TB6560HQ T3-V3

3A 3axis driver card

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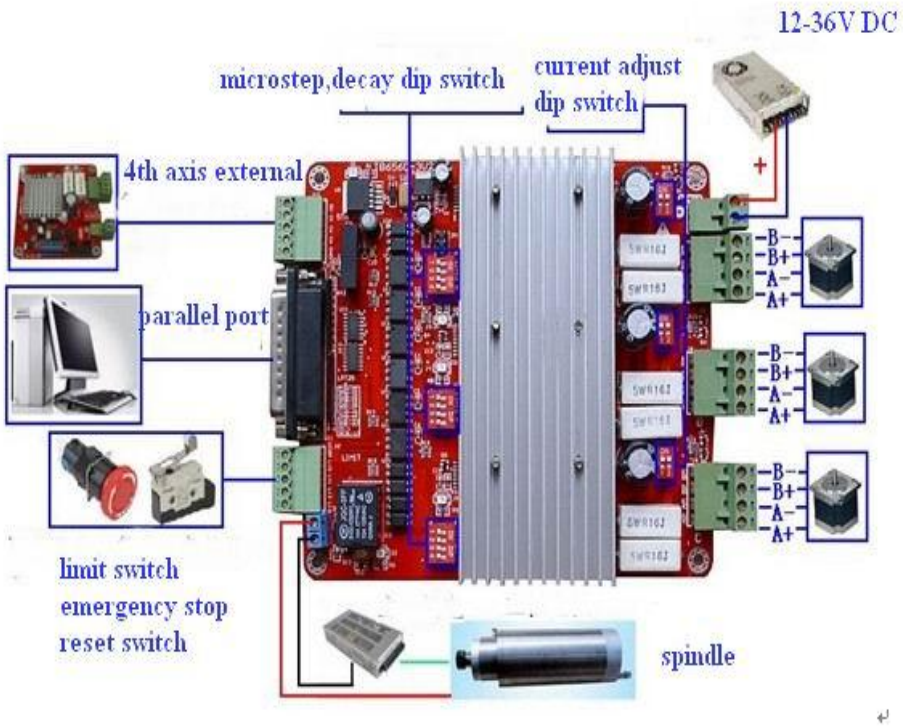
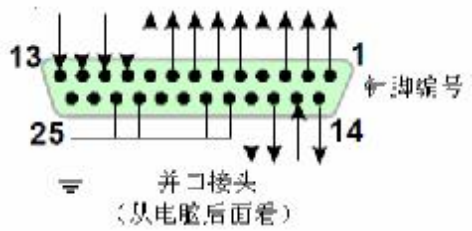
一、Characteristics：

1. **Max phase current is 3.5A, average is 2.5A.**
2. **With spindle control relay, convenient for using mach3 etc software to control spindle start and stop.**
3. **With 4th axis external port, easy for adding 4th axis when you need it.**
4. **standard parrallel port, support MACH2、Mach3、KCAM4, etc 。**
5. **With high speed Optocoupler and DC/DC power isolation，to protect your computer totally.**
6. **Four input controling, can use limit switch, emergency, reset, tool setting and so on function.**
7. **With four** microstep **choices——1、1/2、1/8、1/16。**
8. **With automatic semi flow function， current can be reduced automatically when motor stop, then reducing the heating of motor.**

