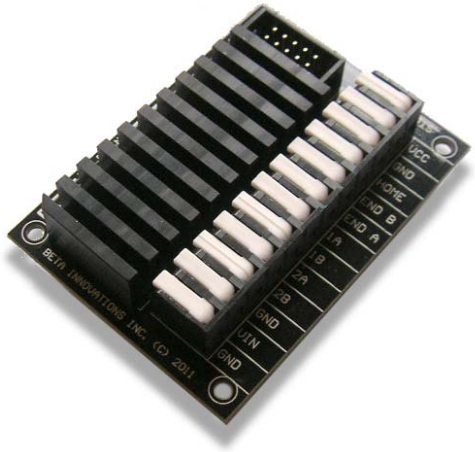
The STEP-MS driver card is designed to control a bipolar stepper motor with up to 2.5 A output current per coil.

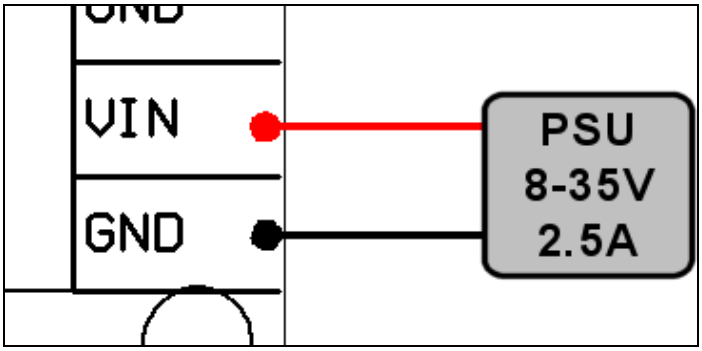


Features:

- Step and direction input control.
- Software selectable micro-stepping support for full-step, half-step, quarter-step, and sixteenth-step.
- Two end stops and one home index input.
- Software selectable maximum output current control up to 2.5 A per coil.
- Powered by the ElectronFlux (separate PSU required for stepper motor).
- Over-temperature thermal shutdown, under-voltage lockout, and crossover-current protection.

Connecting the STEP-MS card:

1. Connect your STEP-MS driver card to one of the *ST1-ST8* ports on the STEP-MS8 card using a 10 pin IDC cable.
2. Connect an external PSU to the VIN and GND pins for driving the stepper motor. Note that VIN must be between 8-35V DC.



CAUTION: Do not exceed 35V DC on VIN.

Connecting Limit Switches:

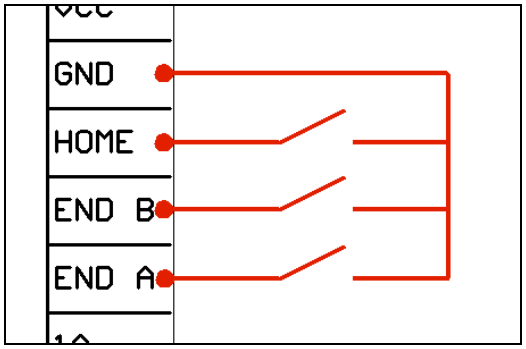
Limit switch inputs are active low and have a built-in pull-up. Leave unconnected if not required. If not used, be sure to deactivate this option for the specified channel in the Device Manager.

When a ground signal is detected on either of the *END* inputs, the driver will stop the motor. While the end signal remains active, the motor will only be allowed move in the reverse direction.

The home signal input is used to detect the zero or home position. This feature is typically only used on power-up to position the stepper motor to a predetermined position. This is automatic and all step and direction input signals to the driver card are ignored until such time as the homing signal is detected.

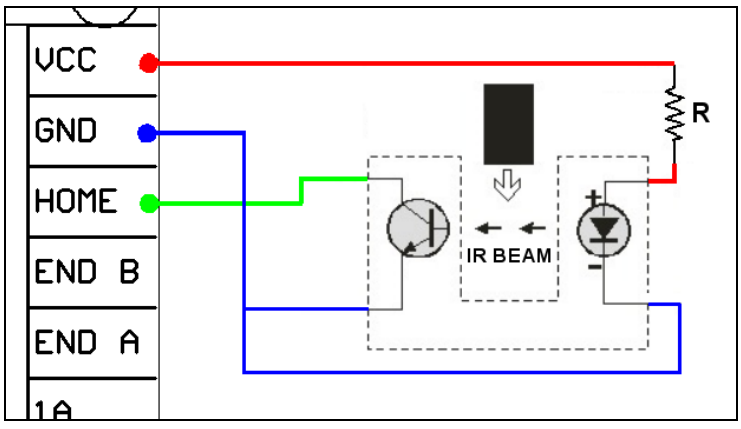
Both these features can be activated or deactivated through the Device Manager. Refer to the Device Manager help file for details.

