# **User's Manual**

For

# ST-6560V4

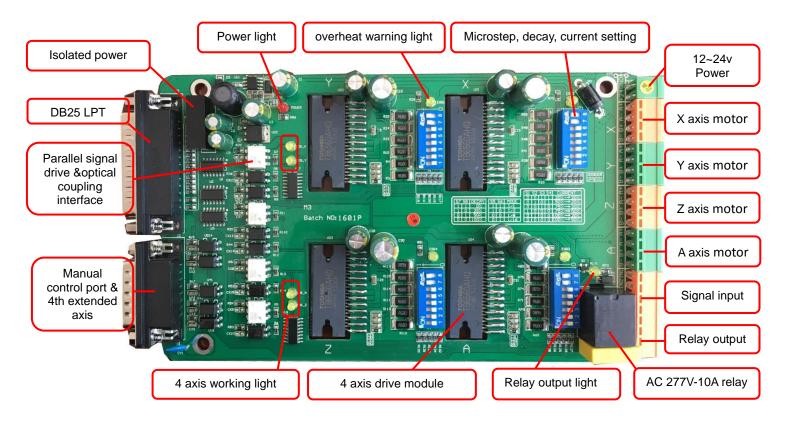
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# 1. Key Features

- Toshiba TB6560AHQ chip High power, maximum current 3.5A
- Resolution 1, 1/2, 1/8, 1/16 micro stepping output
- Working voltage DC12-DC30V, rated voltage 24V
- Adjustable current with 100%, 75%, 50%, 20% of full current by on-board switch.
- Half current function when no signal to prevent motor heating
- Build with a 227V 10A Relay
- Manual Control circuit included
- Overload, over-current and over-temperature safety
- Protect the computer by using isolating power(1000V DC\DC) and optoelectronic coupler
- Supports most parallel software MACH3, KCAM4, EMC2 etc.
- Fixed in Aluminum box, better cooling function than fan and safer protection for board circuit

# 2. Photo of 4-AXIS CNC Board





# 3. Hardware Installation

#### 3.1 Selecting and Connecting Stepper Motors

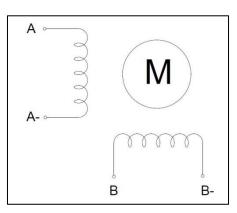
WARNING: INCORRECT WIRING OF THE STEPPER MOTOR TO THE DRIVE BOARD CAN LEAD TO

IMMEDIATE DAMAGE OF DRIVE BOARD - DO NOT CONNECT OR DISCONNECT MOTORS WHILE POWER

IS ON.

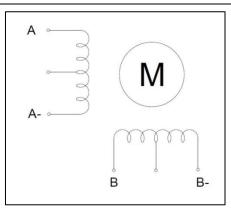
- 4 Wire, 6 Wire, and 8 Wire stepper motors can be used.
- 4 Wire motors are recommended as they are by their manufacture true bipolar motors and easier to properly connect to stepper motor drive controller.
- It is critical to obtain a proper motor coil diagram of any motor you wish to utilize (making 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).

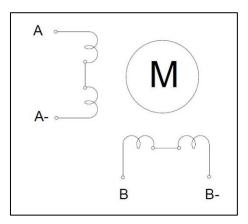
#### b. 6 Wire Stepper Diagram



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).

#### 3.2 Connect to 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.

PIN	Signal
1	NC
2	X axis pulse input
3	X axis direction input
4	Y axis pulse input
5	Y axis direction input
6	Z axis pulse input
7	Z axis direction input
8	A axis pulse input
9	A axis direction input
10	LPT input signal 1 (corresponding IN1 on the board)
11	LPT input signal 2 (corresponding IN2 on the board)
12	LPT input signal 3 (corresponding IN3 on the board)
13	LPT input signal 4 (corresponding IN4 on the board)
14	NC
15	LPT input signal 5 (corresponding IN5 on the board)
16	All axis enable input
17	Output control of relay (227V/10A)
18-25	GND

It is critical that your computer has parallel port DB25 outlet, 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 recommended and most likely will not work.

### 3.3 Manual Control

PIN	Input Signal 0V~5V
1	X axis pulse input
2	X axis direction input
3	Y axis pulse input
4	Y axis direction input
5	Z axis pulse input
6	Z axis direction input
7	All axis enable input
8	Connect to the collector of NPN in relay, and connect to 24V through relay
9	A axis pulse input
10	A axis direction input
11	24V power output (<500mA condition)
12	Manual control signal input for relay
13	5V power output (<50mA condition)
14	Direct connecting to IN1, as the input signal of parallel port PIN10
15	Power GND

# 3.4 Port for extending and relay

PIN (0V~5V)	1	2	3	4	5	6	7	8	9	10
Input Signal	IN1	IN2	IN3	IN4	IN5	GND	L2	L1	NC	NC

# 4. Setting

Working Current> Pause current	S1	S2	<b>S</b> 3	<b>S</b> 4
20%>20%	0	0	1	1
50%>20%	0	1	0	1
75%>20%	0	0	1	0
75%>50%	1	0	0	0
100%>20%	0	1	0	0
100%>50%	0	0	0	0

#### 4.1 Current adjusting and default testing

**EXAMPLE:** 75%-->20%

Working current=3.5A \*75%, Pause current=3.5A \*20%

4.2	Subdivision	mode &	Decay mode	setting

	S5	<b>S</b> 6		<b>S</b> 7	<b>S</b> 8
1	1	1	NO DECAY	1	1
1/2	1	0	SLOW DECAY	1	0
1/8	0	0	MID DECAY	0	1
1/16	0	1	FAST DECAY	0	0

Note: If there is bumming when motor running or locked, it can be eliminated by setting the decay mode.

