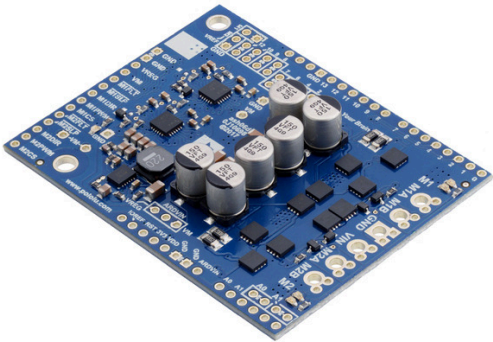# Pololu Dual G2 High-Power Motor Driver 18v18 Shield for Arduino

Pololu item #: 2515
Brand: **Pololu**   **supply outlook**
Status: Active and Preferred ❓
  ✔ **RoHS 3**

Price break	Unit price (US$)
1	59.95
5	55.15
25	50.74
100	46.68

Quantity: [1]   Add to cart

backorders allowed   Add to list

← . . . . →

This shield makes it easy to control two high-power DC motors with your Arduino or Arduino-compatible board. Its twin discrete MOSFET H-bridges support a wide **6.5 V to 30 V** operating range and are efficient enough to deliver a continuous **18 A** without a heat sink. The drivers offer basic current sensing and current limiting functionality, and they accept ultrasonic PWM frequencies for quieter operation. The Arduino pin mappings can all be customized if the defaults are not convenient, and the motor driver control lines are broken out along the left side of the shield for general-purpose use without an Arduino.

or .

Description   **Specs (13)**   **Pictures (14)**   **Resources (8)**   FAQs (0)   **On the blog (2)**   **Distributors (40)**

Overview

The G2 family of dual high-power motor driver shields features pairs of discrete MOSFET H-bridges designed to drive two large brushed DC motors. They have the form factor of an Arduino shield, so they can plug directly into an **Arduino** or compatible board, such as the **A-Star 32U4 Prime**, but they also break out all of the motor driver pins along the left side of the board to enable use as a general-purpose motor driver without an Arduino. Four versions are available so you can pick the one with the appropriate operating voltage range and output current capabilities for your project:
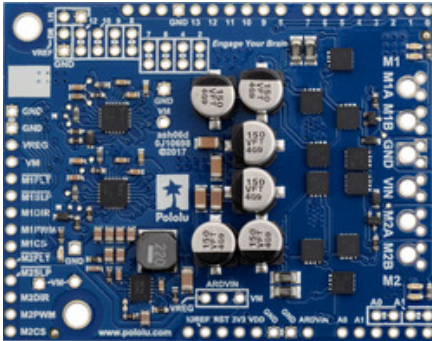
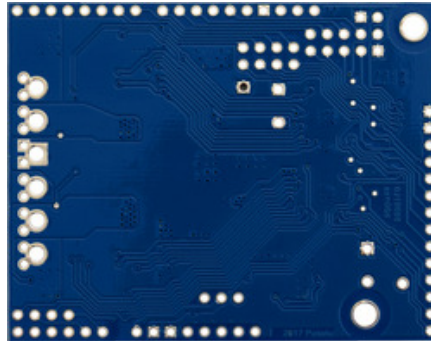|	**Dual G2 High-Power Motor Driver 18v22 Shield**	**Dual G2 High-Power Motor Driver 18v18 Shield**	**Dual G2 High-Power Motor Driver 24v18 Shield**	**Dual G2 High-Power Motor Driver 24v14 Shield**
Absolute max input voltage:	30 V		40 V	
Max nominal battery voltage:	18 V		28 V	
Max continuous current per channel:	22 A	18 A	18 A	14 A
Default active current-limiting threshold:	60 A	50 A		40 A
Current sense output:	10 mV/A	20 mV/A		

The minimum operating voltage for all four versions is 6.5 V. The maximum operating voltages are given in the above table; they are well above what typical Arduinos can tolerate, so the shields include an integrated 7.5 V, 1 A switching step-down regulator that can optionally be used to power whatever Arduino or Arduino-compatible board it is plugged into, enabling operation from a single power supply. This regulator can also be configured to output 5 V for applications where that would be more useful than the default 7.5 V, and the Arduino pin mappings can all be customized if the defaults are not convenient.

These dual motor drivers are also available as **Raspberry Pi expansion boards**. For single-channel versions in a more compact form factor, consider our **High-Power Motor Drivers**. For a lower-power, lower-cost alternative Arduino shield, please consider the **Dual MC33926 Motor Driver Shield**.

