ST6560-T3 3axis mach3 cnc Stepper Motor Controller operation instruction



1

Content

ST6560-T3 3axis mach3 cnc Stepper Motor Controller operation instruction	1
I. features of ST6560-T3	3
II 、 Applications:	3
III、Electrical drawing	4
V. Definition on pins of parallel port	4
VII.Limit switch connection	6
VIII. Adjusting current decay, microstep resolution, current output	7
1. Current decay adjustment	7
3、Current setting	9
IX. stepper motor Connection	9
X.The choice of stepper motors and its power	10
XI、Usage of MACH3	12
1 Startup Mach3	12
3、Adjusting limits witch of mach3	15
4、Running of G code	16
5. How to use the manual control interface of MACH3	18

I. features of ST6560-T3

- It Can drive 3 stepper motor running at the same time, the 4th axis also can be added, if you need to extend it ;
- It has High-speed photoelectric coupler and DCDC (dc isolation module), Can strongly protect your computer not to be damaged;
- **U** One relay, it can be used to control spindle start and stop;
- u standstill current automatically reduced to 50% of the selected dynamic current one second after the last pulse,;
- **u** 4 axis 0.8-3.5A (peak) adjustable current, four running mode, microstep resolution (1, 1/2, 1/8, 1/16);
- **u** Interface with Standard parallel port, support MACH3 or other parallel port software;
- Four input port, Can connect to the limit switch, emergency stop, or other Input devices;
- U Power supply voltage : 12-36VDC.

$II \sim Applications:$

Suitable for a wide range of stepping motors, from size 39mm to 57mm. It can be used in various kinds of machines, such as engraving machines, laser cutters ,and so on.

$\mathrm{III}_{\mathbb{V}}$ Electrical drawing



V. Definition on pins of parallel port



	25 phi paraner port control is defined as follows.						
DB25 PIN	The role of the pin on	notes					
	driver board						
1	EN	Enable all axis					
2	STEPX	X pulse signal					
3	DIRX	X direction signal					
4	STEPY	Y pulse signal					
5	DIRY	Ydirection signal					
6	STEPZ	Z pulse signal					
7	DIRZ	Z direction signal					
10	LIMIT-1	X axis Limit					
11	LIMIT-2	Y axis Limit					
12	LIMIT-3	Z axis Limit					
13	LIMIT-4	Emergency stop					
14	Relay control						
15	NC	Not connect					
16	STEPB-	B (4th axis) pulse signal					
17	DIRB-	B(4th axis) direction signal					
18-25	GND						

Fig.2 25-pin parallel port control is defined as follows:

VI.The extend connection of 4th axis





VII.Limit switch connection



VIII. Adjusting current decay , microstep resolution, current output





1. Current decay adjustment

The D1D2 are switches on the panel to set the current decay value

DIP switch on of two D1D2:, D1/D2:

ON/ON—100%; ON/OF—25%;

OF/ON—50%; OI	F/OF	
DIP D1	DIP D2	Mode
ON	ON	Fast decay
OF	ON	50% fast decay
ON	OF	25% fast decay
OFF	OFF	Slow decay

Q: What are the specific role of the current decay of stepper motor driver board? A: Subdivision is now the current subdivision of stepping motor. The phase current according to the sinusoidal tangent the current point as a basic point subdivision.when phase current reaches the subdivision that through to control current to control decay.Otherwise, if angle overshoot will occur, can not be stuck in sub-angle. Different modes of decay depends on different in speed of motor. Fast decay at high speed, low decay at low speed,Slow decay occurs vibration, noise, when high-speed.In severe cases, will lead to position not allowed,when we select low speed motor to faster decay. Motor Control IC for the current decay of the H bridge is the control mode switch.The high side of the tube when the slow decay off, fast decay tube are closed when the high and low side.Mixed decay is the fast decay and then a slow decay, mixing ratio of decay and power for the chip also will be different.

2.Subdivision regulation

DIP switches on the M1, M2 two to adjust, driver board subdivision may be adjustable, DIP switch The correspondence location and mode of between segments as follows:

DIP M1	DIP M2	Subdivision mode
ON	ON	1/8
OFF	ON	1/16
ON	OFF	1/2
OFF	OFF	1

To make the motor run smoothly, please try to choose high segments, such as 1 / 16 segments

3、Current setting



Fig.6

Current regulation is by the panel to T1T2 two DIP switches to control .Figure XYZA

Dip T1	Dip T2	Value of current
ON	ON	20%*2.5A
OFF	ON	50%*2.5A
ON	OFF	75%*2.5A
OFF	OFF	100%*2.5A

current regulation identifies the location of the 2-way DIP switch

Proposed stepper motor current as close as possible the rated current

IX. stepper motor Connection



Four-wire stepper motor connection



Fig 8 Six-wire stepper motor connection



Fig 9 eight-wire stepper motor connection

Notes:Motor A+,A-, B+,B-, connected respectively, connected driver board AP, AM, BP, BM, Ensure that the connection is correct, Otherwise it will damage the chip!!

