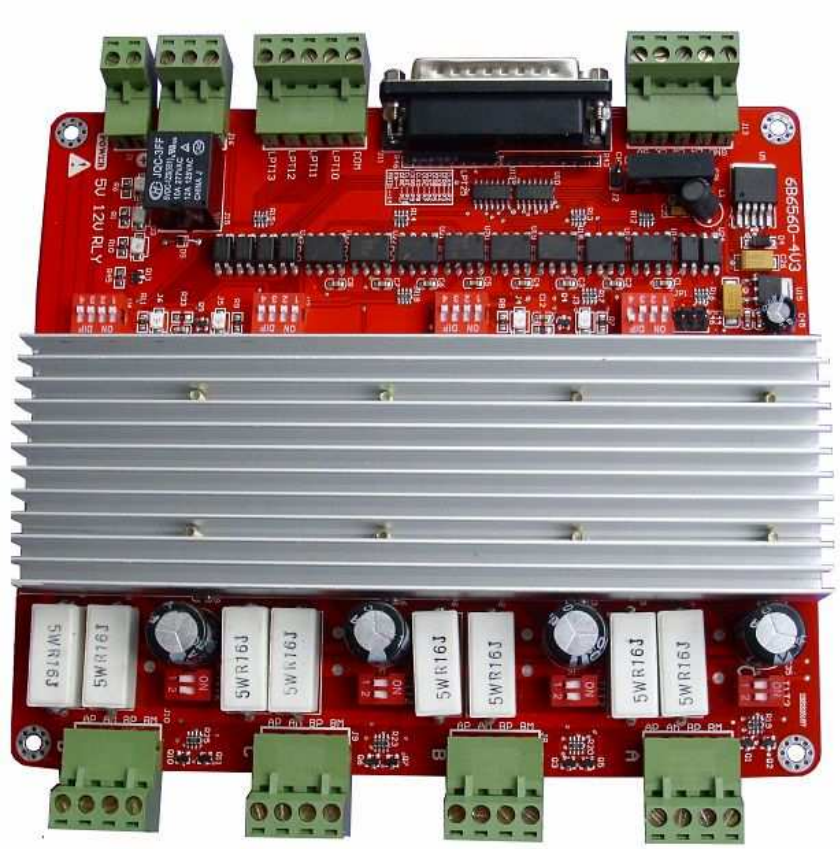
IFS-6560T4-N

MANUAL OF 2.5A FOUR AXIS OF STEPPER MOTOR



CONTENT

Manual of IFS-6560T4-N

I. Summary

The computer engraving machine is a new set of engraving and milling. The machine is mainly suitable for processing a variety of colorful patterns mould, such as,matrixes for embossing,sole mould,button mould,Zipper model,Stamping die design and die text,Instrument Mould,glass mold,etc.Also applies to advertising, such as logo of firms,scutcheon,module of building,badge,name-plate,panel,association's, emblem,door-plate,destination,board,decoration,upholster,etc. And applies for graphic engraving,Yin wen and Yang wen profile, and relief sculpture,such as portrait,scenery,Calligraphy Lettering,seal,etc.

The company's 4-axis Engraving machine drive will composed minimum control system, using high-performance special micro-step control of TB6560 chip , open micro-computer control according to user requirements to functional design to the driver board.The control panel suitable for driving any small or four-phase or two-phase hybrid stepping motor. And have 4 files adjustable features of current 0.6A, 1.2A, 1.8A, 2.5A , support MACH2, MACH3 ,KCAM4 Series software,Widely used in mold processing, graphic sculpture. As a result of new bipolar constant-current chopping technique, high precision, the motor running,with small vibration, low noise, smooth operation, safe and convenient, it is welcomed by the vast number of DIYers and engraving machine manufacturers.

II、The advantages of TB6560AHQ

1、The advantages at low speed

Low-speed operation system means clock frequency is not high, a small current drive based , such as several to 100 rpm, under the conditions of the user, in such applications will increase in costs such as using the traditional driver, either due to integrated chip subdivision is too low, leaving the low-speed vibration is too large;

either had to choose a high drive segments.

The advantages of TB6560AHQ

- low vibration and noise.Because the chip comes with an optional sub-2,4,16, enough to meet speed nearly a few to high speed.
- Less heat:Large enough to heat the chip comes with a separate support the cooling requirements of small current drive
- Supports a variety of stepper motor:Customers can choose slightly larger moment of a hybrid or permanent magnet stepper motor, the motor work in the allowed peak torque between 30-50 percent, the motor costs almost the same; the chip set to provide more current file and current decay model, support various parameters under thethe same power index .

2、The advantages at high speed

High-speed operation system means clock frequency is higher, and a large current drive-based. Such as speed close to thousand rpm, under this application,compare with traditional driven program,Either due to integrated chip segment is too low, leaving the system is too small speed range,Either due to excessive breakdown and increase high costs, may also caused by high torque decrease vibration and noise.

The advantages of TB6560AHQ

- Low vibration and noise.As the chip TB6560AHQ comes with 16 segments, meeting nearly from a few to thousand rpm. and generates automatically a pure sine wave control current,compare with another highly integrated chip, the high torque at the same speed will not only not decreased, but increased..As TB6560AHQ can withstand the peak driving voltage 40V, 3.5A peak current, it provides continuous technical support.when the motor torque in a large, high-speed operation.
- Supports a variety of stepper motor.Customers can choose a hybrid moment slightly larger or permanent magnet stepper motor, in the maximum torque of between 30-50%, the motorthe costs is almost the same. The chip provide high

current set and multi-profile current decay mode, support the same power index of the various parameters under the stepper motor.

- Less heat.The embedded drive compact, easy to heat.When it drive in high current , the chip surface to facilitate the external cooling radiator, the user can be also directly connected to the metal shell of the original controller,

In short, because TB6560AHQ is highly integrated, the external circuit is very simple, it is high reliability, and support 57 and some 86 per minute stepper motor from a few dozen to thousand rpm.in the wide speed application development and enable the both costs down of numerical control equipment and production

III、Brief performance of IFS-6560T4-N

We have accumulated many years of design experience in 4-axis engraving machine drive. And developed this type of TB6560T3V1.In addition to its main features a little bit above 6560, it also has:

- Driving four 2.5A stepper motor simultaneously,With 5-axis expansion, if you need to extend it
- Isolated completely high-speed DCDC optocouplers and protect your Pc.
- Spindle relay output, if you use the mach3 to control spindle start and stop
- Semi-flow control ,when the motor stop, current is reduced to the minimum stop effectively.
- The interface with the fans, you can add any fans
- With 4-way 0.8-3.5A (peak) adjustable current, rated output two-phase bipolar stepper motor driver
- Interface with Standard parallel port , support MACH2, KCAM4 series software.
- Limit interface with 4-ways, Plug connector designed fby connecting limit switches as you like
- Support four running mode,such as mixture,fast,low,normal mode.
- Support the choice of four segments - 1,1 / 2,1 / 4,1 / 16

- Stability,and small heat,24-36V single power supply input with switching power chip supply 5V power

