USB 运动控制卡(AKZ250 版本)安装手册

Ver1.17

 本卡特点：

- ✧ 支持 Mach3 所有版本，包括目前最新版 Mach3 R3.042.040。
- ✧ 支持所有 Windows 版本，包括目前最新版 Windows7。
- ✧ USB 无需安装驱动，所有 Windows 版本即插即用。
- ✧ 全面支持 USB 热插拔，随时监测 USB 连线状态，Mach3 工作中，USB 电缆拔出再插上，也可正常连线。
- ✧ 支持 4 轴联动，包括点动 4 轴联动。
- ✧ 支持自动对刀，电子手轮，软件限位，软件消回差功能。
- ✧ 48M 速度，无需 PC 介入，信号由运动控制卡独立完成处理，确保您拥有真正地实时性和可靠性。
- ✧ 拥有 200KHz 输出，接伺服/步进。
- ✧ 拥有状态指示灯，可提示 USB 连线，Mach3 连线，运行中，各类状态一目了然。
- ✧ 拥有 16 个输入指示灯，清楚显示信号输入状态。
- ✧ 拥有测速功能，主轴实际转速在 Mach3 界面中实时显示，并且创新提供实时转速的图表显示，主轴的转速变化清晰且生动。
- ✧ 拥有板载隔离电源，无需外接电源，简化电控箱电源要求，方便接线，同时也可使用外部电源，灵活选择。
- ✧ 采用 10Mhz 高速光耦 10 个，通用光耦 24 个，总计光耦达到 34 个，隔离所有输入/输出，高成本设计提供完整抗干扰性能以及完善的安全保护。
- ✧ 提供完备的安装手册，文档清晰，图文并茂，描述详细。
- ✧ 电路板精心布线，唯选优质器件，制作精良。

Mach3 USB Motion Card (AKZ250) Installation Manual

Ver1.17 (Date of document updates:**2012/11/2**)


Features:

- ✧ Fully supporting all Mach3 versions, including the Mach3 R3.042.040 version.
- ✧ Supporting Windows series, including Windows2000/XP/Vista/Windows7.
- ✧ No need to install any USB drivers,it can be used aftr plugging in the computer.
- ✧ Full support for USB hot-swappable, the card is Monitoring USB connection status at any time.
- ✧ Fully suypporting Mach3 software limitation and backlash functions.
- ✧ Maximum step-pulse frequency is 200KHz,which is suitable for the servo or stepping motor.
- ✧ Status indicator LED can be useful to show the USB connection, and working stauts by flashing.
- ✧ 16 general-purpose input, with particular indicators, the input signal states can clearly shows.
- ✧ Feed rate, spindle speed rate, or jog rate can by controlled by the adjustment-knob.
- ✧ With on-board isolated power supply, external power supply is not requested. Simplifying power requirements of electronic control system for easy using. in addition, external power can also be applied for reduce USB load.
- ✧ 10 high-speed optocouplers whth 10MHz, 24 general optocouplers for isolating all of the input/ output signals, this high-cost dsign can be porvided high performance and stable system.
- ✧ With a real-time speed chart and spindle speed changes can be observed

安装手册导览

文档更新记录

运动控制卡配线示意图

外形及安装孔机械尺寸

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3. 运动控制卡的硬件安装
4. USB 运动控制卡的接线表
5. USB 运动控制卡的接线图
6. 外部倍率旋钮
7. 主轴调速模拟量输出
8. 主轴测速功能
9. 自动对刀
10. 电子手轮
11. 预读缓冲设置

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7. Spindle speed PWM output
8. Measure the rotating speed of the spindle
9. Auto tool zero
10. MPG Setup
11. Read-ahead buffer setting

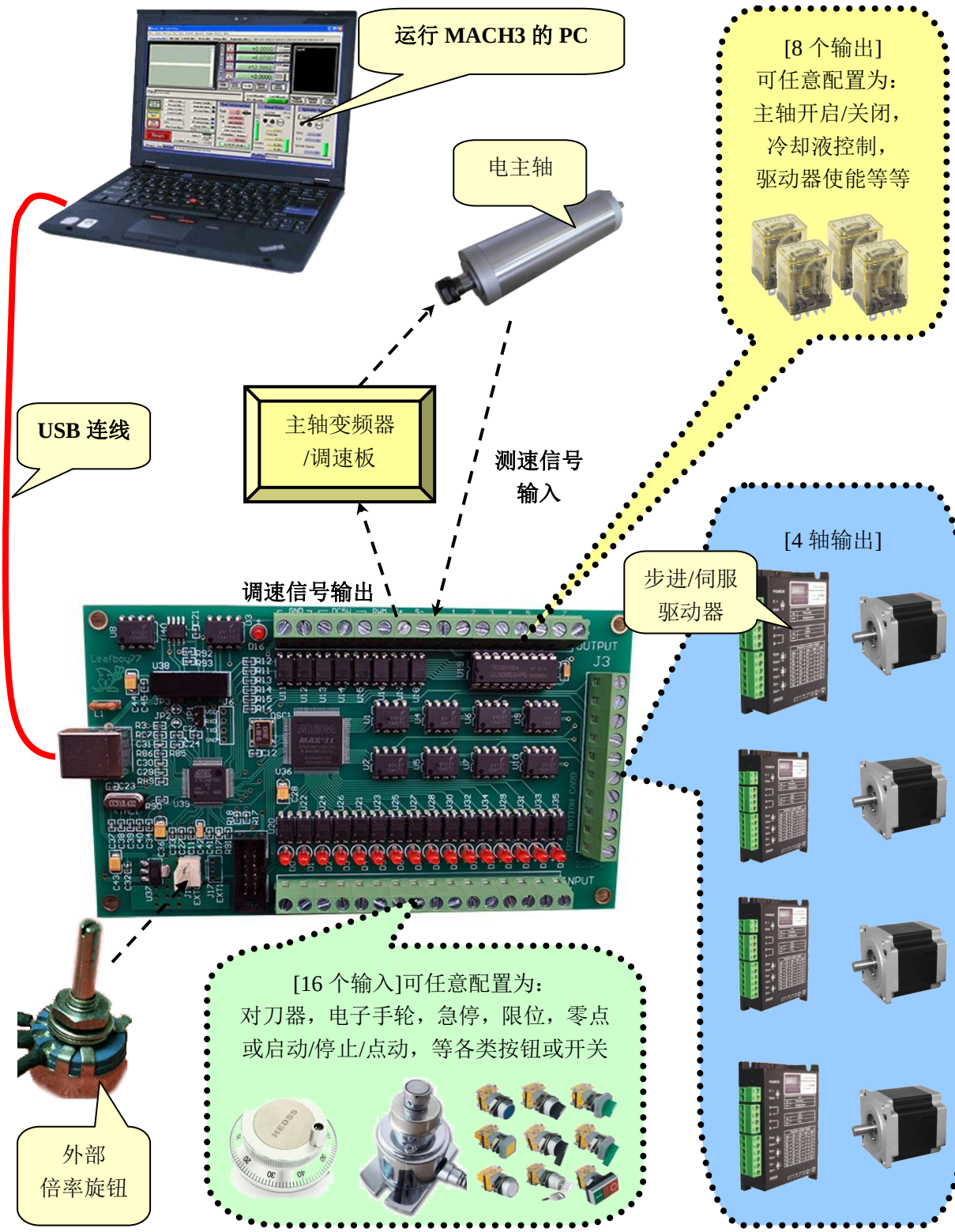
文档更新记录

日期/版本	内容
2010-11-29 Ver1.05	主轴调速：增加变频器接线图，调速信号 PWM 相位配置 Mach3 的软件配置：增加电机运行参数设置 安装准备：增加使用原配 USB 电缆的提示信息 USB 运动控制卡的接线图：增加必须外接续流二极管的提示 Mach3 的软件配置：增加 Mach3 中输入信号配置 Port#为”1” 排版调整：主轴测试等
2011-1-1 Ver1.06	1. 电子手轮 2. 自动对刀
2011-3-2 Ver1.07	增加自动对刀的软件配置
2011-3-30 Ver1.08	1. 增加主轴继电器配置 2. 增加输入传感器，PNP，NPN，接线和配置
2011-4-18 Ver1.09	1. 输入接线表增加手轮描述 2. 更新控制卡图片(光耦)
2011-12-27 Ver1.10	1. 修正自动对刀章节文字输入错误 2. 增加主轴变频器,正/反转控制接线 3. 增加单线对刀器接线图
2011-12-28 Ver1.11	修改单线对刀器接线图
2011-12-28 V1.12	修正输出接线表 J5（表格增加一个 DC5V 端子）
2012-4-27 V1.15	修正 PWM 频率 KHz => Hz
2012-4-29 V1.16	修改 PWM 实例图片
2012-11-2 V1.17	1. 更改单线对刀器接线图及配置 2. 删除电子手轮内部供电接线图 3. 主轴变频器，增加 ACM、DCM 端子标示 4. 增加说明：隔离电源模块功率有限，不能给传感器供电

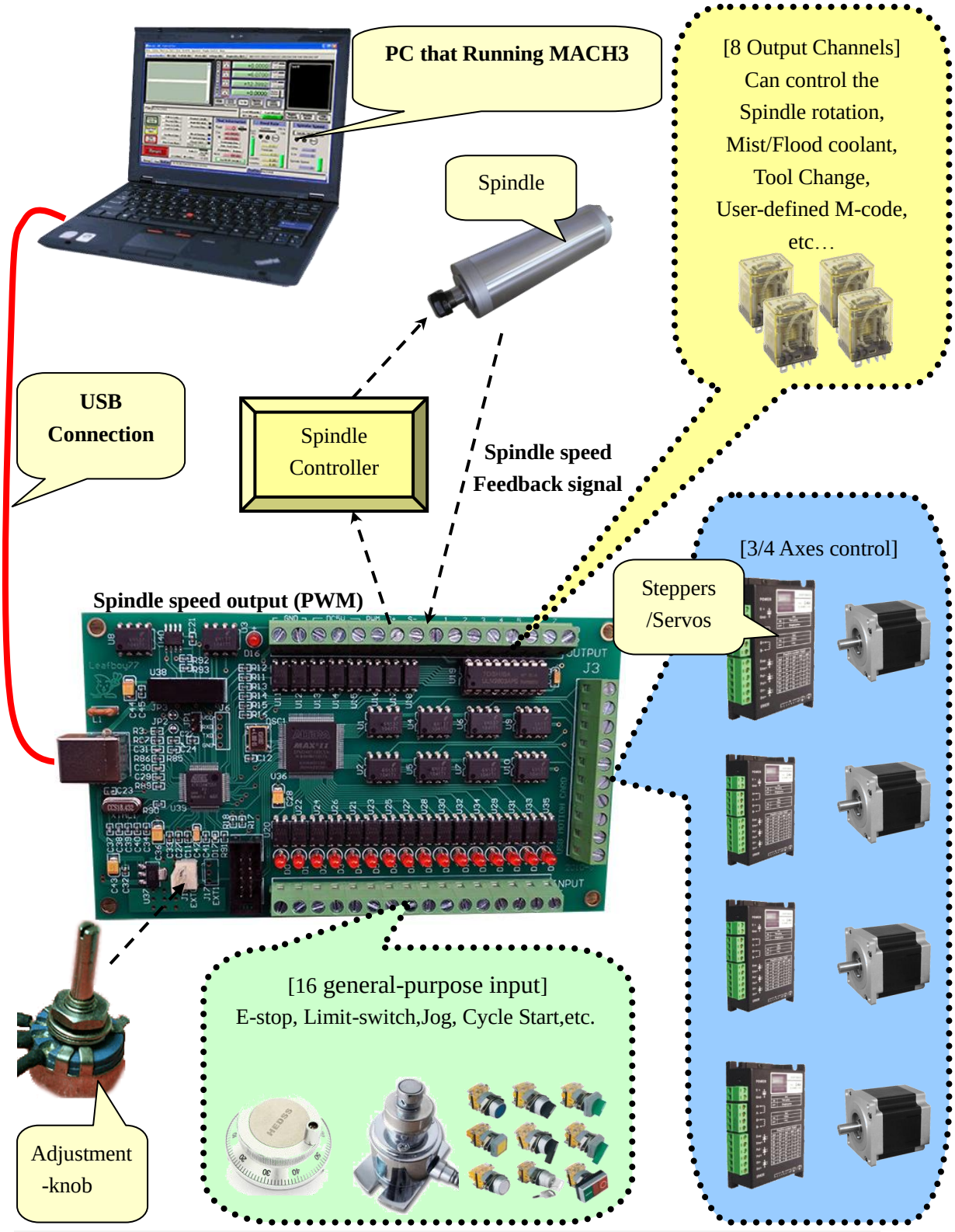
Revisions List

Date/ver	Info
2012-4-27 V1.15	Fix: PWM Freq KHz => Hz

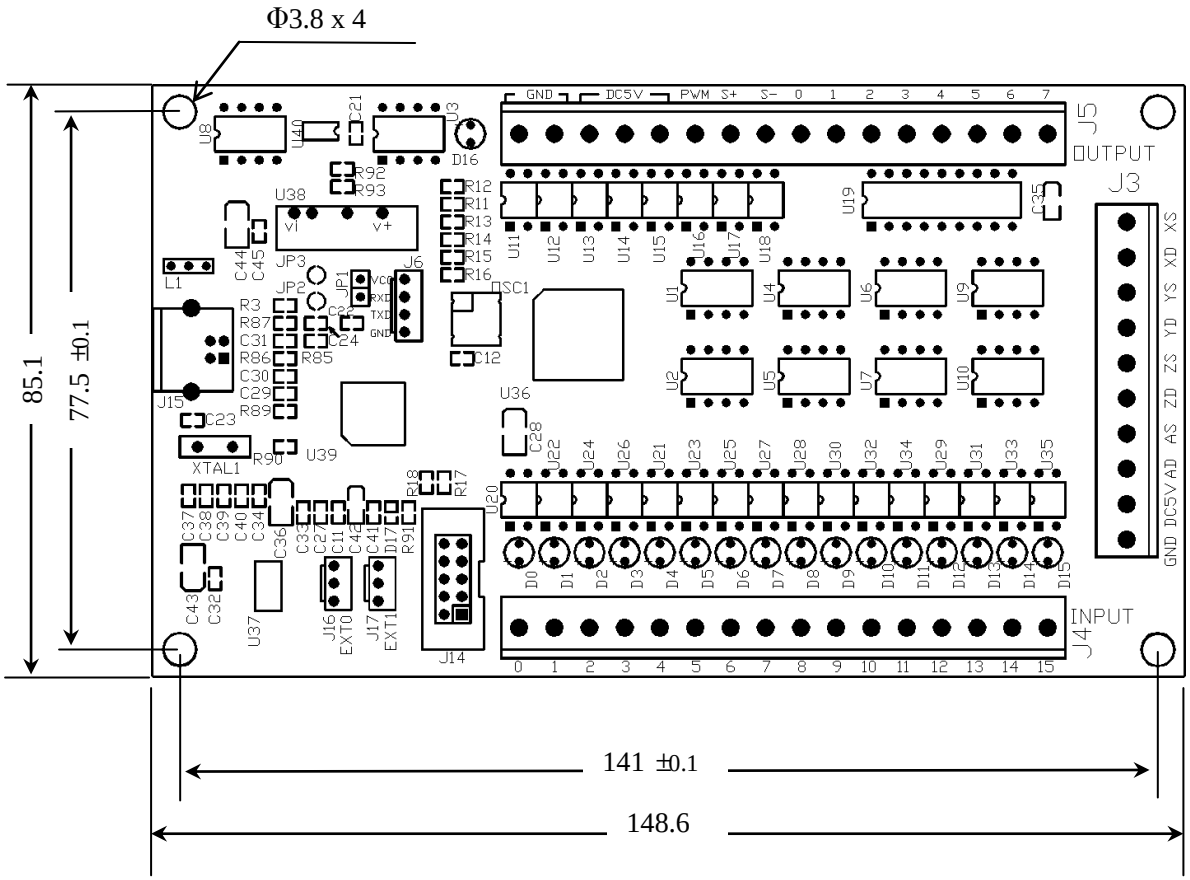
运动控制卡配线示意图


运行 MACH3 的 PC
电主轴
[8 个输出]
可任意配置为：
主轴开启/关闭，
冷却液控制，
驱动器使能等等
USB 连线
主轴变频器
/调速板
测速信号
输入
调速信号输出
[4 轴输出]
步进/伺服
驱动器
[16 个输入]可任意配置为：
对刀器，电子手轮，急停，限位，零点
或启动/停止/点动，等各类按钮或开关
外部
倍率旋钮

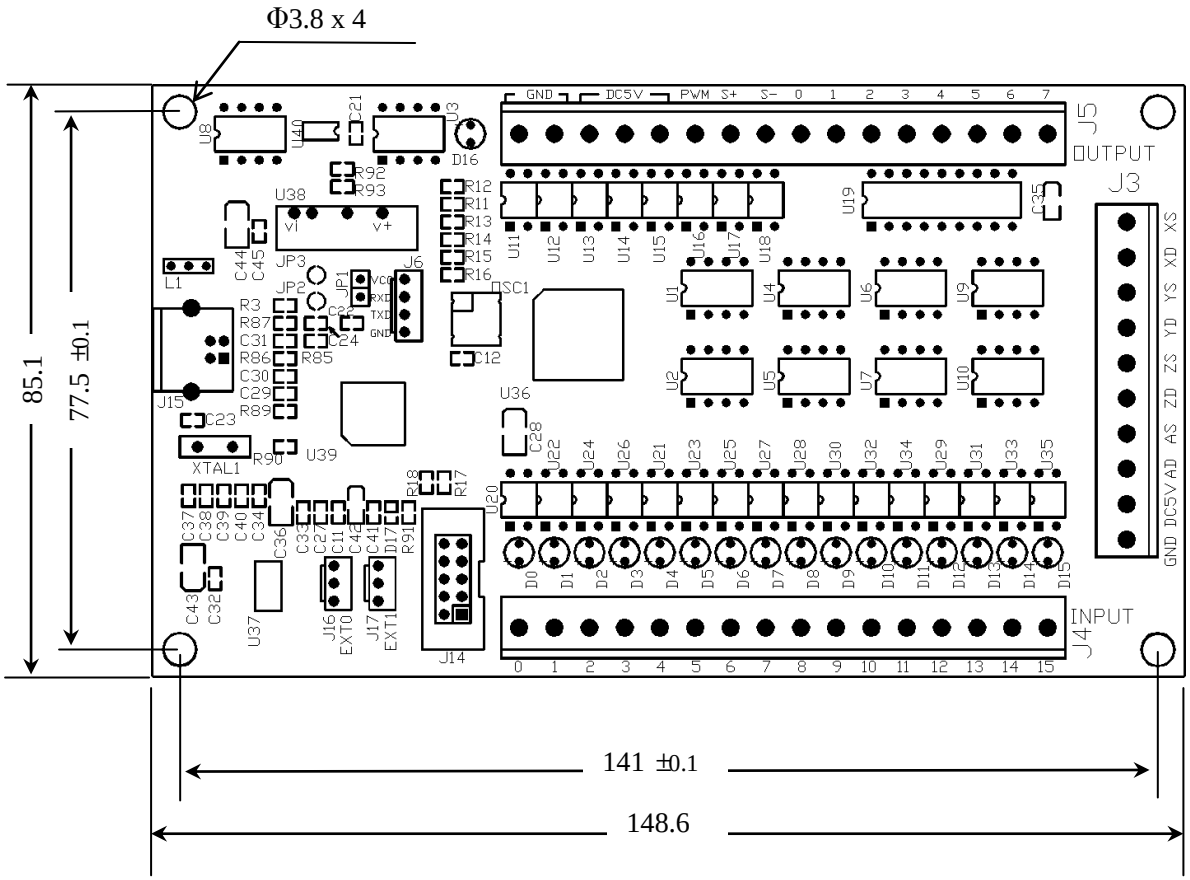
Basic connection diagram (an Overview)



