

Wire Steppers

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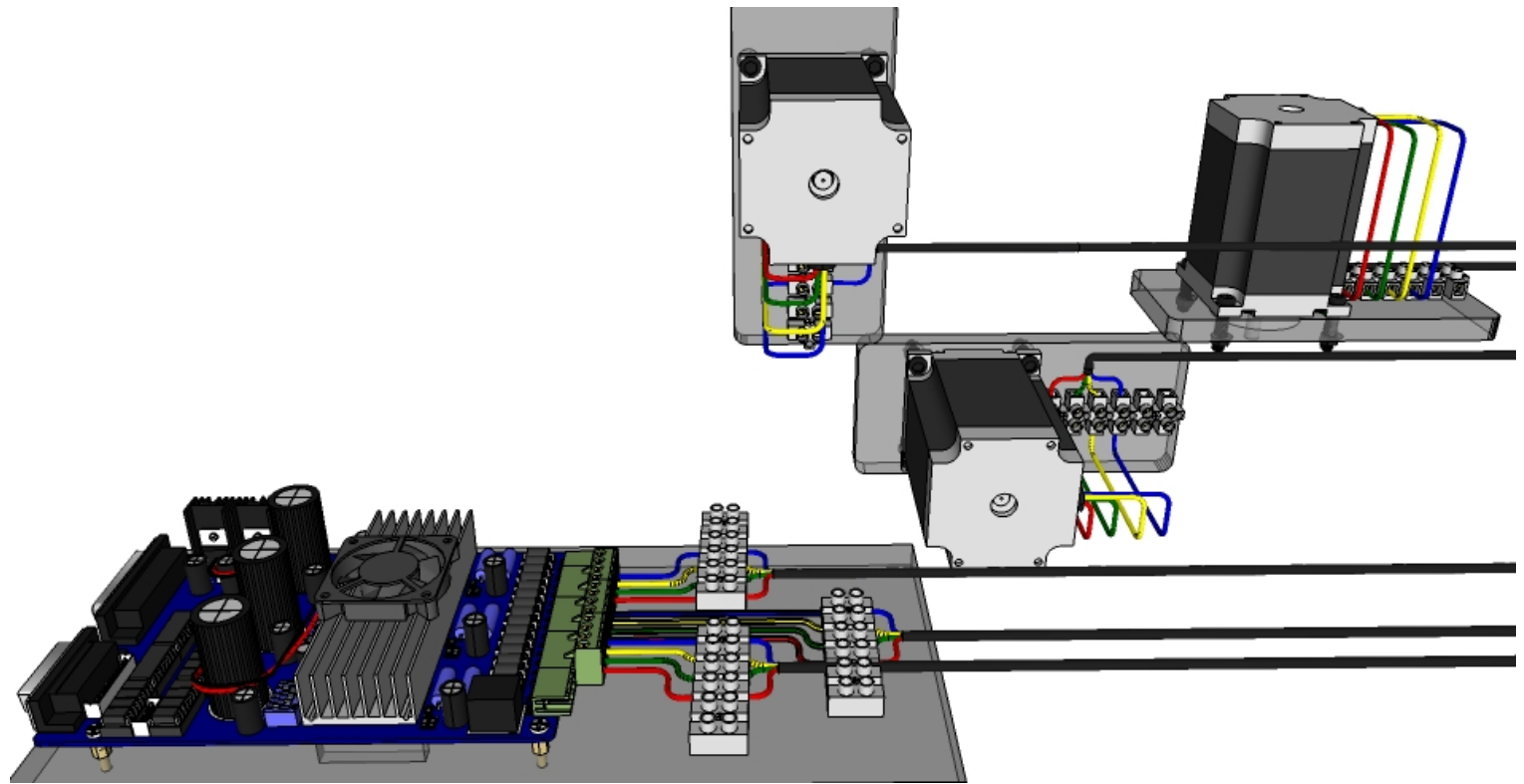
Power Supply with C



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Wiring Stepper Motors to the TB6560 Driver Board

- Mount AC Relay
- Mount DC Converter
- Mount E-Stop
- Mount Limit Switches
- Mount Stepper Motor
- Mount Cooling Fan
- Wire DC Converter to
- Wire JK02 to DC Con
- Wire DIV268N to Ste
- Wire JK02 to DIV268
- Wire DIV268N to Pow
- Wire Steppers
- Wire E-Stop to JK02
- Wire Limit Switches



The TB6560 driver board is capable of driving up to 3 bi-polar Stepper motors. The motors need to run on anywhere between 12V and 36V and draw a current from 1.5 amp to 3 amp (up to a 3.5 amp peak). Connecting motors outside this range may/will damage the driver board. (I have actually done this with a 4.2 amp motor, it will leave a crater in your board where the Toshiba TB6560 chip used to be).

Warnings

AC Mains Power can kill or seriously injure

DO NOT plug in your equipment while you are working on it

Never make changes to your board while it is powered up as it will permanently damage it

Wire Limit Switches

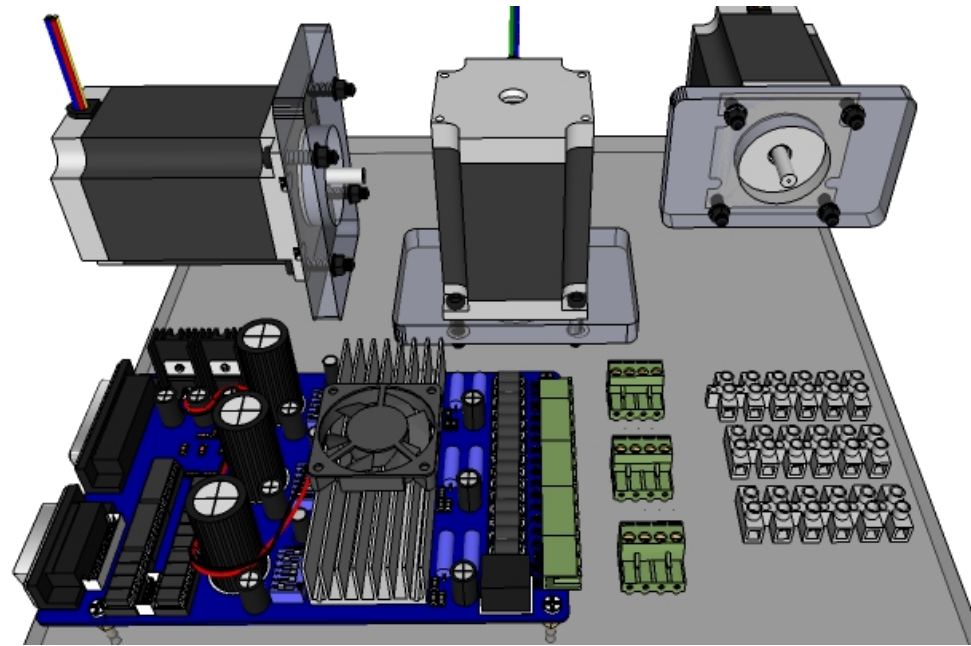
Wire Converter/Fan

Mach3 EStop/Limits

Mach3 Pins/Ports JKB

Parts Required

Supplied Parts



3 x Mounted Stepper motors (motors don't have to mounted if your only testing your system)

1 x Mounted TB6560 driver board

2 x Rail connector (pictured - pre-cut in to 6 connector pieces)

3 x Terminal block 4 wire

Parts to be sourced

? x Meters of 4 Core wire/cable

You will require enough cable to complete 3 runs from the electronics enclosure to each of the stepper motors on your machine. Contrary to previous instructions, it is **not recommended** that you use 6 core (or more) cable with the intention of using the additional wires to run limit or home switches or other sensors. This is not recommended as the higher current from the stepper motor wires may cause noise in the limit circuit generating false limit/home triggers. It is fine to run additional

core wiring for the purpose of powering pumps, fans, lighting, etc.. (Please note: if you find any references to running 6 core wire for the purposes of limit switches as well. please disregard)

6 x 3mm Screws (self tapping) to pass through the 8mm mount of Rail terminal and suitable for your machine material.