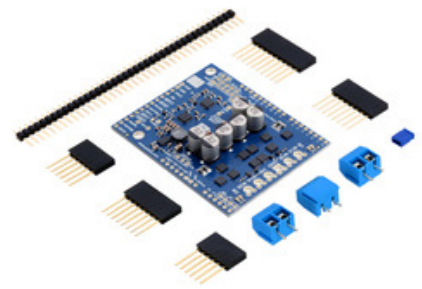## Details for item #2515

Pololu Dual G2 High-Power Motor Driver 18v18 Shield for Arduino.

Pololu Dual G2 High-Power Motor Driver 18v18 or 24v14 Shield for Arduino, bottom view.
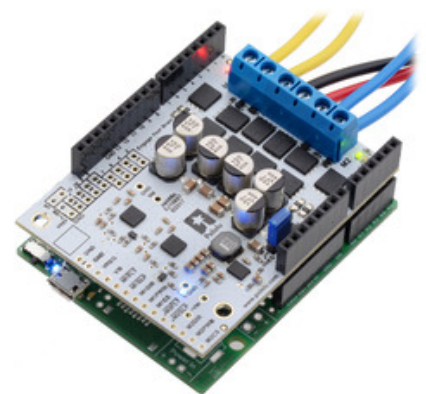

Pololu Dual G2 High-Power Motor Driver 18v18 Shield for Arduino with included hardware.

- Operating voltage: 6.5 V to 30 V (absolute maximum; not intended for use with 24 V batteries)

- Output current: 18 A continuous

- Current sense output proportional to motor current (approx. 20 mV/A; only active while H-bridge is driving)

- Active current limiting (chopping) with approximate default threshold of 50 A (can be adjusted lower)

This version, the **18v18** motor driver shield, can be distinguished from the other versions by its **blue** PCB and the number **150** on top of the tall silver electrolytic capacitors.

Features common to all versions

- Inputs compatible with 1.8 V, 3.3 V, and 5 V logic

- PWM operation up to 100 kHz

- Motor indicator LEDs show what the outputs are doing even when no motor is connected

- Blue power LED is lit while the board is powered

- Reverse-voltage protection

- Undervoltage shutdown

- Short circuit protection

- Control interface allows for sign-magnitude or locked-antiphase operation

- Integrated 7.5 V, 1 A switching step-down voltage regulator (can be set to output 5 V instead)
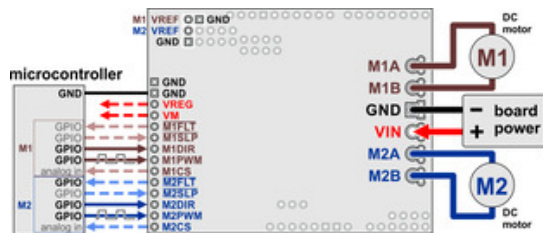

Pololu Dual G2 High-Power Motor Driver Shield being controlled by an A-Star 32U4 Prime.

- **Arduino library** makes it easy to get started using this board as a mot

- Detailed **user's guide**

- Arduino pin mappings can be customized if the default mappings are r

- When used as a shield, the motor power supply or 7.5 V regulator outp the Arduino base for single-supply operation

- Can be used with an Arduino or compatible board (through shield boards (through 0.1″ header along the left side)
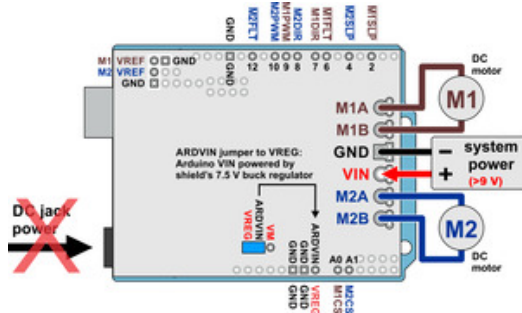
Dual G2 high-power motor driver shield powering an Arduino with the shield's 7.5 V regulator (VREG).
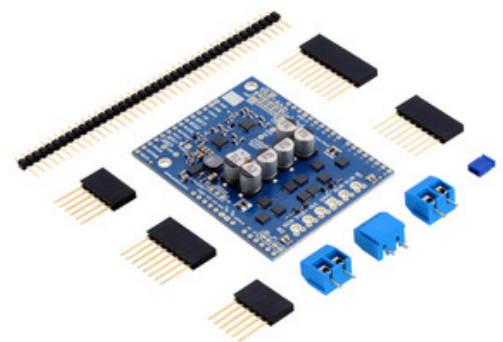
Dual G2 high-power motor driver shield connected to a microcontroller (dashed connections are optional).

Included hardware

This motor driver board ships with all of the surface-mount parts populated. However, soldering is required for assembly of the included through-hole parts. The following through-hole parts are included:

- one extended/stackable 1×10 female header (for Arduino shields)

- two extended/stackable 1×8 female headers (for Arduino shields)

- two extended/stackable 1×6 female headers (for Arduino shields)

Pololu Dual G2 High-Power Motor Driver 18v18 Shield for Arduino with included hardware.

