

**UNIVELOP Three Axis CNC Driver Board V1.0 Users Manual**

# **Three Axis CNC Driver Users Manual**

Revision 1.2

**Univelop Comp. Tech. LLC.**  
<http://www.cncgeeker.com>

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# UNIVELOP Three Axis CNC Driver Board V1.0 Users Manual

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# UNIVELOP Three Axis CNC Driver Board V1.0 Users Manual

## 1. GENERAL INFORMATION

### 1.1. Scope

This document describes the basic functionality and the electrical specifications of Univelop Tech. LLC's Three Axis CNC Driver Board.

### 1.2. General Description

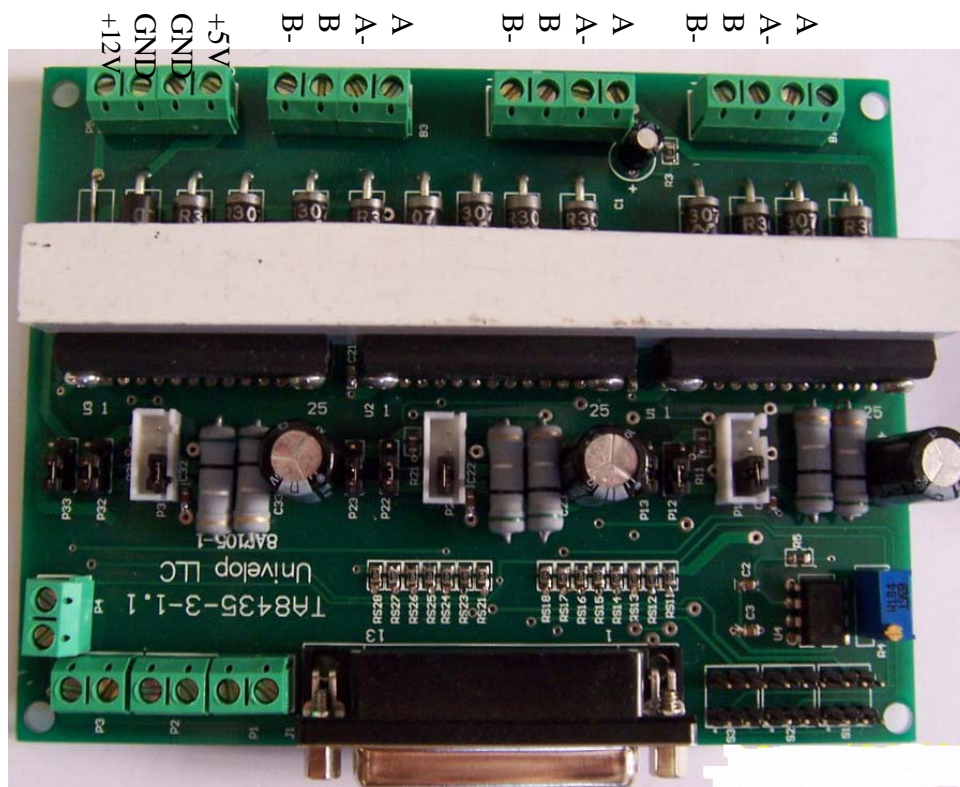
Univelop Tech. LLC's Three Axis CNC Driver Board is designed to communicate directly with KCAM4, MACH, NINOS, etc..., which supports parallel port.

### 1.3. Features

- Supports KCAM4, MACH, NINOS, etc...
- Two phase bipolar (chopper) pulse width modulating technology
- Resolution 1, 1/2, 1/4, 1/8 micro stepping output
- Suitable for 4, 6, or 8 wire motors
- Maximum 36VDC @ 2.5 amps/phase motor output
- Stop Button for emergency stop
- Limit/Home Signal input
- Manual Control circuit included
- Step Current® Technology (with *optional* Step Current® Extend Board): Step Current® technology is used to decrease the current up to 1/2, when motors are in idle for all axis so as to protect expensive step motor and driver board for long time running.