IV、GENERAL DIAGRAM

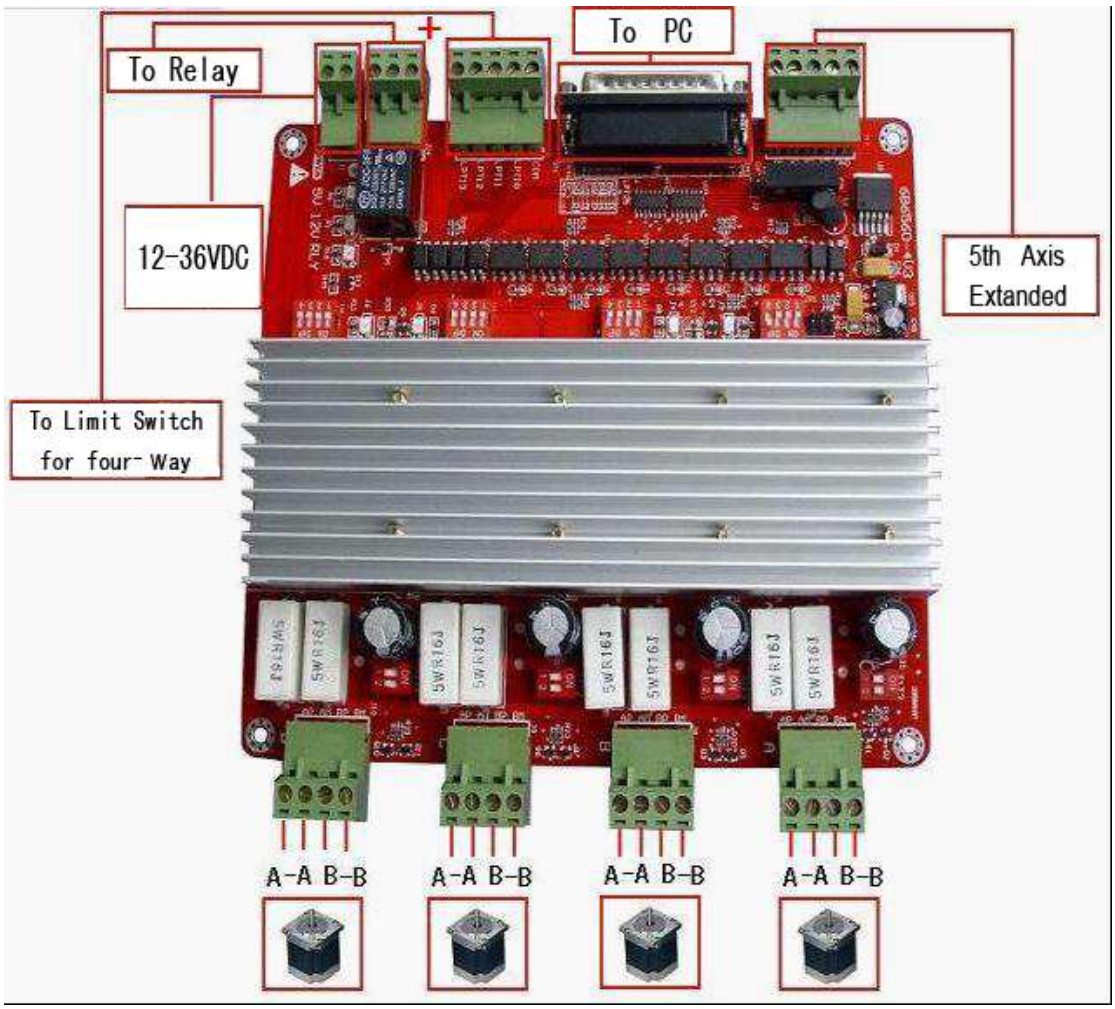


Fig 1

V、Definition on pins of parallel port

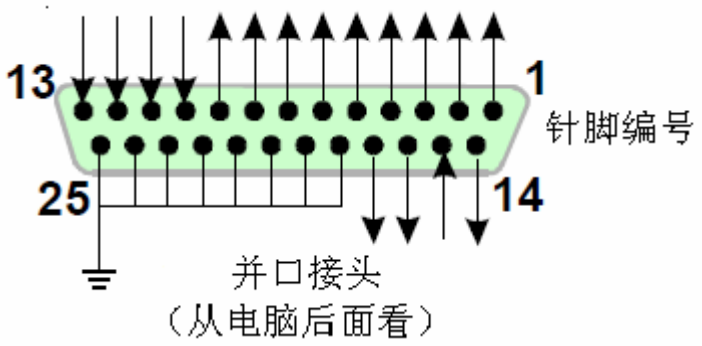


Fig2

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 pulse signal
3	DIRX	X direction signal
4	STEPY	Y pulse signal
5	DIRY	Y direction signal
6	STEPZ	Z pulse signal
7	DIRZ	Z direction signal
8	STEPA	A pulse signal
9	DIRA	A direction signal
10	LIMIT-1	Limit input1
11	LIMIT-2	Limit input2
12	LIMIT-3	Limit input3
13	LIMIT-4	Limit input4
14	Relay control	
15	blank	
16	STEPB-	B pulse signal
17	DIRB-	B direction signal

18-25	GND	

VI.Adjusting current decay,subdivision,current output

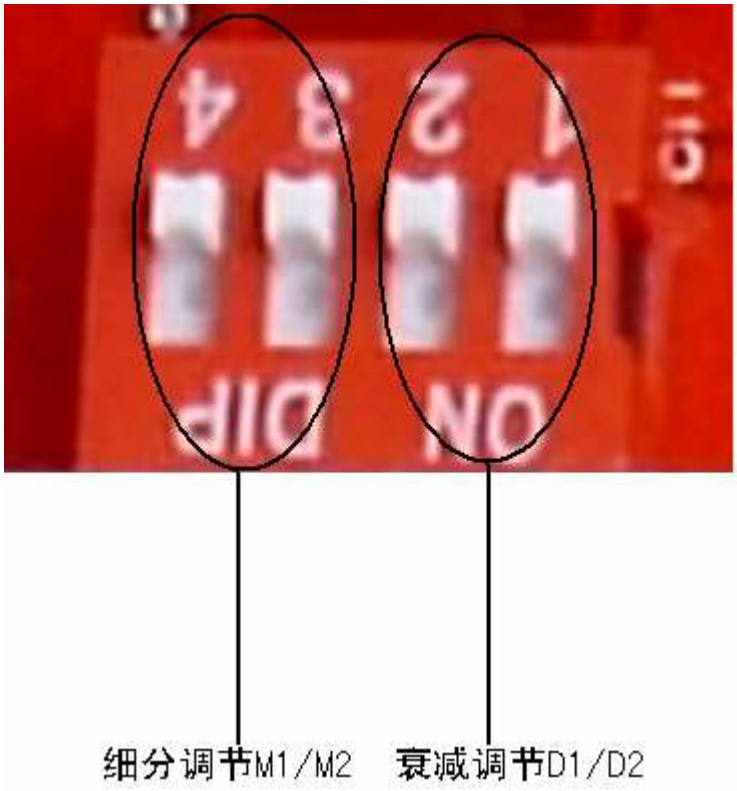


Fig 3

6.1、Adjusting current decay

The specific role of the current decay of stepper motor driver board:

Subdivision is now a way of the current subdivision of stepping motor, phase current according to sine wave is about to get the current point as the tangent point of breakdown. Subdivision in the phase current reaches the point of control is necessary to control current decay, otherwise there will overshoot the angle will not stay in the exact breakdown point.Motor at different speeds, selected for different decay modes.fast decay ad high speed,slow decay at low speed.Slow decay occurs when high-speed vibration, noise, Low speed at fast decay will lead motor weakness, severe

cases are not allowed to locate. Motor Control IC for the current decay of the H bridge switches is the control mode.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 first and then a slow decay, mixing ratio of decay time and power for the chip also will be different.

