STEPPERONLINE Motors&Electronics

This document describes the basic functionality and the electrical specifications of StepperOnline's Four Axis TB6600 CNC Driver Board.

1. Key Features

- Supports MACH3, KCAM4, EMC2 etc...
- Can drive four channels 4.5A stepper motors, input voltage up to 18V 40V.
- Resolution 1, 1/2, 1/4, 1/8, 1/16 micro stepping output.
- 100% Full DC-DC high-speed optical isolation to protect the user's computer and equipment.
- Four channels of 0.4 4.5A adjustable output current for 2/4 phase bipolar stepper driver.
- Build with 2 ways relay output and 5 ways limit interface
- Automatic idle-current reduction.

2. Photo of 4-AXIS CNC Board



VFD: Variable-frequency Drive



3. PIN Define

3.1 DB25 LPT pin define:



PIN	Pin Symbols	Description
1	PWM	0-10V output control
2	STEPX	X axis pulse
3	DIRX	X axis direction
4	STEPY	Y axis pulse
5	DIRY	Y axis direction
6	STEPZ	Z axis pulse
7	DIRZ	Z axis direction
8	STEPA	Extending axis pulse
9	DIRA	Extending axis direction
10	LIMIT-1	LPT input signal 1
11	LIMIT-2	LPT input signal 2
12	LIMIT-3	LPT input signal 3
13	LIMIT-4	LPT input signal 4
14	ENABLE_ALL	All axis enable input
15	LIMIT-5	LPT input signal 5
16	RELAY1	Relay 1 control
17	RELAY2	Relay 2 control
18-25	GND	GND

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.

3.2 2x10 GPIO Define

Please note: If external device is PLC or other controllers which output voltage higher than 5V, please connect a resistor in series. (12V controller connect 1K resistor, 24V controller connect 2K resistor).

STEPPERONLINE Motors & Electronics

4-Axis TB6600 CNC Driver Board Users Manual

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1	PWM	0-10V output control
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9	DIRA	Extending axis direction
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11	LIMIT-2	LPT input signal 2
12	LIMIT-3	LPT input signal 3
13	LIMIT-4	LPT input signal 4
14	ENABLE_ALL	All axis enable input
15	LIMIT-5	LPT input signal 5
16	RELAY1	Relay 1 control
17	RELAY2	Relay 2 control
D5V	Digital 5V	Power for MCU (+5V)
DGND	Digital GND	Power for MCU(OV)
P5V	Analog 5V	Power for external sensor (+5V)
PGND	Analog GND	Power for external sensor (OV)

4. Setting

4.1 Current

Current	0.4A	1.6A	2.6A	3.2A	3.8A	4.0A	4.3A	4.5A
S1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
S2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
S3	ON	ON	ON	ON	OFF	OFF	OFF	OFF

4.2 Subdivision

Subdivision	NC	1	1/2	1/2	1/4	1/8	1/16	NC
S4	OFF	OFF	OFF	OFF	ON	ON	ON	ON
S5	OFF	OFF	ON	ON	OFF	OFF	ON	ON
S6	OFF	ON	OFF	ON	OFF	ON	OFF	ON



5. 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 4-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.

a. 4 WIRE STEPPER DIAGRAM



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

b. 6 WIRE STEPPER DIAGRAM



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).



c. 8 WIRE STEPPER DIAGRAM



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).

