USB motion control card installation manual

The card features:

Supports all versions of Mach3, including the latest version of Mach3 R3.042.040.

Supports all versions of Windows, including the latest version of Windows7.

No need to install USB drivers, all versions of Windows plug and play.

Comprehensive support USB hot-swappable, USB connection at any time to monitor the state, Mach3 work

As in, USB cable and then pull out the plug, can also be wired normally.

Support for 4-axis, including 4-axis jog.

Support the automatic tool, electronic hand wheel, the software limit, the software consumer backlash function.

48M speed, without a PC involved, the signal independently from the motion control card processing,

Make sure you have a true real-time and reliability.

With 200KHz output, then the servo / stepper.

Has a status indicator, can prompt a USB connection, Mach3 connection, operation,

Various status at a glance.

Has 16 input indicators clearly show the signal input state.

Has a speed function, spindle speed in real-time display in the Mach3 screen,

And innovation to provide real-time speed chart shows, a clear and spindle speed changes Vivid.

With on-board isolated power supply, no external power supply, simplifying the electrical control box power

requirements,

Easy wiring, but also to use external power, flexible options.

Using 10Mhz speed optocoupler 10, Universal coupler 24, a total of opto-up To 34, all isolated inputs / outputs,

high-cost design to provide complete immunity

Performance and complete security.

Provide a complete installation manual, document clear, illustrated, described in detail.

Careful circuit board layout, only selected high-quality components, well-made.

Documentation update records

Date / version of the content

2010-11-29

Ver1.05

Spindle Speed: increases drive wiring diagram, speed control signal PWM phase configuration

Mach3 software configuration: Increase the motor parameters

Installation Preparation: Original USB cable to increase the use of message

USB motion control card wiring diagram: add to outer tips connecting diode

Mach3 software configuration: Increase the input signal configuration in Mach3 Port # "1"

Layout adjustment: testing the spindle

2011-1-1

Ver1.06

1 electronic hand wheel

(2) automatic knife

2011-3-2

Ver1.07

Increase the automatic software configuration tool

2011-3-30

Ver1.08

1. Increase the spindle relay configuration

(2) increase the input sensor, PNP, NPN, wiring and configuration

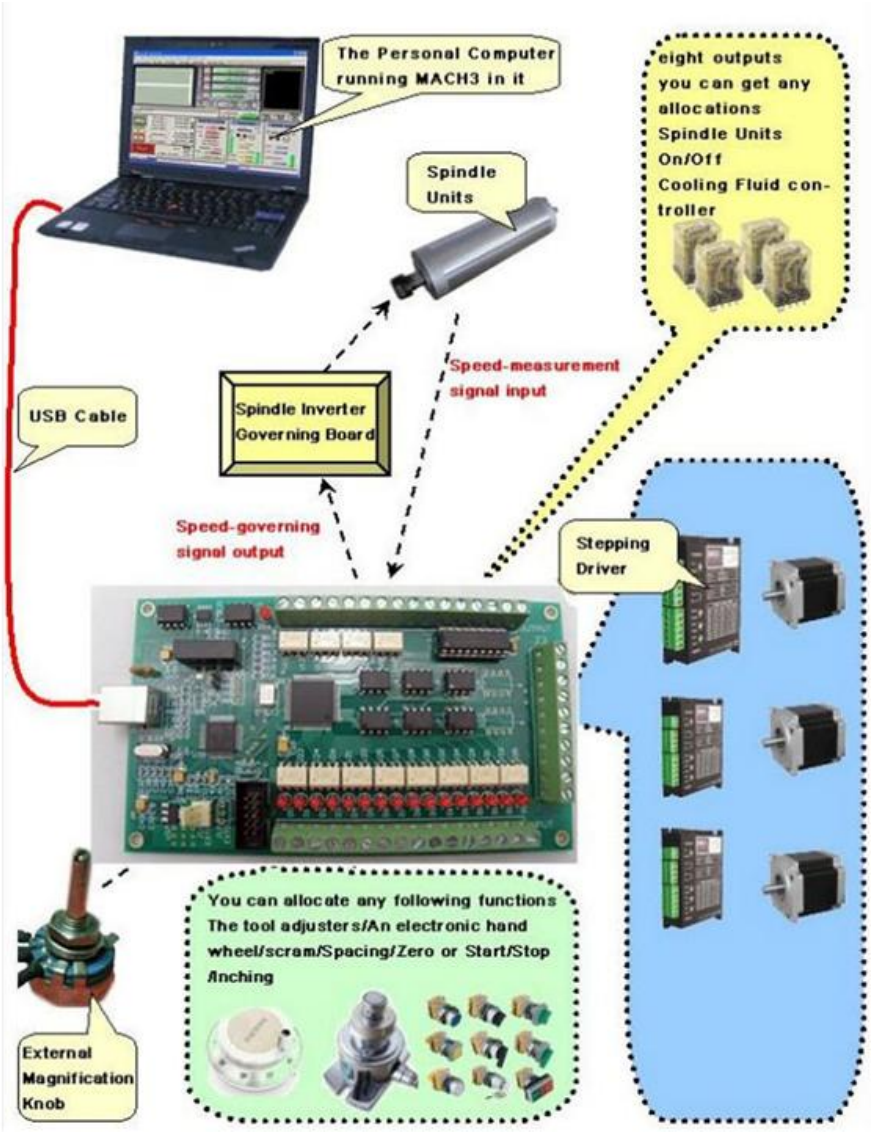
2011-4-18

Ver1.09

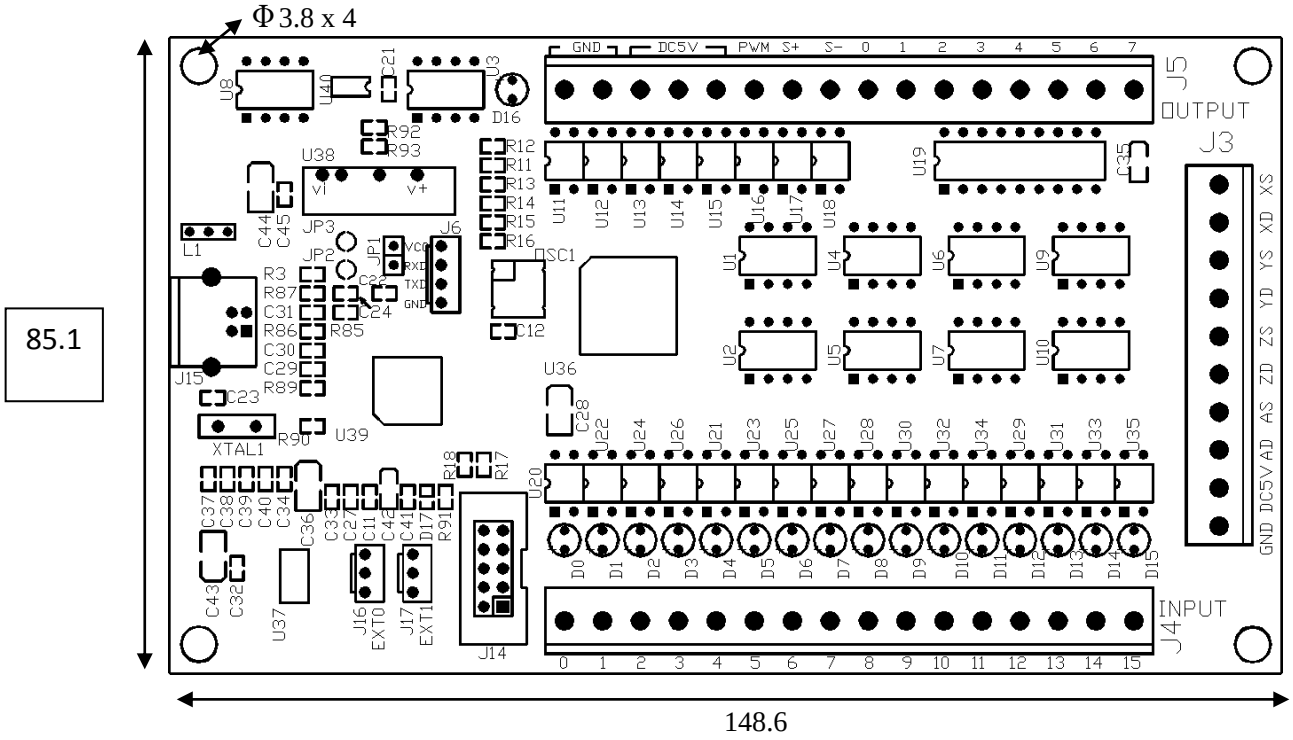
1. Handwheel input wiring table describes the increase

2 Update the control card picture (optocoupler)

Wiring diagram of motion control card



Mechanical dimensions and mounting hole shape



Preparing for installation

Mach3 Software preparation

This card is a Mach3 USB interface 3 / 4 external axis motion control card.

Download the latest version of Mach3 website address: http://www.machsupport.com/downloads.php

Into the official website, click to download Mach3: red circle as shown in Figure

Home | Downloads | Purchase | Support | Resources

Downloads

For previous versions of Mach and LazyCam, XML's, and other Extra Information: Click Here

(Some of the older files are linked directly from the FTP server in order to avoid redundancy. If your download does not start immediately, please give it a few seconds - it's probably trying to contact/login to the FTP server.)

Mach

Mach3 is the flagship of the ArtSoft products. It is released in two versions: a Lockdown version, and a Development version. The Lockdown is a stable, static release recommended for new users, or people trialing the software. The Development version contains developing features and is released quite often so people can obtain new (but untested) features and capabilities. Both releases are limited to 500 lines of Gcode until licensed. Mach3 has a limit of 10,000,000 lines of Gcode even after licensing.

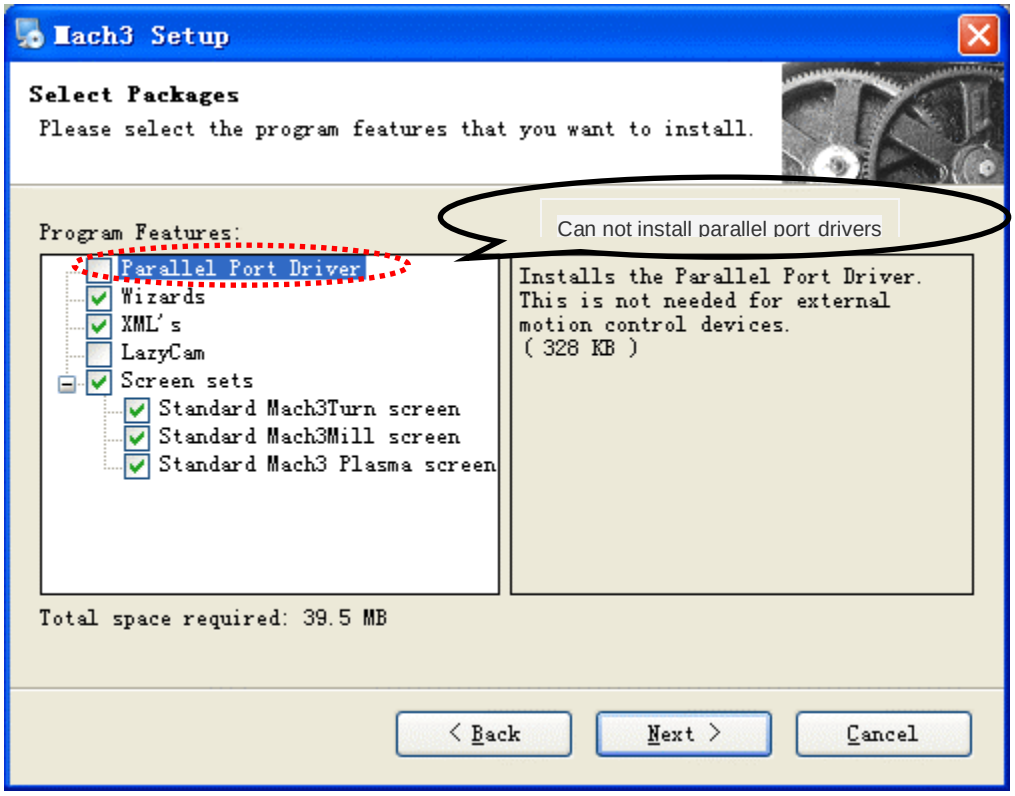
You must use a Desktop PC running a 32-bit version of Windows if you are using the Mach3 Parallel Port Driver. Laptops are not supported because the power saving features of the chipsets disrupt the pulse stream. Mach3 will only be supported on laptops running an external motion controller, such as one of those found on the Plugins page.

Lockdown:

Mach3 R3.042.040

Mach3 Changelog

Mach3 installed, you can not install parallel port drivers.



USB cable preparation

Please ring, were installed in the USB cable at both ends

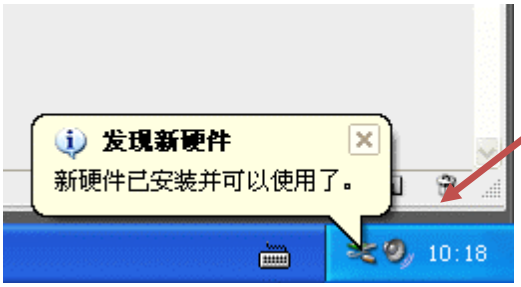
Use this product with a USB cable.

Such as self-matching, make sure to use quality Qualified cable.

Motion control card software installation

The cards do not need to install the USB driver, Windows2000/Xp/Vista/Windows7 plug identification.

1. receipt card, first connect the PC using a USB cable.



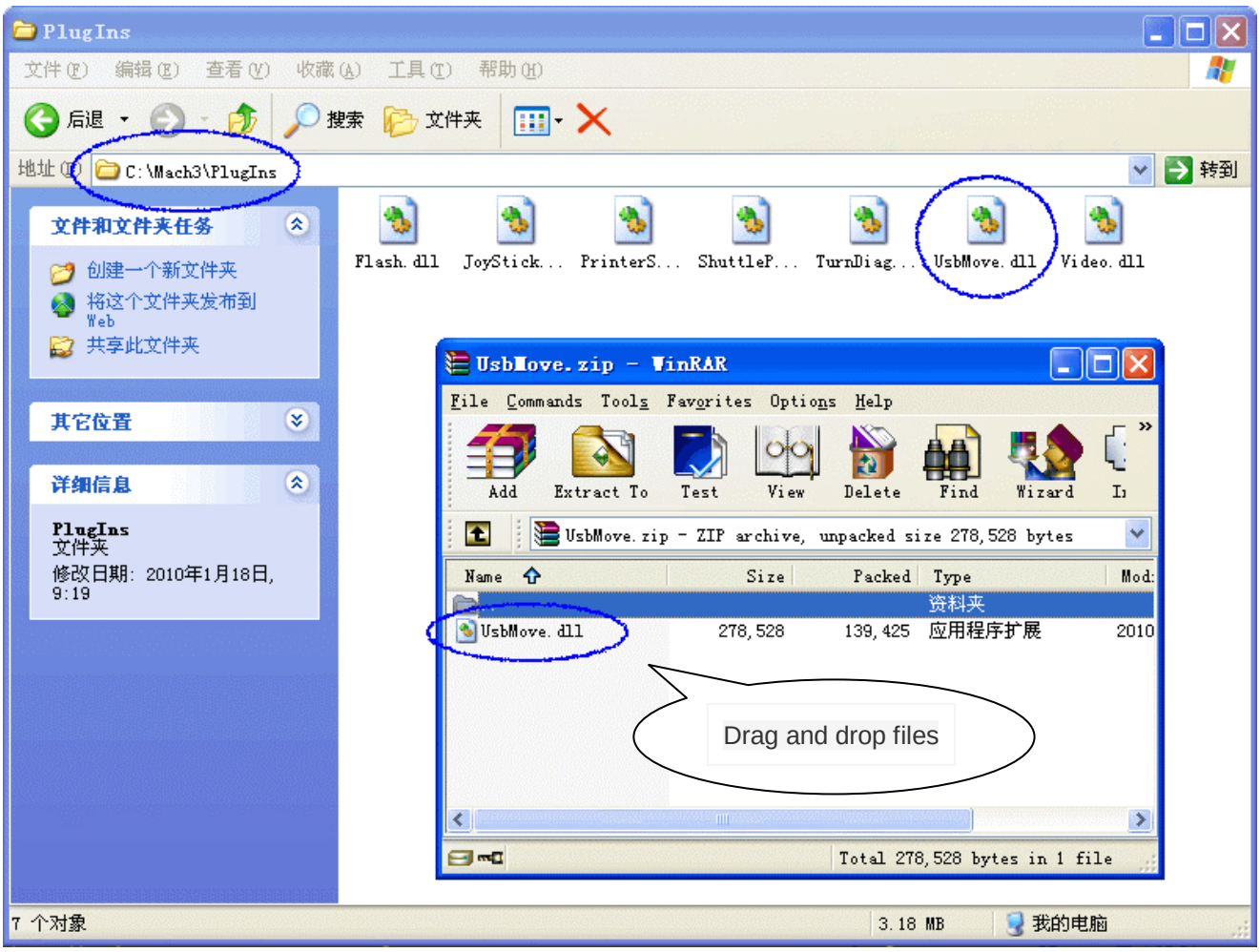
When the motion control card on the status indicator light

From that USB has been connected successfully.