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

6.2、Adjusting subdivision

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

DIP M1	DIP M2	Subdivision mode
OFF	ON	1/16
OFF	OFF	1/4
ON	OFF	1/2
ON	ON	1

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

6.3、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 current
OFF	ON	25%*2.5A
ON	ON	50%*2.5A
ON	OFF	75%*2.5A
OFF	OFF	100%*2.5A

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：

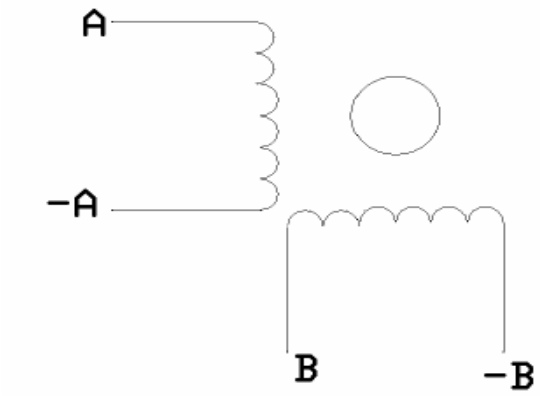


Fig 5

Four-wire stepper motor connection

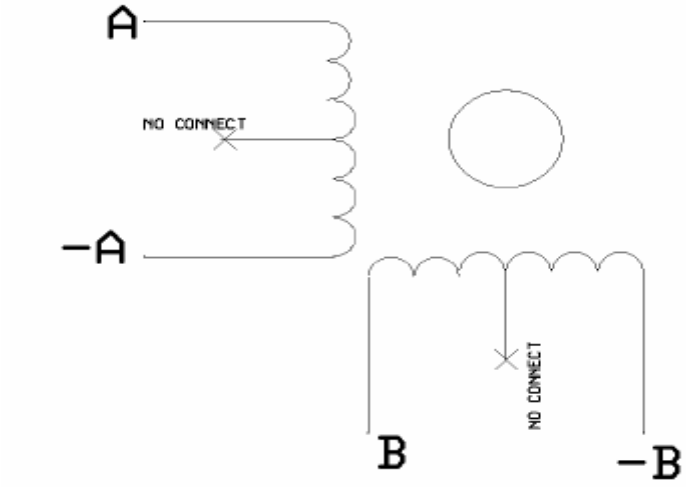


Fig 6

Six -wire stepper motor connection

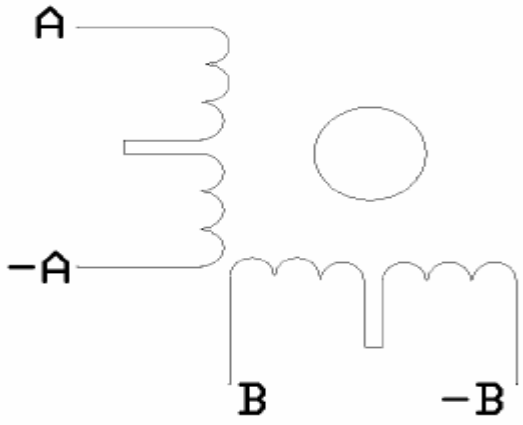


Fig 7

Eight -wire stepper motor connection

Notes:Motor A,-A, B,-B, connected respectively, connected driver board AP, AM, BP, BM

VIII、Limit switch connection

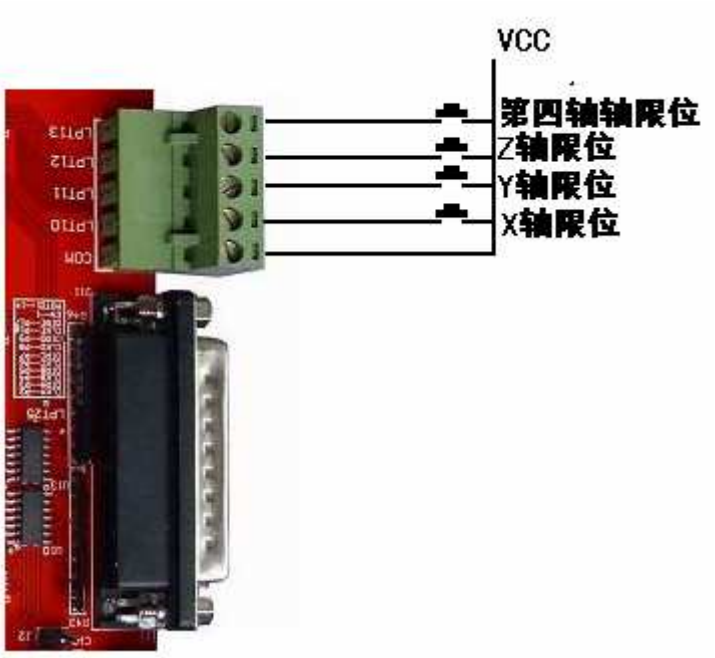


Fig 8

IX、The 4th axis extended connection

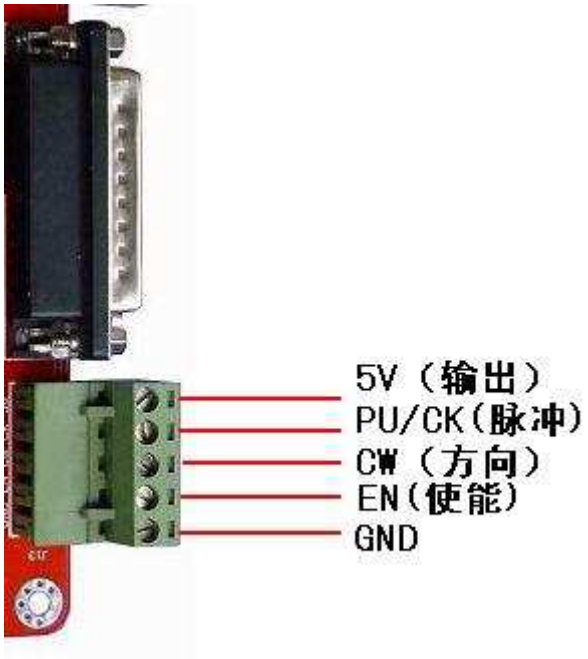


Fig 9

X、 Match with the and driver board

The panel of IFS-6560T4-N four-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、**Select 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 12-36VDC 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.
- Ttandem-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.

