MAKERGEAR

Kit Assembly Guide

Items Needed

Tools Needed:
2 mm allen wrench
2.5 mm allen wrench
3 mm allen wrench
7 mm wrench (or pliers if you do not have this wrench)

Bag A:
X Motor
Extruder Motor
1 - M3x8 SS screw
6 - M3x12 SS screws
7 - M3 washers

Bag B:
Mounting plate assembly
2 - M3x10 SS screws
Motor Mount Assembly
2 - M3x12 SS screws

Bag C:
Hot end

Bag D:
Extruder Motor
3 - M3x12 SS screws

Bag E:
Filament Drive
2 - M3 washers
2 - M3x25 SS screws
Fan Assembly (with M3x50 SS screw)

Bag F:
Electronics case with RAMBo and SD Cable attached
1 - M4x8 Black screw
1 - M4 Black washer
1 - M4 nylocks

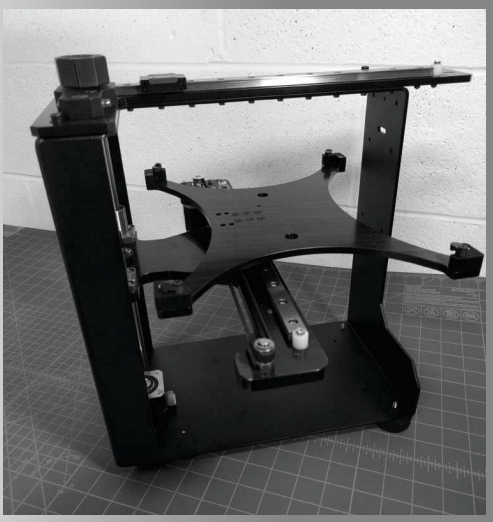
Bag G:
Y Harness
Z Harness
Printed Shroud
2 - M3x8 SS screws
4 - M2.5x12 SS screws
2 - M3x6 SS screws

Bag H:
X Motor Harness
Extruder Harness
Printed Wire Cover
4 - M3x10 black buttonhead
2 large cable ties
12 small cable ties
5 cable ties anchors

Bag J: (for HBP)
1 Black Clamp
1 - M4 nylock
3 - M4x8 Black screws
3 - M4 Black washers

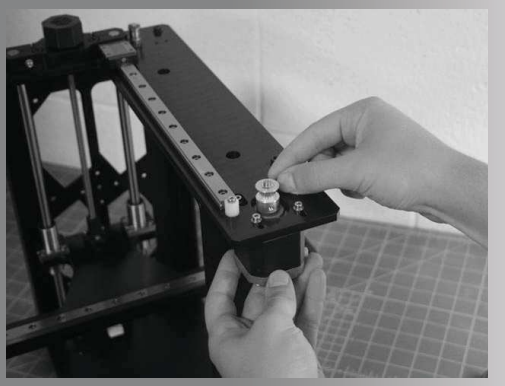
Bag K:
Printed Spool Holder
4 - M4x8 Black screws

1



1. Prepare your work area. Make sure you protect the table or bench you use from dents or scratches.

Remove the kit components from the box and set the frame in your work area.

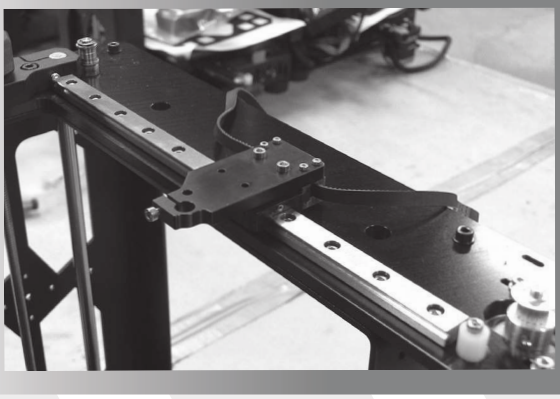


2. Using Bag A:

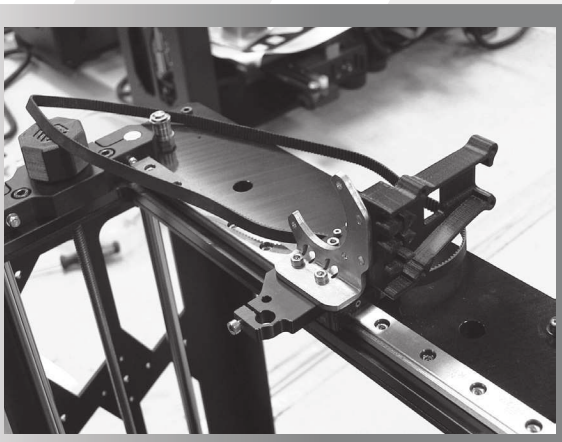
a. Place **[1] M3x8 SS screw** with **[1] M3 SS washer** into the recessed slotted hole in the top plate.

b. Place **[3] M3x12 SS screws** with **[6] M3 SS washers** (two for each screw) in the remaining three slots.

c. With the Drive Pulley on the X Motor coming up through the top plate, loosely fasten the x-motor using 2.5 mm allen wrench. The electric plug should face towards the rear.