外形及安装孔机械尺寸


Φ3.8 x 4
85.1
77.5 ±0.1
141 ±0.1
148.6
J5
OUTPUT
J3
J4
INPUT
J15
J14
XTAL1
U36
U39
U37
U38
JP1
JP2
JP3
J6
J16
EXT0
J17
EXT1
SC1
GND
DC5V
PWM
S+
S-
XS
XD
YS
YD
ZS
ZD
AS
AD
DC5V
GND

Mechanical dimensions diagram



1. 安装准备

1.1 Mach3 软件准备

本卡是一款 Mach3 USB 接口的 3/4 轴外部运动控制卡。

最新版 Mach3 官方网站下载地址：http://www.machsupport.com/downloads.php

进入官方网站后，点击 Mach3 下载：如下图中红圈所示

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

1. Prepare

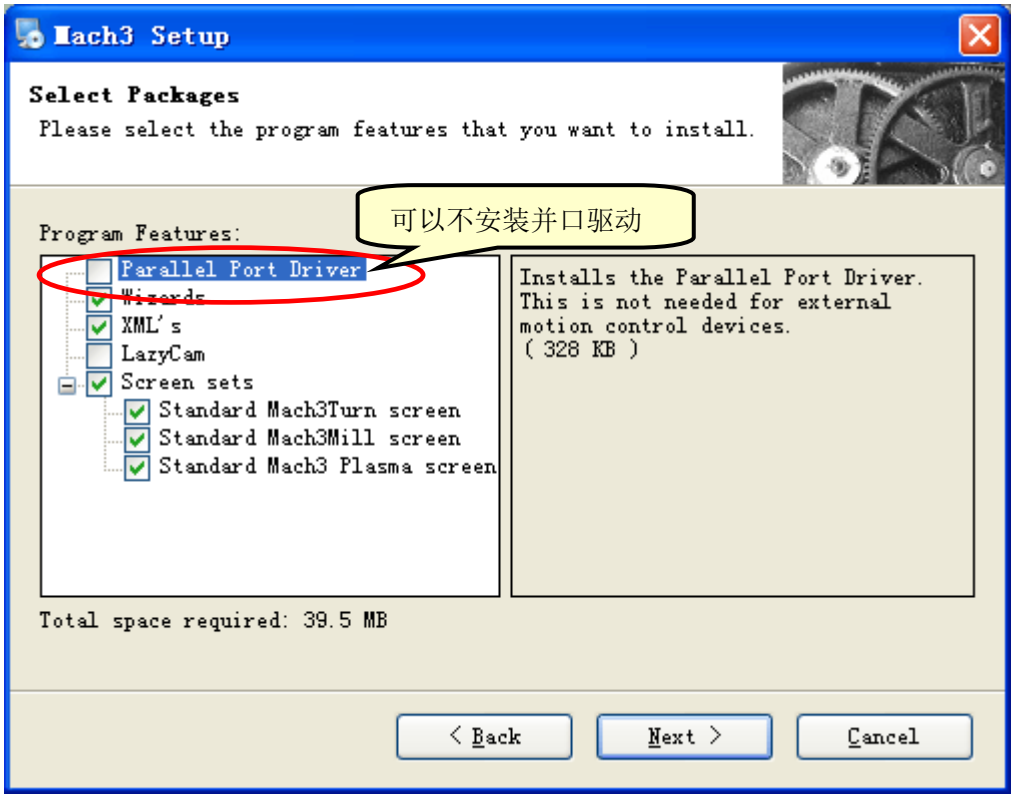
1.1 Prepare Mach3 software

This card is a Mach3 USB interface 3/4 axes external motion card。

The latest version of Mach3 official website:
http://www.machsupport.com/downloads.php

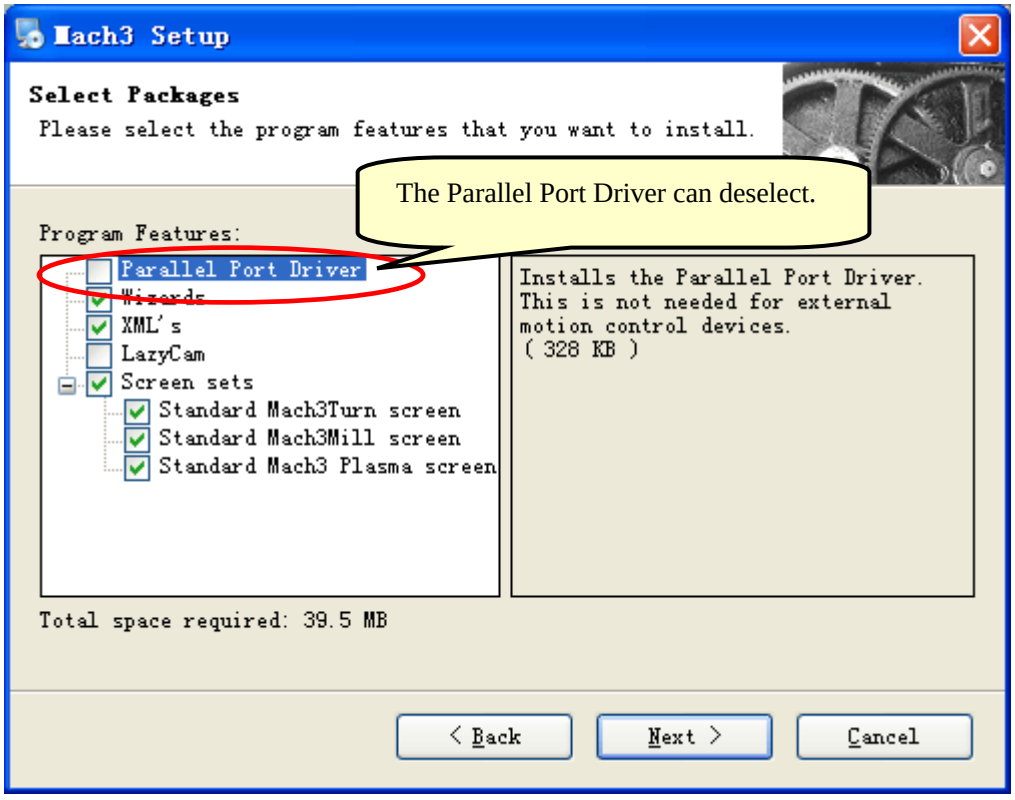
Mach3 download: as shown below:

安装 Mach3 时，可以不安装并口驱动。



Installation the Mach3:

The Parallel Port Driver does not require.



1.2 USB 电缆的准备

请将磁环，分别安装在 USB 线的两端

注意：

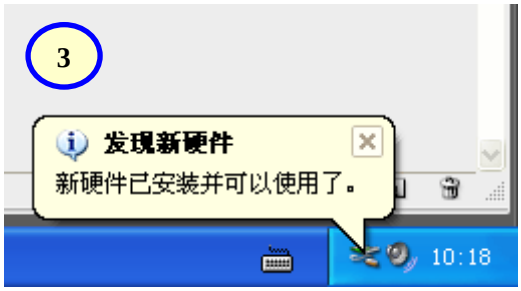
请使用本产品所配 USB 电缆。

如自行选配，请确保使用质量合格的电缆。

1.3 运动控制卡的软件安装

本卡不需要安装 USB 驱动程序，Windows2000/Xp/Vista/Windows7 即插即识别。

1.3.1 收到卡后，先使用 USB 线与 PC 连接。



当运动控制卡上的状态指示灯亮起，表示 USB 已经连接成功。

1.2 USB cable Prepare

Magnet ring installed in the USB cable at both ends

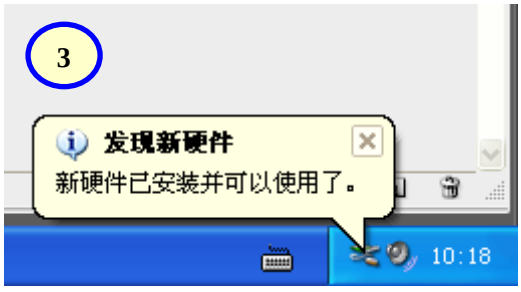
Attention

Use of acceptable quality USB cable

1.3 Installation the software of the USB motion card

This USB motion card does not need install any USB driver，Windows2000/Xp/Vista/Windows7 can directly identify.

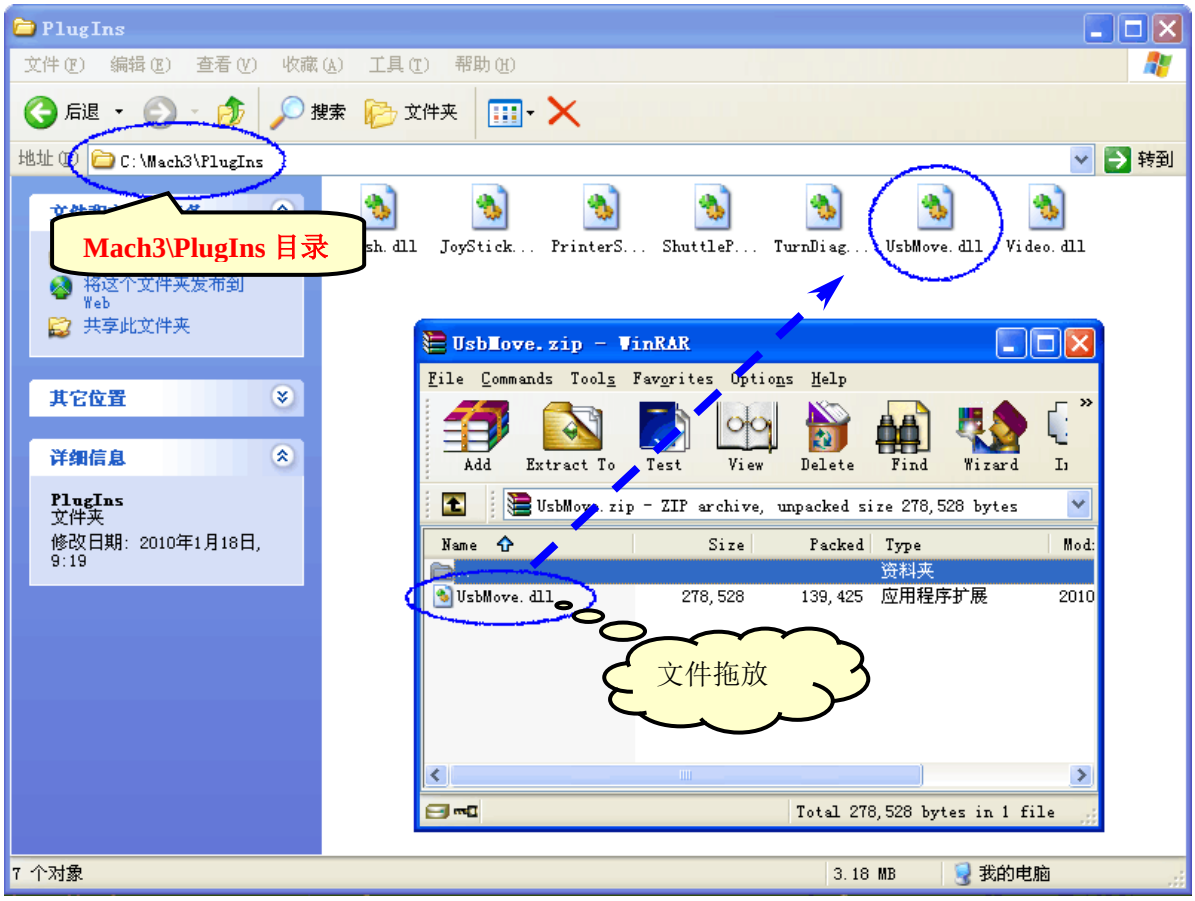
1.3.1 Connecting the USB cable to the PC and the motion card.



When the status indicator (LED) lights on the card, USB connection is successful.

1.3.2 将所附软件 **usbmove.dll** (usbmove.zip 解压缩)，放置于 **Mach3\PlugIns** 目录（文件夹）。例如您的 Mach3 软件安装在 C:\Mach3，则将 usbmove.dll 放置于 C:\Mach3\PlugIns.

附注：插件 usbmove.zip，请到以下链接下载最新版本：http://leafboy77.com/

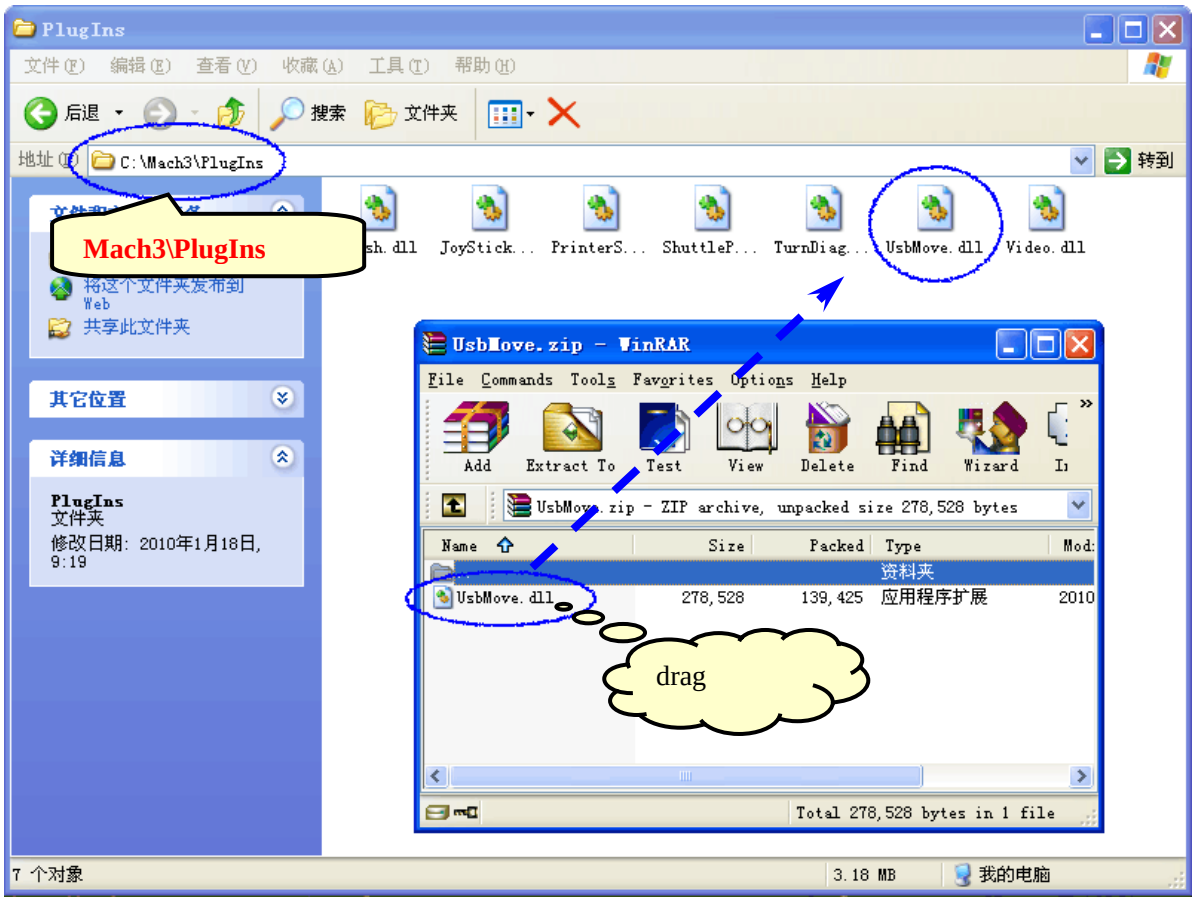


1.3.3 启动 Mach3 软件，您会看到运动控制卡的选择对话框，请选择“Mach3-USB-Motion-Card”，还可以选择”Don't ask me this again”以后不再提示。

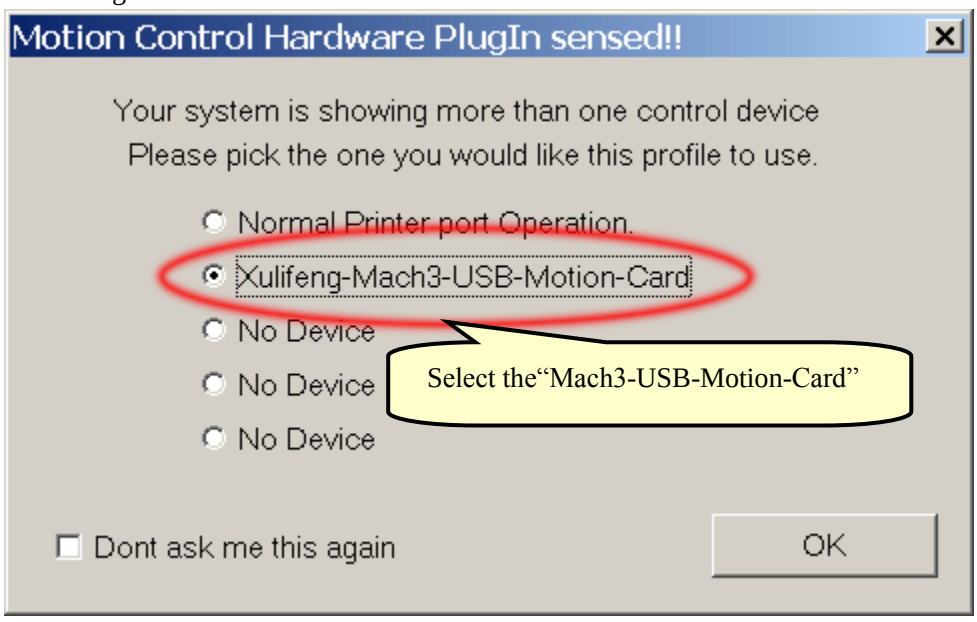
当卡上指示等闪烁,表示 MACH3 与 USB 卡已经连线完成。

1.3.2 Installing the motion card plug-in. Unzip the usbmove.zip, copy or drag usbmove.dll into your Mach3\PlugIns folder.

Note: Download the latest version of plug-in(usbmove.zip) in http://leafboy77.com/



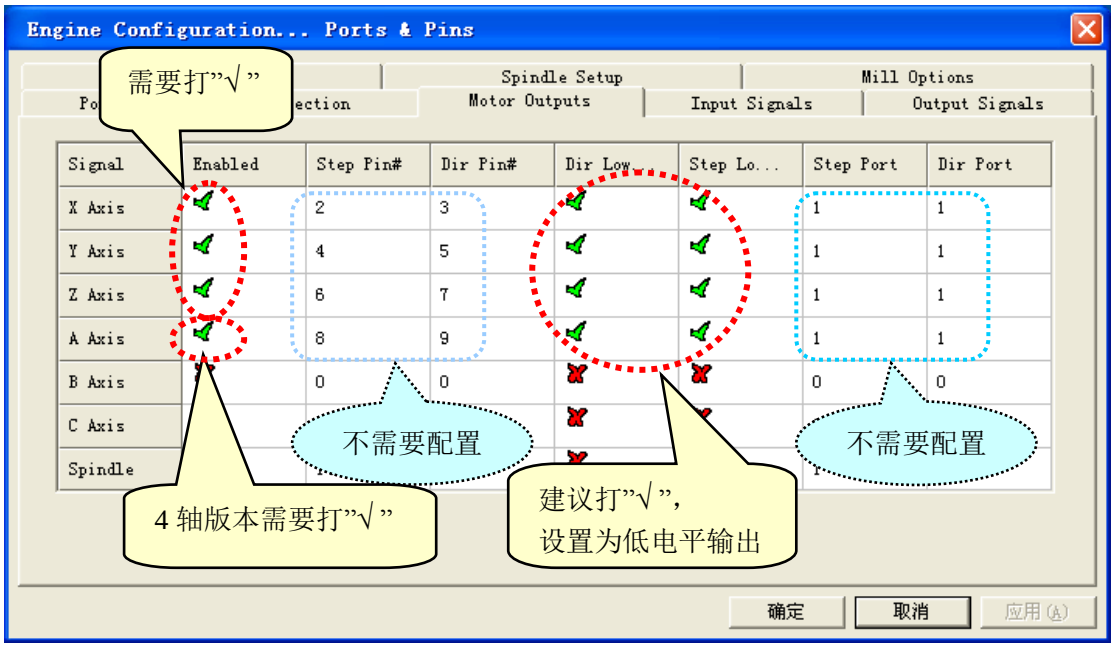
1.3.3 Start the Mach3 software, a dialogueof “Motion Control Hardware PlugIn sensed!!”is shown. Please select the “Mach3-USB-Motion-Card”，you can also check”Don't ask me this again”.