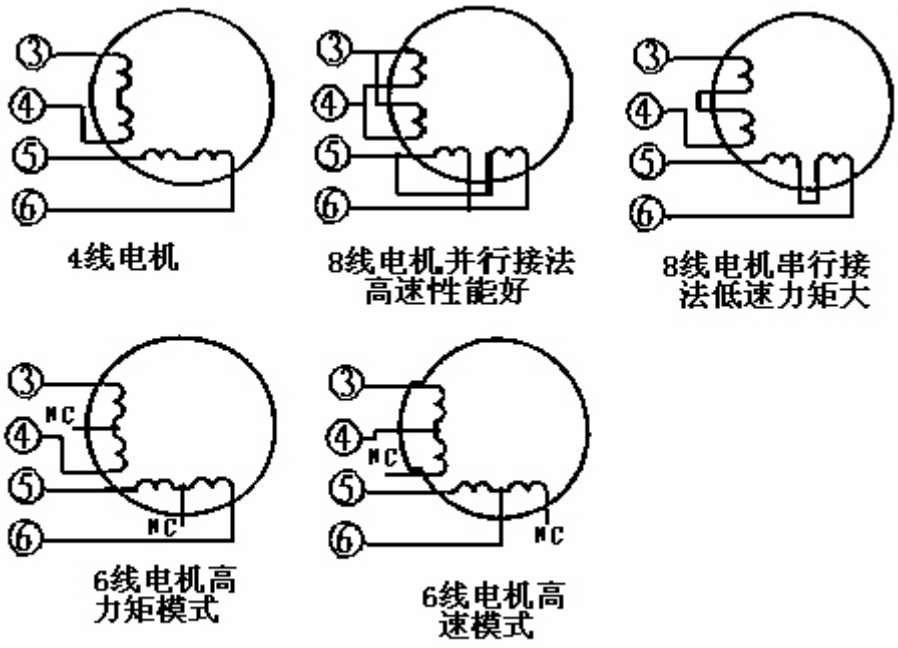


图 3. 电机接线

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

11.1、Startup Mach3

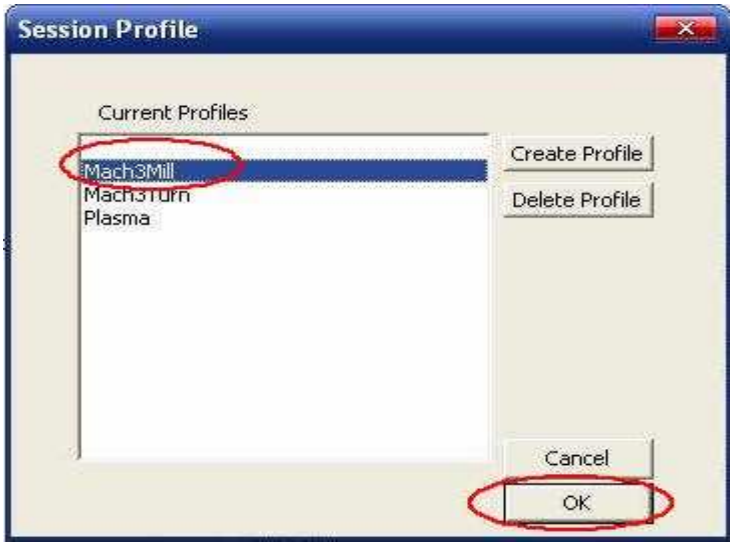


Fig 11 open mach3

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

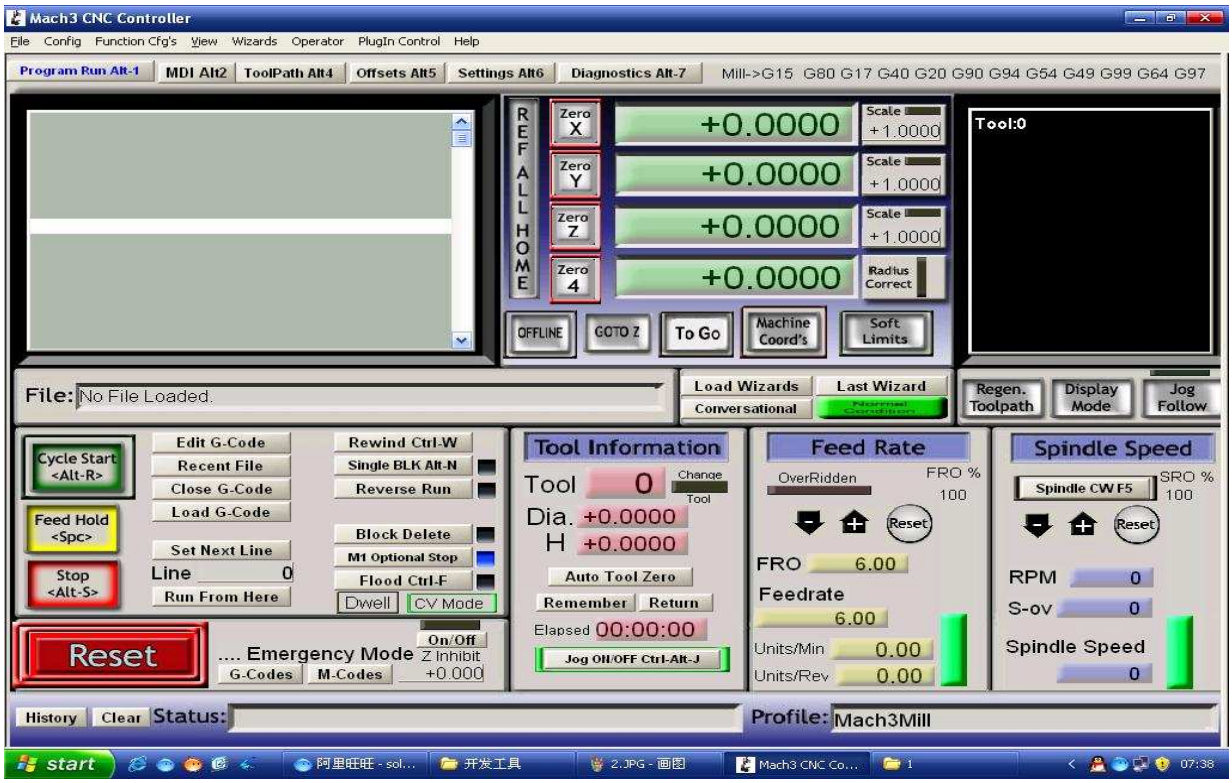


Fig 12 the main interface of march3