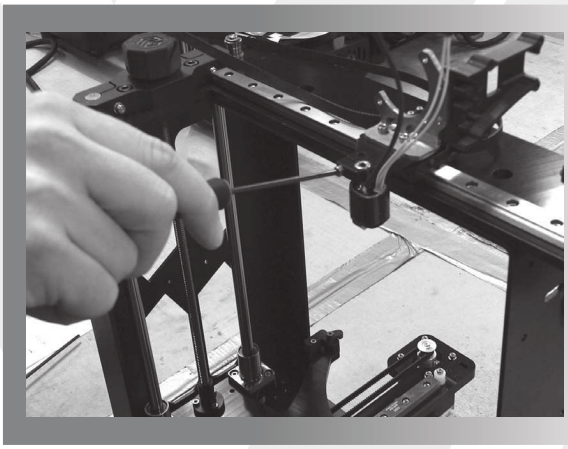


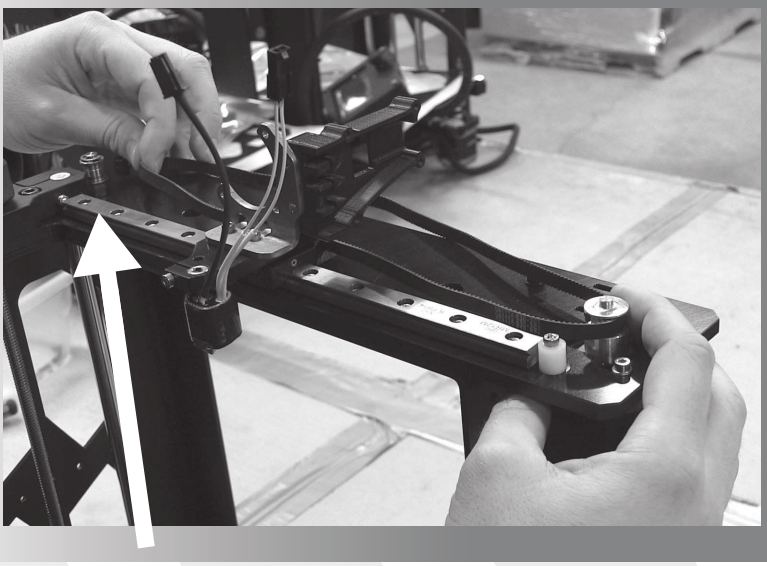
3. Using Bag B:
Place the mounting plate assembly on top of the bearing carriage on the top plate with the black printed piece down and behind the rail. Use a 2.5 mm allen wrench to fasten down the assembly with **[2] M3x10 SS screws** (the shorter screws) through the two rear holes.



4. Still using Bag B:
Retrieve the motor mount assembly and orient it such that the printed piece points towards the rear of the machine. Securely fasten using a 2.5 mm allen wrench with **[2] M3x12 SS screws** (bag B) through the front two holes. **IMPORTANT: Ensure that the motor mount does not wobble before proceeding.**

5. Using Bag C:
Insert your hot end into the front hole of the mounting plate assembly. Securely tighten the **m3x12 SS screw** already present with a 2.5 mm allen wrench. Make sure that the inlet of the hot end is flush with the mounting plate. The wires should clear the mounting plate and not be bent by it.

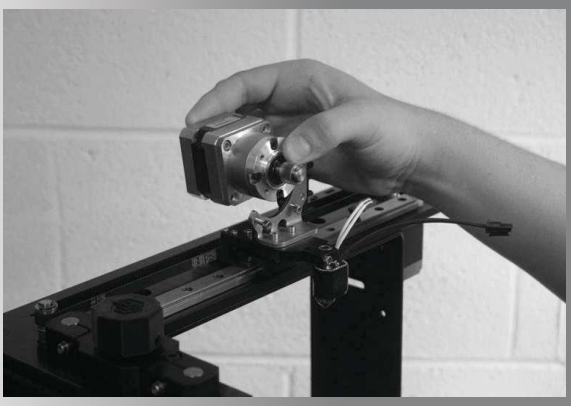




IDLER BEARING

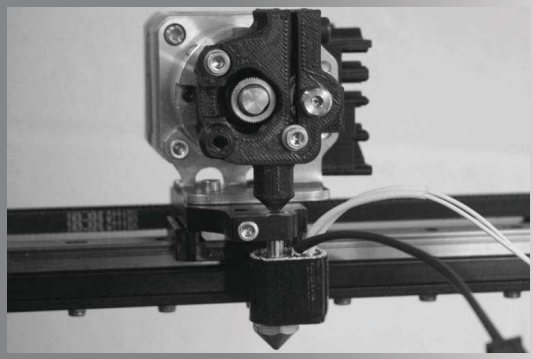
6. Wrap the belt around the drive pulley and then around the idler bearing.

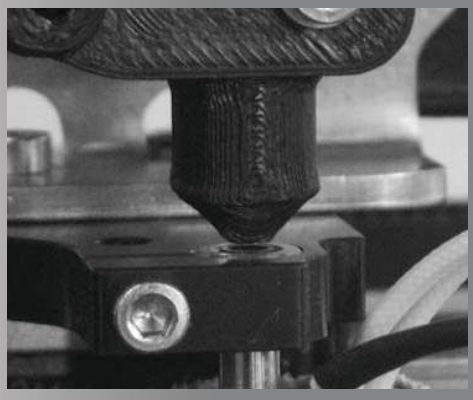
Then **FIRMLY** pull on the motor to create tension in the belt. Tighten the 4 screws with a 2.5 mm allen wrench.



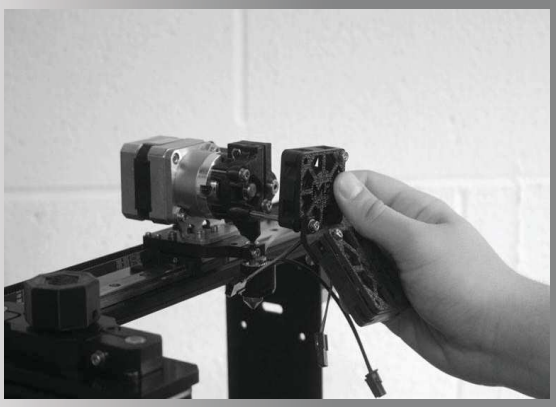
7. Using Bag D:
Securely fasten your extruder motor to the motor mount with **[3] M3x12 SS screws** using a 2.5 mm allen wrench. The motor plug should be pointing towards the right of the machine aligned with the hole in the printed piece.

8. Using Bag E:
Loosely fasten the filament drive to the motor using a 2.5 mm allen wrench with **[2] M3x25 SS screws** with **[2] M3 SS washers** through the top left and bottom right holes as pictured.