Recommended tools

Wire stripper

Wire cutter

Flat head screwdriver (small)

Philips head screwdriver (small)

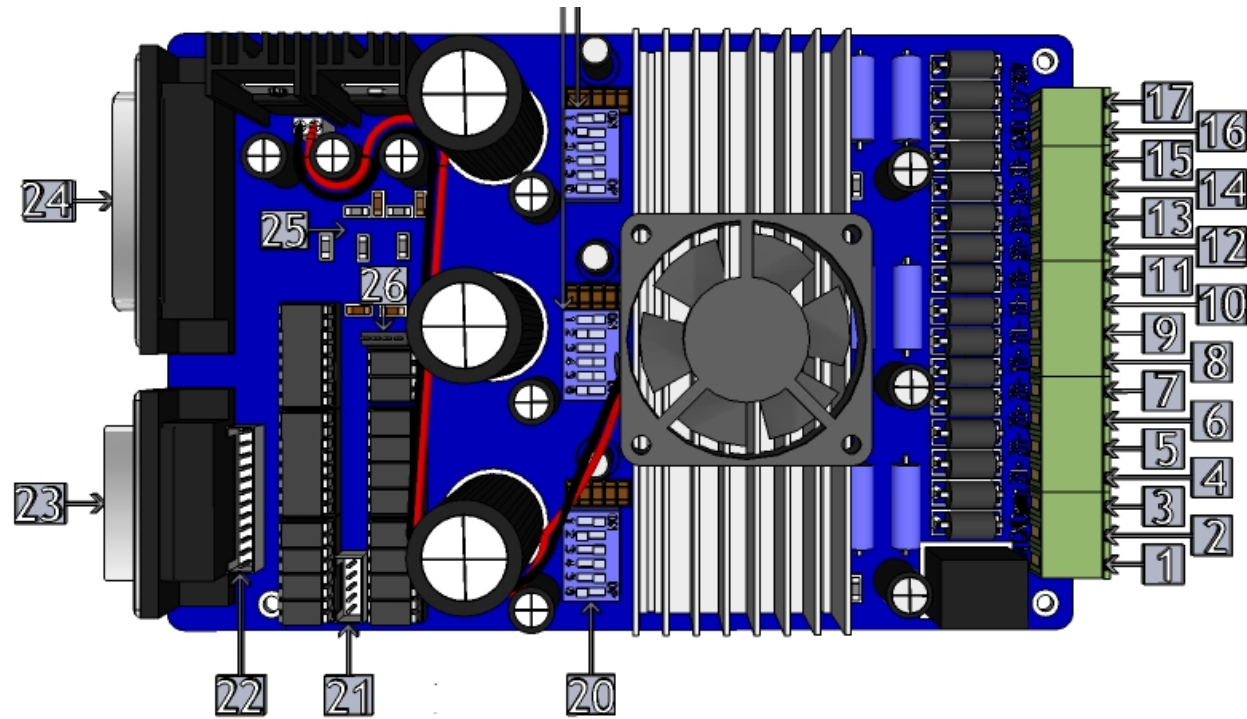
Craft knife or Stanley knife

3mm Drill bit suitable for your machine material

Electric drill

Parts Overview

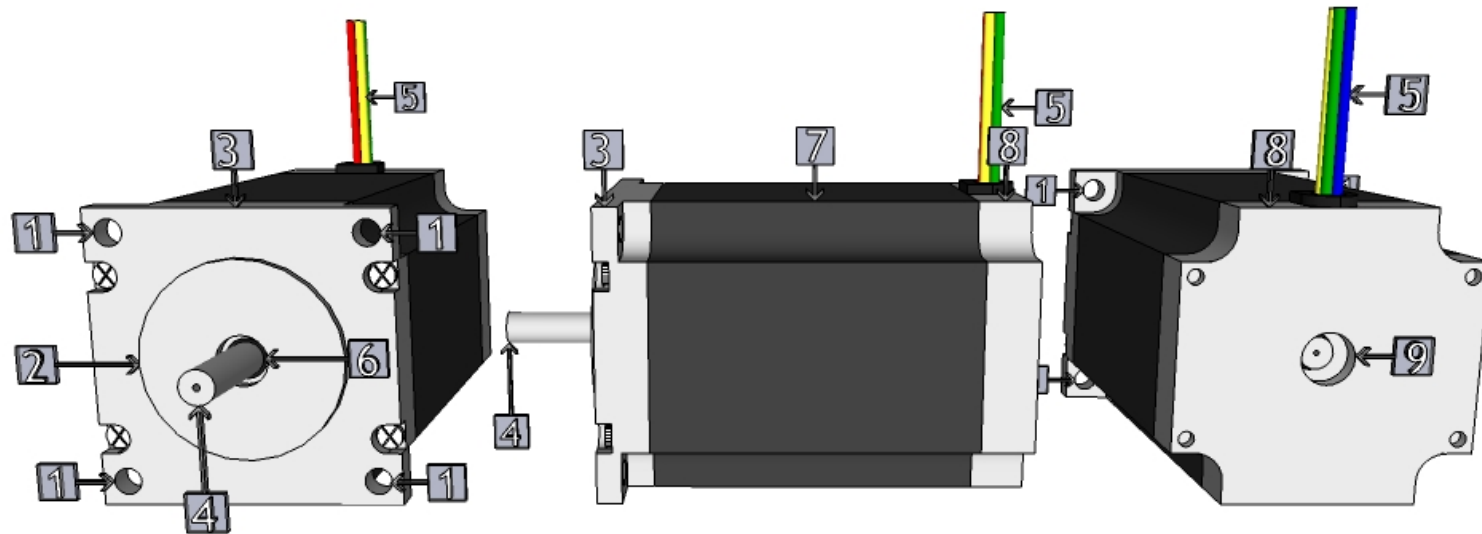
TB6560 Driver board



1. Pin 1 - Relay 12/36v DC + in
2. Pin 2 - 12/36v DC -
3. Pin 3 - Relay 12/36v DC + out
4. Pin 4 - Z Axis A+ out
5. Pin 5 - Z Axis A- out
6. Pin 6 - Z Axis B+ out
7. Pin 7 - Z Axis B- out
8. Pin 8 - Y Axis A+ out
9. Pin 9 - Y Axis A- out
10. Pin 10 - Y Axis B+ out
11. Pin 11 - Y Axis B- out
12. Pin 12 - X Axis A+ out
13. Pin 13 - X Axis A- out
14. Pin 14 - X Axis B+ out
15. Pin 15 - X Axis B- out
16. Pin 16 - 12/36v DC - in
17. Pin 17 - 12/36v DC + in
18. Dipswitch bank 1 - X axis setting
 1. SW1 - Current setting