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

11.2、The basic set of mach3

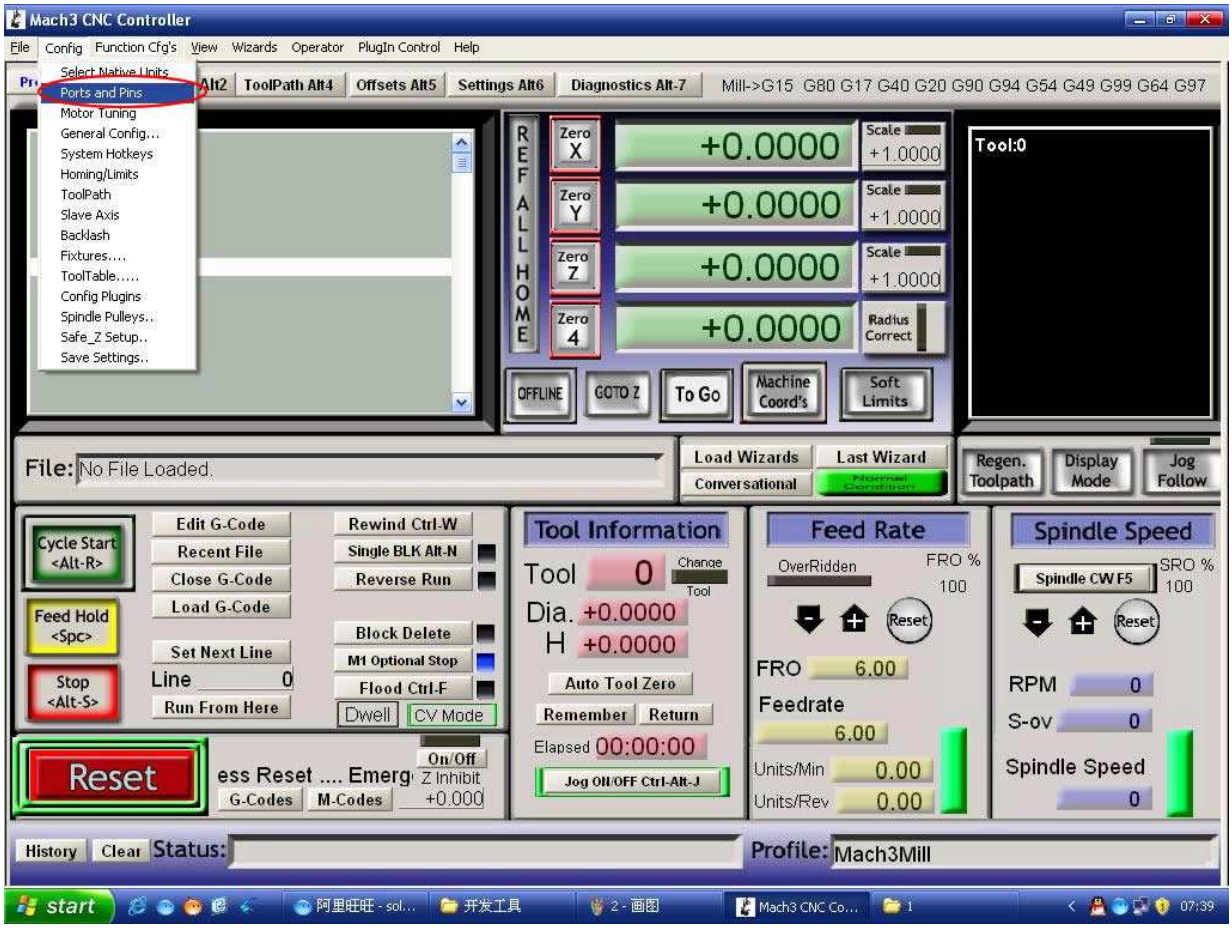


Fig 13 set menu of mach3

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

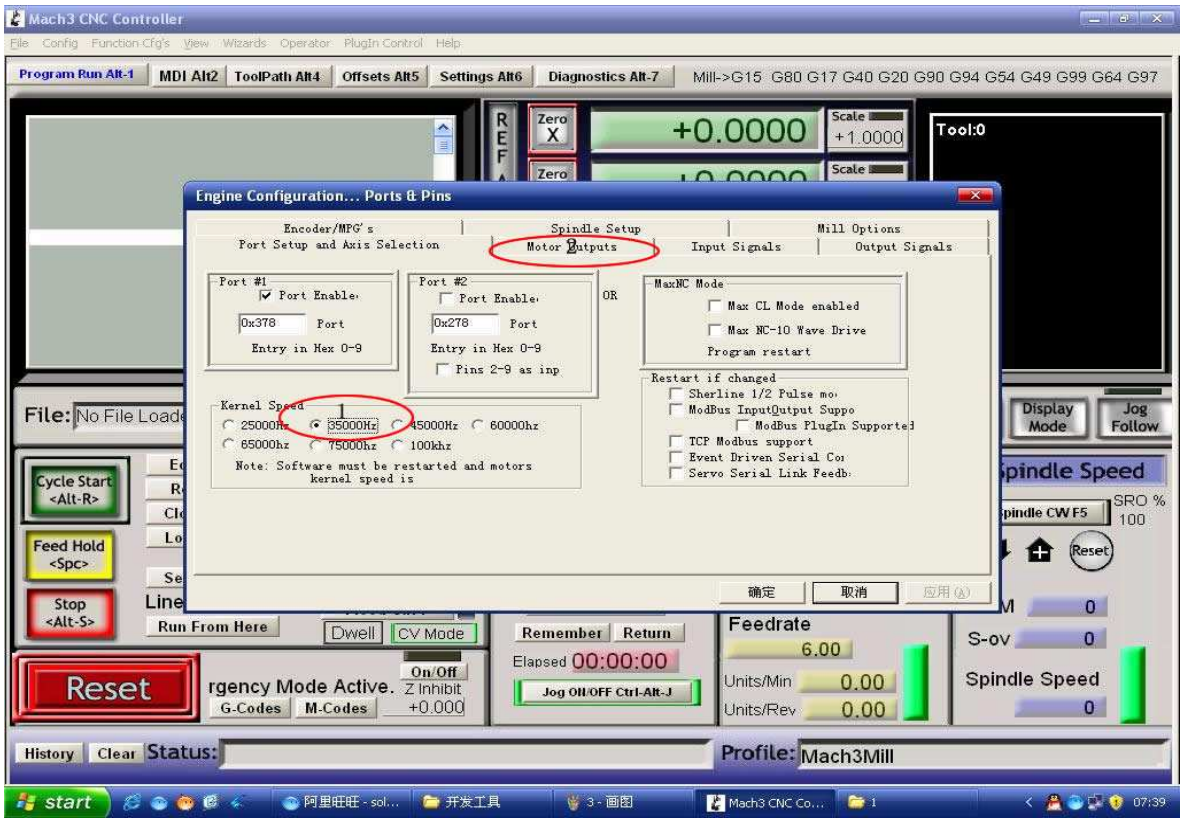


Fig 14 The basic frequency setting

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 us direction and pulse settings:

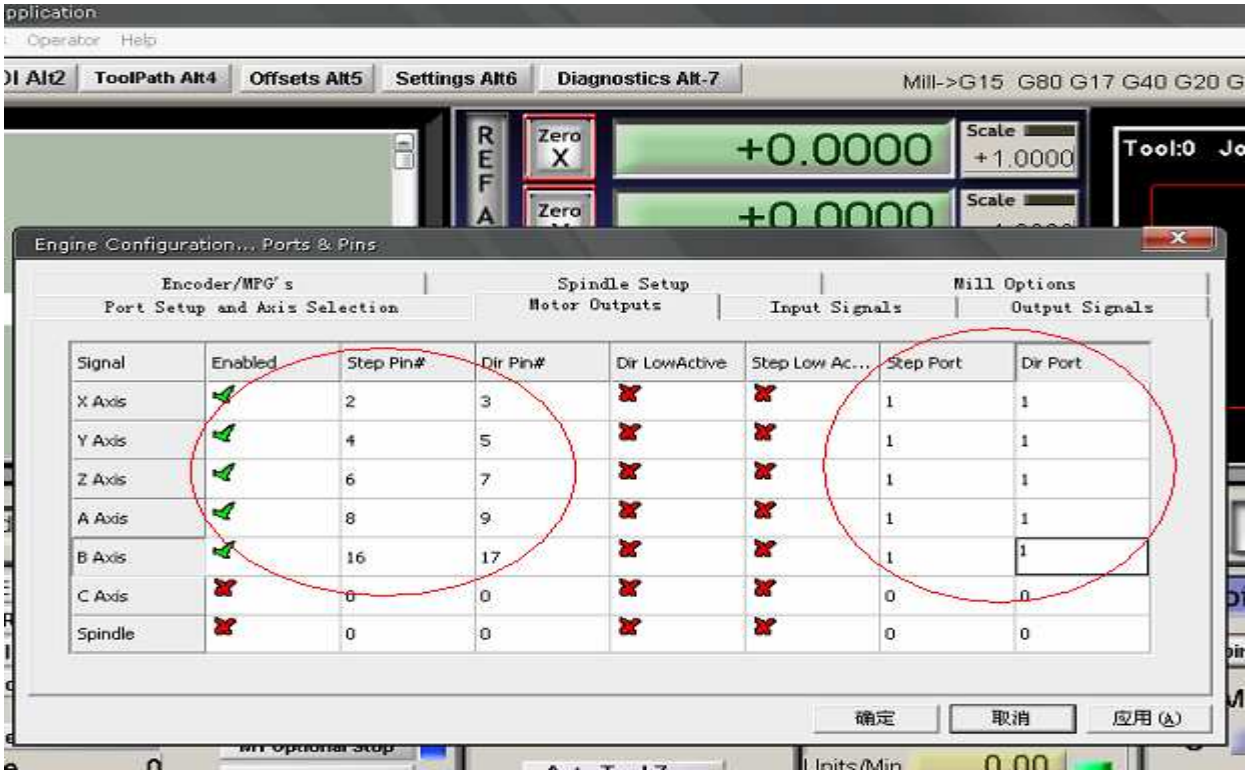


Fig 15 basic setting of direction and pulse pins

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

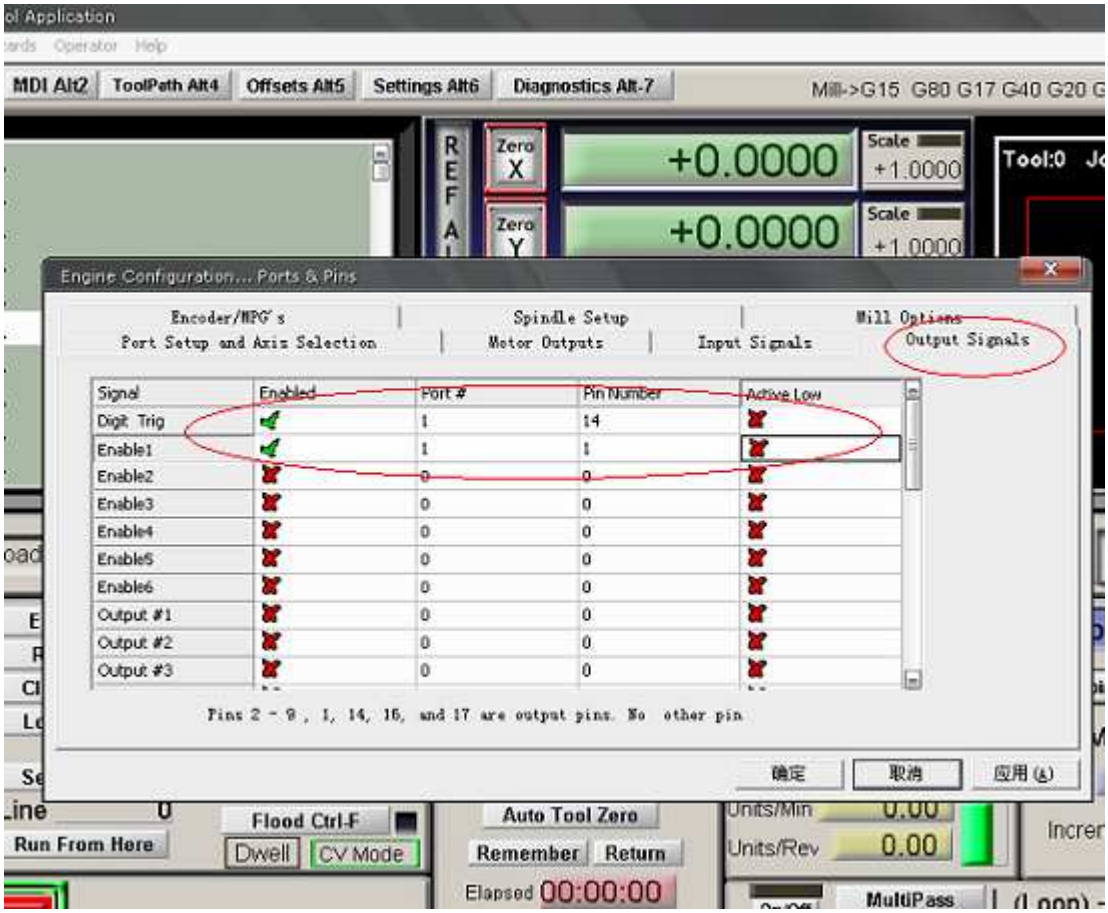


Fig 16 setting the ENABLE and Relay's pin

11.3、Adjusting limits witch of mach3