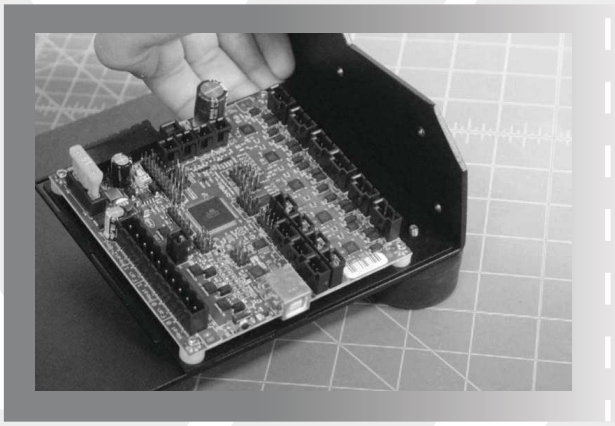


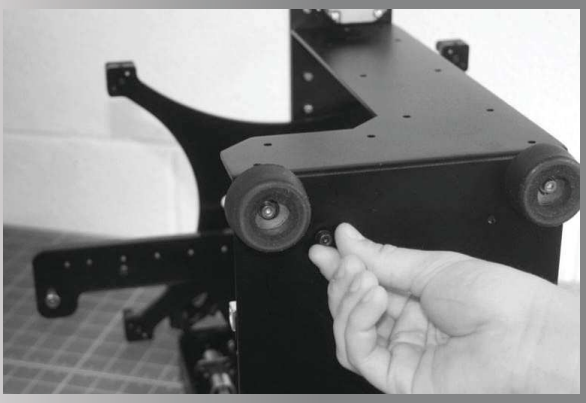
9. Align the tip of the filament drive with the hole of the hot-end, then use a 2.5 mm allen wrench to securely fasten the filament drive.



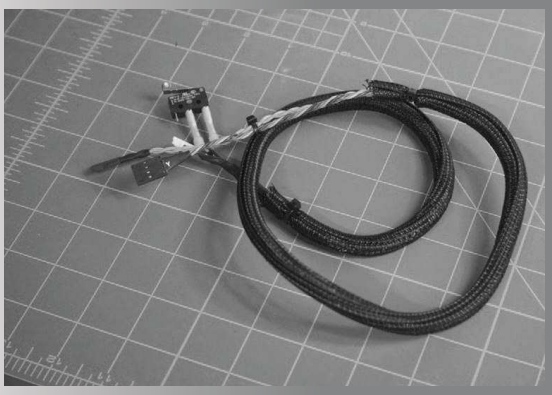
10. Still using Bag E:
Attach the **fan assembly** with the **M3x50 SS screw** to the bottom-left hole in the filament drive. Fasten with a 2.5 mm allen wrench.

11. Using Bag F:
Raise the bed with the knob on the top left of your machine to give you access to the base of the printer. Remove the electronics case lid from the **electronics case**.
Place the electronics case plate with RAMBo such that the screw from the front right foot of the printer passes through the electronics case plate. Fasten the plate with [**1] M4 nylock nut** using a 7 mm wrench or pliers.



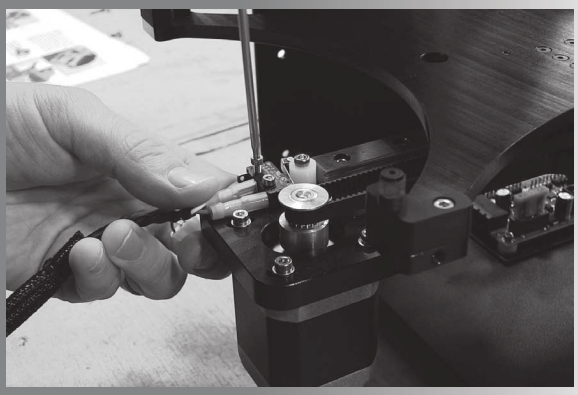


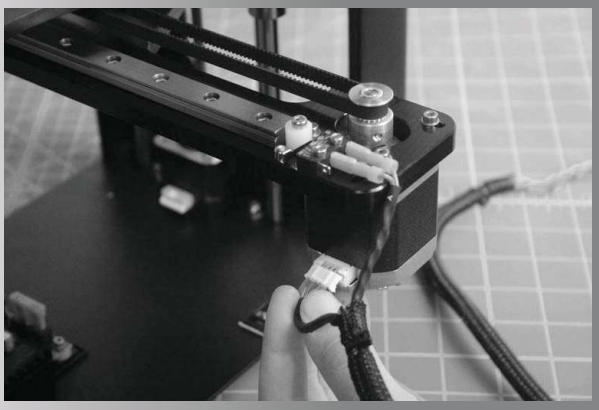
12. Still using Bag F
Tilt the printer on its left side as shown. Use **[1] M4x8 black screw** with **[1] M4 black washer** to fasten the RAMBo platform to the base of the machine with a 3 mm allen wrench.



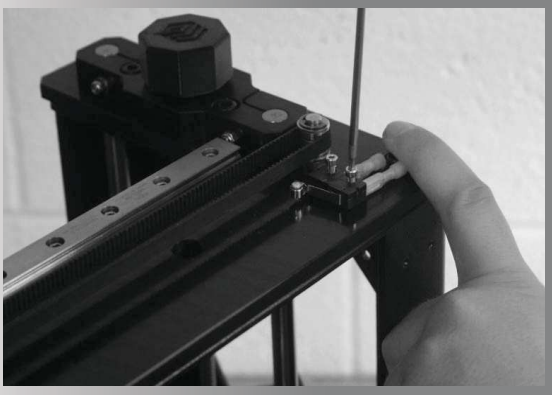
13. Using Bag G:
Locate the Y-motor wire harness. Check for a "Y" label on one end.

14. Still using Bag G:
Fasten the end-stop switch to the z-stage using **[2] M2.5x12 SS screws** (set aside the other 2 of these 4 screws for use in step 16) with a 2 mm allen wrench. The text should be face up. There is a bumper on the bottom of the spider that triggers the switch. When the switch is mounted, try moving the spider all the way back to the switch and listen for the switch to click.