# 5. How to use MACH software?

See Pic.1: open MACH3, choose Mach3mill,click OK.

	Session Profile	1	×
Machi Nachi Loader	Current Profiles	Create Profile	
Mach3Mill	Mach3Turn Plasma	Delete Profile	
-			
Mach3Turn			



See Pic.2, there are common use buttons.

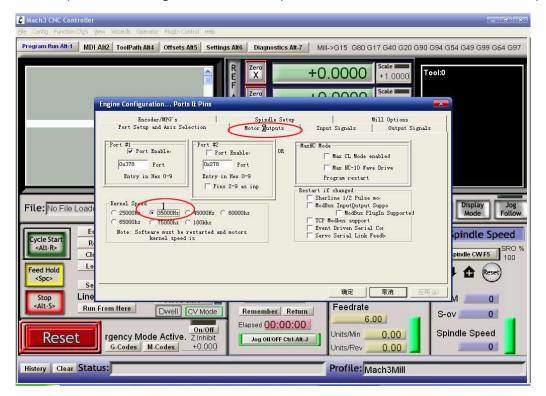
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File: No File Loaded	Wizards         Last Wizard         Regen.         Display         Jog           sational         Exercised         Toolpath         Mode         Follow					
Edit G-Code       Rewind Ctrl-W         Single BLK Alt-N       Recent File         Close G-Code       Block Delete         Feed Hold       Set Next Line         Stop       Stop         Alt-So       Run From Here         Divell       On Off         G-Codes       M-Codes         Color       On Off         G-Codes       M-Codes	Feed Rate       Spindle Speed         OverRidden       FRO %         100       FRO %         100       FRO %         FRO 6.00       Feedrate         6.00       S-ov         Units/Min       0.00         Units/Rev       0.00					
History Clear Status:	Profile: Mach3Mill					

See Pic.3, open config----ports and pins

🕻 Mach3 CNC Controller 📃 🖉 💌						
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Pro Select Native Units Alt2 ToolPath Alt4 Offsets Alt5 Settings	Alt6 Diagnostics Alt-7 Mill	->G15 G80 G17 G40 G20 G90	G94 G54 G49 G99 G64 G97			
Mator Tuning General Corfig System Hotkeys Homing/Links ToolPath Slave Axis Backlash Frictures ToolTable Corfig Plugins Spindle Pulleys Safe Z Setup Save Settings	F         Zero         +0           H         Zero         +0           M         Zero         +0           M         Zero         +0           OFFLINE         GOTO Z         To Go	.0000 .0000	egen. Display Jog			
File: No File Loaded.			olpath Mode Follow			
Cycle Start (Alt-R>       Edit G-Code Recent File       Rewind Ctrl-W         Feed Hold (spc)       Single BLK Alt-N       Reverse Run         Feed Hold (spc)       Load G-Code       Block Delete         Stop (slt-S)       Bit Next Line       Block Delete         Stop (slt-S)       Line       D         Run From Here       Dwell       CV Mode         Reset       Conoff       Z Inhibit         G-Codes       M-Codes       +0.000	Tool Information         Tool       0         Dia.       +0.0000         H       +0.0000         Auto Tool Zero         Remember       Return         Elapsed Q0:00:00         Jog Oll OFF Ctrl-AR-J	Feed Rate           OverRidden         FRO %           100         100           FRO         6.00           Feedrate         6.00           Units/Min         0.00           Units/Rev         0.00	Spindle Speed Spindle CWF5 100 SPO % RPM 0 S-ov 0 Spindle Speed 0			
History Clear Status:		Profile: Mach3Mill				

Pic.3

See Pic.4, Circle 1 frequencies setting, to control the speed, and then click Circle 2 to define ports & pins.



# See Pic. 5, X\ Y\ Z\ A\ axis "motor outputs"

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	XAxis	4	2	3	*	×	1	1		
	Y Axis	4	4	5	×	*	1	1.		
	ZAXIS	4	6	7	*	×	1	-		
File: No File Load	A Axis	4	8	9	×	×	1	1	- Pard	
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Pic.5

See Pic. 6, set "output signals"

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	Signal	Enabled	Port #	Pin Number	Active Low	-	
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	Enable2	<b>X</b>	1	16	X		
-	Enable3	X	1	16	X		
and the second	Enable4	4	1	16	X		
File: C:\Document:	Enable5		1	0	X		Display Jog
	Enable6	<u>×</u>	1	0			Mode Follow
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Cycle Start R	Output #2	X	1	0	X		pindle Speed
<alt-r></alt-r>	Output #3		1	0	<u> </u>	-	SRO %
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<spc></spc>							
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See Pic. 7, pulse width setting: Step impulse: 5us, Direction impulse: 5us