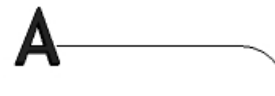
1. SW1 - Current setting
2. SW2 - Current setting
3. SW3 - Decay mode setting
4. SW4 - Decay mode setting
5. SW5 - Microstep Setting
6. SW6 - Microstep Setting
19. Dipswitch bank 2 - Y axis setting
 1. As per bank 1
20. Dipswitch bank 3 - Z axis setting
 1. As per bank 1
21. Emergency stop and limit switch connector
 1. Pin 1 - X Limit (configurable)
 2. Pin 2 - Y Limit (configurable)
 3. Pin 3 - X Limit (configurable)
 4. Pin 4 - E-Stop (configurable)
 5. Pin 5 - Ground (common ground for all pins)
22. Display panel connector
23. D-Sub 15 - Jog pendant Input connector
24. D-Sub 25 - Parallel cable/PC input connector
25. Axis activity LEDs
26. TBA
27. Cooling fan and Heat sink

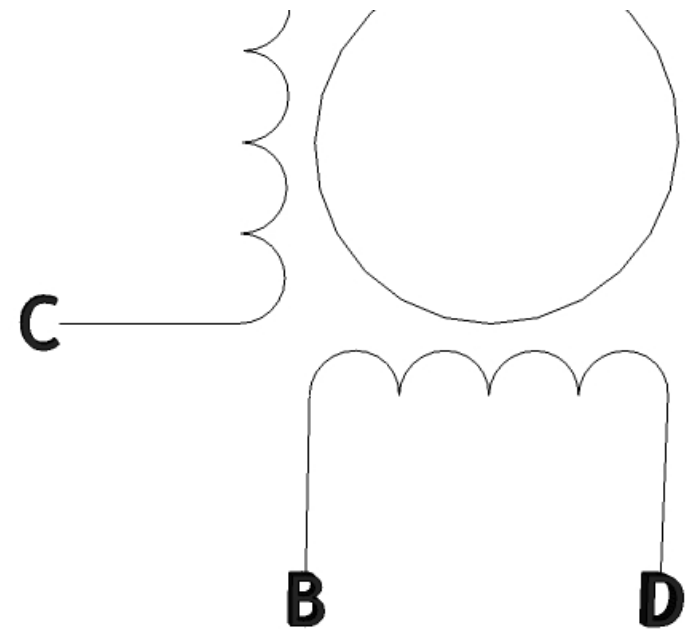
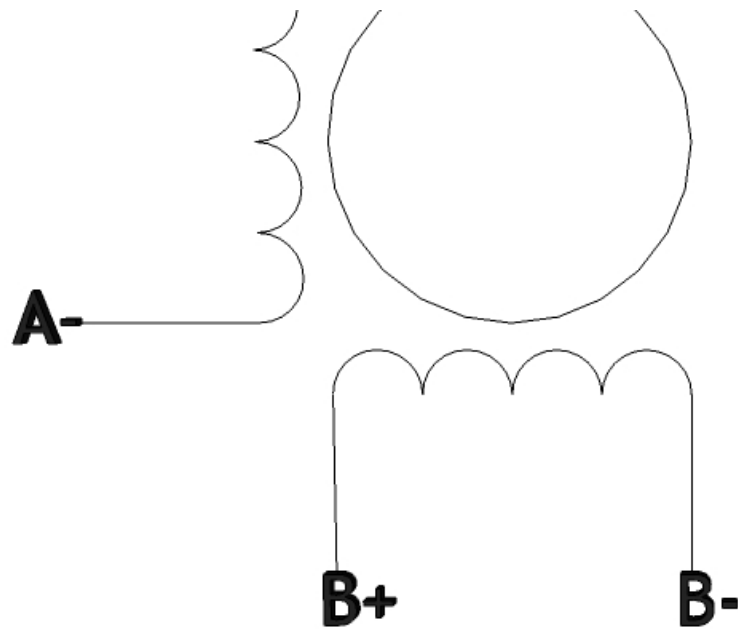
Stepper Motor



- 1. M5 Mounting points
- 2. Mounting flange
- 3. Mounting plate
- 4. Output shaft
- 5. Wiring loom
- 6. Front bearing
- 7. Coil housing
- 8. Rear plate/cover
- 9. Rear bearing

Stepper Motor Coil winding





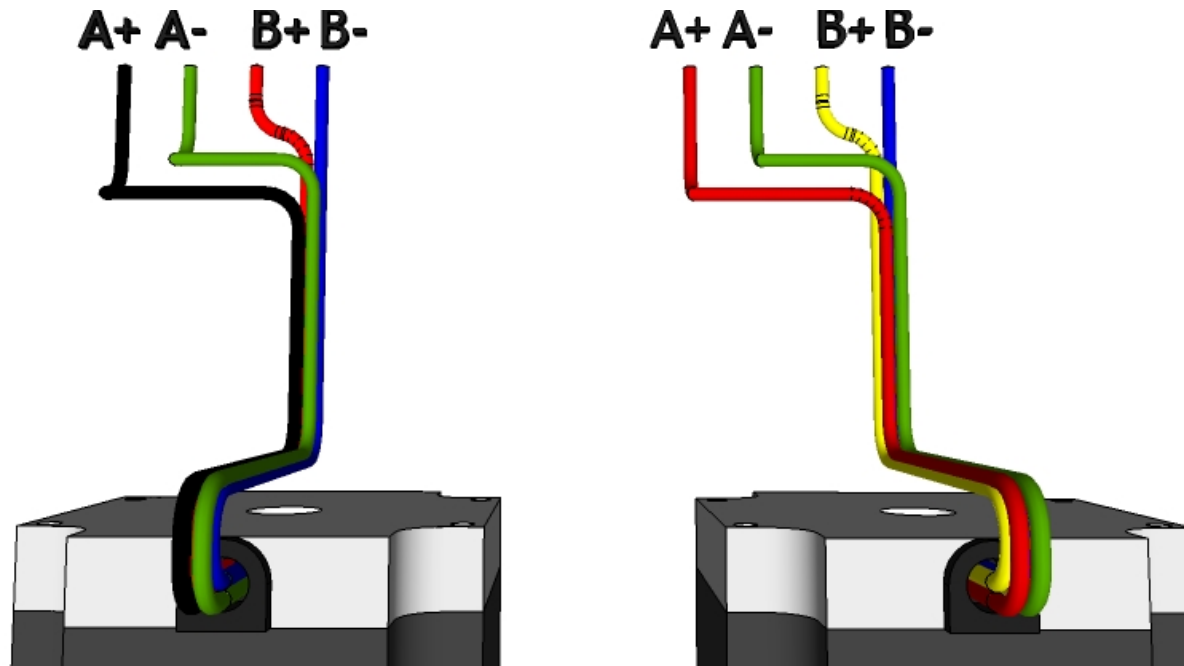
The Stepper motor coil winding is usually depicted in one of 2 ways in diagrams, either with the terminals marked with their polarity and coil or simply as a set of marked terminals. The diagrams correspond as follows:

1. "A+" or "A" indicates current in on coil 1
2. "A-" or "C" indicates current in out coil 1
3. "B+" or "B" indicates current in on coil 2
4. "B-" or "D" indicates current in out coil 2

Stepper motor wire colour codes

19.5 KG

21.0 KG



Depending on the version of your kit you will have either the 19.5Kg NEMA23 motors or the 21Kg NEMA23 motors. they can be told apart by the colouring of the wires:

19.5KG

- Black wire A+
- Green wire A-
- Red wire B+
- Blue wire B-

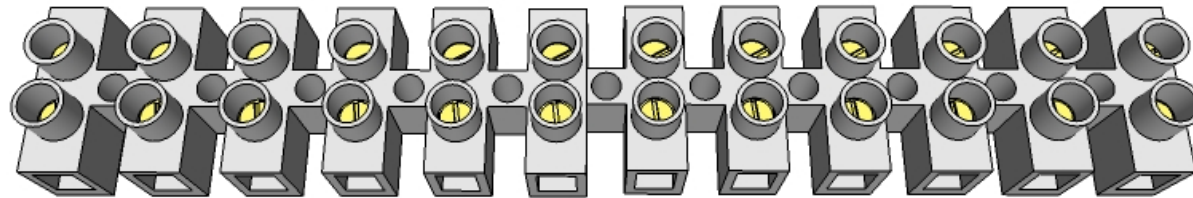
21.0KG

- Red wire A+
- Green wire A-
- Yellow wire B+
- Blue wire B-

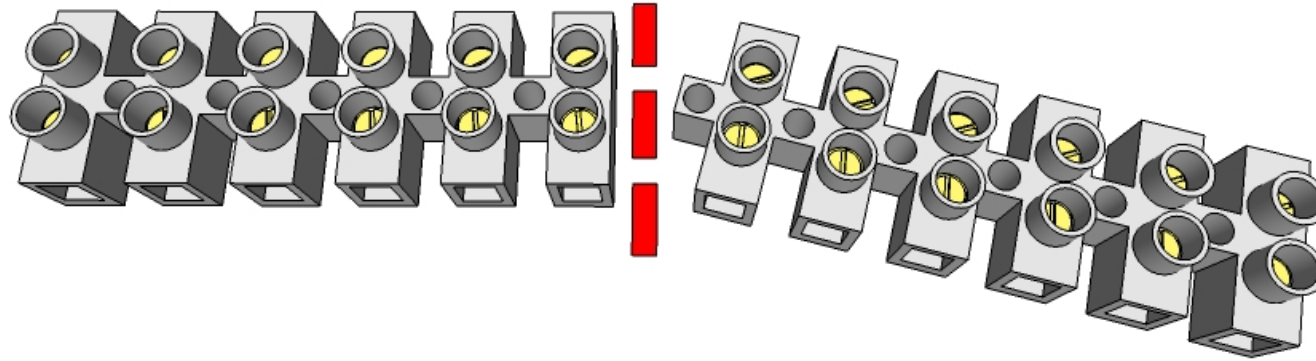
Assembly/Installation process

Make sure your power is not on and the lead is unplugged from the wall socket.

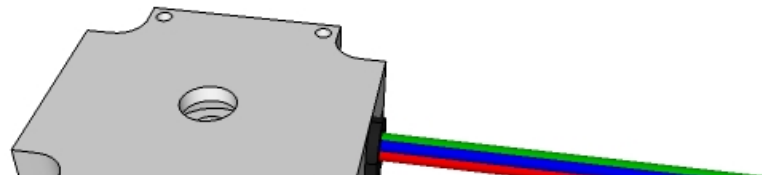
The rail connectors that have been supplied with your kit are 12 terminal, these will need to be halved to give you 6 terminal units. These can be used at either end of your cable but in the following examples it will be used at the motor end.

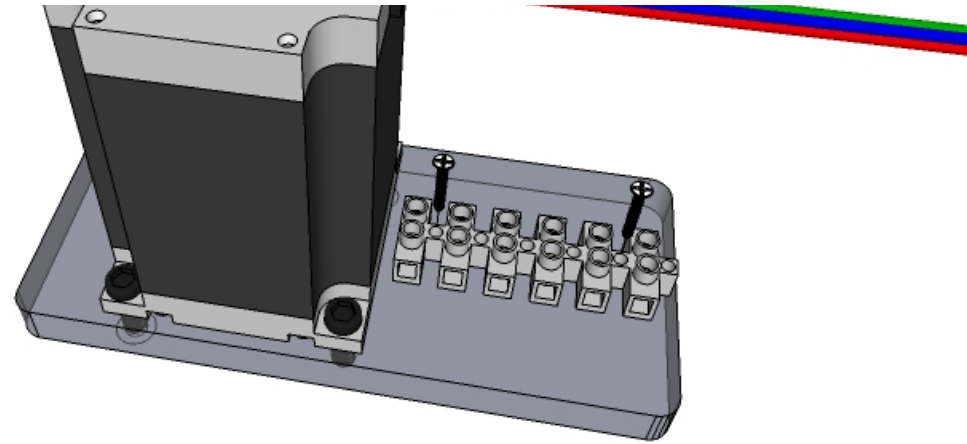


Count across 6 terminals (this should be the centre) and cut through the mounting hole with your craft knife. This will divide the rail connector in 2 and give you 2 x 6 terminal rail connectors. Repeat this with second Rail connector, for the installation you will need 3 of these 6 terminal connectors.

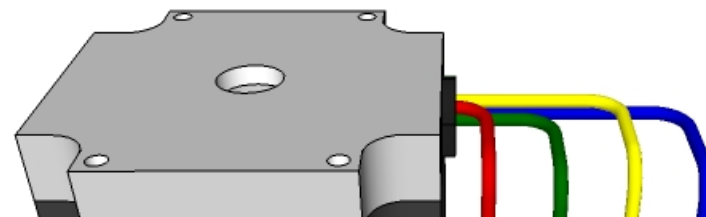


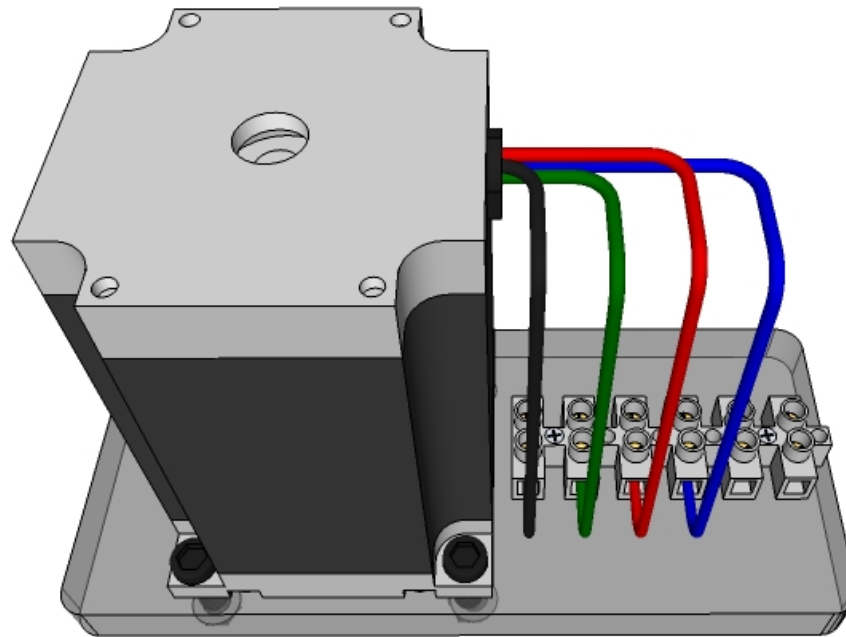
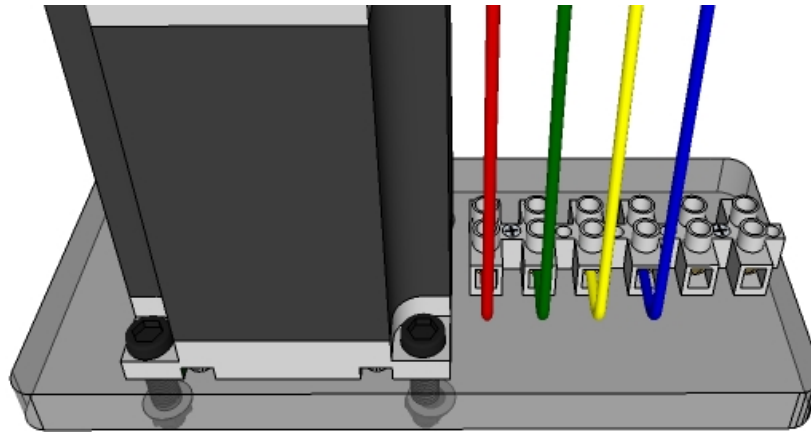
Select a position on the "X" axis Stepper motor mount or near the stepper motor appropriate for rail connector to be mounted keeping in mind you will need to access both sides of it. Use the Rail connector as a template and drill appropriate 3mm holes and then screw in the screws. The terminal block should be held down firmly.





