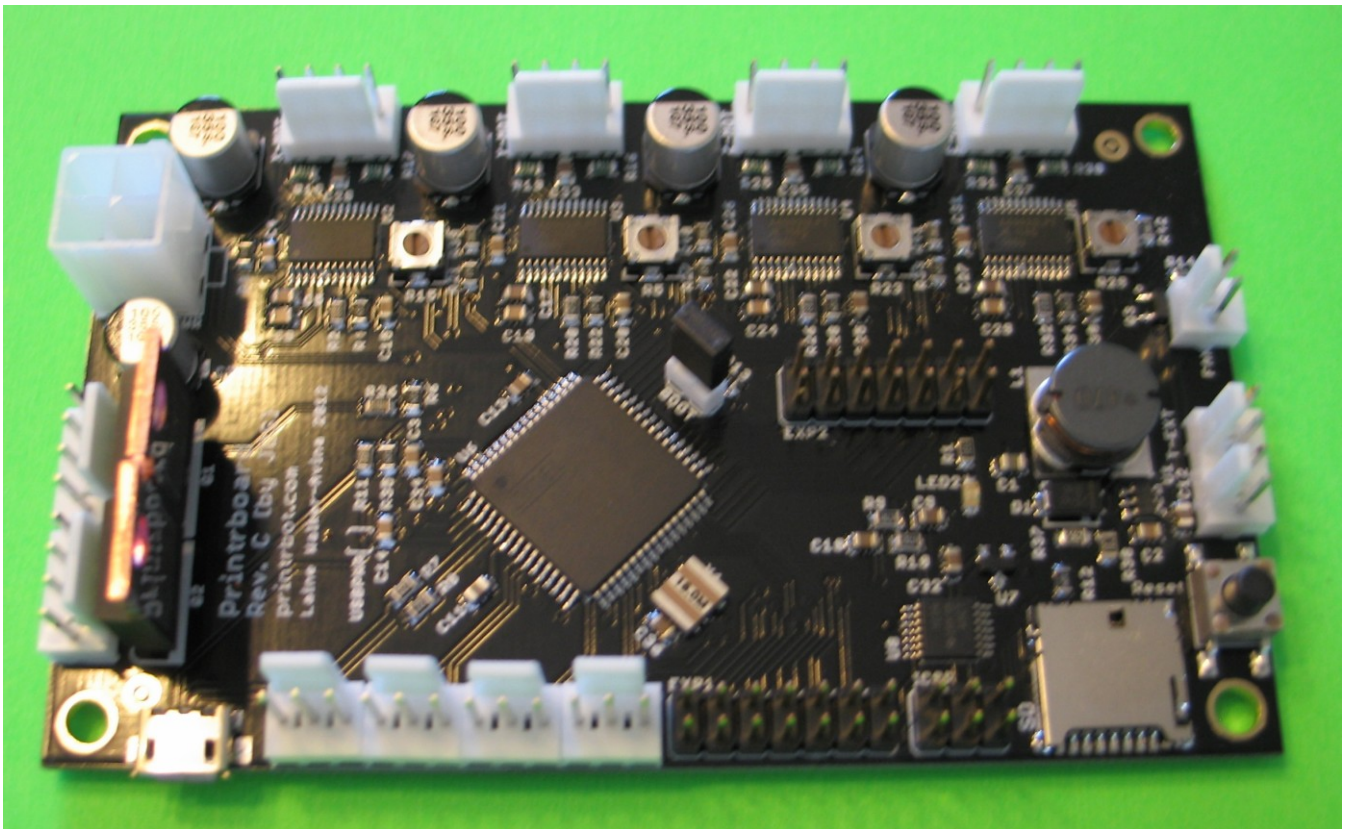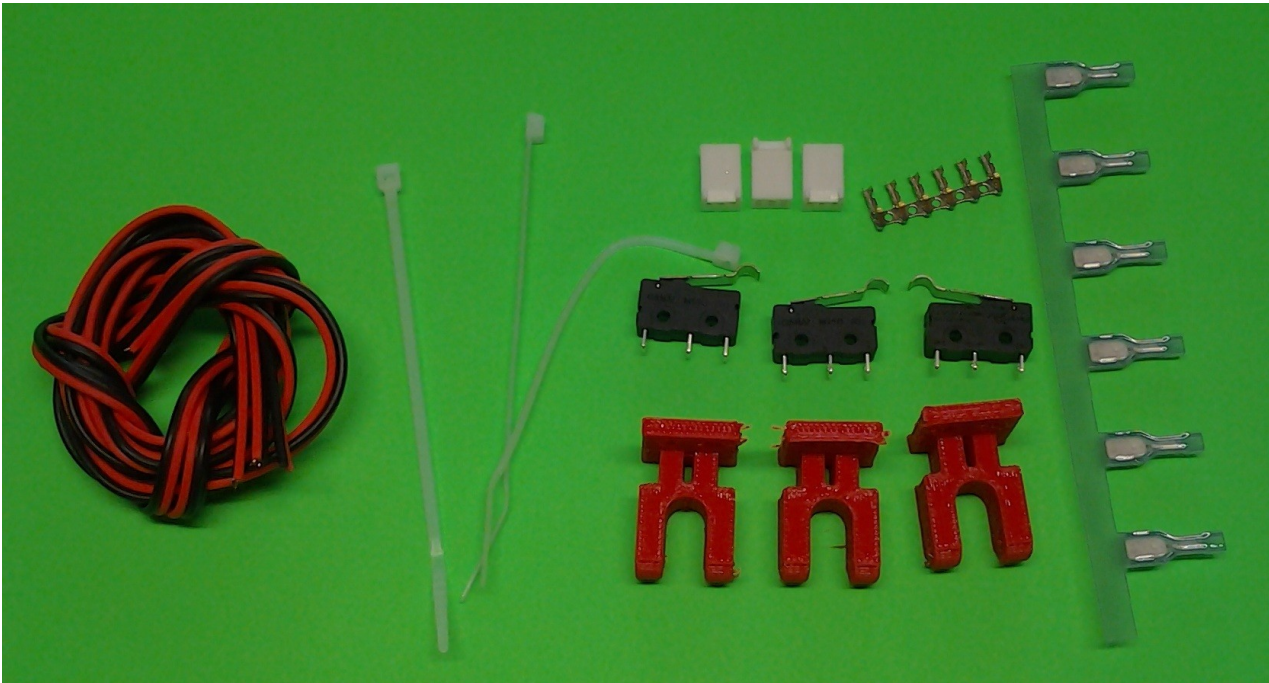# PrintrBoard Electronics

