



CHANGZHOU LONGS MOTOR CO., LTD

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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 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,EMC2 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 | OFF |
| 25% | OFF | OFF | SLOW | OFF | OFF | 1/16 | OFF | ON |

* Important Notes:



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- 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:

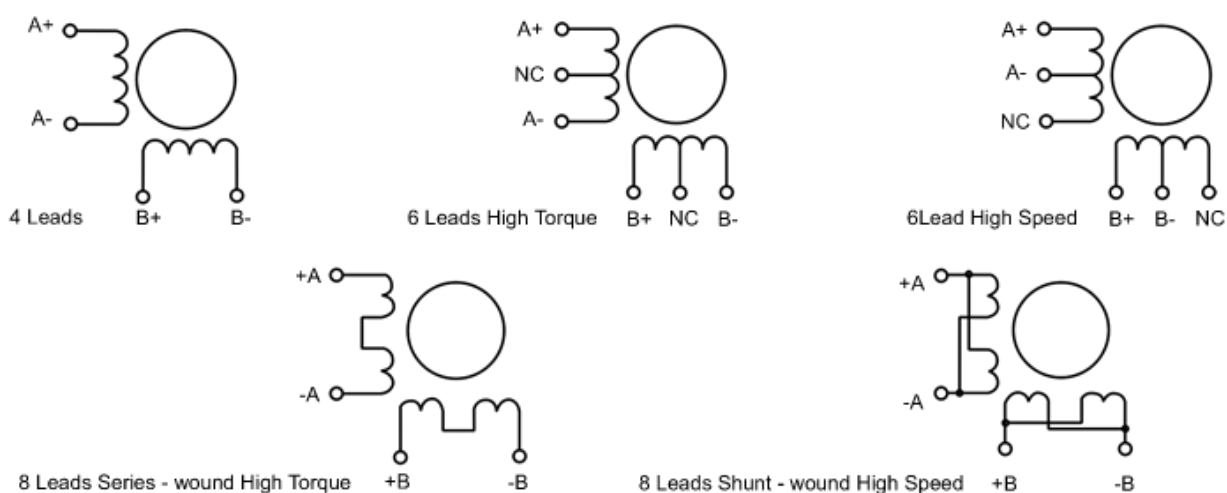
*Output current = Rated current of your stepper motors * quantity + 2A*

*(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.

Wiring Diagram:



Simple introductions:



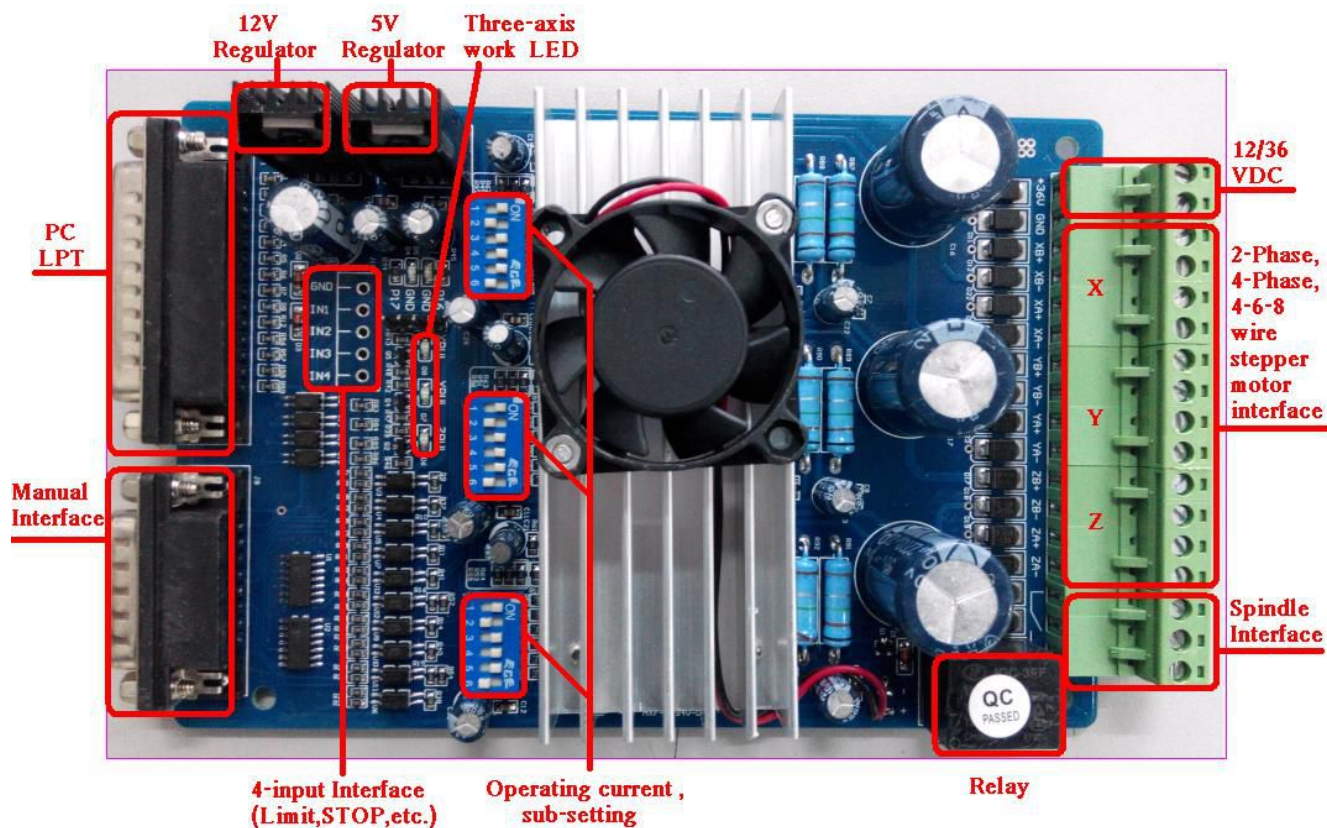
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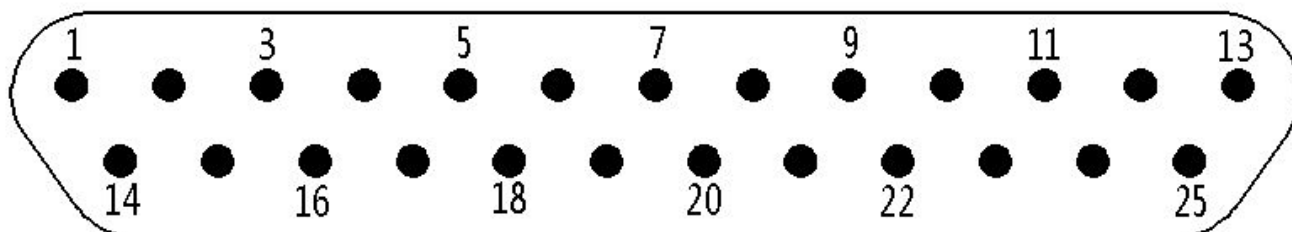
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DB-25



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 |



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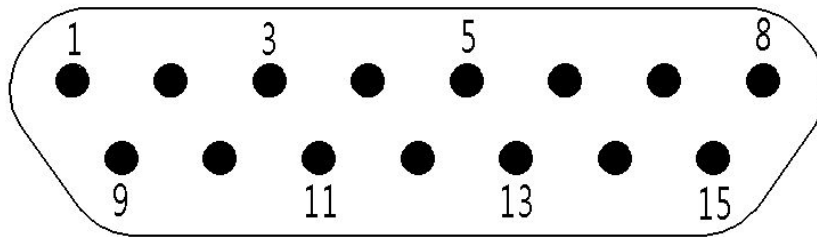
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DB-15



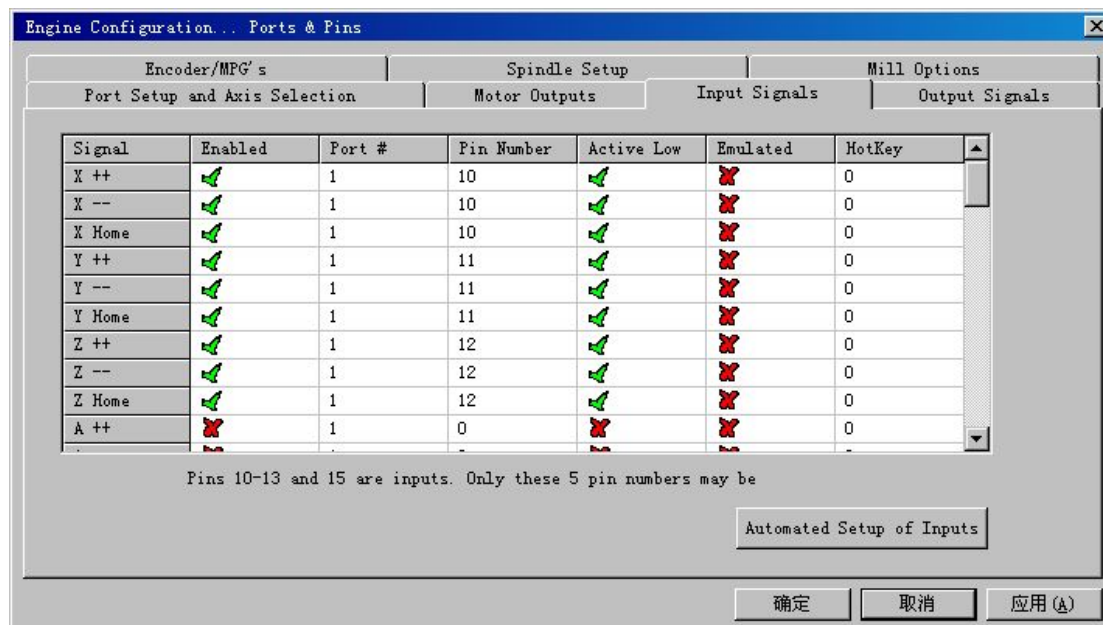
The definition of 1-PIN15 of Manual Interface:

| 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 | 5v/V DD | GN D | STOP | Y Step | Y Dir | Z Limit | Y Limit |

The definition of 4 channel inputs interface:

| Input 1 | Input 2 | Input 3 | Input 4 |
|-------------------|-------------------|-------------------|-------------------|
| Corresponding P10 | Corresponding P11 | Corresponding P12 | Corresponding P13 |

Limit setting for reference:





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Engine Configuration... Ports & Pins

Encoder/MPG's Spindle Setup Mill Options

Port Setup and Axis Selection Motor Outputs Input Signals Output Signals

| Signal | Enabled | Port # | Pin Number | Active Low | Emulated | HotKey |
|-------------|---------|--------|------------|------------|----------|--------|
| Input #4 | | 1 | 0 | | | 0 |
| Probe | | 1 | 0 | | | 0 |
| Index | | 1 | 0 | | | 0 |
| Limit Ovrd | | 1 | 0 | | | 0 |
| EStop | | 1 | 13 | | | 0 |
| THC On | | 1 | 0 | | | 0 |
| THC Up | | 1 | 0 | | | 0 |
| THC Down | | 1 | 0 | | | 0 |
| OEM Trig #1 | | 1 | 0 | | | 0 |
| OEM Trig #2 | | 1 | 0 | | | 0 |

Pins 10-13 and 15 are inputs. Only these 5 pin numbers may be

Automated Setup of Inputs

确定 取消 应用 (A)

The definition of output Interface:

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

Instructions of *MACH3*



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Fig.1

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



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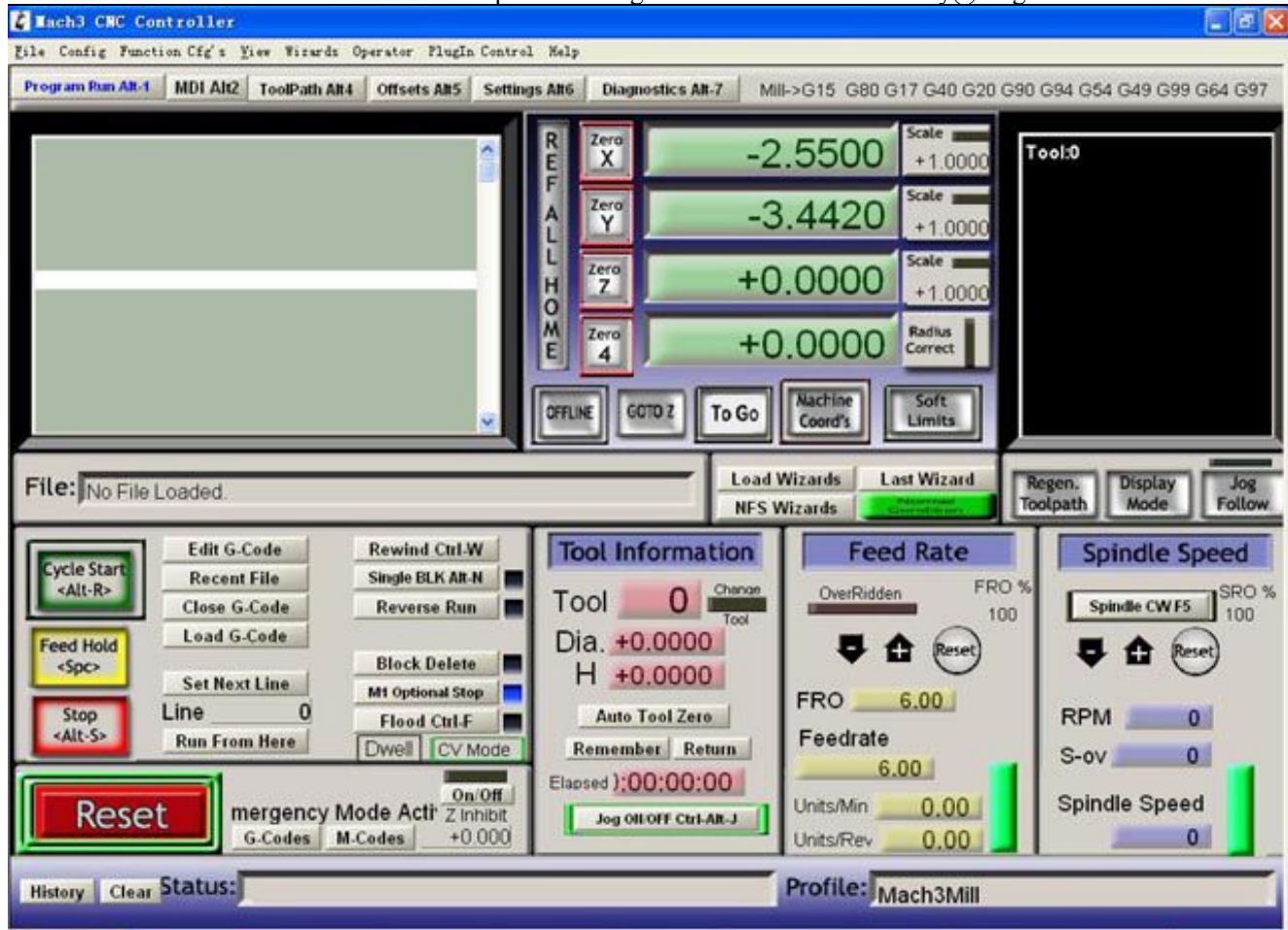