6. How to use MACH software?

Session Profile	
Current Profiles	
Mach3Mill	Create Profile
Plasma	Delete Profile
	Cancel
	ОК

Pic.1



4-Axis TB6600 CNC Driver Board Users Manual

🐇 Mach3 CNC Controller			_ 8 _×
Elle Config Function Cfg's View Wizards Operator PlugIn Control Help			
Program Run Alt-1 MDI Alt2 ToolPath Alt4 Offsets Alt5 Setting	s Alt6 Diagnostics Alt-7 Mill	->G15 G80 G17 G40 G20 G90	G94 G54 G49 G99 G64 G97
	R Zero +0 F Zero +0 U Zero +0 Zero +0 Zero +0 OFFLINE GOTO Z To Go	.0000 Scale +1.000 .0000 Scale +1.000 .0000 Scale +1.000 .0000 Scale -1.000 .0000 Radius Correct .0000 Radius Soft Limits Soft Limits	ool:0
File: No File Loaded.	Load V	Vizards Last Wizard sational Constitution	egen. Display Jog olpath Mode Follow
Edit G-Code Rewind Ctrl-W Single BLK Att-N Reverse Run Close G-Code Block Delete Stop Set Next Line Stop Set Next Line Mt Optional Stop Flood Ctrl-F Cwell CV Mode Run From Here On/Off Codes M.Codes	Tool Information Tool 0 Change Tool Dia. +0.0000 H H +0.0000 Auto Tool Zero Remember Return Elapsed 00:00:00 Jog Oll/OFF Ctrl-Alt-J	Feed Rate	Spindle Speed
History Clear Status:		Profile: Mach3Mill	

Pic.2



Pic.3



🐇 Mach3 CNC Controller		×
Elle Config Function Cfg's View	Wizards Operator PlugIn Control Help	
Program Run Alt-1 MDI Alt	ToolPath Alt 4 Offsets Alt5 Settings Alt6 Diagnostics Alt-7 Mill->G15 G80 G17 G40 G20 G90 G94 G54 G49 G99 G64	G97
	gine Configuration Ports & Pins	
	Encoder/MFG's Spindle Setup Mill Options Fort Setup and Axis Selection Motor Batputs Input Signals Output Signals	
	Port #1 Image: Fort Enable. Image: Fort Enable.	
File: No File Loade	Kernel Streta C 25000hr © 35000Hr © 60000hr C 55000hr © 1000hr Note: Software mut be restarted and motors kernel speed is Kernel speed is	Jog ollow ed
Cic Feed Hold <spc> Se —</spc>	pindle CW F5	RO % 100
Stop Line Alt-S> Run Fro	m Here Dwell CV Mode Remember Return Feedrate S-ov 0	
Reset	On/Off gency Mode Active. Elapsed 00:00:00 Jog 0ILOFF Ctrl-Alt-J Units/Min 0.00 Units/Rev Spindle Speed G.Codes M-Codes +0.000 Units/Rev 0.00 0	
History Clear Status	Profile: Mach3Mill	

Pic.4

En	Engine Configuration Ports & Pins									
	Encoder/MPG's Spindle Setup Mill Options Port Setup and Axis Selection Motor Outputs Input Signals Output Signals									
	Signal	Enabled	Step Pin#	Dir Pin#	Dir Low	Step Lo	Step Port	Dir Port		
	X Axis	4	2	3	X	×	1	1		
	Y Axis	4	4	5	X	×	1	1		
	Z Axis	4	6	7	X	×	1	1		
	A Axis	4	8	9	X	×	1	1		
	B Axis	X	0	0	X	×	0	0		
	C Axis	×	0	0	X	×	0	0		
	Spindle	4	1	0	X	4	1	0		
						确	定 取	2消 应用 (<u>(¥)</u>	