2 . the accompanying software usbmove.dll (usbmove.zip extract), placed on the Mach3 \ PlugIns directory (file

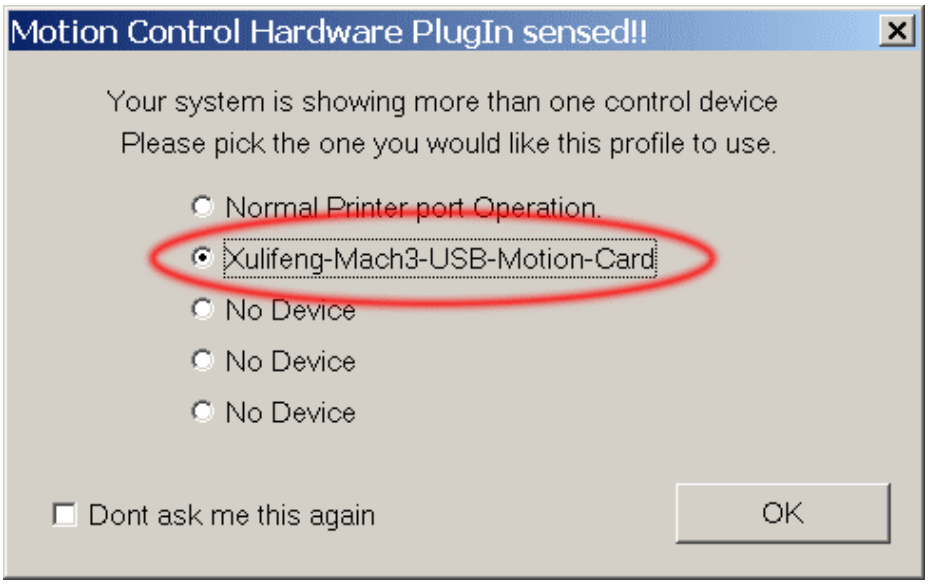
Folder). For example, your Mach3 software installed in C: \ Mach3, will be placed in usbmove.dll

C: \ Mach3 \ PlugIns.



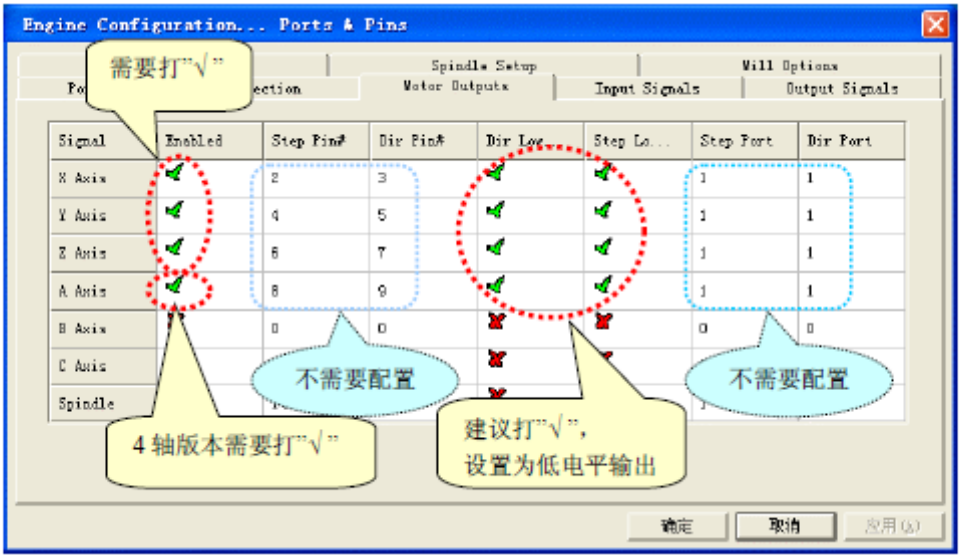
3 .start Mach3 Software, you will see motion control card selection dialog box, select

"Mach3-USB-Motion-Card", you can also select the "Don't ask me this again" will no longer be prompted. .

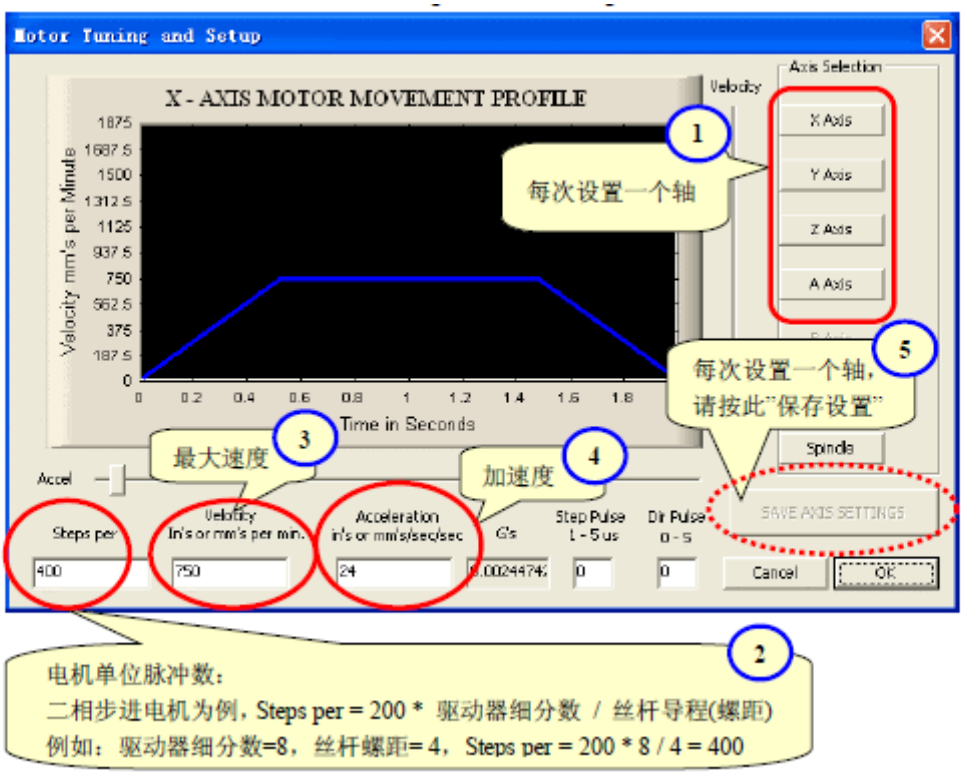


Mach3 software configuration

1. Mach3 in the X, Y, Z, A axis configuration, as shown below: (Config => Ports and Pins)



Motor parameters, as shown below: (Config => Motor Tuning)



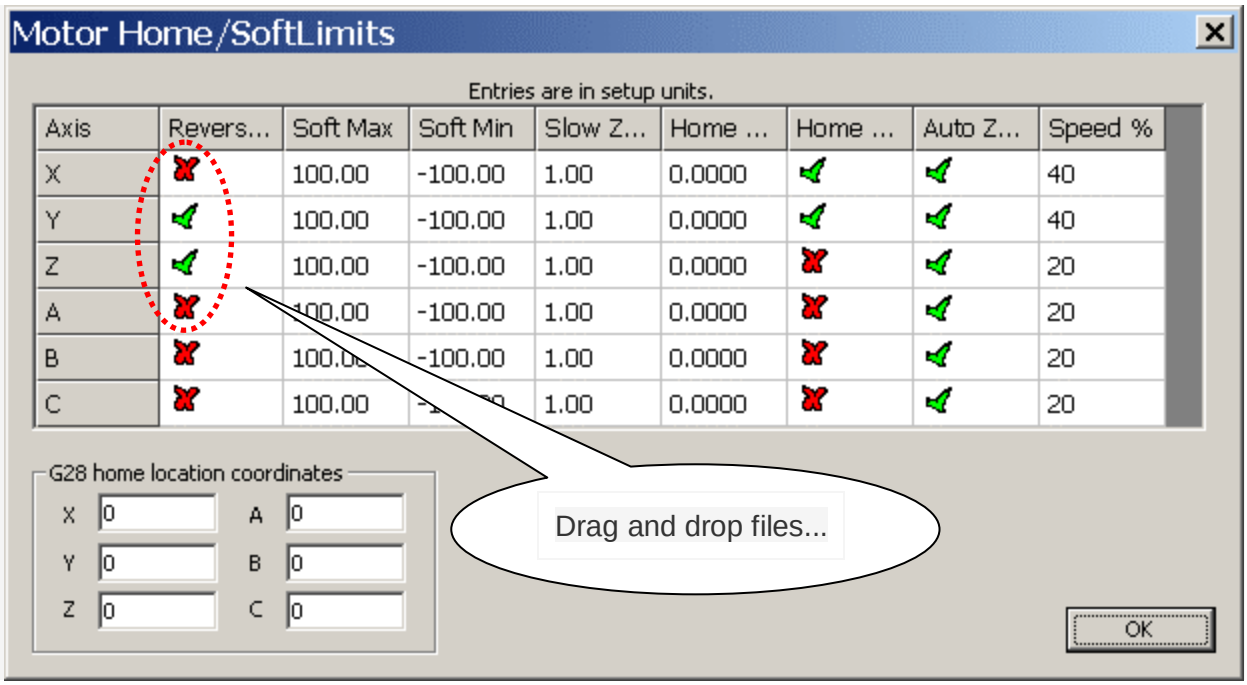
Motor unit number of pulses:

Two-phase stepper motor, for example, Steps per = 200 * number of segments drive / screw lead (pitch)

For example: the number of segments = 8 drive, screw pitch = 4, Steps per = 200 * 8 / 4 = 400

The direction of the axis, it is recommended to configure the interface as shown below:

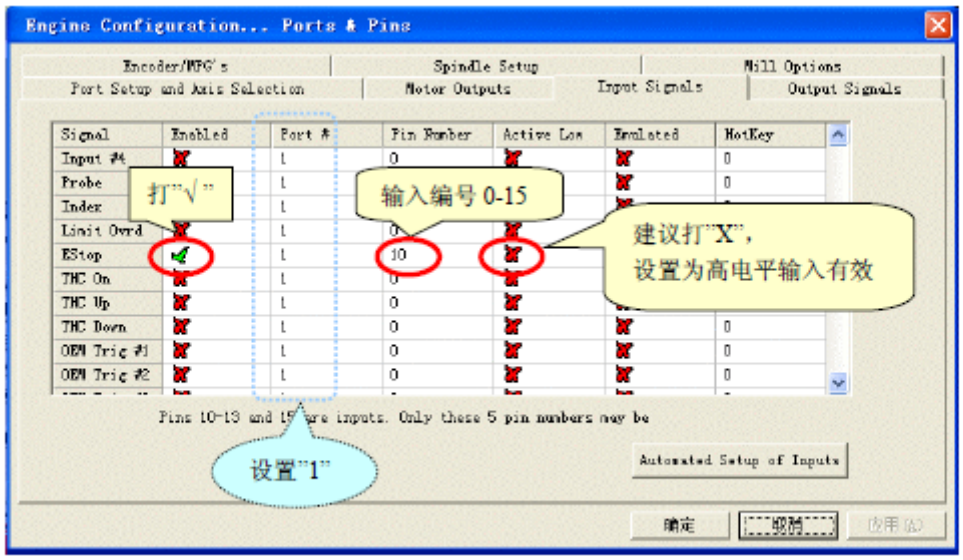
Mach3 Main Menu => Config => Homing / Limits



2. Mach3 in the configuration of the input signal. The motion control card input number from 0 to 15 of 16,

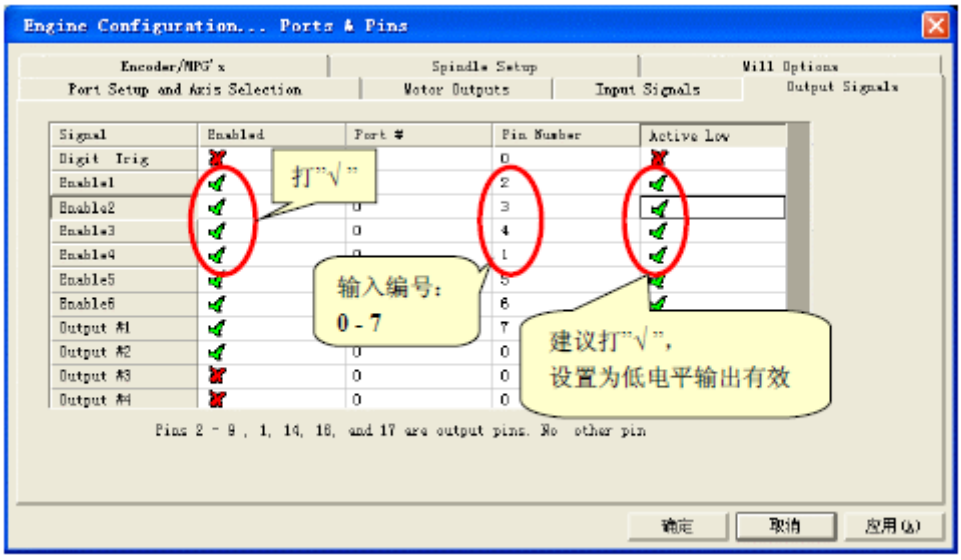
J4 on the card's output interface. Recommended that all input points in the Mach3 is configured as active-high

(hit "X").



3. Mach3 output signal configuration. The motion control card output signal number a total of 8, then the card

J5 Port. Recommends that all output in the Mach3 is set to active low (hit "√").