Fig.2

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.



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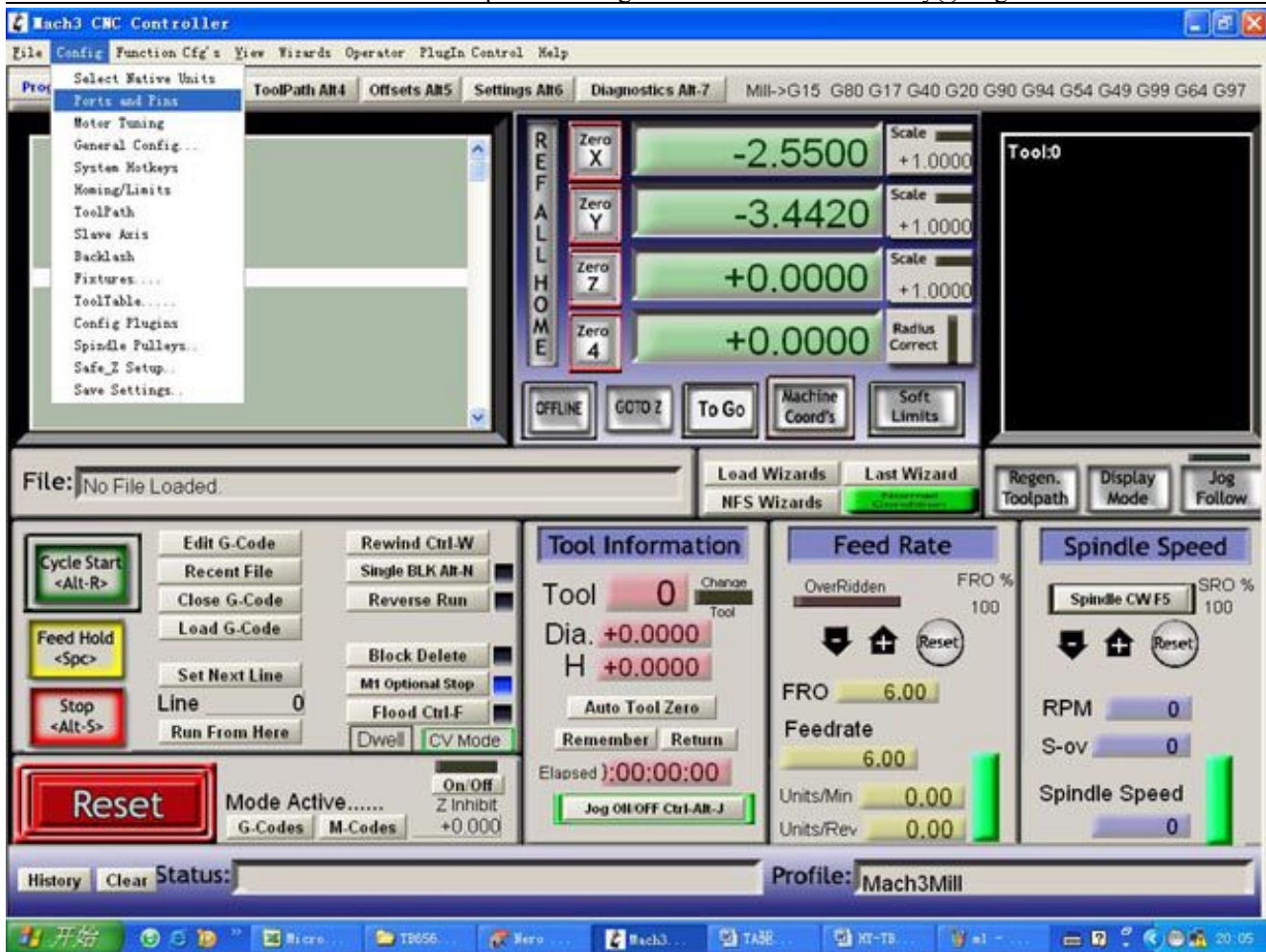


