GRBLDuino Mega Shield V1 Datasheet – GRBL v1.1 Compatible

GRBLDuino Mega Shield is a GRBL v1.1 compatible 6-axis CNC Stepper Driver Shield for the Arduino Mega platform. The 6-Axis GRBL can be downloaded from: https://github.com/EccentricWkshp/grbl-Mega-4axis

The GRBLDuino Mega 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 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 Mega 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 Mega Shield so take care when connecting the power wires.

Bill of Materials

- 1   GRBLDuino Mega Shield V1 PCB
- 21   2 Position Screw Terminal Blocks
- 12   8 Position Female Headers
- 1   1x3 Pin Male Pin Headers
- 6   1x4 Pin Male Pin Headers
- 1   1x6 Pin Male Pin Headers
- 5   1x8 Pin Male Pin Headers
- 6   2x3 Pin Male Pin Headers
- 6   2x6 Pin Male Pin Headers
- 1   2x18 Pin Male Pin Headers

- 18   Short 2 Pin Jumper Shunts
- 7   Long 2 Pin Jumper Shunts
- 1   Tact Switch
- 1   10k Ohm Resistor (R1)
- 2   680 Ohm Network Resistor (RN1, RN2)
- 7   150nF Ceramic Capacitors (C7-13)
- 6   100uF Electrolytic Capacitors (C1-6)

A/B/C Axis Jumper Settings

The 4th, 5th, and 6th axes (the A, B, and C axes) can be driven as an independent axis or cloned from any other axis.

To have the A axis clone the X axis, place the jumper in the X axis row in the A axis column as shown in the image to the right. To have the B axis clone the Y axis, place the jumper in the Y axis row in the B axis column as shown in the image to the right. To have independent A, B, and C axes, place the jumpers at the intersection of the A, B, and C rows and columns as shown in the image to the right.
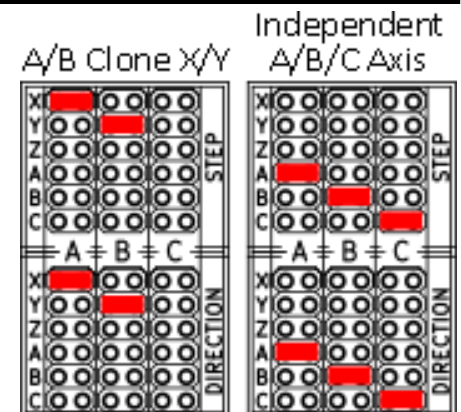

Stepper Driver Connections

GRBLDuino Mega 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 Shield).

GRBLDuino Mega Shield V1 allows for connection of 8 machine functions: Emergency Stop, Abort, Hold, Resume, Probe, Coolant Enable, Spindle Speed, and Spindle Direction. Screw terminal blocks are provided to allow for easy connections to the control buttons and machine functions.

The two pin screw terminal blocks for Resume, Hold, Abort, E-Stop, Door Safety, Coolant (flood and mist), and Spindle (enabled, direction, and speed) 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. 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 left terminal in each block when viewed from the top of the board. The control pin is the circled pad when looking at the bottom of the board.

