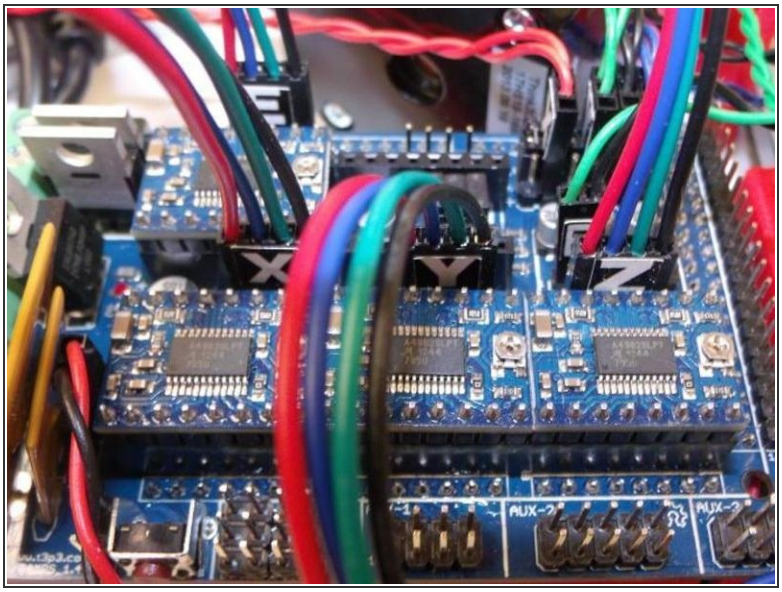
- Next the Z-Probe on row 5 (Z-min)

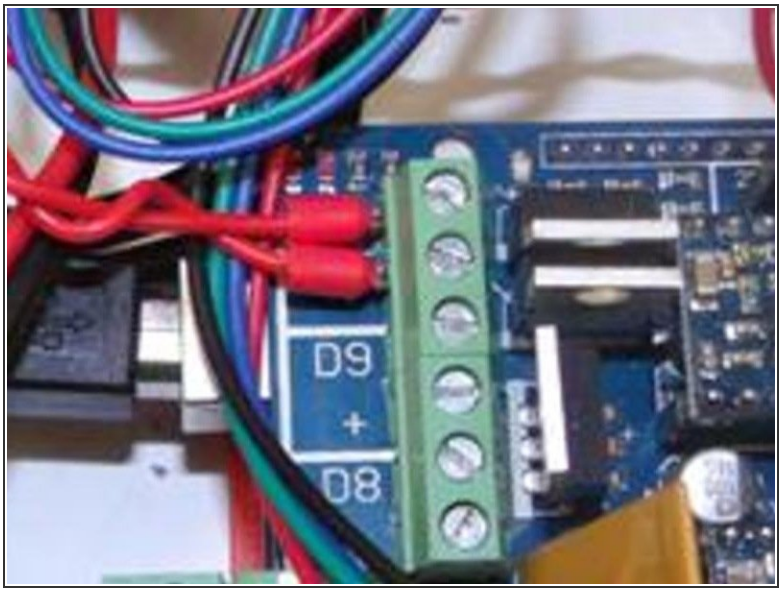
Step 8 — Connect End-Stops (continued)

- Followed by the Y-endstop on row 4 (Y-max)
- Leave row 3 (Y-min) empty and finish with the X-endstop on row 2 (X-max).
- Connect the hot-end thermistor cable (white) to the first pair of thermistor pins labeled T0.

Step 9 — Connect End-Stops (continued)





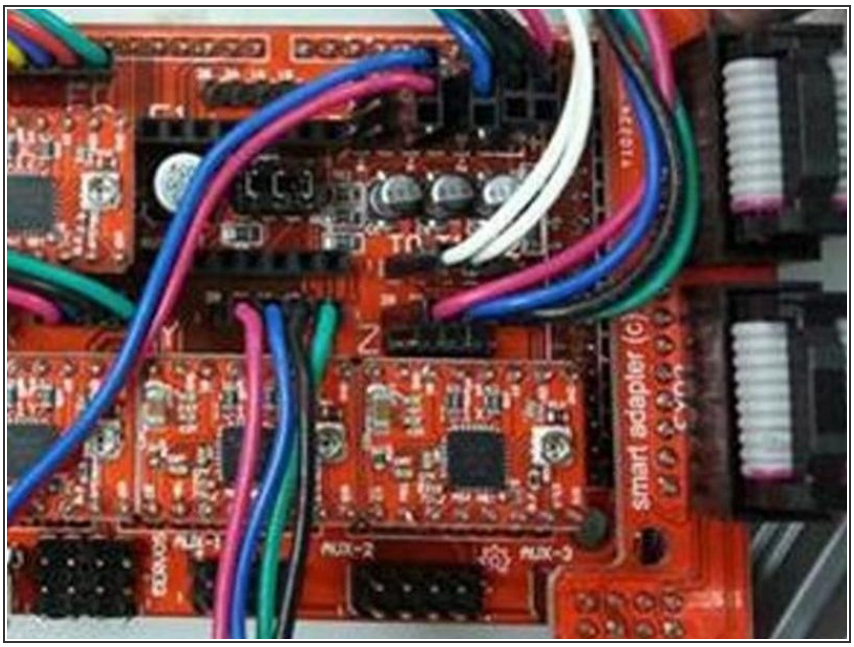
- If not already done in the step above, connect the X, Y, Z, and E motors as shown. There are 2 rows of pins for Z- you can use the either one.

⚠ Unlike shown on the picture, the green cables from the four motors need to face TOWARDS the green power plug!

- Connect the hot-end to the + and- pins Marked D10 on the RAMPS board.

ⓘ The hot-end wires are not polarized.

Step 10 — Connect LCD Board



- Fit the LCD controller ribbon cables to the connector board and the board to AUX3 and AUX4 on the RAMPS board.

⚠ Make sure EXP1 und EXP2 go into their respective connectors!

This concludes the basic wiring. You can tidy it up later, after commissioning, once it is all confirmed as working.