Fig.3

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

Please refer to Fig.4



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Engine Configuration... Ports & Pins

Encoder/MPG's | Spindle Setup | Mill Options

Port Setup and Axis Selection | Motor Outputs | Input Signals | Output Signals

Port #1
☒ Port Enable:
0x378 Port
Entry in Hex 0-9

Port #2
☐ Port Enable:
0x278 Port
Entry in Hex 0-9
☐ Pins 2-9 as inp

OR

MaxNC Mode
☐ Max CL Mode enabled
☐ Max NC-10 Wave Drive
Program restart

Restart if changed
☐ Sherline 1/2 Pulse mo
☐ ModBus InputOutput Suppo
☐ ModBus PlugIn Supported
☐ TCP Modbus support
☐ Event Driven Serial Co
☐ Servo Serial Link Feedb:

Kernel Speed
☐ 25000Hz ☒ 35000Hz ☐ 45000Hz ☐ 60000Hz
☐ 65000Hz ☐ 75000Hz ☐ 100kHz
Note: Software must be restarted and motors kernel speed is

确定 取消 应用 (A)

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 Configuration... Ports & Pins

Encoder/MPG's | Spindle Setup | Mill Options

Port Setup and Axis Selection | Motor Outputs | Input Signals | Output Signals

| Signal | Enabled | Step Pin# | Dir Pin# | Dir Low... | Step Lo... | Step Port | Dir Port |
|---------|---------|-----------|----------|------------|------------|-----------|----------|
| X Axis | | 1 | 7 | | | 1 | 1 |
| Y Axis | | 8 | 3 | | | 1 | 1 |
| Z Axis | | 5 | 4 | | | 1 | 1 |
| A Axis | | 0 | 0 | | | 0 | 0 |
| B Axis | | 0 | 0 | | | 0 | 0 |
| C Axis | | 0 | 0 | | | 0 | 0 |
| Spindle | | 0 | 0 | | | 0 | 0 |

确定 取消 应用 (A)