- three **2-pin 5mm terminal blocks** (for board power and motor outputs)

- 40-pin **0.1″ straight breakaway male header** (may ship in several pieces, such as two 20-pin strips)

A **0.1″ shorting block** (for optionally supplying shield power to Arduino) is also included.

You can solder the terminal blocks to the six large through-holes to make your motor and motor power connections, or you can break off a 1×12 section of the 0.1″ header strip and solder it into the smaller through-holes that border these larger holes. Note, however, that the terminal blocks are only rated for 16 A, and each header pin pair is only rated for a combined 6 A, so for higher-power applications, thick wires should be soldered directly to the board, and appropriately high-current connectors (like **these**) should be used.

When not using this board as an Arduino shield, you can solder the 0.1″ headers to the logic connections along the left side of the board to enable use with **custom cables** or **solderless breadboards**, or you can solder wires directly to the board for more compact installations. Note that motor and motor power connections should not be made through a breadboard.

The motor driver includes six 100 µF or 150 µF electrolytic power capacitors, and there is room to add additional capacitors (e.g. to compensate for long power wires or increase stability of the power supply). Additional power capacitors are usually not necessary, and no additional capacitors are included with this motor driver.

The two mounting holes are intended for use with **#4 screws** (not included).

Current sensing and limiting

The driver's current sense pins, M1CS and M2CS, output voltages proportional to the motor currents while the H-bridge is driving. The output voltage is about 10 mV/A for the 18v22 version and 20 mV/A for the other versions, plus a small offset, which is typically about 50 mV.

For high-current installations, motor and power supply wires should be soldered directly to the driver (the supplied terminal blocks are only rated for up to 16 A).

The driver has the ability to limit the motor current through current chopping: once the motor drive current reaches a set threshold, the driver goes into brake mode (slow decay) for about 25 µs before applying power to drive the motor again. This makes it more practical to use the driver with a motor that might only draw a few amps while running but can draw many times that amount (tens of amps) when starting. You can lower the default current limit threshold by connecting an additional resistor between the VREF pin and the adjacent GND pin.

See the **user's guide** for more information on current sense feedback and current limiting.

Real-world power dissipation consideration

The MOSFETs can handle large current spikes for short durations (e.g. 100 A for a few milliseconds), and the driver's current chopping will keep the average current under the set limit. The peak ratings are for quick transients (e.g. when a motor is first turned on), and the continuous rating is dependent on various conditions, such as the ambient temperature. PWMing the motor will introduce additional heating proportional to the frequency. The actual current you can deliver will depend on how well you can keep the motor driver cool. The driver's printed circuit board is designed to draw heat out of the MOSFETs, but performance can be improved by adding a heat sink or air flow. For high-current installations, the motor and power supply wires should also be soldered directly instead of going through the supplied terminal blocks, which are rated for up to 16 A.

> **Warning:** This motor driver has no over-temperature shut-off. An over-temperature or over-current condition can cause **permanent damage** to the motor driver. You might consider using either the driver's integrated current sense output or an **external current sensor** to monitor your current draw.
>
> This product can get **hot** enough to burn under normal operating conditions. Take care when handling this product and other components connected to it.

## G2 and H2 high-power motor driver versions

There are four versions of the single-channel G2 high-power motor drivers that share compatible pinouts, and eight versions of the dual-channel G2 high-power motor drivers. Four of the dual-channel drivers have the form factor of an Arduino shield, but they can also be used with other controllers as general-purpose motor drivers. The other four dual-channel drivers are in the form factor of a Raspberry Pi HAT and compatible **Raspberry Pi** boards (Model B+ or newer). We also have a higher-voltage, single-channel H2 high-power motor driver with the