Visual Instructions
MAKERFARM
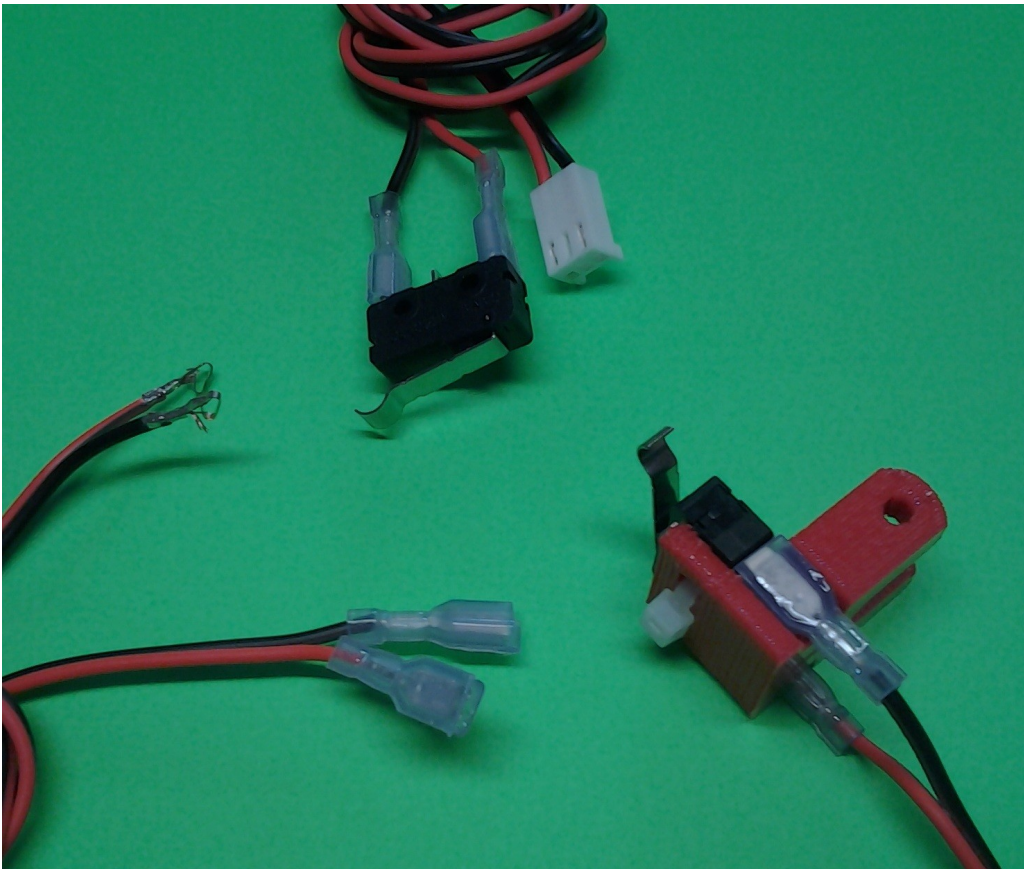
PrintrBoard Connections