III. Motion control card hardware installation

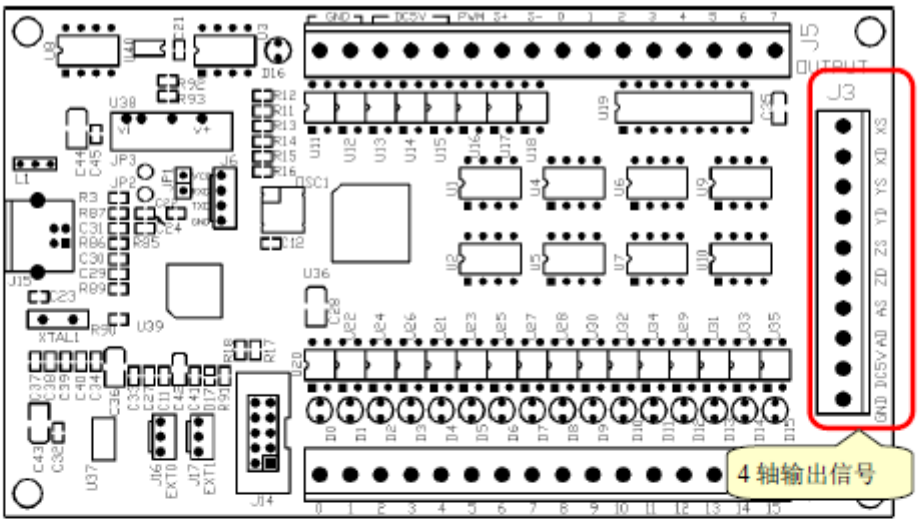
This card is USB-powered, isolated power module has been installed, no external power supply.

All outputs, including 4-axis pulse / direction output / 8 control outputs / spindle speed output, USB connection

the default output high Resistance. After starting in the Mach3, Mach3 controlled by the level recommended in

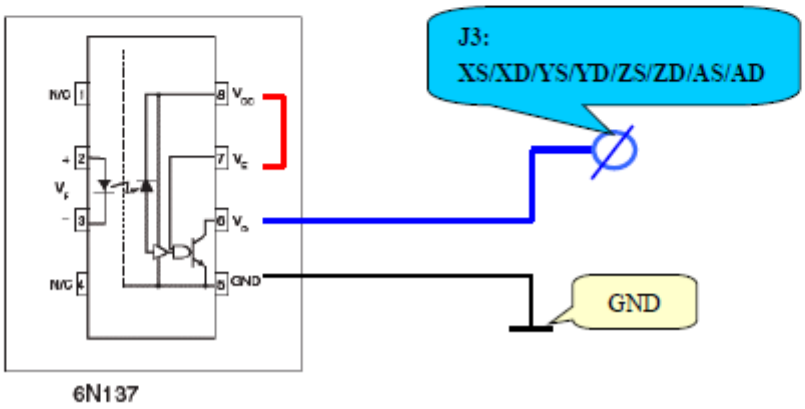
all of the output signal is set low in there Mach3 Effect.

1.4-axis output signal, the control card J3 wiring, see J3 wiring table.



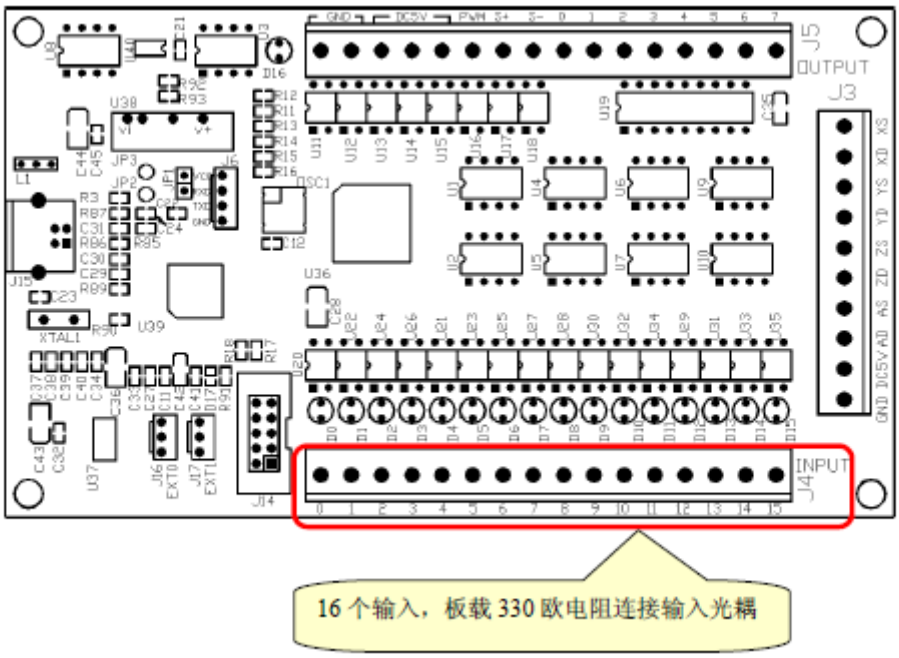
接口原理图

Schematic



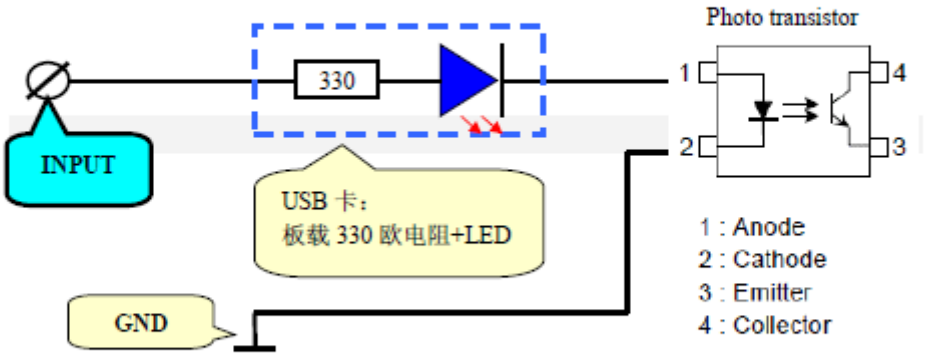
6N137

2.16 input, input voltage 5V (At this point the input current 7mA). In the J4 connector on the control card wiring



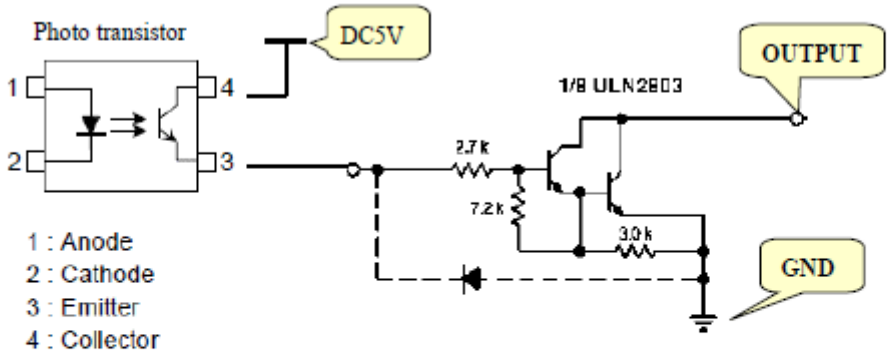
接口原理图

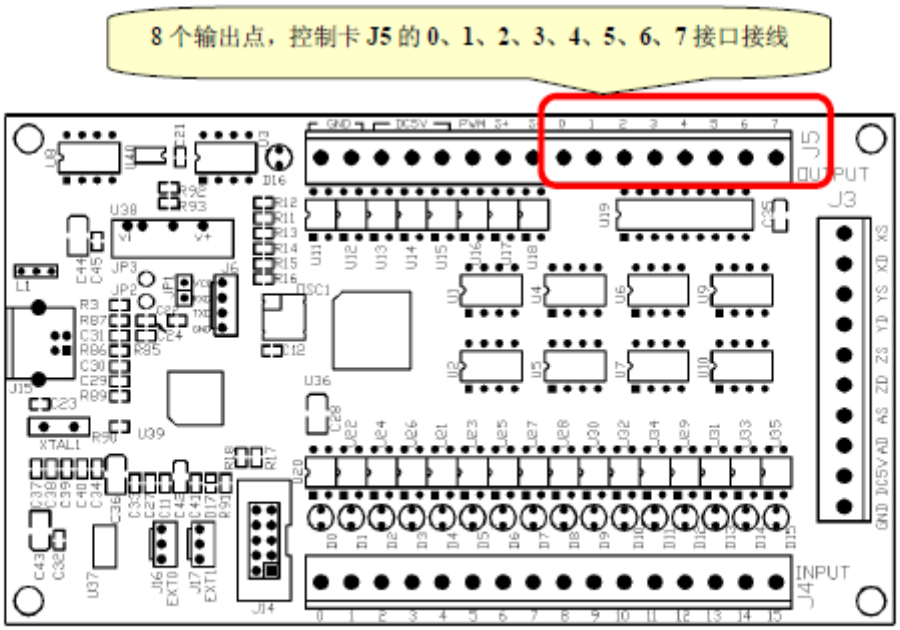
16 inputs, onboard 330 ohm resistor to connect the input coupler



3.8 output, J5 of 0,1,2,3,4,5,6,7 Interface wiring.

Maximum control voltage 24V, maximum output low drive current 500mA, or output impedance.





USB connection table motion control card

1 drive connection table

GND DC5V AD AS ZD ZS YD YS XD XS

Pin Name	Corresponds to the function	Electrical Characteristics	Explain
GND	signal ground	GND	signal common ground
DC5V	output 5V	Max: 120mA	output isolated power supply module
AD	A-axis output (Adir)	OC, 12V/13mA	access A drive
AS	A axis pulse output (Astep)	OC, 12V/13mA	access A drive
ZD	Z-axis output (Zdir)	OC, 12V/13mA	access the Z drive
ZS	Z-axis pulse output (Zstep)	OC, 12V/13mA	access the Z drive
YD	Y axis output (Ydir)	OC, 12V/13mA	then Y drive
YS	Y-axis pulse output (Ystep)	OC, 12V/13mA	then Y drive
XD	X-axis output (Xdir)	OC, 12V/13mA	then X drive
XS	X-axis pulse output (Xstep)	OC, 12V/13mA	then X drive

2 input connection table

J4

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

引脚名称	对应功能	电气特性	说明
0	通用输入/	5V、7mA	可作为通用输入，或者作为手轮输入/
1	手轮输入		“0”,”1”,支持手轮输入”A”,”B”相位信号
2	通用输入		在 MACH3 中配置功能
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

3 Output Connection Table

GND	GND	DC5V	DC5V	PWM	S+	S-	0	1	2	3	4	5	6	7

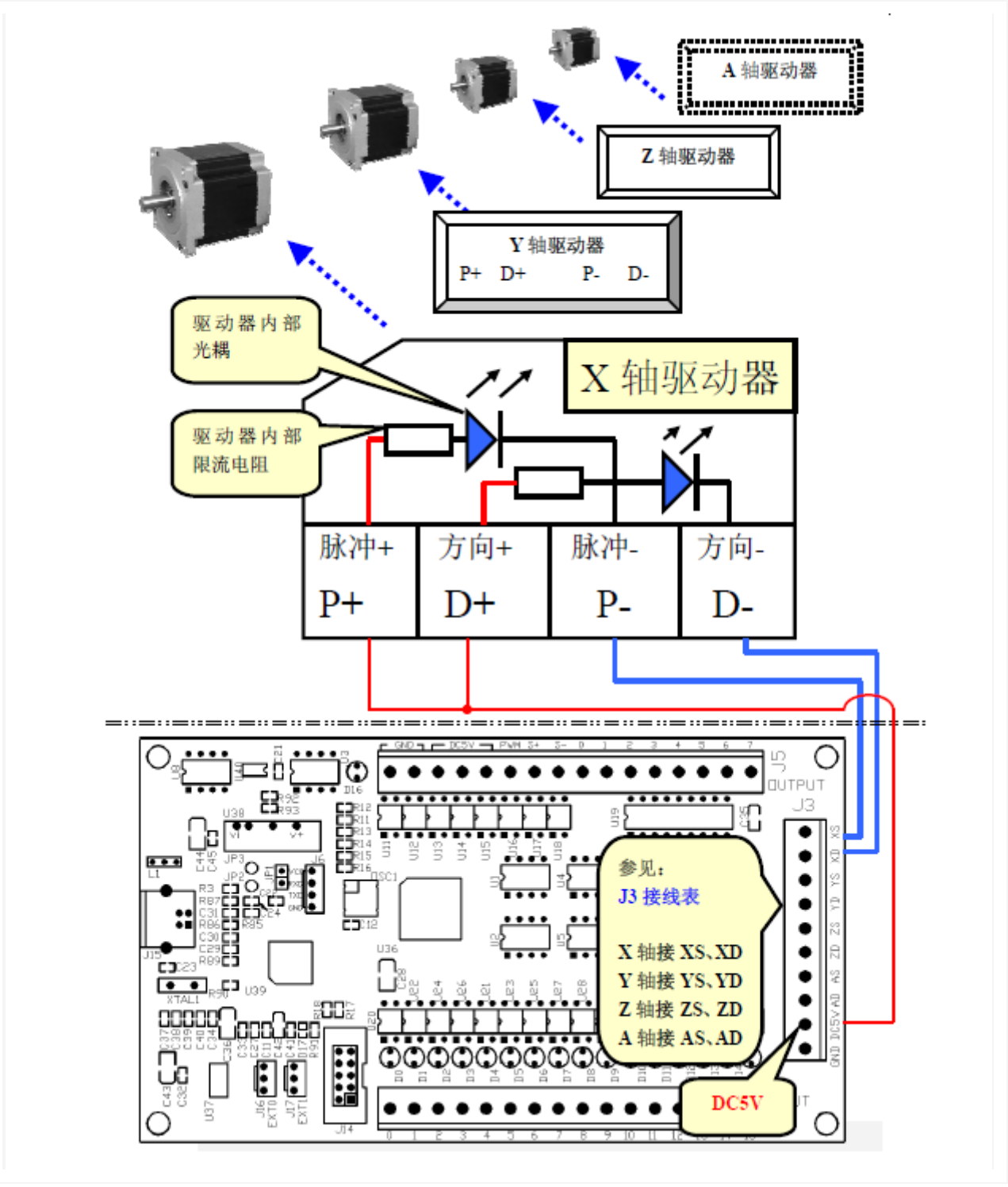
引脚名称	对应功能	电气特性	说明
GND	信号地线	GND	信号公共接地
GND			
DC5V	输出 5V	最大:120mA	隔离电源模块输出
DC5V			
DC5V			
PWM	PWM 模拟量	OC，12V/13mA	主轴调速输出
S+	主轴测速输入信号+	6mA	LED 正极
S-	主轴测速输入信号-	6mA	LED 负极
0	通用输出	OC， 最大 24V /500mA	在 MACH3 中配置功能
1			
2			
3			
4			
5			
6			
7			

1. "DC5V" on-board isolated power module output (internal power). Voltage of 5V, the maximum output current of 120mA.
2. "OC", said: open collector (open drain) output.