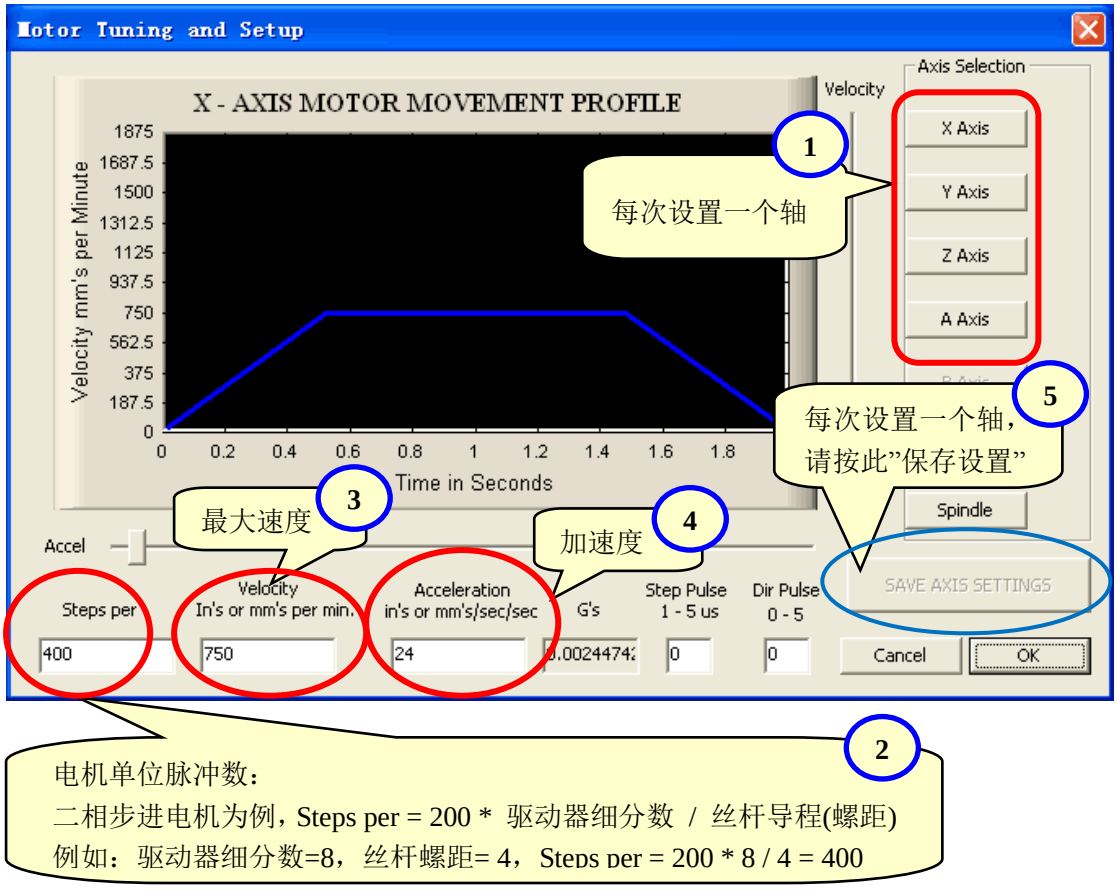
When the Mach3 is connecting with the card, the Status indicator (LED on the card) is flashing.

2 Mach3 的软件配置

2.1 Mach3 中 X、Y、Z、A 轴配置，如下图所示：(Config => Ports and Pins)

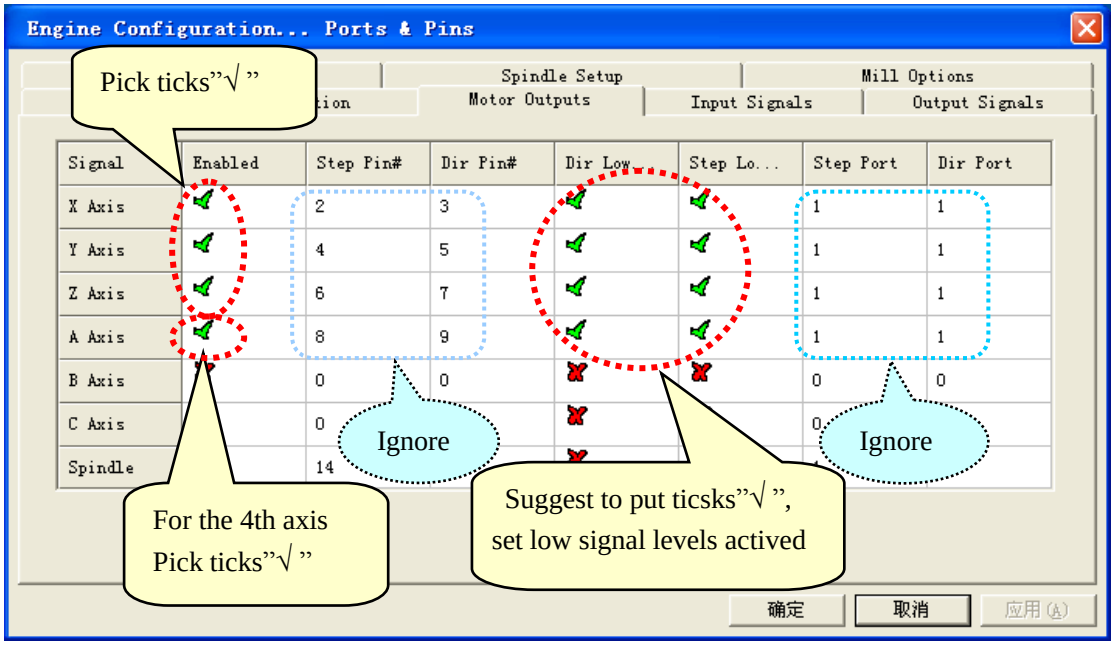


2.2 电机运行参数设置，如下图所示：(Config => Motor Tuning)

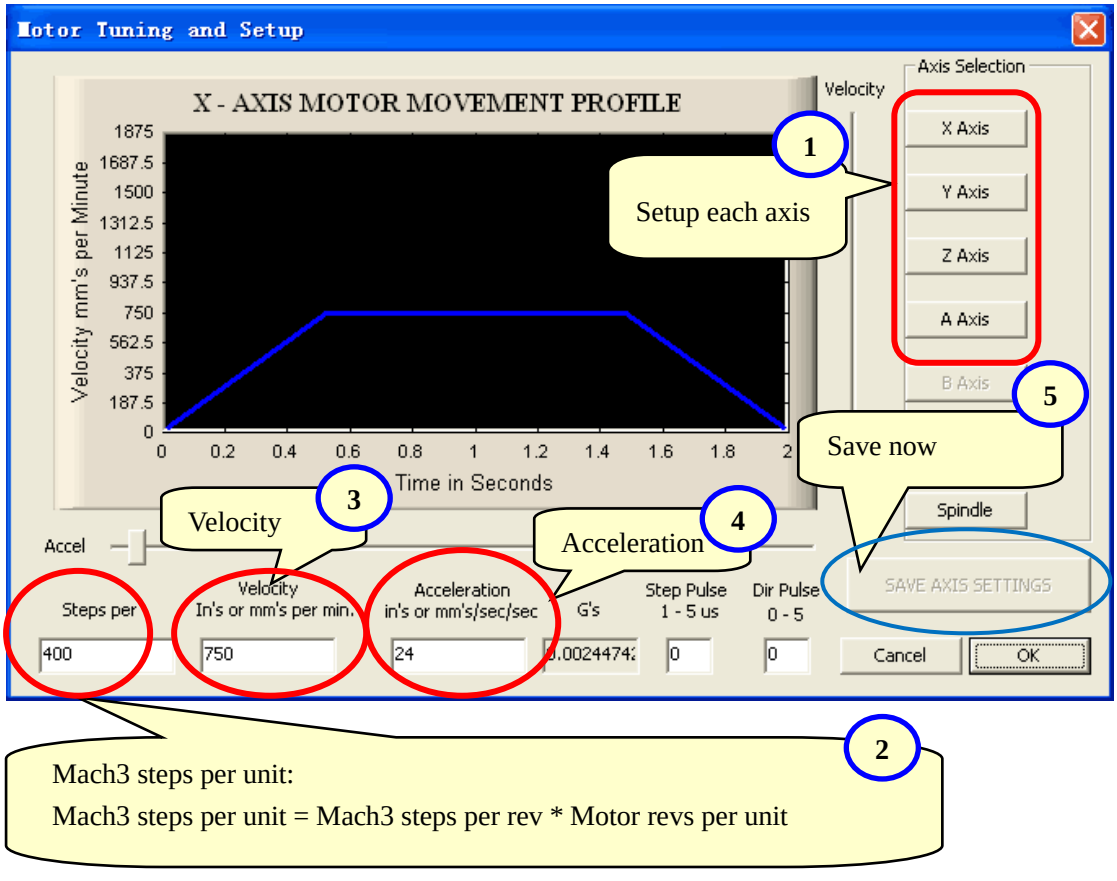


2. Setup for Mach3

2.1 Mach3 X、Y、Z、A Axis config as shown below: (Config => Ports and Pins)

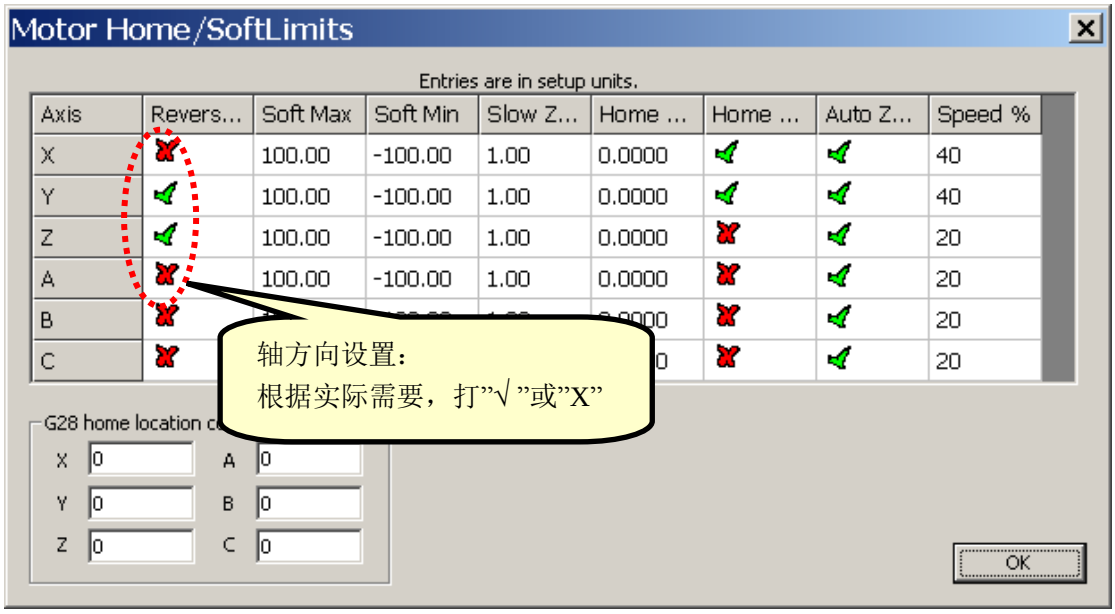


2.2 Motor tuning setup as shown below: (Config => Motor Tuning)



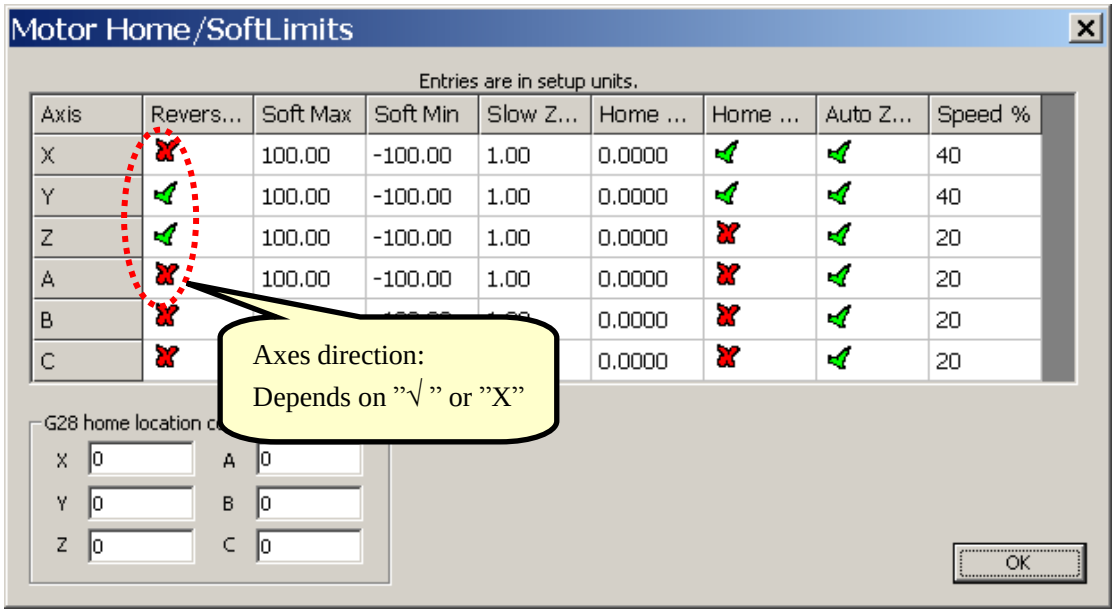
2.3 轴的**运行方向**，建议在下图所示界面中配置：

Mach3 主菜单=〉Config =〉Homing/Limits

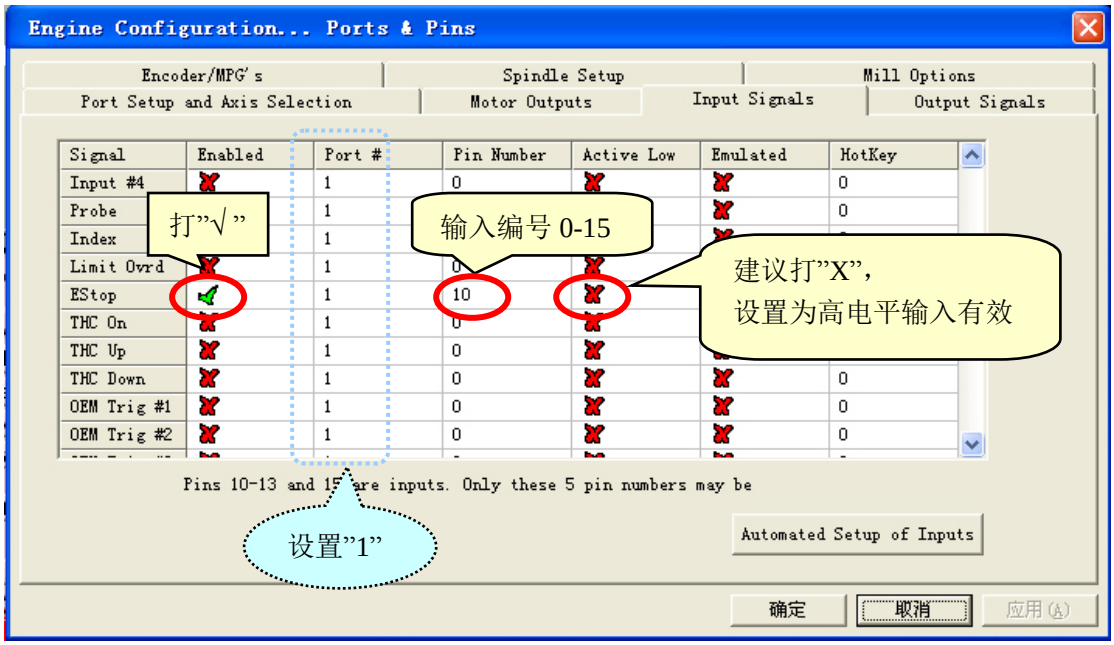


2.3 The Mach3 Menu => Config => Homing/Limits dialog

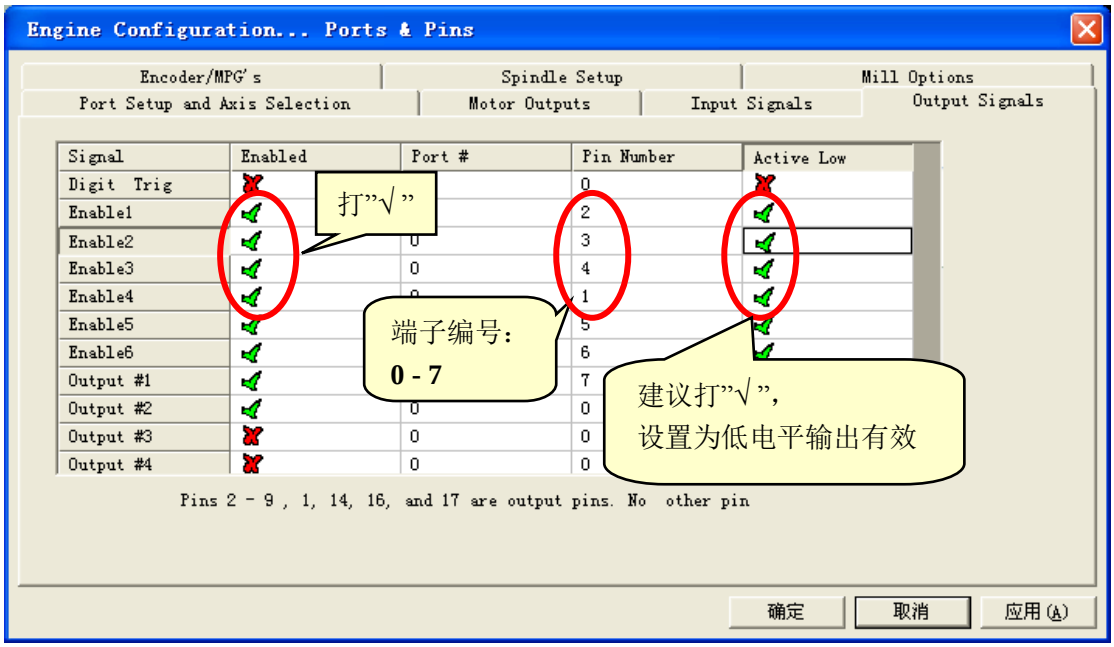
Axes direction, depends on the “Reversed”.