Switches:



Photodiodes:

Photodiodes can be connected to any limit switch input as follows. Refer to Photodiode manufacturer's specs to determine the value of *R*.



Connecting Stepper Motors

Stepper motors come in a variety of configurations and sizes. There are three basic types of step motors: variable reluctance, permanent magnet, and hybrid. The hybrid motor offers the smallest step angle, followed by the permanent magnet motor and lastly the variable reluctance motor which has the largest step angle. Variable reluctance motors are not supported by the STEP-MS card.

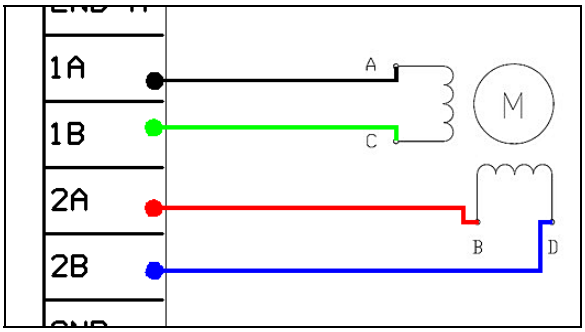
The following diagrams illustrate how to connect the most common motor types. Using the Device manager, configure all stepper mode channel settings prior to connecting the stepper motor to the driver card.

To avoid damaging your stepper motor, you want to avoid exceeding the rated *current*, which is different for every motor. The Device Manager stepper motor settings let you limit the maximum current, so as long as you set the limit below the rated current, you will be within spec for your motor, even if the voltage exceeds the rated voltage. The voltage rating is just the voltage at which each coil draws the rated current. By using a higher voltage along with active current limiting, the current is able to ramp up faster, which lets you achieve higher step rates than you could using the rated voltage.

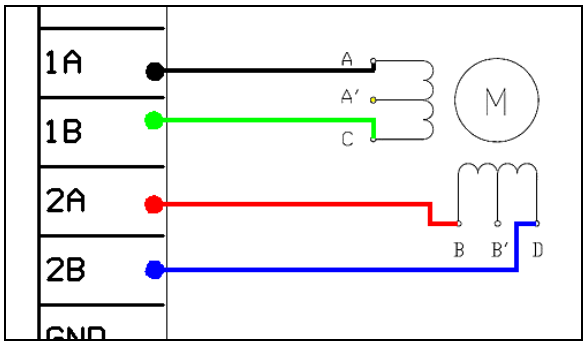
WARNING: **Excessive heating may occur** if the configuration values are set while the motor is connected to the driver card. Most motors cannot withstand temperatures above 100°C. Coil windings may fuse together and/or rotor shaft may seize if temperature exceeds manufacturer specified limits. Short-term current overload will in general, not harm most motors.

WARNING: Do not connect or disconnect a stepper motor while the driver card is powered. Doing so may damage the driver card.

4 Lead Stepper Motor Bipolar Connection:



6 Lead Stepper Motor Bipolar Connection:

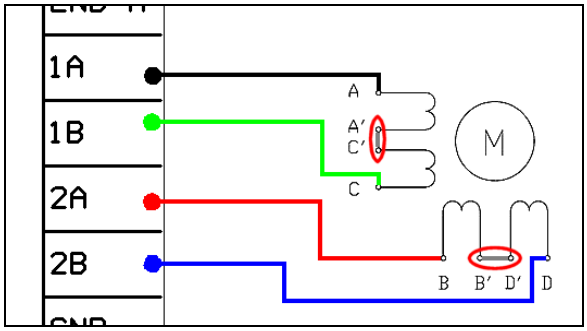


Leave middle leads unconnected.