Click ***input signal***，the parameter as fig17

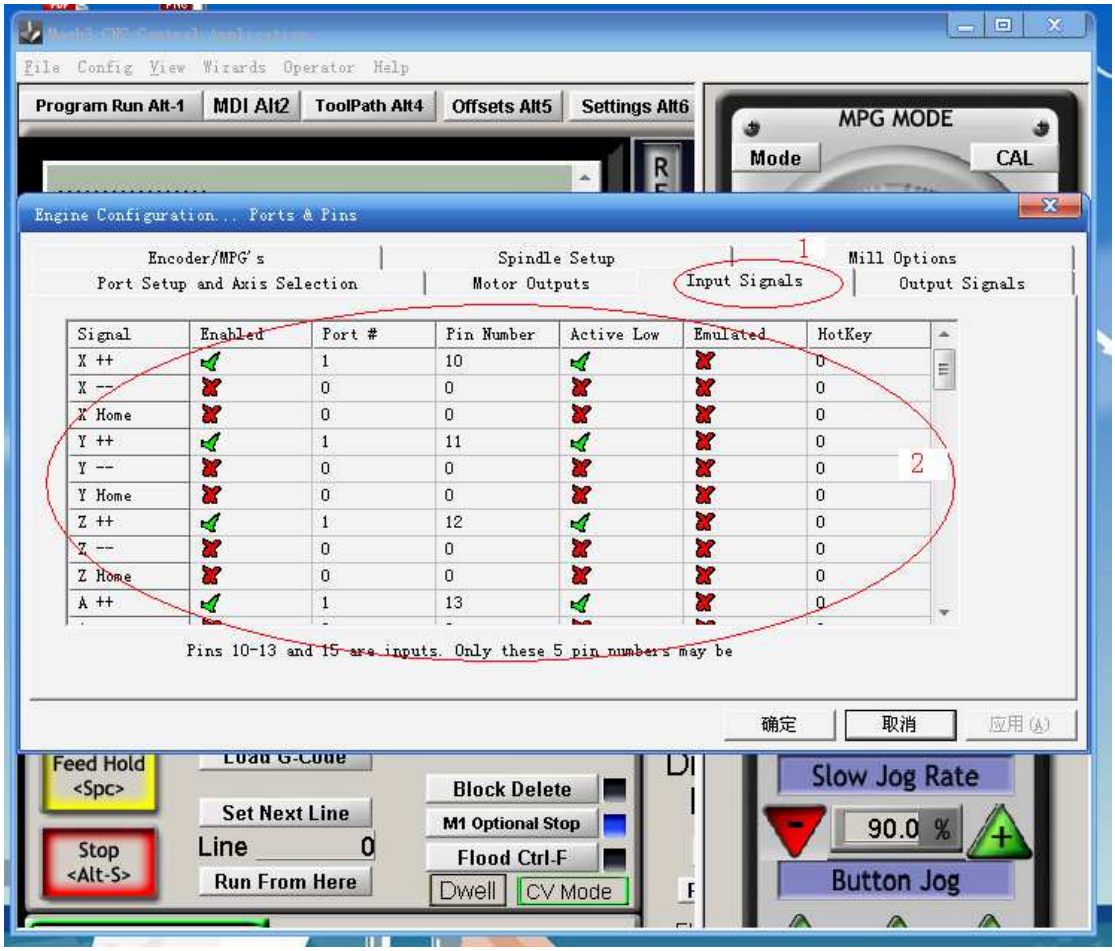


Fig 17

11.4、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

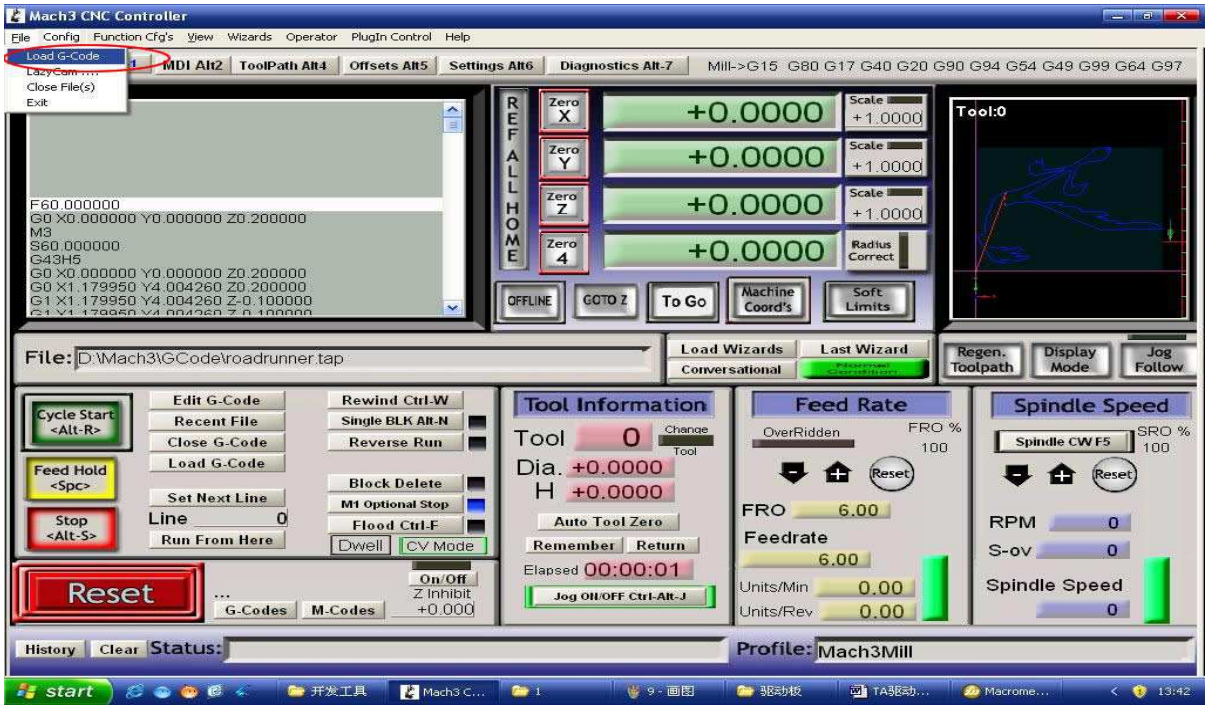
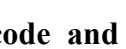
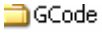