2.4 Mach3 中输入信号的配置。本运动控制卡的输入信号编号从 0 到 15 总共 16 个，在卡的输 J4 接口上。建议所有输入点在 Mach3 中配置为高电平有效（打”X”）。



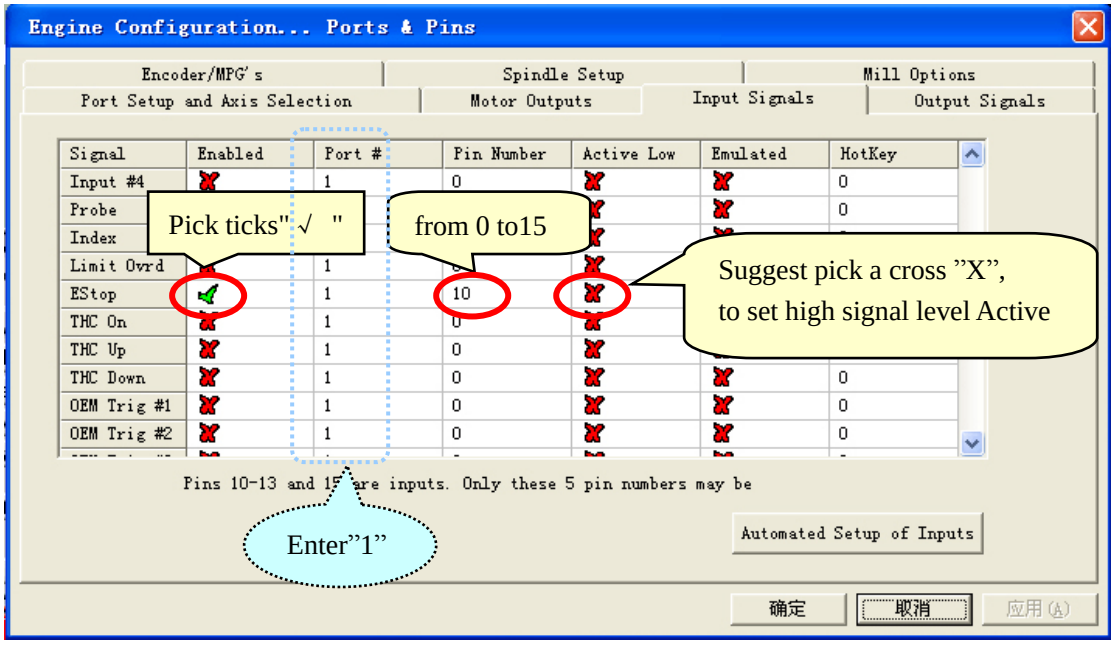
2.5 Mach3 中输出信号的配置。本运动控制卡的输出信号编号总共 8 个，在卡的 J5 接口上。建议所有输出点在 Mach3 中设置为低电平有效（打”√”）。



2.4 Setup the input singles.

There are 16 general-purpose input channels. The channels number is from 0 to 15(at J4).

Suggest Active Low =”X” (Set High signal Level for Inputs)

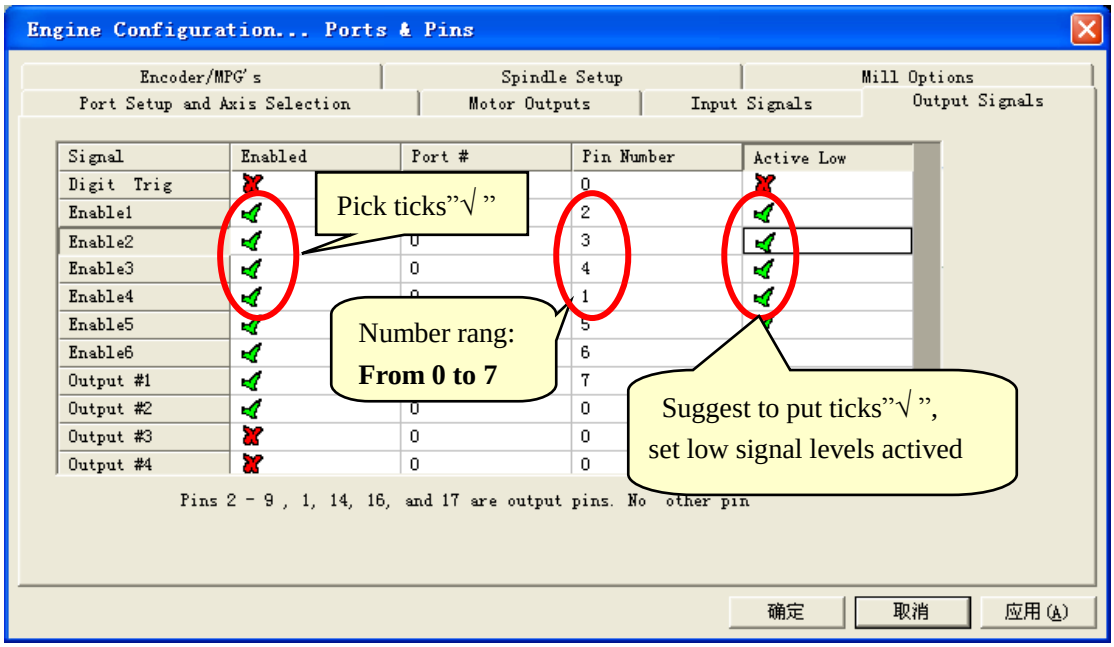


2.5 Setup the Output signals.

There are 8 general-purpose (open-drain) output channels,

The channels number is from 0 to 7 (at J5).

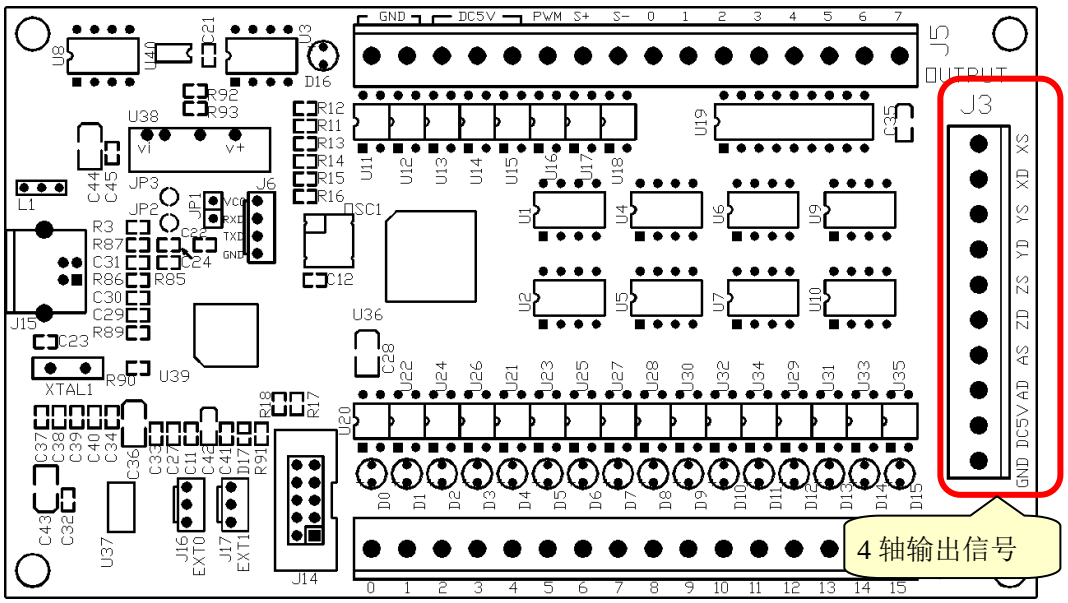
Suggest Active Low =” √” (Set Low signal Level for outputs)



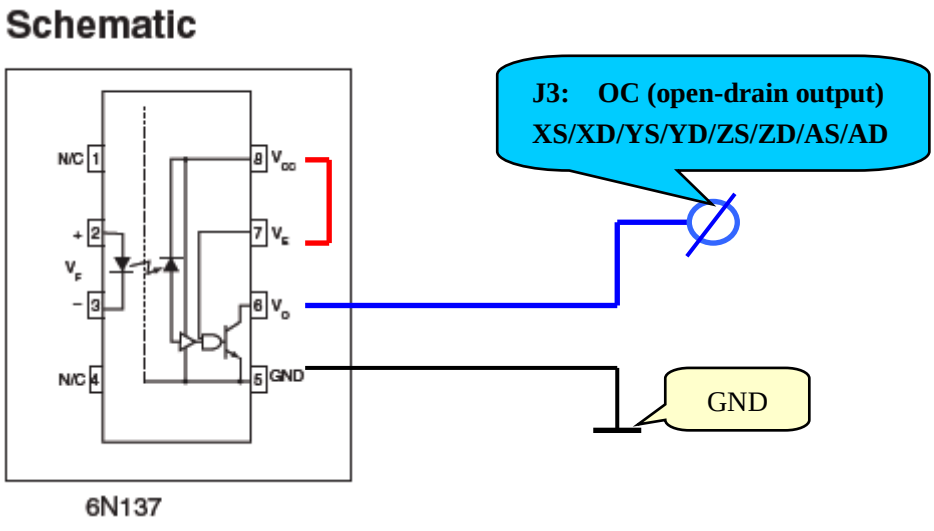
3. 运动控制卡的硬件安装

本卡采用 USB 供电，已安装有隔离电源模块，不需要外接电源。
所有输出，包括 4 轴脉冲/方向输出/8 个控制输出/主轴调速输出， USB 连接后默认输出高阻。在 Mach3 启动后，电平由 Mach3 控制，建议所有输出信号在 Mach3 中设置为低电平有效。

3.1 4 轴输出信号，在控制卡 **J3** 接线，参见 J3 **接线表**。



接口原理图



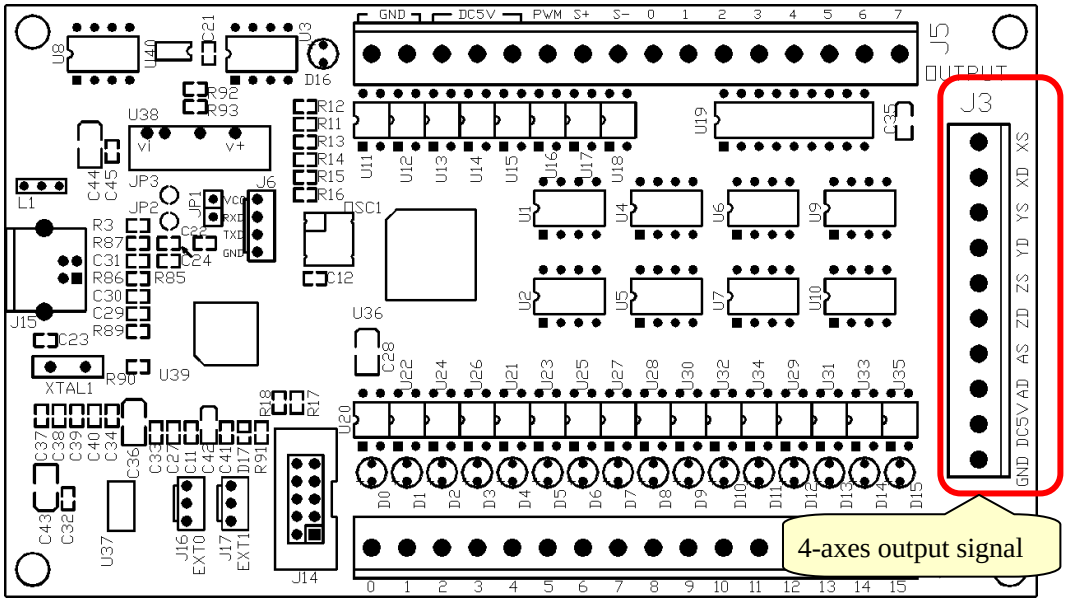
3. Setup motion card Hardware

The board is used USB power source, with isolated power source module, external power supply is not requested.

All outputs, including 4 axes pulse/DIR/8 output controls/Spindle-speed PWM output, are set to be high-impedancestate (Hi-Z) when USB is connected. When running Mach3, Level is controlled by Mach3.

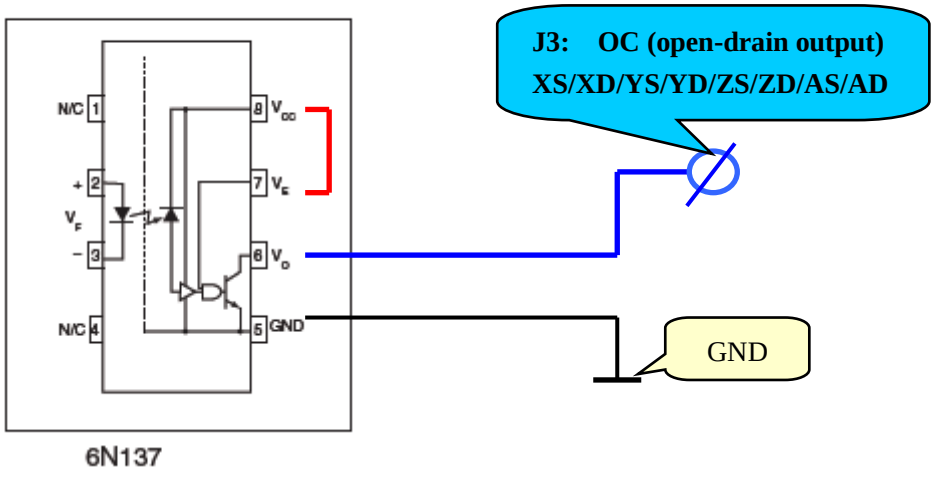
Suggest: All output signals in Mach3 can be set to be Active Low.

3.1 4 axis output signals, please refer to J3signals indicating.

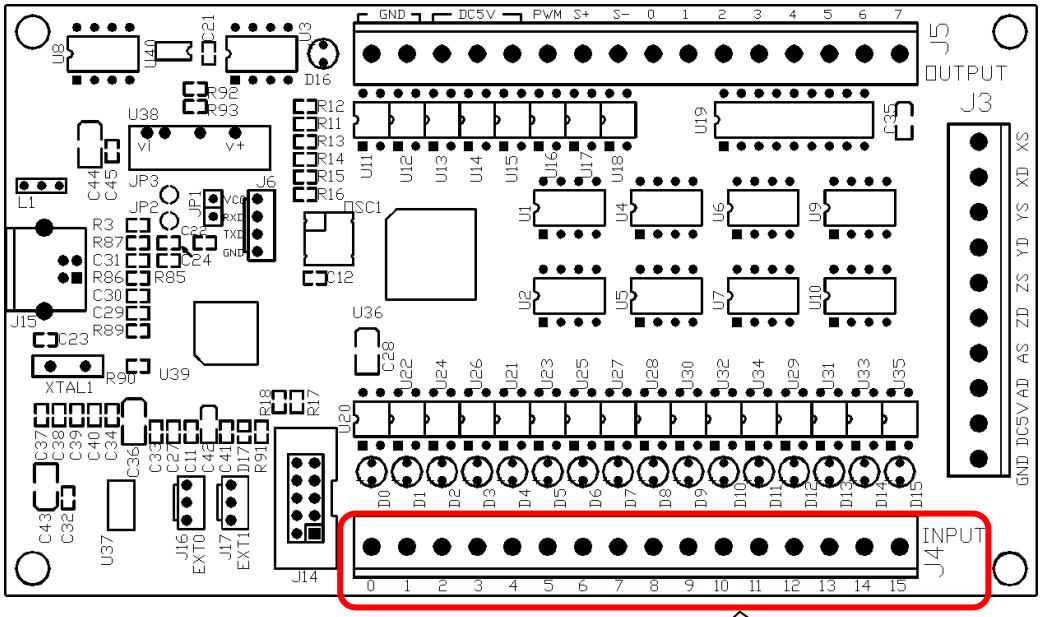


4-axes and Spindle PWM outputs

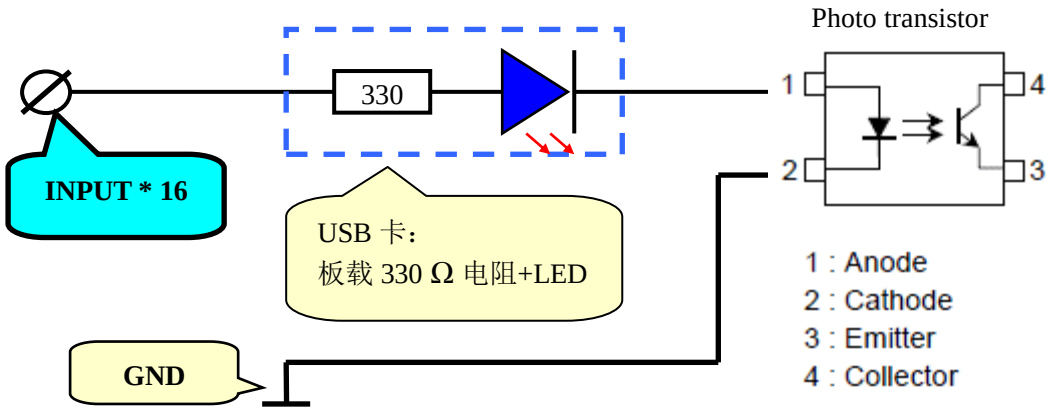
Schematic



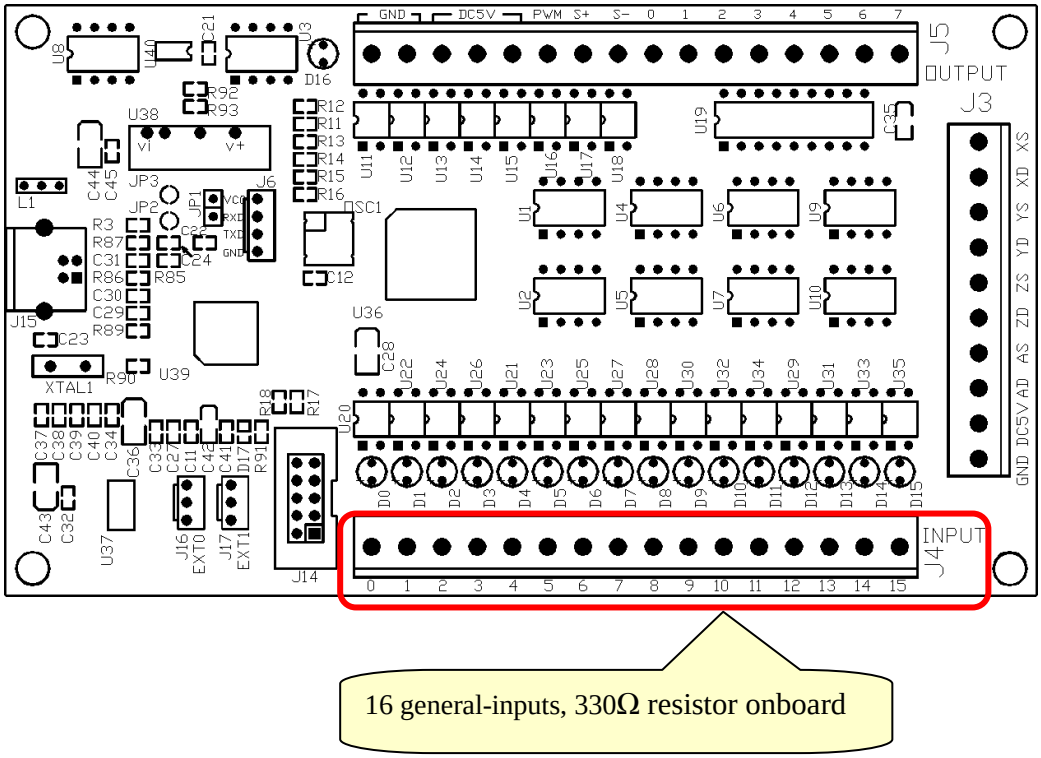
3.2 16 个输入点，输入电压 5V(此时输入电流 7mA)。在控制卡的 J4 插口上接线。



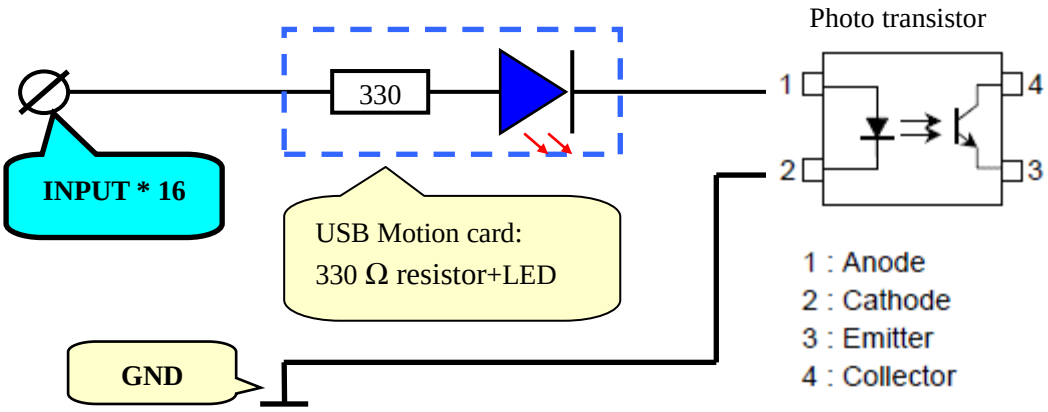
接口原理图



3.2 16 general-inputs, input valtage 5V(current:7mA). Wired on J4.

