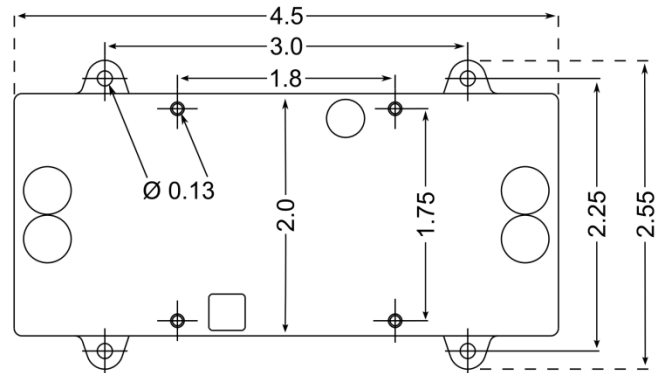
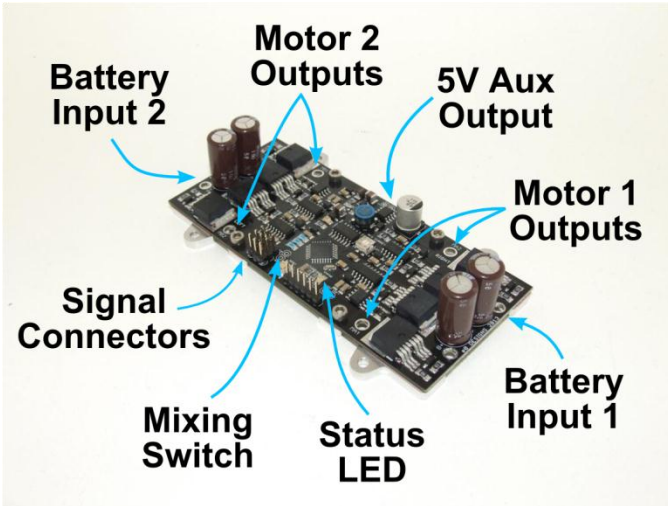
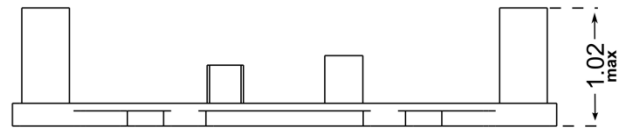


Overview

Mounting Dimensions



Dimensions in Inches



RageBridge is a motor controller that can drive 2 channels of DC motors from 2 R/C “servo” style PWM inputs, in forward and reverse with no delay.

RageBridge features optional channel mixing, 3rd channel direction reversal (“invert”) input, stick travel calibration, signal-loss failsafe, synchronous rectification with regenerative braking, constant-current output mode, and an isolated heat sink plate.

Specifications

Voltage Input Range	12 – 36v nominal 8 – 50v absolute limits
Continuous Current	30A per channel @ 50% duty cycle, 25°C ambient
Maximum Current	Up to 90A per channel Constant-current mode limited
Dimensions	4.5” x 2” x 0.8” Board only 4.5” x 2.55” x 1.0” With heat sink
Weight	3.5oz without wires
Inputs	2x R/C servo for drive signals <i>500us to 2500us limits</i> <i>1100us to 1900us default</i> 1x R/C servo for invert control 1x Mixing switch header
Logic Power	5V @ 150mA maximum
Heat Management	Isolated heat spreader plate

Installation

RageBridge’s isolated heat spreader plate has four clearance holes for #4 screws (0.130 diameter). The heat spreader plate may be bolted directly to a metal chassis for better thermal performance.

RageBridge may also be mounted without the heat sink to minimize dimensions. The board itself has 4x #4-40 screws which may be untightened with a 3/32” hex wrench. Use the following guidelines for best results:

1. **Use nonconductive standoffs or spacers** to offset the board from the mounting surface.
2. **Insulate the underside** using electrical tape or brush-on insulation compound to prevent stray metal or wires from shorting.
3. **Do not enclose the board in tape, shrink tube, or sealed cases.** Doing so will negatively affect the thermal performance and reduce continuous current rating.