same form factor as the single-channel G2 drivers, but the control interface and some aspects of the operation are different. The following table provides a general comparison of the G2 and H2 drivers:
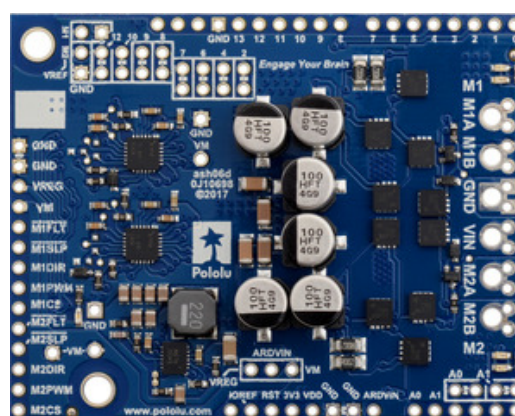
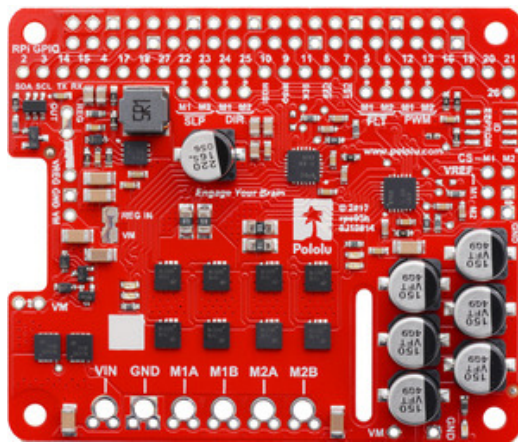| Pololu G2 High-Power Motor Drivers					
Motor channels	Name	Absolute max input voltage	Max nominal battery voltage	Max continuous current per channel	Default active current-limiting threshold
1	**G2 High-Power Motor Driver 18v25**	30 V	18 V	25 A	60 A
	G2 High-Power Motor Driver 18v17			17 A	40 A
	G2 High-Power Motor Driver 24v21	40 V	28 V	21 A	50 A
	G2 High-Power Motor Driver 24v13			13 A	30 A
	H2 High-Power Motor Driver 36v11 CS	60 V	36 V	11 A	–
2	**Dual G2 High-Power Motor Driver 18v22 Shield**	30 V	18 V	22 A	60 A
	Dual G2 High-Power Motor Driver 18v18 Shield			18 A	50 A
	Dual G2 High-Power Motor Driver 24v18 Shield	40 V	28 V	18 A	50 A
	Dual G2 High-Power Motor Driver 24v14 Shield			14 A	40 A
	Dual G2 High-Power Motor Driver 18v22 for RPi	30 V	18 V	22 A	60 A
	Dual G2 High-Power Motor Driver 18v18 for RPi			18 A	50 A
	Dual G2 High-Power Motor Driver 24v18 for RPi	40 V	28 V	18 A	50 A
	Dual G2 High-Power Motor Driver 24v14 for RPi			14 A	40 A
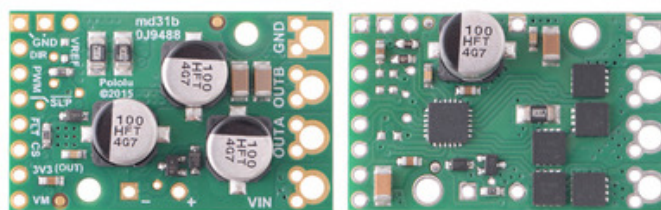
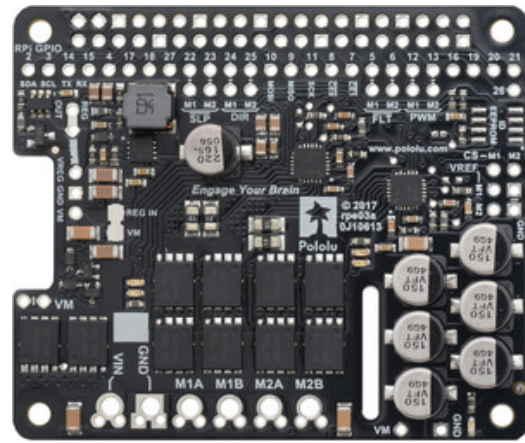**Pololu G2 High-Power Motor Driver 24v21 and 24v13.**
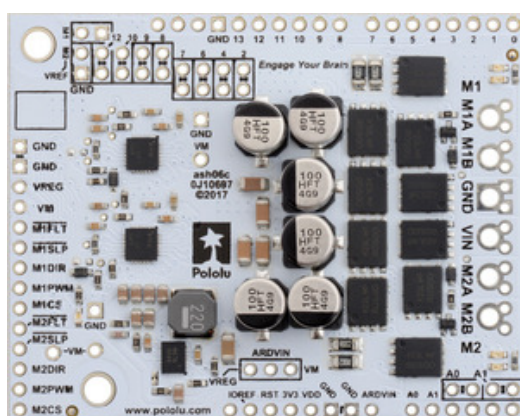
Pololu Dual G2 High-Power Motor Driver 24v18 Shield for Arduino.

Pololu Dual G2 High-Power Motor Driver 24v14 Shield for Arduino.

Pololu Dual G2 High-Power Motor Driver 18v18 for Raspberry Pi.

Pololu Dual G2 High-Power Motor Driver 18v22 for Raspberry Pi.

Note: As an alternative to these motor drivers, our **Simple Motor Controllers** have similar power characteristics and offer high-level interfaces (e.g. USB, RC hobby servo pulses, analog voltages, and TTL serial commands) that make them easier to use for some applications.