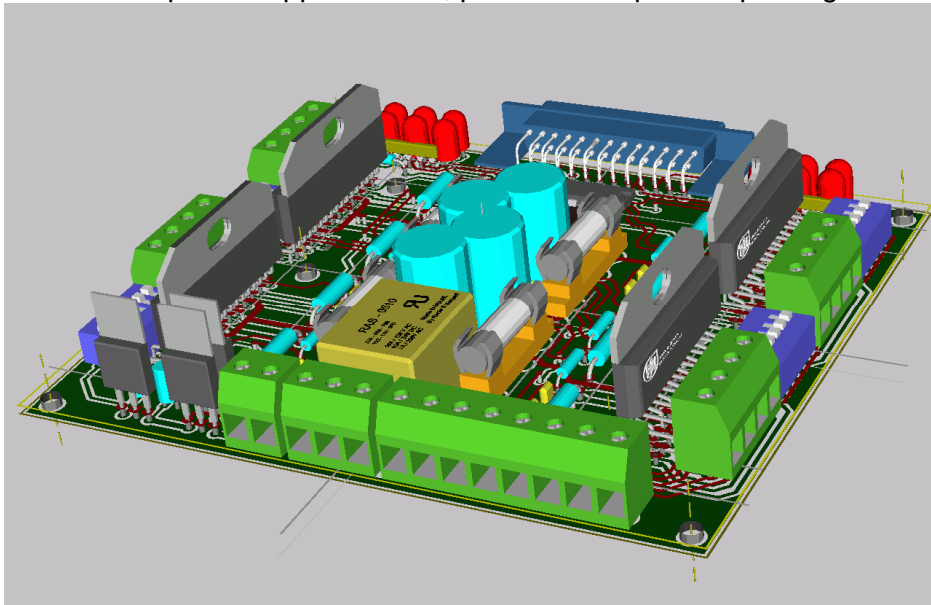


CNC4X35A 4 axis Stepper Motor Control Board

Just connect bipolar stepper motors, power and a parallel port signal source



CNC4X35A 4 axis Stepper Motor Control Board Specs:

- Designed for easy construction/retrofit of desktop/small benchtop milling/engraving machine
- Direct connection to parallel port computer
- Drives 4 stepper motors in bipolar microstepping mode
- Wide range of motors (5-30V and 0.7- 3A)
- On board switch allowing 4th axis to „shadow“ Y axis or independent
- Support for up to 5 external input signals (usually used for Limit X, Y, Z, Probe and E-Stop)
- On board relay for easy Spindle ON/OFF setup
- LED indicator for Power, input signals and driver status
- All input ports from computer are buffered and Schmidt triggered
- Compatible with a large number of programs (Mach2/3, Master5, EMC,KCAM, USBCNC etc.)

Each of 4 axis features :

- PWM current control dual D-Mos H-Bridge
- .6 or 1.5 or 2.25 or 3 Amp (0.56 or 1.4 or 2.1 or 2.8 Vers.) Current Limit adjustable by dip switch
- Full, Half, Quarter, & 1/16 Microstepping Resolution
- Current Decay Mode Selection From Fast Decay to Slow-Decay Modes by dip switch
- Thermal Shutdown and Crossover Current Protection

Overview

This document describes configuration and operation of CNC4X35A stepper motor driver boards. The CNC4X35A provides an interface between a step pulse generator (PC , embedded controller etc) and up to 4 stepper motors.

Power supply : min 15 V - max.32V

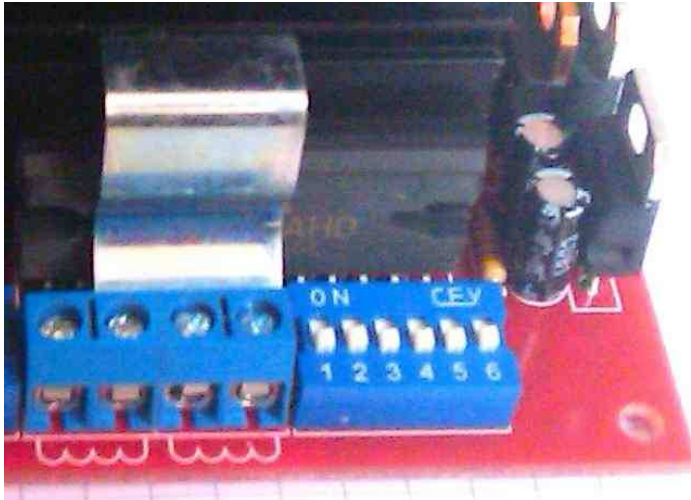
Important precautions on using CNC4X25A driver

Do **NOT** reverse polarity on board power supply (board will be damaged immediately). At power supply connector it is figured a + sign. There should be connected positive polarity
Do **NOT** connect or disconnect motors when the drive is powered.