Fig.5



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

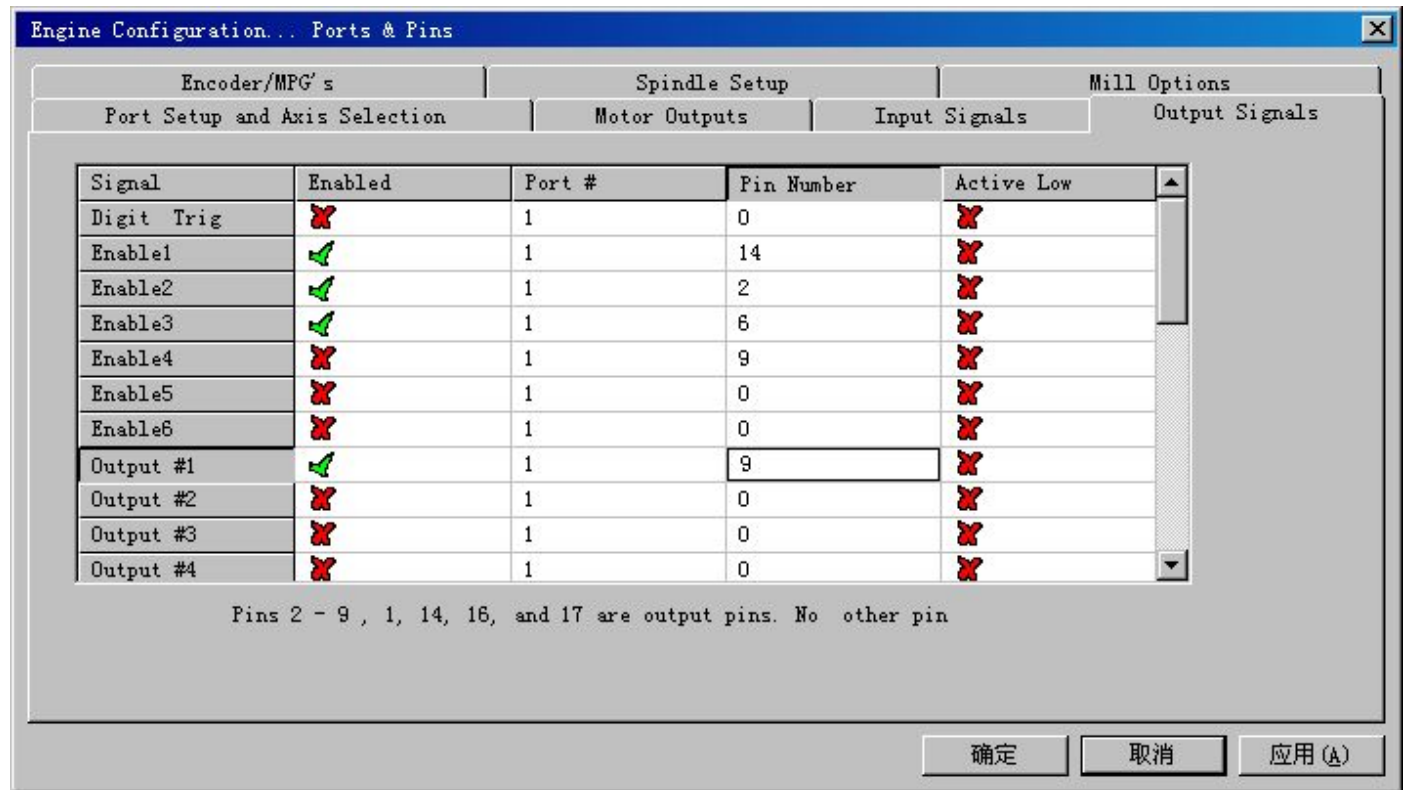


Fig.6

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



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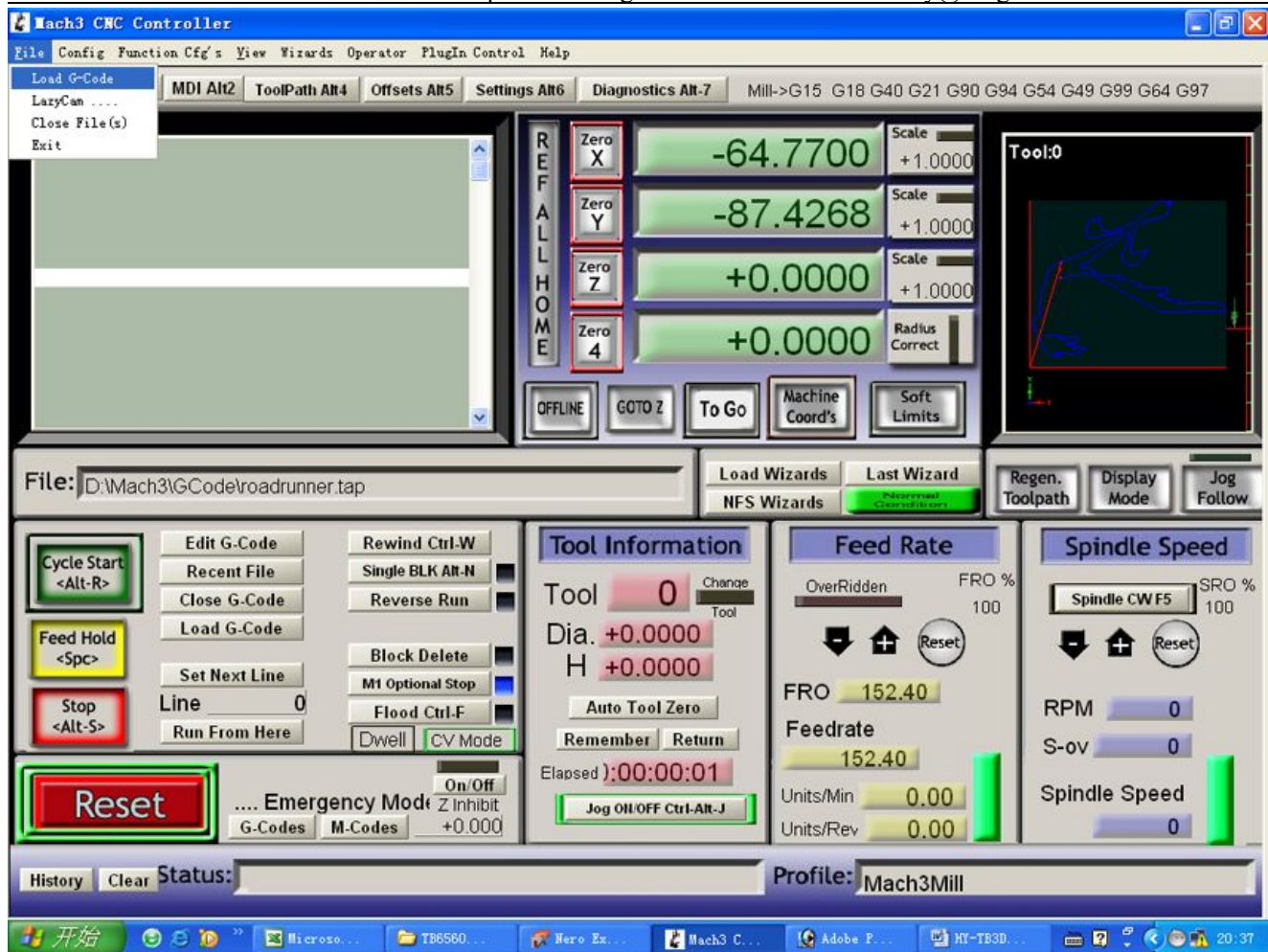