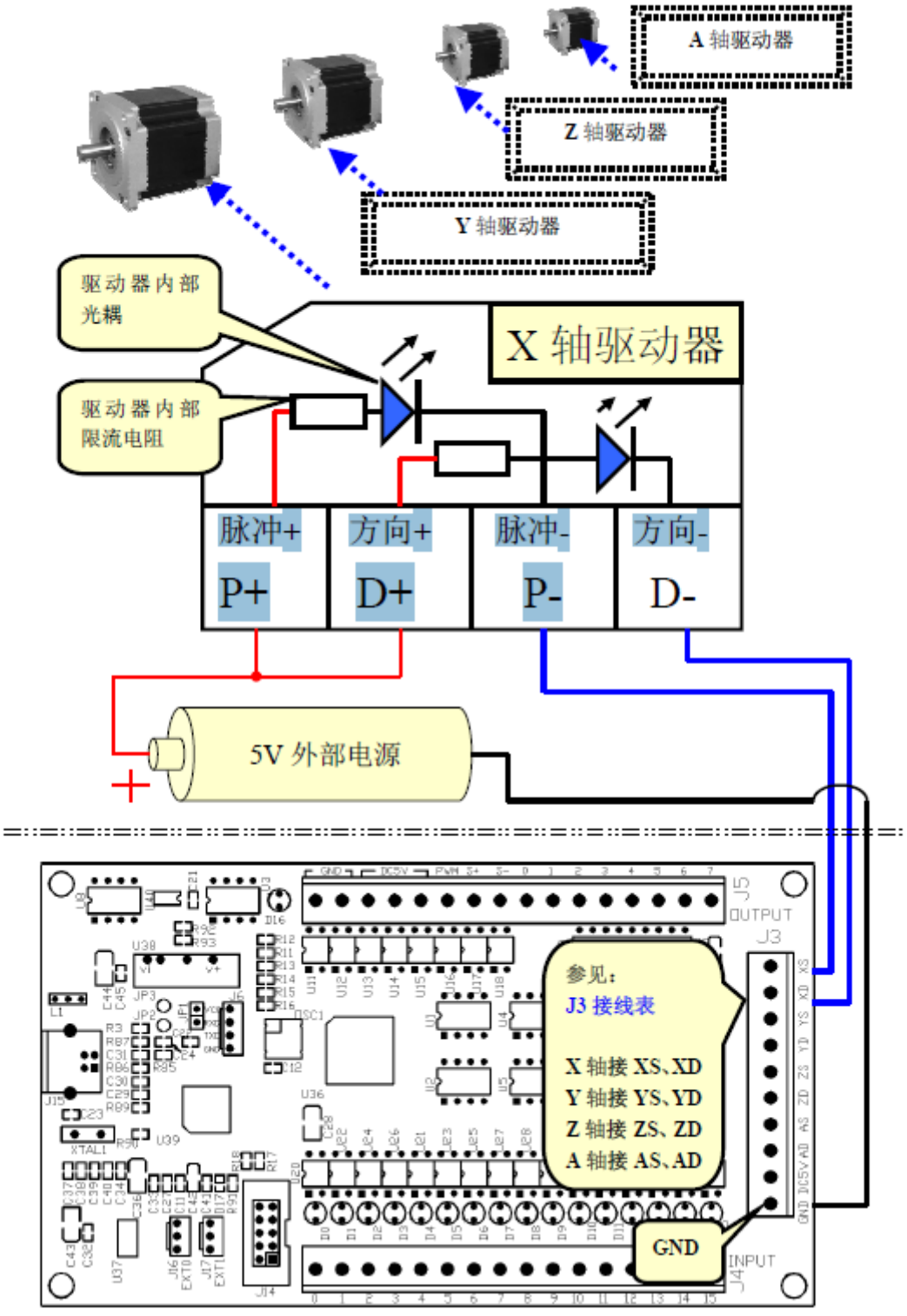
Five. USB motion control card wiring diagram

1. X, Y, Z, A axis output. You can use the following two kinds of power supply: Internal power supply / external power supply.

I. Use the power motion control card, driver, according to the need to install the appropriate current limiting resistor.

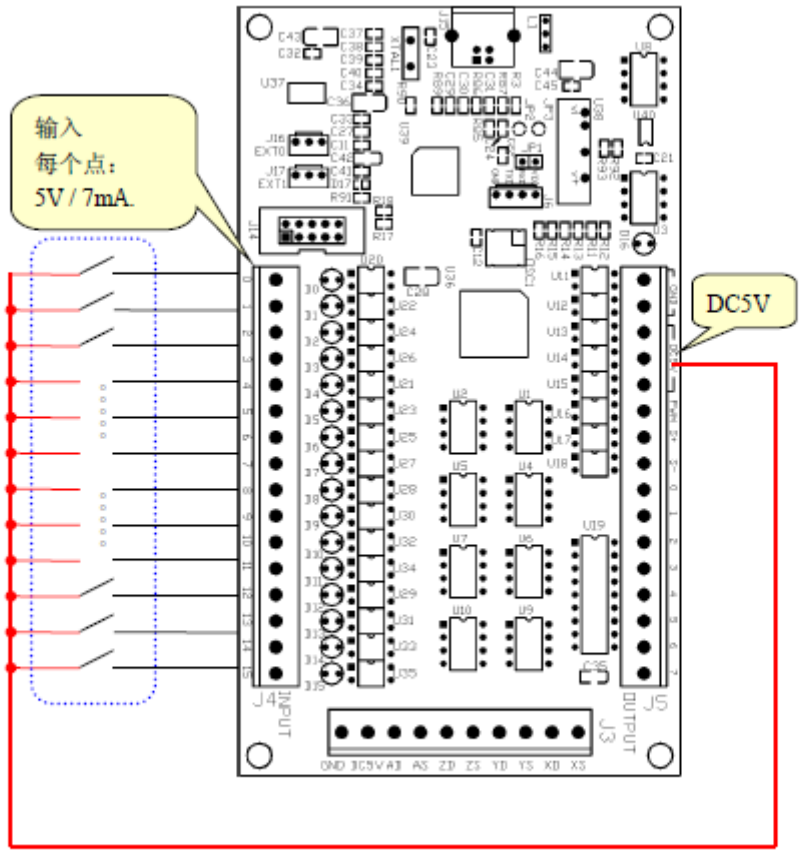


II. External power supply, drive, according to the need to install the appropriate current limiting resistor.

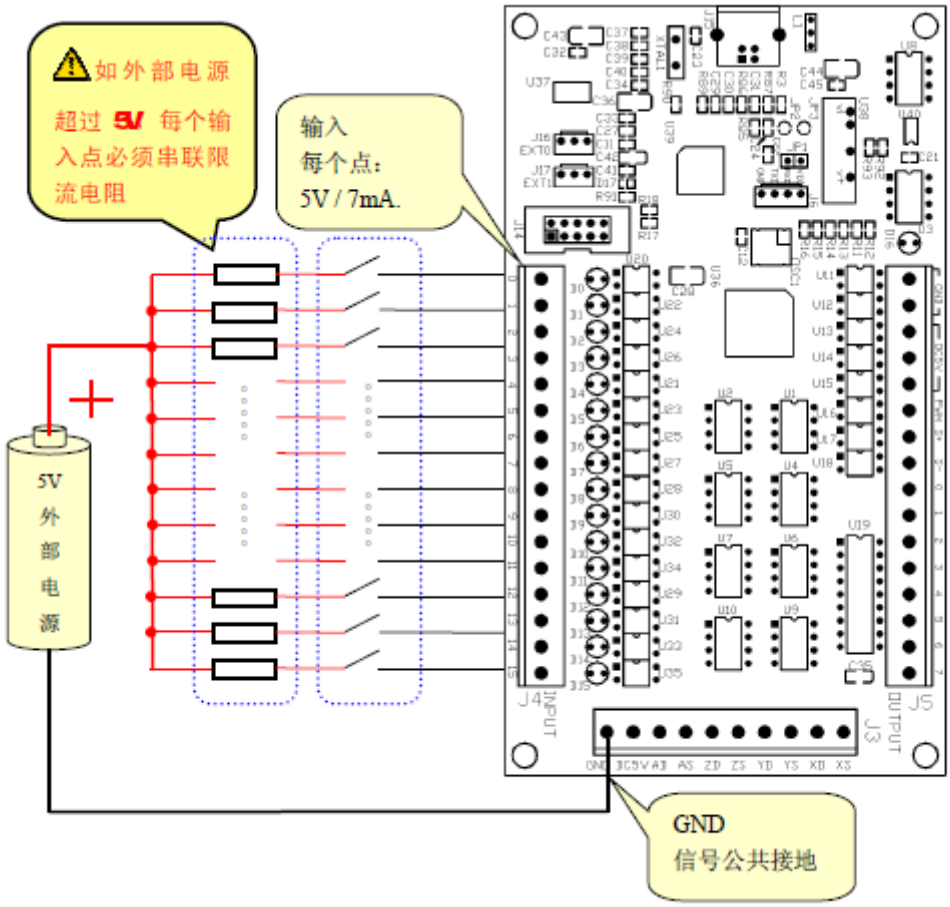

A 轴驱动器
Z 轴驱动器
Y 轴驱动器
驱动器内部光耦
驱动器内部限流电阻
X 轴驱动器
脉冲+
方向+
脉冲-
方向-
P+
D+
P-
D-
5V 外部电源
参见：
J3 接线表
X 轴接 XS、XD
Y 轴接 YS、YD
Z 轴接 ZS、ZD
A 轴接 AS、AD
GND
OUTPUT
INPUT
J3
J4
J5

2) Input: Voltage 5V. You can use the following two kinds of power supply: Internal power supply / external power supply.

I. Use of an internal power motion control card, driver input



II. A 5V external power supply to drive input.



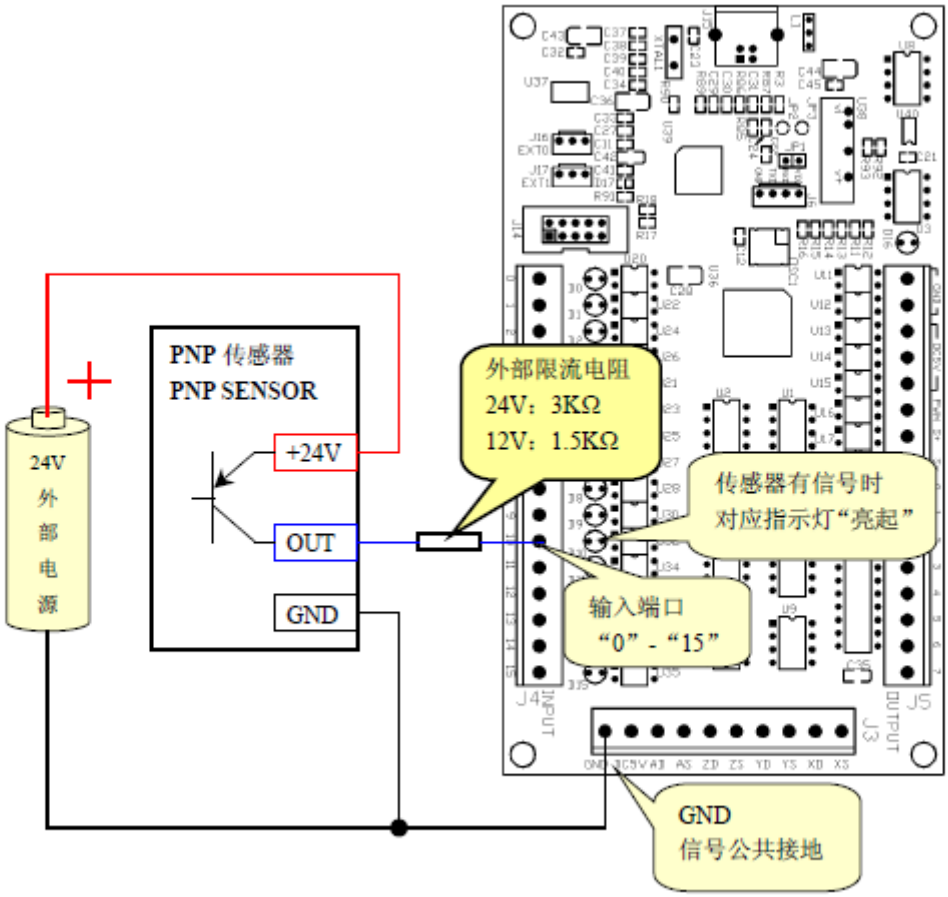
Note: external power supply voltage exceeds 5V or more, need an external current limiting resistor in series

(on the board for the 330 ohm current limiting resistor).

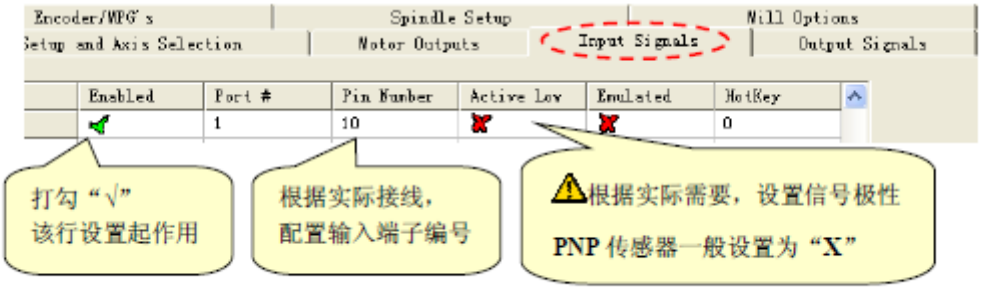
Resistance value: 24V at 3K, 12V at 1.5K.

3 sensor wiring and configuration

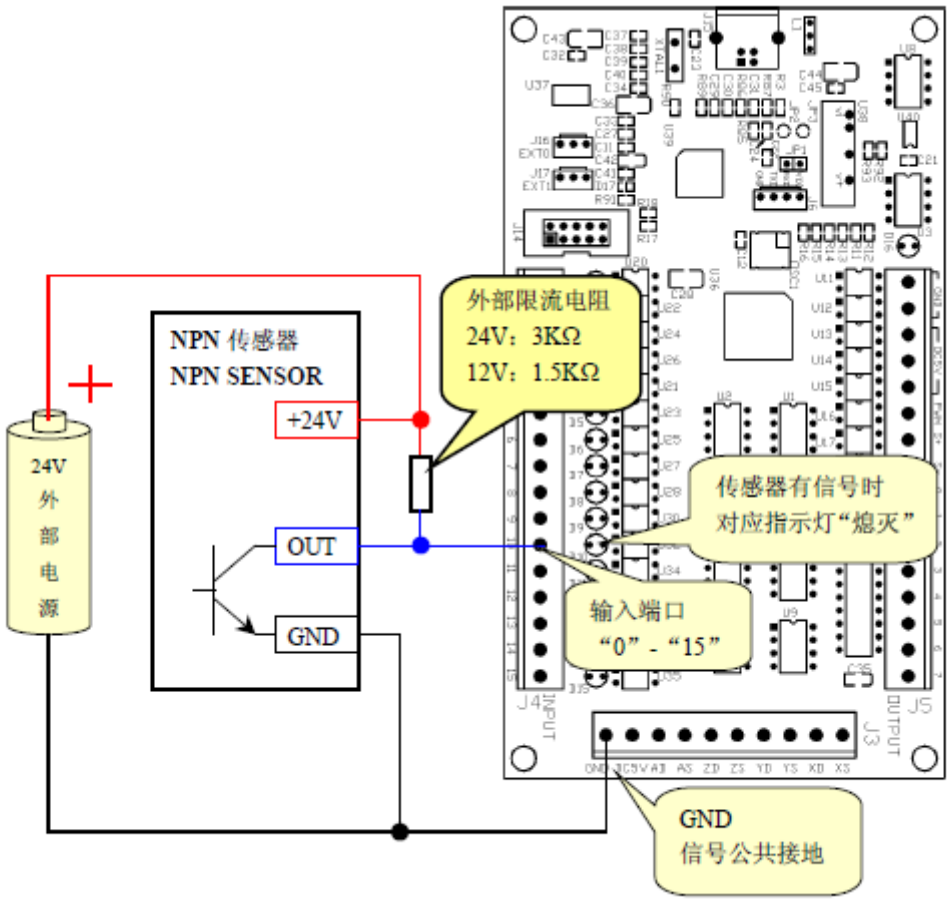
I. PNP sensor, driver input.