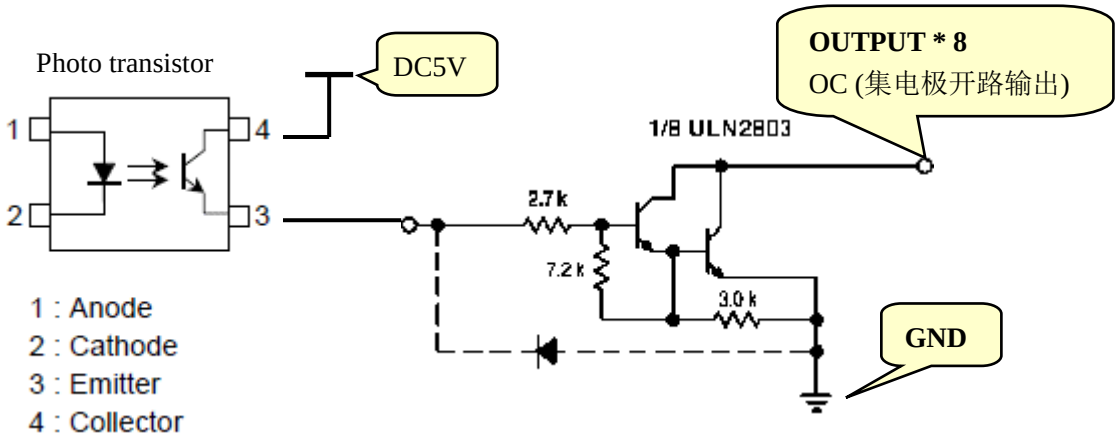


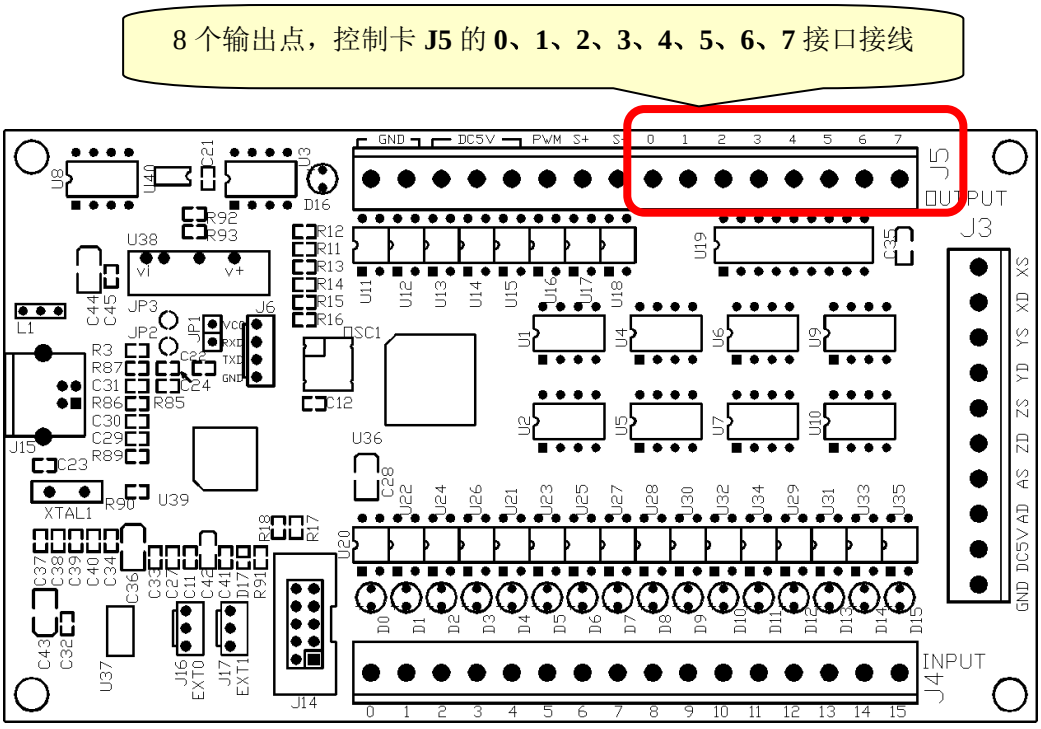
16-general-inputs Schematic



3.3 8 个输出点，**J5** 的 **0、1、2、3、4、5、6、7** 接口接线。

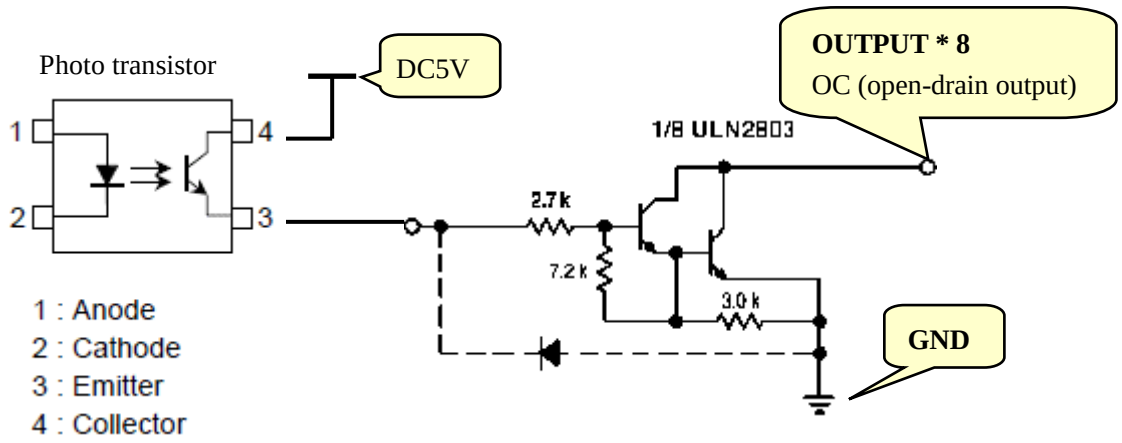
最大控制电压 24V，输出低电平时最大驱动电流 500mA，否则输出高阻。

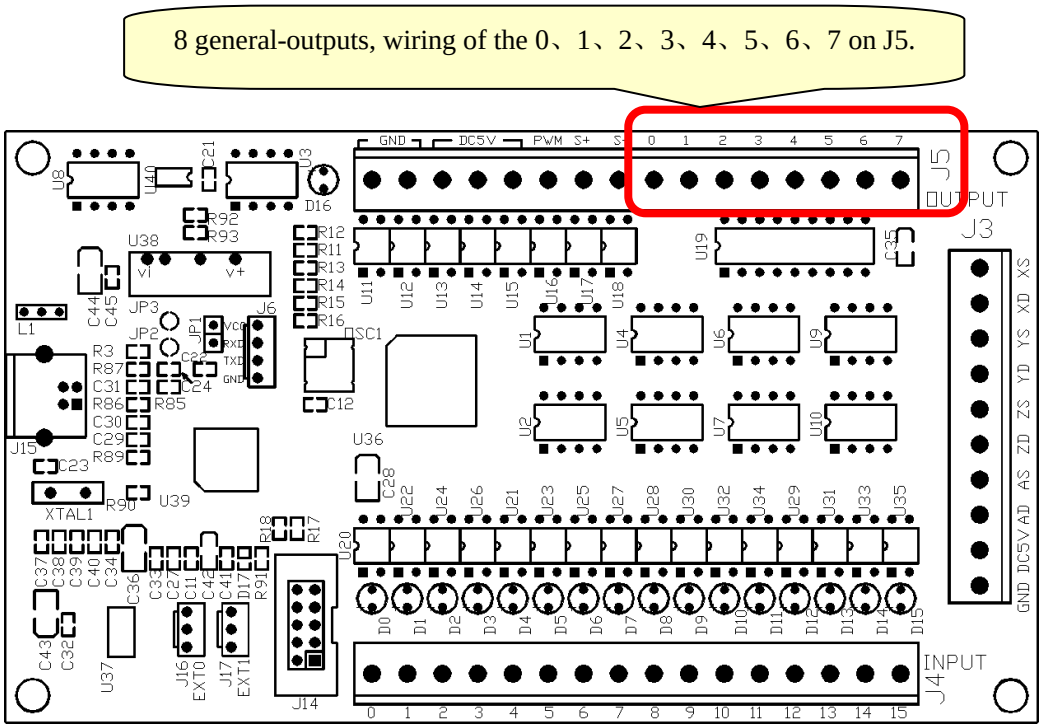




3.3 8 general-outputs, wiring of the **0、1、2、3、4、5、6、7 on J5.**

Maximum Load voltage=24V / current=500mA, When output Low (turn on), otherwise the output is high-impedancestate (Hi-Z).





4 USB 运动控制卡的接线表

4.1 驱动器接线表

J3

GND	DC5V	AD	AS	ZD	ZS	YD	YS	XD	XS

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
DC5V	输出 5V	最大:120mA	隔离电源模块输出
AD	A 轴方向输出(Adir)	OC，12V/13mA	接 A 驱动器
AS	A 轴脉冲输出(Astep)	OC，12V/13mA	接 A 驱动器
ZD	Z 轴方向输出(Zdir)	OC，12V/13mA	接 Z 驱动器
ZS	Z 轴脉冲输出(Zstep)	OC，12V/13mA	接 Z 驱动器
YD	Y 轴方向输出(Ydir)	OC，12V/13mA	接 Y 驱动器
YS	Y 轴脉冲输出(Ystep)	OC，12V/13mA	接 Y 驱动器
XD	X 轴方向输出(Xdir)	OC，12V/13mA	接 X 驱动器
XS	X 轴脉冲输出(Xstep)	OC，12V/13mA	接 X 驱动器

4.2 输入接线表

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 Description
0	通用输入/ MPG 手轮输入	5V 最大：7mA	可作为通用输入，或者作为手轮输入/ “0”,”1”,支持手轮输入”A”,”B”相位信号
1			
2	通用输入		在 MACH3 菜单 “Config”=>”Ports and Pins” =>“Input Signals”中 配置功能
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

4 Motion card connection Table

4.1 4-axes

J3

GND	DC5V	AD	AS	ZD	ZS	YD	YS	XD	XS

Pin Name	Function	Electrical	Description
GND	GND	GND	Signal Ground
DC5V	5V DC Output	Max=120mA	On-board isolated power module output
AD	A Direction	OC，12V/13mA	A axis Direction Signal
AS	A Stepping	OC，12V/13mA	A axis Stepping (Pulse) Signal
ZD	Z Direction	OC，12V/13mA	Z axis Direction Signal
ZS	Z Stepping	OC，12V/13mA	Z axis Stepping (Pulse) Signal
YD	Y Direction	OC，12V/13mA	Y axis Direction Signal
YS	Y Stepping	OC，12V/13mA	Y axis Stepping (Pulse) Signal
XD	X Direction	OC，12V/13mA	X axis Direction Signal
XS	X Stepping	OC，12V/13mA	X axis Stepping (Pulse) Signal

4.2 16-Inputs

J4

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

Pin number	Function	Electrical	Description
0	General-purpose Input / MPG Input	5V Max:7mA	general-purpose “0”,”1” Input / or Manual Pulse Generator (AB) Input
1			
2	General-purpose Input		Functions are set by Mach3 “Config”=>”Ports and Pins” =>“Input Signals”
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

4.3 输出接线表

J5

GND	GND	DC5V	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 out:5V	最大 max: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(Positive input)
S-	主轴测速输入信号-	6mA	LED 负极(Negative input)
0	通用输出 8 general-purpose (open-drain) output channels	OC (open-drain), 最大 24V /500mA	在 MACH3 菜单 “Config”=>”Ports and Pins” =>“Output Signals”中 配置功能
1			
2			
3			
4			
5			
6			
7			

注意：

1. “DC5V”为板载隔离电源模块输出（内部电源）。电压 5V，**最大输出电流 120mA**。
2. ”OC ”表示：集电极开路（漏极开路）输出。

4.4 Output

J5

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

Pin Name	Function	Electrical	Description
GND	GND	GND	Signal Ground
GND			
DC5V	5V DC output	Max=120mA	On-board isolated power module output
DC5V			
DC5V			
PWM	Pulse-Width Modulation	OC，12V/13mA	Spindle speed Control (Output)
S+	LED Positive input	6mA	Spindle speed Measure (Input)
S-	LED Negative input		
0	8 general-purpose (open-drain) output channels	Max=24V /500mA OC (open-drain)	Functions are set by Mach3 ”Config”=>”Ports and Pins” => “Output Signals”
1			
2			
3			
4			
5			
6			
7			

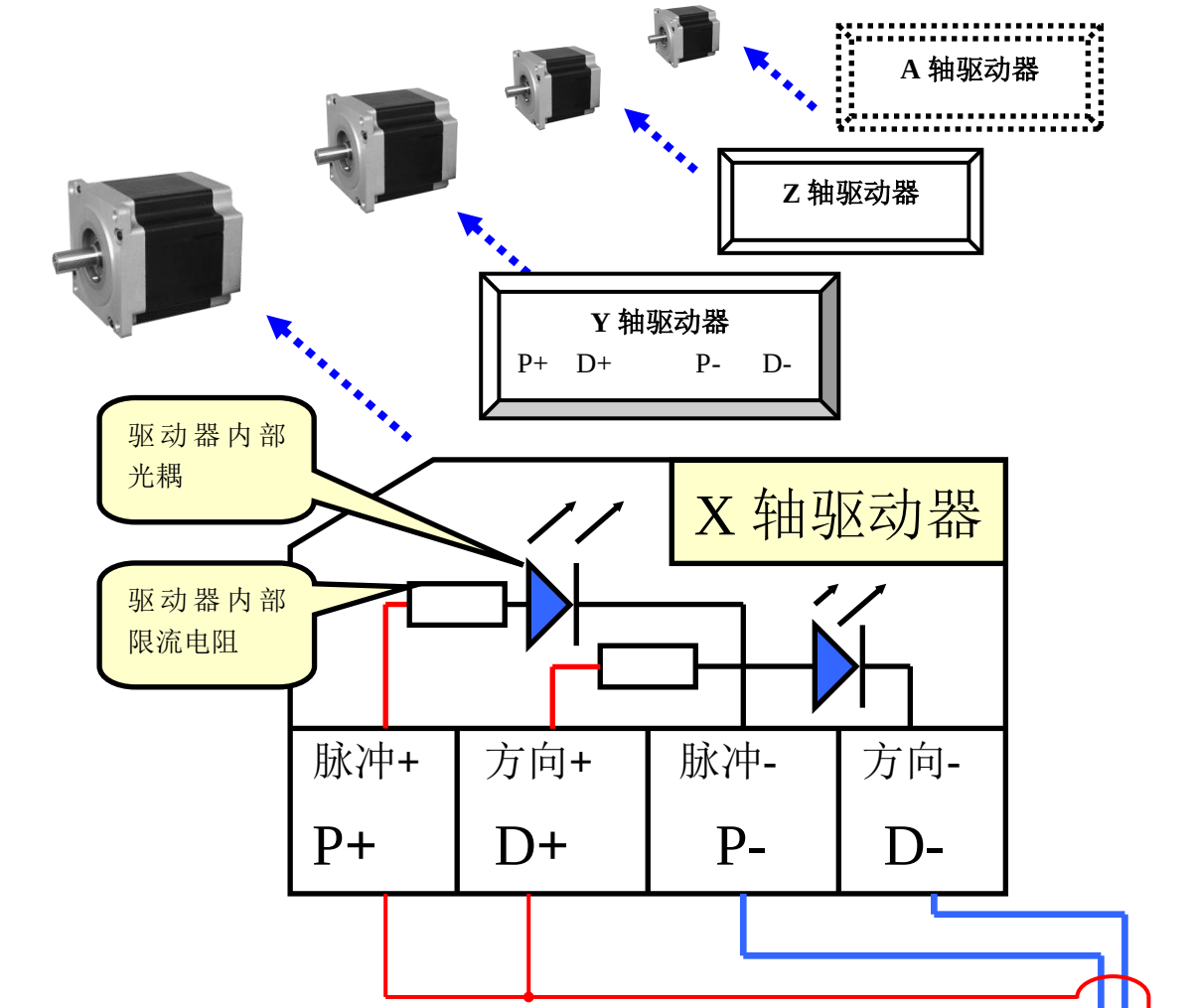
Note:

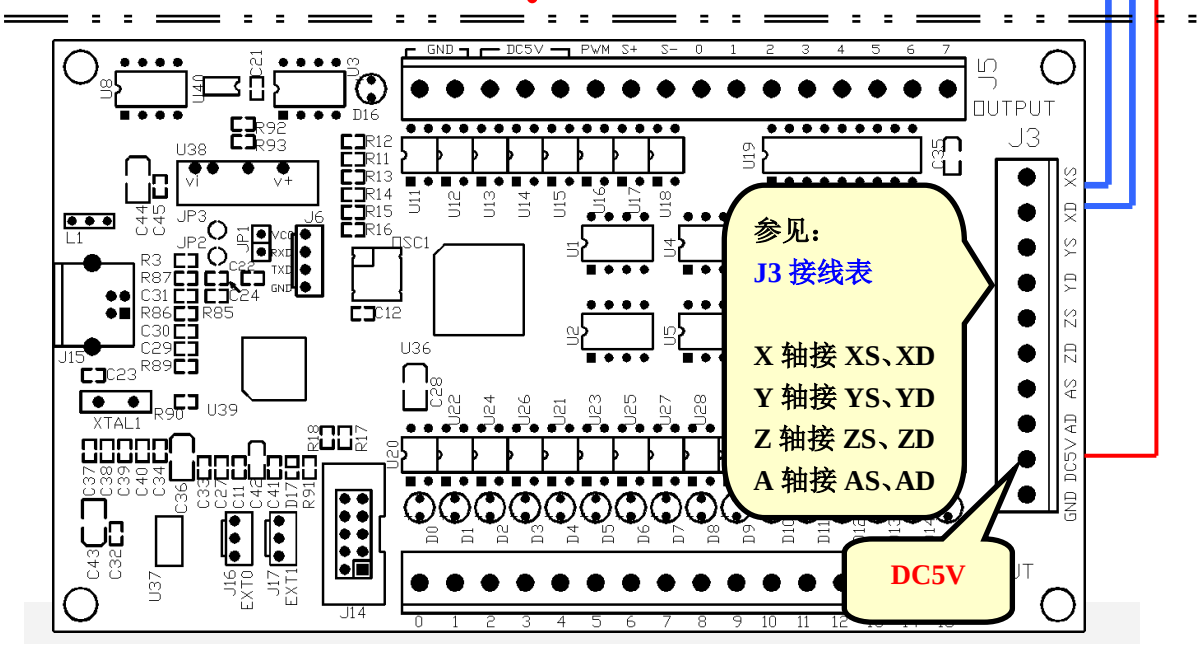
1. “DC5V” is on-board isolated power module output. Voltage:5V, max current **120mA**.
2. “ OC “: open-drain output

