

FASTERCNC CO., LTD.

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DDUMV5



DDUMV5 Simple Description (English)

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Chapter 1 Overview

▶ 1.1 Simply Introduction

DDUM6V5.0 is designed by our Studio, it is a CNC system based mach3. Its version is 5.0 now. You do not need to add other Hardware, and you can complete the signal conversion from the G-code to the movement of the stepper motor drive control. This card is compatible with most stepper drives and servo drives. And it is perfect weapon to replace mach3 parallel interface board. DDUM6V5.0 is 6 axes mach3CNC card. Each axis port can general 2000Khz plus for stepper motor driver or servo motor driver.

▶ 1.2 Requirements of Computer

Basic Configuration:

- 1) CPU: 1GHz;
- 2) Memory: 512MB
- 3) 500MB Available disk space
- 4) USB 2.0

Recommended configuration:

- 1) CPU: 2GHz Dual Core;
- 2) Memory: 2GB;
- 3) 1G Available disk space
- 4) USB 2.0

▶ 1.3 Product feature

- 1) USB communication interface, and power supply for the board;
- 2) 14 IO input, opto-isolated, It Can be configured to limit the emergency stop and other functions, all of them are 2edg port.
- 3) 18 IO input with no opto-isolated but with iso-IC. This port is set to IDC 2.54mm port.
- 4) 23 IO output with no opto-isolated but with iso-IC. This port is set to IDC 2.54mm port.
- 5) 2IO output with opto-isolated for spindle.
- 6) up to 6 axes stepper-motor control port. Each port has up to **2000KHz** plus output;
- 7) COTEX-M3 of NXP-LPC is main control chip;

New feature

- 8、New design Aluminum shell make the system more stable;
- 9、 This system is equipped with RS232 manual control box. You can use manual control box with this port.Also you can use electronic handwheel.
- 10、 Spindle control port has PWM Mod (0%-100% dutycycle with 12Vpp) and voltage Mod (0-10V) .
- 11、 Spindle speed feed back port-INDEX.
- 12、 There is a power autostability system. When USB port overvoltage or undervoltage or within other EMI, this system can make power of system stable.
- 13、 There are High speed interface chips,which make stepper driver signal more stable.
- 14、 There is a USB protection chip,which can protect system within high voltage EMI;

