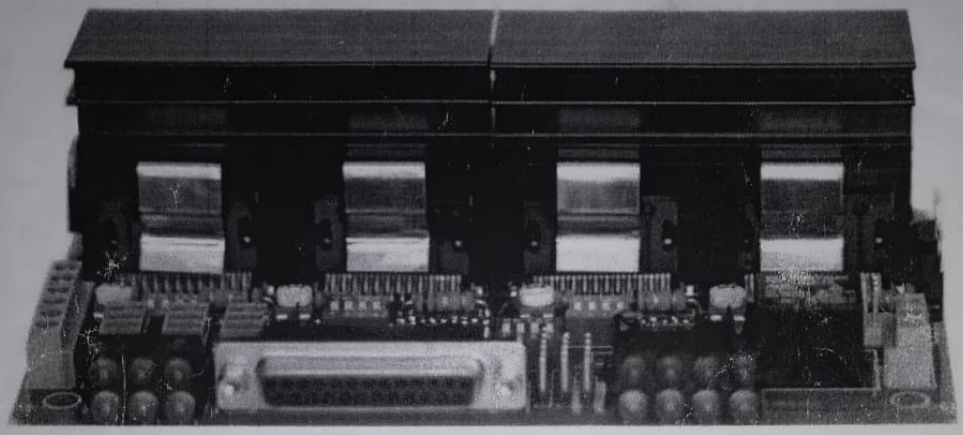
CNC4X45A 4 axis Stepper Motor Control Board

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



CNC4X45A 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 (or as an option a ribbon cable input)
- Drives 4 stepper motors in bipolar microstepping mode
- Wide range of motors (5-35V and 0,5-4,2A)
- Configurable timer for coil current reduction after a period of inactivity (absence of pulse signal on input)
- On board dip switch allowing 4'th axis to „shadow" X or Y or Z axis or independent as A axis
- 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 inside microcontroller
- Open source microcontroller code
- Compatible with a large number of programs (Mach2/3, Master5, EMC,KCAM, USBCNC etc.)

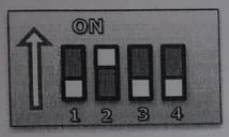
Each of 4 axis features :

Lazy Cam 2D foam:
Dolphin CAD CAM

General Settings Switch

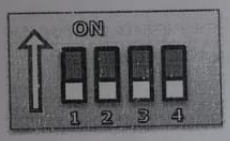
Low Torque Timer Setting
Microswitch next to parallel connector does general settings.
Switch number 1 it's reserved for future use (SPI/Serial Connection).

Switch number 2 determines global settings for each channel low torque settings :



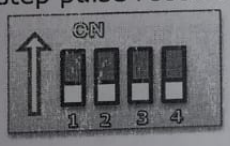
When switch 2 it's on (UP) timer it's 10 seconds for each channel.

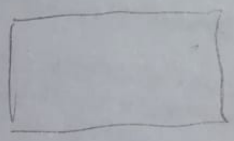
If switch 2 it's off :



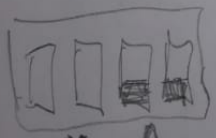
then timer it's 20 seconds.

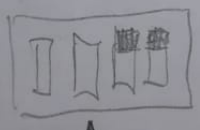
Each channel has it's individual timer who count period (set above) after last step pulse received.

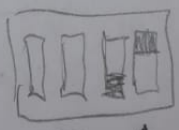




Channel Shadow
Channel A (number 4 or rightmost) has a special feature : can work by himself as a 4'th axis or it can follow one of axis X or Y or Z.
This is done trough switches 3 and 4 from global settings microswitch.


X - A


A

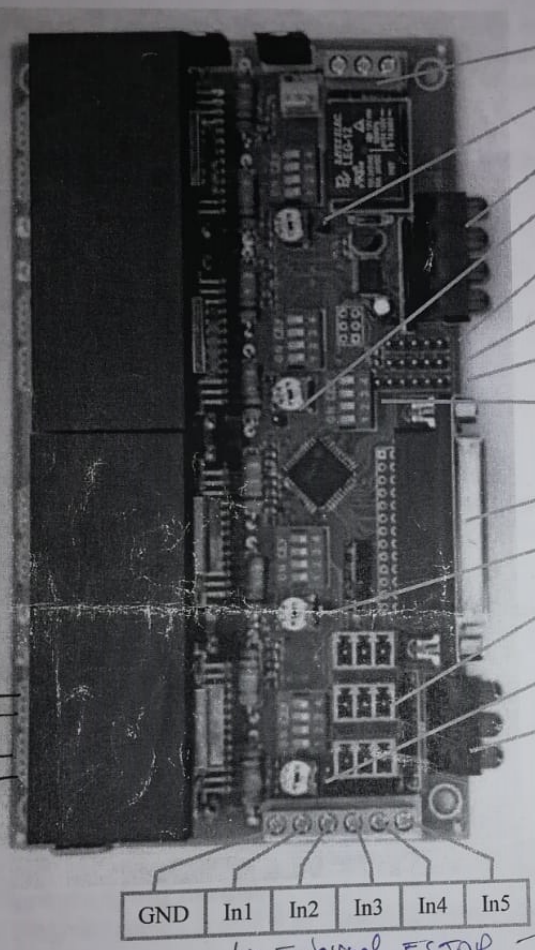

Z - A


Y - A

Motor current setting
Each axis can be separately setup to deliver different maximum current levels by adjusting on-board trimmer pot.