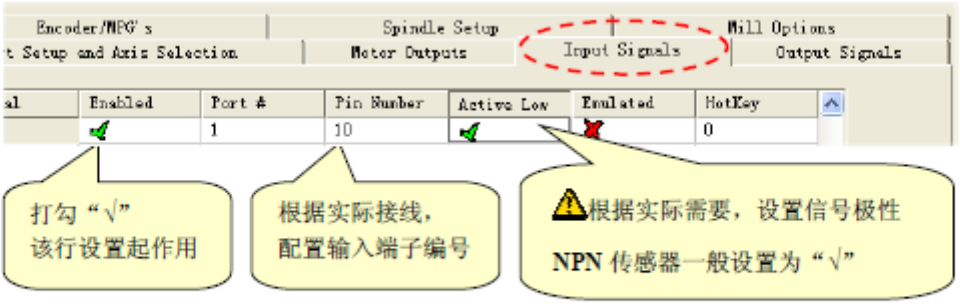
Mach3 input configuration



II. NPN sensors, driver input.



Mach3 input configuration

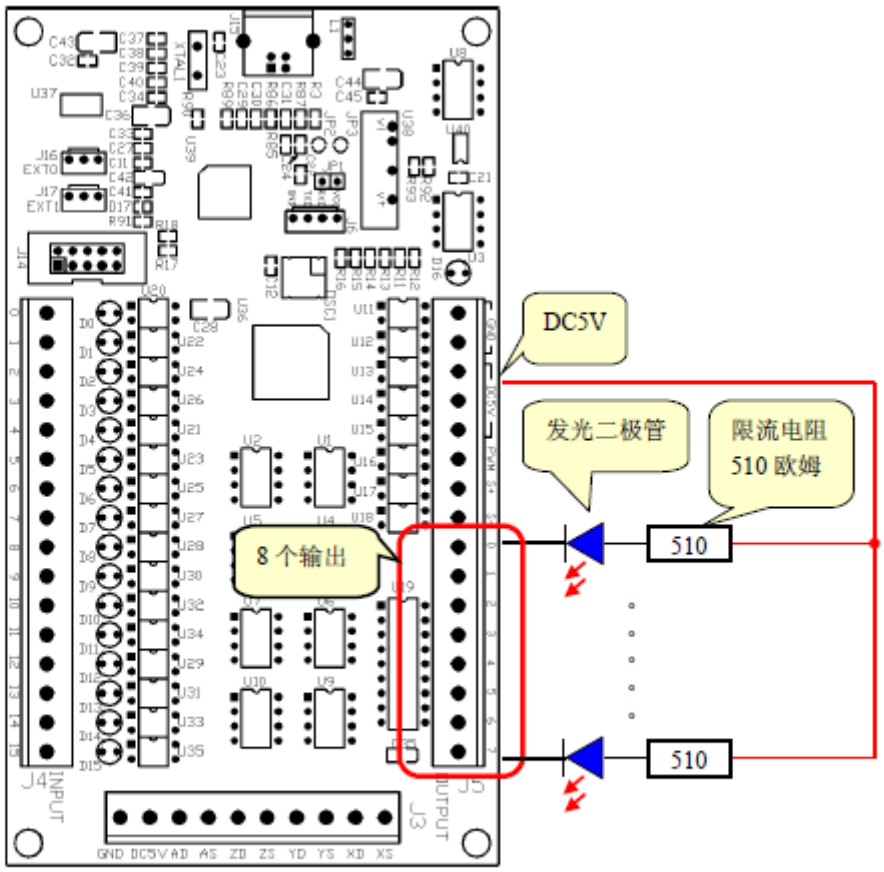


4 outputs: 8 outputs for maximum control voltage 24V, maximum output low drive current 500mA, or output

Impedance.

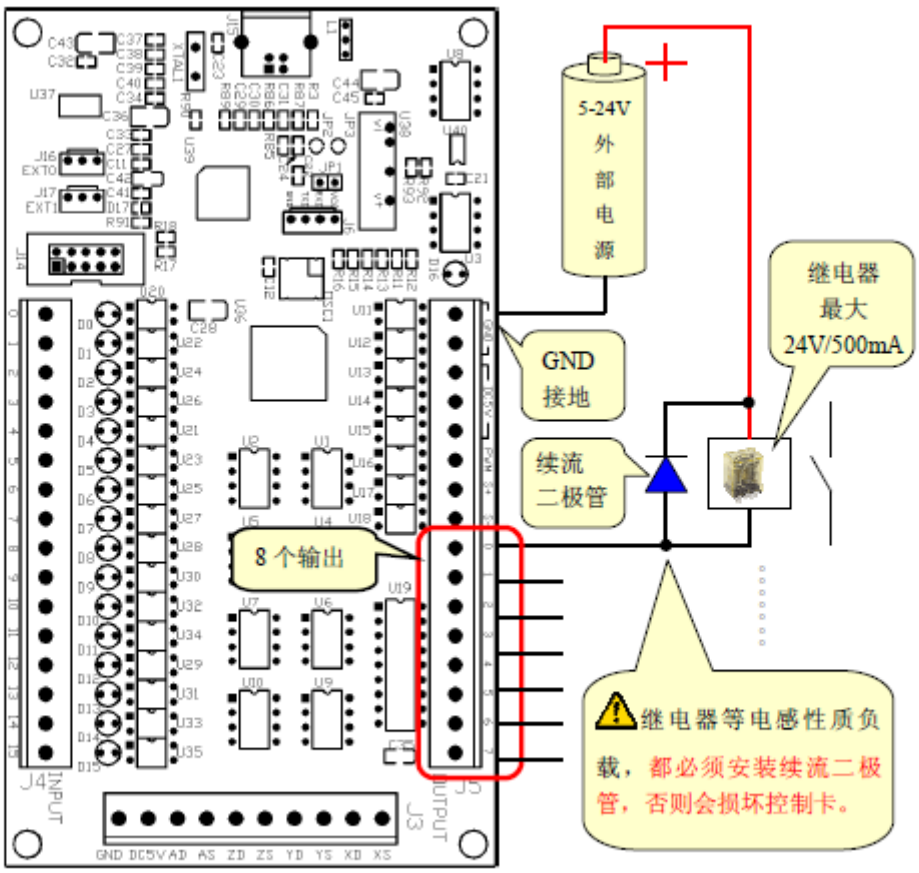
I. Use of the internal motion control card power supply, LED driver

Drive a small current load, such as LED, driver-enable control, you can directly use the internal power supply.



II. Using 5-24V external power supply, drive 500mA relay.

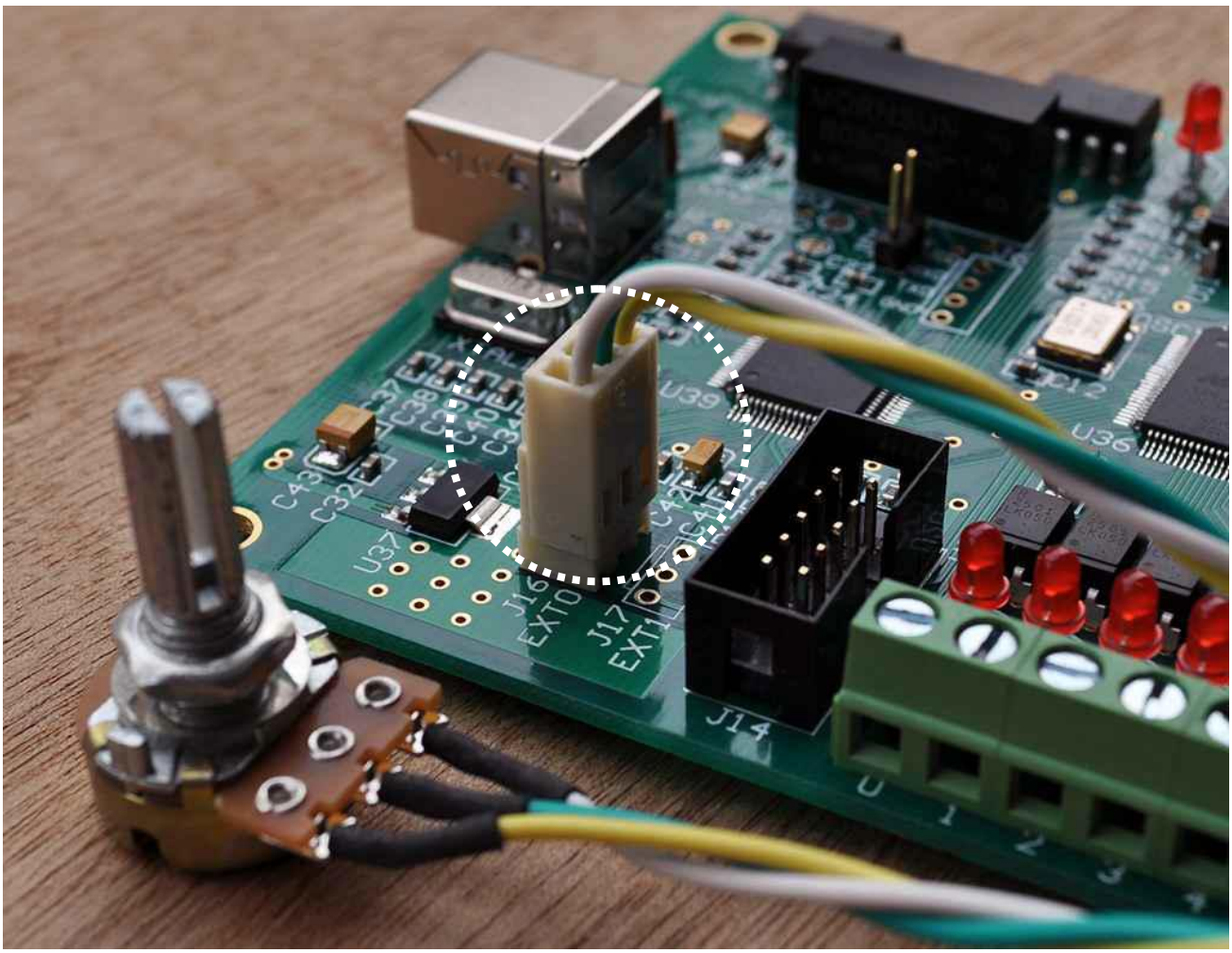
Driving high current loads such as relays, etc., need to use an external power supply.



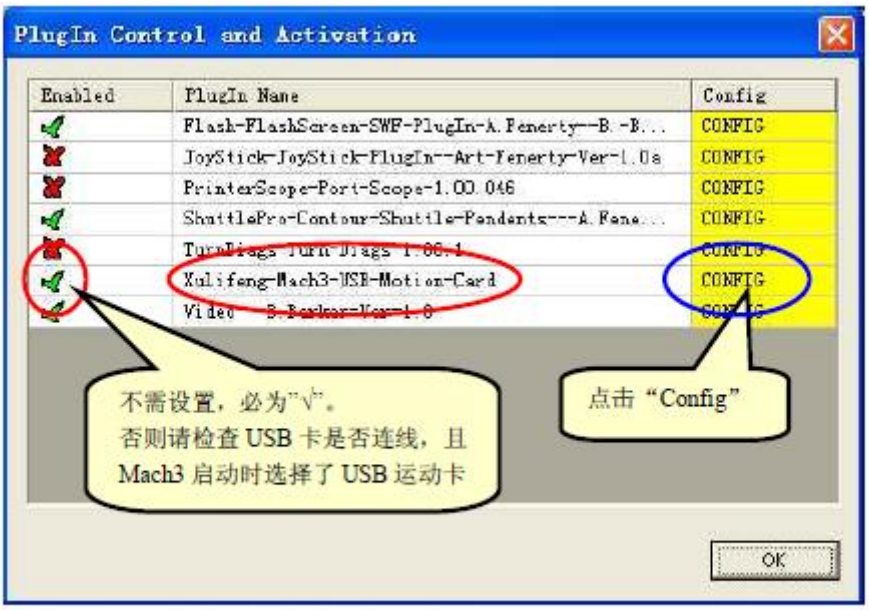
6. External magnification knob

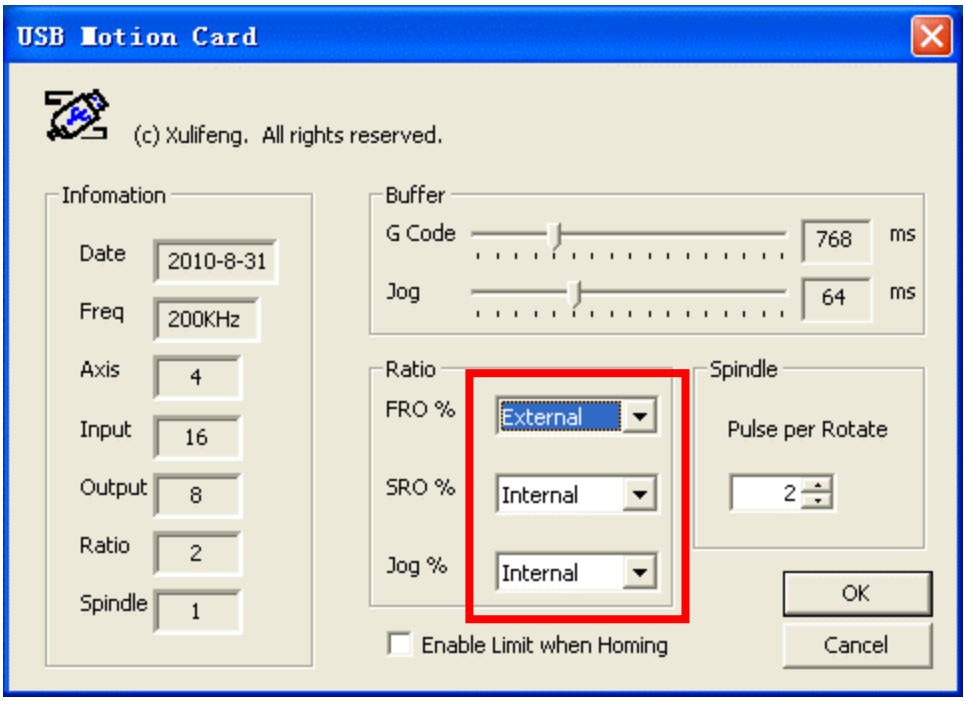
Complete the first step in the manual "Installation Preparation."

The rate knob and USB card rate knob seat EXT0 (J16) connection.

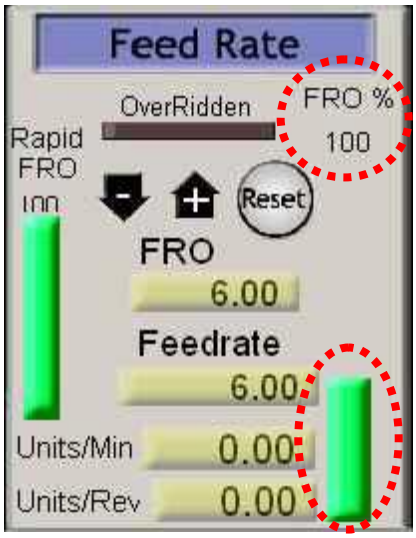


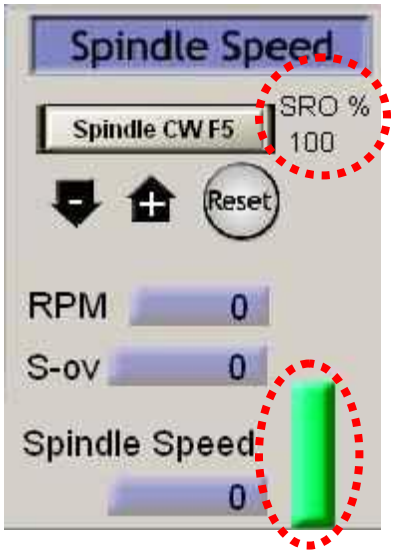
Mach3菜单中Config=>Config Plugins，进入PlugIn Control and Activation



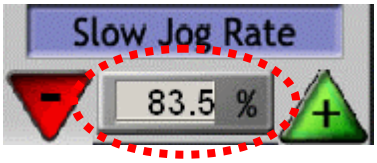


After configuration, click "OK". Rotation rate knob, Mach3 interface corresponding to the FRO%, SRO% value immediately changes.