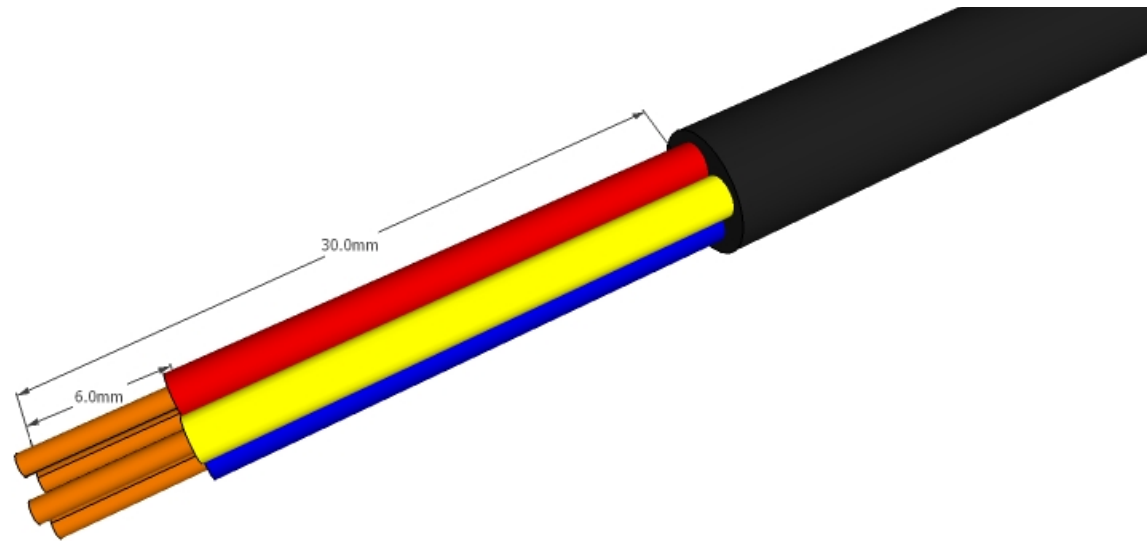
With a small Philips head screwdriver loosen off the first 4 screws in the terminal block. Run the wires From the Stepper motor in order (A+ A- B+ B-) to the rail terminal (using the correct order will assist in avoiding confusion latter on). As in previous steps you can trim the wires at the rail terminal (allowing 10mm extra) and strip back the shielding 5mm-6mm. Insert the wires in order and tighten the screws in the terminal block.





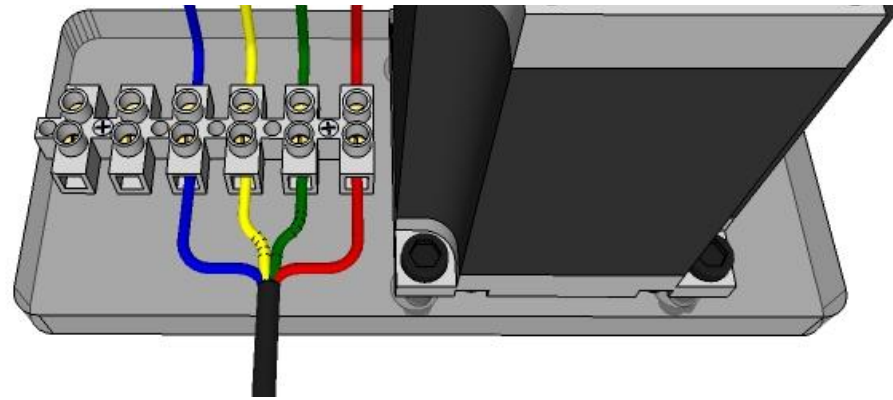
The next step is to create your cable run from the stepper motor back to your enclosure. Using your 4/6 core cable strip the protective cover back approximately 30mm and the strip each wire around 5mm - 6mm and give each wire a twist to bind all of the strands together.



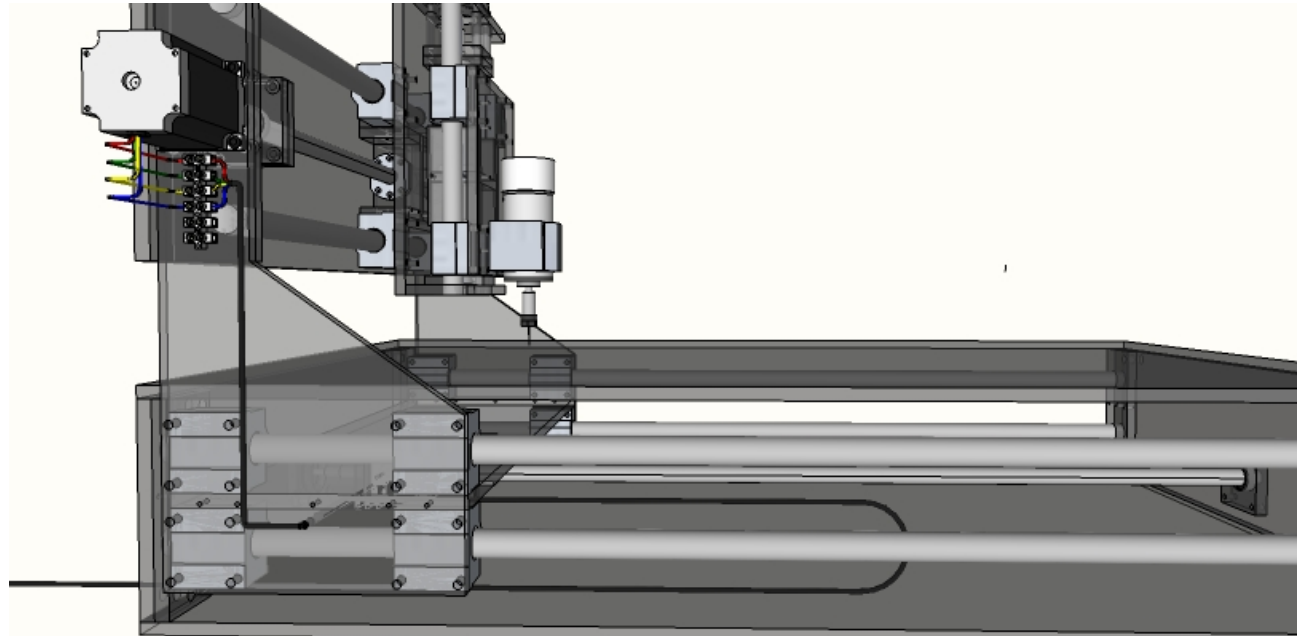


Loosen off the 4 screws on the opposite side of the rail connector that you just attached your stepper motor wires to. Insert the stripped wires of your cable in to the rail terminal. Where possible use a corresponding colour of wire, if this is not possible, note down the colour wire you used to connect to the corresponding wire on the stepper motor (you'll need to know this when wiring the TB6560). Tighten the screws on the rail connector.