► 1.4 Outview & Size

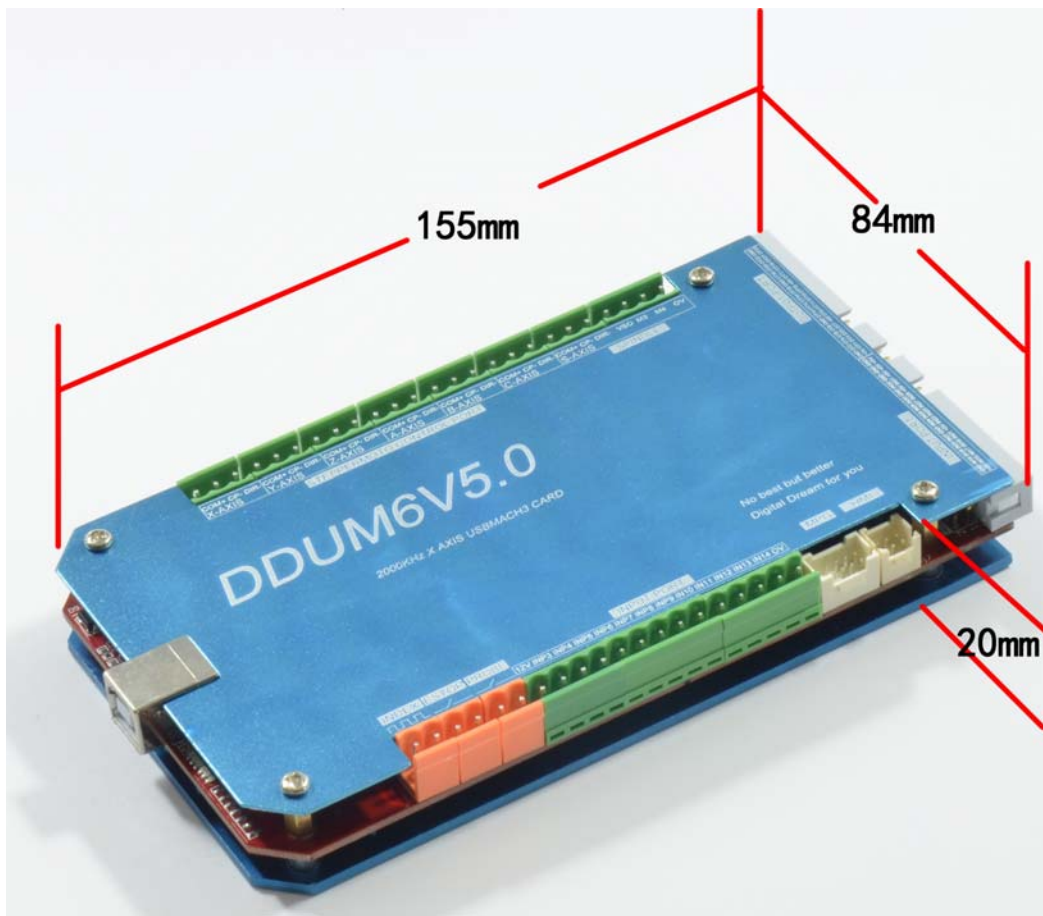


Figure1-1. Size of DDUM6V5.0

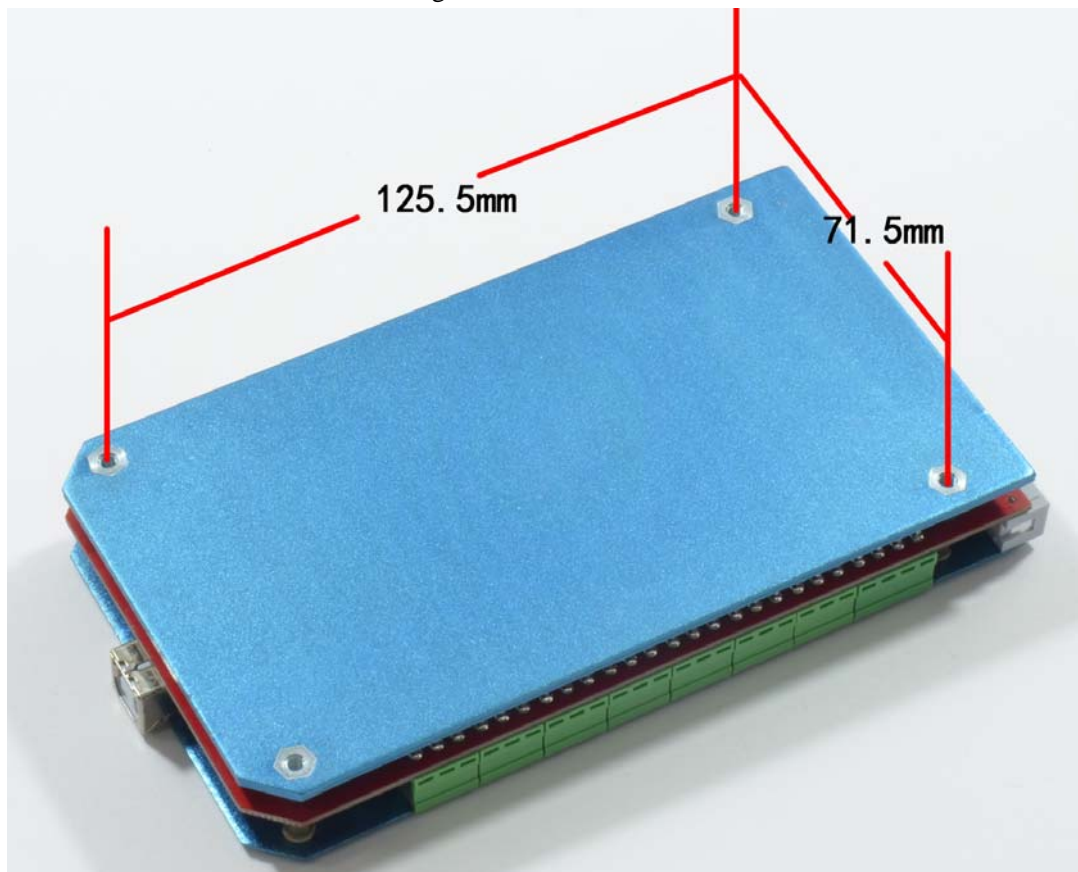


Figure1-2. Install size of DDUM6V5.0



Figure1-3. Outview of DDUM6V5.0-1

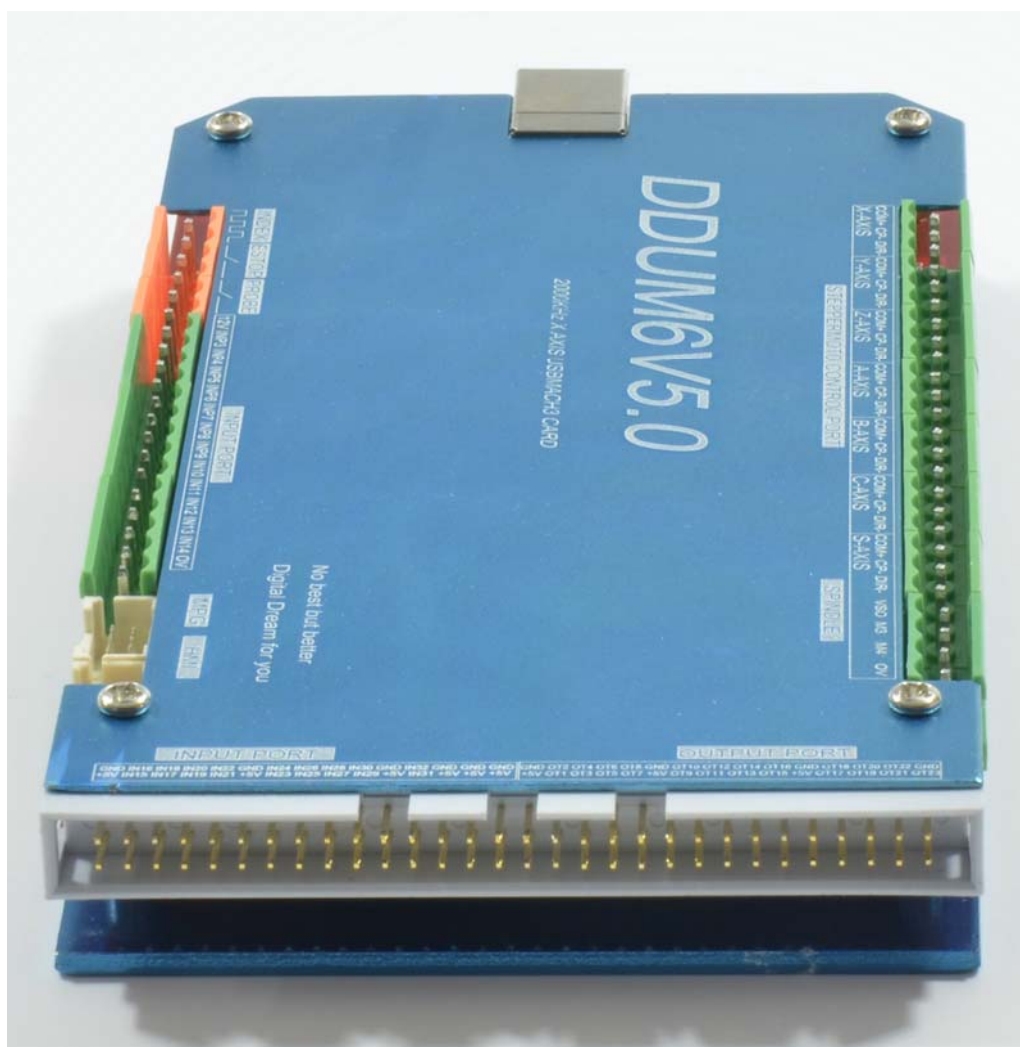


Figure1-4. Outview of DDUM6V5.0-2



Figure1-5. Outview of DDUM6V5.0-3

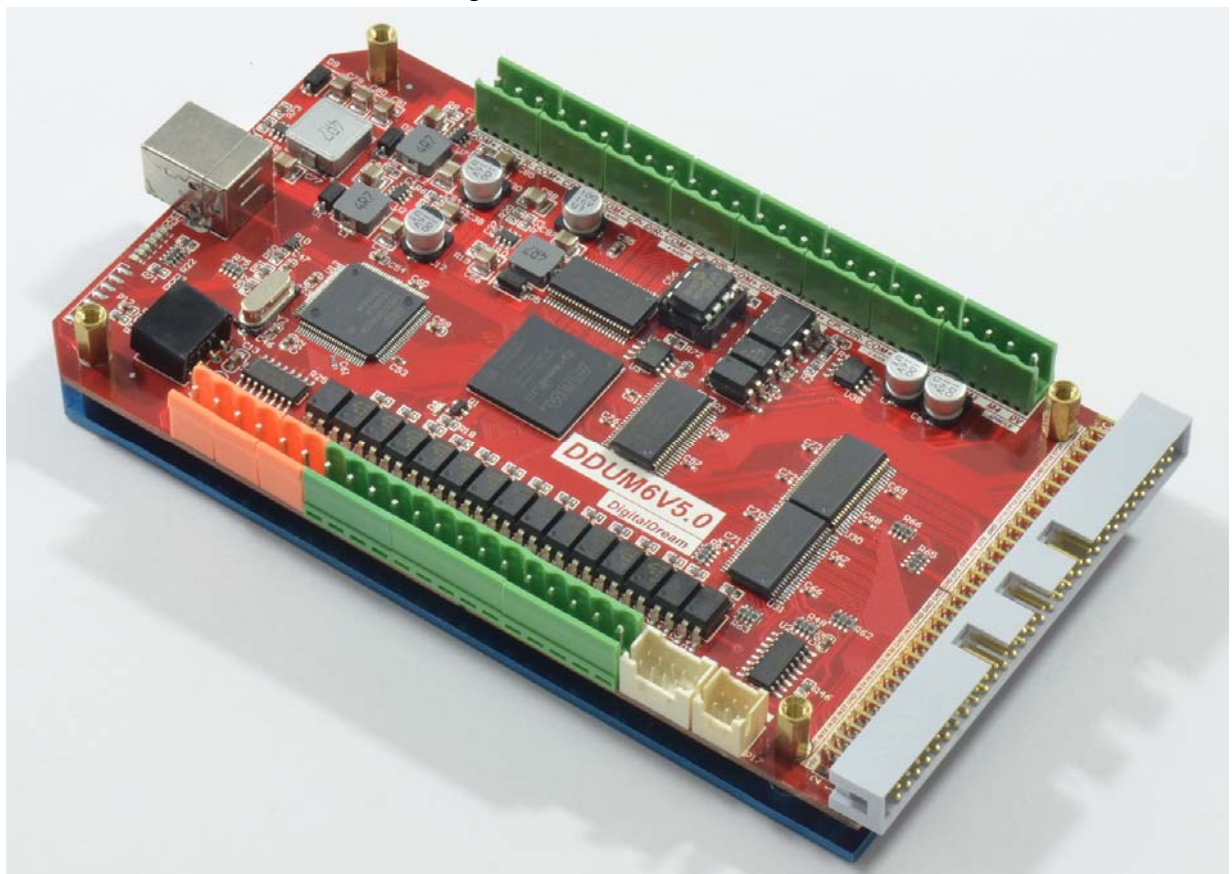


Figure1-6. Outview of inside of DDUM6V5.0

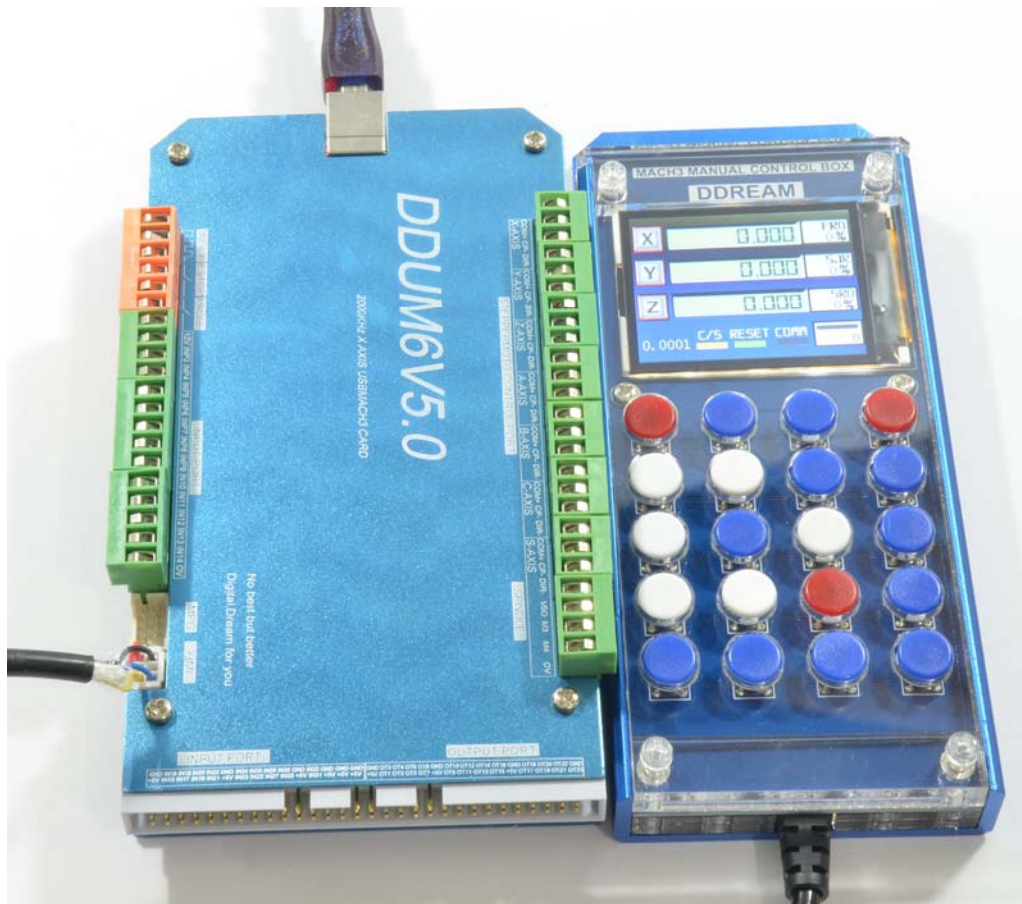


Figure1-7. Outview of DDUM6V5.0 and Hand control Box

▶ 1.5 Notes and Cautions



- Prohibits the rain, boards for high-performance precision equipment, rain can cause short-circuit



- CAUTION WARNING, various wiring in strict accordance with installation Description document specification.



- High risk, boards need to stay away from high-pressure.

Chapter 2 Detail Features

► 2.1 Electrical parameters

- A. System input voltage 5V;
- B. Operating voltage of input interface with no opto-isolated: 5V
- C. Operating voltage of input interface with opto-isolated: 12V;
- D. Operating voltage of output interface: 5V;
- E. stepper motor control signal output voltage: 5V;
- F. Spindle Signal: 10V;