Endstops: Gather the following Items:

Strip about 1/4" or 5mm from the ends of the black and red wires, Crimp on the Molex connector ends and the Motor Connector ends. Push the Motor Connector ends onto the outer 2 legs of the Mechanical Switch then Zip Tie the Switch onto the Endstop Holder. Last install the Molex connector with the molex connector ends in the outer 2 holes.
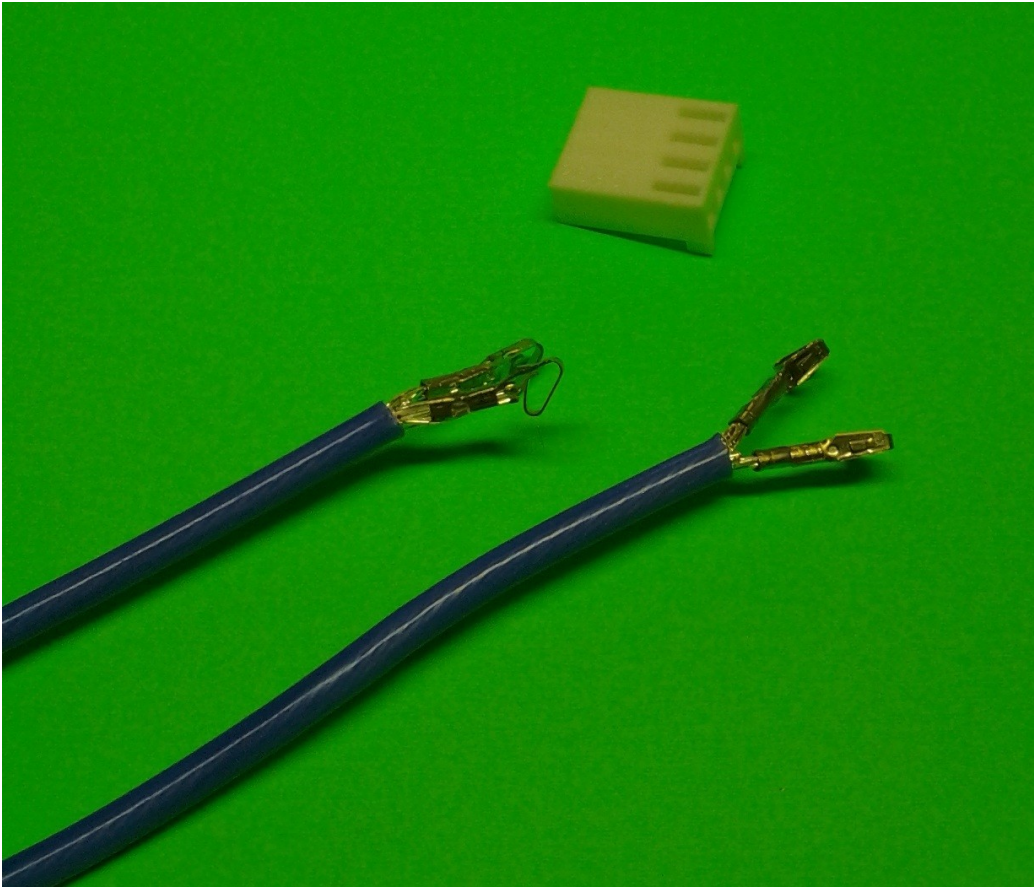
Note: Polarity doesn't matter with these switchs so black and red can be connected to any side.