## 2. Descriptions of 3-AXIS CNC Board

### 2.1. Photo of 3-AXIS CNC Board



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Fig. 1 Three Axis CNC Driver Board (Dimension: 100mm X 130mm)



Fig. 2 Step Current® Extend Board(Optional)

## 2.2. Key Features

- Supports KCAM4, MACH, NINOS, etc...
- Two phase bipolar (chopper) pulse width modulating technology
- Resolution 1, 1/2, 1/4, 1/8 micro stepping output
- Suitable for 4, 6, or 8 wire motors
- Maximum 36VDC @ 2.5 amps/phase motor output
- Stop Button for emergency stop
- Limit/Home Signal input
- Manual Control circuit included

## 2.3. Electrical Characteristics

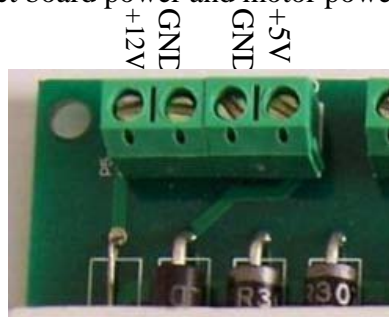
Symbol	Parameter	Min	Typical	Max	Units
T <sub>STR</sub>	Storage Temperature	- 40		+150	°C
T <sub>OP</sub>	Working Temperature	- 15	+ 25	+ 85	°C
I <sub>CC</sub>	Current	50	100	200	MA
+12V	Motor Voltage	5	24	36	V
+5V	Board Voltage	4.5	5	5.5	V

## 3. Hardware Installation

### 3.1.Board Connection

Obey the following steps to connect the board:

1. Connect board power and motor power to the board as same as following.

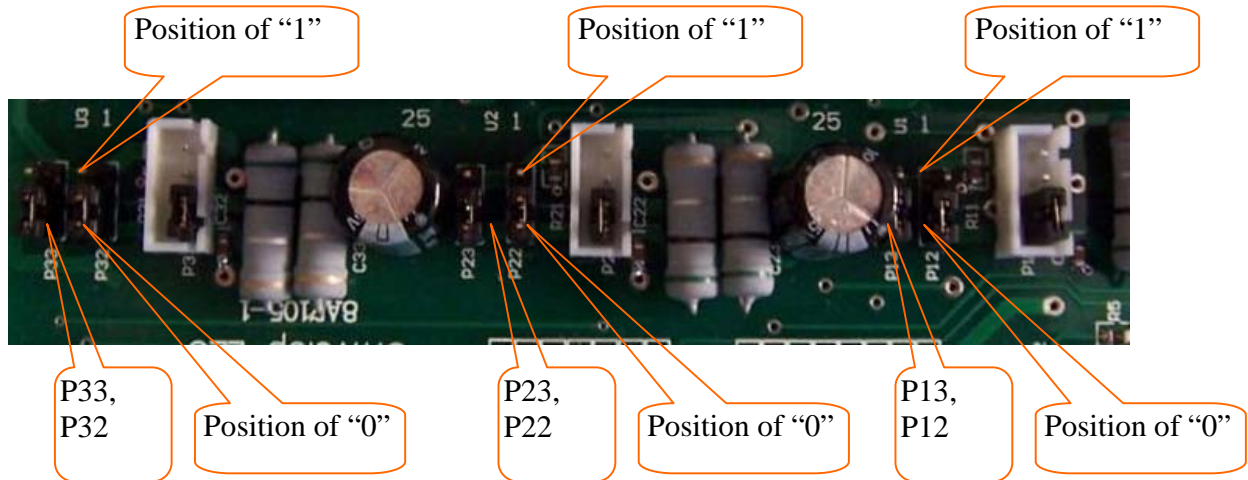


Here:

Symbol	Parameter	Min	Typical	Max	Units
+12V	Motor Voltage	5	24	36	V
+5V	Board Voltage	4.5	5	5.5	V

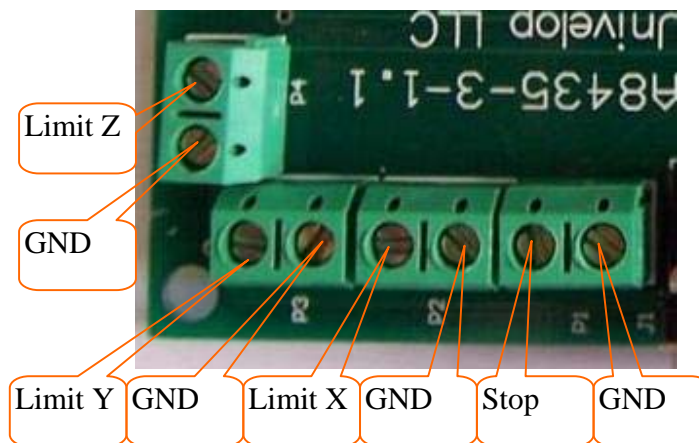
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2. Connect the motors to the board (more detail in Section 3.2)
3. Setup the board with S11, S12, S13,  
X-axis: P11, P12, P13 ; Y-axis: P21, P22, P23 ; Z-axis: P31, P32, P33:



P11: 0: 0.5v(half-current), 1:0.8v(full-current).  
P12, P13: 00 (full step), 10 (1/2 step), 01 (1/4 step), 11 (1/8 step).  
Here: 0: GND, 1:high 5v.  
Original positions are all in 0.

