## User Guide for 3 axis TB6560 driver board

#### **Product Features:**

- Toshiba TB6560AHQ chip High power, maximum 3.5A drive current chipset !
- 1-1/16 microstep setting Higher accuracy and smoother operation than standard 1, 1/2 step!
- Adjustable 1.5A-3A drive current settings for each axis 25%,50%,75%,100% of full current can be set for different stepper motors
- Overload, over-current and over-temperature safety Full protection for your computer and peripheral equipment !
- On board current switching Power output can be set according to specific user requirement !
- Full closed-type optical isolation to protect the user's computer and equipment
- Relay spindle interface Outputs Max. 36V 7.5A for spindle motors or coolant pump (only one device can be powered by this output!)
- 4 channel inputs interface- Can be used for XYZ limit and emergency stop !
- Professional design Two stage signal processing with super anti- jamming !
- Bipolar constant current chopper drive with non-resonant region Controls motors smoothly through range
  without creep effect !
- Four control inputs (divided into pairs of knives) Allows setting of limit and emergency stop !
- Universal architecture Supports most parallel software MACH3,KCAM4 etc!

#### **Dip settings:**

Current Setting	1	2	Decay Mode Settings	3	4	MicroStep Settings	5	6
100%	ON	ON	FAST	ON	ON	1	ON	ON
75%	ON	OFF	25%	ON	OFF	1/2	ON	OFF
50%	OFF	ON	50%	OFF	ON	1/8	OFF	ON
25%	OFF	OFF	SLOW	OFF	OFF	1/16	OFF	OFF

#### \* Important Notes:

• Power supply DC 12-36V (not included)

\*Voltage Selection:

12-16V DC power supply for Nema 17 stepper motors

16-24V DC power supply for Nema 23 stepper motors

24-36V DC power supply for Nema 34 stepper motors

(High voltage will burn up the chips or stepper motors!!!)

\*Ampertage Selection:

Output current of the power supply can be calculated by the following expressions:

Output current = Rated current of your stepper motors \* quantity + 2A

(For example, if you want to drive 3 \* 3A Nema 23 stepper motors, theoretically 24V 11A DC power

supply is recommended, but higher power such as 24V 15A also will be good.

If you are not sure about the selection of power supply, please feel free to contact us for help)

- The power output of 12V shall be applied to the radiator fan of 12V
- Driver output compatible with 2 or 4 phase, 4,6 or 8 lead stepper motors, 3A max.
- Suitable for unipolar or bipolar stepper motors.
- Voltage regulated spindle speed controlled by parallel interface as function of supply voltage.





## The definition of 1-PIN 25 of Parallel Interface:

PIN9	PIN14	PIN7	PIN1	PIN2	PIN3	PIN8	PIN6	PIN4	PIN5	PIN16	PIN17
spindle motor	X Enable	X Dir	X Step	Y Enable	Y Dir	Y Step	Z Enable	Z Dir	Z Step	Expand output 1	Expand output2

### The definition of 1-PIN15 of Manual Interface:

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
X Step	X Enable	Spindle Motor	X Dir	Y Enable	Z Dir	Z Step	Z Enable	Y Limit	Z Limit	Y Dir	Y Step	STOP	GND	5v/VDD

The definition of DB9 4 channel inputs interface:

P1	P2	P3	P4	P5
X Limit	Y Limit	Z Limit	STOP	GND
Corresponding P10	Corresponding P11	Corresponding P12	Corresponding P13	

Connection Diagram:



Limit setting FOR REFERENCE ONLY:

(\*Note: you can also have other settings for other applications)

En	.coder/MPG's	I,	Spindle	e Setup	I	Mill Op	tions
Port Set	up and Axis Sel	ection	Motor Outp	uts	Input Signals	Ou	tput Signals
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	<b></b>
X ++	4	1	10	4	X	0	
X	4	1	10	4	X	0	
X Home	4	1	10	4	X	0	
Y ++	4	1	11	4	X	0	
Ү	4	1	11	4	X	0	
Y Home	4	1	11	4	X	0	
Z ++	4	1	12	4	X	0	
z	4	1	12	4	X	0	
Z Home	4	1	12	4	X	0	
A ++	X	1	0	X	X	0	-
	- <b>1</b>	1.	-	<b>b.a</b>	h.a	-	
	Pins 10-13 @	und 15 are inpu	its. Only these	5 pin numbers	may be		
						C.4	
					Automated	. Setup of 11	aputs