Fig.7

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



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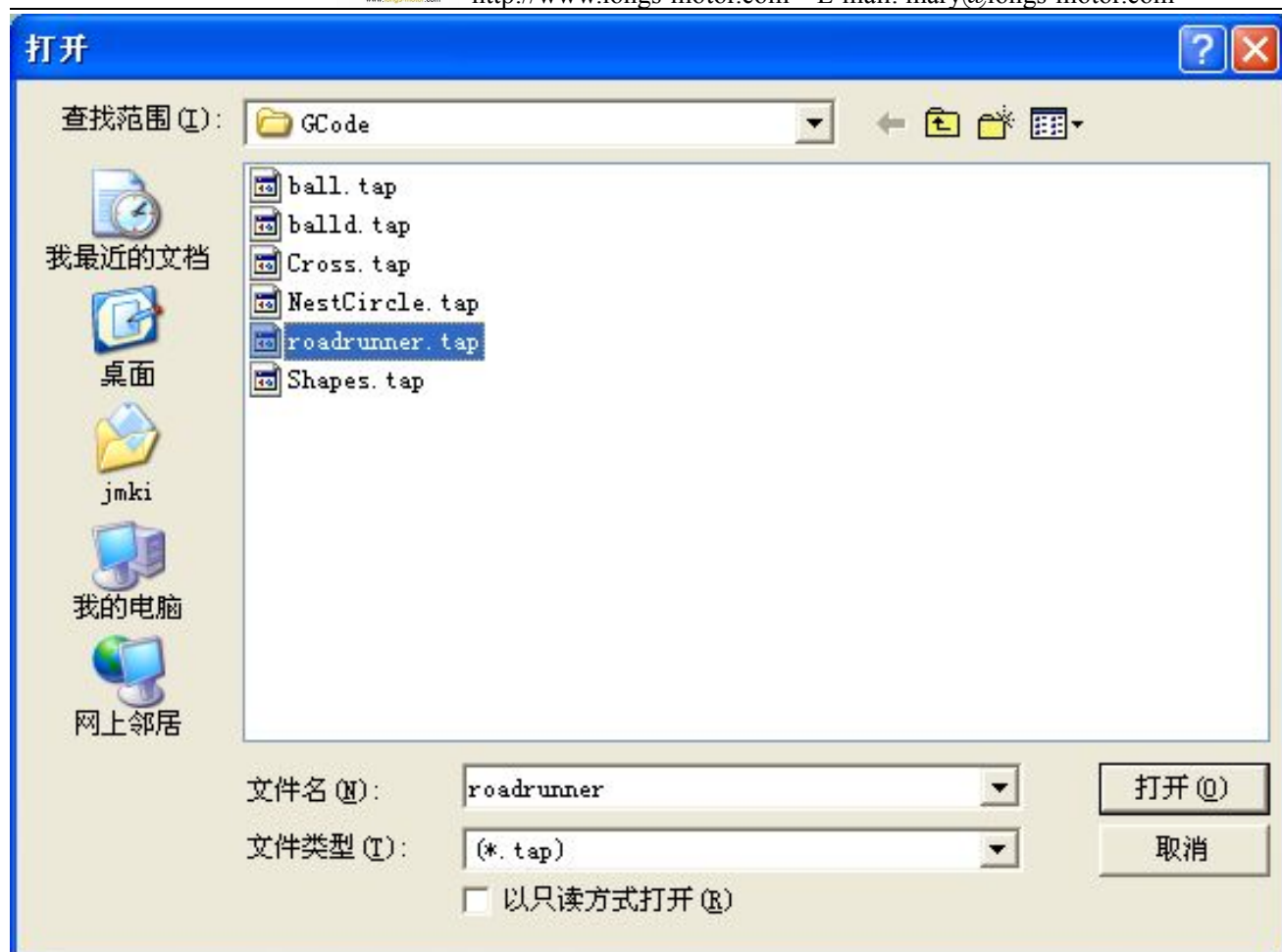