5 USB 运动控制卡的接线图

5.1 X、Y、Z、A 轴输出。可以使用以下 **2 种供电方式**：内部电源/外部电源。

5.1.1 使用运动控制卡的电源，驱动，请根据需要安装合适的限流电阻。



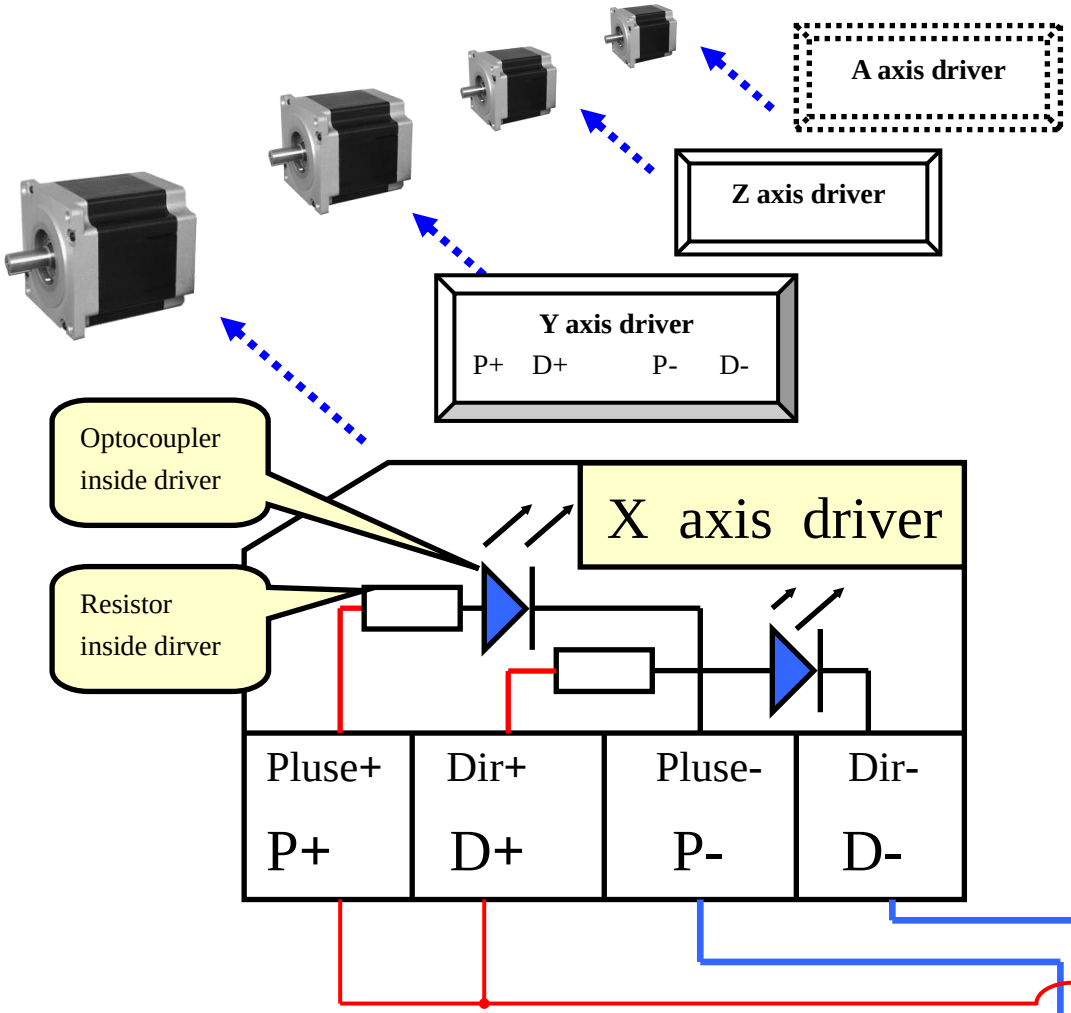


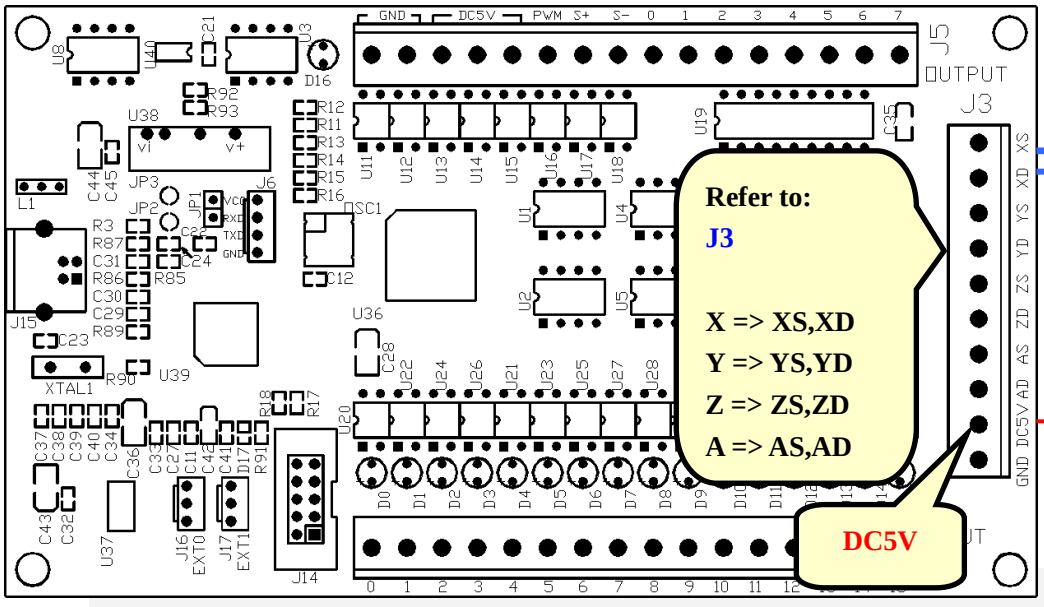
5 Motion card connection Diagram

5.1 X、Y、Z、A axes output. Optical power supply: Internal(on board) or External.

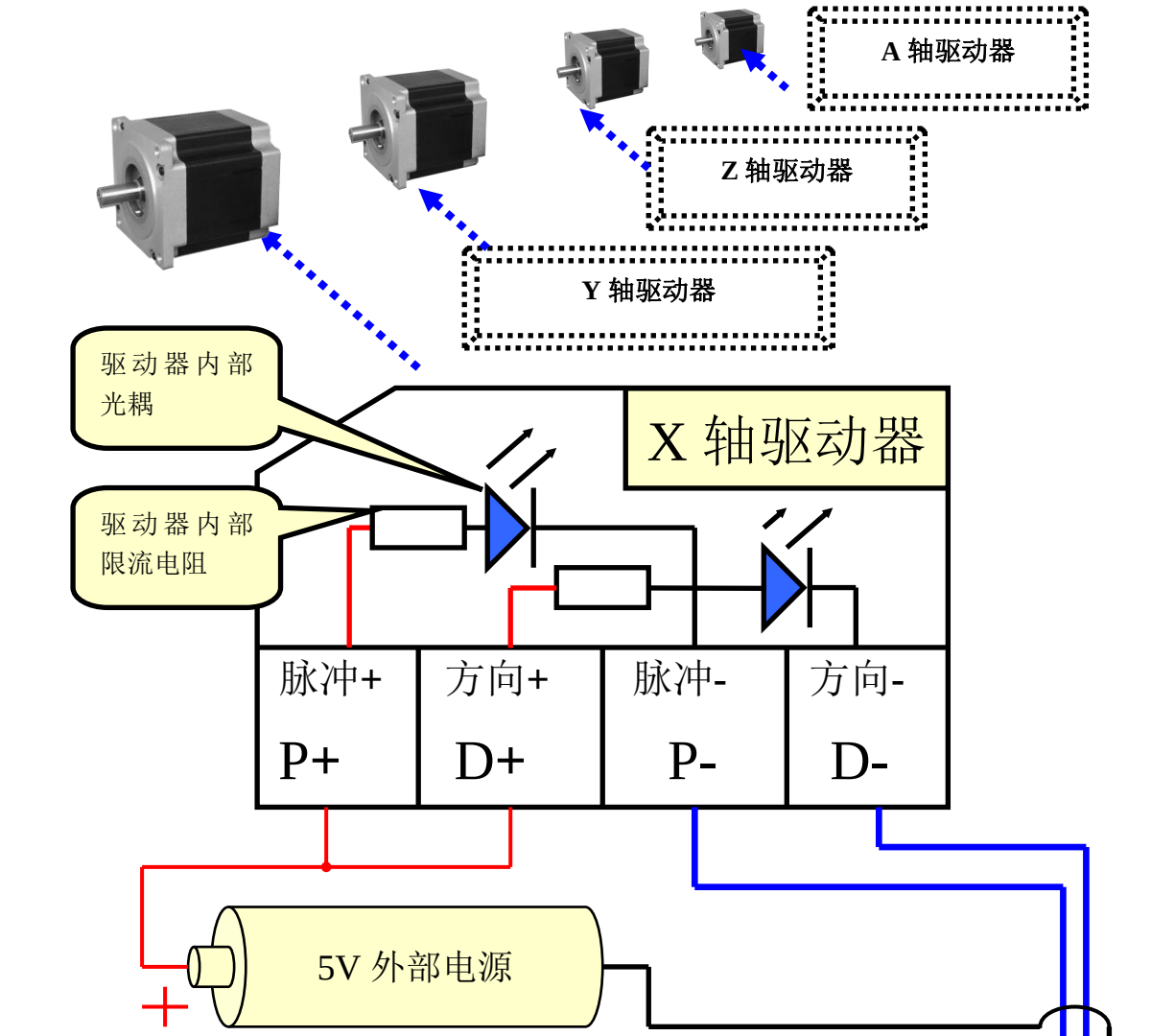
5.1.1 Using Internal(on board) power supply to drive.

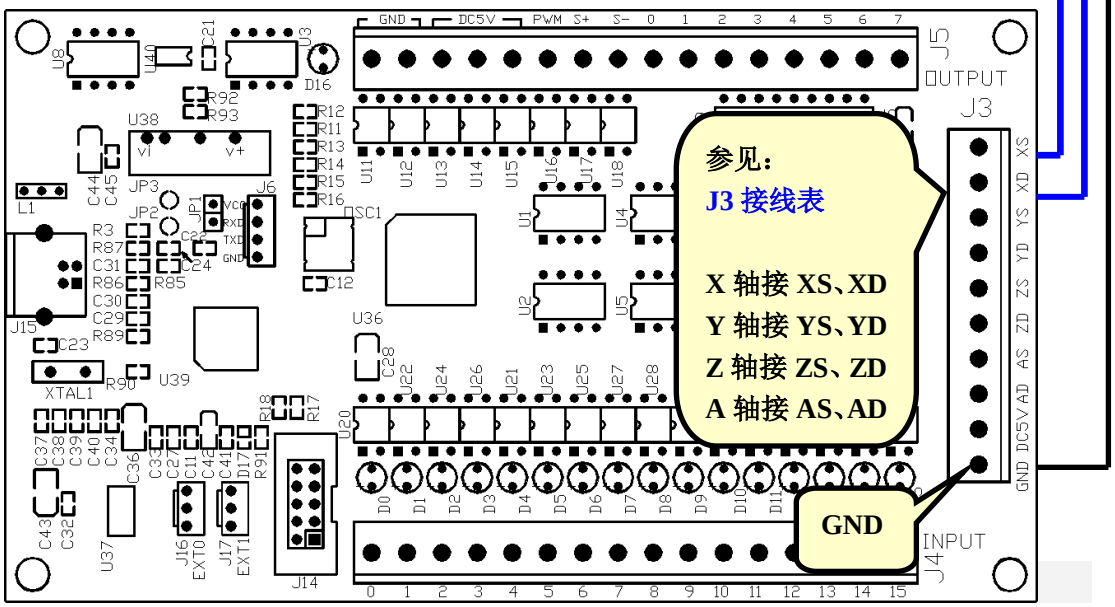
Please install suitable resistance according to your setpping/servo driver need.





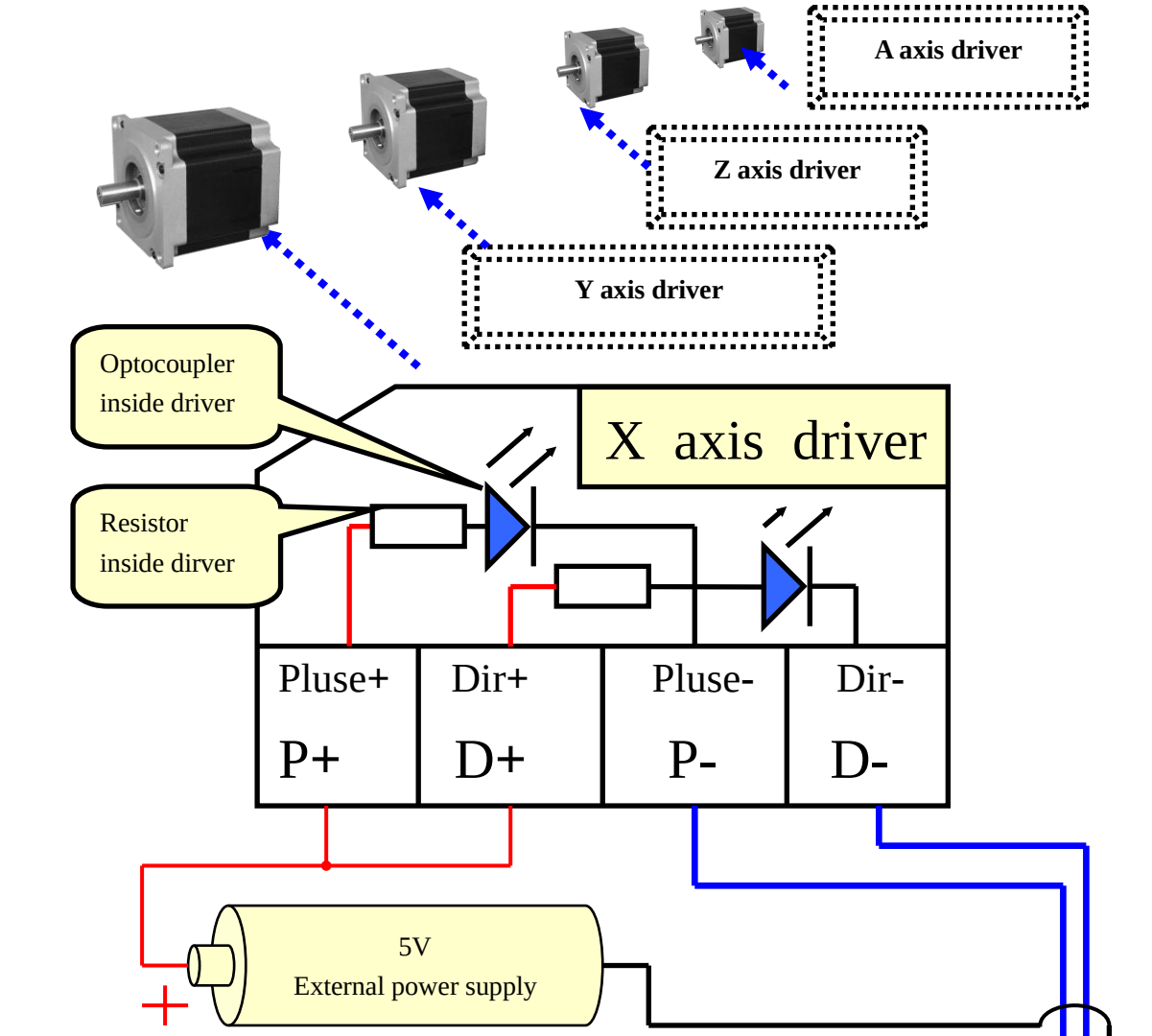
5.1.2 使用外部电源，驱动，请根据需要安装合适的限流电阻。

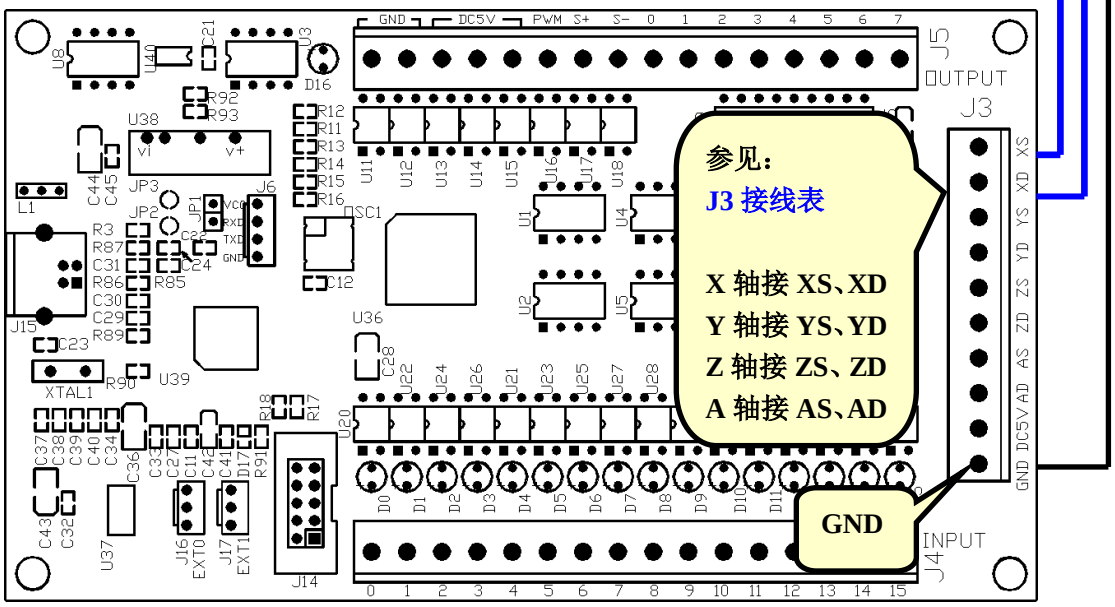




5.1.2 Using External power supply to drive.

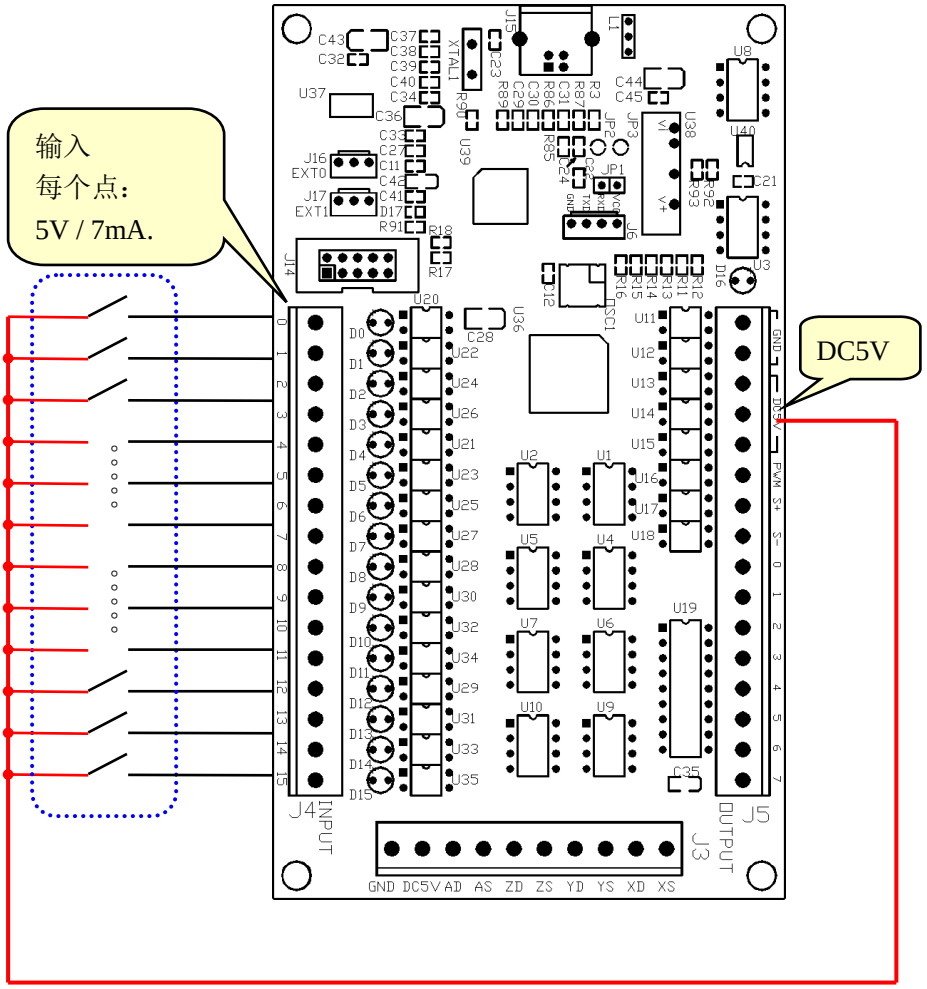
Please install suitable resistance according to your setpping/servo driver need.





