



Particle Photon 8 Channel Relay Shield User Manual

Description

The Particle Photon 8 Channel Relay Shield was developed so that anyone could dive right into the IoT world. It can be used to control lights, motors, solenoids, and many other electrical items. The Blynk App can be used to create an app for easy control right on your phone. It has 8 relays on board that are controlled independently by the digital I/O pins that are used to switch the relays on or off based on the state of the digital pin (HIGH or LOW). **Table 1** below shows which digital pin is connected to each relay. It is also labeled on board between the 3-position screw terminal and the relay.

Relay #	Digital Pin #
1	D1
2	D0
3	D3
4	D2
5	D4
6	D5
7	D7
8	D6

Table 1. Relay control pinout.

The remaining analog I/O pins are broken out to screw terminal blocks for easy access. Each relay has its own 3-position screw terminal labeled, NO, C, or NC, for Normally Open, Common, or Normally Closed respectively. Each relays contact current rating is 10 amps and switching voltage rating is 277 Vac and 24Vdc max.

Power can be supplied to the board by either the 2.1mm barrel jack connector that is found on the Arduino Uno, or the 2-position screw terminal. The recommended supply voltage is 12Vdc for the board, with an amperage of at least 3 amps. The relay shield board can be seen in **Figure 1**.

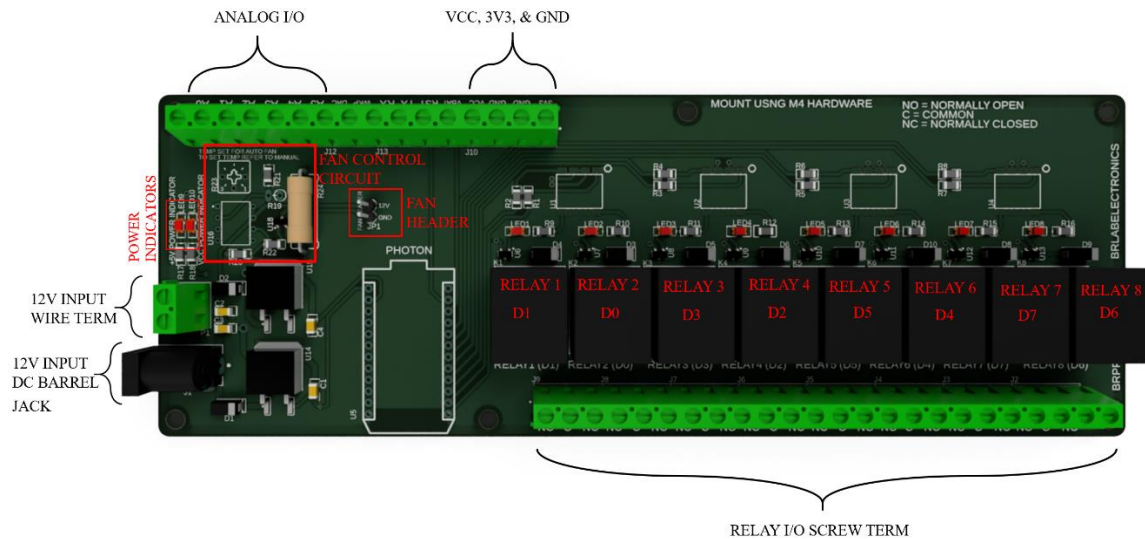


Figure 1: Relay Shield breakouts.

Applications

- DIY Electronics
- Home Automation
- IoT Applications
- IoT Prototyping
- Prototyping
- Farming Automation
- Gardening Automation
- Aquaculture Automation
- Lighting Automation

Specifications

- Fully Assembled
- Input Voltage: 12Vdc
- Barrel Jack or Screw Terminal Power Supply Input Connections
- 8 Channel Relay Control (isolated optocoupler control, protects the Photon)
- Temperature Controlled Automatic Fan – Addon option
 - Fan must be 2 wire
 - Fan needs to be rated for 200mA
 - A fan can also be purchased in the store as an addon
- Sleek Black Finish
- Leadfree HASL Surface Finish



Temperature Controlled Automatic Fan Circuit Option

This option has all of the above specifications as well as a temperature controlled fan circuit to improve cooling when the relay shield is being used under heavy load or operating in a high temperature environment. Temperature is measured using a 10K NTC thermistor. Use the steps below to set the temperature at which the fan will turn on at.

Equipment needed:

- Multimeter with probes
- Phillips head screw driver
- Flat head screw driver

Step 1:

Select the temperature from **Table 2** below that the fan needs to turn on at for your application. If the relay shield is to be placed inside an enclosure, a high ambient environment, or the relays will be under heavy load for long periods of time it is recommended to select a lower setpoint temperature to start cooling sooner.

Temperature (°C)	Voltage
60	1.77
55	1.99
50	2.18
47	2.34
44	2.49
41	2.63
39	2.75
37	2.86
35	2.96
33	3.05
32	3.14
30	3.21

Table 2. Temperature versus setpoint voltage.

Step 2:

With a selected temperature the trimmer potentiometer (pot) output needs to be set to the corresponding voltage. **Figure 2** and **Figure 3** below shows where the trimmer pot and opamp is located and where connections need to be made to set the trimmer pot voltage. The positive probe needs to land on pin number 3 of the opamp and the negative probe needs to be placed on any ground (GND) screw terminal position.