二、Diagram：

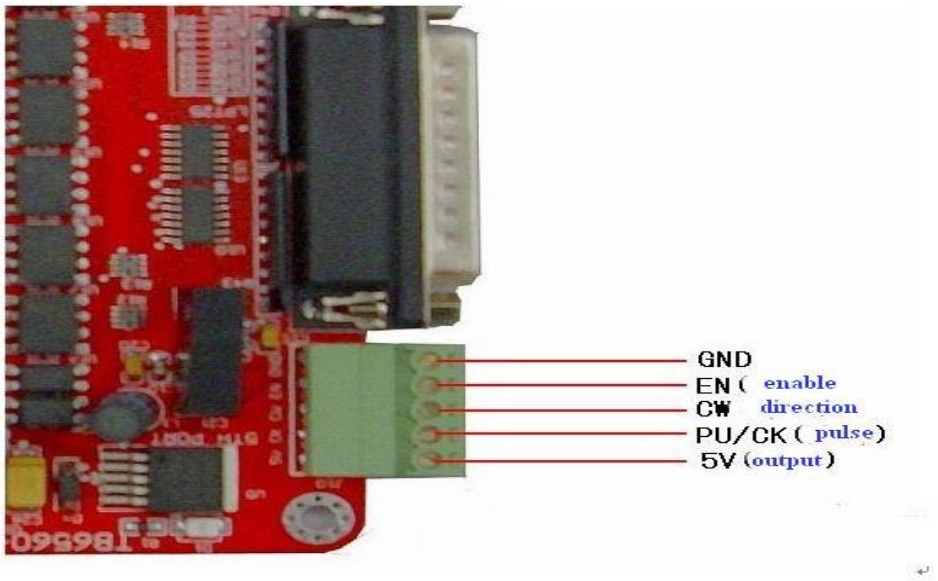


三、parrallel pin defination：

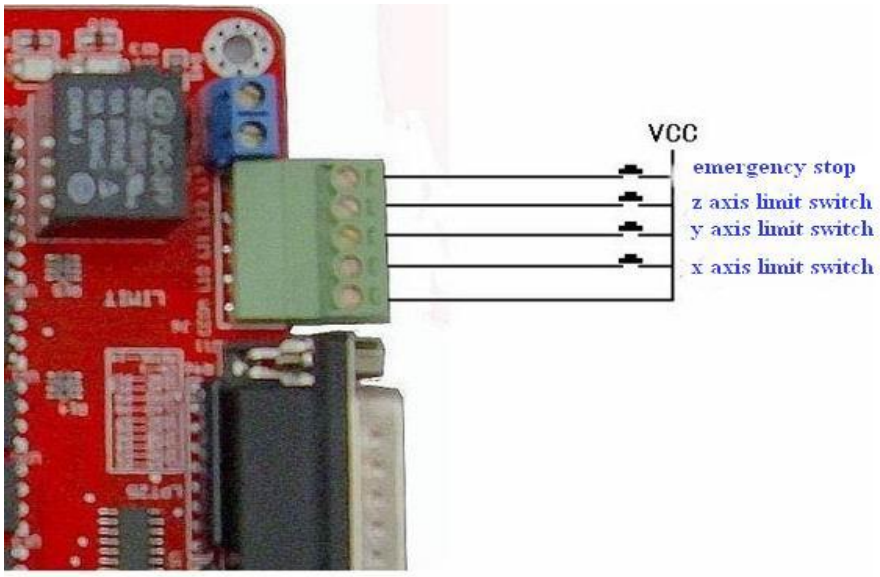


DB25 (PIN)	Function of pin on drivercard	note
1	EN	For all axis
2	STEPX	X（1st axis） pulse signal
3	DIRX	X（1st axis）direction signal
4	STEPY	Y（2nd axis） pulse signal
5	DIRY	Y（2nd axis） direction signal
6	STEPZ	Z（3rd axis） pulse signal
7	DIRZ	Z（3rd axis）direction signal
10	LIMIT-1	Limit switch port 口 1
11	LIMIT-2	Limit switch port 口 2
12	LIMIT-3	Limit switch port 口 3
13	LIMIT-4	Emergency stop
14	Spindle controlling relay	
15	empty	
16	STEPB-	B（4th axis） pulse signal
17	DIRB-	B（4th axis）direction signal
18-25	GND	

四、connectionway of 4th axis：



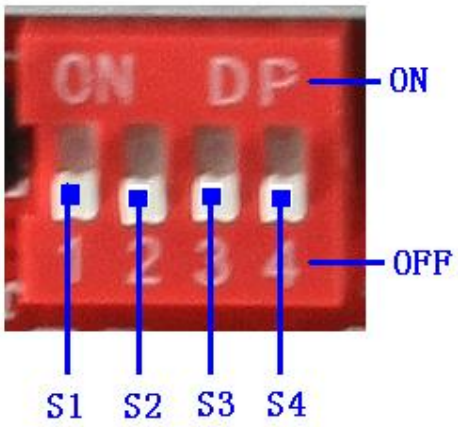
五、limit switch and emergency stop connection way：



note：as input port, it can not only accept limit switch, emergency stop, but also can accept reset, tool setting , etc.

六、Adjust of current, microstep, decay mode：

microstep, decay mode：



6.1、Adjust of current decay

S1、S2 is for current decay,

S1	S2	Mode status
ON	ON	Fast decay
OF	ON	50% fast decay
ON	OF	25% fast decay
OFF	OFF	Slow decay

Tips：when you don't know which decay mode is suitable for your motor, you can let motor running continuously, then adjust the dip switch to test the best mode. which way can make motor run more steadily and less noise.

6.2、adjust of microstep

S3	S4	microstep mode
OFF	ON	1/16
OFF	OFF	1/4
ON	OFF	1/2
ON	ON	1

Tips：in order to make motor running perfect, please choose the high subdivision, such as /16 。

6.3、setting of current

current adjust switch

T1/T2

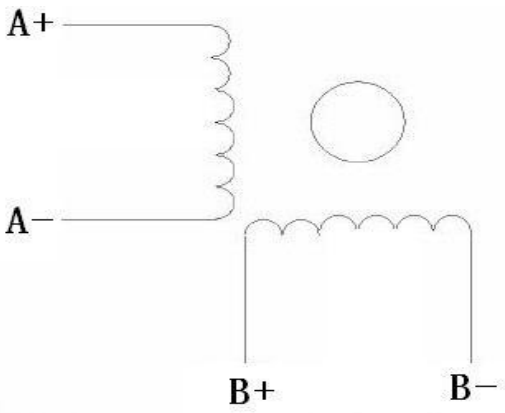
Current can be adjusted through T1/T2 dip switch , the site of T1/T2 and current relationship as follows:：

T1	T2	current
ON	ON	25%*3A
OFF	ON	50%*3A
ON	OFF	75%*3A
OFF	OFF	100%*3A

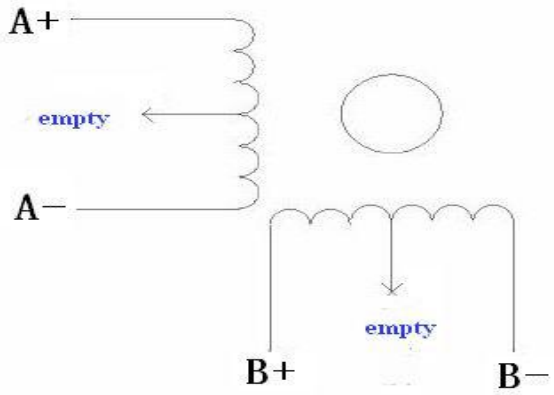
Tips：try to make current setting to be close to motor rated current.