The limit switch and probe screw terminals are located along the top edge of the board. On these terminal blocks, the control pin is the right terminal in each block when viewed from the top of the board. The control pin is the circled pad when looking at the bottom of the board.
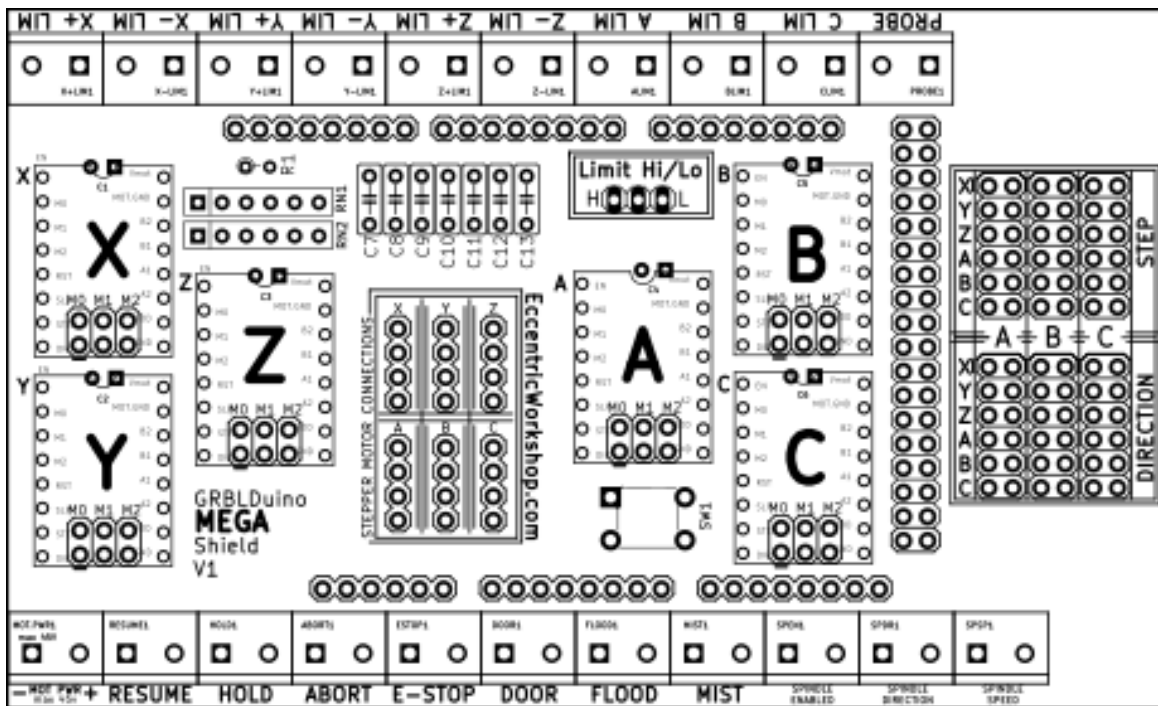

Limit Switch Settings

GRBLDuino Mega Shield allows for connection of 9 limit switches: two (+ and −) per X, Y, and Z axis and one each per A, B, and C axis. Two pin screw 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.
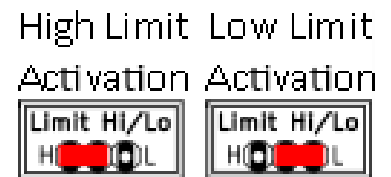
GRBL default is for limit switch activation through a normally-open switch connecting the limit switch pin to ground. This mode is picked by using the Limit Hi/Lo jumper to select the center and right points. If you prefer to have high activated limit switches, use the Limit Hi/Lo jumper to select the center and left pins.

High Limit Low Limit
Activation Activation

GRBLDuino Mega Shield stepper motor connections are located near the center of the board and are labelled as STEPPER MOTOR CONNECTIONS.

All motor headers have the same pin outs. From top to bottom, the motor connections are B2, B1, A1, A2.
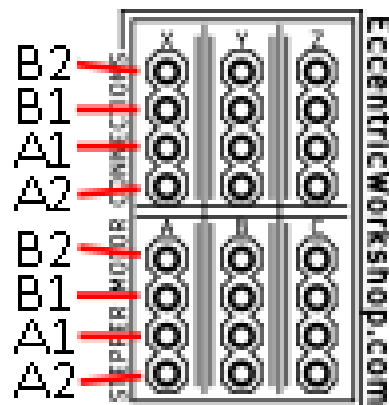
Microstep Settings