Heated Bed:

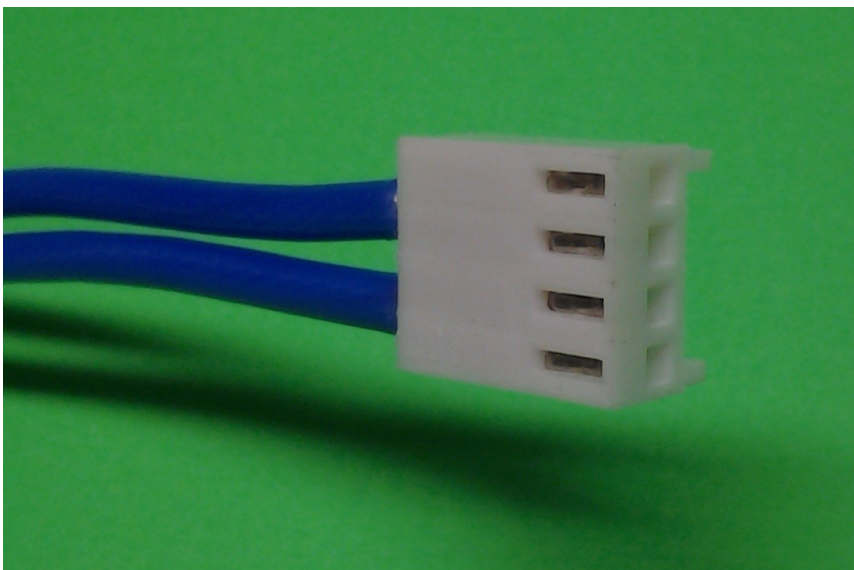After soldering on the 2 wires to the heated bed Strip 3/8" of insulation off of both wires, separate the stranded wire into 2 parts and crimp on 2 molex connector ends per wire.
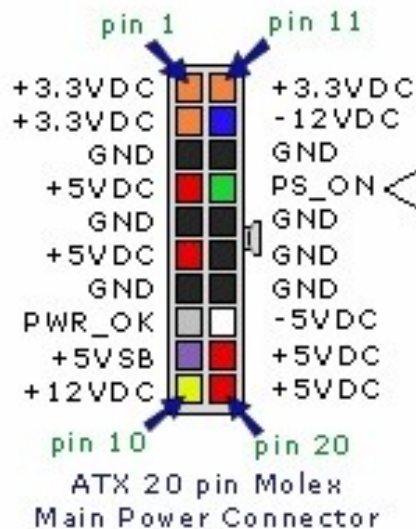

Insert the Molex Connector ends into a 4 pin Molex Connector as shown.