七 different type motor connection way

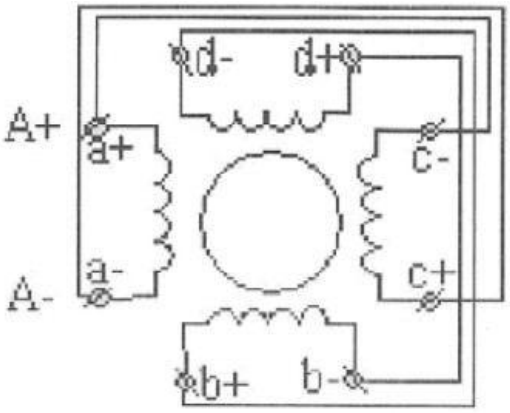
TB6560HQT3-V3 driver card is suitable for 2 phase, 4 phase（4 leads， 6 leads、8 leads），current is less than 3A stepper motor, connection way of motor and driver card as follows:



2 phase ,4 leads motor can be
connect with driver card directly



4 phase, 6 leads motor ,
the middle leads is empty connection



4 phase, 8 leads motor
using parallel connection way

八、power supply specification choose：

TB6560T3-V3 dirver card power supply Voltage range:12V-36V, you can choose the power supply specification according to your motor speicifcation：

Motor model	Power votage	Power current	Power	note
42(nema 17)	12-16V	6A	72-96W	It must be DC power supply, and please use multimeter to test output voltage before using it. Then to confirm it is good quality power supply.
57(nema 23)	16-24V	8A	128-200W	
86(nema 34)	24-36V	14A	330-500W	

tips ：

1. generally speaking, voltage is higher, motor torque will be bigger when running at high speed, then can avoid lose step. But in other sdie, voltage is too high will demage the driver, and motor will shake when it run at low speed with high voltage.

2. To same motor, when current setting is bigger, motor torque will be bigger, but bigger curren will lead to more heating of motor and driver. So current is usually supposed to be the parameters , which can make motor not overheating when it working long time.

⑴ 4 leads and 6 leads motor at high speed mode, current should be equal or a little bit less than motor rated current

⑵ 6 leads motor at high torque mode, current should be 70% of motor rated current.

⑶ 8 leads motor with tandem-type connection, output current should be 70% of motor rated current.

⑷8 leads motor with parallel connection, output current should be 140% of motor rated current.

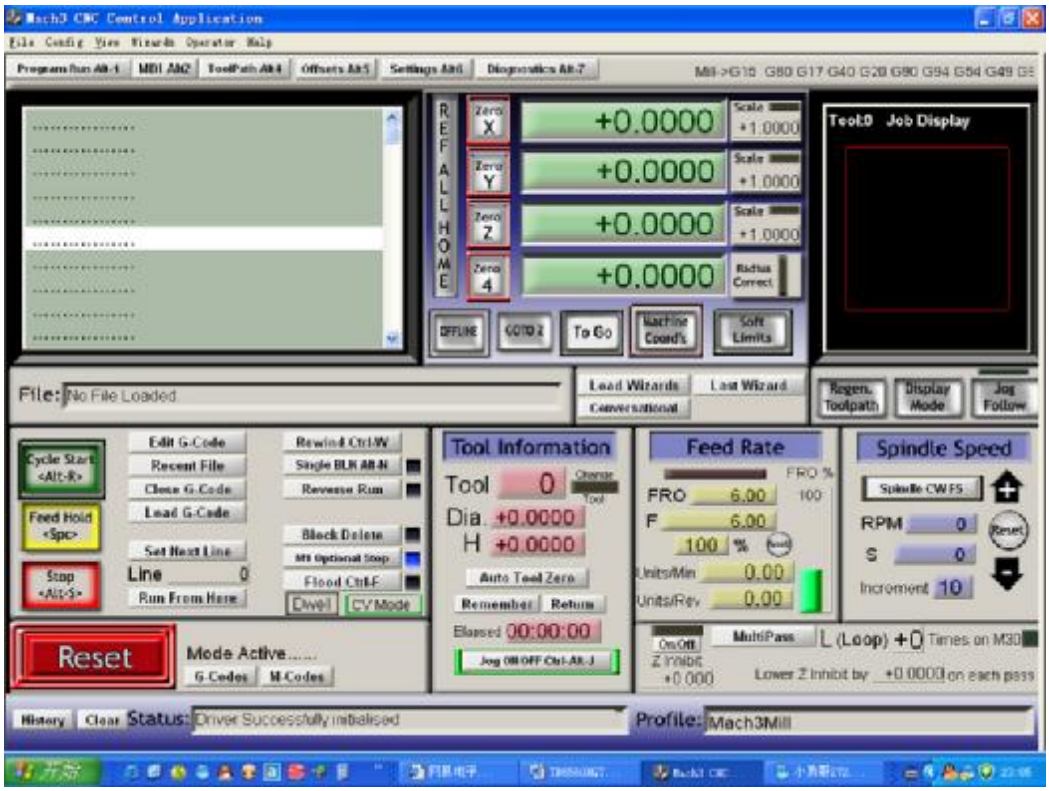
Caution: please let motor run about 15-30 mins after finish setting of current, and if the temperature of motor is too high, please reduce the current setting.

