

# TB6560 mach3 cnc Stepper Motor Controller operation instruction



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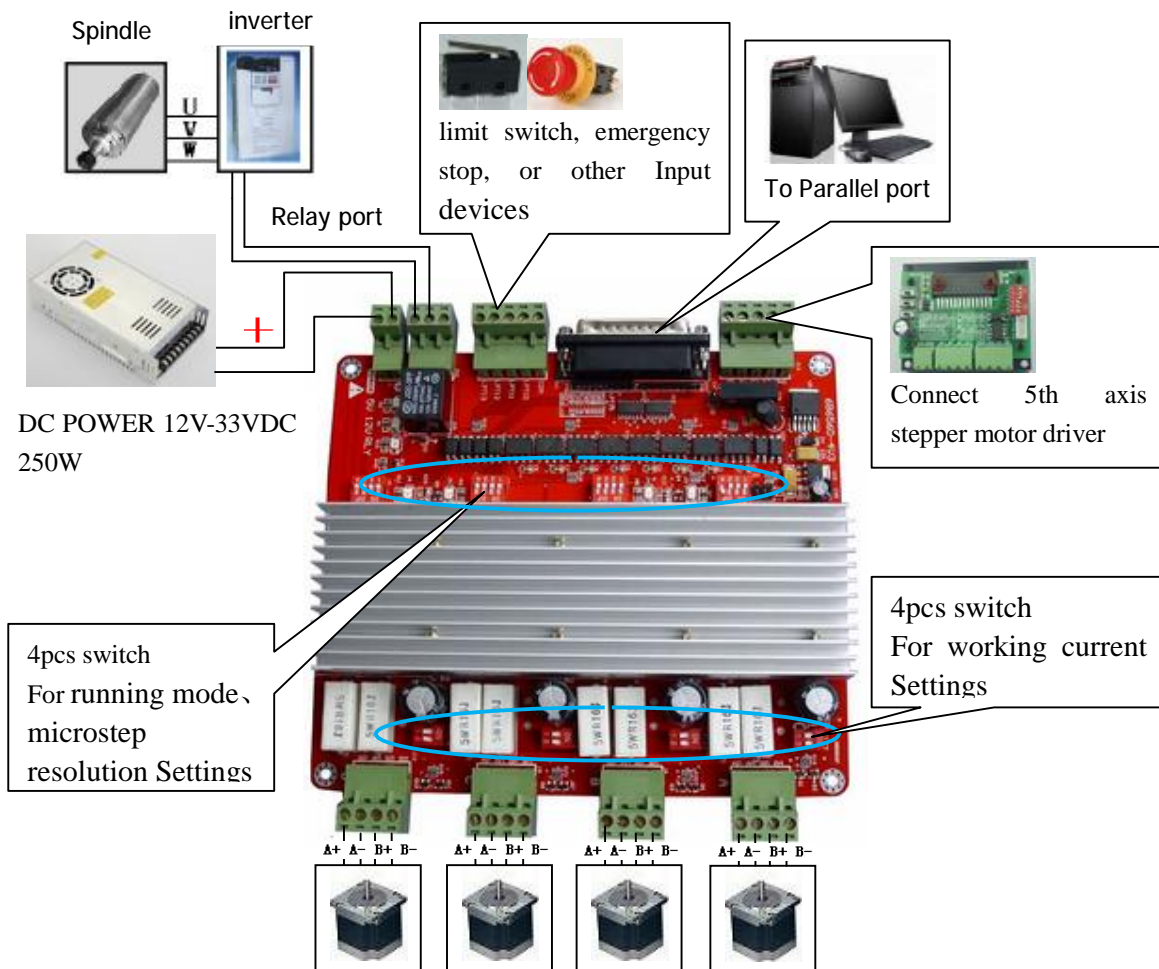
## I 、 features of TB6560

- ◆ It Can drive four stepper motor running at the same time, the fifth 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。

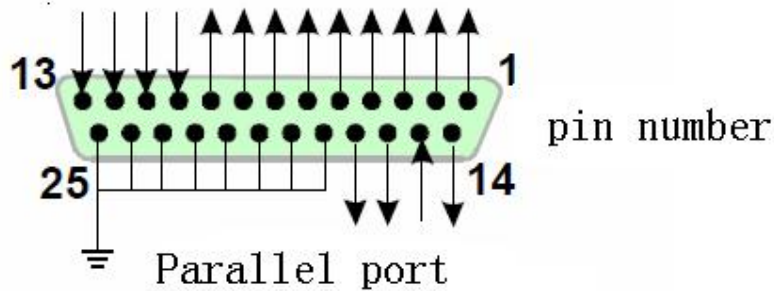
## II 、 Applications:

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.