4. (Optional) Setup the “Step Current” extension board with S11, S21, S31,  
Please follow the Appendix A.
5. (Optional) Connect the limit switches to the board.  
P1: Emergency Stop  
P2: Limit X  
P3: Limit Y  
P4: Limit Z



Signals are Active Low.

4. Connect DB 25 with parallel port in a computer  
More details are in section 3.3.
5. Turn on the board power and motor power, as well as the computer.
  - Connect suitable power supply at Input outlet on front of controller
  - 24vdc @ 2-6amp switching power supply recommended
6. Attempt to jog each axis with software (if axis turns in opposite direction of desired direction - attempt axis rotation reversal via software- if unable to do so switch 2 wires for one coil (i.e. switch A with A#, do not switch wires between coils)
7. You are now done and able to begin using your new stepper motor drive

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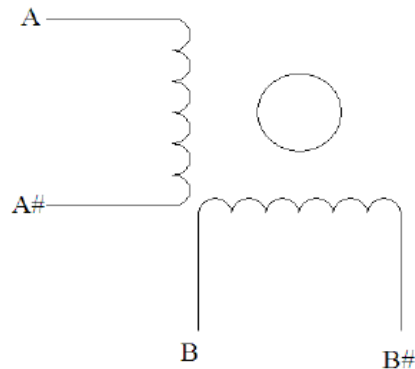
**REMEMBER NEVER CONNECT OR DISCONNECT MOTORS WHILE POWER IS ON**

### 3.2. SELECTING AND CONNECTING STEPPER MOTORS

**WARNING: INCORRECT WIRING OF THE STEPPER MOTOR TO THE DRIVE BOARD CAN LEAD TO IMMEDIATE DAMAGE OF DRIVE BOARD - DO NOT CONNECT OR DISCONNECT MOTORS WHILE POWER IS ON**

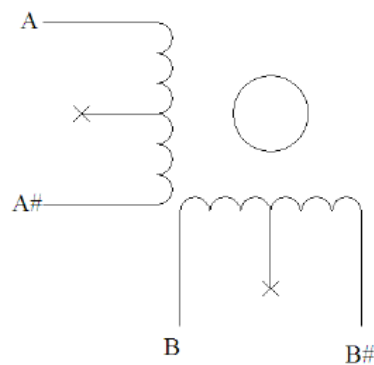
4 Wire, 6 Wire, and 8 Wire stepper motors can be used with 3-AXIS CNC Board. 4 Wire motors are recommended as they are by their manufacture true bipolar motors and easier to properly connect to stepper motor drive controller It is critical to obtain a proper motor coil diagram of any motor you wish to utilize (making cross connections between the two coils will destroy the control circuitry) 1.8 deg per step resolution is the industry standard for most automation grade stepper motors and is recommended for most applications

#### 4 WIRE STEPPER DIAGRAM



Each wire is connected to its corresponding terminal block location (i.e. A# wire is connected at A- location)

#### 6 WIRE STEPPER DIAGRAM (SERIES WIRING)

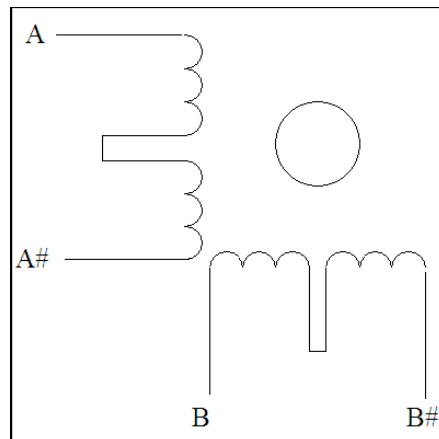


Center wire of each coil not connected (insulate termination)

Remaining wires are connected to their corresponding terminal block location (i.e. A# wire is connected at A- location).

