

Beefy H-Bridge Motor Driver

Application Reference

The Beefy H-Bridge Motor Driver is the latest variants in our high current DC Motor driver series. When used in intermittent low duty applications (e.g. Mobile Robots)

Quick Specifications:

Motor Supply Voltage: 7 to 35VDC

Load Current: >20A surge, 6A continuous (Note 1)

Control Input: Logic 5V

Driver Chip: Allegro A3941

Indicators: Two LED Fault Indicators

Wiring Example

An annotated wiring setup using a microcontroller (e.g. Arduino Uno) is shown in the figure below. For example, the arrow symbol labeled "Note 4" denotes more details explained in Note 4.

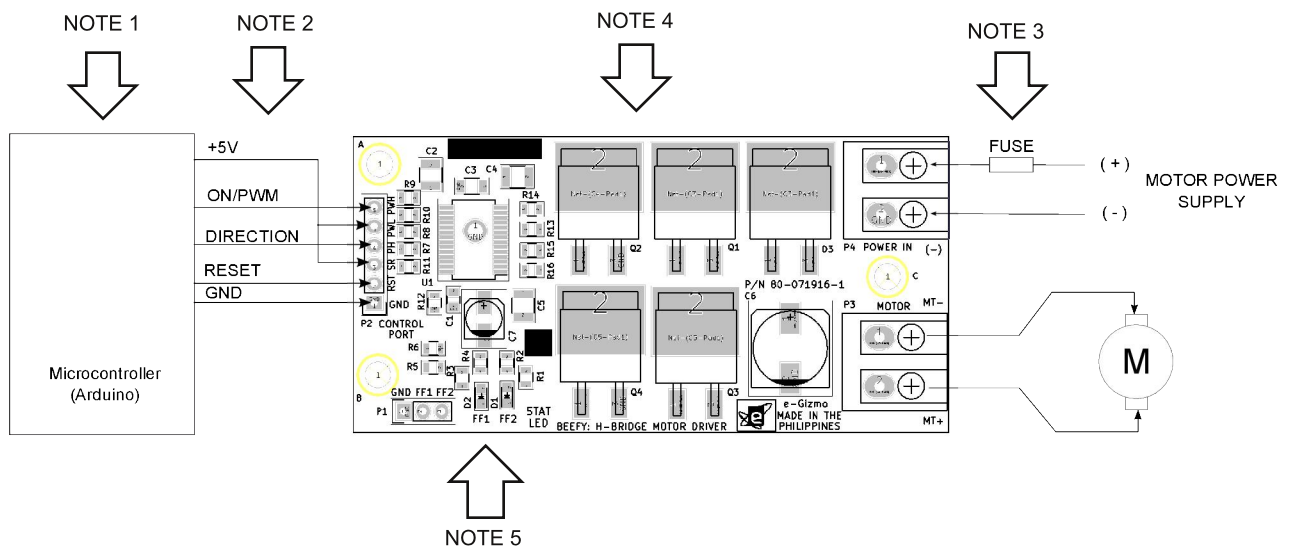


Figure 1. Beefy H-Bridge Motor Driver wiring diagram.

1. Microcontroller

Beefy Motor Driver will work with any microcontroller circuit operating with 5V I/O logic. This includes the gizDuino, Arduino, and Genuino ATMEGA based boards.

2. Control Inputs

The Beefy Motor Driver can be operated in a quite lot of configuration. However, if you are like most users who do not want to be bothered by many details and just want to get things done, the sample wiring as shown should suffice. The equivalent pin functions are described as follows:

2.1 ON/PWM - A 5V input will drive the motor to full power. PWM input will proportionately reduce output power (e.g. for speed control function).

2.2 DIRECTION - A logic low input will make the driver output power at the indicated polarity. Driving this input to logic high will reverse the driver output polarity (i.e. reverse the motor rotation).

2.3 RESET - A logic low at the RESET input will shutdown the Motor Driver. This should be kept at logic high during normal operation.

2.4 SR pin has significance while the ON/PWM pin is driven low. In this wiring example, SR pin is permanently tied to +5V (logic High). This keeps a pair of MOSFET conducting when the ON/PWM pin is in the LOW state. This, in effect, provides some braking action, allowing for tighter control of the motor speed. Wire the SR pin to logic low if you want the motor to coast instead.

Here is a short list of advantages and disadvantages of wiring SR = Logic High (Slow Decay mode).

Advantages:

- Better speed control.

- Higher torque at low duty PWM input (low motor speed)

Disadvantages:

- Draws more power from the motor supply when motor is lightly loaded.

- Driver tends to run hotter at light motor load because of the additional energy it dissipates as a consequence of braking.

For a more detailed description of the pin functions, please consult the A3941 datasheet.

3. Motor Power

The Beefy Motor Driver can work with motor supply voltages ranging from 7V up to 35VDC.

