

GRBLDuino Uno Shield V2 – GRBL v1.1 Compatible



GRBLDuino Uno Shield is a GRBL v1.1 compatible 4-axis CNC Stepper Driver Shield for the Arduino Uno platform. Four holes are provided to secure the Arduino and GRBLDuino Shield together for mounting.

The GRBLDuino Shield is designed to provide easy access to the pins required for complete machine control. Terminal blocks are provided to allow for easy connections to control buttons and dual-axis limit switches.

GRBLDuino Uno Shield is designed around Pololu DRV8825 stepper drivers. The drivers designed to be inserted into sockets on each axis to be user replaceable in the event of damage.

Input voltage range for GRBLDuino Uno Shield is up to 45 volts DC and should be selected based on your stepper motor specifications and requirements. The Pololu DRV8825 drivers have a maximum input voltage of 45 volts and A4988 drivers have a maximum input voltage of 35 volts – anything higher will damage the drivers. Be sure to select a power supply appropriate to the stepper drivers you have chosen. The shield itself uses power from the host Arduino. There is no reverse voltage protection on GRBLDuino Uno Shield so take care when connecting the power wires.

Bill of Materials

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|------|----------------------------------|------|--------------------------------------|
| • 1 | GRBLDuino Uno Shield PCB | • 12 | Short 2 Pin Jumper Shunts |
| • 15 | 2 Position Screw Terminal Blocks | • 3 | Long 2 Pin Jumper Shunts |
| • 8 | 8 Position Female Headers | • 1 | Tact Switch |
| • 1 | 1x3 Pin Male Pin Headers | • 1 | 10k Ohm Resistor (R1) |
| • 4 | 1x4 Pin Male Pin Headers | • 1 | 680 Ohm Network Resistor (RN2) |
| • 1 | 1x6 Pin Male Pin Headers | • 4 | 150nF Ceramic Capacitors (C5-8) |
| • 2 | 1x8 Pin Male Pin Headers | • 4 | 100uF Electrolytic Capacitors (C1-4) |
| • 1 | 1x10 Pin Male Pin Headers | | |
| • 2 | 2x4 Pin Male Pin Headers | | |
| • 4 | 2x3 Pin Male Pin Headers | | |
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A Axis Jumper Settings

The 4th axis (the A axis) can be driven as an independent axis (with customized GRBL firmware) or cloned from the X, Y, or Z axis. Through the A Step and A Dir jumper settings, the A axis step and direction pins can be independently slaved to any other axis step or direction, or can be driven separately through Arduino pins A3 and A4. Please be aware Coolant Enable is tied to pin A3 and is unavailable when the independent A axis is in use.

To clone an axis, place the A Step and A Dir jumpers on the X, Y, or Z header pins to select that axis.

Stepper Driver Connections

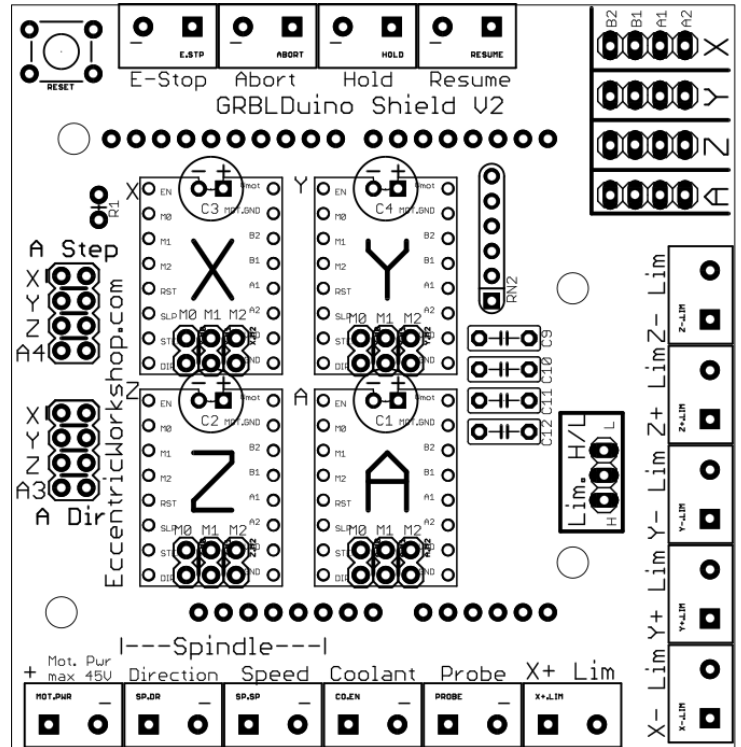
GRBLDuino Uno Shield is designed to be used with Pololu DRV8825 stepper drivers though other pin compatible drivers such as DRV8880, DRV8834, and A4899 will also work.