► 2.2 Functions and define of each module

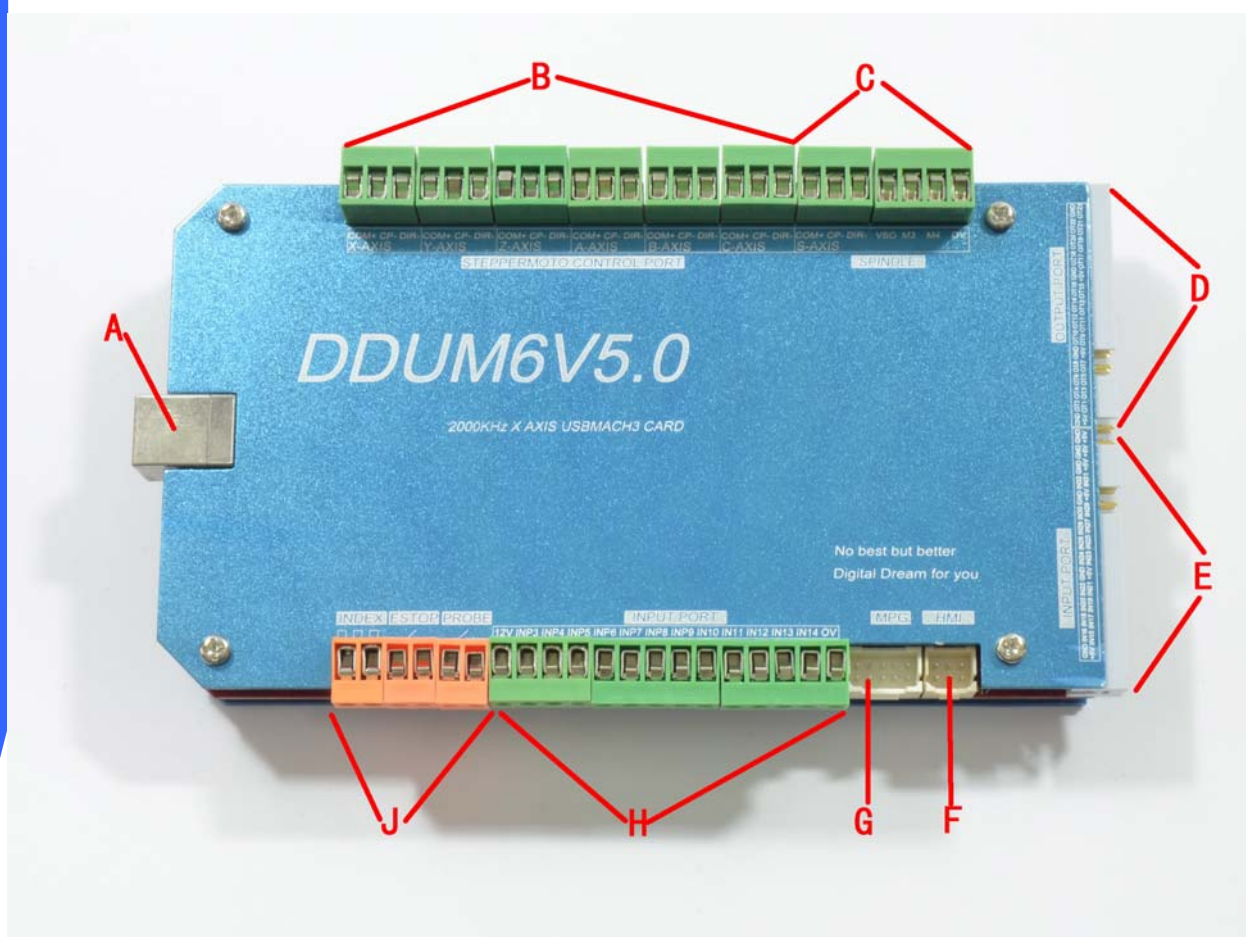


Figure2-1. Block of Function

- A) USB PORT, This interface is connected to the computer through a USB line. You can use the software mach3 to control this board, Note that you should use a USB2.0 cable with shielding and ferrite core, and cable length should be not more than 2 meters.
- B) 6-axis stepper motor control signal output, axes are defined as X\Y\Z\A\B\C from left to right. Each axis is defined as COM+\CP-\DIR-. They are positive common, negative pulse, negative direction. This card is common positive connection, so CK+ and DIR+ of Stepper driver should be connected to COM+. This board does not support the common negative connection. See as Figure2-2. This card doesn't have EN signal, Most drives on sale should not connected to the EN signal.

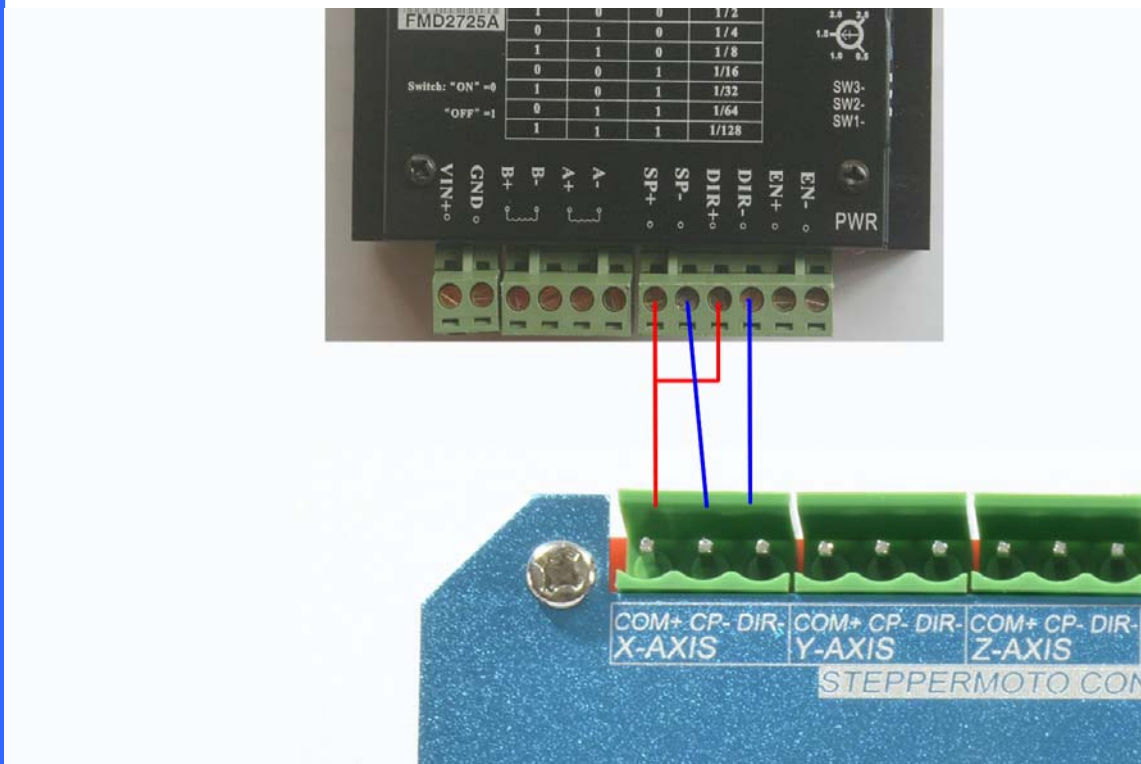


Figure2-2. Stepper motor driver connection

- C) Spindle control port. This port does not need referenced voltage. It supply speed control voltage to Frequency Converter. Define as VSO、M3、M4、0V from left to right. They are Spindle Speed control voltage output 0-10V、Spindle Speed control PWM

output, general output M3, general output M4, GND. The connection method of this port to Frequency Converter see as Figure 2-3. VSO to VI as speed control port, M3/M4 to M1/M2, which can be set as START/STOP or other function. Attention: M3/M4 are PORT2's PIN24 and PIN25 in mach3.

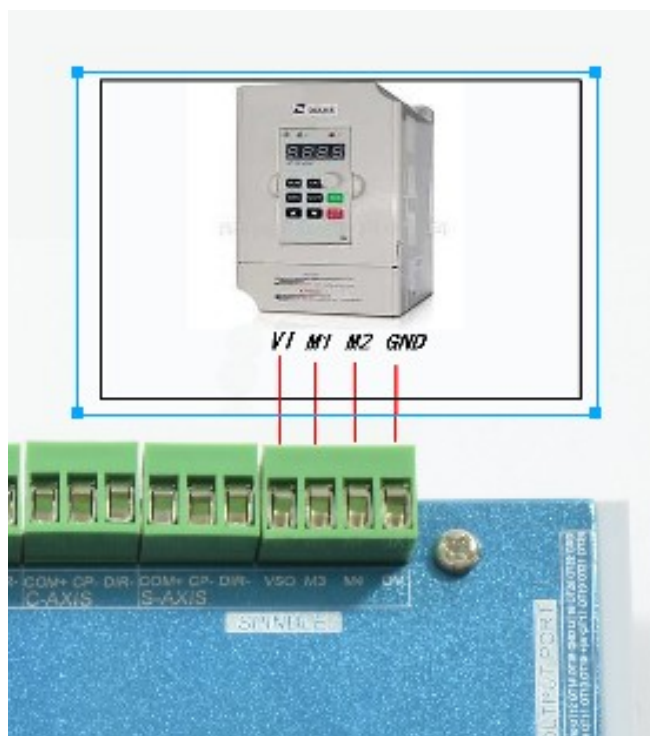


Figure2-3. Spindle connect method

- D) General IO output. Have a current drive capability within 20MA. The card turn 90° clockwise, see as Figure 2-4, it's defined as GND, OUT2, OUT4, OUT6, OUT8, GND, OUT10, OUT12, OUT14, OUT16, GND, OUT18, OUT20, OUT22, GND from left to right in top row; it's defined as +5V, OUT1, OUT3, OUT5, OUT7, +5V, OUT9, OUT11, OUT13, OUT15, +5V, OUT17, OUT19, OUT21, OUT23 from left to right in bottom row.



Figure2-4. general output

- E) Input port without opticalcoupler. This port has no opticalcoupler,but there are another opto-isolated IC. If there are high voltage input,it can protect the board. The card turn 90° clockwise, see as Figure 2-5,it's defined as GND、IN16、IN18、IN20、IN22、GND、IN24、IN26、IN28、IN30、GND、IN32、GND、GND、GND from left to right in top row; it's defined as +5V、IN15、IN17、IN19、IN21、+5V、IN23、IN25、IN27、IN29、+5V、IN31、+5V、+5V、+5V form left to right in bottom row.



Figure2-5. general input

- F)Manual control box/HMI port. This is a USART port, Manual control box or HMI can connect to mach3 with this port using a special protocol.

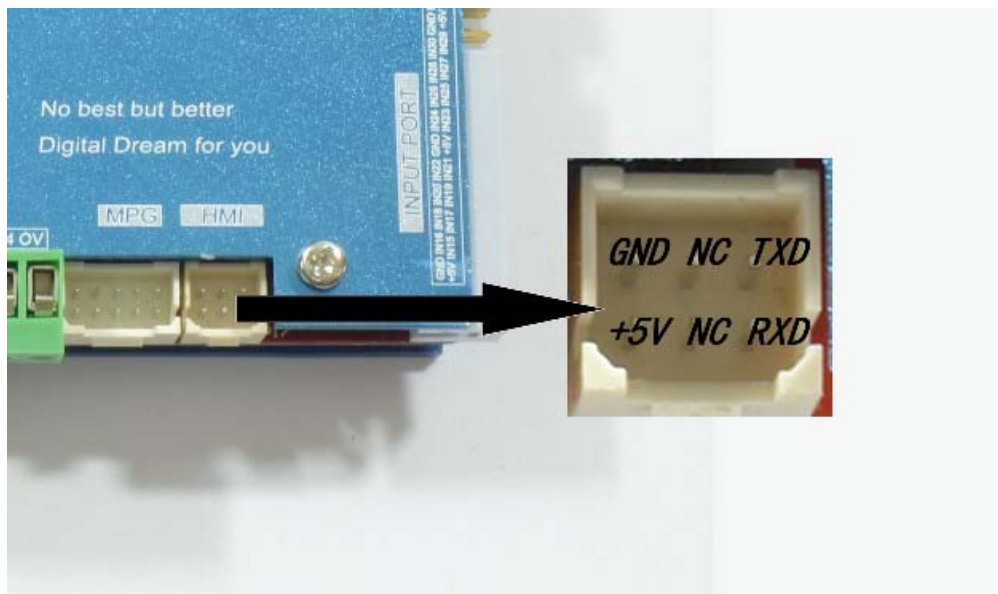


Figure2-6. Manual control box/HMI port

- G)MPG port.You can use a MPG from this port.