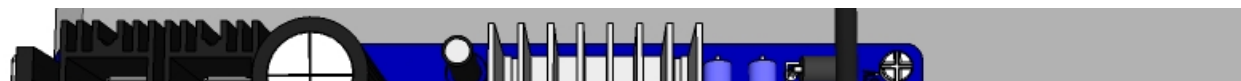


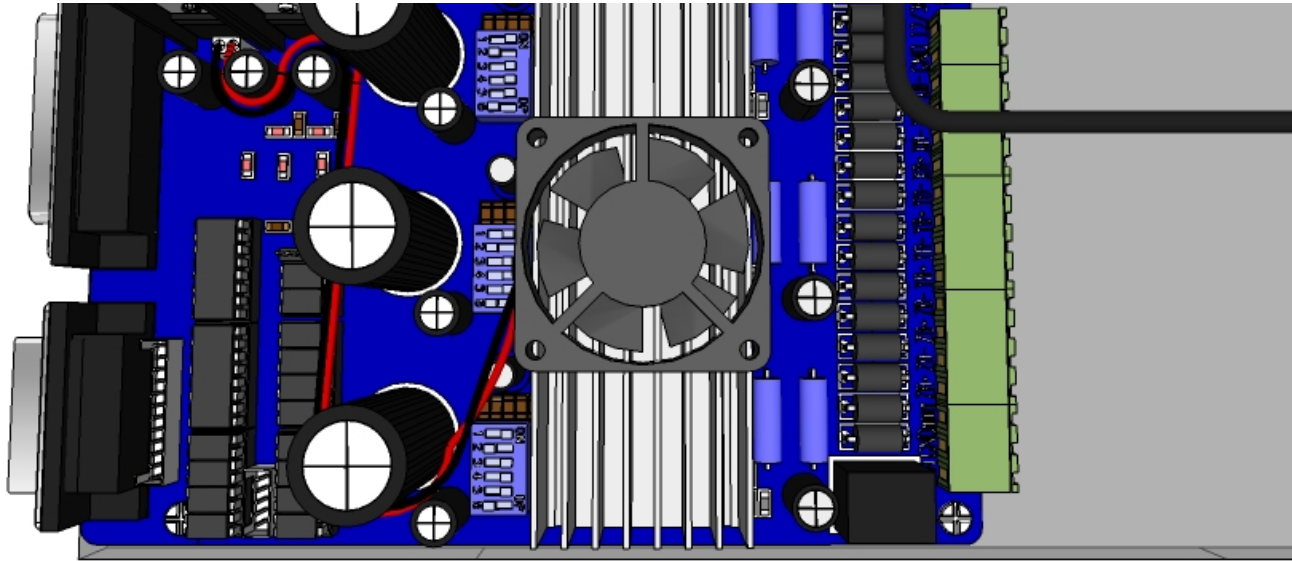


Run your 4/6 core wire back through your machine and to your enclosure.



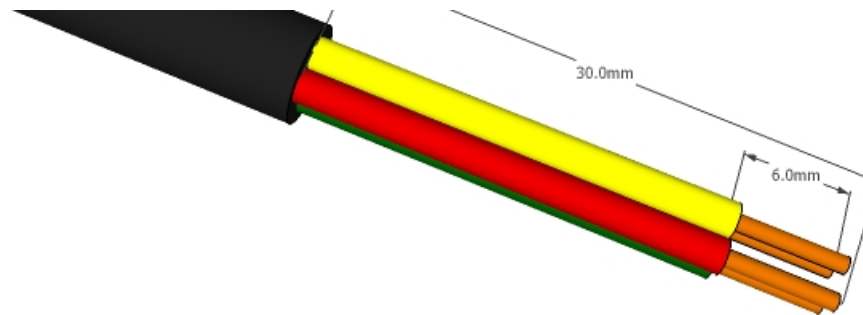
The cable should run to the front of output pins 12, 13, 14 and 15 (X axis output) on the TB6560 driver board. Using the method explained in previous steps allow approximately 20mm extra cable and cut. Keep the remaining cable for the Y and Z axis runs.





With this end of your 4/6 core cable strip the protective cover back approximately 30mm and the strip each wire around 5mm - 6mm and give each wire a twist to bind all of the strands together.





The next step is to connect the stripped wires to a 4 wire Terminal block. Use a small flat head screwdriver to loosen the 4 screws on top of the block, as you loosen the screws you might notice the terminals inside are not opening. This is because they are spring loaded, push down with screwdriver and you should see them open. Place the block in front of you with the screws facing upward, the connector pins should be pointing to your left and the open terminals to the right. If your 4/6 core cable did not have corresponding colours please use your notes to make sure the wires are connected correctly. Incorrect wiring can/will damage the TB6560 driver board.

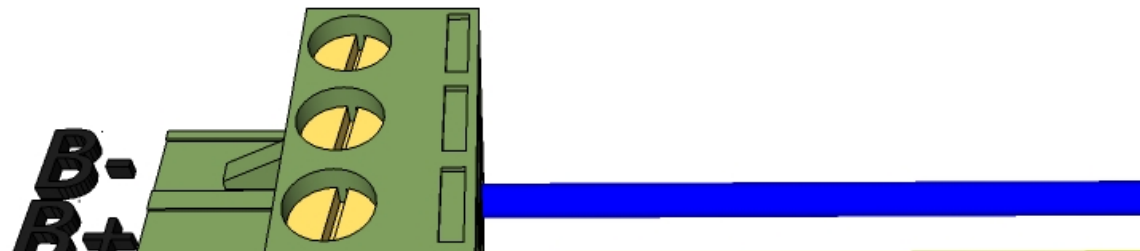
Insert the A+ wire from the Stepper motor in the terminal closest to you, it should line up with pin 12 (XA+) on the TB6560.

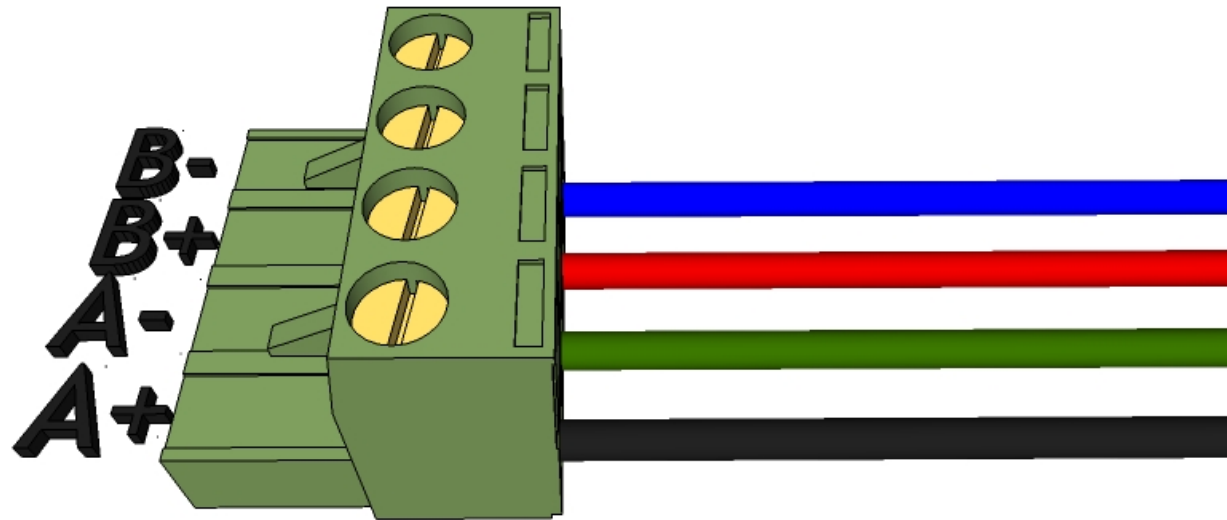
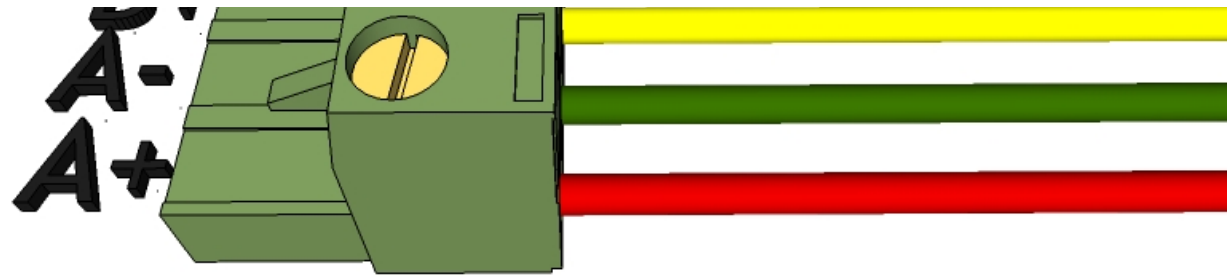
Now insert the A- wire to the second terminal, it should line up with pin 13 (XA-).