### III、 Electrical drawing



## V、 Definition on pins of parallel port



25-pin parallel port control is defined as follows:

DB25(PIN)	The role of the pin on driver board	Notes
1	EN	Enable all axis
2	STEPX	X axis pulse signal
3	DIRX	X axis direction signal
4	STEPY	Y axis pulse signal
5	DIRY	Y axis direction signal
6	STEPZ	Z axis pulse signal
7	DIRZ	Z axis direction signal
8	STEPA	A axis pulse signal
9	DIRA	A axis direction signal
10	INPUT-1	X axis Limit
11	INPUT-2	Y axis Limit
12	INPUT-3	Z axis Limit
13	INPUT-4	Emergency stop
14	Relay control	
15	NC	Not connect
16	STEPB-	B axis pulse signal
17	DIRB-	B axis direction signal
18-25	GND	

## VI.Adjusting current decay 、 microstep resolution、 current output

### 1、 Adjusting current decay

Marked on board D1/D2 ,the value of the current decay is set DIP switch

D1/D2 correspondence between the location and decay mode, following table

DIP D1	DIP D2	Running mode
ON	ON	Fast decay
OF	ON	50% decay
ON	OF	25%decay
OFF	OFF	Slow decay

### 2、 Adjusting subdivision

You may adjust the subdivision mode of board, DIP switches on the two of M1/M2 adjust DIP switch, DIP switch location and subdivision mapping table below

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 microstep resolution such as 1 / 16 microstep resolution**

### 3、 Adjusting current output



电流调节拨码开关T1/T2

Fig 4

Current standard T1/T2 by two board DIP switch to adjust,T1/T2 location and value of current output, correspondence as follows:

Dip T1	Dip T2	Value of current
ON	ON	20%*3A
OFF	ON	50%*3A
ON	OFF	75%*3A
OFF	OFF	100%*3A

**We proposed the current value closed to rated of stepper motor**

## VII、 Connection of stepper motor

Electrical connection diagram refer to the overall wiring diagram IV:

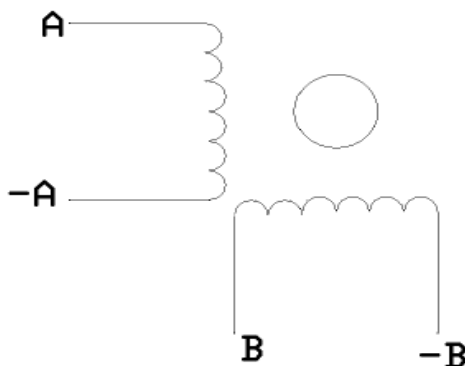


Fig 5

Four-wire stepper motor connection

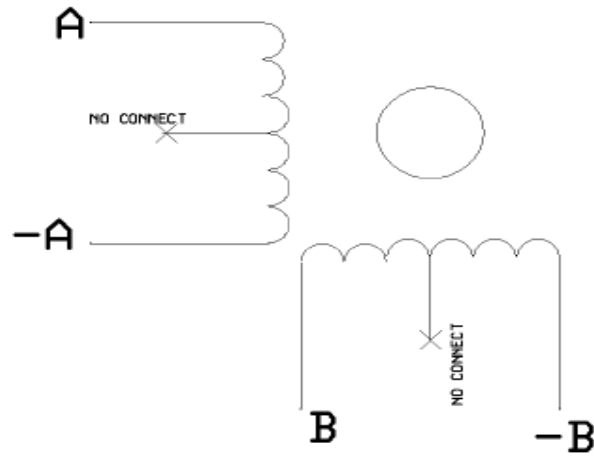


Fig 6

Six -wire stepper motor connection

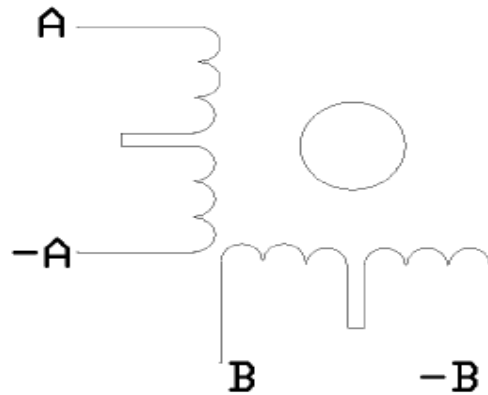


Fig 7

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!!**



## VIII、 Limit switch connection

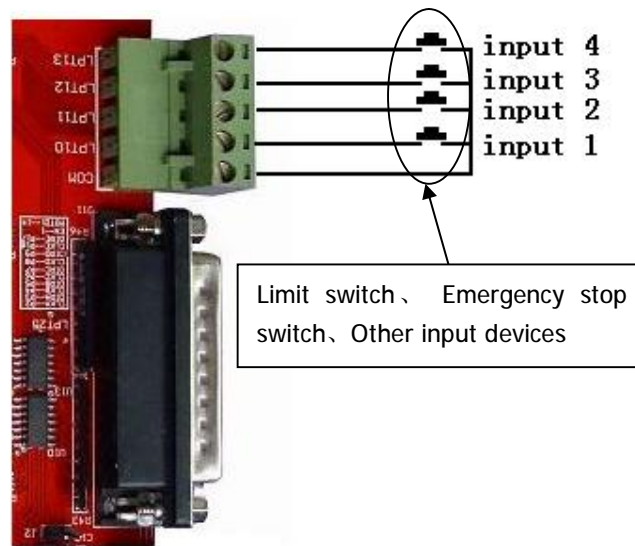


Fig 8

## IX、 The 5th axis extended connection

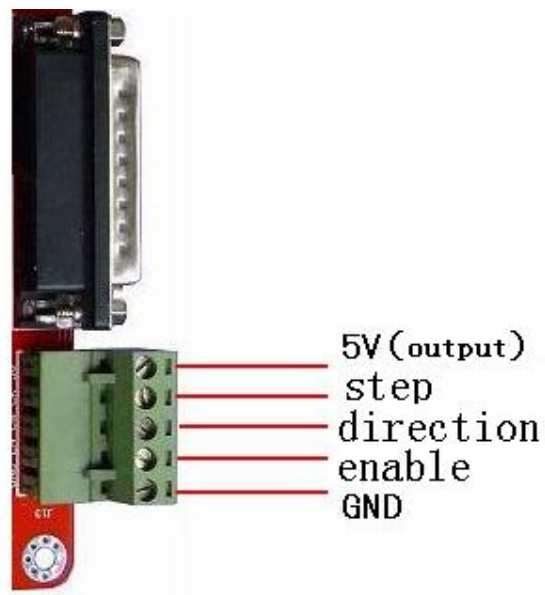


Fig 9

## X、 Motor connection

The panel of ST6560T4 4-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.

### 1、 Power supply voltage

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 12-33VDC 8A

### 2、 Set value of 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 on running at long-term.

- ⌚ 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.
- ⌚ Tandem-type connection of 8-wire:output current is 70%of rated value
- ⌚ Parallel connection of 8-wire:output current is 1.4times of rated value.

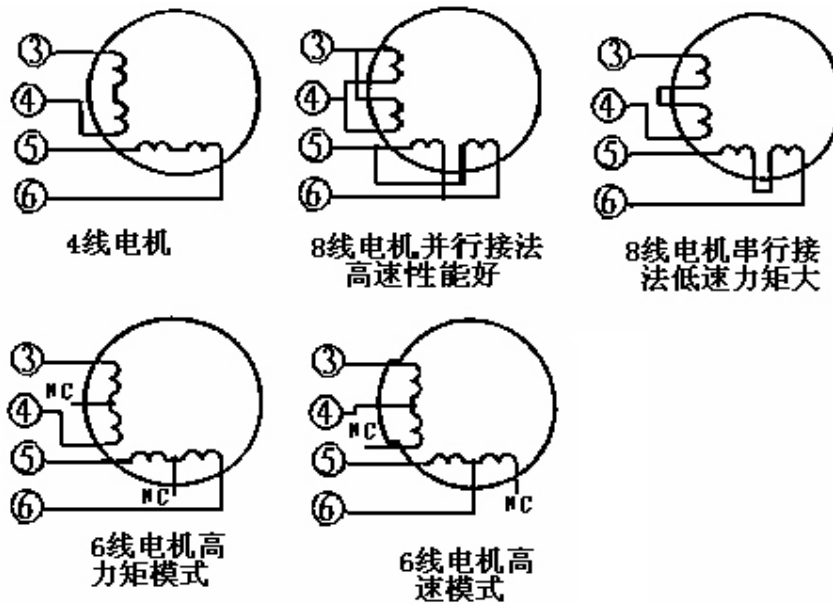


图 3. 电机接线

Notes: please operating motor 15-30 minutes when you finished the setting of current. If the motor temperature is too high, you should reduce the value. If reducing the current value, the motor output torque is not enough to improve the cooling conditions, are invited to ensure motor and drive are not hot.