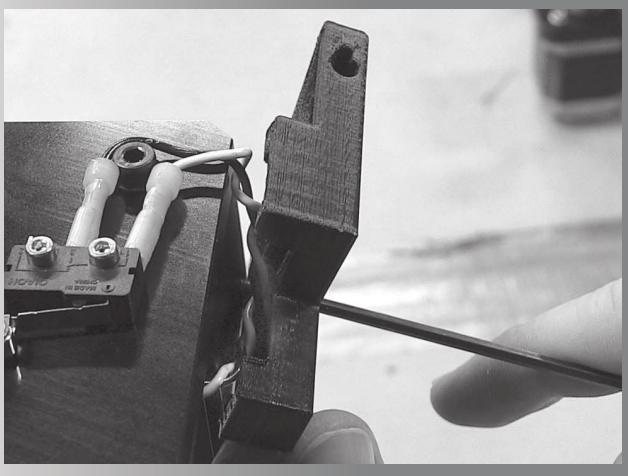


15. Plug white connector into the y-motor.

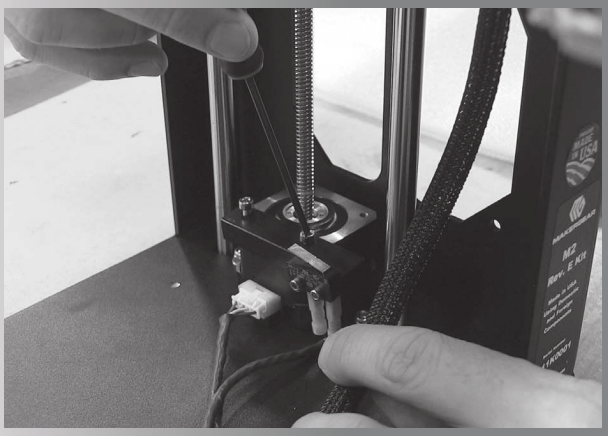


16. Still using Bag G:
Locate the X end-stop harness. Fasten the X end-stop switch, text facing down, with **[2] M2.5x12 SS screws** and a 2 mm allen wrench. When the switch is mounted, try moving the extruder all the way right and listen for the switch to click.

17. Still using Bag G:
Retrieve the shroud and bend the wiring from the X end-stop switch so that it fits into the contour of the shroud.



18. Still using Bag G:
Use a 2.5 mm allen wrench to fasten the shroud to the frame with **[2] M3x8 SS screws**. The black and white wires will run to the inside of the frame.

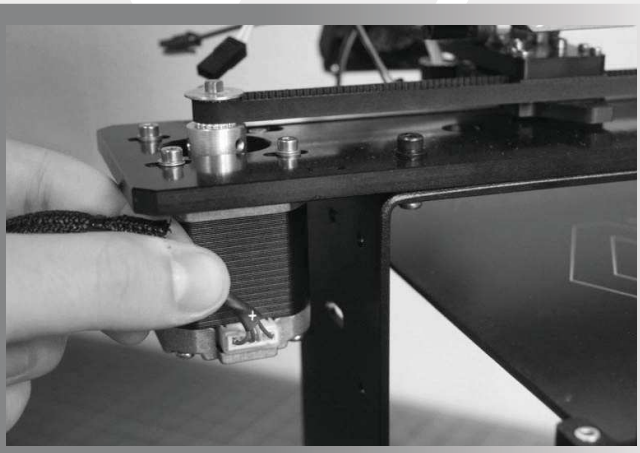


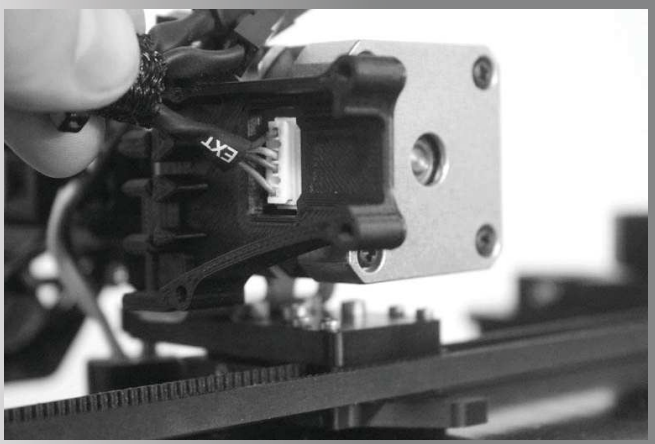
19. Still using Bag G:
Connect the remaining parts of the cable with the X end stop (a.k.a. the Z-motor harness).

a. Plug in the Z-motor wire (marked "z") into the Z-motor (bag F).

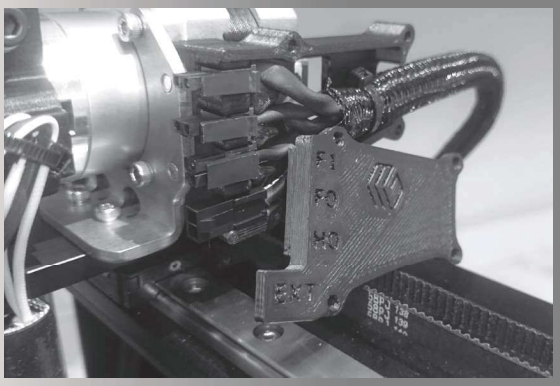
b. Affix the Z bottom end-stop using **[2] M3x6 SS screws** in the two holes in the moter closest to where the Z-motor wire was plugged in.

20. Using Bag H:
Retrieve the X-motor wire harness and plug the cable into the X-motor.



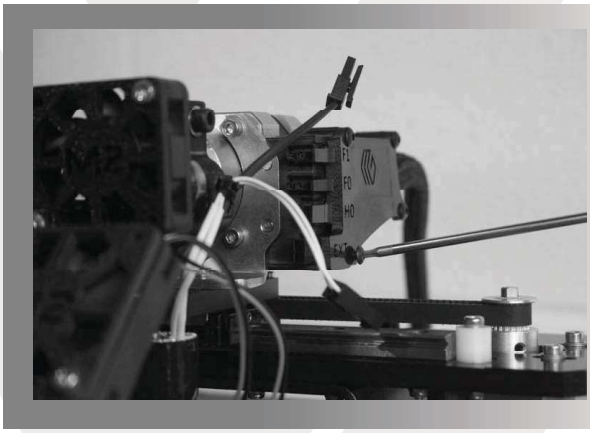


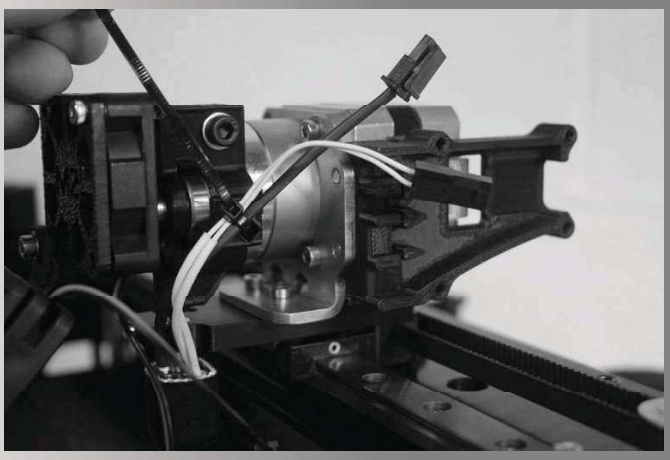
21. Still using Bag H:
Retrieve the extruder harness and plug the extruder motor wire into the extruder motor.