Rotation rate knob, Mach3 interface corresponding to the Slow Jog Rate% value immediately changes.

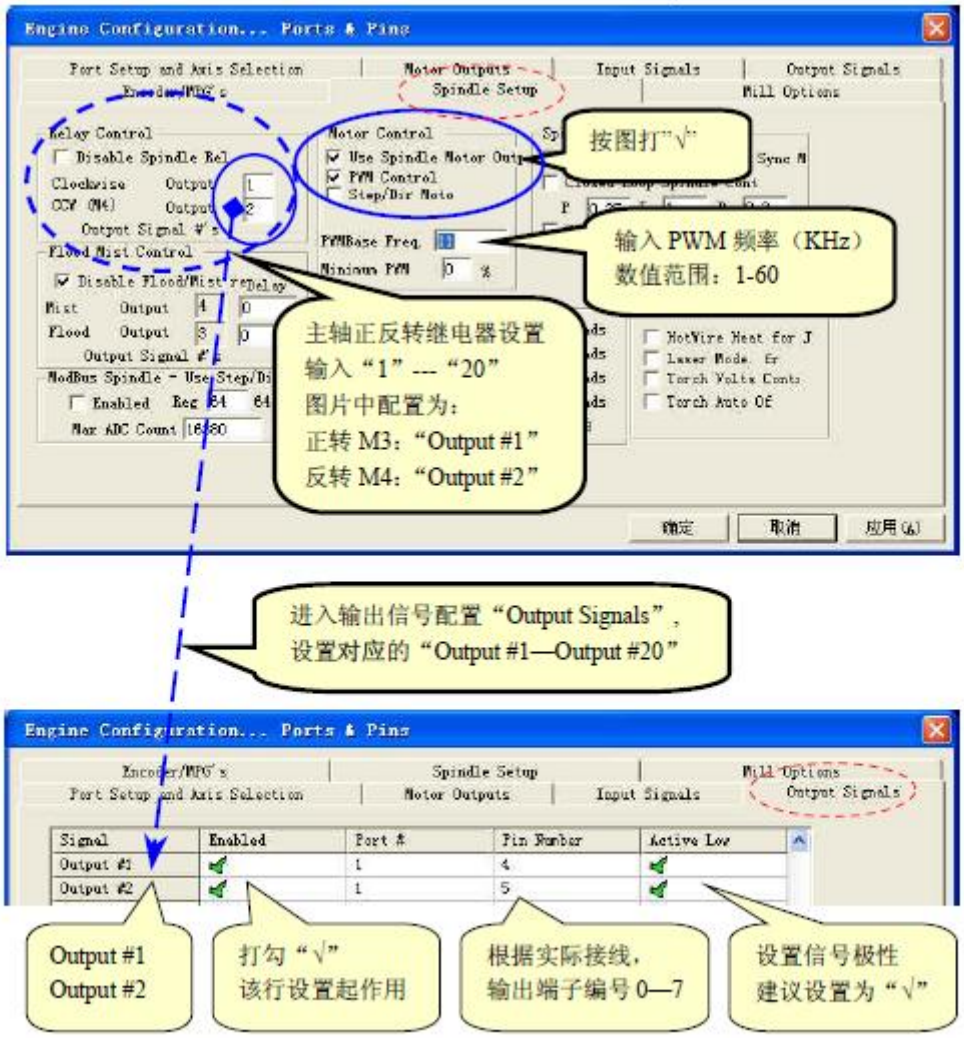


7. spindle speed analog output

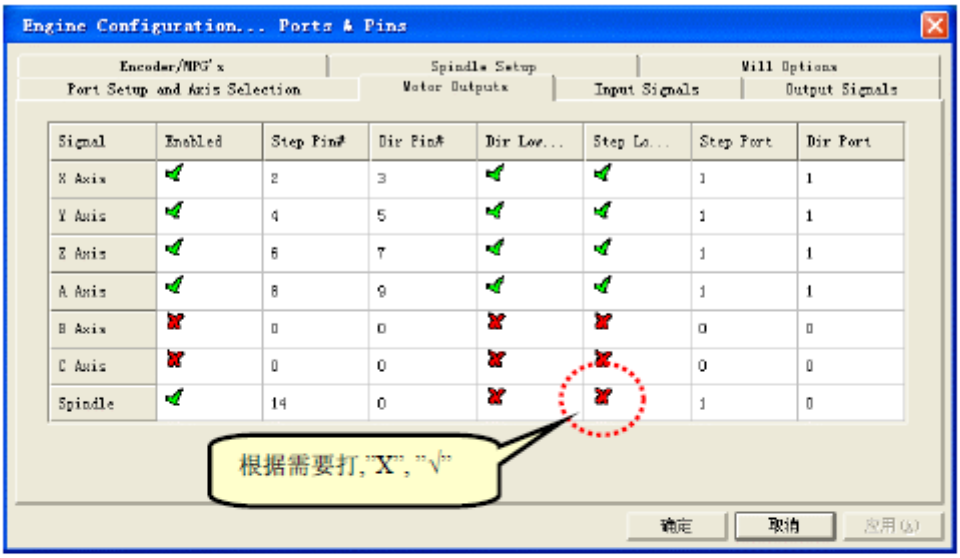
Software Configuration

Into the spindle set "Spindle Setup", check "Use Spindle Motor Output", "PWM Control".

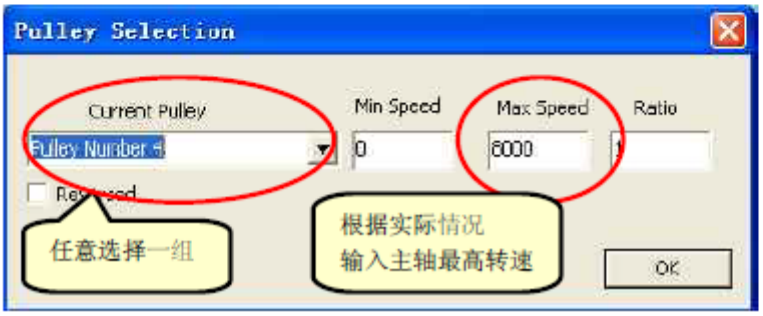
In PWMBase Freq. Enter the desired frequency, number 1-60, in units of KHz.



Spindle speed signal PWM phase configuration



Mach3 菜单中"Config=>Spindle Pulleys..", 进入"Pulley Selection"



Other spindle configuration instructions, refer to "Mach3Chinese-Documents.pdf" in "5.5.6 Setting the spindle motor."

Spindle Test

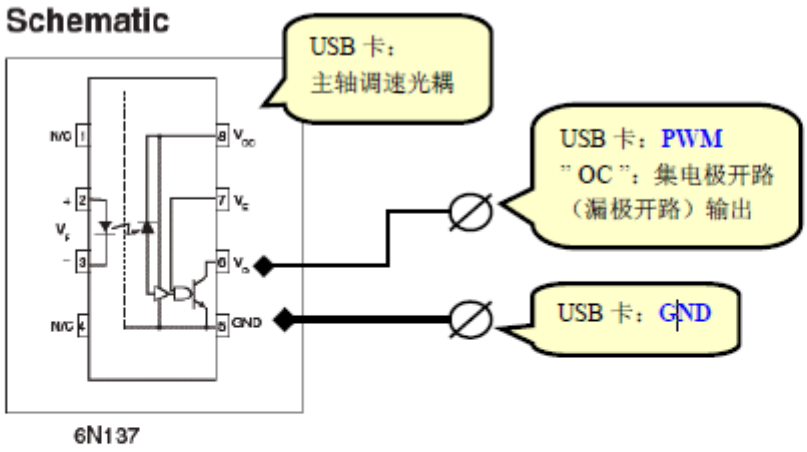
In the manual input interface on the input data box:

Enter the "M3", you can hear the spindle relay (if configured and installed the spindle forward relay).

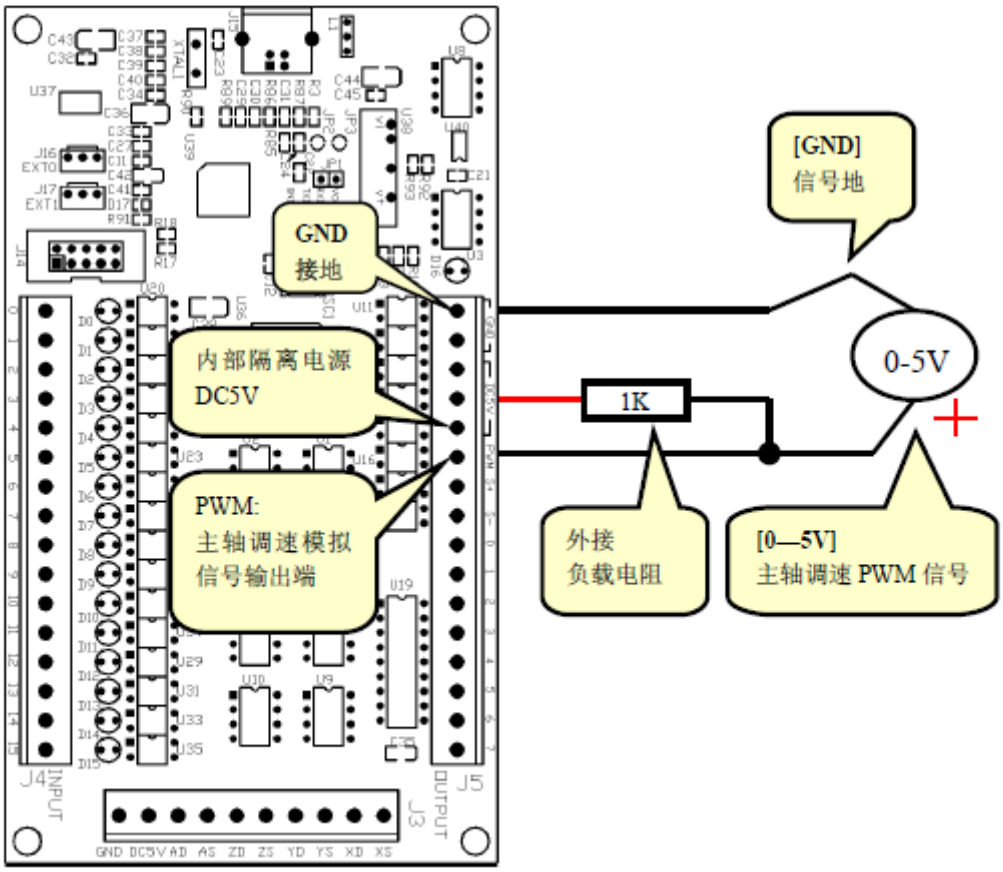
Enter "S10000", spindle rotation.

Enter the "M5", spindle stop switch.

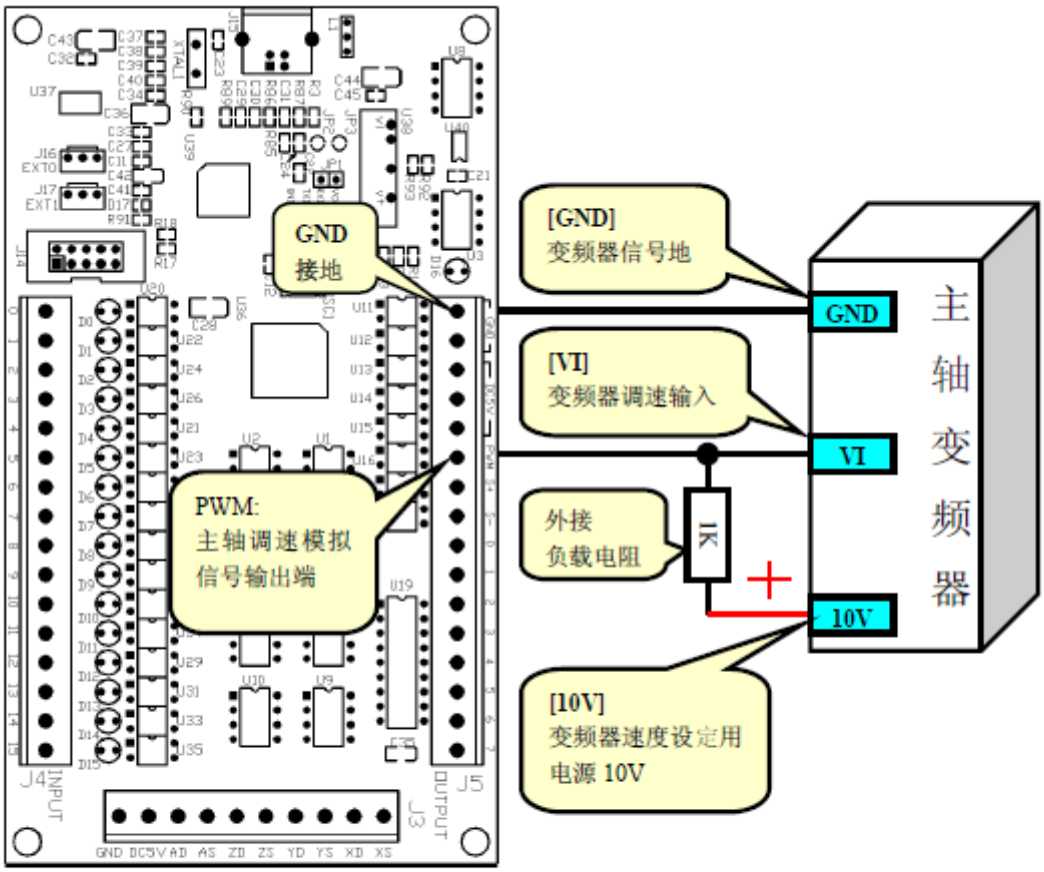
Speed analog output interface schematic



使用 USB 卡内部电源接线（输出 0-5V）

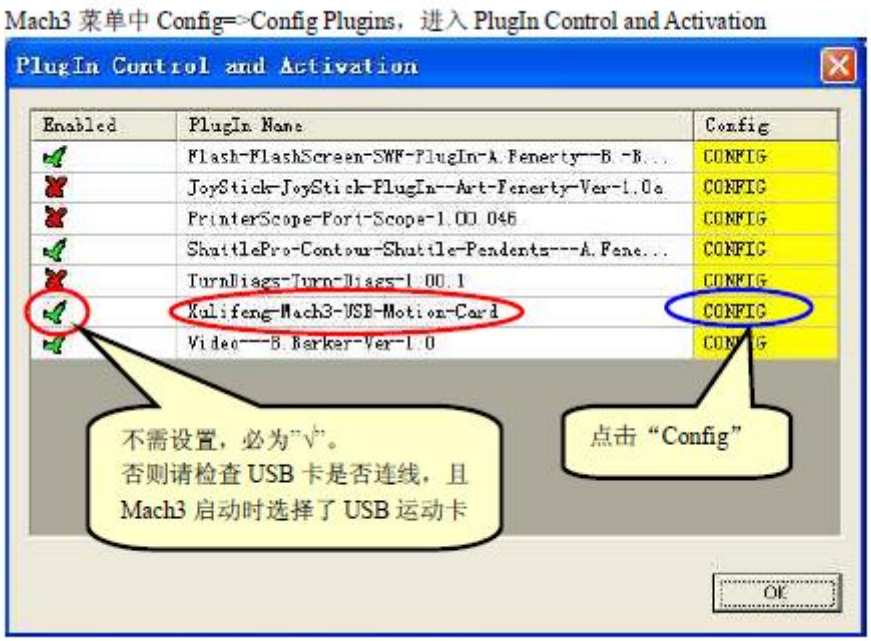


External power supply wiring (output 0-10V)