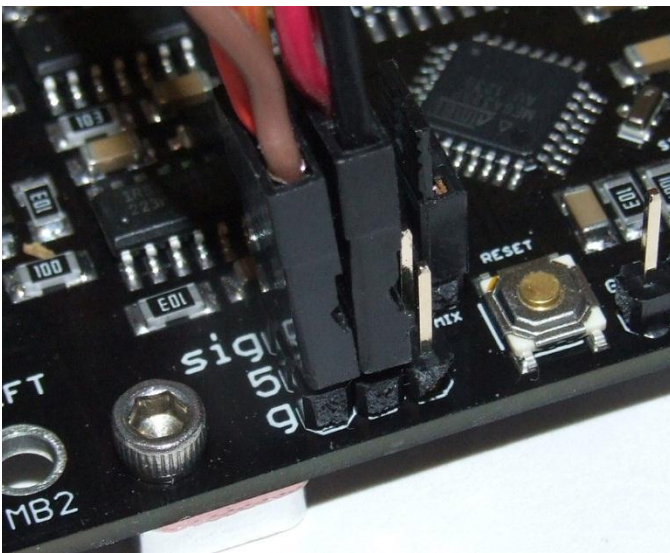
Signal Connection

The IN1, IN2, and IN3 pin headers accept standard 3-pin servo connectors. The ground wire must be oriented towards the outside of the board. It is generally black or brown.

Connect IN1 to channel 1 of your radio and IN2 to channel 2.

If invert control is needed, connect IN3 to a switch channel on your radio. Else, leave it unconnected.

The Mixing switch is enabled if the two MIX pins are connected via a jumper (not included). If it is disconnected, the channels are independent.



*Example 2 channel connection
with mixing header (not included) installed*

Range and Direction

By default, signal pulse widths greater than 1500us is associated with motor terminals 1 (MA1 and MB1) being more positive in voltage.

Invert status is active if the pulse width on IN3 is greater than 1500us.

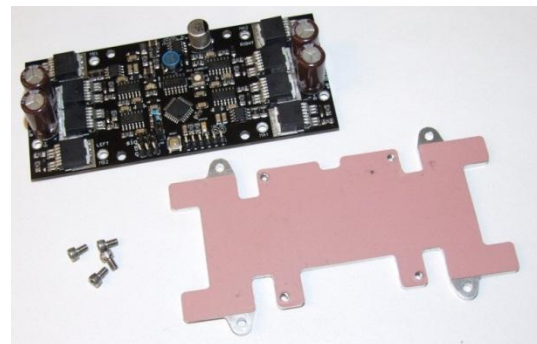
Power Connection

Warning: Do not use RageBridge with only a power supply. The regenerative nature of RageBridge will cause the motor's kinetic energy to be directed into the power supply upon stopping and can cause high voltage spikes and damage to both supply and controller. A battery must be placed between the supply and controller to absorb this energy if a supply must be used.

Power connections to RageBridge are made using solder terminal holes on the circuit board.

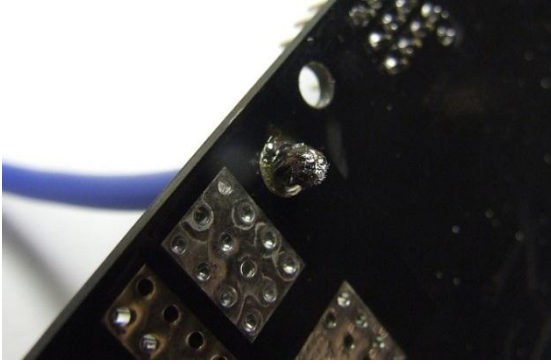
Use 12 to 16 gauge wire. 14 gauge is recommended.

The heat sink should be dismantled first for easiest access to the solder terminals. Use a 3/32" hex wrench to undo the four #4-40 screws mounting the board to the heat sink.

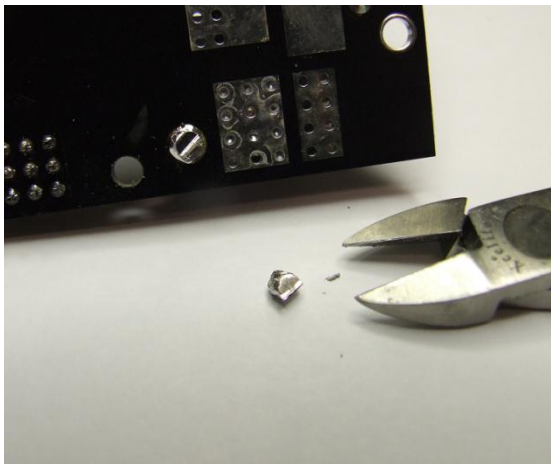


Both sets of B+ and B- terminals must be connected to power. The board derives logic power from the **right** side as viewed from above. The voltages **may** be different between sides provided neither exceeds the board's capabilities.

Twist and tin the wire prior to soldering them in the terminals. This prevents frayed wires from shorting neighboring components. Flush cut the resulting solder joint to minimize risk of causing shorts.