Do **NOT** allow Vsupply to exceed +32VDC, STEP & DIR lines to exceed +5.0 VDC
 Do **NOT** connect scopes or any other test devices to the motor leads
 Use of a cooling fan is recommended for systems operating at or near the maximum current rating

Power

Each axis can be separately setup to deliver different maximum current levels by adjusting on-board configuration switches. Configuration switches are at the right of coil connectors.



(In this picture all switches are off.)

Switches number 1 and 2 are responsible for power configuration.

Sw1	Sw2	Current
Off	Off	3.0 A (2.8 A)
On	Off	2.25 A (2.1 A)
Off	On	1.5A (1.4 A)
On	On	0.6 A (0.56 A)

Microstepping

Each axis can be configured individually to deliver a different microstepping for each motor. Switches number 3 and 4 are dedicated for microstepping configuration.

Sw3	Sw4	Microstepping (steps per revolution on a 1.8 deg/step motor)
Off	Off	1/1 (200 steps per revolution)
Off	On	1/2 (400 steps per revolution)
On	Off	1/16 (3200 steps per revolution)
On	On	1/8 (1600 steps per revolution)

Current Decay

On stepper motors BEMF (Back Electromotive Force) current has big values and methods of reusing it and redirect it back to power supply may change very much the behaviour of motor spinning. Each axis can be configured individually for a different current decay for each motor. Switches number 5 and 6 are dedicated for this .

Sw5	Sw6	Current Decay
Off	Off	Normal 0% - slow decay all time

Off	On	25% Decay
On	Off	50% Decay
On	On	100% Decay – Fast Decay

Paralel port pin configuration

Pin number	Direction	Signal	Active On :
1	Input from PC	Relay On	Active High
14	Input from PC	Enable Board	Active High
2	Input from PC	Direction Motor 1	Active High
3	Input from PC	Step Motor 1	Active High
4	Input from PC	Direction Motor 2	Active High
5	Input from PC	Step Motor 2	Active High
6	Input from PC	Direction Motor 3	Active High
7	Input from PC	Step Motor 3	Active High
8	Input from PC	Direction Motor 4*	Active High
9	Input from PC	Step Motor 4*	Active High
10	Input to PC	Input P	Active Low
11	Input to PC	Input X	Active Low
12	Input to PC	Input Y	Active Low
13	Input to PC	Input Z	Active Low
15	Input to PC	Input E	Active Low

Input ports are pulled up by a resistor to +5V. External signals should connect input point to GND.

Suggested inputs are P – probe , E – Emergency Stop, X,Y,Z – home switches. The X Y and Z input have in common the ground signal.

*Switch 5 has 2 modes :

1. Motor 4 will shadow/follow motor 2 (signal from pin 4 and 5 of parallel port)
2. Motor 4 will run following signals from pin 8 and 9 of parallel port.

Mach3 Users :

Put the configuration file into C:\mach3 folder (if you have installed Mach3 in C:\)



MillCNC4X35A.xml

This sample configuration file will allow you to test the board faster.

To start the program you should run a command like :

C:\Mach3\Mach3.exe /p MillCNC4X35A

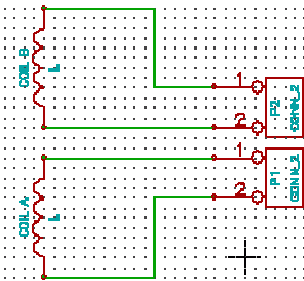


MillCNC4X35A.Ink

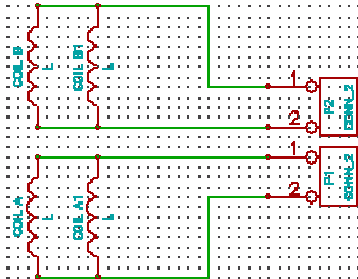
Below it is a sample configuration of motor wirings :