Fig.8



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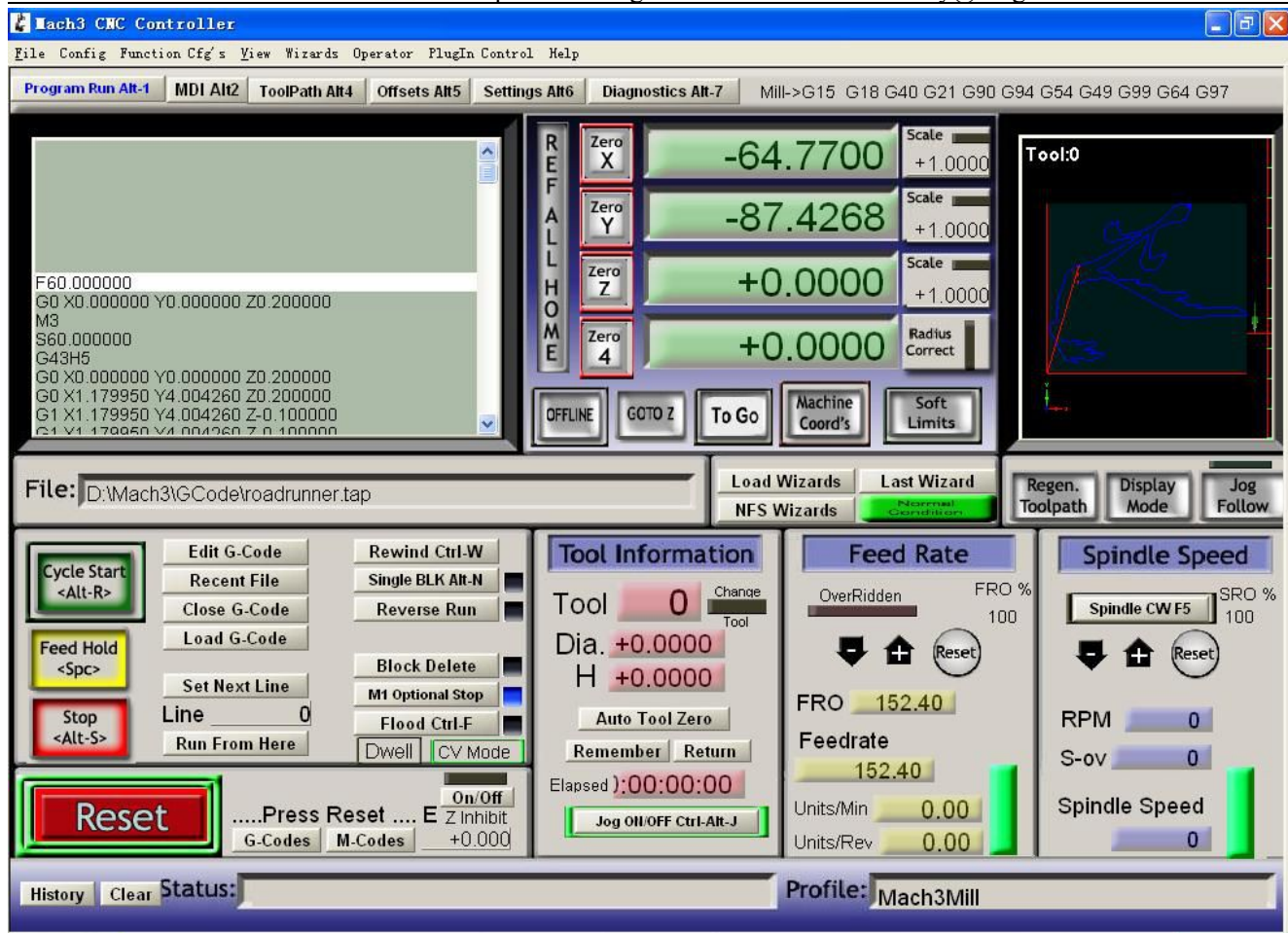


Fig.9

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 confirm the parallel cable has been plugged 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!