九、MACH3 software using

Note ： in this part, we only explain the basic setting of mach3, it is just for our driver card, to make sure it can make your motor move smoothly and normally.

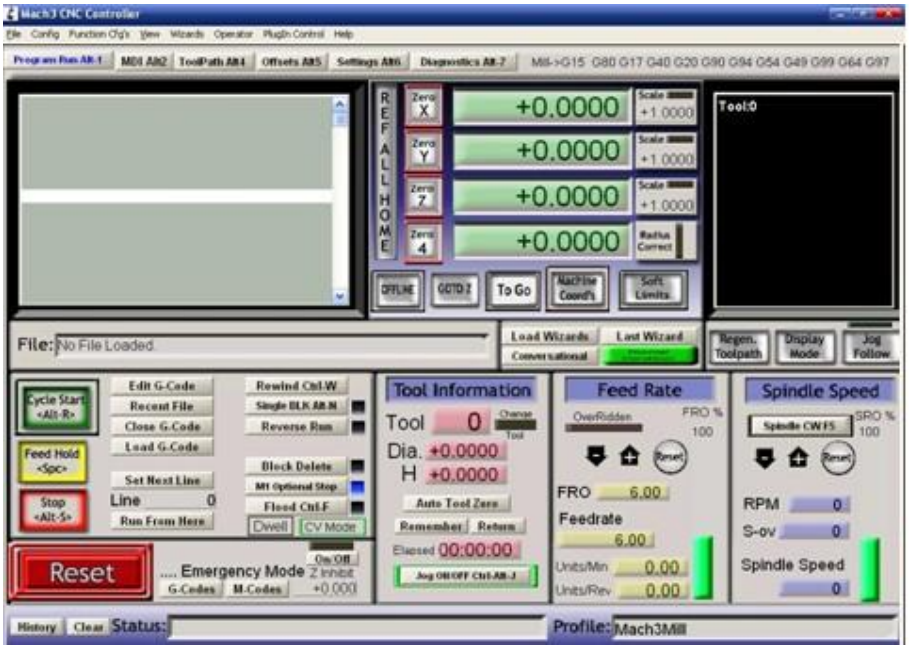
9.1、Mach3 launch：

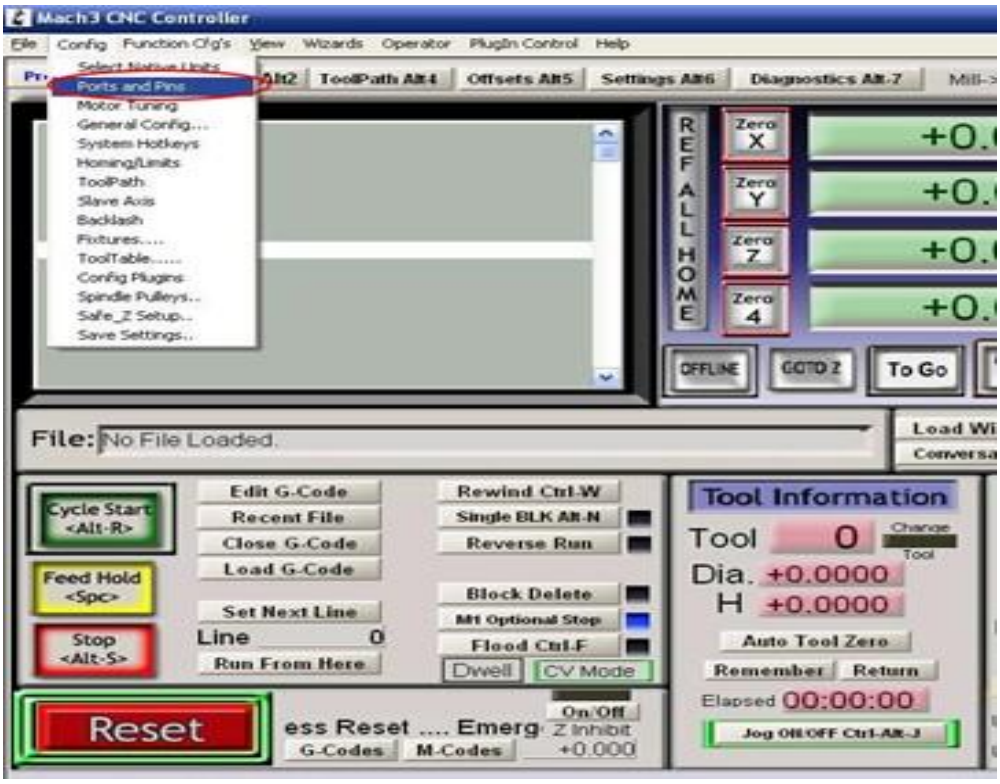
After MACH3 installation finished., there will be three icon on your desktop. Please reset your computer, then click this one:



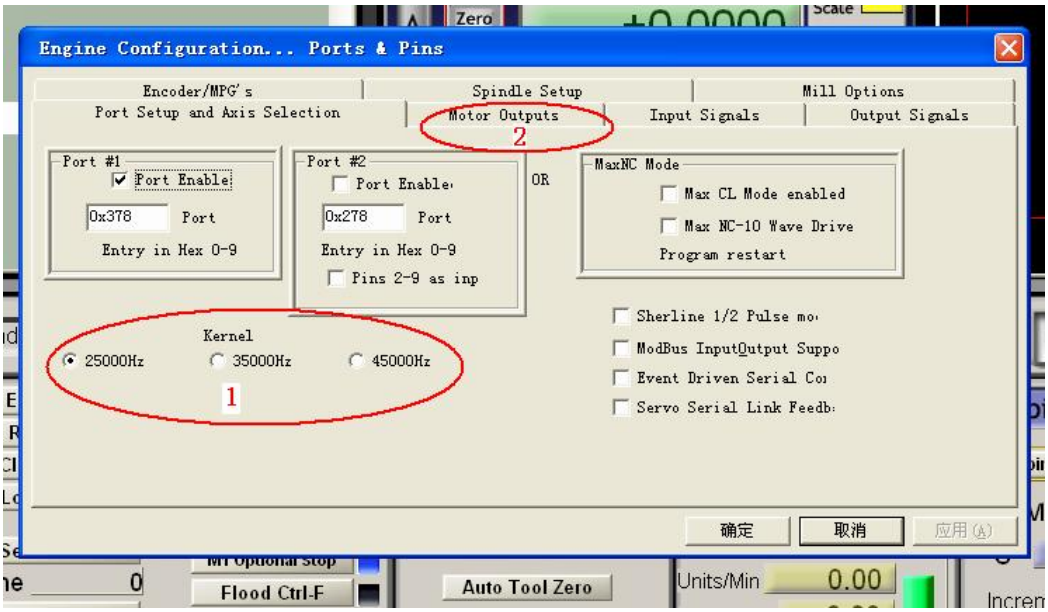
Note：Mach3 can not be used after you start it. It need to be set according to your driver card characteristics and parallel port pin defination.

9.2、Mach3 port and pin setting：



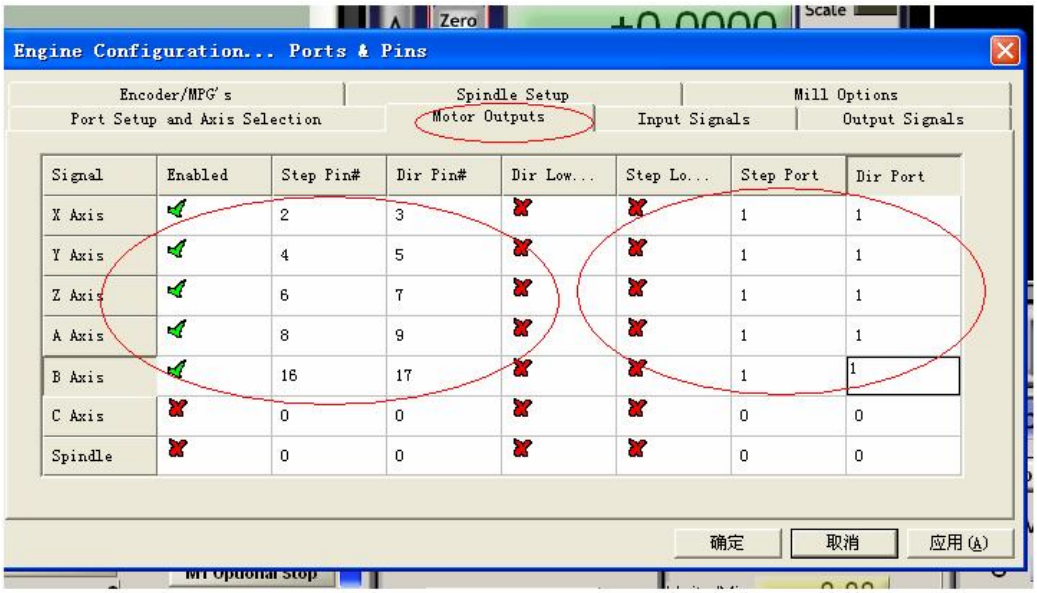


Like above picture, config→ports and pins .