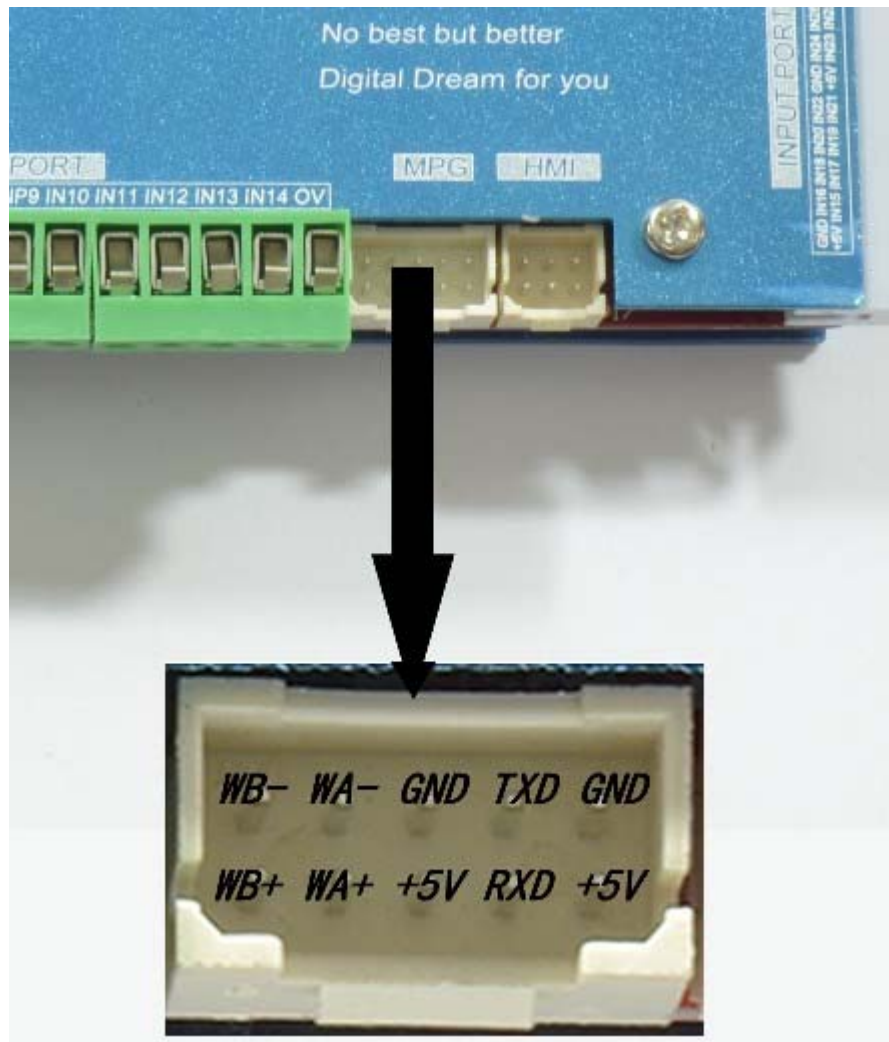


Figure2-7. Define of MPG port

- H)General input port with opticalcoupler. See as Figure 2-8,2-wire micro switch and inductive switch connect method .Connect 12V and INPX
 (X=3,4,5,6,7,8,9,10,11,12,13,14) .Inductive switch's positive should be connected to 12V and it's negative should be connected to INPX. 3-wire PNP inductive switch should connect to PIN 0V ,see as Figure 2-9.

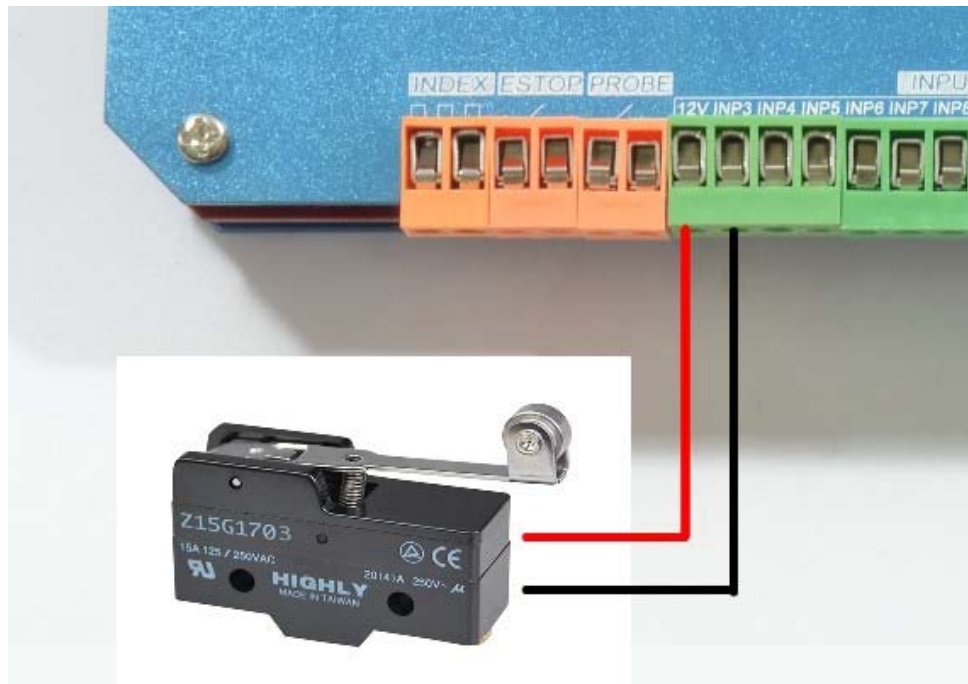


Figure2-8. General input connect to mico switch.

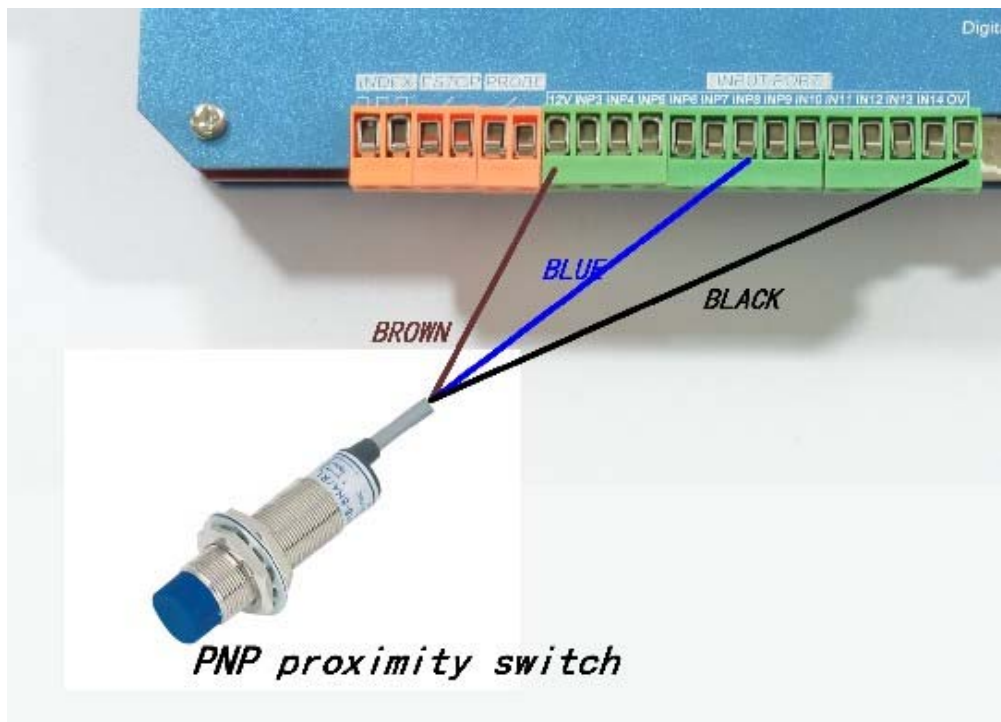


Figure2-9. General input connect to 3-wire inductive switch

- J) Probe/Estop/Spindle speed Index port. Probe port connection method see as Figure 2-10, Estop port connection method see as Figure 2-11, Index port connection method see as Figure 2-12. You should pay attention to positive and negative of the port Inex.

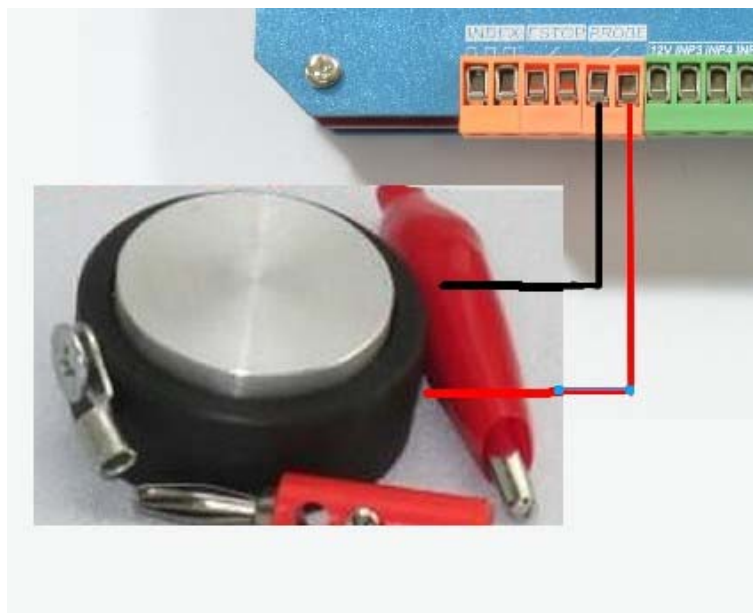


Figure2-10. Probe port connection method

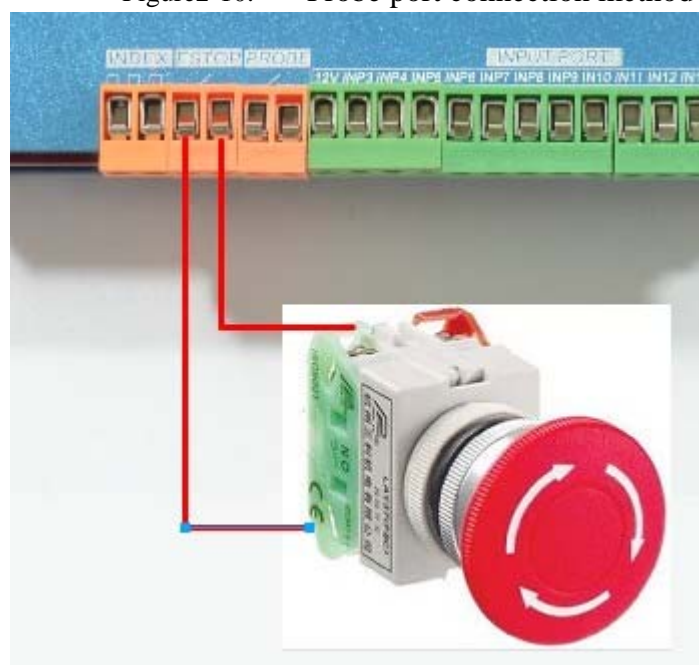


Figure2-11. Estop port connection method

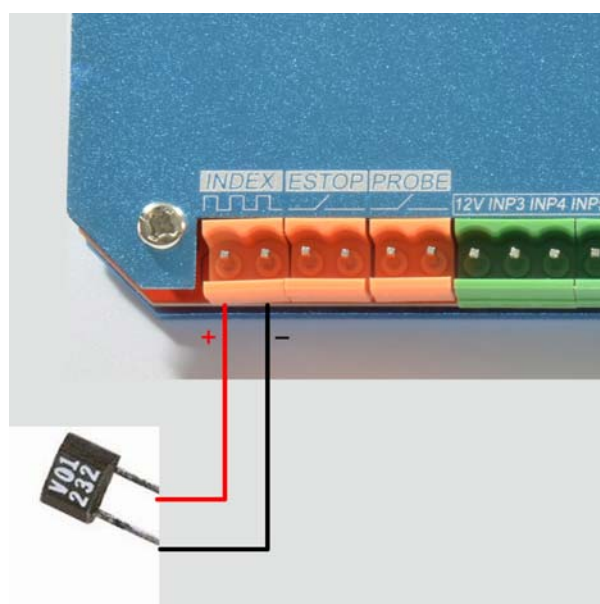


Figure2-12. Index port connection method

Chapter 3 Software Installation

▶ 3.1 MACH3 Install

When you purchase our product, we will supply a CD-ROM, which contains the MACH3 installation, registration, and USB plug-ins. See as Figure 3-1.