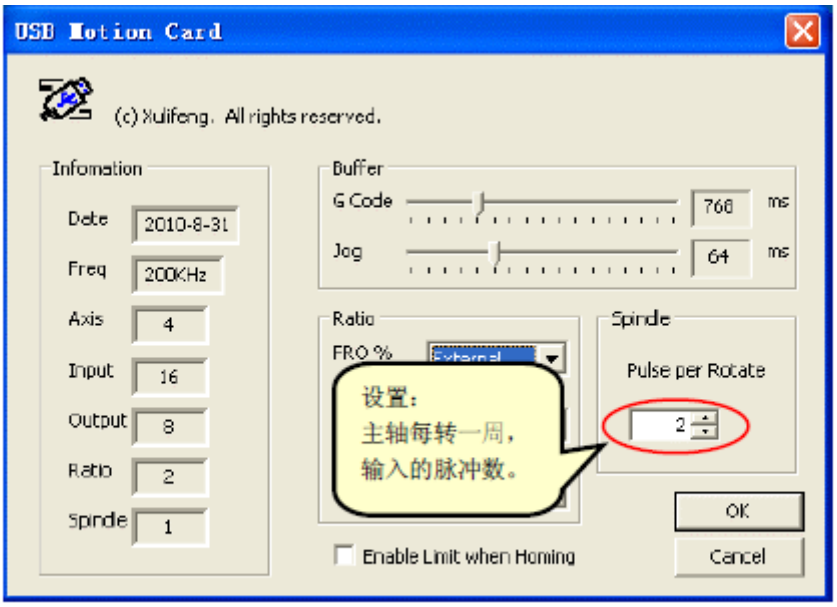


8.spindle speed

USB card configuration dialog

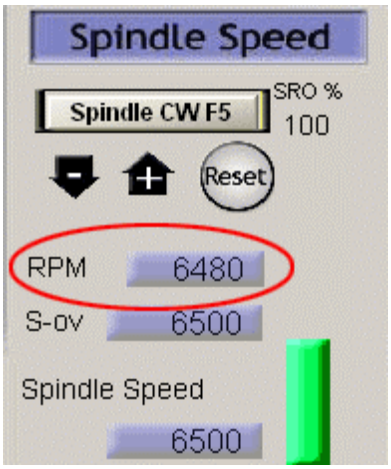


Click "Config" dialog box after the USB card configuration



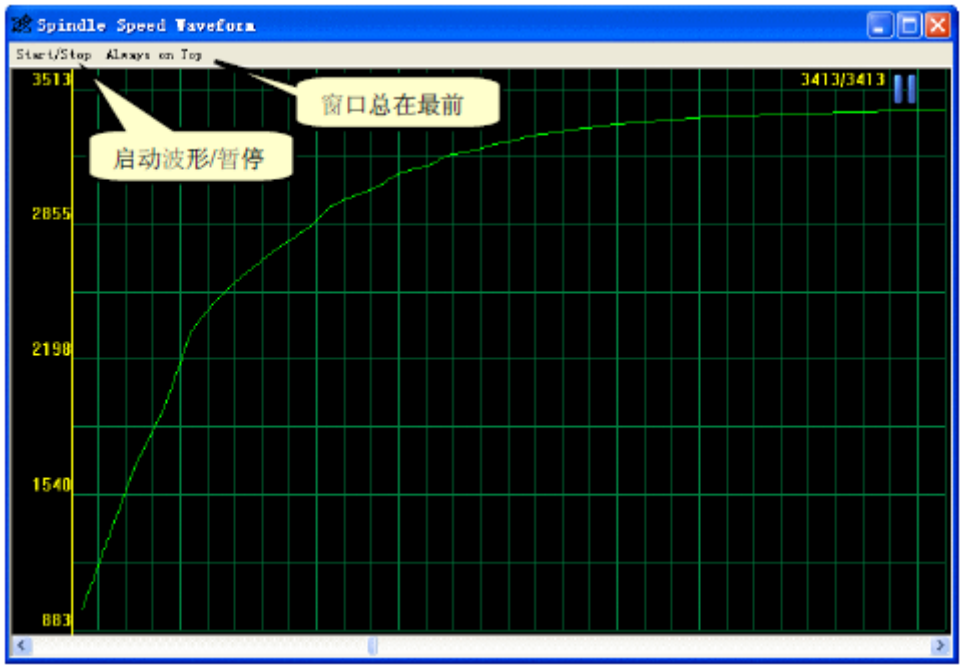
Spindle speed display

Measured speed will be displayed in Mach3



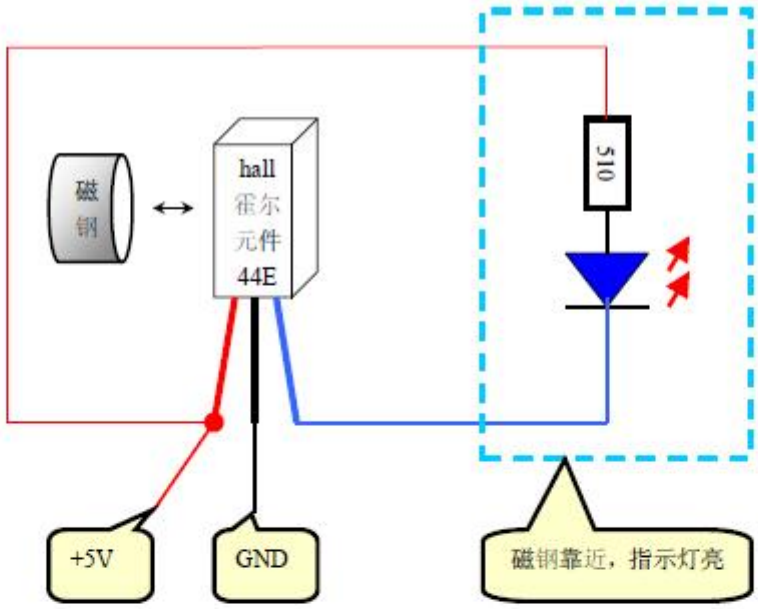
It may also open the spindle speed real-time waveform display

Below: a measure of the speed curve when starting the spindle



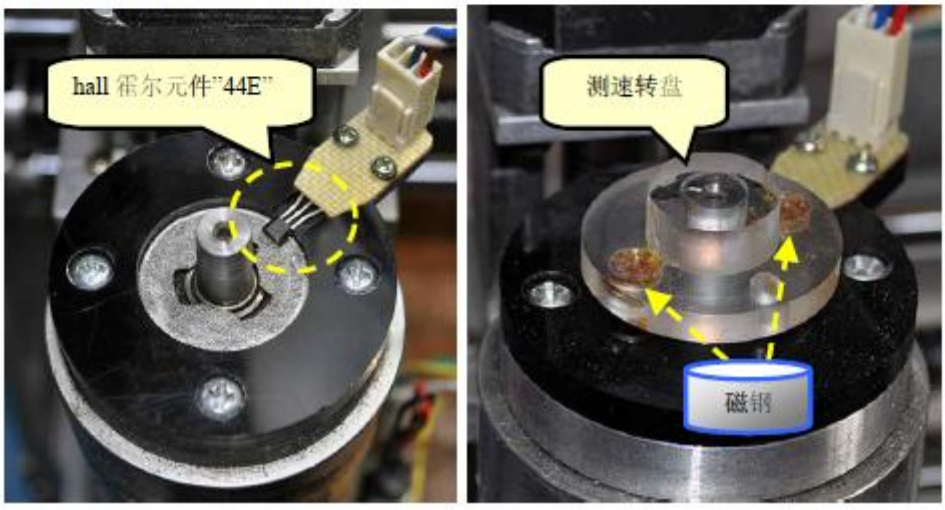
Velocity diagram of the Hall element working

Hall element "44E" is an open collector (open drain) output, the OC output.