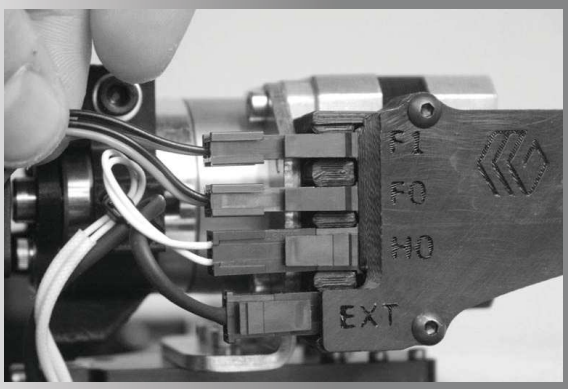
22. Still using Bag H:
Take note of the markings on the lid of the wire box. They match wire connectors to the slots in the box. Slide the wire ends into their respective slots according to the box lid. This will require careful alignment and a bit of force. Please see the picture at www.makergear.com/wirebox for a clearer image.

23. Start the **[4] M3x10 Black buttonhead screws** into the wire box cover. Then, place the cover over the box ensuring that no wires are pinched and secure using a 2 mm allen wrench.





24. Still using Bag H:
Use a small cable tie to secure the hot end wires (black and white) to the filament drive.



25. Plug in the wires from the hot-end and fans.

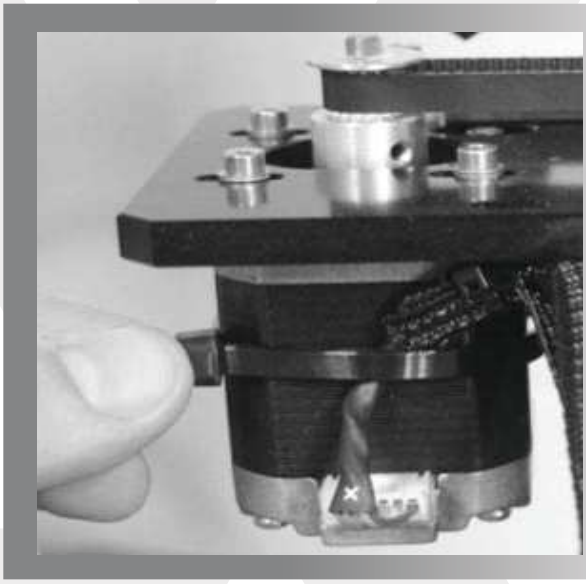
a. F1 is the small fan

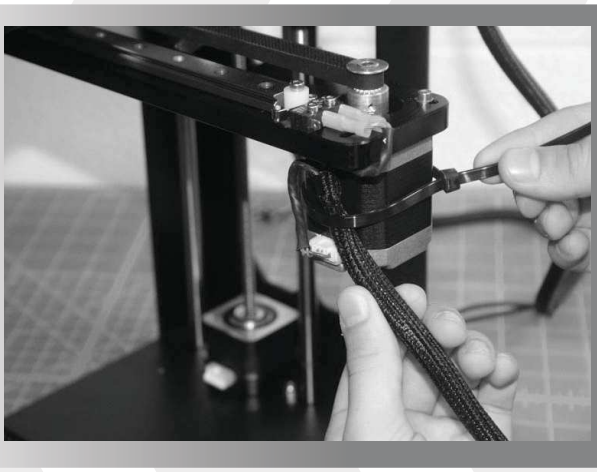
b. F0 is the bigger fan (Bad fan)

c. H0 is the heater cartridge (white)

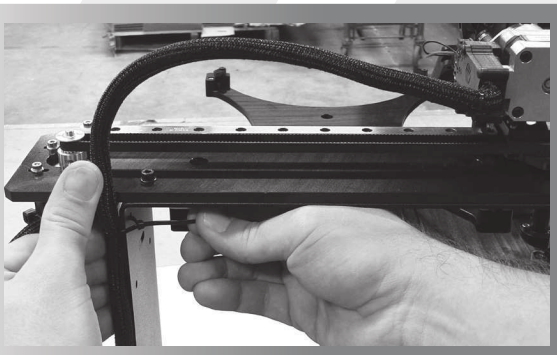
d. EXT is the hot end thermistor

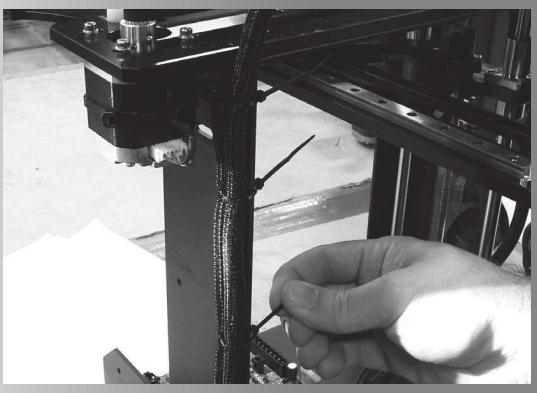
26. Still using Bag H:
Use a large cable tie to secure the x motor wire to the motor while leaving a little slack.





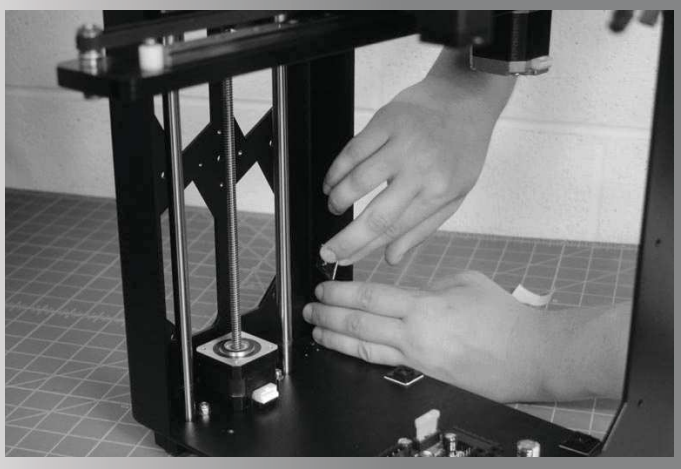
27. Still using Bag H:
Using a large black cable tie, secure the y-cable to the y-motor as shown. The wires coming out of the braided loom are not secured with the zip tie.