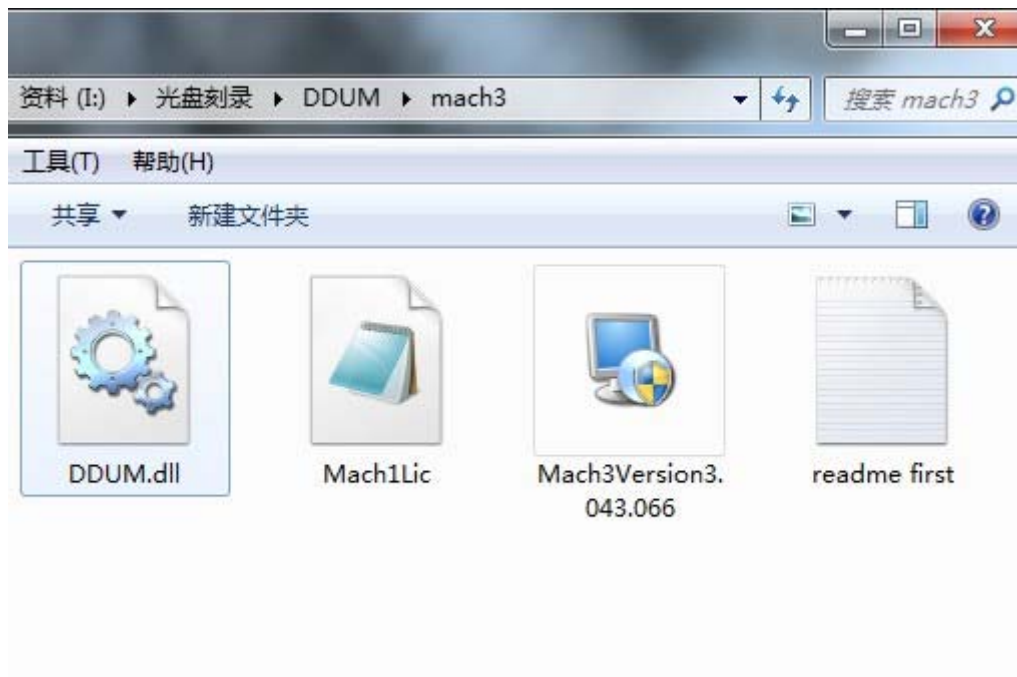
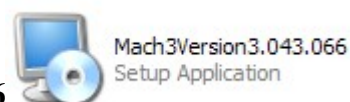


Figure3-1. software of CD-ROM

First run the installation Mach3Version3.043.066
first page. See as Figure 3-2.



Mach3Version3.043.066
Setup Application

。 Into the

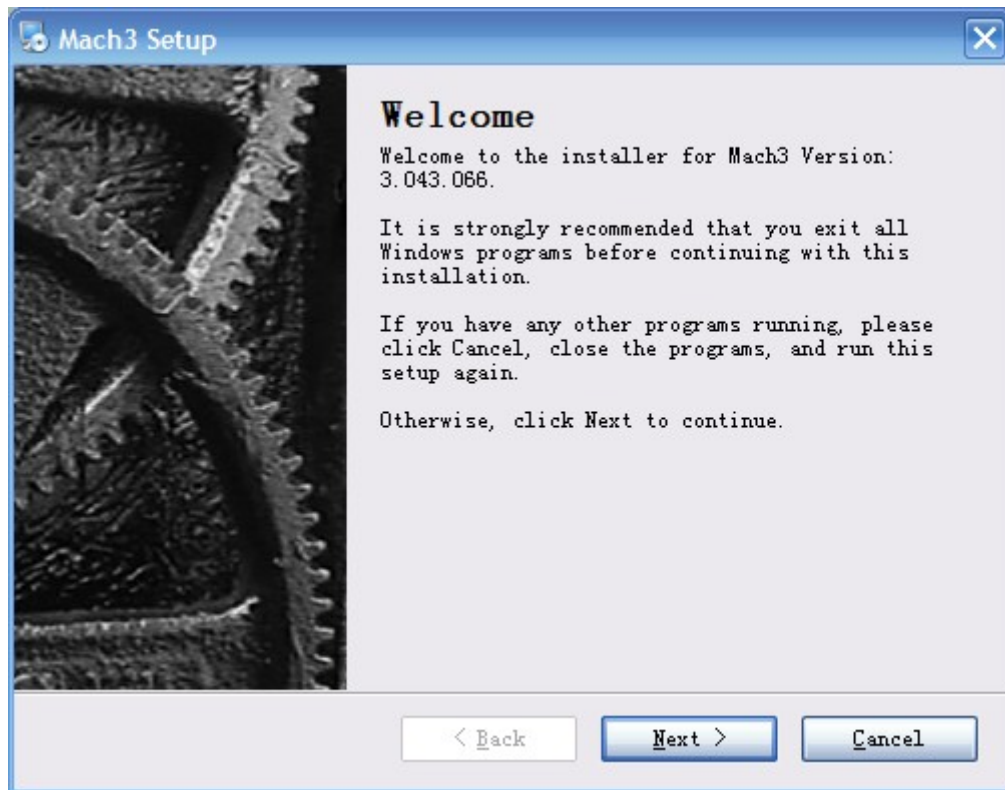


Figure3-2. MACH3 installation process 1

Click Next and then enter the page shown in Figure 3-3

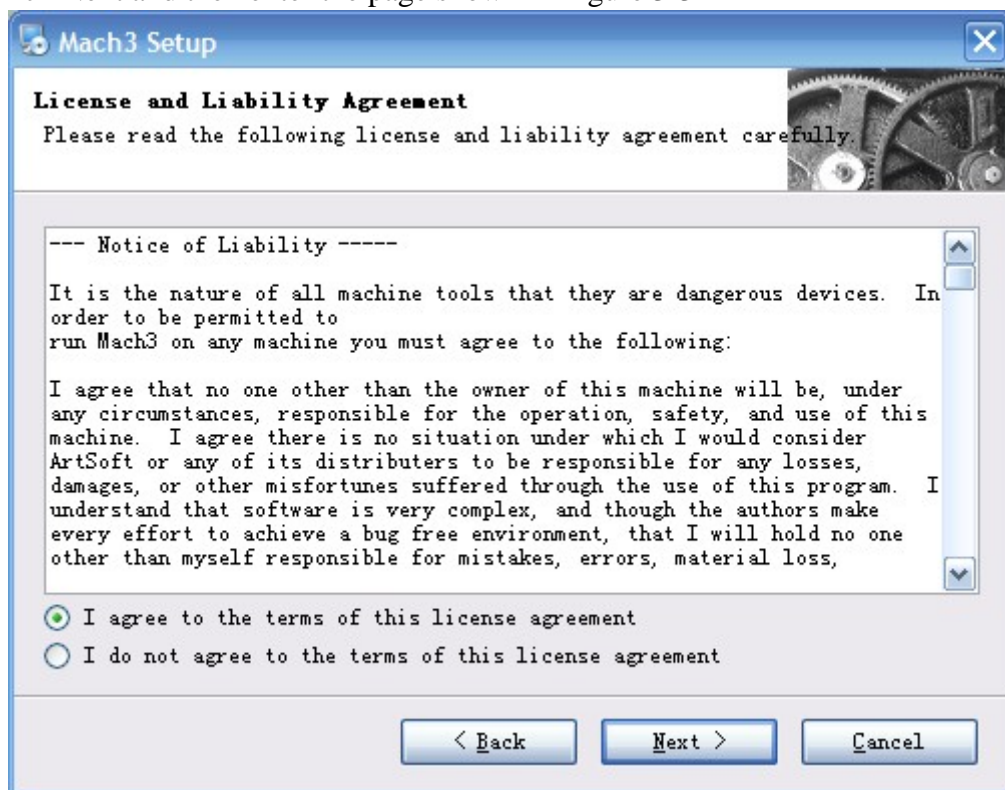


Figure3-3. installation process 2

选择同意协议，点下一步，如图 3-4



Figure3-4. MACH3 installation process 3

Select the installation path, click Next (it can be installed on any disk, and recommended to install the C drive or the D drive) See as Figure 3-5

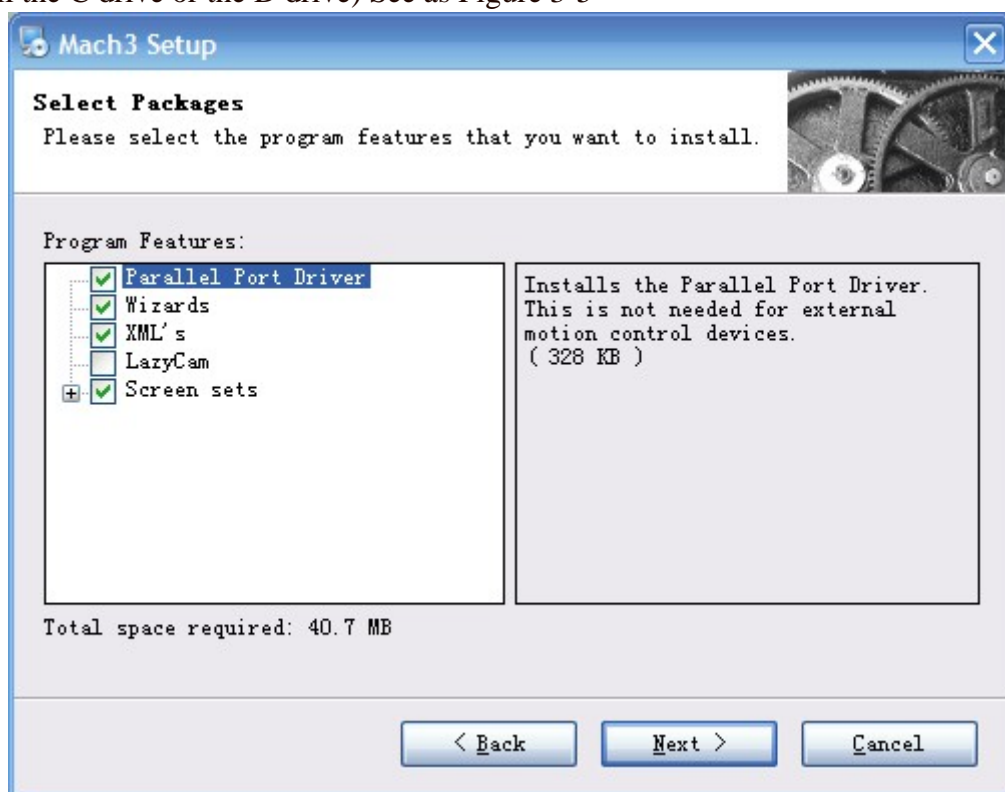


Figure3-5. MACH3 installation process 4

Click Next until completion. Then restart the computer.