Pic.5



4-Axis TB6600 CNC Driver Board Users Manual

Encoder/MPG's Spindle Setup Mill Options Port Setup and Axis Selection Motor Outputs Input Signals Output Signals Signal Enabled Port # Pin Number Active Low Emulated HotKey X ++ 1 11 4 0 Image: Setup Signals O X ++ 1 11 4 0 Image: Setup Signals O Image: Setup Signals Image: Setup Signals X ++ 1 11 4 0 Image: Setup Signals X ++ 1 11 0 Image: Setup Signals Image: Setup Signals Image: Setup Signals Y ++ 1 12 4 0 Image: Setup Signals Image: Setup Signals Image: Setup Signals Y ++ 1 12 4 0 Image: Setup Signals Image: Setup Signals Image: Setup Signals Y ++ 1 13 4 0 Image: Setup Signals Image:	Configuration	. Ports & P	ins					
Fort Setup and Axis Selection Motor Outputs Input Signals Output Signals Signal Enabled Port # Pin Number Active Low Emulated HotKey X ++ 1 11 4 0 1 0 X 1 11 4 0 1 0 1 X 1 11 0 0 0 1 0 1 X Home 1 0 2 0 0 1 1 1 1 1 1 1 1 1 1 1 0 1	Encoder/MPG's		Spindle	e Setup	1	Mill	Options	
Signal Enabled Port # Pin Number Active Low Emulated HotKey X ++ 1 11 4 0 0 X 1 11 4 0 0 X Home 1 0 2 0 0 X Home 1 12 4 0 0 Y ++ 1 12 4 0 0 Y Home 1 0 2 0 0 0 Y Home 1 13 4 0 0 0 0 Z Home 0 0 2 0 0 0 0 0 A ++ 1 15 4 0 0 0 0 0 0 0	Port Setup and Axis Selection Motor Outputs Input Signals Output Signals							
X ++ A 1 1 1 1 0 1 0 1 X ++ 1 11 1 1 0	al Enabled	Port #	Pin Number	Active Low	Fmulated	HotKey		
X 1 11 1 0 0 0 X Home 1 0 X 0 0 0 Y Home 1 12 X 0 0 Y Home 1 12 X 0 0 Y Home 1 12 X 0 0 Y Home 1 13 X 0 0 Z Home 0 0 X 0 0 A ++ 1 15 X 0 0		1	11	4	×	0		
X Home 1 0 X 0 Y ++ 1 12 X 0 Y 1 12 X 0 Y Home 1 0 X 0 Y Home 1 0 X 0 Z Home 1 13 0 0 Z Home 0 0 0 0 A ++ 1 15 X 0	- <u>4</u>	1	11	4	×	0	- 3	
Y ++ 1 12 Image: Constraint of the second sec	me 🔀	1	0	X	X	0		
Y I 12 I 0 Y Home I 0 I 0 I 0 Z ++ I 13 I 0 I 0 Z I 13 I 0 I 0 Z Home 0 0 I 0 I 0 A ++ I 15 I 0 I 0	4	1	12	4	X	0		
Y Home Y 1 0 Y 1 0 Y 0 Z ++ 1 13 1 0 0 0 Z 1 13 1 0 0 Z 1 13 1 0 0 Z Home 0 0 1 0 0 A ++ 1 15 1 0 0		1	12	4	X	0	_	
Z ++ 1 13 1 0 Z 1 13 1 0 Z Home 0 0 1 0 A ++ 1 15 1 0	me 🔀	1	0	X	X	0		
Z I I3 I O Z Home I O I I A ++ I I I5 I O	· 🖌	1	13	4	X	0		
Z Home X 0 X 0 0 A ++ 1 15 X 0 0 0		1	13	4	X	0		
A ++ 🖌 1 15 🖌 🥻 0	me 🔀	0	0	X	X	0		
	· 🖌	1	15	4	X	0	~	
		1.	· · -		h.n	-		







Engine Configuration Ports & Pins								
	Encoder/MPG's Spindle Setup Mill Options							
	Fort Setup and Axis Selection motor Outputs input Signais Output Signais							
	Signal	Enabled	Port #	Pin Number	Active Low			
	Digit Trig	X	0	0	X			
	Enable1	4	1	14	4	E		
	Enable2	X	0	0	X			
	Enable3	X	0	0	X			
	Enable4	X	0	0	X			
	Enable5	X	0	0	X			
	Enable6	X	0	0	X			
	Output #1	4	1	16	4			
	Output #2	4	1	17	4			
	Output #3	X	0	0	X			
	Output #4 🗶 0 0 🛛 🗶 💌							
	Pins 2 - 9 , 1, 14, 16, and 17 are output pins. No other pin							
	确定 取消 应用 (4)							

Pic.8

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(Please note: some of computer has opposite "Active low" and "Active high", if it is with your computer, please change above three "Active Low" to "Active High".)