## XI、 Usage of MACH3

### 1、 Startup Mach3

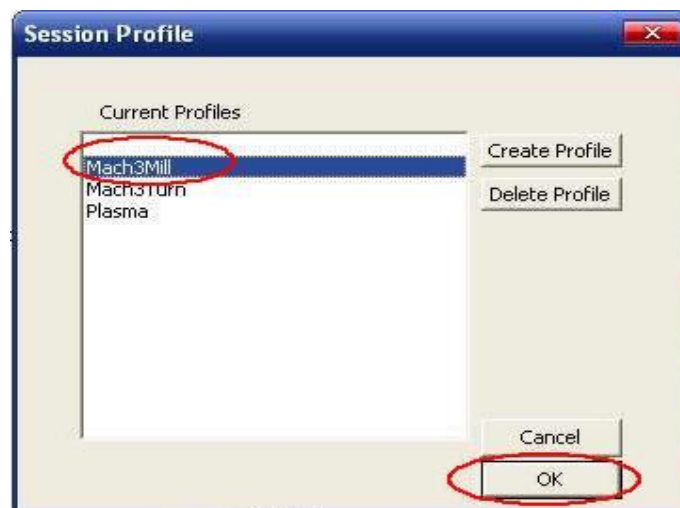


Fig 11 open mach3

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

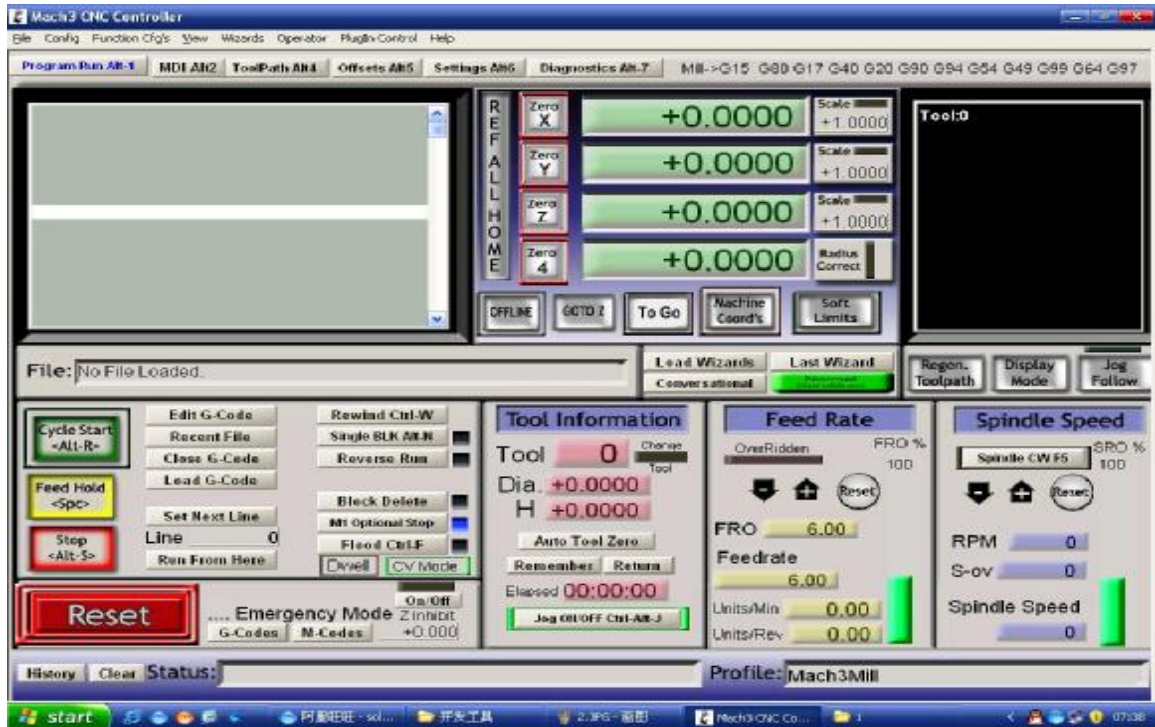


Fig 12 the main interface of march3

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

## 2、 The basic set of mach3

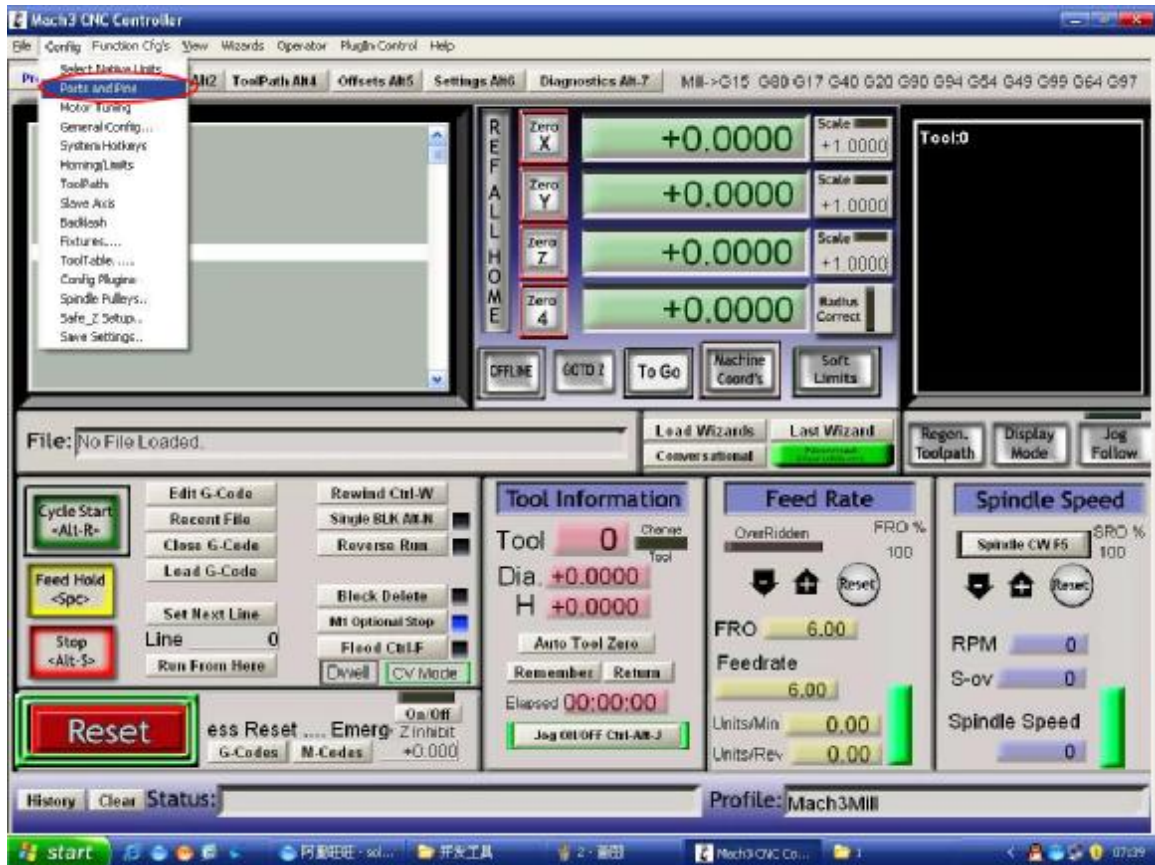