▶ 3.2 MACH3 Registration



Copy the file Mach1Lic.dat in The CD-ROM to mach3 installation path (eg C:/MACH3).

▶ 3.3 USB Plug-in installation



Copy the file DDSM.dll to X:\Mach3\PlugIns, X is the disk where the soft is installed.

Chapter 4 Software

▶ 4.1 Open Software

- Double-click the mach3mill



Enter mach3 software. Pop-up the plug-in dialog box. See as Figure 4-1.



Figure4-1. Plugin selection dialog

Choose our plugin DDUM-USBMACH3-PlugIn---Ver-2.0a. Then press OK. If you do not want to the dialog box appear again next time, you can select Don't ask me this again.

▶ 4.2 Software Common settings

■ DDSM plugin setting

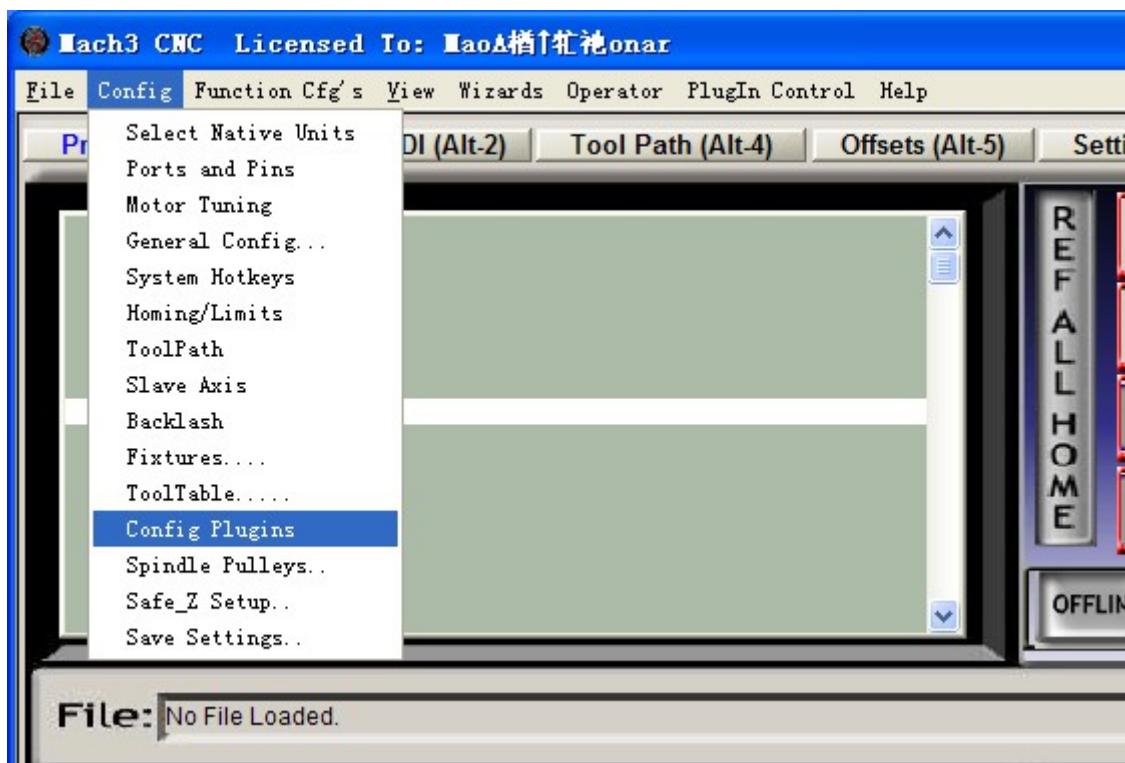


Figure4-2. get in config plugins

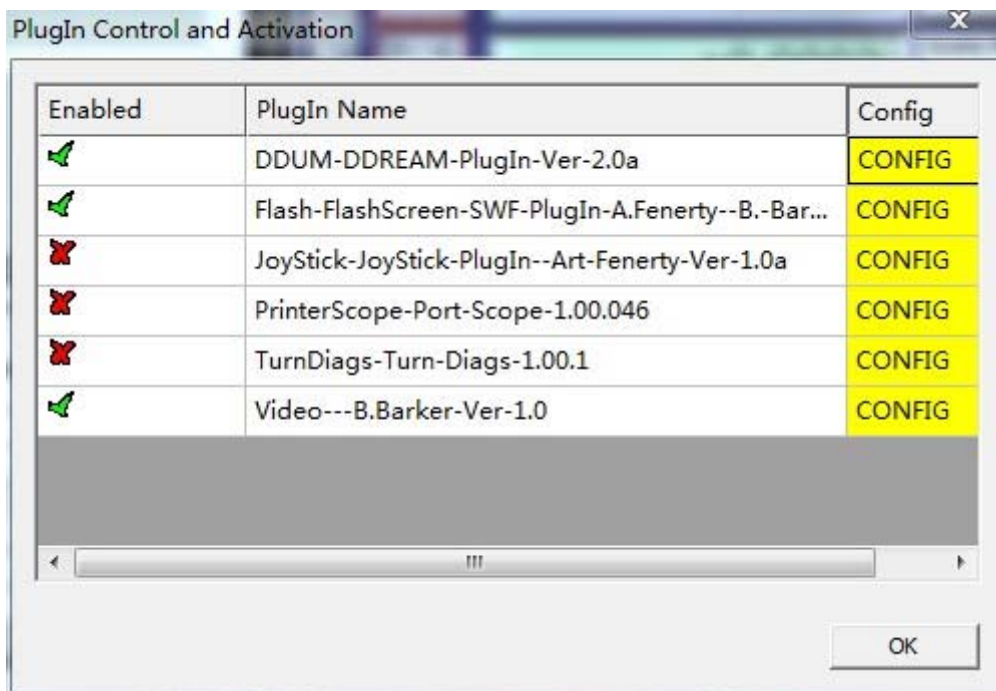


Figure4-3. click config of DDUM



Figure4-4. config dialog

In this dialog you can change buffer time and pluse width. Suggest setting is device buffer to 400ms and jog buffer to 100ms.If your system is not stable, pls increase device buffer time.

■ Motor operating parameters setting

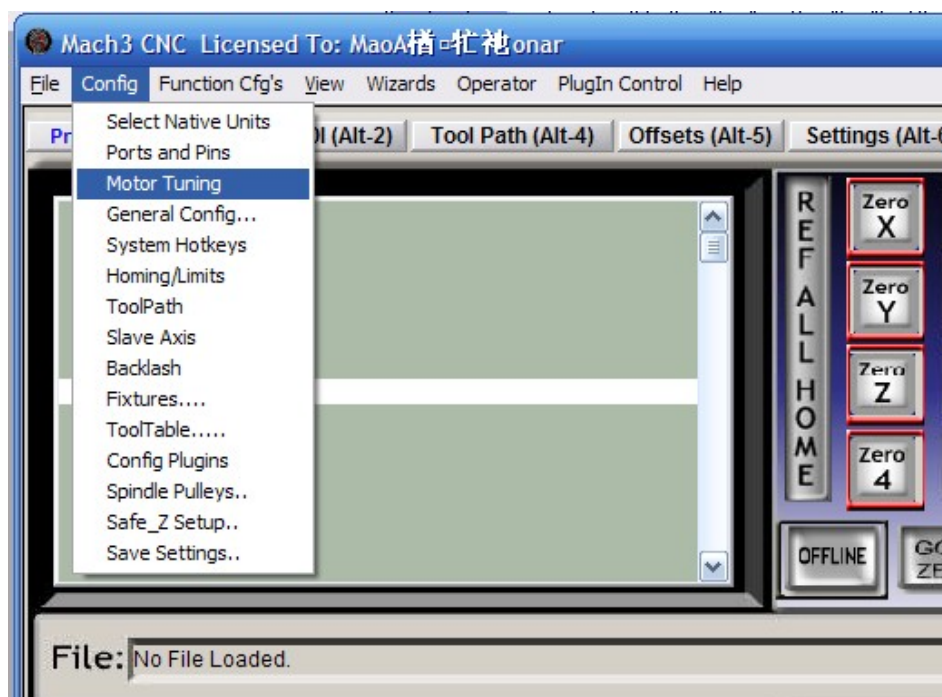


Figure4-5. Motor operating parameter setting menu entry

See as Figure 4-5.From submenu “motor tuning” of the menu “config” into the motor parameter settings dialog. See as Figure 4-6

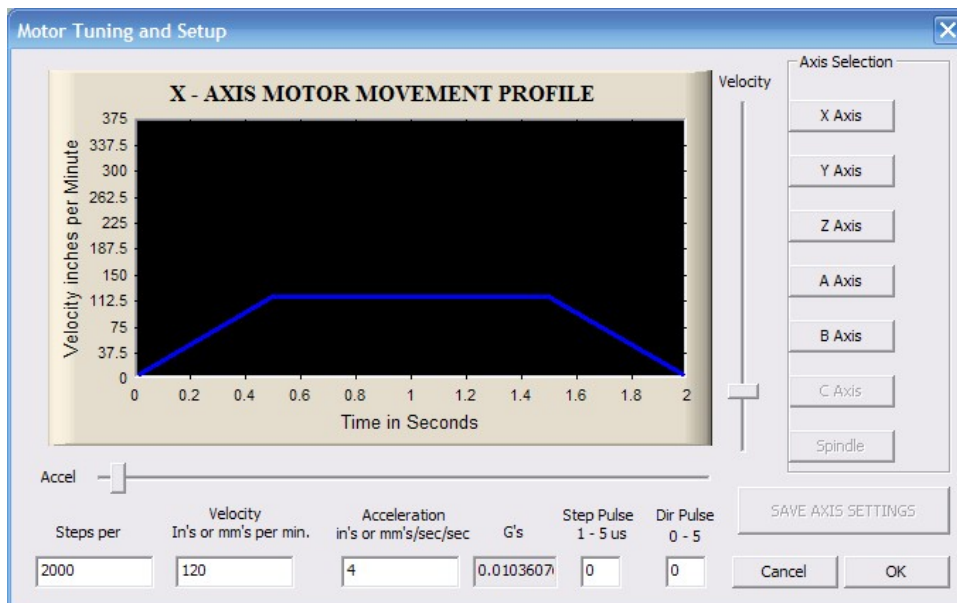


Figure4-6. Motor operating parameter settings dialog

The parameters are defined as follows:

Steps per: Pulse equivalent ,it is number of pulses required with axial movement 1mm, This can be calculated by lead screw pitch and motor drive segment. Such as pitch 2.5mm,2-phase motor 8 segments, Calculation method is $8 \times 200 / 2.5 = 640$.