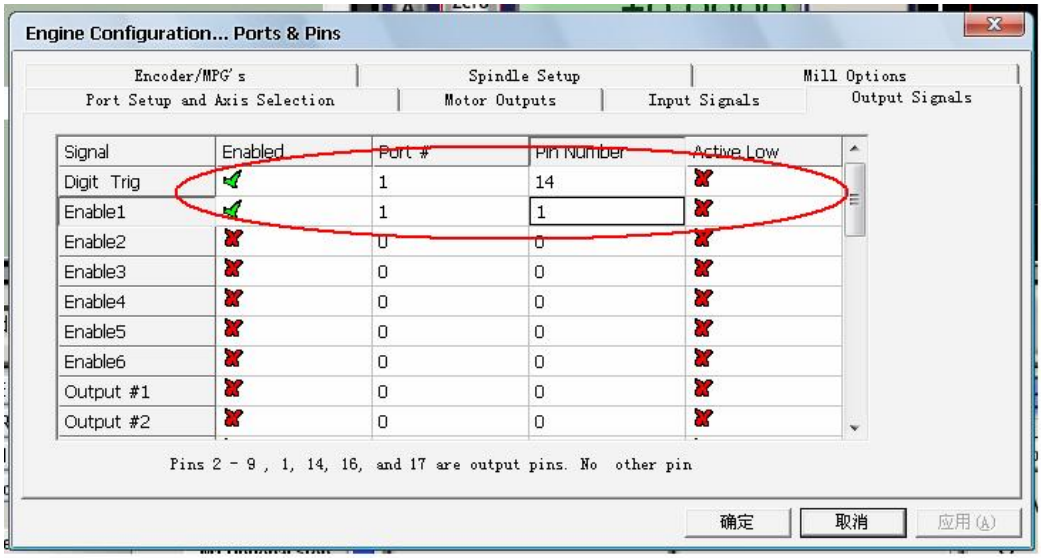


In circle 1, we can set the basic frequency, it can effect the speed of motor, and to be stepper motor, we usually choose 25000HZ as default. After that, please press circle 2 button, then we will do the pin of direction and pulse setting ：

Tips：please remmber save the data after setting.

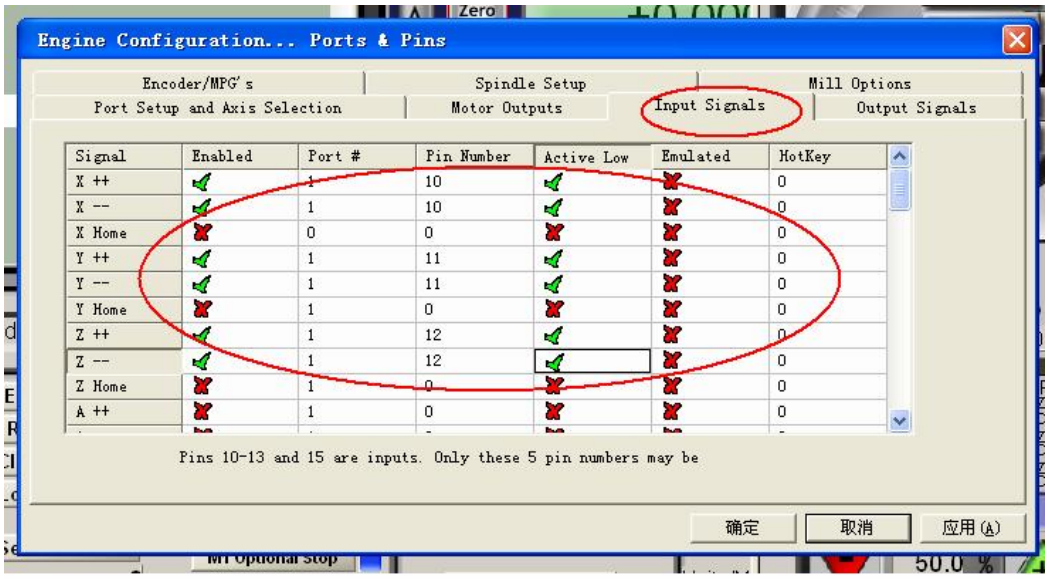


Please change the data as above shows. After this step. Please press **output signals**，then we will do the pin of EN and relay control setting.：



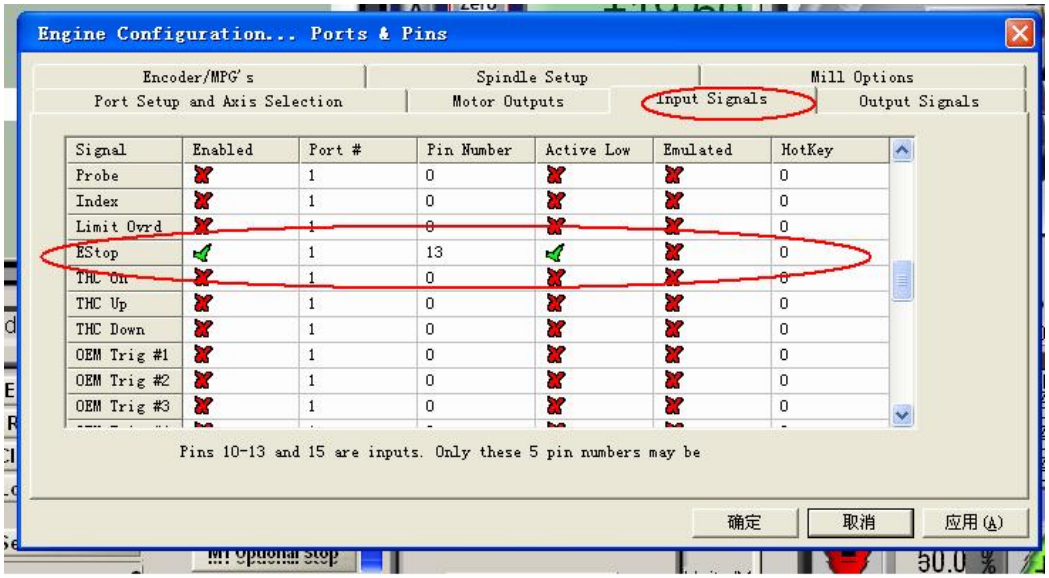
9.3、setting of limit switch：

Press **input signal**，then do as follows：



Emergency stop setting: machine should be stop emergently when urgent situation happens.