CORRECT CONNECTIONS

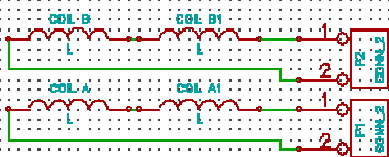
4 WIRE MOTORS



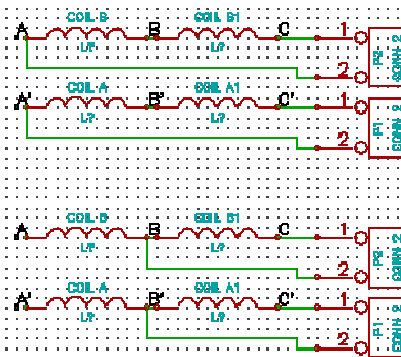
6 WIRE MOTORS BIPOLAR PARALEL



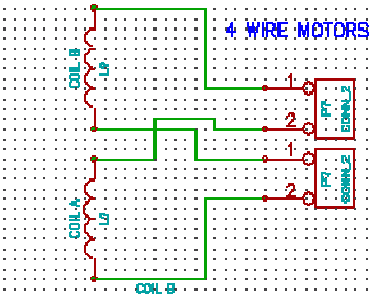
6 WIRE MOTORS BIPOLAR SERIES



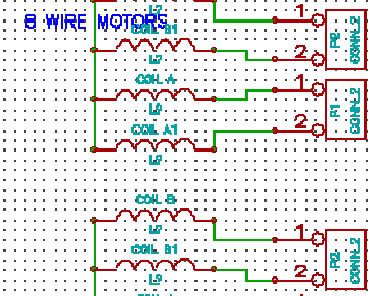
6 WIRE MOTORS



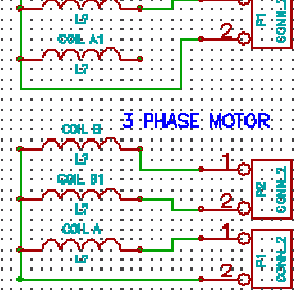
WRONG CONNECTION 1
DRIVER WILL BE DAMAGED IMMEDIATELY.
IT MUST NOT EXIST ANY CONNECTION
BETWEEN TWO CONNECTORS / DRIVES