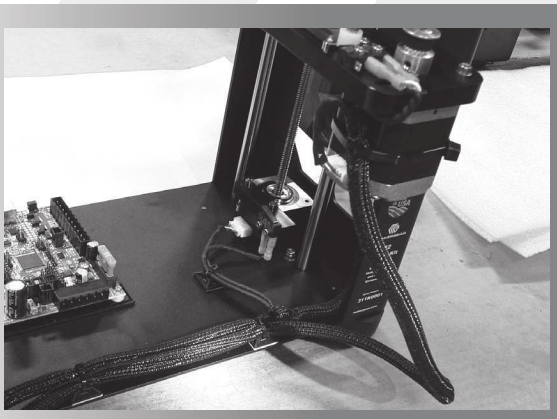


28. Still using Bag H:
Move the extruder assembly all the way to the Z motor side. Pull up the wire so that it is about 4" above the top of the frame in the middle. Using a small cable tie, secure just the extruder cable to the very top hole. Then secure both the X motor and the extruder cables to the 2nd and 3rd top holes.

29. Still using Bag H:
Place a cable tie anchor at a 3-finger (about 2.5") spacing from each side of the printer on the top of the base of the machine. Place one more cable tie anchor about 2" in front of the cable tie anchor pictured on the right to support cables coming from the z motor.

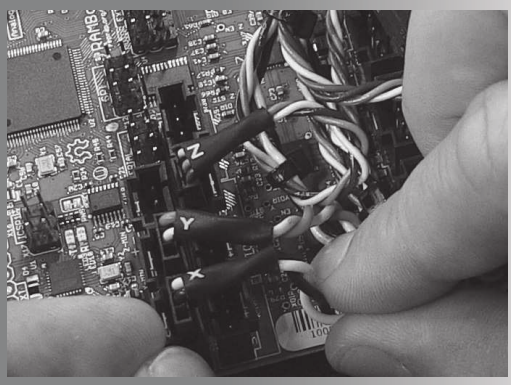


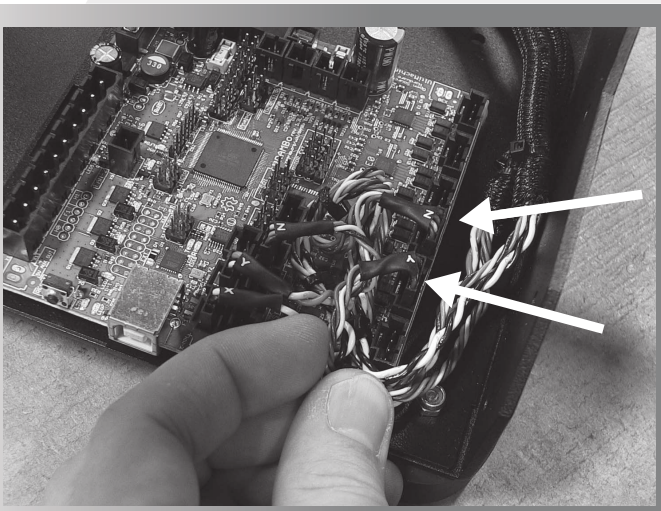
30. Still using Bag H:
Place a cable tie anchor against the back wall of the printer at a 3-finger spacing from the top, and another at a 3-finger spacing from the bottom.



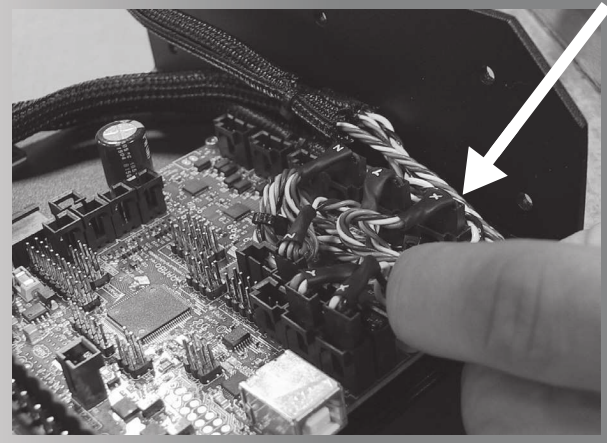
31. Still using Bag H:
Use cable ties with the cable tie anchors to secure the harnesses to the frame of the printer. **TIP: When wiring, try to make it look good—you will have to live with it. Extra cable ties are included if you need to go back and make it look better**.

32. Referencing the schematic on page 16, Plug in the Z end-stop trigger wire (3 port) with the yellow wire facing rear in the Z max position. Plug in the Y end-stop wire with the empty slot facing towards the front in the Y min position. Plug in the X end-stop wire with the empty slot facing towards the front in the X min position.