Fig 13 set menu of mach3

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

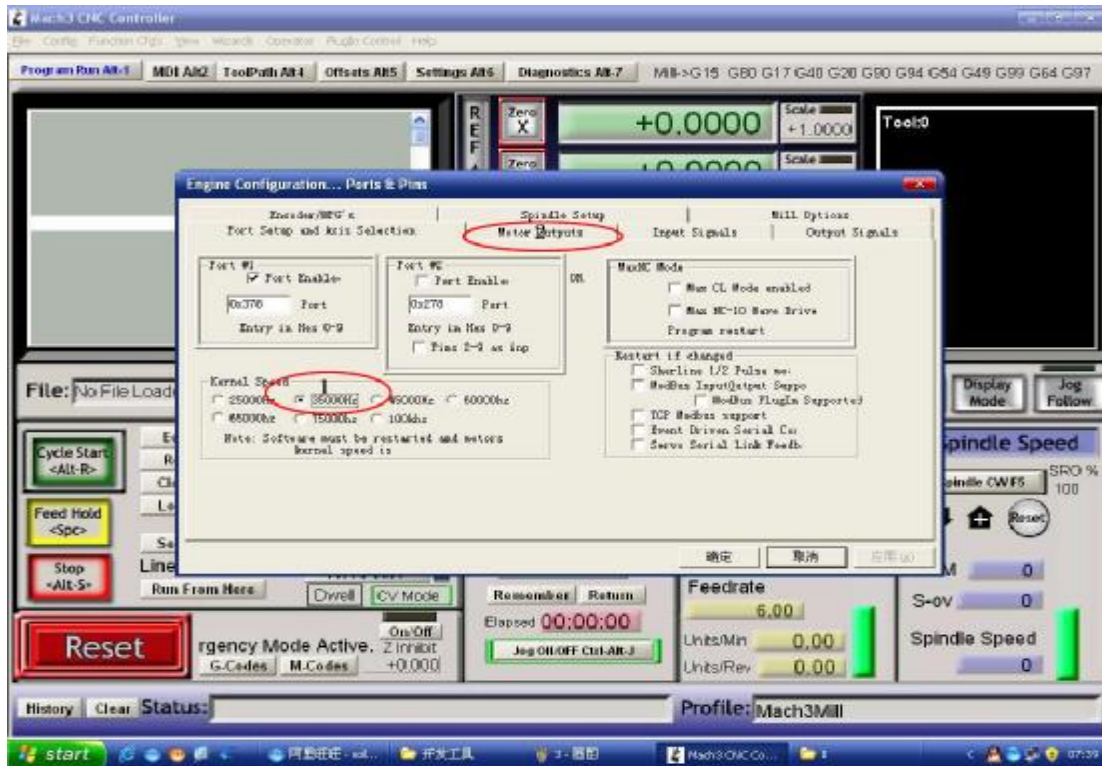


Fig 14 The basic frequency setting

Circlet1, where you can set the fundamental frequency, this parameter is the speed of motor rotation. After setting the place chosen circlet 2, there shown in Figure 15, the following as direction and pulse settings:

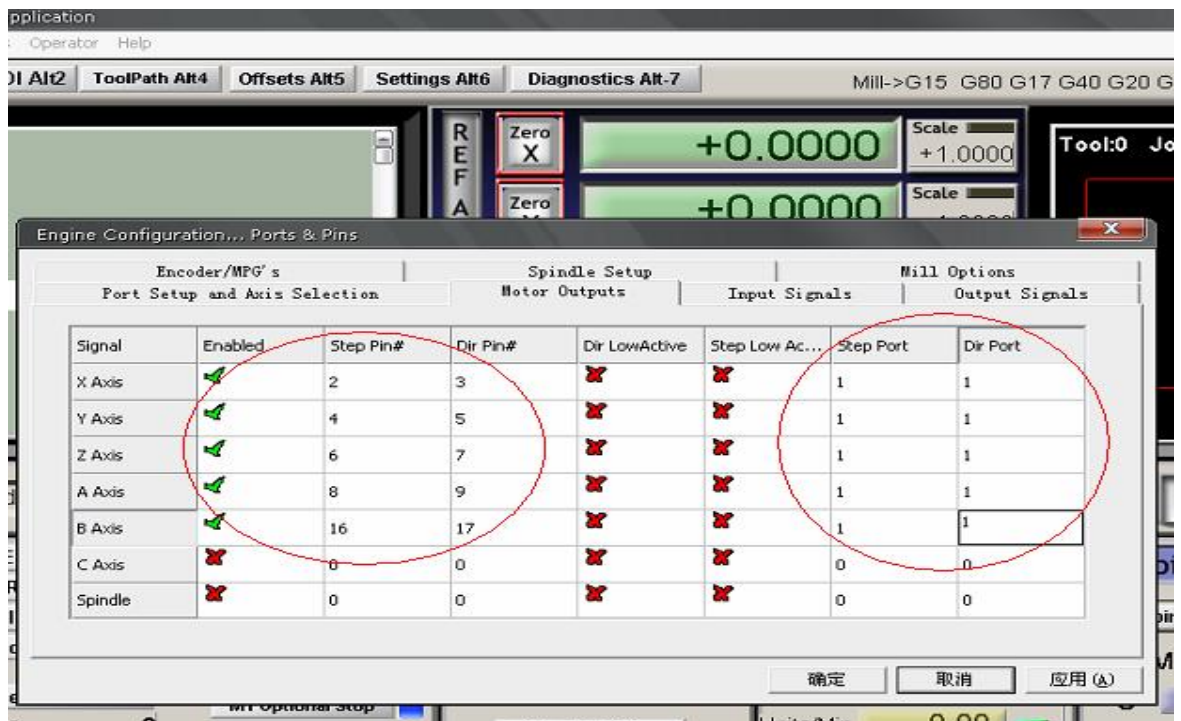


Fig 15 basic setting of direction and pulse pins

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

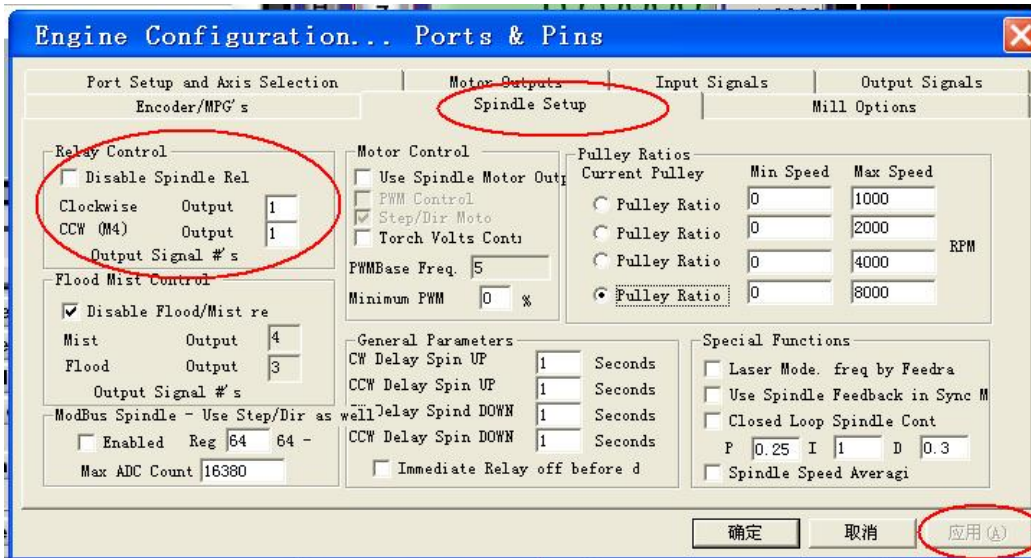
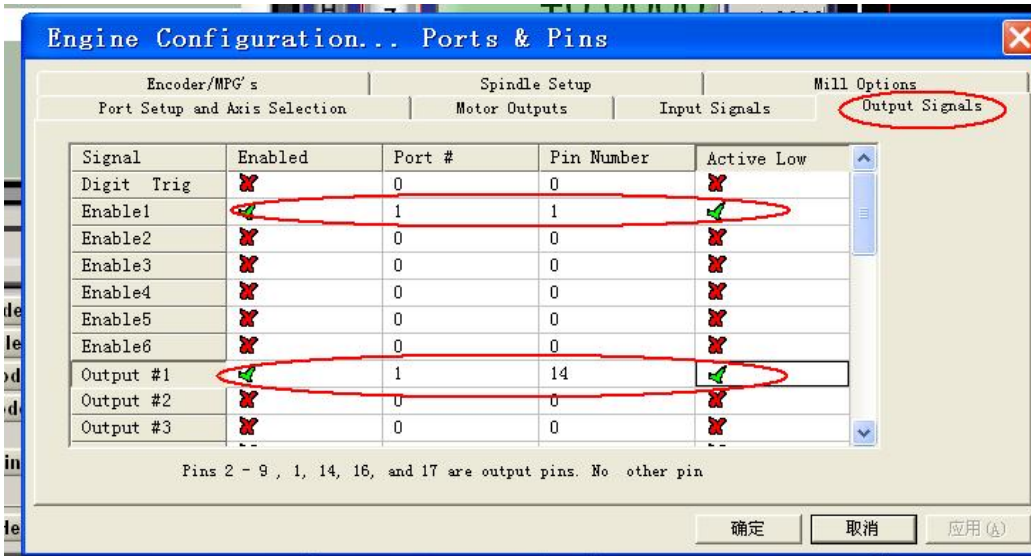