The B+ wire to the third terminal - pin 14 (XB+).

And the last wire, the B- to the furthest terminal which should line up with pin 15 (XB-) on the TB6560

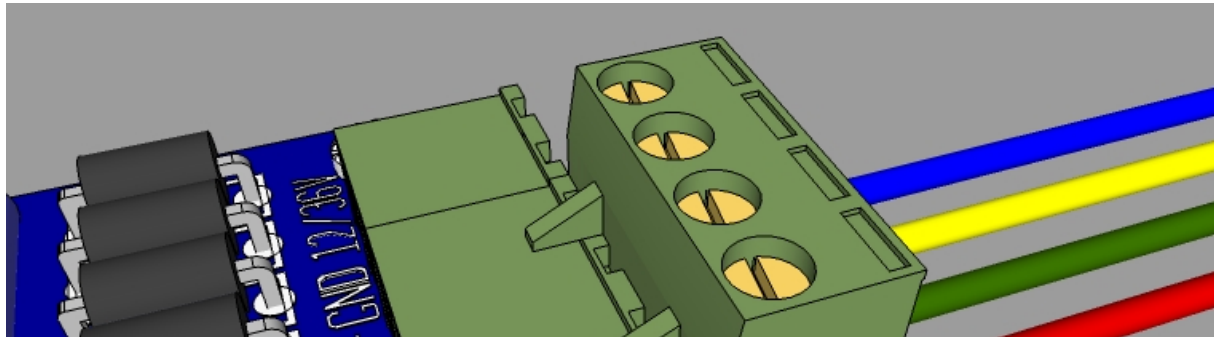
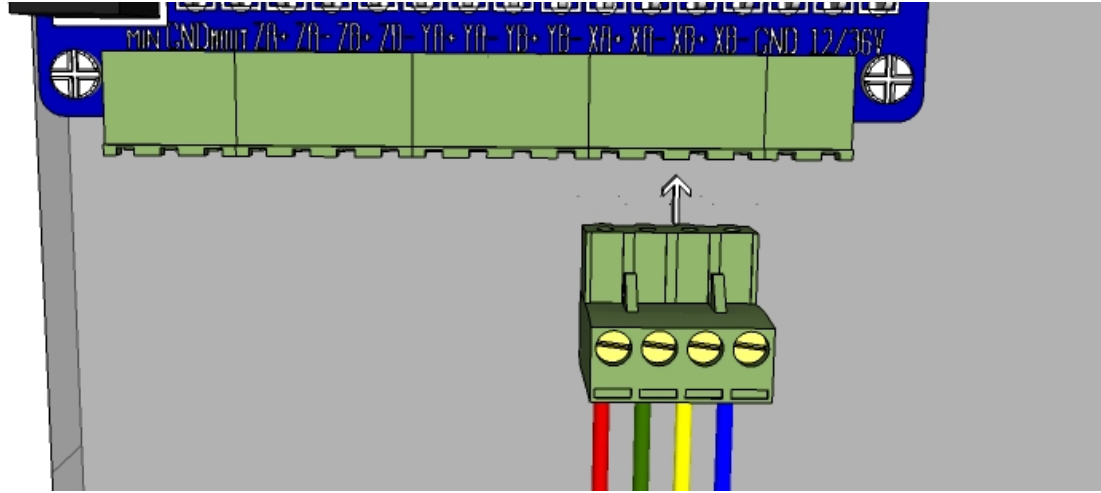
Tighten all the screw.

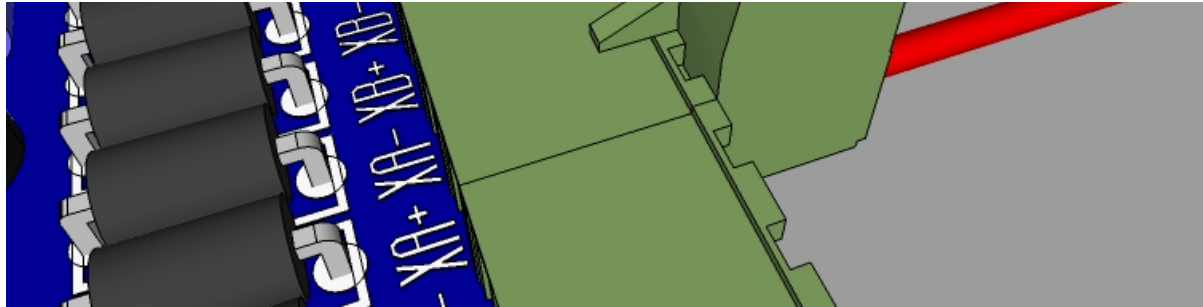




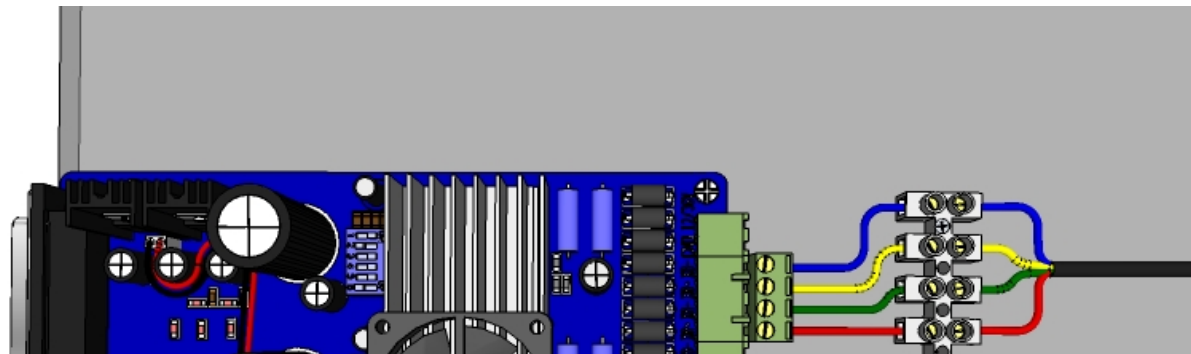
Now plug the Terminal block into pins 12 to 15 on the TB6560, they are labeled XA+, XA-, XB+, and XB-. Pinch the top of the connector and the underside of the board between your fingers as you insert the Terminal block, this is to stop you from pulling the connector away from the board as the fit might be tight. The small fins on the top of the Terminal go over the top of the connector.