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
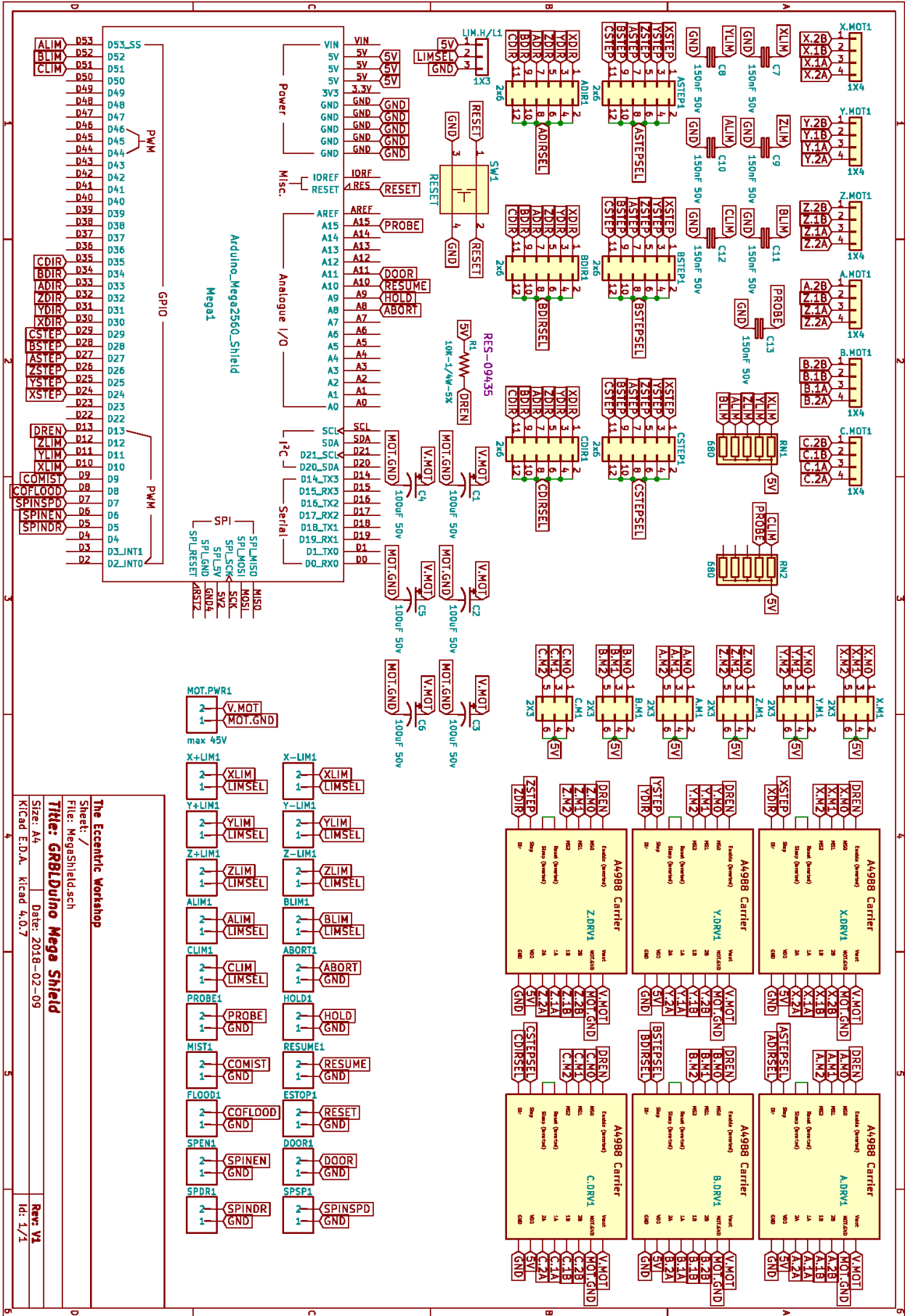
The Eccentric Workshop

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Title: GRBLDuino Mega Shield

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