Fig 16 setting the ENABLE and Relay's pin

### 3、Adjusting limits witch of mach3

Click *input signal*, the parameter as fig17

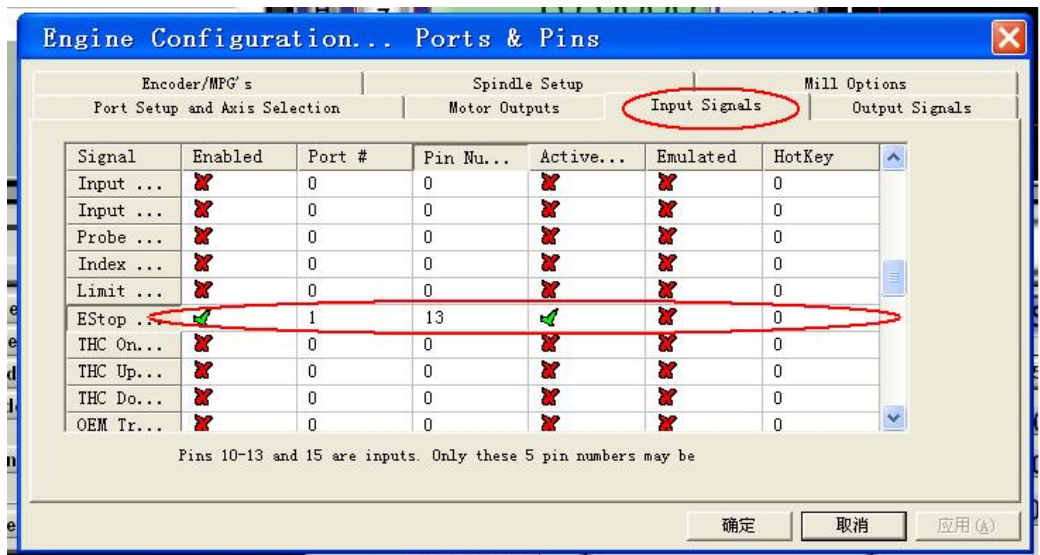
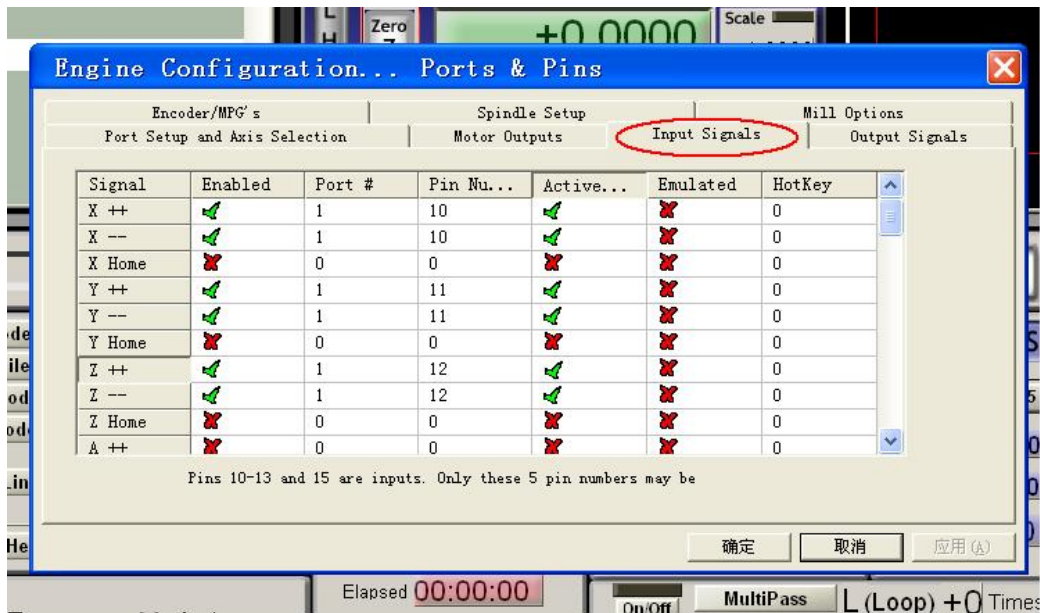