Encod	ler/MPG's	r	Spindle	e Setup		Mill Options
Port Setup	and Axis Sel	ection	Motor Uutp	uts	Tubnt piguara	Uutput Signals
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey 🔺
Input #4	X	1	0	X	X	0
Probe	X	1	0	X	X	0
Index	X	1	0	X	X	0
Limit Ovrd	X	1	0	X	X	0
EStop	4	0	13	4	X	0
THC On	X	1	0	X	X	0
THC Up	X	1	0	X	X	0
THC Down	X	1	0	X	X	0
OEM Trig #1	X	1	0	X	X	0
OEM Trig #2	X	1	0	X	X	0
	<b></b>	1.	i -		h.a	
	Pins 10-13 a	nd 15 are input	ts. Only these	5 pin numbers	may be	
					Automated	Setup of Inputs

The definition of output Interface:

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
VD D	GN D	XA +	XA-	XB +	XB-	YA+	YA-	YB +	YB-	ZA+	ZA-	ZB+	ZB-	MO /V+	GN D	MO -

Instructions of MACH3



Fig.1

Open MACH3 software, select mach3MILL, and then click OK. Please refer to Fig.1

🐉 Mach3 CNC Controller	
Elle Config Function Cfg's <u>Vi</u> ew Wizards Operator PlugIn Control Help	
Program Run Alt-1 MDI Alt2 ToolPath Alt4 Offsets Alt5 Settings	Is Alt6 Diagnostics Alt-7 Mill->G15 G80 G17 G40 G20 G90 G94 G54 G49 G99 G64 G97
	R    Zero    +0.0000    \$cale    +1.0000      A    Y    +0.0000    \$cale    +1.0000      Y    +0.0000    \$cale    +1.0000      Zero    +0.0000    \$cale    +1.0000      Zero    +0.0000    \$cale    +1.0000      Zero    +0.0000    \$care    +1.0000      GOTO Z    To Go    Machine    \$soft      Jord    To Go    Correct    Soft
File: No File Loaded.	Load Wizards Last Wizard Regen. Display Jog Conversational Genetitien Mode Follow
Edit G-Code    Rewind Ctrl-W      Cycle Start    Recent File <alt-r>    Close G-Code      Feed Hold    Load G-Code      <spc>    Set Next Line      Stop    Line      <alt-s>    Run From Here</alt-s></spc></alt-r>	Tool Information    Feed Rate      Tool    O    Chanae      Dia. +0.0000    Tool    00      H    +0.0000    FRO      Auto Tool Zero    FRO    6.00      Remember Return    Feedrate    S-ov      Elansed 00:00:00    6.00    S-ov
Reset Emergency Mode Z Inhibit G-Codes M-Codes +0.000	Jog OII/OFF CtrI-Alt-J      Units/Min      0.00      Spindle Speed        Units/Rev      0.00      0      0
History Clear Status:	Profile: Mach3Mill

The interface of *MACH3* is displayed as Fig.2. The frequently-used action buttons are listed on the interface. We can configure *MACH* software at first.



Fig.3

Click *PORT* & *PIN* sub-menu of *config* menu. Please refer to Fig.3. Please refer to Fig.4

Mach3 CNC Controller
rogram Run Alt-1 MDI Alt2 ToolPath Alt4 Offsets Alt5 Settings Alt6 Diagnostics Alt-7 Mill->G15 G80 G17 G40 G20 G90 G94 G54 G49 G99 G64 G9
Cogram Run Alt-1    MDI Alt2    ToolPath Alt4    Offsets Alt5    Settings Alt6    Diagnostics Alt-7    Mill->G15    G80    G17    G40    G20    G90    G94    G54    G49    G99    G64    G99      If Zero    +0.0000    Scale      Fort    Fort    Fort    Fort    Fort    Fort    Spindle    Setup    Mill    Mill Options    Output Signals      Fort    #1    Image: Tool of the setup    Motor Qutputs    Input Signals    Output Signals    Output Signals      Fort    #1    Image: Tool of the setup    Max NC Mode    Max NC Mode    Max NC Mode    Max NC Mode    Max NC 10 Wave Drive      Fort    #1    Image: Tool of the setup    Max NC 10 Wave Drive    Max NC 10 Wave Drive    Max NC 10 Wave Drive      Fort    #1    Image: Tool of the setup    Image: Tool of the setup    Max NC 10 Wave Drive    Max NC 10 Wave Drive      Fort    #1    Image: Tool of the setup    Image: Tool of the setup    Max NC 10 Wave Drive    Max NC 10 Wave Drive      Image: Tool of the setup    Fins 2-9 as inp    Fins 2-9 as inp    Fins 2-9 as inp
File: No File Loads    Kernel Speed    45000Hz    60000hz    Shert Linkinged      Cycle Start    Ec      Alt-R>    Ctc    R    Ctc    Servo Serial Link Feedb    Servo Serial Link Feedb      Feed Hold    Lo    Servo Serial Link Feedb    Servo Serial Link Feedb    Servo Serial Link Feedb
Stop Line 通定 0
Control    Remember    Return    Feedrate    S-ov    Ov      Reset    rgency Mode Active.    Z Inhibit    Jog Oll/OFF Ctrl-Alt-J    Units/Min    0.00    Spindle Speed      G-Codes    M-Codes    +0.000    Units/Rev    0.00    0    0
listory Clear Status: Profile: Mach3Mill
<mark>- start )</mark> 💋 💿 🥶 🧐 🌾 💫 阿里旺旺 - sol 🍋 开发工具 🦉 3 - 画图 🛛 🛃 Mach3 CNC Co 🍃 1 🛛 🕹 🙅 🝚 👽 👽 07