Engine Configuration Por	ts & Pins		
Port Setup and Axis Selection Encoder/MPG's -Relay Control	Motor Outputs Spindle Setup	Input Signals	Output Signals Mill Options
□ Disable Spindle Rel Clockwise Output CCW 0M4) Output Output Signal #'s Flood Mist Control ✓ Disable Flood/Mist re Mist Output	Vise Spindle Motor Outr Vise Spindle Motor Outr Step/Dir Moto Torch Volts Conti PWMBase Freq. 5 Minimum PWM 0 %	ent Pulley Min Spe Pulley Ratio 0 Pulley Ratio 0 Pulley Ratio 0 Pulley Ratio 0	ed Max Speed 1000 2000 4000 8000 tions
Flood Output 4 Output Signal #'s ModBus Spindle - Vse Step/Dir as Enabled Reg 64 64 - Max ADC Count 16380	CW Delay Spin UP 1 Sec CCW Delay Spin UP 1 Sec wellJelay Spind DOWN 1 Sec CCW Delay Spin DOWN 1 Sec Immediate Relay off befor	conds Laser Mode conds Vse Spindl conds Closed Loc conds P 0.25 : e d Spindle Sp	e. freq by Feedra Le Feedback in Sync M op Spindle Cont I 1 D 0.3 peed Averagi
		确定	取消 应用 (A)

Pic.9



Pic.10



🐇 Mach3 CNC Controller			
Elle Config Function Cfg's View Wizards Operator PlugIn Control Help			
Load G-Code MDI Alt2 ToolPath Alt4 Offsets Alt5 Setting	s Alt6 Diagnostics Alt-7 Mil	I->G15 G80 G17 G40 G20 G90	G94 G54 G49 G99 G64 G97
Close File(s)			
Exit	R Zero +O	0000 +1.0000	ool:0
	F F	11.0000	
	A Y +0	.0000 scale	a P
		+1.0000	The .
F60.000000	H Z +0	.0000 scale	I francisco de la companya de la com
G0 X0.000000 Y0.000000 Z0.200000 M3		1.0000	
S60.000000 G43H5	E 4 +0	.0000 Radius Correct	
G0 X0.000000 Y0.000000 Z0.200000 C0 X1 170050 X1 001260 Z0 200000			
G0 X1179950 Y4.004280 20.200000 G1 X1.179950 Y4.004260 Z-0.100000	OFFLINE GOTO Z TO GO	Machine Soft Coord's Limits	-
File: DiMach2)C Cadalraadrupper tap	Load \	Vizards Last Wizard R	egen. Display Jog
File. D. Machs/GCode/road/uniter.tap	Conver	sational Condition To	olpath Mode Follow
Edit G-Code Rewind Ctrl-W	Tool Information	Feed Rate	Spindle Speed
Cycle Start Recent File Single BLK Alt-N	Chapter	OurDidden FRO %	printe speed
Close G-Code Reverse Run		100	Spindle CW F5 100
Feed Hold Load G-Code	Dia. +0.0000	5 A Reset	E A Reset
<pre><spc></spc></pre> Set Next Line Block Delete	H +0.0000		
Stop Line 0 Eload Ctrl E	Auto Tool Zero	FRO 6.00	RPM 0
<alt-s> Run From Here Dwell CV Mode</alt-s>	Remember Return	Feedrate	
	Elapsed 00:00:01	6.00	5-00 0
Reset 7 Inhibit		Units/Min 0.00	Spindle Speed
G-Codes M-Codes +0.000	Jugonor carrates	Units/Rev 0.00	0
		Destitud.	
History Clear Status:		Profile: Mach3Mill	

Pic.11



Pic.12