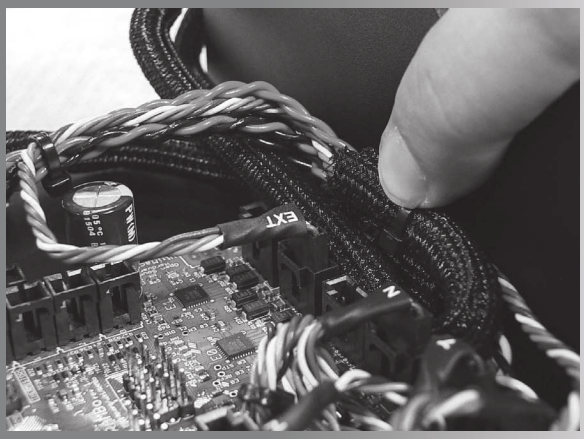


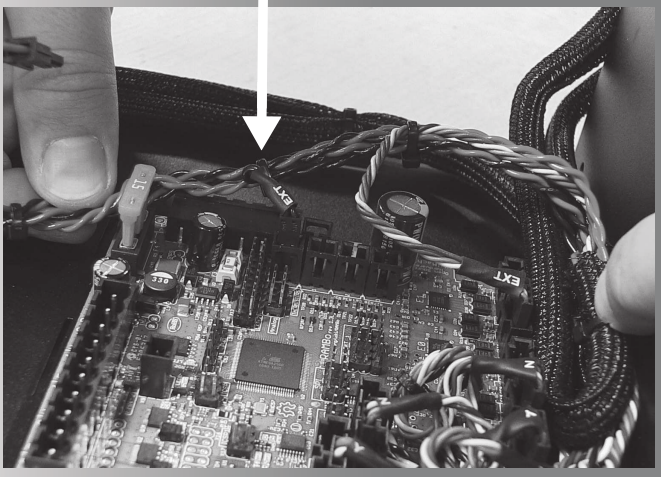
33. Plug in the 4 Prong Y and Z motor cables into the slots on the right side of the RAMBo as shown. The red wire should be towards the rear in each bundle. They are labeled on the RAMBo near each motor driver chip.



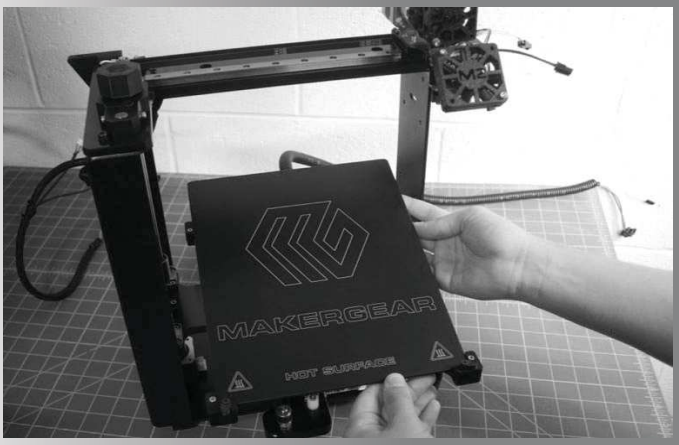
34. Run the X cable around the back side of the printer and plug it into the RAMBo in front of the Y and Z cables. It should be the front most port, and the red wire should be towards the rear.

35. Plug the 4 prong extruder motor wires into the RAMBo. There should be one open slot between the Z-motor and the extruder motor. The red wire should be towards the rear of the machine.



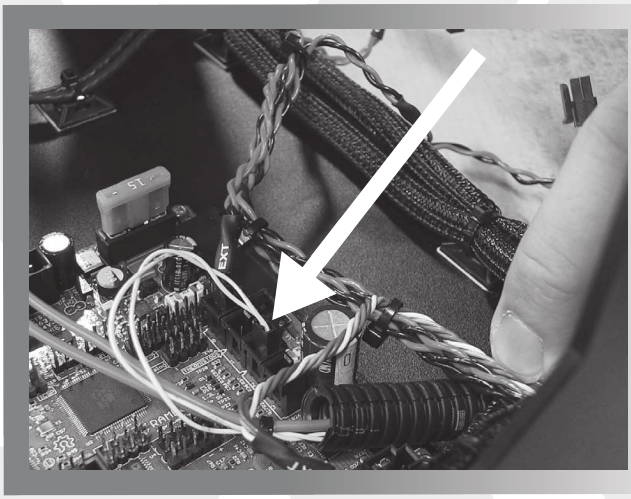


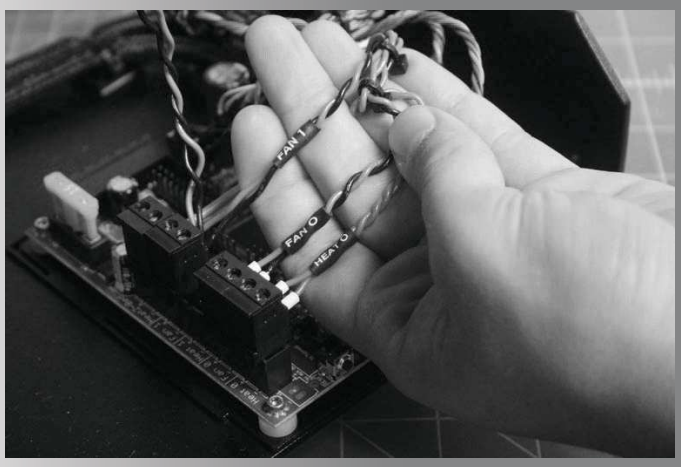
36. Plug the two prong extruder thermistor wire into "T0". It can be plugged in either way.



37. Place the Heated Build Platform (HBP) inside the four rubber corners.

38. Run the HBP tubing underneath all other wires into the Electronics Case. Then, plug in the HBP thermistor (white) into the location marked "T2" on the RAMBo. This can be found in the wiring diagram at the end of this document. (The connector can be inserted either of two ways).



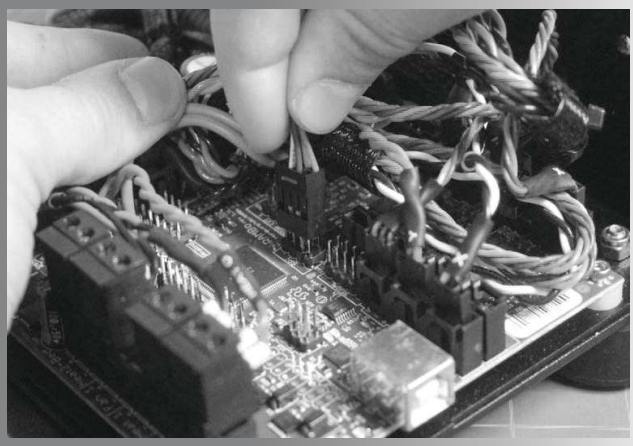


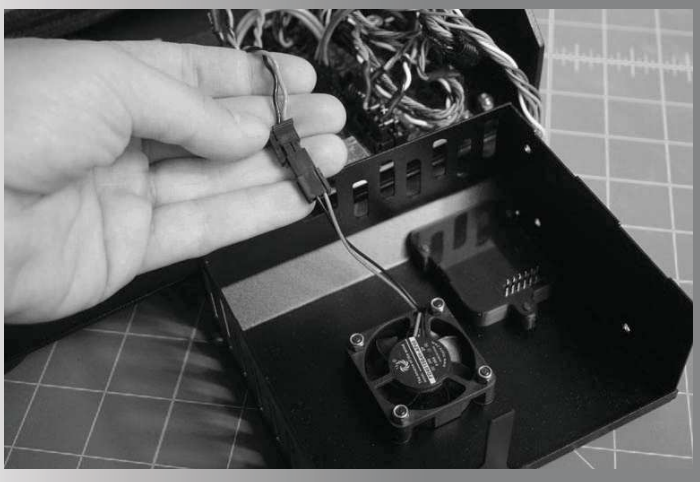
39. From the front to back of the machine, plug in the following:

a. H0 into "Heat 0"
b. Fan 0 into "Fan 0"
c. Empty
d. Fan 1 into "Fan 1"
e. Red HBP wire into "Heat2-Bed"

40. Using Bag J:
Use the black clamp to secure the flex tubing from the HBP using the protruding screw from the back-right foot. The tube should just pass into the RAMBo. Fasten with **[1] M4 nylock nut**. Tie down the HBP wire bundle with the other harnesses to the X-motor frame upright at the lowest cable tie hole with a cable tie.

41. Plug the SD card reader cable (running from the top of the electronics case) 2x4 female end into the 2x4 pin header on the RAMBo labeled "SPI." The red wire must be towards the USB port.





42. Connect the extra connector on the Fan 1 harness to the fan on the lid of the electronics case.

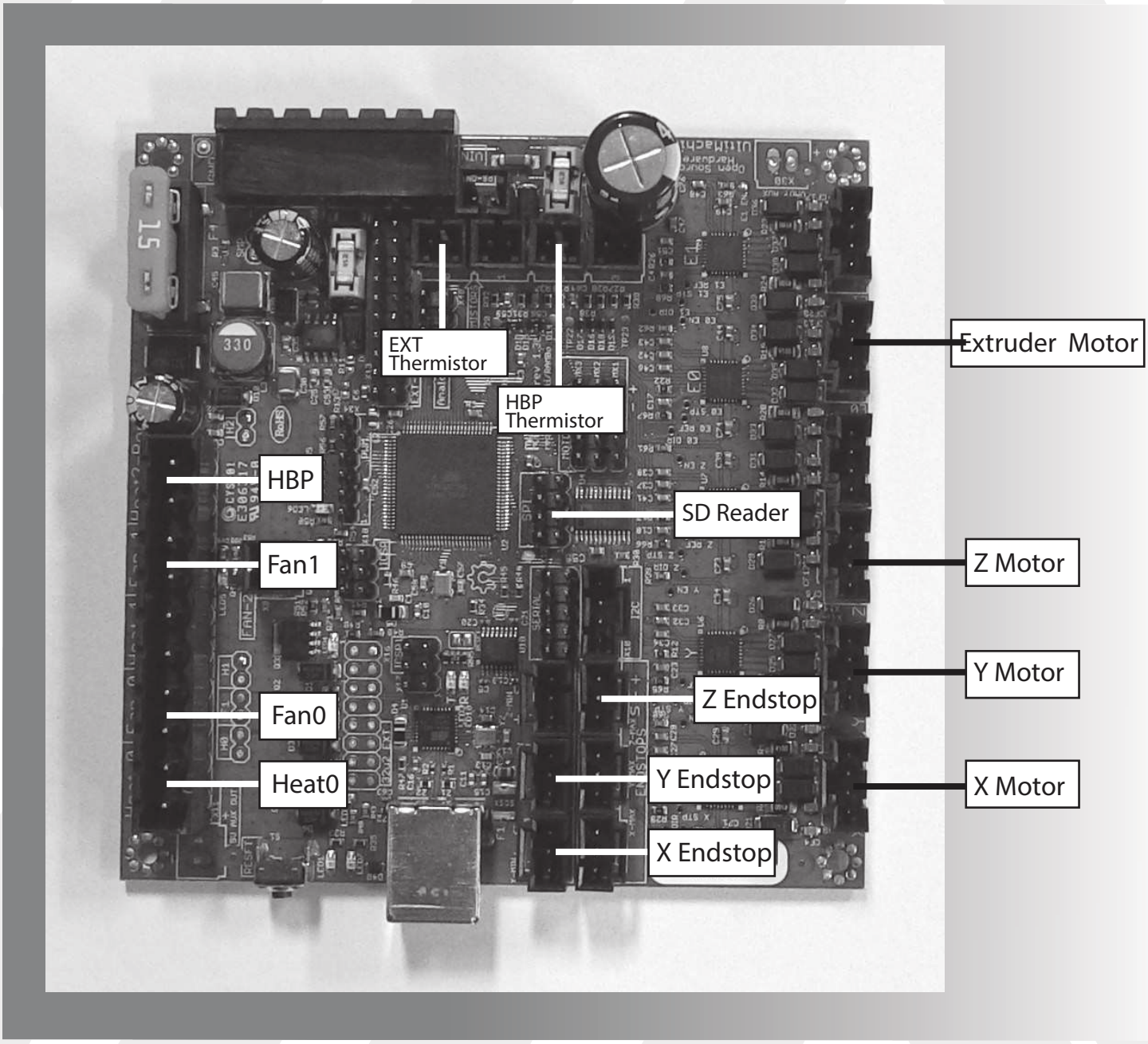
43. Still using Bag J:
Place the electronics case into position and secure with **[3] M4x8 black screws** and **[3] M4 black washers** using a 3 mm allen wrench.

44. Using Bag K:
Attach the spool holder with **[4] M4x8 black screws** with a 3 mm allen wrench to the left side of the printer.

45. You are now ready to move on to the M2 User Guide included with your shipment. Please be aware that this guide was written specifically for M2's that were assembled and tested at our facility so there may be some inconsistencies. The main difference is that you will have to thoroughly go through the quickstart app **(www.MakerGear.com/pages/Quick-Start-App)** to level your bed. Happy printing!

Simplified Wiring Diagram

This diagram is intended to provide clarity and reassurance that your wiring is correct. It should not be a replacement for the previously described wiring instructions.



Notes

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