X.The choice of stepper motors and its power

The panel of IFS-6560T3-N axis match with two and four-phase motor drive of

domestic and foreign manufacturers, in order to obtain the most satisfactory results, need to set a reasonable supply voltage and current. The high-speed performance depends on the degree of the motor supply voltage.but the current set value determines the output torque of the motor.

A.Setting supply volatage

In general, when the higher the supply voltage, more great torque at the motor high speed, and avoid the motor out of step at high speed. On the other hand, the voltage too high may damage the drive, and work in high-voltage, vibratory at low speed Reference value of power between 24-36VDC 6A

B.Setting output current

The larger of setting current, the greater of output torque in the same motor. But the problem is the larger current the more heat of motor and driver. So in general, we set the value at when it warm but not too hot to run at long-term.

- **u** AT high speed mode of 4 and 6-wire: the output current equal or less rated value
- Larger torque mode of 6-wire: output current is 70% of rated value.
- **u** Tandem-type connection of 8-wire:output current is 70% of rated value
- **u** Parallel connection of 8-wire:output current is 1.4times of rated value.



Fig.10 the diagram of motor

XI、Usage of MACH3

1、Startup Mach3



Fig 11 open mach3

When you have installed the software, here are 3 icons on the desk,let's click the march3Mill, as fig 11.



Fig 12 the main interface of march3

The main interface of MACH3 as fig 12, some basic buttons on it, Here, we first configure MACH3.



2、 The basic set of mach3

Fig 13 set menu of mach3

Open the config menu, ports and pins menu, marked with red circlet

	Unsets i	setting	S AILO DIA	ignostics Alt-7		Mill->G1	5 G80 G17 G4	0
		8	R Zero E X		+0.00	00	1.0000 To	ol
			F Zero			00	ale IIII	
gine Configur	ation Ports 8	Pins						2
En Port Set	coder/MPG's up and Axis Se	 Lection	Sp: Notor	indle Setup Outputs	 Input Sign	Nil: Nil:	l Options Output Signals	
Signal	Enabled	Step Pin#	Dir Pin#	Dir LowActive	Step Low Ac	Step Port	Dir Port	ĺ
X Axis	4	2	3	×	* /	1	1	
Y Axis	4	4	5	*	*	1	1	1
Z Axis	4	6	7	×	*	1	1	
A Axis	4	8	9	×	*	1	1	1
B Axis	A.	16	17	×	*	1	1	
C Axis	×	0	0	×	×	0	-	
Spindle	*	0	0	×	×	0	0	
	980							

ST6560-T3 3axis mach3 cnc Stepper Motor Controller operation instruction

Fig 15 basic setting of direction and pulse pins

When you finished the setting, click output signals then set ENABLE and Relay

Encoder Port Setup an	/MPG's 1d Axis Selection	Sp Motor	indle Setup Outputs In	Mi put Signals	11 Options Output Sign
Signal	Enabled	Port #	Pin Number	Active Low	~
Digit Trig	X	0	0	X	
Enable1		1	1	4>>	
Enable2	X	0	0	X	
Enable3	*	0	0	X	
Enable4	2	0	0	X	
Enable5	*	0	0	X	
Enable6	8	0	0	X	
Output #1	4	1	14	4	
Output #2	8	U	0	8	_
Output #3	X	0	0	X	~
Pin	s 2 - 9 , 1, 14,	16, and 17 are ou	tput pins. No other	pin	

Port Setup and Axis Selection	Motor Outputs Input Signals Output Signals
Encoder/MPG's	Spindle Setup Mill Options
Relay Control Disable Spindle Rel Clockwise Output 1 Output Signal #'s Flood Mist Control Disable Flood/Mist re Mist Output 4 Flood Output 3 Output Signal #'s ModBus Spindle - Use Step/Dir as Enabled Reg 64 64 - Bus DD Core 16220	Motor Control Pulley Ratios Min Speed Max Speed PWM Control Current Pulley Min Speed Max Speed PWM Control C Pulley Ratio 0 1000 Step/Dir Moto Fulley Ratio 0 2000 Torch Volts Conts Fulley Ratio 0 4000 Winimum PWM 0 % Fulley Ratio 0 8000 General Parameters Fulley Ratio 0 8000 8000 CW Delay Spin UP 1 Seconds Laser Mode. freq by Feedra weilplay Spin DOWN 1 Seconds Use Spindle Feedback in Sync M CCW Delay Spin DOWN 1 Seconds Closed Loop Spindle Cont P 0.25 I 1 D 0.3