Velocity: The speed is the axial velocity, Units is mm/s, Recommended settings 1500.

Acceleration: Units is mm/s², Recommended settings 200.

Step Pulse: Step Pulse Cannot be set, it's 2.5us in default.

Dir Pulse: . Dir Pulse Cannot be set, it's 2.5us in default.

Attention: The parameters for each axis is not necessarily the same, To select the axis, and then set parameters. You should click “SAVE AXIS SETTINGS” After setting.

■ Port Settings

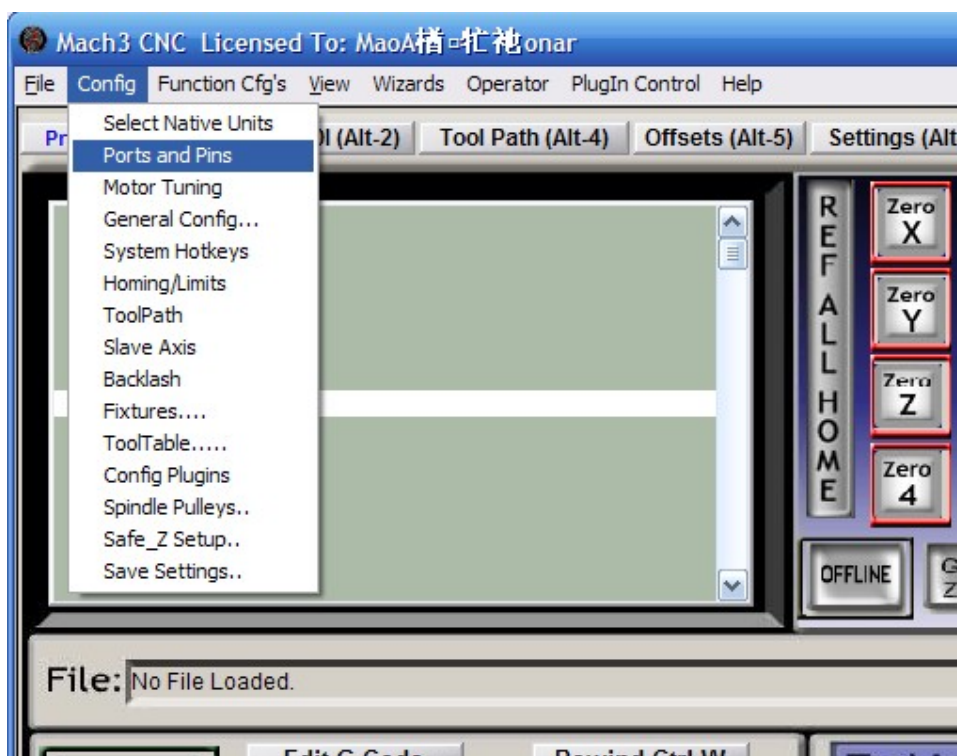


Figure4-7. Port setting entry

See as Figure 4-7, Click the sub-menu “ports and pins” of menu “Config” into Port

Settings dialog box.

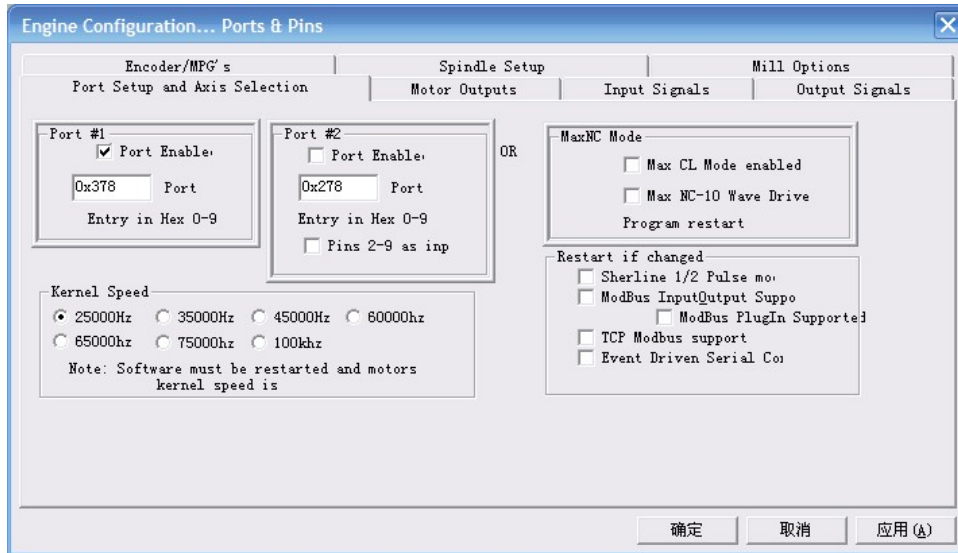


Figure4-8. Pin&Port Dialog

The sub-pages you need to set include “Motor Outputs”, “Input Signals”, “Output Signals” and “Spindle Setup”. First Click to enter “Motor Outputs”. This page is to select the stepper motor control pin. Because our usbmach3 interface board stepper motor signals are fixed, So here only need to Select, no need to select the specific pin. See as Figure4-9

To make the Z axis to the same direction, Z axis’s “Dir low” should be set to “√”. Other axes’s should be set as system need.

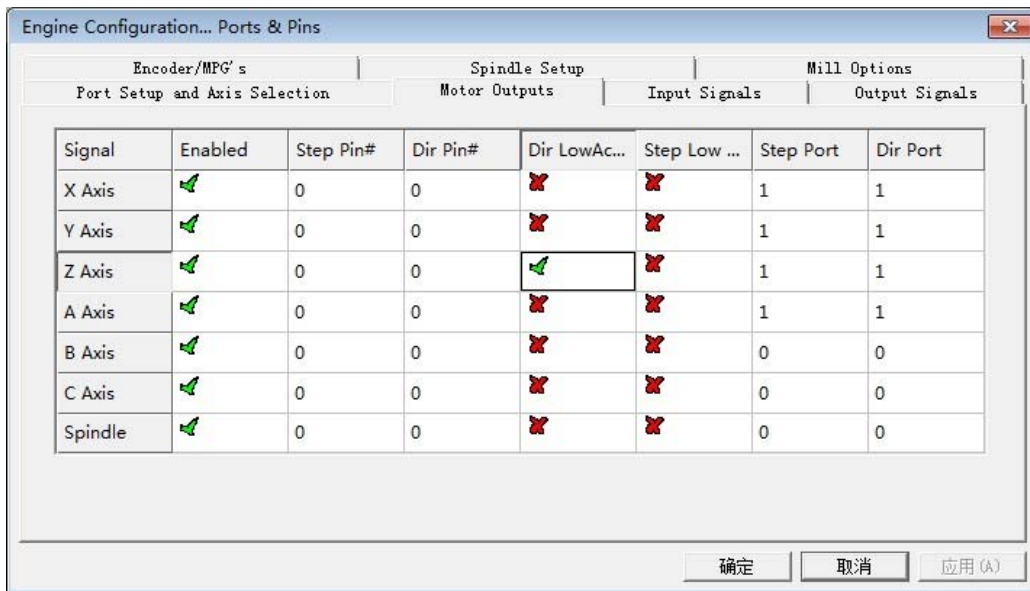


Figure4-9. Stepper motor port settings dialog

Click “Input Signals” Into the input signal settings page. See as Figure4-10

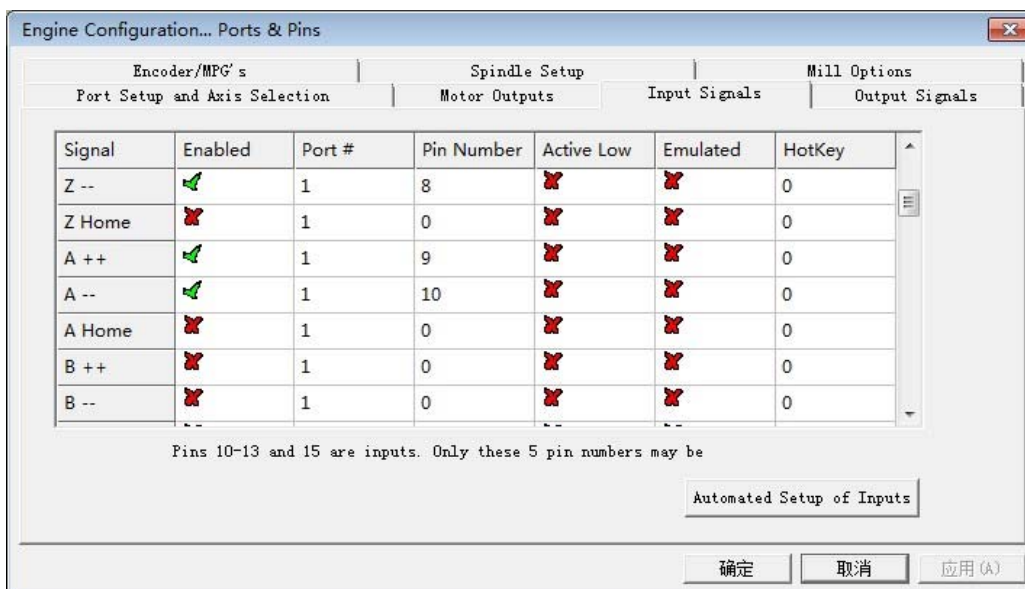
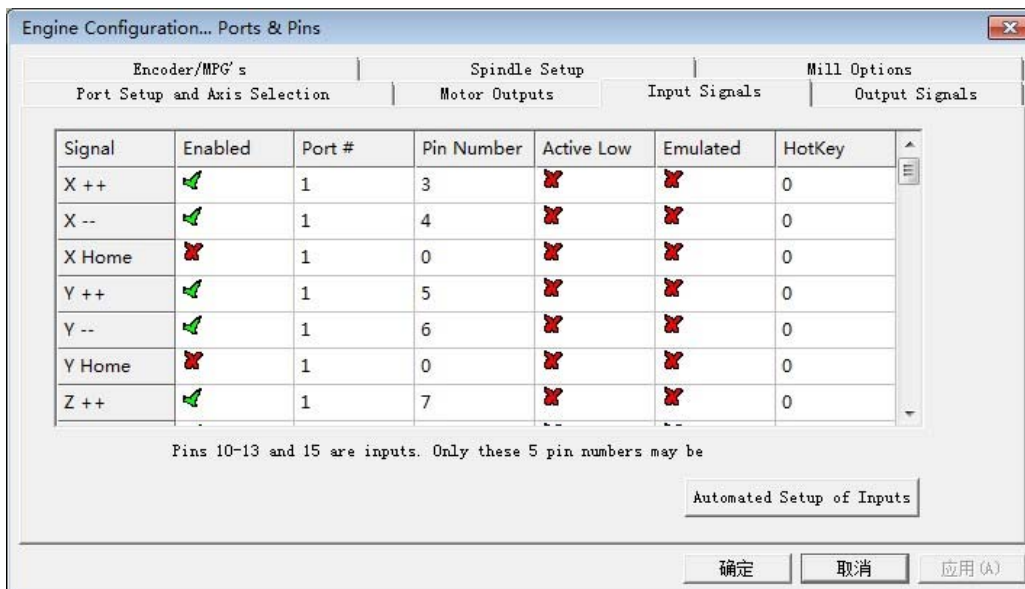


Figure4-10. IO limited Input Settings dialog

Here you can configure according to your actual needs the corresponding function. Optional Function include XYZABC6axis's Upper and lower limit、XYZABC6axis's HOME point.