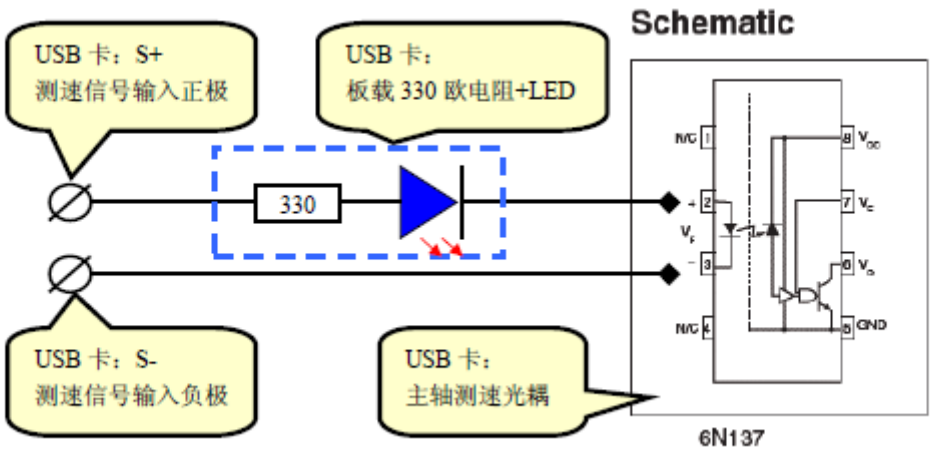


测速霍尔元件/转盘安装示意图

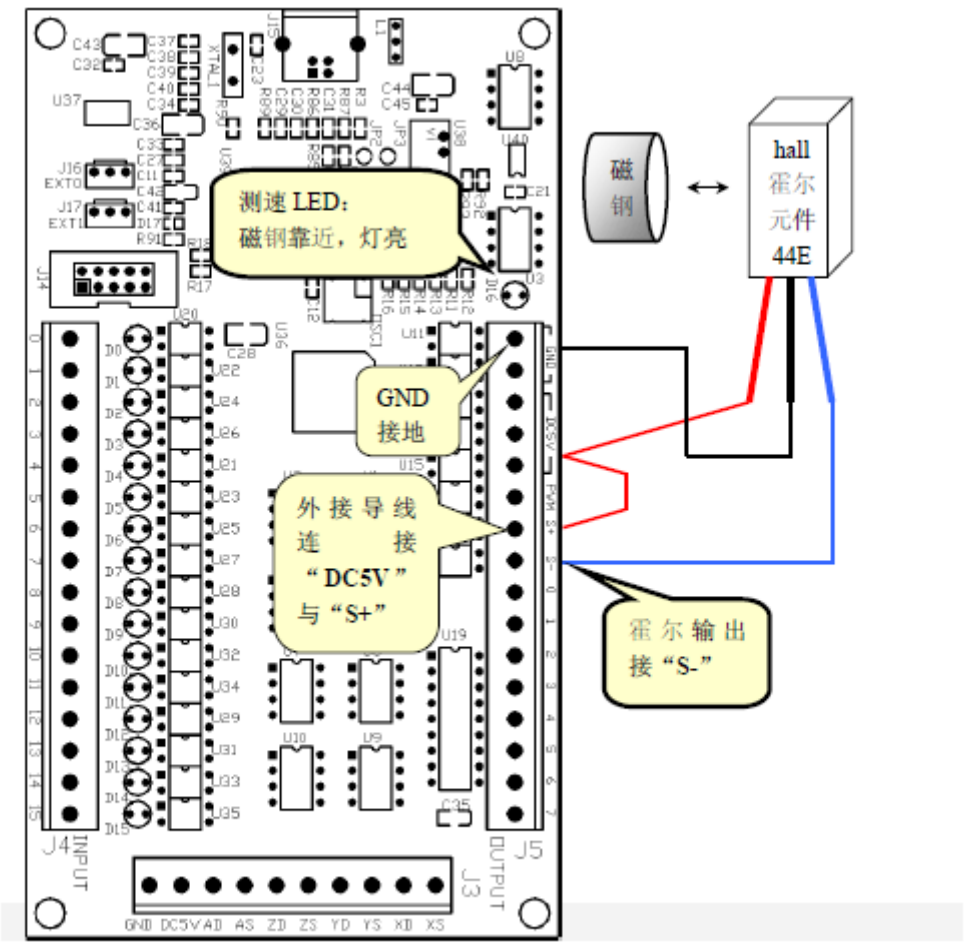
注意：磁钢有 SN 极，安装时注意调整。



USB card speed input interface schematic

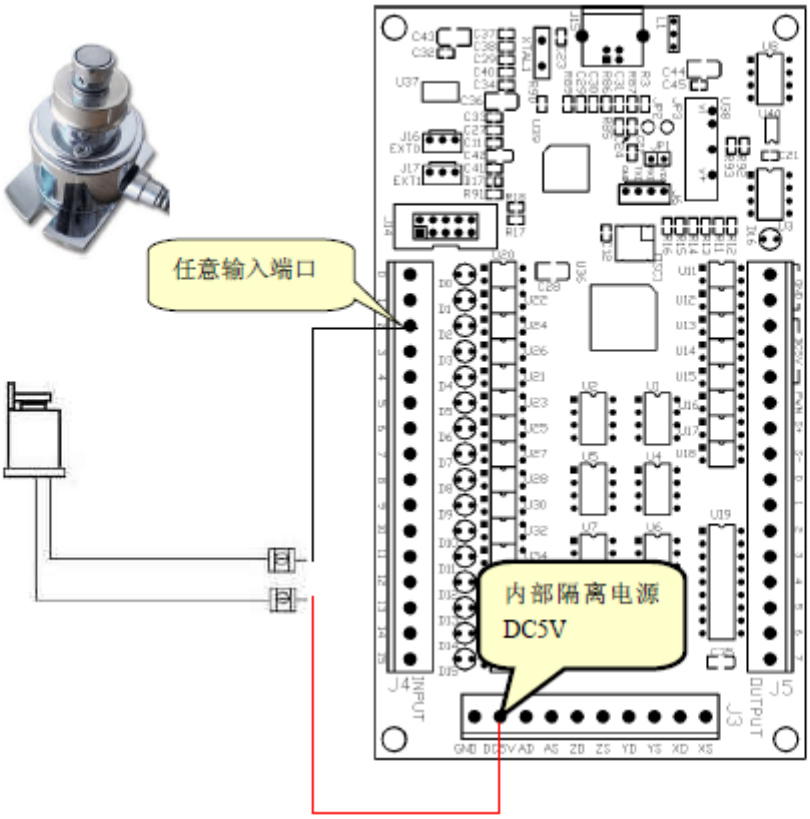


Speed USB card terminal Hall element

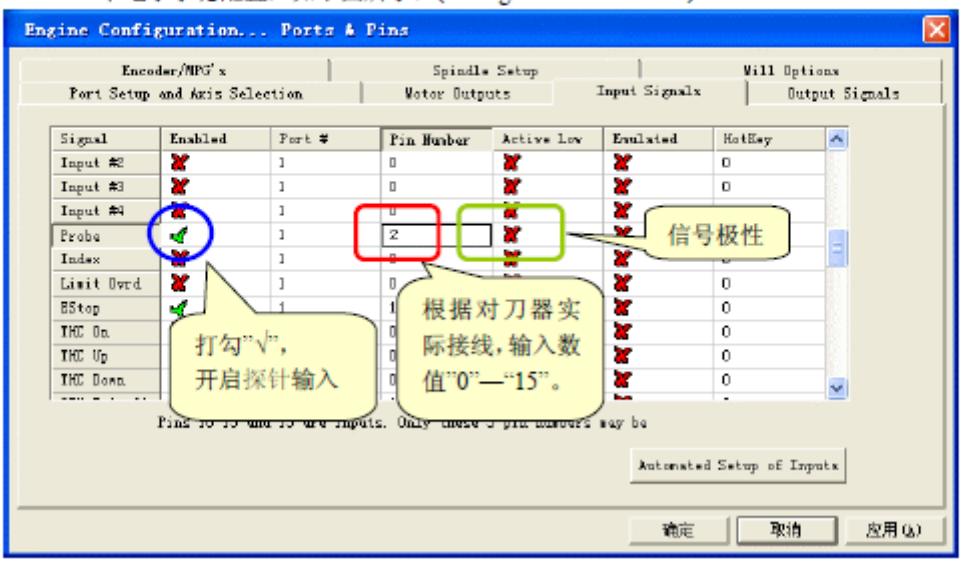


IX. Automatic tool

Wiring of the knife

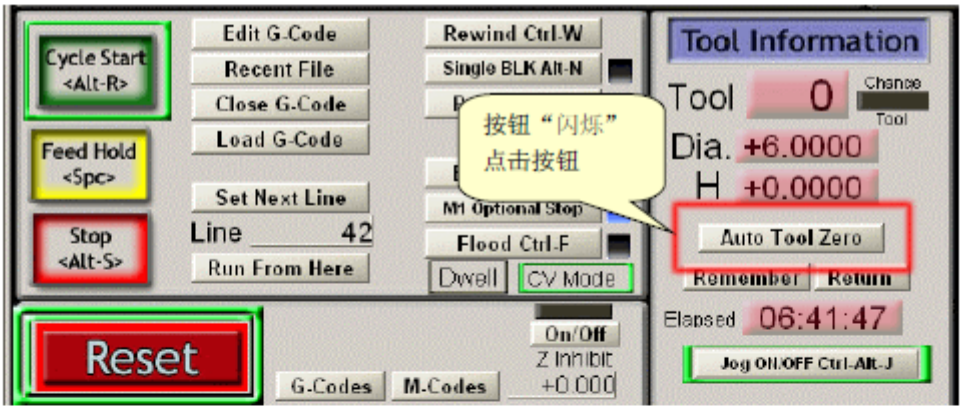


Mach3 中电子手轮配置，如下图所示：(Config => Ports and Pins)

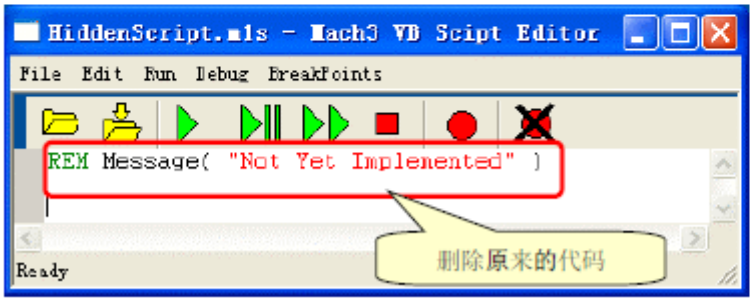


1. Mach3 菜单 (Operator => Edit Button Script)

2. 点击闪烁中的"Auto Tool Zero"按钮

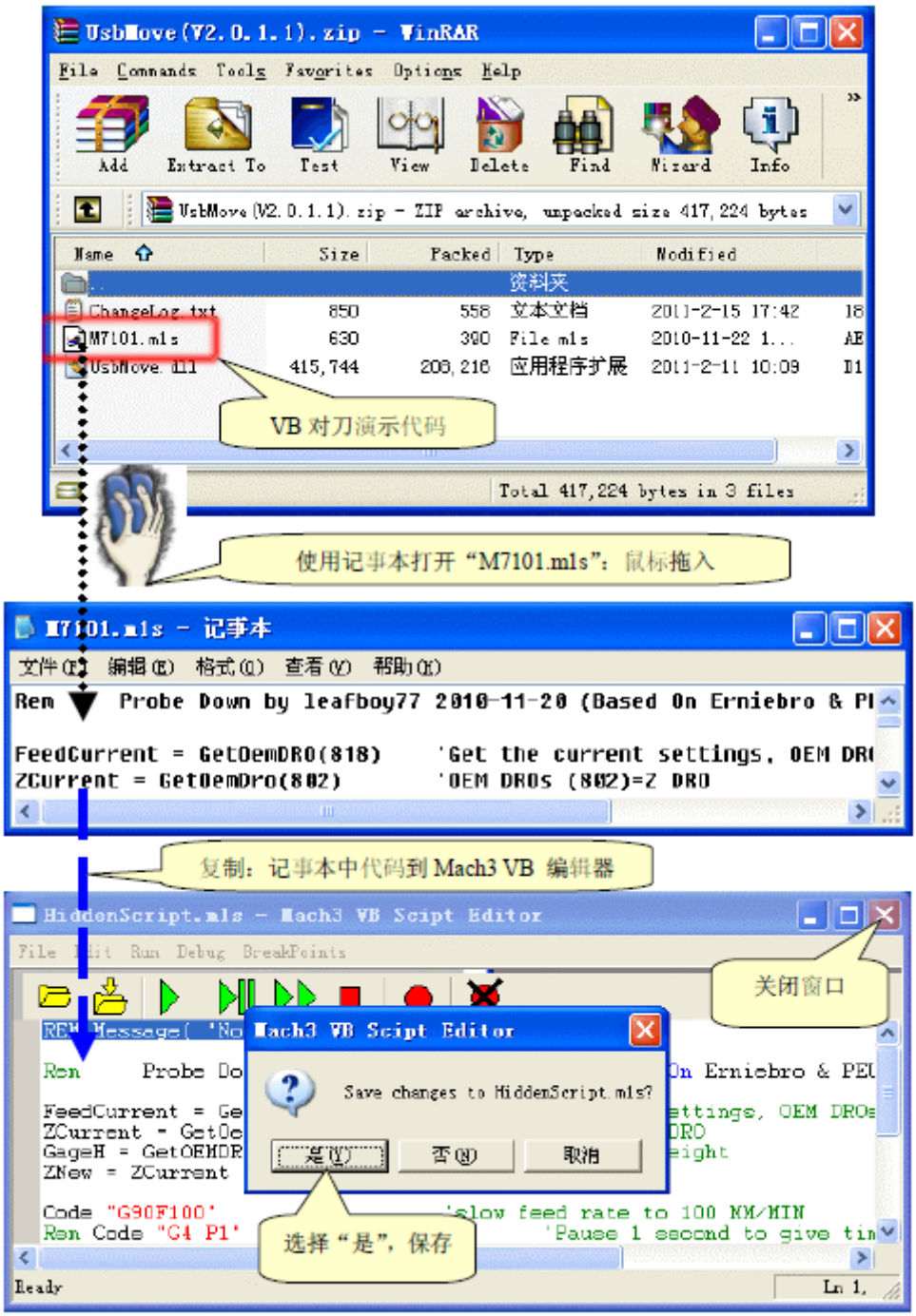


3. 弹出 VB 编辑器，删除代码。



3. VB code for the tool, enter in the VB editor.

USB card provided with the usbmove.zip knife demo VB code for "M7101.m1s", use Notepad to open.

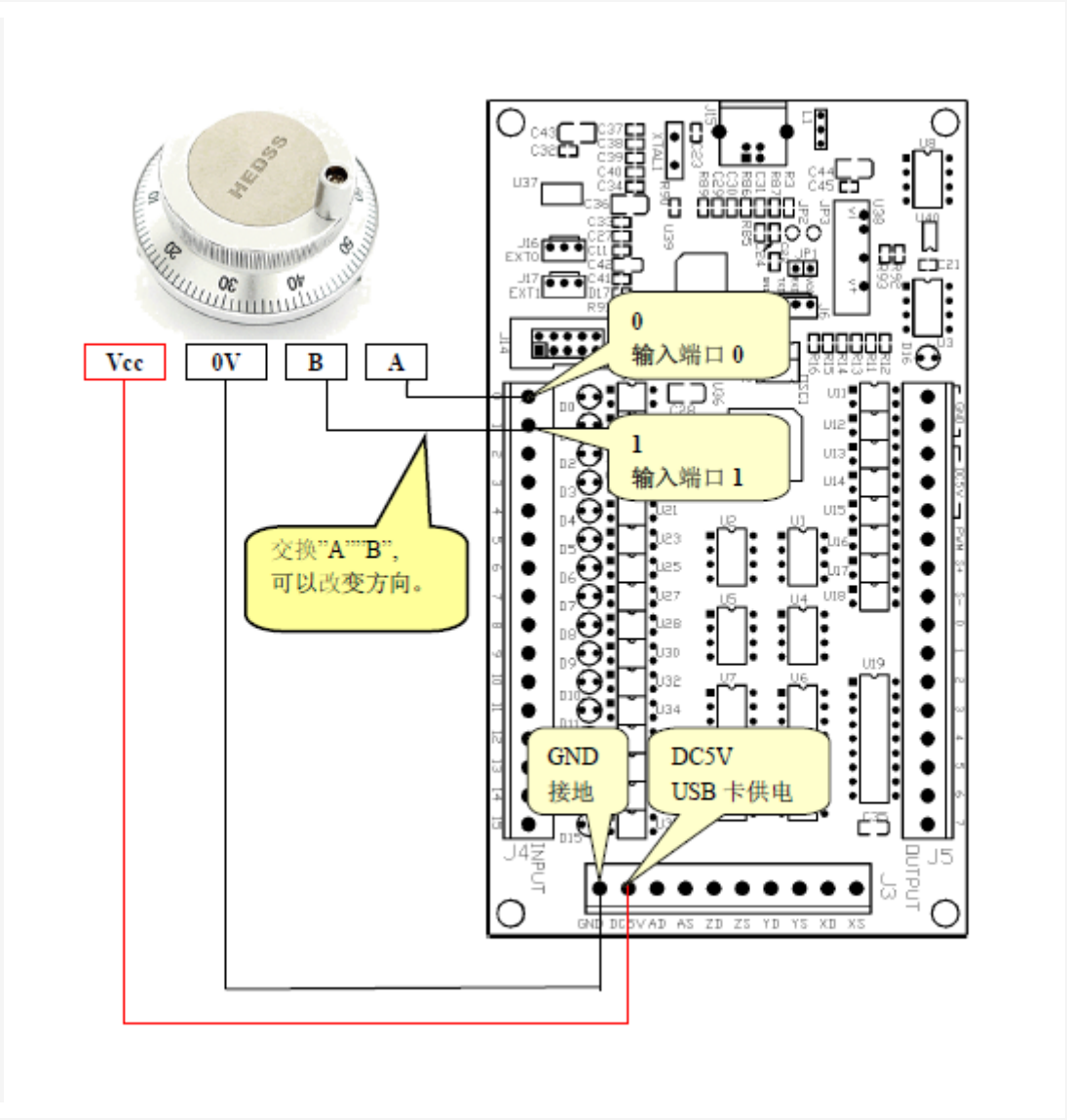


4. Test: Click on "Auto Tool Zero" button to test the action of the knife.

VB code for the knife shows, according to the actual need to change.

X. electronic hand wheel

Internal power supply

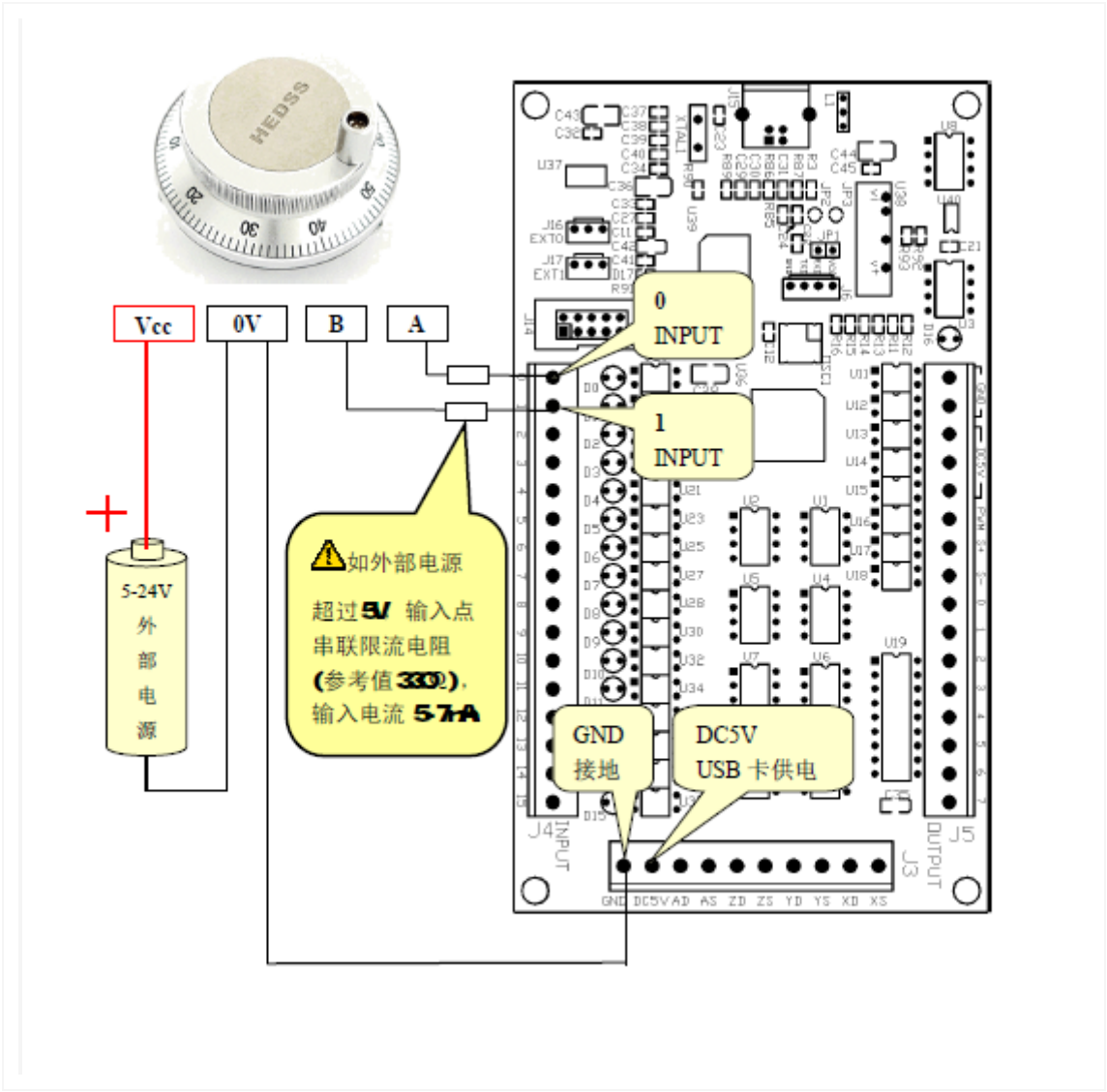


Note:

1. "DC5V" on-board isolated power module output (internal power). Voltage of 5V, the maximum output current of 120mA.

(2) such as electronic hand wheel with 12V/24V, or total current load capacity of the USB card, please use the external power supply.

External power supply



Software Configuration

Mach3 in electronic hand wheel configuration, as shown below: (Config => Ports and Pins)

11. USB motion control card read-ahead buffer setting

Mach3 菜单中 Config=>Config Plugins，进入 PlugIn Control and Activation

Performance based on the PC used to set read-ahead cache. Adjust the buffer time to make run smooth.