PrintrBoard Connections—Continued

Power Connector: Use a standard ATX Power supply to power the Printrboard.

diagrams with pins facing forward

pin 1		pin 11
+3.3VDC		+3.3VDC
+3.3VDC		-12VDC
GND		GND
+5VDC		PS_ON
GND		GND
+5VDC		GND
GND		GND
PWR_OK		-5VDC
+5VSB		+5VDC
+12VDC		+5VDC
pin 10		pin 20

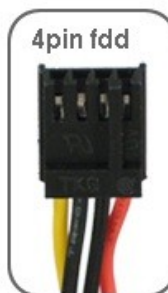ATX 20 pin Molex
Main Power Connector

To turn the power supply on and keep it on connect the Green wire and a black wire, or use a piece of paperclip cut to size to connect them.

pin 1		pin 3
GND		+12VDC
GND		+12VDC

ATX 4 pin Molex
12V P4 Connector
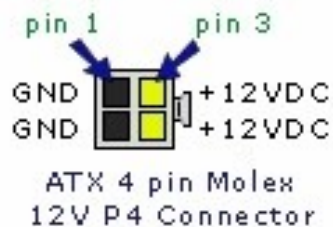
Use this connector with your Printrboard, make sure it only has Black and Yellow wires

Do not use this connector
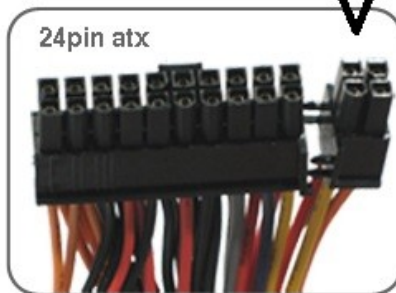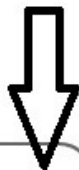
PrintrBoard needs to use a High output 12v Connection as seen below

24pin atx	4pin molex	4pin fdd	4pin p4_12v

15pin sata2	6pin pci express	6pin aux	4pin hp vedio power	6pin dell_p6
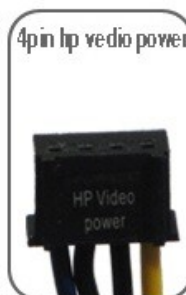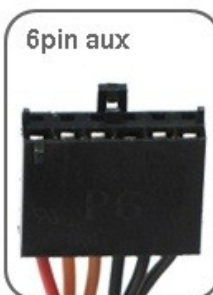
PrintrBoard Connections—Continued

Final Connections: Connect everything as seen below:

X-axis   Y-axis   Z-axis (left and right)   Extruder

Power Supply

Extruder

Hot Bed

Micro USB

X   Y   Z   Endstops

Fan

Thermistor (extruder)

Thermistor (hot bed)