Pic.7

Pls click "load G-code", see Pic.8 and Pic.9

🛃 Mach3 CNC Controller	- 0 <b>-</b>
Eile Config Function Cfg's View Wizards Operator PlugIn Control Help	
Load G-Code 1 MDI Alt2 ToolPath Alt4 Offsets Alt5 Settings Alt6 1	Diagnostics Alt-7 Mill->G15 G80 G17 G40 G20 G90 G94 G54 G49 G99 G64 G97
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File:     D:\Mach3\GCode\roadrunner.tap     Load Wizards     Last Wizard     Regen.     Display     Jog       Conversational     Conversational     Conversational     Conversational     Follow	
Cycle Start     Recent File     Single BLK AR-N     TOOL       Close G-Code     Reverse Run     Dia.       Feed Hold     Load G-Code     Block Delete       Stop     Set Next Line     M1 Optional Stop       Chine     O     Flood Ctrl-F       Alt-S>     Run From Here     Dwell       On/Off     Elaps	Linformation Chance OverRidden FRO OverRidden FRO Court Court Court FRO Court Cour
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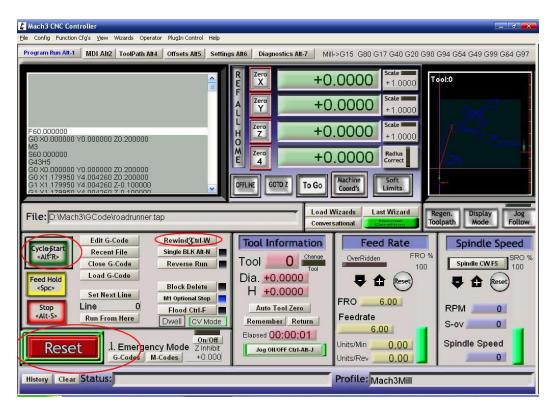
#### & Mach3 CNC Controlle Program Run Alt-1 MDI Alt/2 ToolPath Alt/4 Offsets Alt/5 Settings Alt/6 Diagnostics Alt.7 Mill->G15 G80 G17 G40 G20 G94 G54 G49 G99 G64 G97 Zero X +0.0000ool:0 +1.0000 Scale I 打开 查找范围 (L): Code - 🗧 🖆 📰 ball.tap balld.tap Cross.tap Ì 我最近的文档 🖻 NestCircle.tap G roadrup 桌面 我的文档 Regen. Display Jog Toolpath Mode Follow File: No File Loaded **夏**夏 我的电脑 Edit G-Code Spindle Speed Cycle Star <Alt-R> Recent File 网上邻居 Spindle CW F5 SRO 1 Close G-Code roadrunner • 打开 (0) 文件名 (M): Load G-Code Feed Hold B 🔒 (Reset <Spc> 文件类型(T): • (\*. tap) 取消 Set Next Line 「 以只读方式打开 (R) Line RPM 0 <Alt-S> Feedrate Run From Here Dwell CV Mode Remember Return S-ov 0 6.00 Elapsed 00:00:00 s Reset .... Emergen Z Inhibit G-Codes M-Codes +0.000 Spindle Speed Units/Min 0.00 Reset Jog ON/OFF Ctrl-Alt-J Jnits/Rev 0.00 0 History Clear Status: ReConfiguration Estop Profile: Mach3Mill

4-Axis TB6560 CNC Driver Board User Manual - ST-6560V4

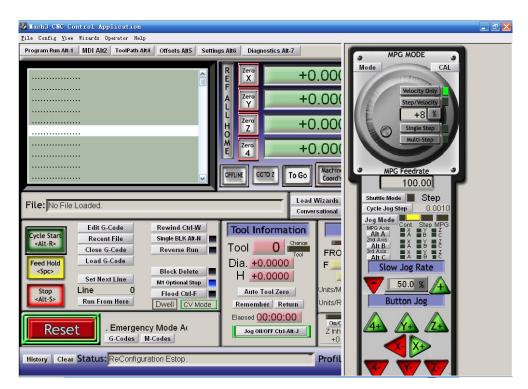
Pic.9

After open the G-code, the Reset light is blinking which means you are in stop condition. You can solve it

by clicking the Reset button(see circle 1), then click circle 2 to start "Cycle-start" .



If you need manual control, pls click TAB button (see Pic.11)





# 6. FAQ

1. Q: For long time working, the aluminum housing very hot, it' s normal?

A: Yes. It' s normal, at normal temperature, housing temperature reach 90°C is normal.

2. Q: How to confirm A+, A-, B+, B- of stepper motor?

A: Choose two wire randomly, connect them, see if there is resistance when run the motor shaft using finger, if there is resistance, then you take these two wires with A+ and A-, and the rest of the wire will be B+ and B-.

3. Q: There is vibration when motor running or noise when motor locking, how to eliminate it?

A: You can try to set the decay mode to eliminate it.

### 7. Contact

For further technical questions, please don't hesitate contact us our email