We name pin 13 as emergency stop as input pin. It should be as follows



For 3 axis system, four input pins can be set as limit switch, emergency stop, reset. There are many way to set. So we only give one way as cite. You can refer to mach3 manua and do the setting according to your requirement.

9.4、motor debugging：

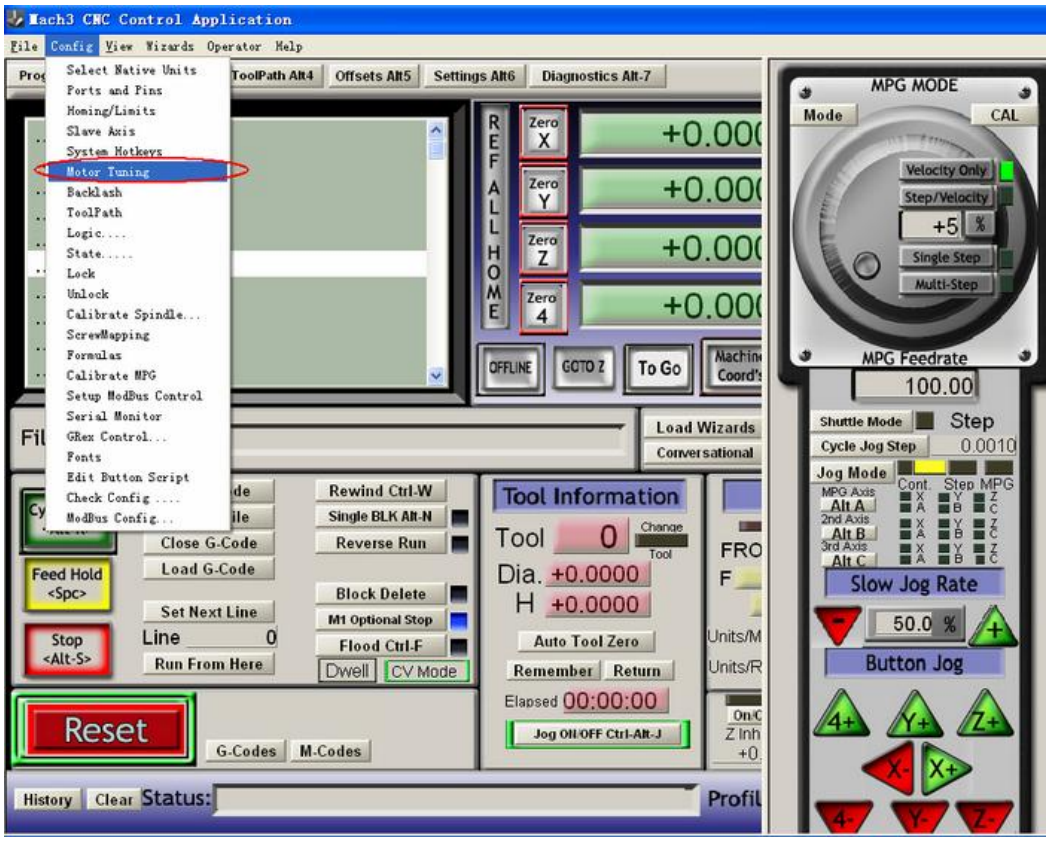
Motor debugging means to debug the state of motion of stepper motor through software. We need to do three operation :

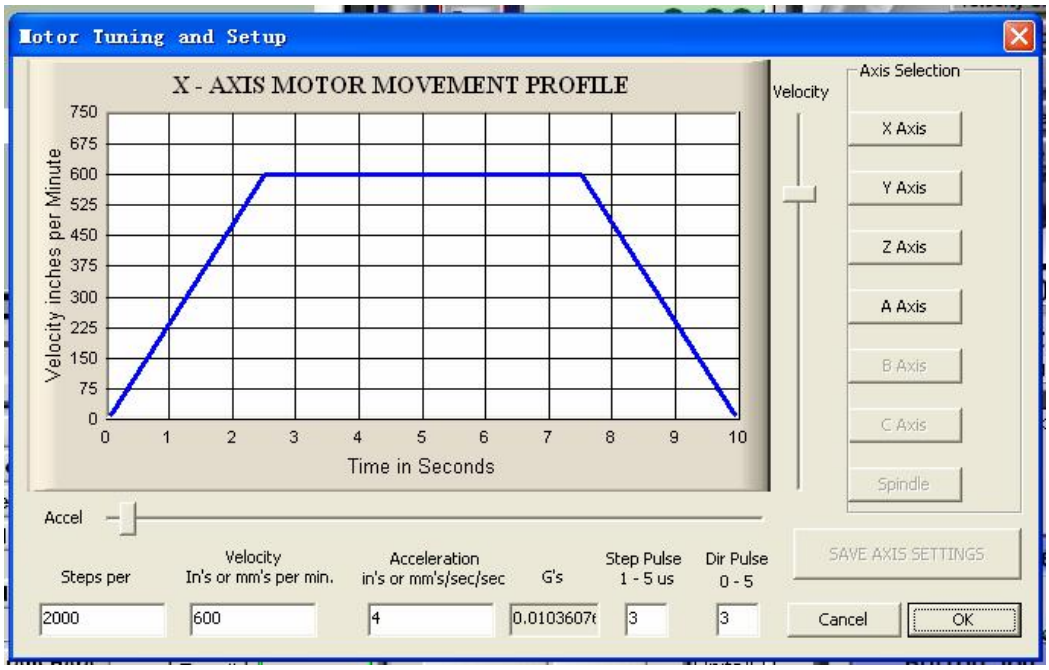
a) caculating tool bits or the pulse of driver needed when table move one unit