Micro SD
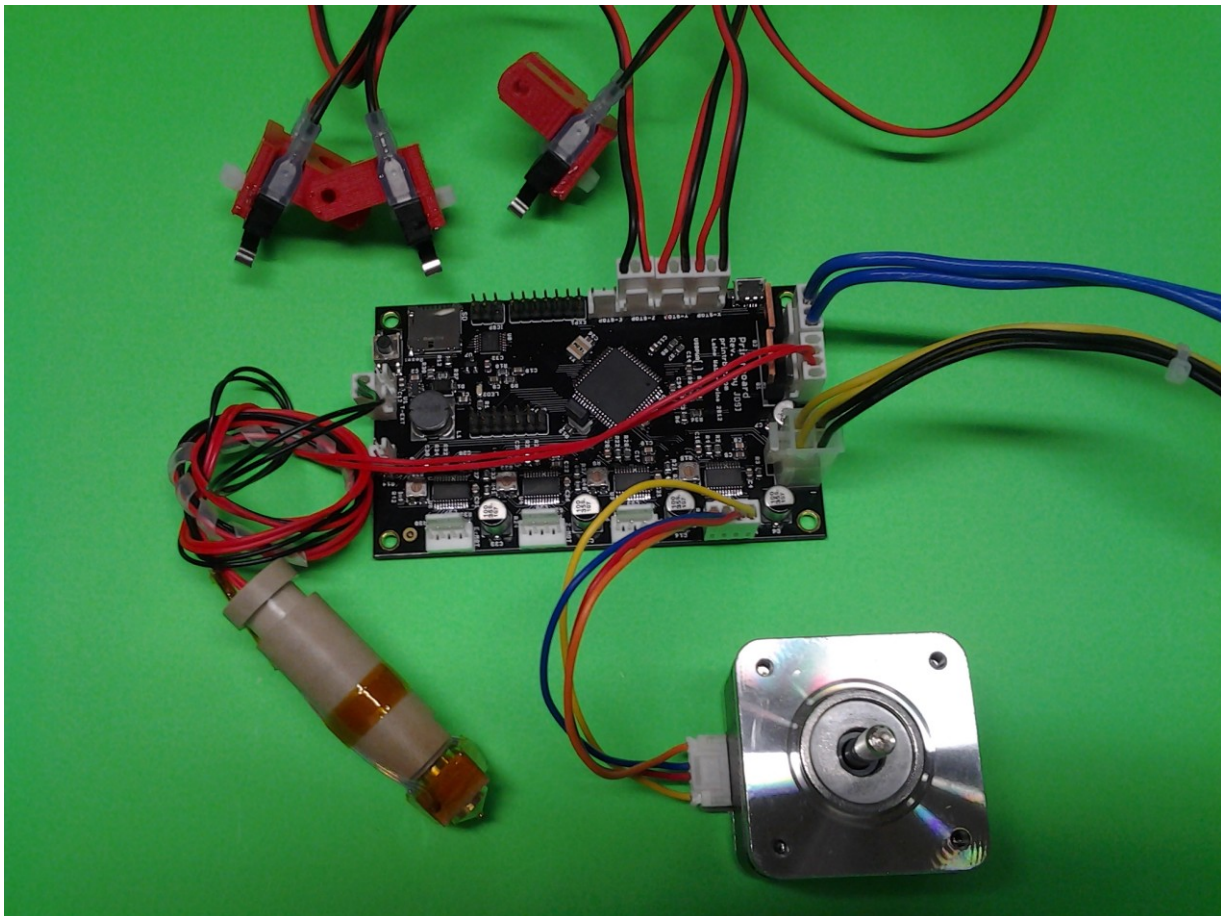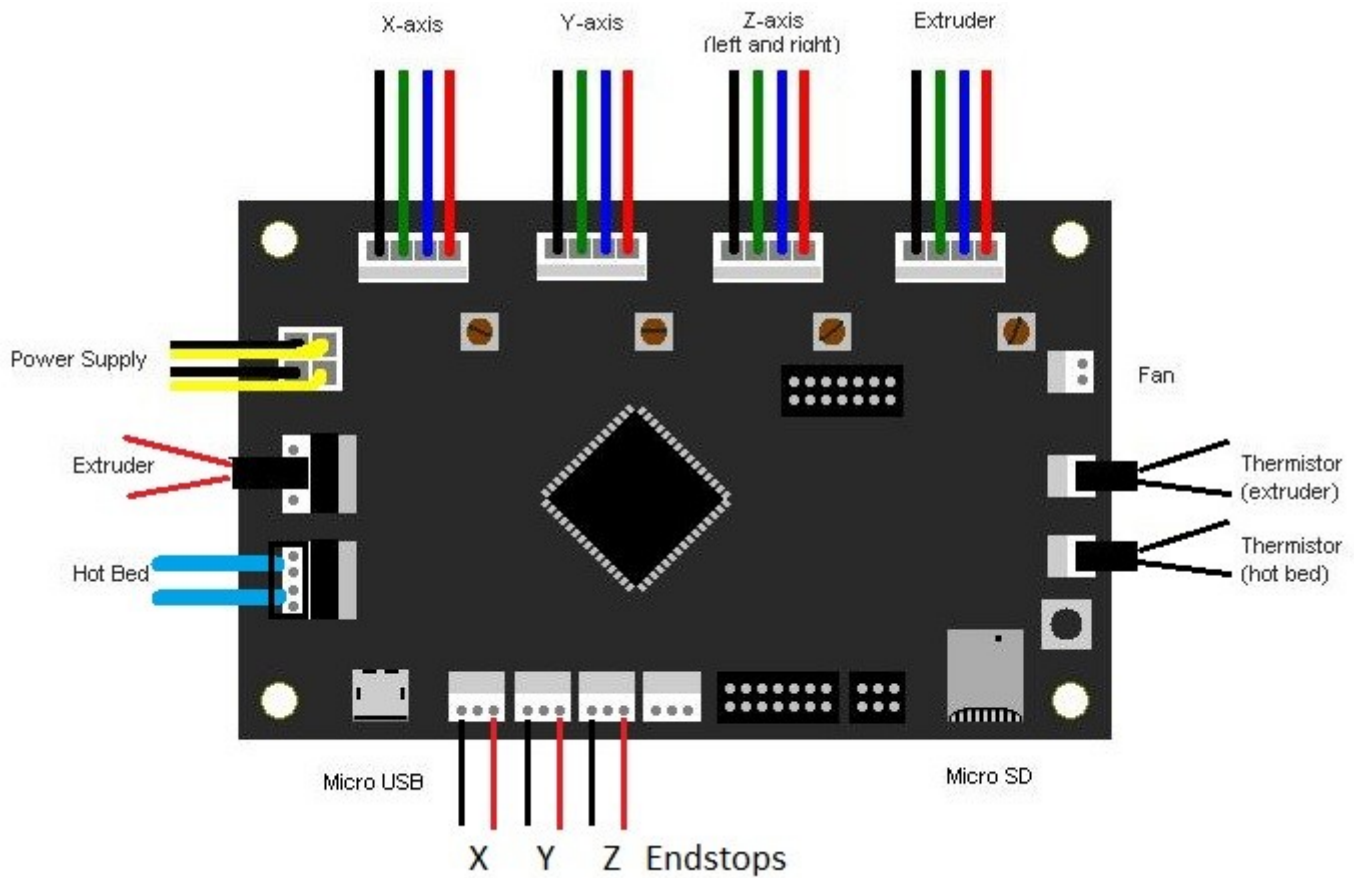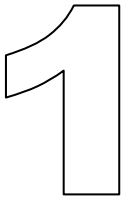
1 Driver Install