Fig 17

## 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



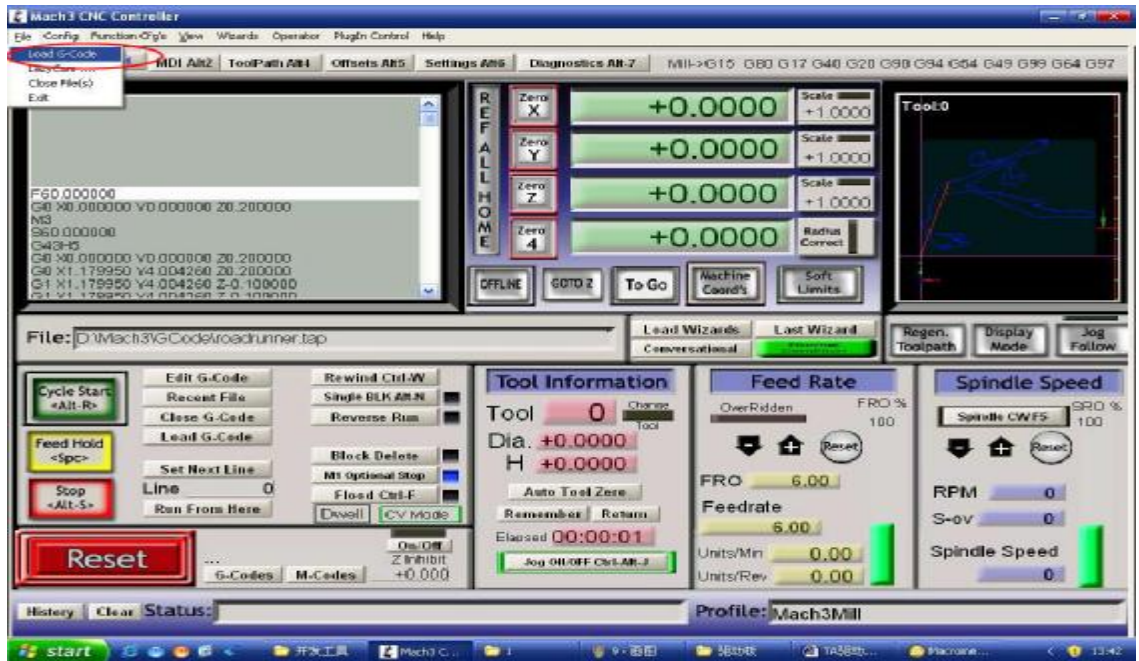


Fig 18 Open G



Click the red circllet **Load G-code** and open the icon  and click , and choice a G code, the interface as follows as fig 19



Fig 19 Open the testing procedures of G

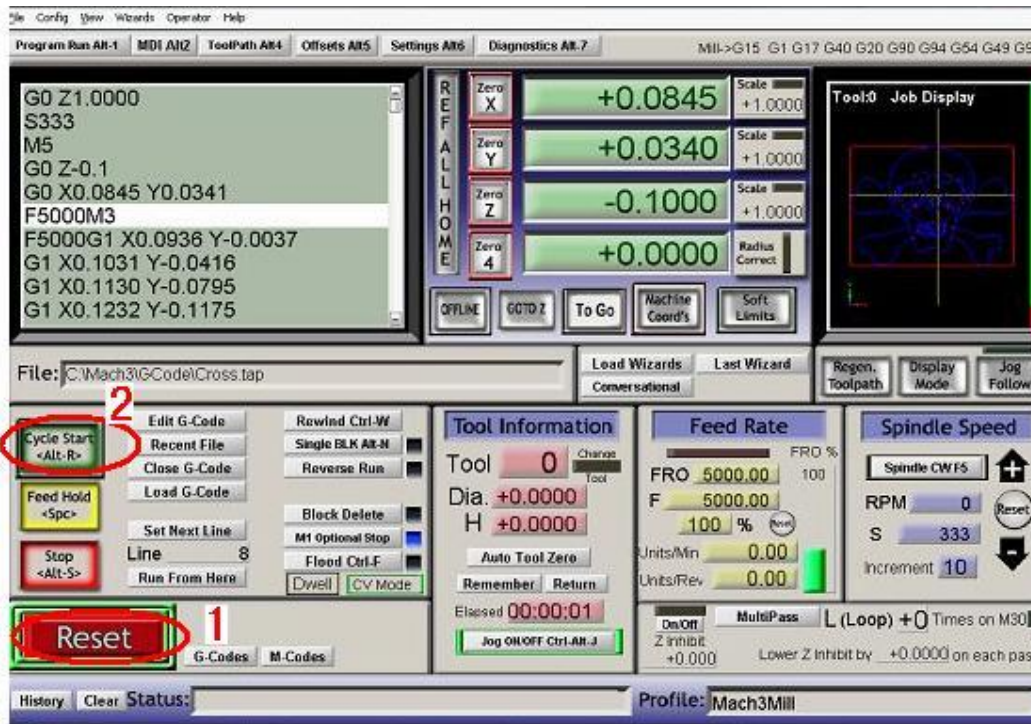


Fig 20

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 :

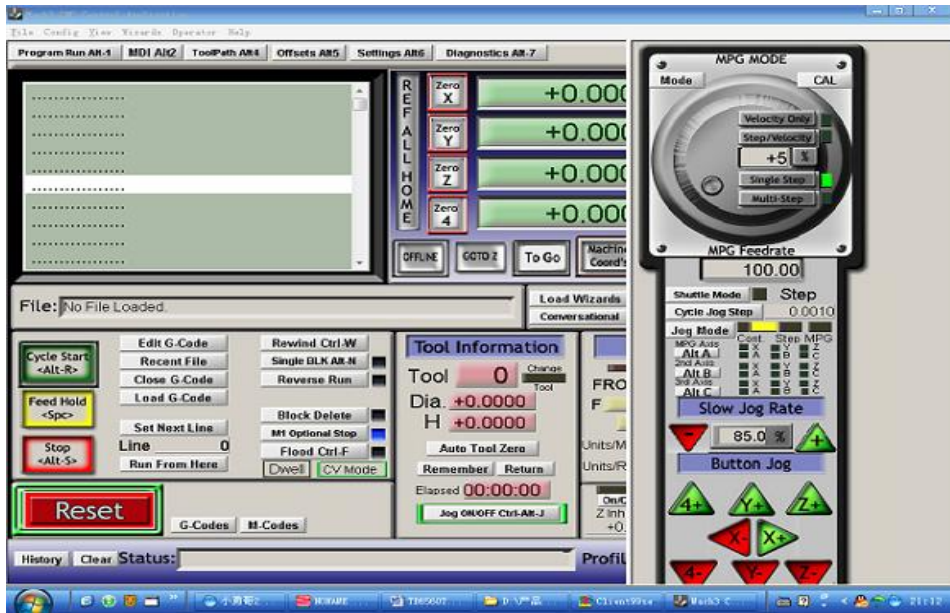


Fig21