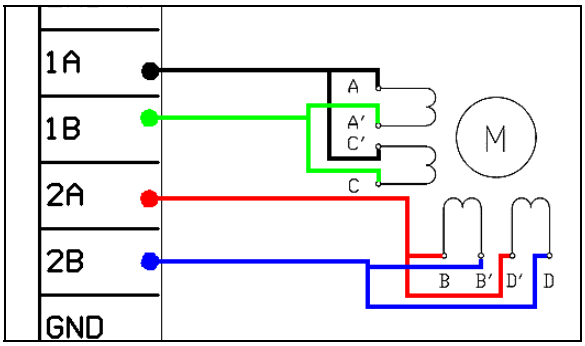
8 Lead Stepper Motor Bipolar Connection:

There are two possible methods of connecting 8 wire unipolar stepper motors, in series or in parallel.

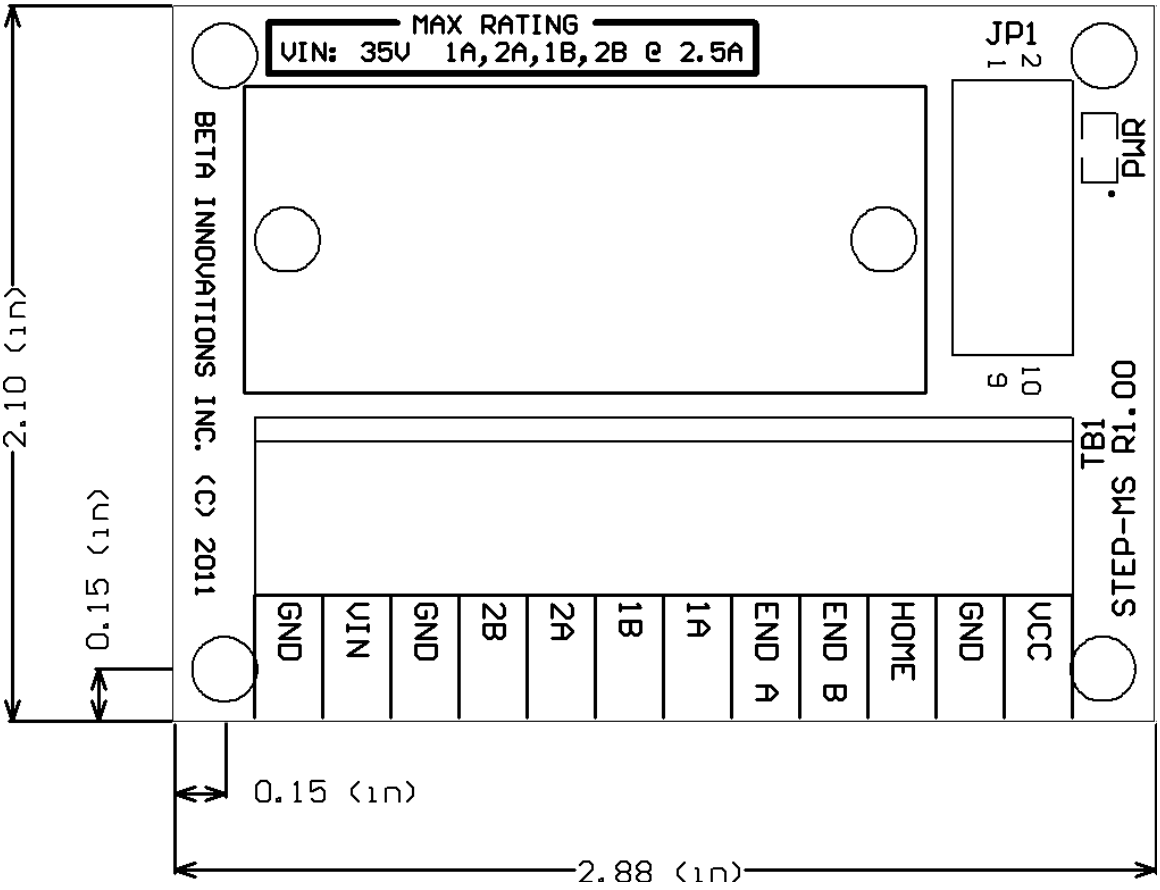
In the series method, the coils are connected as illustrated below. Be sure to connect the two middle leads between coil pairs to create a series connection. This method of connection results in lower coil current (rated coil current for a single winding), but looses torque at higher speeds.



In the parallel method, the coils are connected as illustrated below. This method of connection results in higher coil current (double the rated coil current for a single winding) and maintains torque at higher speeds. The drawback is the increase in current will result in more heat generated by the motor.



Mechanical Specifications:



Visit www.betainnovations.ca for the availability of expansion modules and accessories.