Before plugging in the Printrboard Electronics to your computer install the Printrboard driver Serial_install.exe.

Now you can plug the Printrboard Electronics into your computer via USB Port and wait for the driver to finish installing.

Firmware Install

The Printrboard come pre-loaded with the Marlin Firmware, but you may need or want to make changes. To load firmware follow the instructions below:

Open the folder named Arduino0022 Printrboard, if you already have Arduino loaded on your PC or have a newer or older version make sure to use the one in the Zip file you downloaded. Other versions won't work even if it is v22.

Open the folder named arduino-0022 and run the program arduino. If you are prompted to upgrade the arduino software to a newer version don't do it.

Unlike older AVR microcontrollers, the AT90USB has a special HWB_ALU pin (Hardware Button) which must be tied to ground during a reset cycle in order to place the microcontroller into bootloader mode. This is accomplished by removing a jumper on the Printrboard called "BOOT". Firmware can only be loaded while the chip has booted into its bootloader:

1. Remove the BOOT jumper.
2. Press and release the Reset button. The AT90USB's bootloader will appear as a new USB device the first time you boot into the bootloader. Allow Windows to install the USB driver and note the new COM port number.
3. Replace the BOOT jumper onto the board.
4. Proceed to upload new firmware using the method relevant to your installed bootloader.
5. In Arduino 022, open firmware (lincomatic-Marlin-MakerFarm\Marlin\Marlin.pde)
6. Choose [BootloaderCDC]Teensylu/Printrboard from the Arduino Tools-->Board menu, and select the COM port associated with your Printrboard's bootloader.
7. Click File --> Upload to Board.
8. Arduino will compile and upload firmware. You should see an error a few seconds after the firmware compiles. This is because the AT90USB has successfully exited the bootloader.
9. Press Reset. You may need to disconnect and reconnect the USB and power cables.

In the Arduino Software click File, Open then brows to the Marlin folder in the Printrboard software package you downloaded and open the file Marlin.pde, select the tab labeled Configuration.h. This is where most of the Calibration changes will be made.

2 <u>Pronterface Install</u>

Open the folder Printrun-win-Mar2012-slic3r, open the folder dist and double click on Pronterface.

Select the port your Printrboard was installed to and set the baud to 250000 then click connect. You should get a message that say's „Printer is now online". If you don't get this message and your screen just says „Connecting..." for a long time follow the steps below.

1. Close Pronterface, unplug the USB Cable from the Printrboard, Shut off the Power to the Printrboard, Unplug the Y endstop Cable.

2. Turn on the Power to the Printrboard, Plug in the USB Cable, Start Pronterface and click connect. After the printer has connected plug in the Y Endstop.

Basic Calibration

Now get out your ruler and click x+10, see if the X axis moves 10mm, if it does proceed to Y, then Z axis. If they don't move enough or they move too much we will need to go to the firmware and change the (#define XY_MTR_STPS 400) in the configuration.h tab. For Z edit #define Z_ROD_PITCH, Change to 1.25 for 8mm Z Threaded Rods and 1.411111111111111 for 5/16" Z Threaded Rods.

Now we can calibrate the steps per mm for the extruder which is easiest with some white or clear filament. Before you install the filament into the extruder get a marker and put marks on the filament every 10mm for about 100mm then put marks every 50mm for about 200mm. Now feed the Filament into the extruder and move it in 1mm increments until you have the first mark at the top of the extruder. Set the Extruder to 10mm and click extrude. If it moved exactly 10mm keep going until you can make sure it moves exactly 50mm. If it moves too far or not enough we need to edit the firmware again. For the extruder you will edit #define EXTRUDER_MTR_STPS 200

3 Slic3r

To generate the Gcode for our printer we are going to use Slic3r, to change Slic3r's settings in Pronterface Select Settings & Slicing Settings.

In the Print Settings tab you can change your Layer Height and Fill Density. In the Printer and Filament tab you can change your nozzle diamenter to match your hot end (.35mm or .5mm). You can also set your temperature and Bed Temperature. If you are using ABS set the temps to about 225 and 80-110 for the heated bed, for PLA use 180 and 50 to 70 for the heated bed. Then save your config and close the Slic3r window.

Slicing

Now that we have Slic3r setup in pronterface click Load File and find the Hollow Cube.stl in the Zip File. Slic3r will now slice the .stl file and get it ready to print.

Printing

Connect to your printer, click the Monitor Printer box at the top of the screen and click Print. Make sure your Z Endstop is about 5 or 10mm above the print bed and click print. Once we can see that stuff is working you can click pause, remove the printed platic an move the z opto sensor down a little then try again by clicking Home and Print, you want to keep doing this until your printer puts down a good line of plastic that sticks to your printbed (a heated bed is recommended). If you go down to much you can damage your nozzle so be patient.

Happy Printing!

Troubleshooting:

Endstop switchs only operate when you press the Home button in Pronterface, if you are jogging the motors in pronterface the home switches will not be used.