Next to trimmer potentiometer it's a test point.

Current calculation it's done trough formula :
Icoil = 1.9 X Vreference



24V + −

motor

GRI

NEGRU

↳ External ESTOP

Port - 1 Pin 15

Input Signals → INPUT #1 → ENABLED

MUFĂ TATĂ VEDERE DINSPRE SPATE

NEGRU

VERDE

ROSU

ALBASTRU

Dacă unul din roșcate nu se învârte în sensul corect se inversează firul NEGRU cu cel VERDE

OPRIT DRIVERUL !!

MUFĂ MAMĂ VEDERE DIN SPATE (LIPITURI)

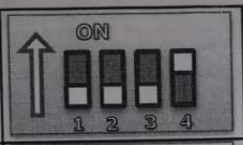
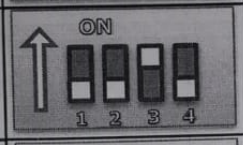
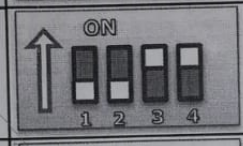
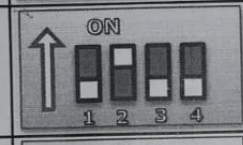
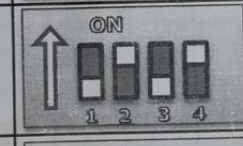
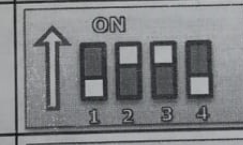
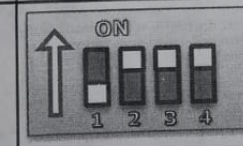
VERDE

MARO

GRI

NEGRU

211, 2

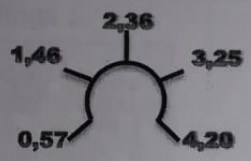
0	0	1		1/1 (2-phase excitation, full-step)
0	1	0		1/2A type (1-2 phase excitation A type) (0% - 71% - 100%)
0	1	1		1/2B type (1-2 phase excitation B type) (0% - 100%)
1	0	0		1/4 (W1-2 phase excitation)
1	0	1		1/8 (2W1-2 phase excitation)
1	1	0		1/16 (4W1-2 phase excitation)
1	1	1		Standby mode (Operation of the internal circuit is almost turned off.)

PORT A PINS -

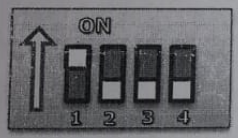
SIGNAL	ENABLED	STEP PIN	DIR PIN	DIR LOW ACT	STEP LOW ACT	STEP PORT
X Axis	V	3	2	X	X	1
Y Axis	V	~~7~~	6	X	X	1
Z Axis	V	9	~~8~~	X	X	1
A Axis	V	5	4	X	X	1

In order to measure reference voltage for each channel you should connect test leads of a multimeter set on voltage between pin 1 of input connector (it's connected to GND) and each test point of corresponding channel.

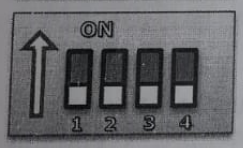
Values of coil curren related to pot position are presented below.



Low Torque
Each channel has a dipswitch with 4 switches.
Microswitch 1 it's for enabling low torque after period of inactivity (total period duration it's set on general settings microswitch).

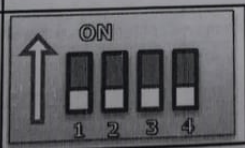


Low torque enabled.



Low torque disabled.

Microstepping modes
Microswitches 2 , 3 and 4 are used to determine microswitching like in table below.

Input			Mode (Excitation)	
M2	M3	M4		
0	0	0		Standby mode (Operation of the internal circuit is almost turned off.)

- PWM current control dual D-Mos H-Bridge
- contious setting of coil current between 0.5 – 4.1 A continuously (using a trim pot)
- 1/1, 1/2 mod A (0% - 71% - 100%), 1/2 mod B (0% - 100%), 1/4, 1/8, 1/16 Microstepping Resolution
- Per motor individual current coil reduction after a period of inactivity (lack of step pulse on inputs)
- Thermal Shutdown and Crossover Current Protection

Overview

This document describes configuration and operation of CNC4X45A stepper motor driver boards. The CNC4X45A provides an interface between a step pulse generator (PC , embedded controller etc) and up to 4 stepper motors.

Power supply : min 15 V - max.35V

Important precautions on using CNC4X25A driver :

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

Do NOT allow Vsuply to exceed +35VDC, 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