#### 8 WIRE STEPPER DIAGRAM

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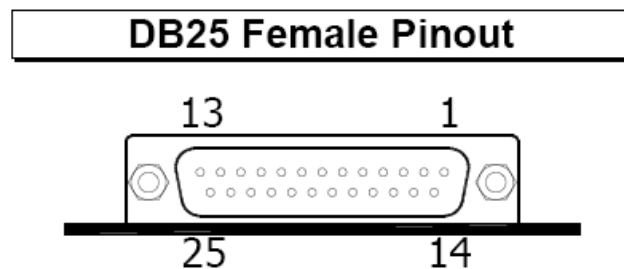


2 center wires of each coil connected (insulate connection) Remaining wires are connected to their corresponding terminal block location (i.e. A# wire is connected at A- location).

If using 6 or 8 wire motors, connected using series wiring method, reduce labeled amperage rating by **50%** (i.e. a motor rated at 4 amps should thus be considered now rated at 2 amps)

### 3.3. CONNECTING with Computer by DB25

The following is to aid in the setup of the use of controller with various CAM software programs operating on your computer.



#### DB25 PIN USAGE:

Pin in Parallel Port	In/Out	Signal	Note
2	Out	Step X	
3	Out	Dir X	
4	Out	Step Y	
5	Out	Dir Y	
6	Out	Step Z	
7	Out	Dir Z	
8	Out	Enable Y (low*)	
9	Out	Enable Z (low*)	
14	Out	Enable X (low*)	
10	In	Emergence Stop (low*)	
11	In	Limit X (low*)	
12	In	Limit Y (low*)	
13	In	Limit Z (low*)	
1,15,16,17		Not Utilized	
18-25		GND	

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\*Signals are Active Low

It is critical that the connection between computer parallel port and motor drive board be direct with the use of adapters (If your computer does not feature a DB25 outlet, you must install one, (these can be achieved via PCMIA cards on laptop computers)) The use of adapters and hubs is not advisable and most likely will not work.

### 3.4. Manual Control

#### Manual control:

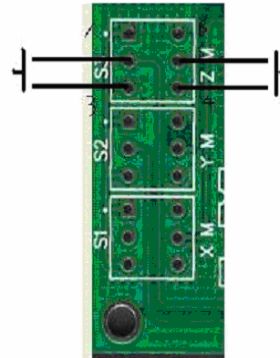
Using S1 to control X-axis, S2 to control Y-axis, S3 to control Z-axis.

X-axis: Ground the DB25 pin 14 to enable X, Short S1.2-3 to drive the motor, short S1.4-5 to change the direction of the motion.

Y-axis: Ground the DB25 pin 8 to enable Y, Short S2.2-3 to drive the motor, connect S2.6 to +5V and short S2.4-5 to change the direction of the motion; connect S2.6 to +5V and short S2.5-6 to change the other direction of the motion;

Z-axis: Ground the DB25 pin 9 to enable Z, Short S3.2-3 to drive the motor, short S3.4-5 to change the direction of the motion.

Start to drive motor



Change direction of motion

## Appendix

### A. Installation of Step Current® Extend Board (Optional)

First unplug the pins in socket P11, P21, P31, then insert the step current® extend board into P11 (see Figure 3 for positions) for X-axis, insert the step current® extend board into P21 for Y-axis, Insert the step current® extend board into P31 for Z-axis. After the board is powered, the LED indicator will be turned on.

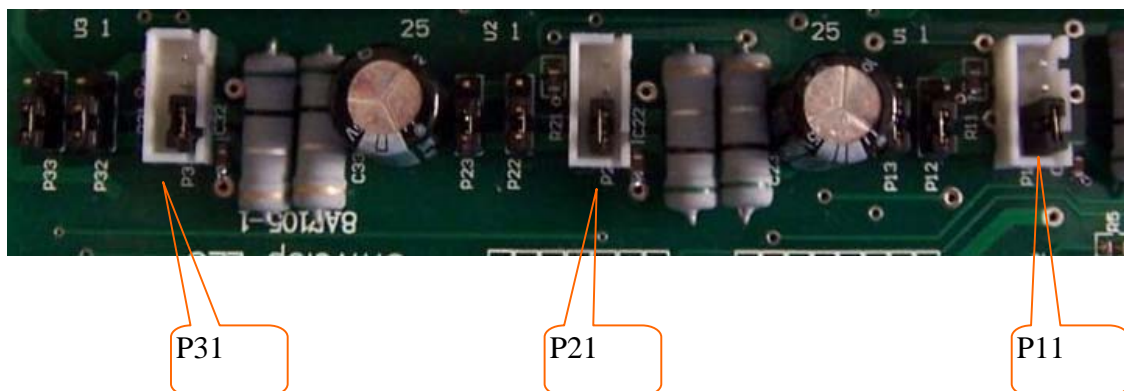


Figure 3. Positions for P11, P21, P31