The Stepper Driver Enable Pin is the upper left pin in each axis socket. Pay attention to orientation when inserting stepper drivers as incorrect orientation will destroy the drivers (and possibly the GRBLDuino Uno Shield).

GRBLDuino Uno Shield allows for connection of 8 machine functions: Emergency Stop, Abort, Hold, Resume, Spindle Direction, Spindle Speed, Coolant Enable, and Probe. Screw terminal blocks are provided to allow for easy connections to the control buttons and machine functions.

The terminal blocks for E-Stop, Abort, Hold, and Resume are located along the top edge of the board. Because connecting the two terminals together activates the control function, switch wire polarity into the terminal does not matter. If you wish to perform more advanced functions, the control pin is the right terminal in each block when viewed from the top of the board (the square pad on the back of the board).

The terminal blocks for Motor Power, Spindle Direction, Spindle Speed, Coolant, and Probe are located along the bottom edge of the board. Spindle Speed is GRBL PWM spindle speed control ready to connect to a spindle motor driver PWM input. Coolant Enable is tied to Arduino pin A4 and not available when the A axis is being independently driven (not a clone of X, Y, or Z). On these terminal blocks, the control pin is the left terminal in each block when viewed from the top of the board. To use the PWM speed output, the left pin is the signal and the right is ground.

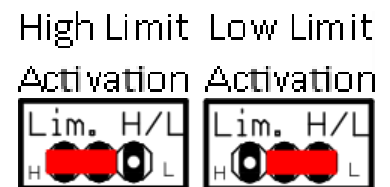


Limit Switch Settings

GRBLDuino Uno Shield allows for connection of 6 limit switches: two (+ and -) per X, Y, and Z axis.

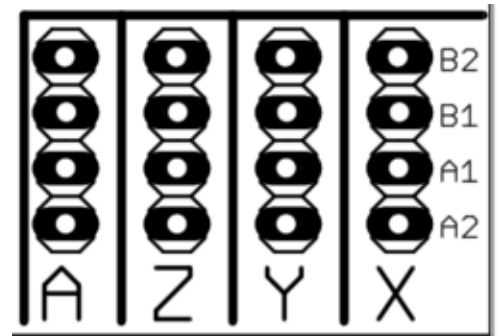
Terminal blocks are provided to allow for easy connections to each limit switch. Because each switch is on an independent terminal block, either switch wire can go into either terminal without regard to polarity. For more advanced uses, the square pad is the signal pin.

GRBL default is for limit switch activation through a normally-open switch connecting the limit switch pin to ground. This mode is picked by using the Lim. H/L jumper to select the center and top pints. If you prefer to have high activated limit switches, use the Lim. H/L jumper to select the center and bottom pins.



GRBLDuino Uno Shield stepper motor connections are located top right corner of the board and are labelled with A, Z, Y, X.

All motor headers have the same pin outs and are marked on the board. From top to bottom, the motor connections are B2, B1, A1, A2.



Microstep Settings

DRV8825 Microstepping Settings

Resolution	M0	M1	M2
Full Step	Low	Low	Low
1/2 Step	High	Low	Low
1/4 Step	Low	High	Low
1/8 Step	High	High	Low
1/16 Step	Low	Low	High
1/32 Step	High	Low	High
1/32 Step	Low	High	High
1/32 Step	High	High	High

A4988 Microstepping Settings

Resolution	M0	M1	M2
Full Step	Low	Low	Low
1/2 Step	High	Low	Low
1/4 Step	Low	High	Low
1/8 Step	High	High	Low
1/16 Step	High	High	High