Fig 18 Open G

Click the red circlet **Load G-code and open the icon** 

and click 

,and choice a G code, the interface as follows as fig 19

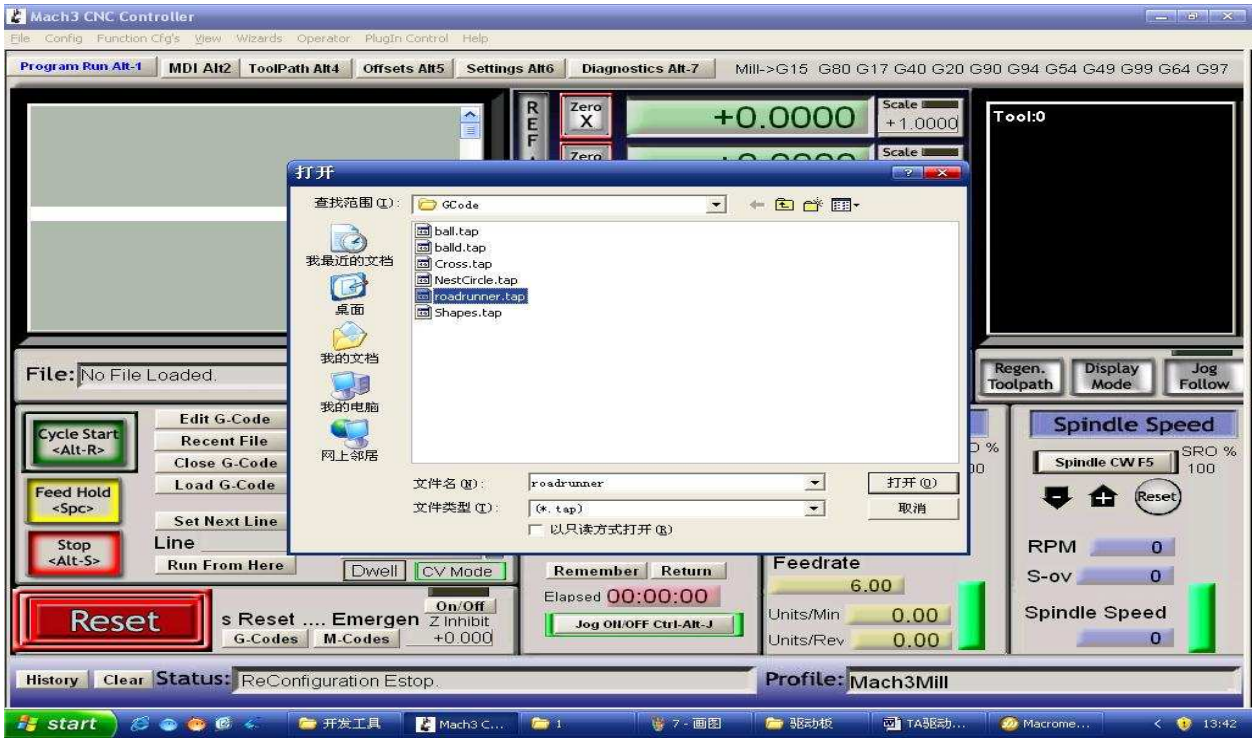


Fig 19 Open the testing procedures of G

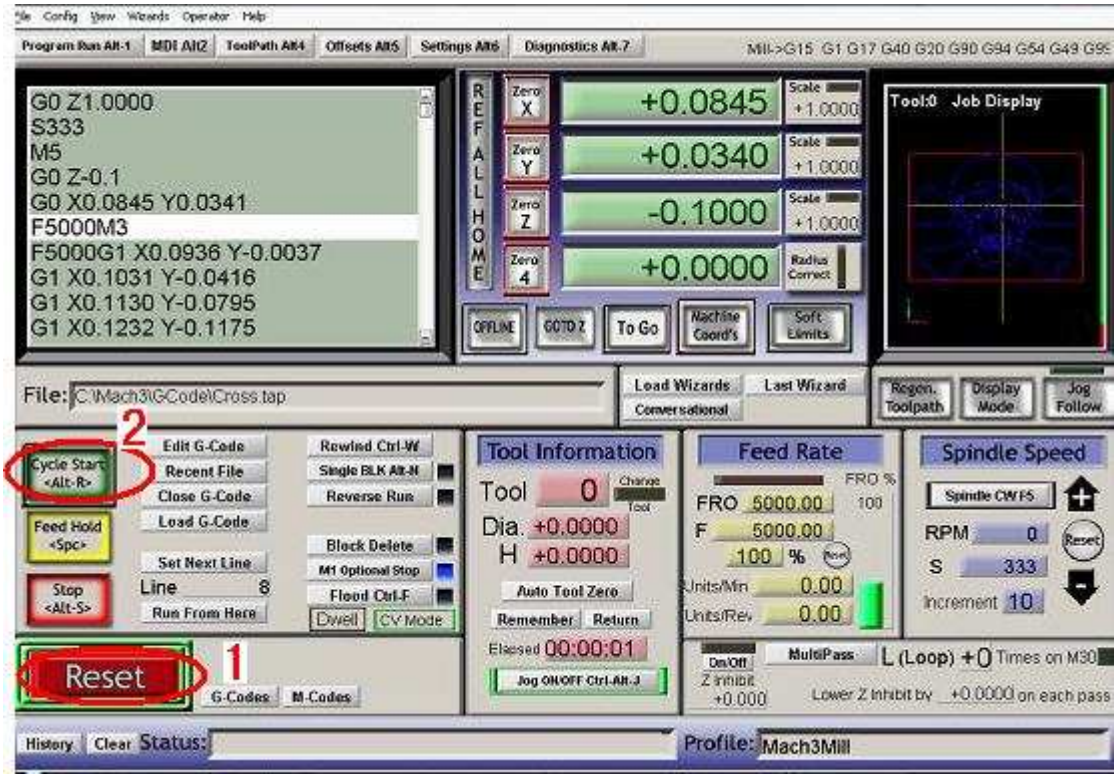


Fig 20

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.，

11.5、How to use the manual control interface of MACH3

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

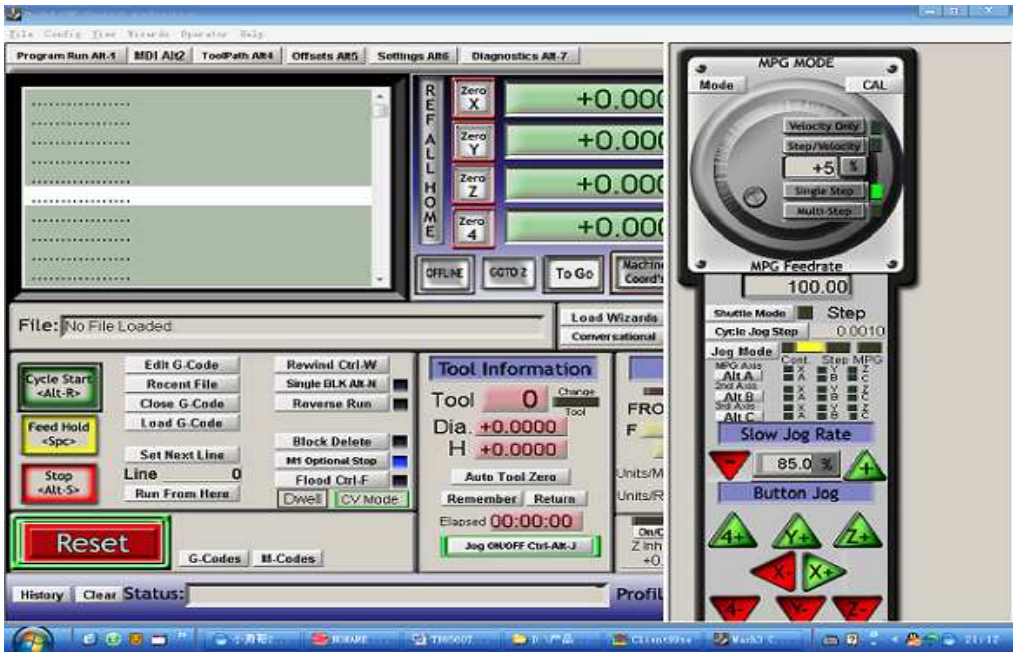

Program Run Alt-1
MDI Alt2
ToolPath Alt4
Offsets Alt5
Settings Alt6
Diagnostics Alt-7
REF ALL HOME
Zero X
Zero Y
Zero Z
Zero 4
+0.000
OFFLINE
GOTO Z
To Go
File: No File Loaded
Load Wizards
Conversational
Cycle Start <Alt-R>
Feed Hold <Spc>
Stop <Alt-S>
Edit G-Code
Recent File
Close G-Code
Load G-Code
Set Next Line
Line 0
Run From Here
Rewind Ctrl-W
Single BLK Alt-N
Reverse Run
Block Delete
M1 Optional Stop
Flood Ctrl-F
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
85.0
Button Jog

图 11