

Kill Robot Arm Controller Board – Perfboard Version

Cautions – Read These First!

- Screw terminal connections aren't labeled (but will be on the production board). In the mean time, please refer to Figures 1 and 2 for the screw terminal layouts.
- Only one “small” stepper motor driver is installed on the perfboard – the other two need to be installed. When installing the drivers on the headers, verify that the little trim pot is as far away from the big capacitor on the perfboard as possible. Rotate the stepper motor driver 180 degrees if necessary.
- Trim pots on the “small” stepper motor drivers need to be adjusted for the NEMA 17 motors.
- The limit switch connections have been wired for “Normally Closed” operation. Jumpers (small wire loops) are installed in the screw terminals to allow testing of grbl withing the limit switches connected.
- Moving around can be accomplished by using a command like
G0 X 10 Y 20 Z -10 A 45 B 32 C64
or just
G0 A 32
if you only want to move the “A” axis. Note that by default the moves are in absolute, not relative, coordinates.
- grbl configuration changes are needed to ensure grbl is compatible with the hardware interface. See Table 1 for an initial recommendation for configuration settings. See [this site](#) for a complete listing of settings. The following, at a minimum, should be changed:

Setting	Purpose
\$1=255	Keeps the motor ENABLE line active when motors are not moving. May not be needed if ENABLE line is not being used.
\$2=7	Inverts the step pulse signal logic ONLY for the X, Y, and Z axes
\$3=7	Inverts the direction signal logic ONLY for the X, Y, and Z axes
\$5=1	Inverts the limit switch logic to permit a 0 (or 0 volts) to represent normal operation with a Normally Closed switch
\$22=0	Disables the Homing cycle (important during initial setup, may be enabled later)

Table 1: Recommended Initial Configuration

\$0=10
\$1=255
\$2=7
\$3=7
\$4=0
\$5=1
\$6=0
\$10=1
\$11=0.010
\$12=0.002
\$13=0
\$20=0
\$21=0
\$22=0
\$23=0
\$24=25.000
\$25=500.000
\$26=250
\$27=1.000
\$30=1000
\$31=0
\$32=0
\$100=250.000
\$101=250.000
\$102=250.000
\$103=250.000
\$104=250.000
\$105=250.000
\$110=500.000
\$111=500.000
\$112=500.000
\$113=500.000
\$114=500.000
\$115=500.000
\$120=10.000
\$121=10.000
\$122=10.000
\$123=10.000
\$124=10.000
\$125=10.000
\$130=200.000
\$131=200.000
\$132=200.000
\$133=200.000

\$134=200.000

\$135=200.000

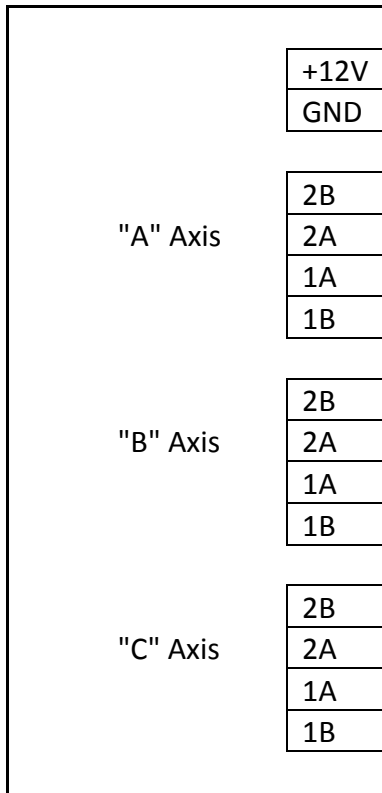
Figure 1: Limit Switch and Large Stepper Motor Connections

X limit switch
X limit switch
Y limit switch
Y limit switch
Z limit switch
Z limit switch
A limit switch
A limit switch
B limit switch
B limit switch
C limit switch
C limit switch
X enable
X direction
X step
Y enable
Y direction
Y step
Z enable
Z direction
Z step
+5V

Note: Each limit switch has two connections with no polarity requirements.

Note: ENABLE lines share a common electrical connection.

Figure 2: Small Stepper Motor Connections and +12V Power Supply



Note: 1A, 1B, 2A, and 2B are connections for the stepper motor coils. Do not connect or disconnect motor coils while the electronics are energized.

Note: The ENABLE lines are not used on this circuit board.

Table 2: Arduino Pin Definitions

Arduino Pin	Function
D10	X axis limit switch
D11	Y axis limit switch
D12	Z axis limit switch
D13	Stepper ENABLE
D24	X axis step control
D25	Y axis step control
D26	Z axis step control
D27	A axis step control
D28	B axis step control
D29	C axis step control
D30	X axis direction
D31	Y axis direction
D32	Z axis direction
D33	A axis direction
D34	B axis direction
D35	C axis direction
D51	C axis limit switch
D52	B axis limit switch
D53	A axis limit switch
Analog 8	Reset (not wired)
Analog 9	Feed Hold (not wired)
Analog 10	Cycle Start (not wired)
Analog 11	Safety Door (not wired)