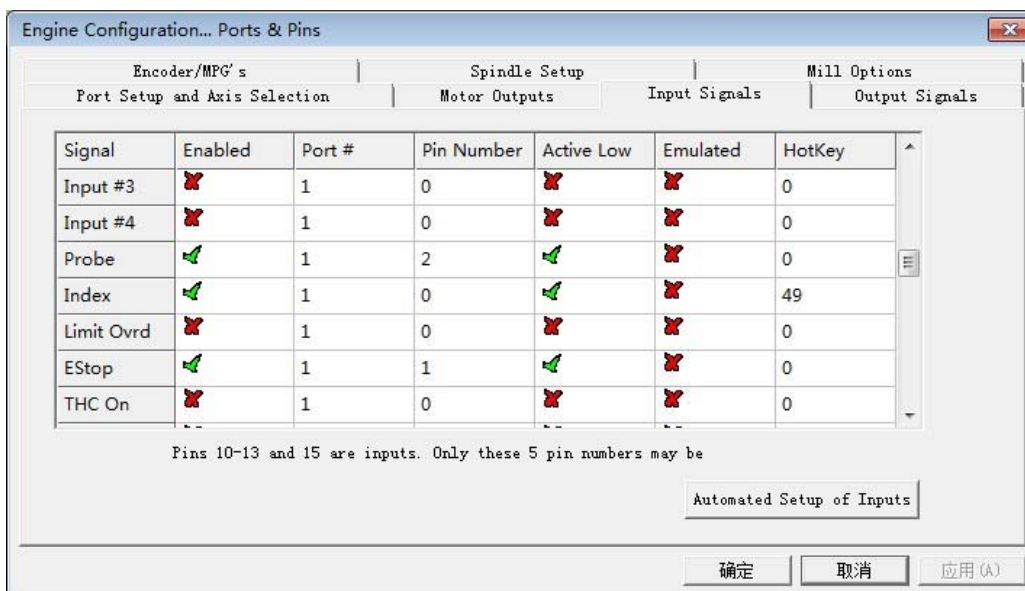


Figure4-11. Estop Probe and index Setting dialog

PROBE、ESTOP and Spindle speed back index Setting see as Figure 4-11, PIN of index should be set to 0, and probe's pin number is 2, estop's pin number is 1.

Click “Output Signals” to enter the Output signal setting page. See as Figure 4-12

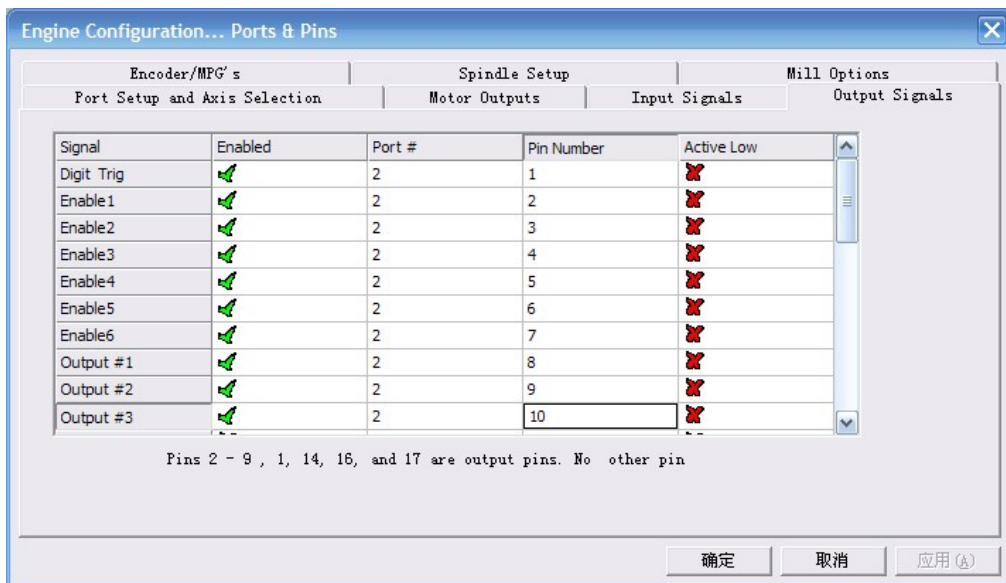


Figure4-12. Output Signal Setup dialog

Note that the output signal number from 1-16. Because there is an overlap with the input signal, We set output signals to the port 2. See as Figure4-12, PORT # All output signal is set to 2. Please put Output signal to the corresponding options as you need.

Click “Spindle Setup” switch to the spindle settings page. See as Figure4-13

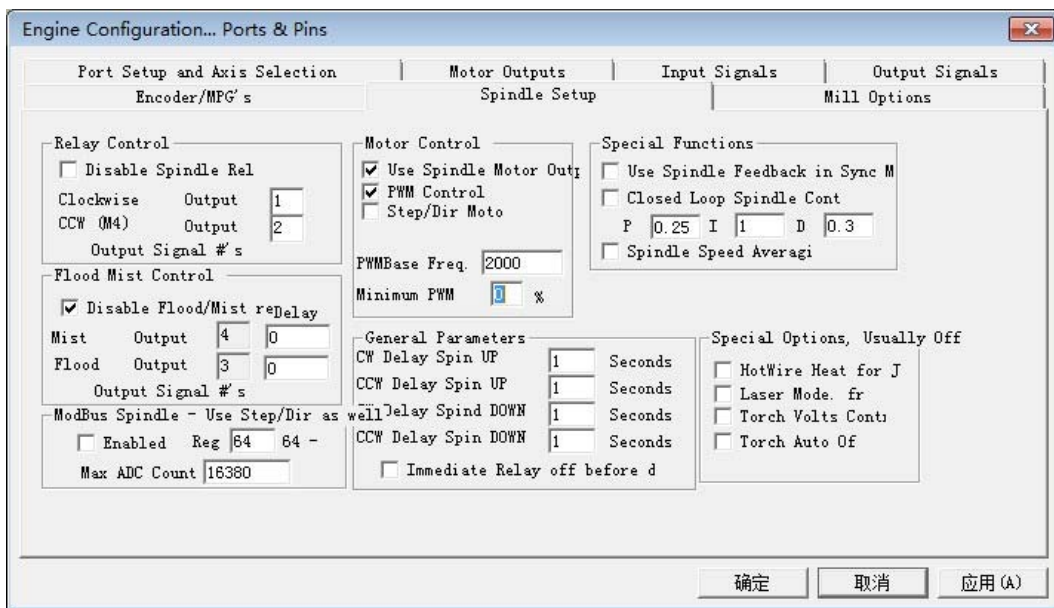


Figure4-13. Spindle Settings dialog

Here we can configure the spindle rotates CW、Reverse CCW、Mist、Flood pin, See as Figure4-13, They have been configured as 1、2、3、4. Corresponding to output#1~output#4 in Figure4-14.output#1~output#6 in Output Signal Setup dialog can be Configured into these 4 signals. Here we note correspondence between 2 page. Please select “use spindle motor output”

if required PWM speed spindle. And select “ PWM Control”. Our PWM pin fixedly arranged on a special pin, it’s no need to be set

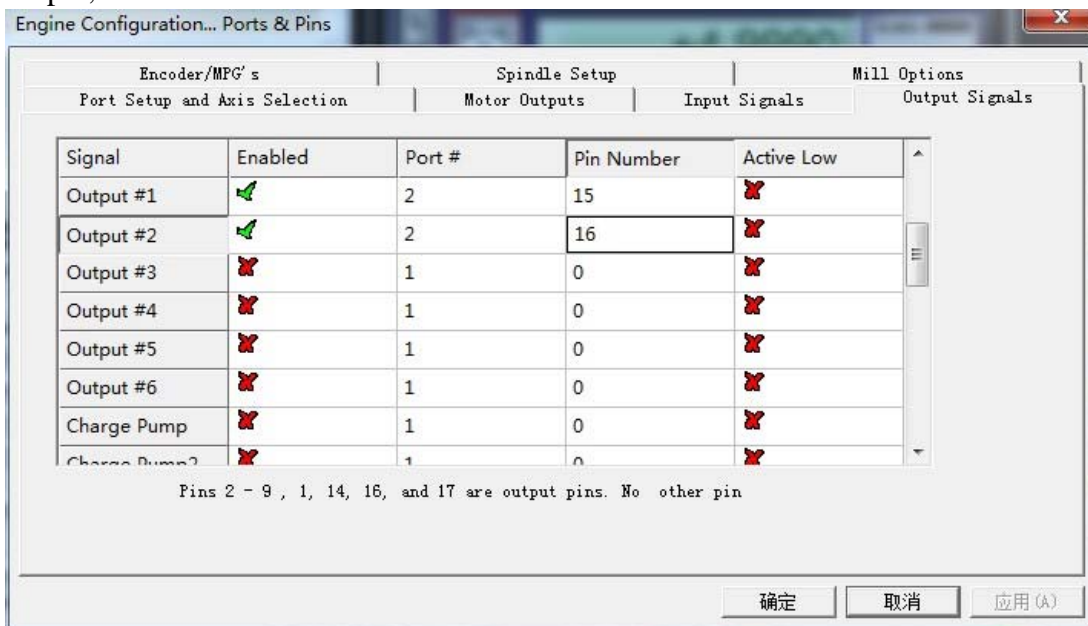


Figure4-14. Spindle setting corresponds to the output configuration

Chapter 5 Q&A

▶ 5.1 Q & A

▶ 5.2 Contact us

- Company Website: ddcnc.com;
- Technical Support email: 649631655@qq.com;
- Technical Support qq: 649631655;