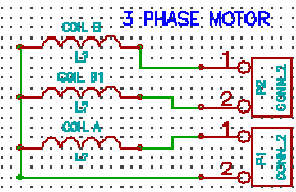
Wrong 1



Wrong 2



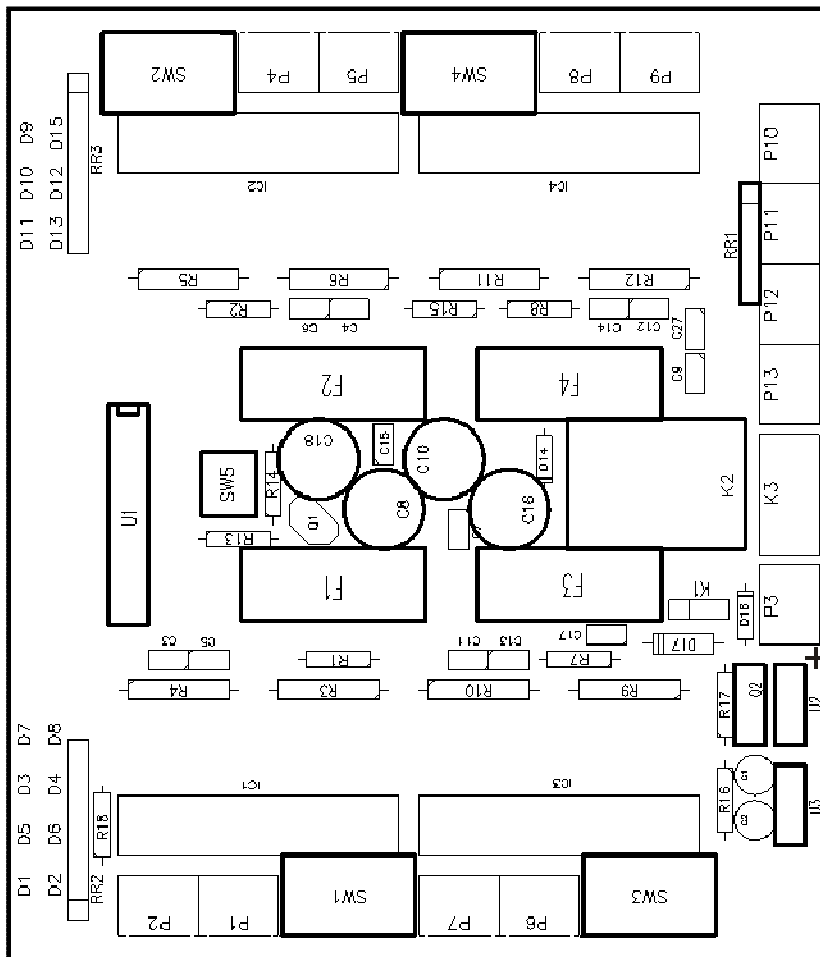
Wrong 3



Wrong 4

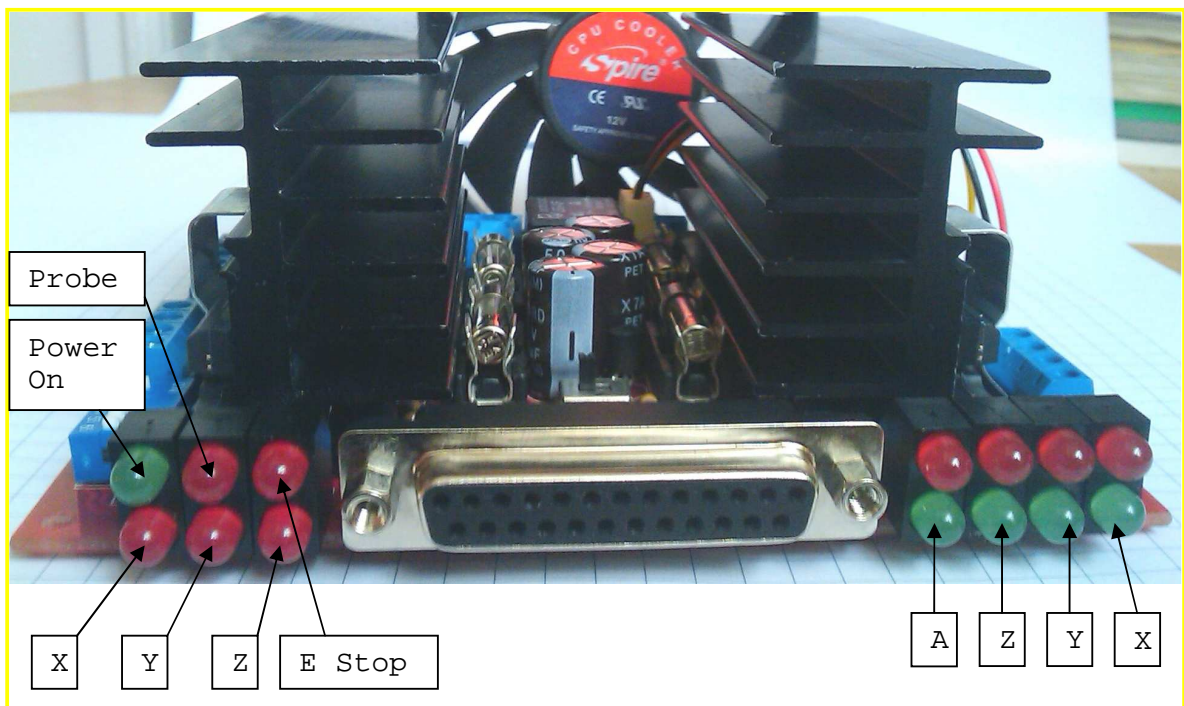
Before connecting motors to driver board, measure to have about same resistance for each coil.
Also please make sure that are no connection between 2 coils.
Coil that it is connected on P1 must be isolated from coil that it is connected to P2 — otherwise the driver will be damaged.

Input Signals



Home X
 Home Y
 Home Z
 GND (Ground)
 Probe
 GND
 Emergency Stop
 GND
 Normally Open
 Common
 Normally Close
 GND
 +VCC Power

Relay



Board Dimensions