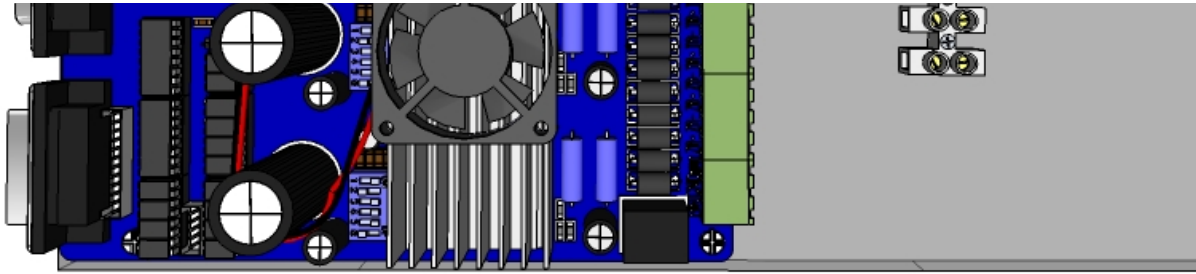






The Picture below shows the Rail terminal used at the enclosure end. It would look like it would be impractical to line them up side by side, and it would be where space is an issue, however you can stagger them. They can also be stacked, you'd just need longer screws. The down side to "stacked" is the screw underneath are no longer accessible and the stack has to be disassembled to get to them.





Now you have successfully wired the "X" its now time to repeat the same steps for "Y" and "Z" axis. The process is the same.

For the "Y" axis run:

The A+ wire from the stepper motor to pin 8 out (labeled YA+) on TB6560 driver board

The A- wire from the stepper motor to pin 9 out (labeled YA-) on TB6560 driver board

The B+ wire from the stepper motor to pin 10 out (labeled YB+) on TB6560 driver board

The B- wire from the stepper motor to pin 11 out (labeled YB-) on TB6560 driver board

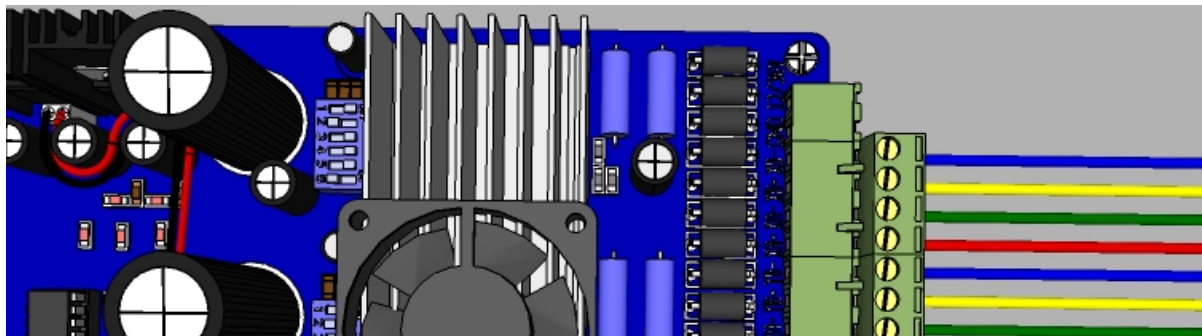
For the "Z" axis run:

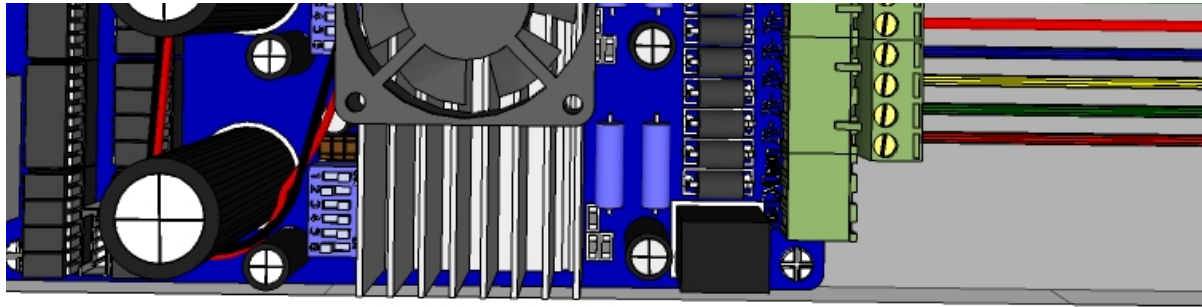
The A+ wire from the stepper motor to pin 4 out (labeled ZA+) on TB6560 driver board

The A- wire from the stepper motor to pin 5 out (labeled ZA-) on TB6560 driver board

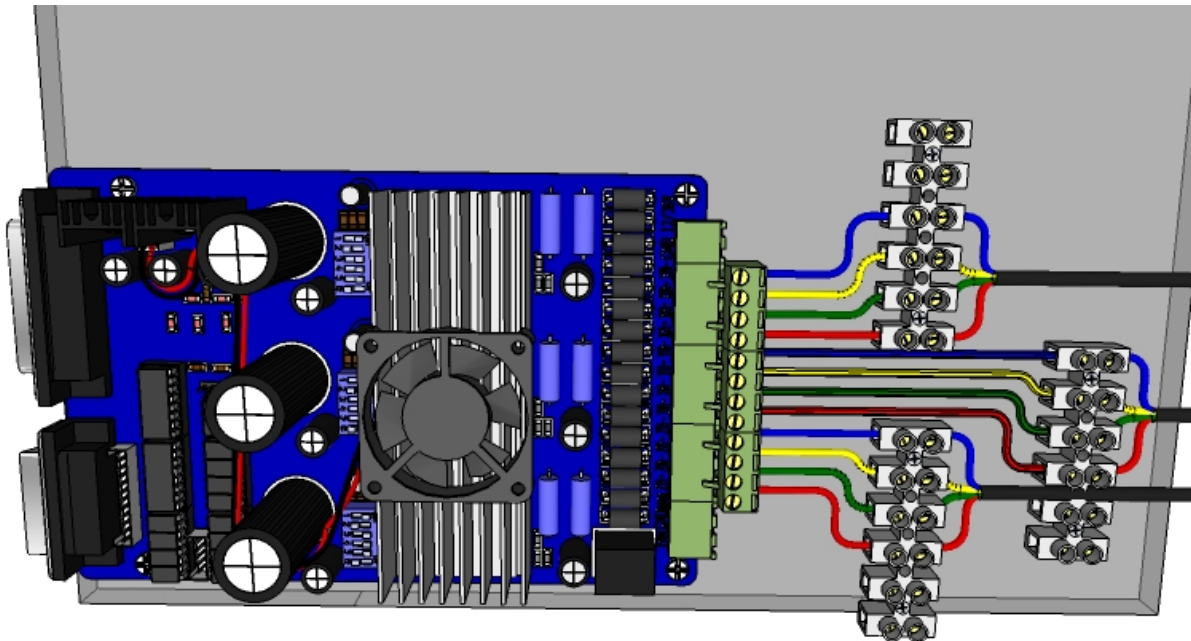
The B+ wire from the stepper motor to pin 6 out (labeled ZB+) on TB6560 driver board

The B- wire from the stepper motor to pin 7 out (labeled ZB-) on TB6560 driver board





Alternate using Rail connectors



At this point the machine is now wired to its minimum and it is capable of running your motors (without router control). If you wanted to jump ahead to configuring your software you could to test your motors. If not please continue mounting and wiring your equipment.

[Configuring software is not complete yet. Please click here to download manufactures instructions.](#)

Supplementary Images

Nil

Next Step

You are now ready to move onto the next step: TBA

[Home](#)

This site was last updated 04/11/15