3.1 Use a power source with volt-amp rating sufficient to run your motor at the desired output power.

3.2 Use wires of sufficient size and with in-line fuse of suitable amperage to connect with your motor power source.

4. Usage Precautions

The Beefy motor driver must be installed in locations where there is unrestricted air movements. Mounting it with the pcb edge up will be advantageous, especially if you are to operate the driver with hefty currents for an extended period of time.

The Beefy Motor Driver can handle fairly large amount of current. For example, it can conduct currents in excess of 15 ampere when operated intermittently, such as moving and stopping a robot. It can survive

Because of the absence of heatsink, however, it should not be operated continuously ON with currents in excess of 6A (@100% PWM duty cycle input). Otherwise, permanent damage due to overheating may occur. Installing a cooling fan will allow you to operate it continuously with drive currents in excess of 10A.

FF1	FF2	STATUS
ON	ON	Normal Operation
ON	OFF	Shorted load
OFF	ON	Chip over temperature
OFF	OFF	V5,VREG,Vbootstrap undervoltage

[illegible]

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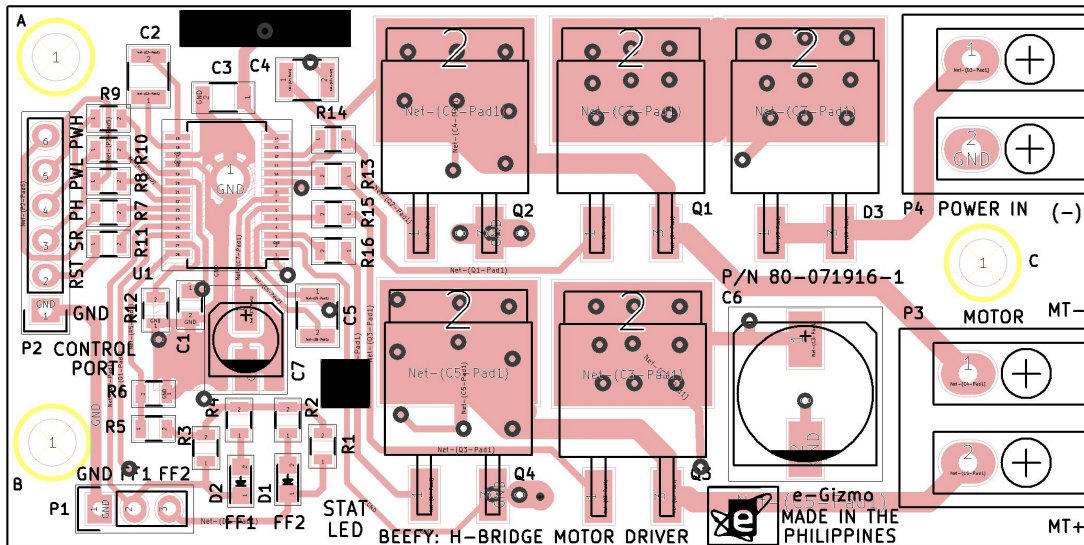


Figure 3. PCB Guide with top layer track pattern.

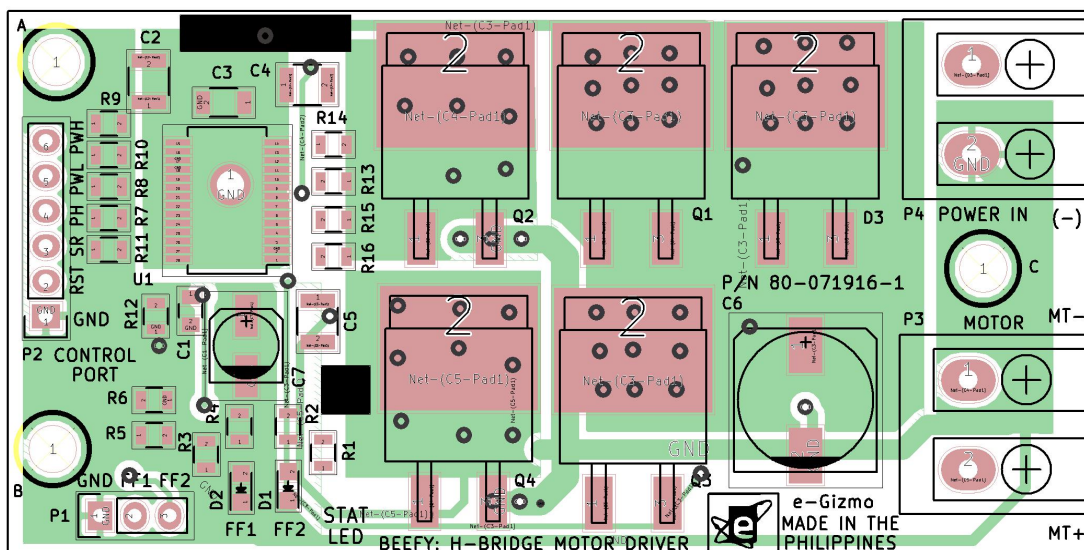


Figure 4. PCB Guide with bottom layer track pattern.