Example wire installation



Flush cutting the resulting joint to minimize shorting risk

Normal and Failsafe Behavior

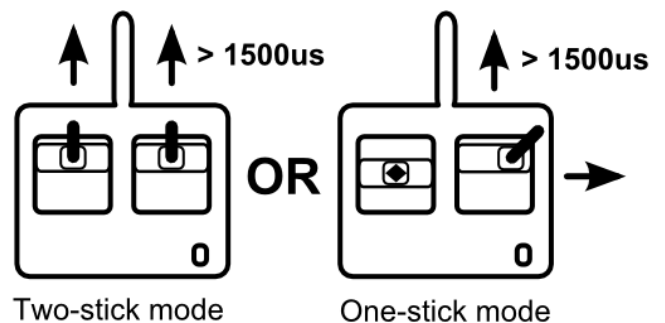
Under normal circumstances when the controller is receiving good signals, the **green LED** (status) will strobe every 1 second. The motor drivers are active and the default neutral behavior is braking.

If either IN1 or IN2 receive an invalid signal, the controller will enter failsafe mode within 1 second. The **green LED** will strobe rapidly, and the motors will coast freely.

If valid signal is received again, the controller will enter normal operation within 0.5 seconds

Stick Calibration

RageBridge's default pulse width range of 1100us – 1900us can be calibrated to better match your radio travels. Before beginning, we recommend that your radio be set up such that stick-up or stick-right is an **increasing** pulse width. This direction is associated with **forward**. **Disconnect all loads from the controller first, to prevent accidental movement.**



To calibrate the controller, use the following procedure:

1. Connect both IN1 and IN2 on the controller to your receiver. **Both channels must be calibrated at once.**
2. Power on your transmitter.
3. Power on the controller.
4. Apply full forward stick travels within 2 seconds.
5. Hold full forward stick travels for 5 seconds.
The **green LED** will light solid, indicating calibration mode is active.
6. Apply full reverse stick travels and hold for least 2 seconds
7. Release the stick to neutral.
8. Calibration will automatically exit after 2 seconds of neutral signal.
9. The **green LED** will blink rapidly for 1 second to indicate successful calibration.

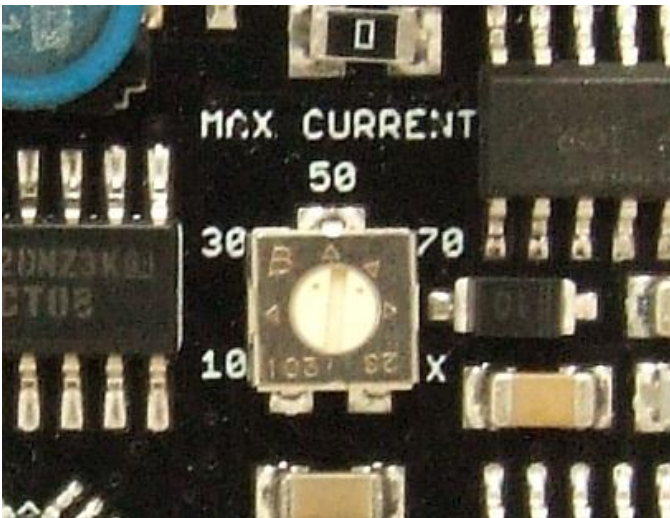
At any point, if the procedure is not followed or there is a signal error, the calibration mode will simply exit and the controller will enter either Normal or Failsafe mode.

Output Current Adjustment

A unique feature of RageBridge is its ability to output exactly as much current as you limit it to. This is a departure from generic “smart” current limiting in which you have no control over when the controller will cut its output current!

RageBridge will output up to your maximum current limit and reduce its output voltage just enough to maintain that current limit if the demand is higher. This offers protection against stalled motors, over-torquing actuators, acceleration-sensitive applications, etc.

To adjust the current limit, turn the Max Current trim potentiometer to your desired setting using a **nonconductive** screwdriver:



The default setting is approximately 50 amps. Use a **DC ammeter** connected to the motor output wire side to verify exact current.

The accuracy of the current limit is strongly dependent on motor inductance; for typical iron core motors, the accuracy is $\pm 2-5$ amps.

Warnings

1. **Controller will be hot during and after operation.** Do not place controller in contact with low temperature melting materials. Do not handle controller immediately after use.
2. **Do not reverse battery polarity.** This controller does NOT have reverse polarity protection. Reverse polarity damage is NOT covered under warranty. See the Shipping and Warranty section on e0designs.com for more information.
3. **Do not cover the controller or wrap it in insulating materials.** Doing so will compromise the controller’s ability to dissipate heat and will reduce the continuous current rating.
4. **Do not short the controller or allow conductive materials to contact the board directly.** The current limit is not guaranteed to protect against “dead” shorts and board level shorts.
5. **Do not use RageBridge with only a power supply.** The regenerative nature of RageBridge will cause the motor’s kinetic energy to be directed into the power supply upon stopping and can cause high voltage spikes and damage to both supply and controller. A battery must be placed between the supply and controller to absorb this energy if a supply must be used.