5.2 输入：电压 5V。可以使用以下 **2 种供电方式**：内部电源 / 外部电源。

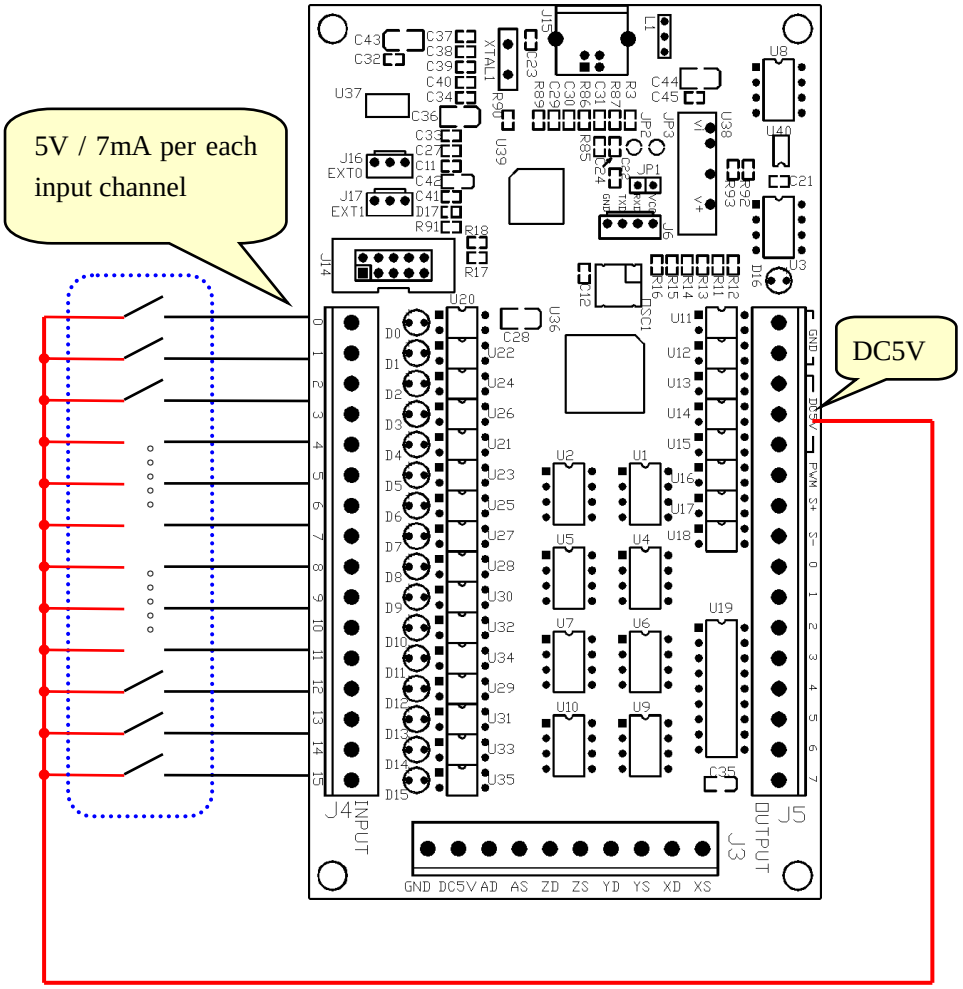
5.2.1 使用运动控制卡的内部电源，驱动输入点。



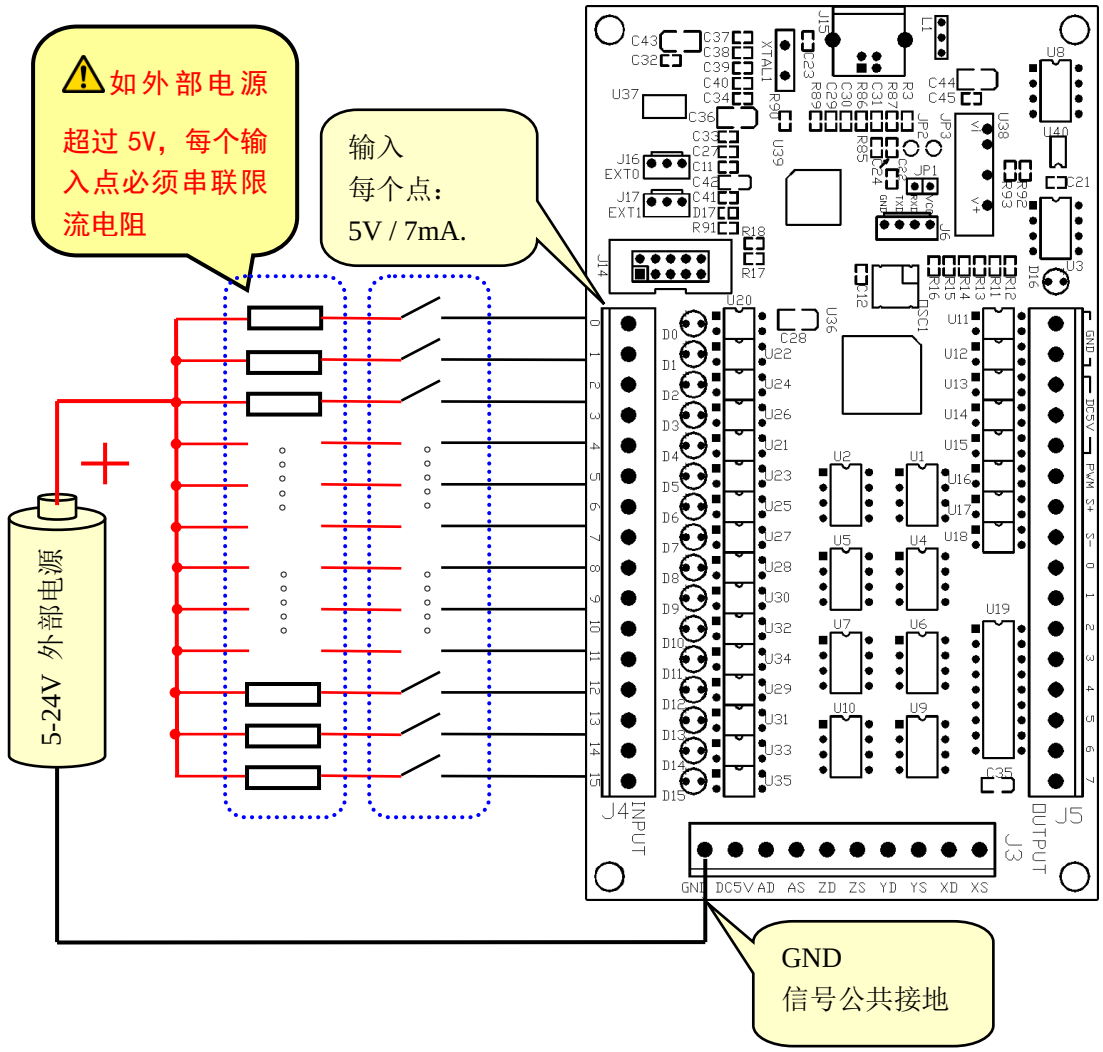
5.2 Input Channels:

There are two methods of voltage power supply: Internal or External

5.2.1 Internal voltage power supply

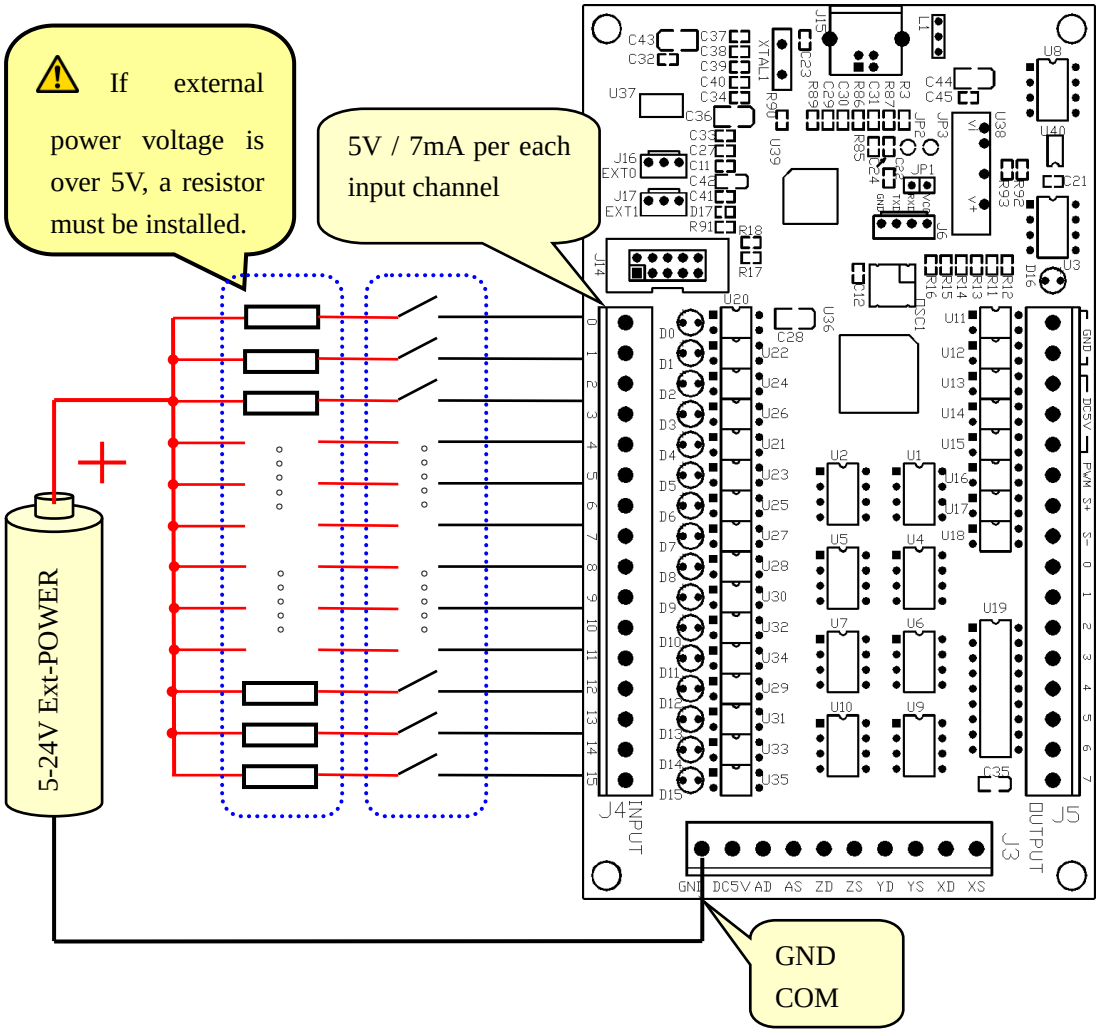


5.2.2 使用 5V 外部电源，驱动输入点。



注意：外部电源电压超过 5V 以上，需串联外部限流电阻（板卡上为 330 欧姆限流电阻）。电阻取值：24V 时 3K Ω，12V 时 1.5K Ω。

5.2.2 External voltage power supply for input.



ATTENTION：

If the external power voltage is over 5V, a resistor must be installed between the power source and each input channel!

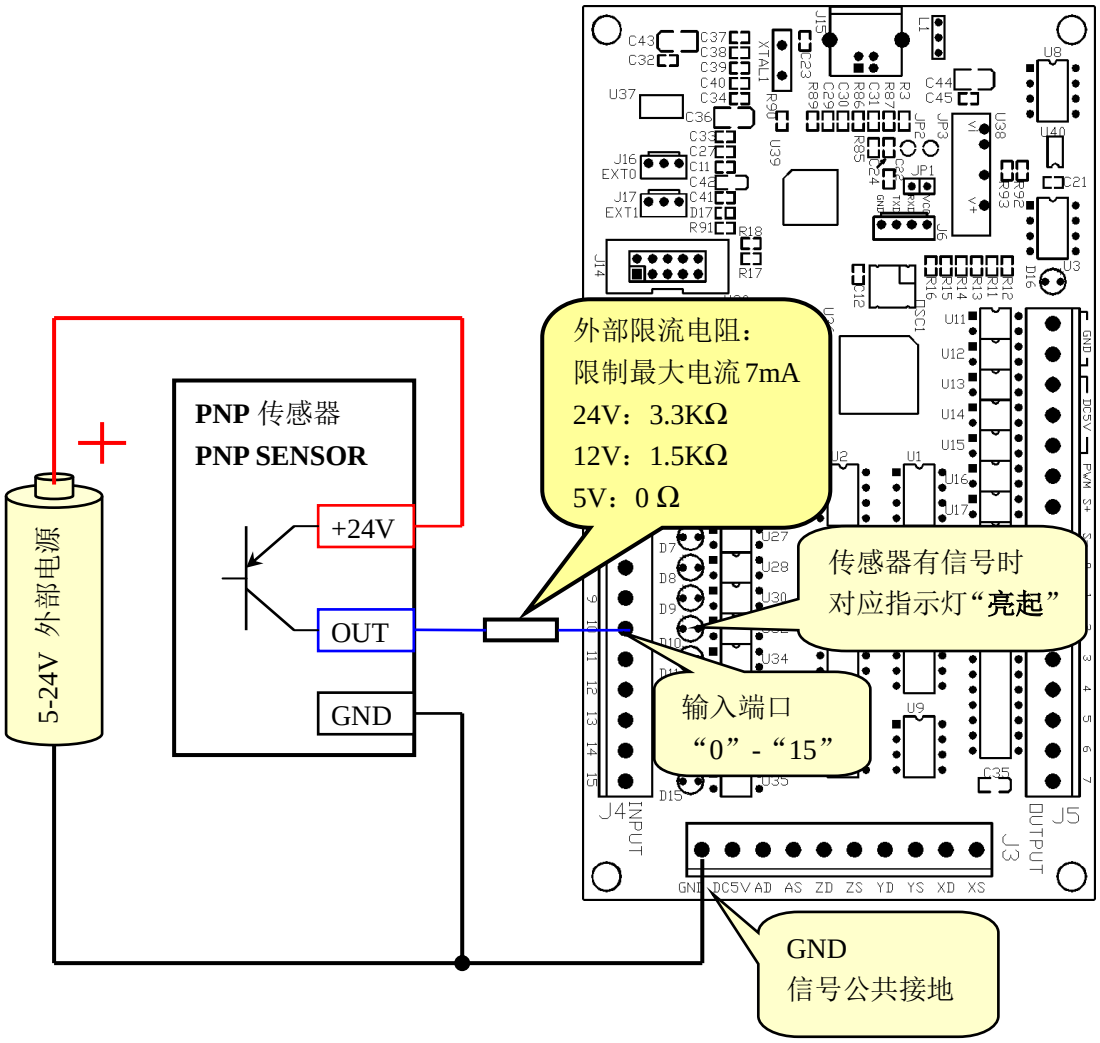
For the external power voltage is 24V, 3K Ω resistor must be used,

And for the external power voltage is 12V, 1.5K Ω resistor must be used,

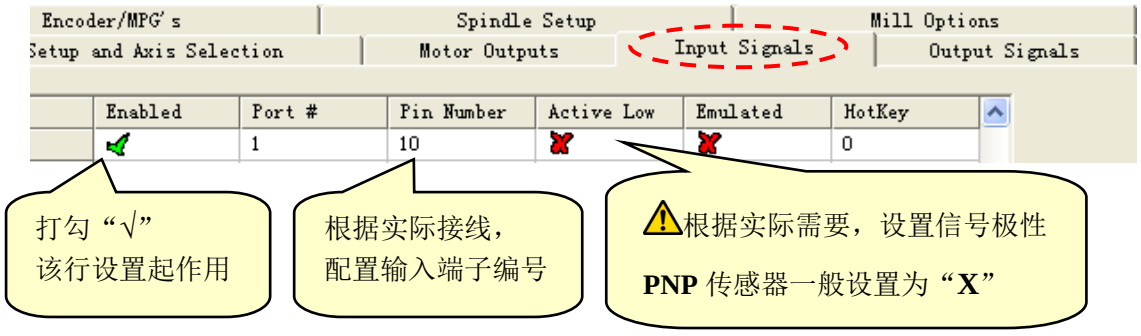
5.3 传感器的接线和配置

5.3.1 PNP 传感器，驱动输入点。

⚠ 内部隔离电源模块功率有限，不能给传感器供电。请使用外部电源。



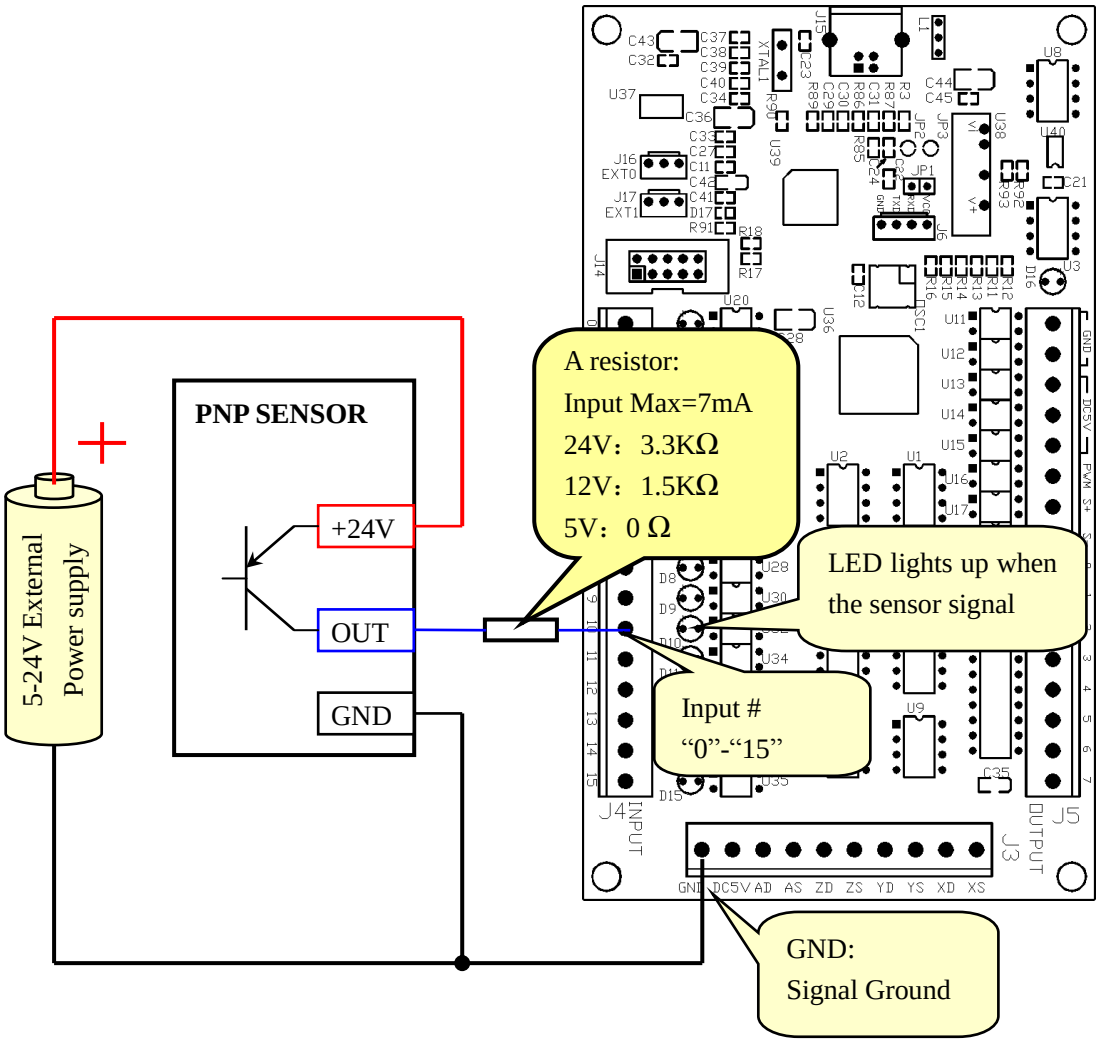
Mach3 输入信号配置



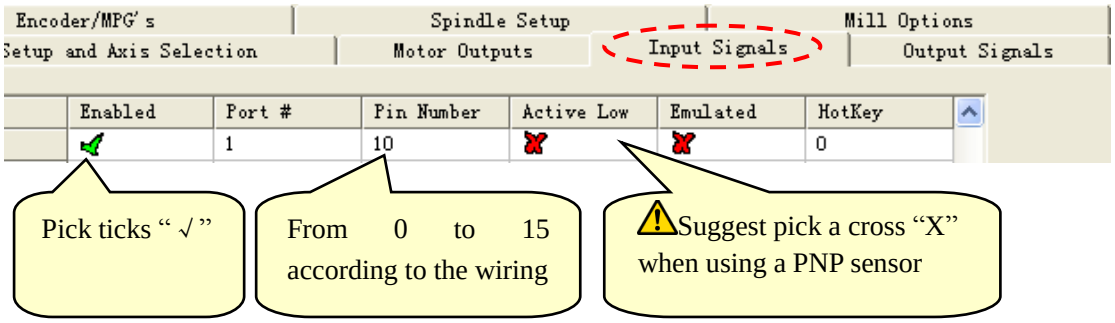
5.3 Sensor's wiring and setting

5.3.1 PNP sensor

⚠ Use the external power supply for the sensor!