Fig.4

To set up the basic frequency within the above Circle 1. This parameter will affect the rotational speed of the motor. After the setup of basic frequency, select Circle 2 where *Configuration Scripting* will be defined, please refer to Fig.5.

Engine Configur	ation Ports	& Pins					×
En Port Setu	coder/MPG's up and Axis Sel	ection	Spin Motor Ou	ile Setup tputs	 Input Signal	Mill 0 Ls   (	ptions Dutput Signals
Signal	Enabled	Step Pin#	Dir Pin#	Dir Low	Step Lo	Step Port	Dir Port
X Axis	4	1	7	X	X	1	1
Y Axis	4	8	3	X	X	1	1
Z Axis	4	5	4	X	X	1	1
A Axis	×	0	0	X	X	0	0
B Axis	×	0	0	X	X	0	0
C Axis	×	0	0	X	X	0	0
Spindle	×	0	0	X	X	0	0
·							
						E   取i	肖 应用 (A)

To modify the software settings according to the definition of Parallel Interface which is detailed in the above circle.

Port Setup and	d Axis Selection '	Motor	Outputs I In	put Signals	Output Signals
-					
Signal	Enabled	Port #	Pin Number	Active Low	<b></b>
Digit Trig	X	1	0	X	
Enablei	4	1	14	X	
Enable2	4	1	2	X	
Enable3	4	1	6	X	
Enable4	X	1	9	X	
Enable5	X	1	0	X	
Enable6	X	1	0	X	
Output #1		1	9	X	
Output #2	X	1	0	X	
Output #3	X	1	0	X	
Output #4	<b>X</b>	1	0	X	<b>•</b>
Pir	as 2 - 9 . 1. 14. 16	. and 17 are ou	tput pins. No other	pin	
	,,,,		• • • • • • • • • • • • • • • • • • • •	•	

Fig.6

Then select the *output signals* column, as shown in Fig.6, and set up the corresponding items per the setup described in the circle.



Fig.5

After all have been set up, open the G CODE that needs to run, as shown in Fig.7

🐇 Mach3 CNC Controller			×
File Config Function Cfg's View Wizards	Operator PlugIn Control Help		
Program Run Alt-1 MDI Alt2 ToolP	ath Alt4 Offsets Alt5 Settin	ngs Alt6 Diagnostics Alt-7 Mill->G15 G80 C	G17 G40 G20 G90 G94 G54 G49 G99 G64 G97
	打开	R Zero +0.0000	Scale Scale 7 Scale
	查找范围 (I): Code	• 🔁 🛨 🛨	
File: No File Loaded. Cycle Start <alt-r> Feed Hold <spc> Edit G-Code Recent File Close G-Code Load G-Code Set Next Line</spc></alt-r>	戦最近的文档 重 東面 東面 東面 東面 東面 北 中 にでは、 日 同 にでるれていた。 日 ででのるれていた。 日 でのするれていた。 でのするれていた。 での	roadrunner	Regen. Display Jog Toolpath Mode Follow D % D % D % D % D % D % D % D % D % D %
Stop Line			RPM 0
Run From Here Reset s Rese G-Code	Dwell CV Mode on/off t Emergen Z Inhibit s M-Codes +0.000	Remember Return Elapsed 00:00:00 Jog Oll OFF Ctrl-Alt-J Units/Rev	.00      S-ov      0        0.00      Spindle Speed      0        0.00      0      0
History Clear Status: ReCo	onfiguration Estop.	Profile: N	1ach3Mill
🦺 start 🛛 😂 💿 👰 🦉 🌾		. 🦳 🦉 7 - 画图 🛛 🗁 驱动板	

Fig.8



After G CODE has been opened, you may see the red button RESET flashing. Click RESET to stop the flashing and then press CYCLESTART at the location of Circle 2

# \*Simple solutions if the driver does not work properly:

- Please double check the software settings according to the Fig.5 and Fig.6
- Please conform the parallel cable has been pluged tightly
- Please turn off the power supply before changing dip settings
- Please use stable high quality DC power supply for this driver
- Problems in Mach3 using, Please refer to the Mach 3 User Manual
- If problem persist, please feel free to contact us!