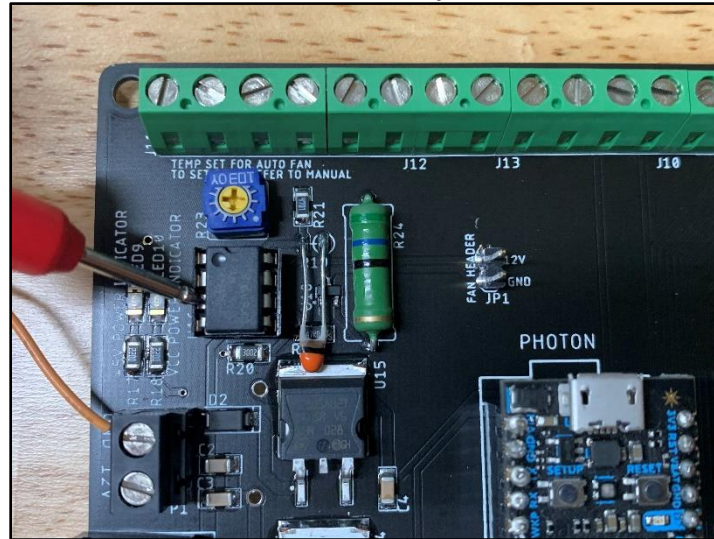


Figure 2: Setting the voltage on the trimmer pot.

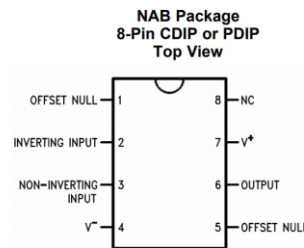


Figure 3: Pin locations on opamp.

Step 3:

With the probes in position use the phillips head screwdriver to turn the trimmer pot clockwise to turn the voltage up and turn it counterclockwise to turn the voltage down till the multimeter reads out the voltage selected back in step 1. Now the fan will turn on at the desired setpoint temperature.

Fan Option

There is a fan option available for purchase. A fan mount can be purchased with it or it can be mounted to the enclosure. If you did not purchase the fan circuit addon feature it is recommended to purchase the heatsink addon to provide some passive cooling to the voltage regulator.



Fan Specification:

- Fan manufacturer: CUI Devices
- Fan Size: Square 60mm
- Fan Thickness: 15mm
- Fan Airflow: 30.4 CFM
- Fan Voltage: 12Vdc
- Fan Power Rating: 213 mA
- 2 wire leads

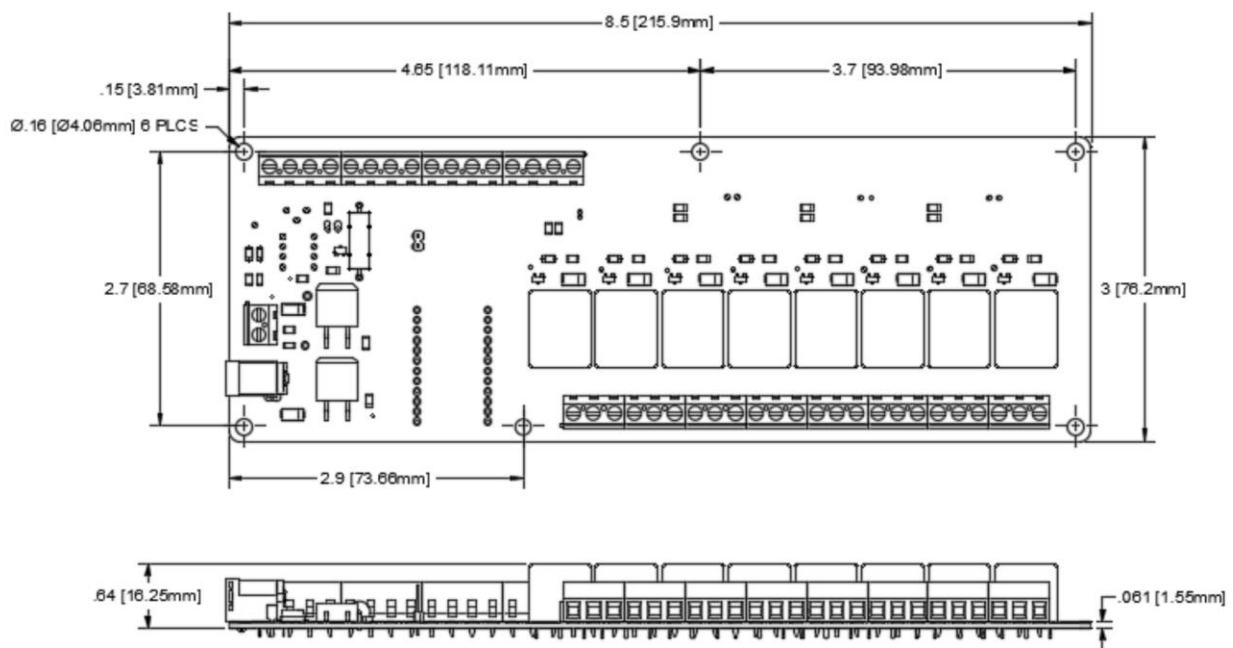
Heat Sink Option

This option adds a heatsink to the voltage regulator that supplies the 5V plane on the board. This plane provides power to the relays and fan controller. The heatsink will passively help keep the voltage regulator cool by conducting the heat and passing it the environment. Pairing the heatsink with a fan will greatly improve the cooling performance of the heat sink and extend the life of the voltage regulator.

Note: It is highly recommended that if all the relays will be on for an extended period of time that cooling be provided to the board to avoid overheating and damaging the power supply circuit. This can be done by ordering the cooling fan control circuit version, heat sink, and fan. Or supply your own provisions for keeping the board cool.

Dimensional Specifications

Dimensions are in inches and in millimeters.





Source Code

Source code can be found here:

Coming soon.

Revision Changes

V00 – Initial Release

Contact Info

For comments or concerns feel free to send them to brlabelectronics@gmail.com.

Please be sure to follow us on Instagram @brlabelectronics.

<https://www.instagram.com/brlabelectronics/>