Fig 16 setting the ENABLE and Relay's pin

3、Adjusting limits witch of mach3

Click *input signal*, the parameter as fig17

Port Set	up and Axis Sel	Lection	Motor Out	tputs 🤇	Input Signal		output Signal
Signal	Enabled	Port #	Pin Nu	Active	Emulated	HotKey	~
X ++	4	1	10	4	X	0	
X	4	1	10	4	X	0	
X Home	X	0	0	×	X	0	
Y ++	4	1	11	4	X	0	
Y	4	1	11	4	X	0	-
Y Home	*	0	0	×	X	0	
Ζ++	4	1	12	4	X	0	
Z	4	1	12	4	X	0	_
Z Home	X	0	0	×	×	0	
A ++	2	0	0	*	*	0	*
	Pins 10-13 a	nd 15 are inpu	ts. Only these	5 pin numbers	may be		
				o pric nametro	may be		

Port Setur	and Axis Se	lection	Motor Out	puts 🤇	Input Signal		utput Signals
Signal	Enabled	Port #	Pin Nu	Active	Emulated	HotKey	~
Input	X	0	0	X	X	0	
Input	X	0	0	X	X	0	
Probe	X	0	0	X	X	0	
Index	X	0	0	X	X	0	
Limit	X	0	0	X	X	0	
EStop . 🧲	4	1	13	4	X	0	>
THC On	X	0	0	X	X	0	
THC Up	X	0	0	X	X	0	
THC Do	X	0	0	8	×	0	
OEM Tr	¥	0	0	*	*	0	~
	Pins 10-13 a	nd 15 are inpu	its. Only these	5 pin numbers	may be		



4、Running of G code

G is the numerical instructions control program code, mach3 for customers to test software comes with the G code, you can easily test machine.click the File, as fig 18



Fig 18 Open G

Click the red circlet Load G-code and open the icon Mach3 and click

ST6560-T3 3axis mach3 cnc Stepper Motor Controller operation instruction

[□]GCode</sup>, and choice a G code, the interface as follows as fig 19

			R X +0.0000 State +1.0000
	打开 査教范囲(①):	100 9Co.4e	
Le: No File Loaded ycle Start Recent File		balt.tap Dalit.tap CrossLap NestCirde.ta PestCirde.ta PestCirde.tap	Regen. Display Jo Toolpath Mode Foll Spindle Speed
eed Hold -Spc- Sot Next Line Line		10件名(8): 文件英型(2):	Frakturar 所用(0) 所用(0) 目 目 日 <th1< th=""> 1 <th1< th=""></th1<></th1<>
Run From Hore	Dwei	On Off	Remember Return Feedrate S-ov 0 Bassed 00:00:00 Units/Win 0.00 Spindle Speed Spindle Speed



Program Run Alt-1 MDI Alt2 ToolPath Alt4 Offsets Alt5 Settin	igs Altó Diagnostics Alt.7	MII->G15 G1 G17 G	40 G20 G90 G94 G54 G49 G9
G0 Z1.0000 S333 M5 G0 Z-0.1 G0 X0.0845 Y0.0341 F5000M3 F5000G1 X0.0936 Y-0.0037 G1 X0.1031 Y-0.0416 G1 X0.1130 Y-0.0795 G1 X0.1232 Y-0.1175	R Zero +(X +(F Zero +(U Zero +(H Zero -(O Zero +(Zero +(-(M Zero +(QFLINE GGTD Z To Go	0.0845 State +1.0000 0.0340 State +1.0000 0.1000 State +1.0000 0.0000 Radius Correct State Liewits	Tool:0 Job Display
File: C:Wach3/GCode/Cross.tap	Load	Wizards Last Wizard	Regen. Display Jog Mode Follow
Edit G-Code Rewind Ctrl-W Cycle Start Recent File Single BLK AR.M Close G-Code Reverse Run Feed Hold Load G-Code Block Delete Stop Set Next Line M1 Optional Stop Alt-S> Run From Hara Dwiell	Tool Information Tool 0 Charge Dia. +0.0000 H +0.0000 Auto Tool Zero Remember Return Elarged 00:00:01	Feed Rate FRO 5000.00 FRO 8 FRO 5000.00 100 F 5000.00 100 % Units/Rev 0.00	Spindle Speed
Reset G.Codes M.Codes	Jog ONOFF Ctri-AH-J	Davott Z innibit +0.000 Lower Z inhi	(Loop) +0 Times on M30
ma Leo. Statuer		Destilation	

Fig 20

When you open the G code, you may watch on a flashing red button **RESET**,

click it to stop, and click the CYCLESTART.

If you want to run your own G code for processing.find your location of G code, and leading it in.,

5. How to use the manual control interface of MACH3

If you want manual control, press the keyboard "TAB" as follows as :



Pig21