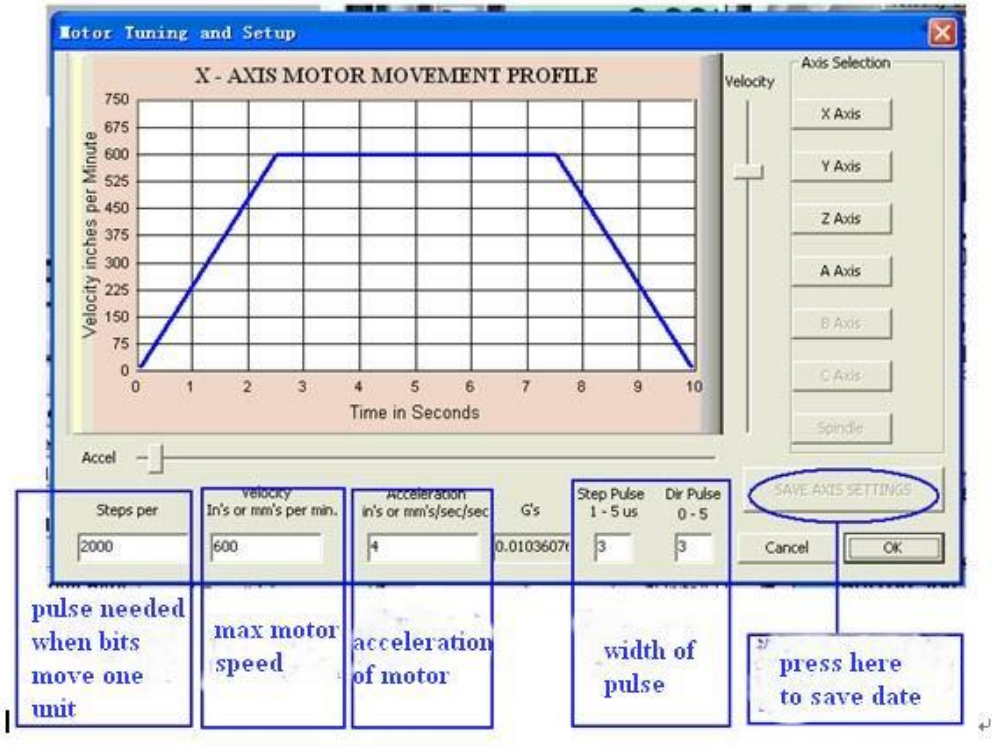
(b) setting the max speed of motor

(c)setting the acceleration of motor.

These are the steps:


Mach3 CNC Control Application
File Config View Wizards Operator Help
Select Native Units
Ports and Pins
Homing/Limits
Slave Axis
System Hotkeys
Motor Tuning
Backlash
ToolPath
Logic....
State.....
Lock
Unlock
Calibrate Spindle...
ScrewMapping
Formulas
Calibrate MPG
Setup ModBus Control
Serial Monitor
GRex Control...
Fonts
Edit Button Script
Check Config ....
ModBus Config...
ToolPath Alt4
Offsets Alt5
Settings Alt6
Diagnostics Alt-7
REF ALL HOME
Zero X
Zero Y
Zero Z
Zero 4
+0.000
OFFLINE
GOTO Z
To Go
Load Wizards
Conversational
Rewind Ctrl-W
Single BLK Alt-N
Reverse Run
Close G-Code
Load G-Code
Feed Hold <Spc>
Block Delete
M1 Optional Stop
Flood Ctrl-F
Set Next Line
Line 0
Stop <Alt-S>
Run From Here
Dwell
CV Mode
Reset
G-Codes
M-Codes
Tool Information
Tool 0
Change Tool
Dia. +0.0000
H +0.0000
Auto Tool Zero
Remember
Return
Elapsed 00:00:00
Jog ON/OFF Ctrl-Alt-J
History
Clear
Status:
MPG MODE
Mode
CAL
Velocity Only
Step/Velocity
+5 %
Single Step
Multi-Step
MPG Feedrate
100.00
Shuttle Mode
Step
Cycle Jog Step
0.0010
Jog Mode
Slow Jog Rate
50.0 %
Button Jog


Motor Tuning and Setup
X - AXIS MOTOR MOVEMENT PROFILE
Velocity inches per Minute
Time in Seconds
Velocity
Axis Selection
X Axis
Y Axis
Z Axis
A Axis
B Axis
C Axis
Spindle
Accel
Steps per
Velocity In's or mm's per min.
Acceleration in's or mm's/sec/sec
G's
Step Pulse 1 - 5 us
Dir Pulse 0 - 5
2000
600
4
3
3
SAVE AXIS SETTINGS
Cancel
OK



Note: please make sure it is safe when you set max motor speed. And make sure the acceleration of motor data can avoid drop step and run normally.

Width of pulse we set 3us here.