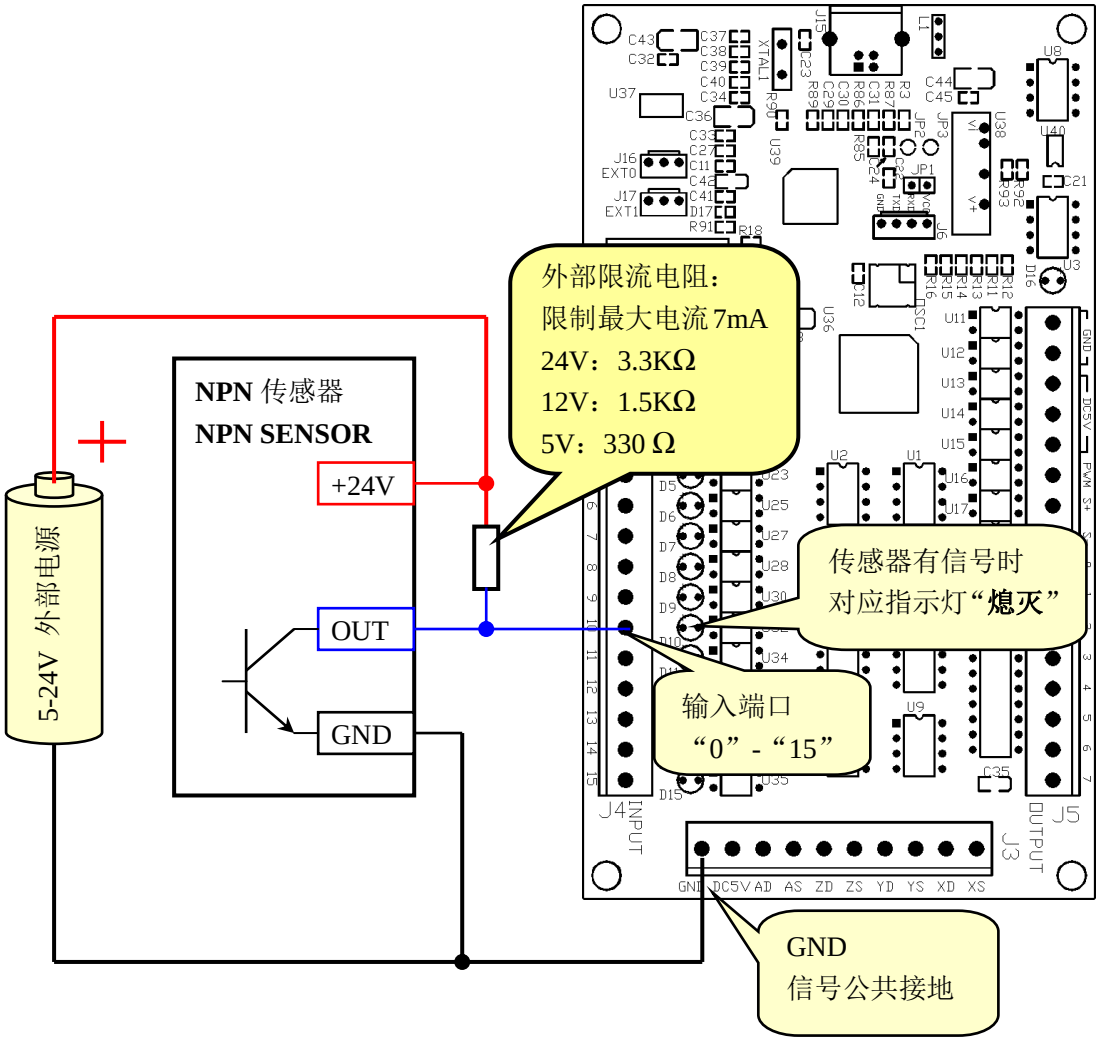


Mach3 Input Signals Setting



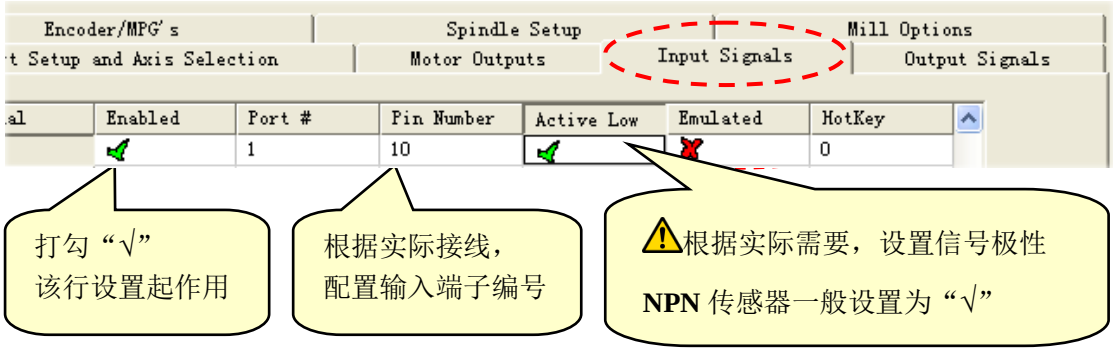
5.3.2 NPN 传感器，驱动输入点。

⚠ 内部隔离电源模块功率有限，不能给传感器供电。请使用外部电源。



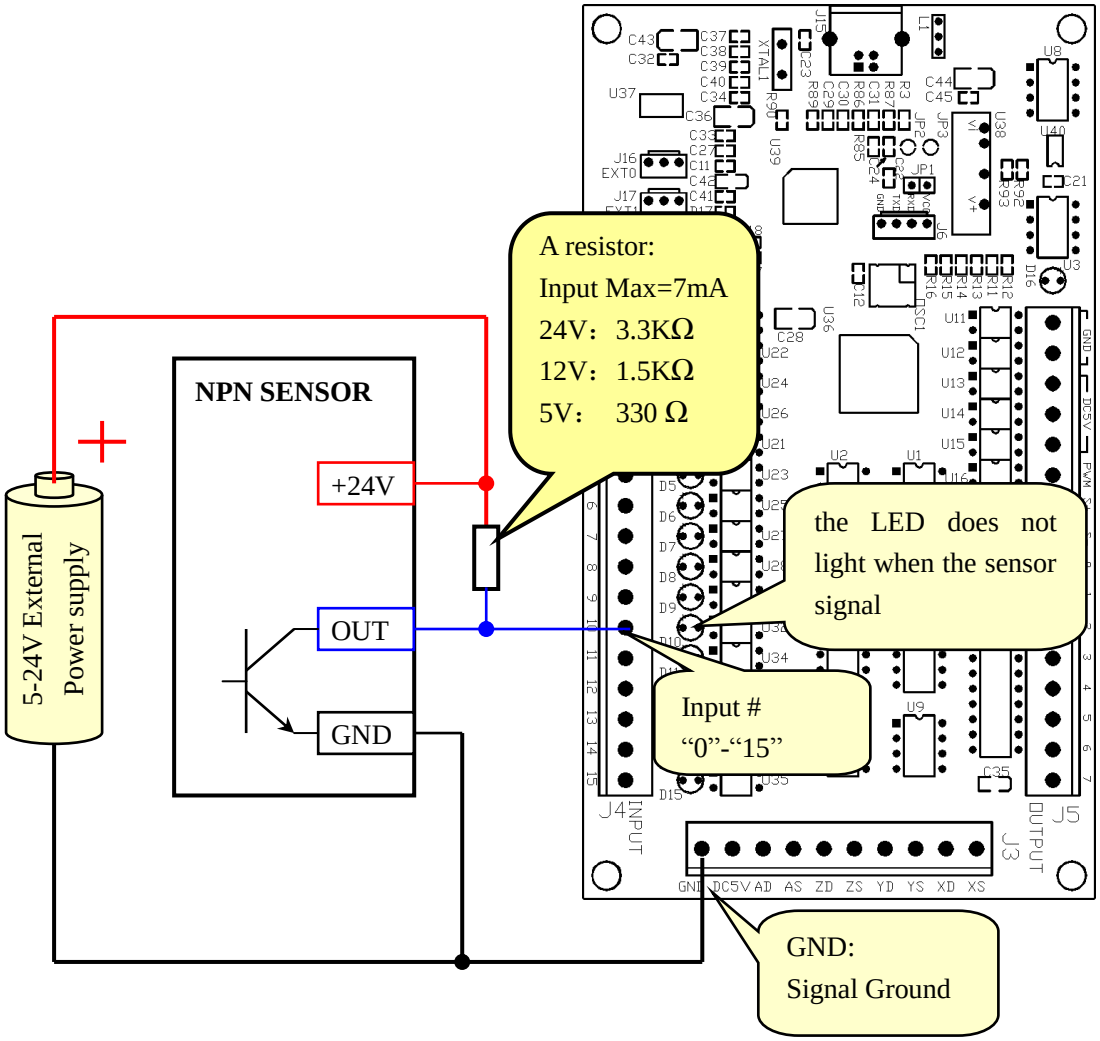
⚠

Mach3 输入信号配置



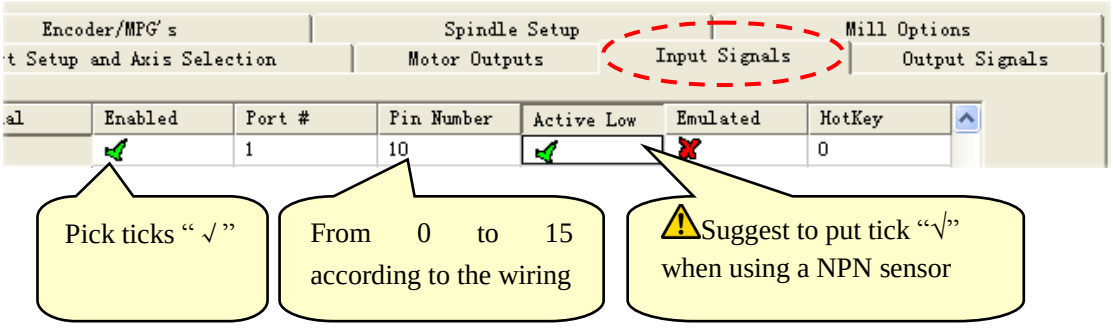
5.3.2 NPN sensor

⚠ Use the external power supply for the sensor!



⚠

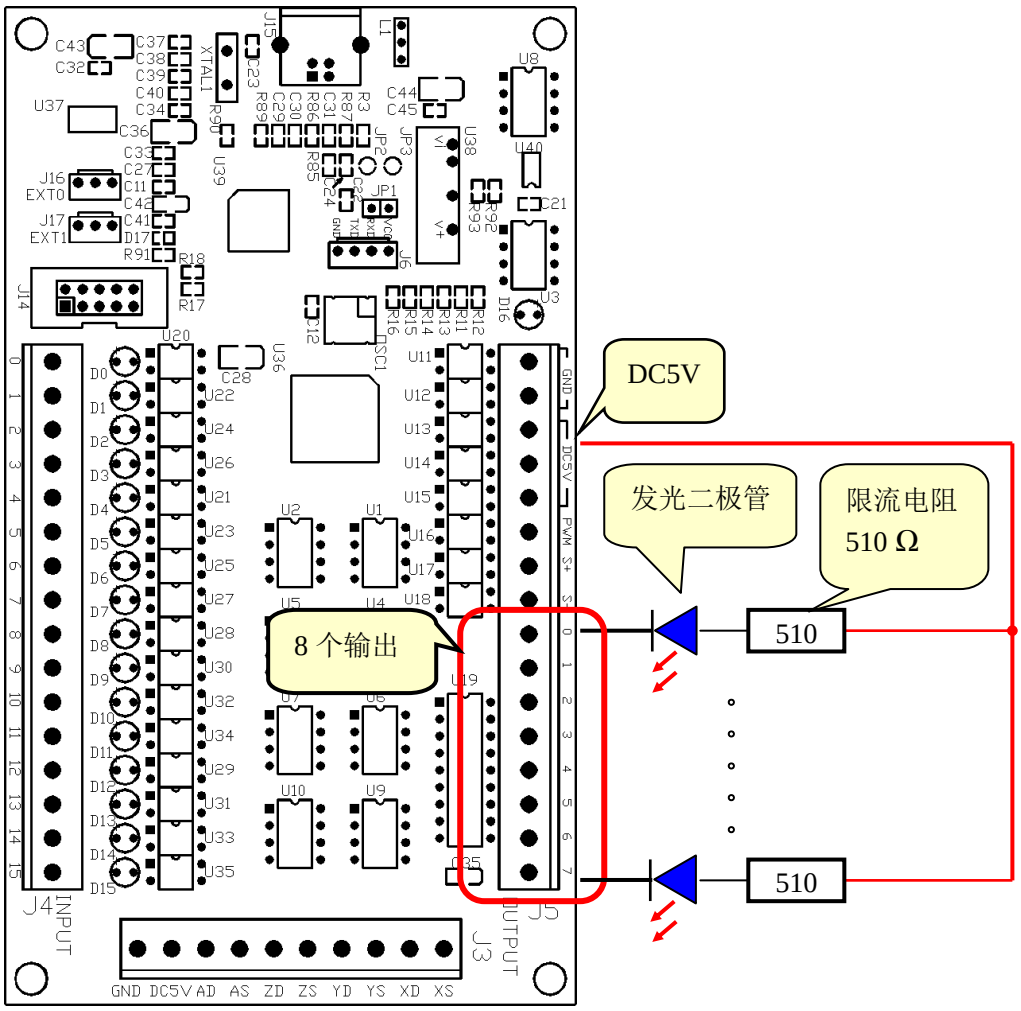
Mach3 Input Signals Setting



5.4 输出：8 个输出最大控制电压 24V，输出低电平时最大驱动电流 500mA，否则输出高阻。

5.4.1 使用运动控制卡的内部电源，驱动发光二极管

驱动小电流负载，例如 LED，驱动器使能控制等，可以直接使用内部电源。

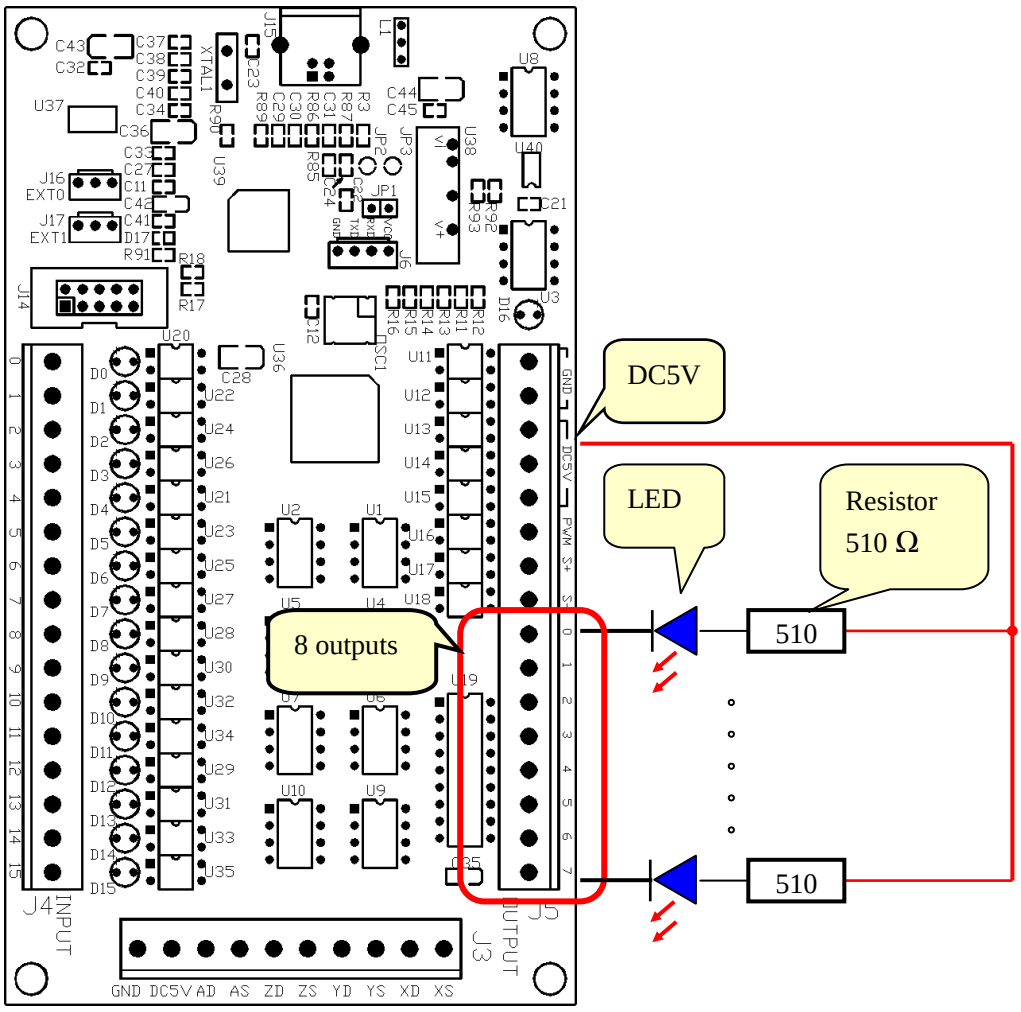


5.4 output: 8-general-outputs,

Maximum Load voltage=24V / current=500mA, When output Low (turn on), otherwise the output is high-impedancestate (Hi-Z).

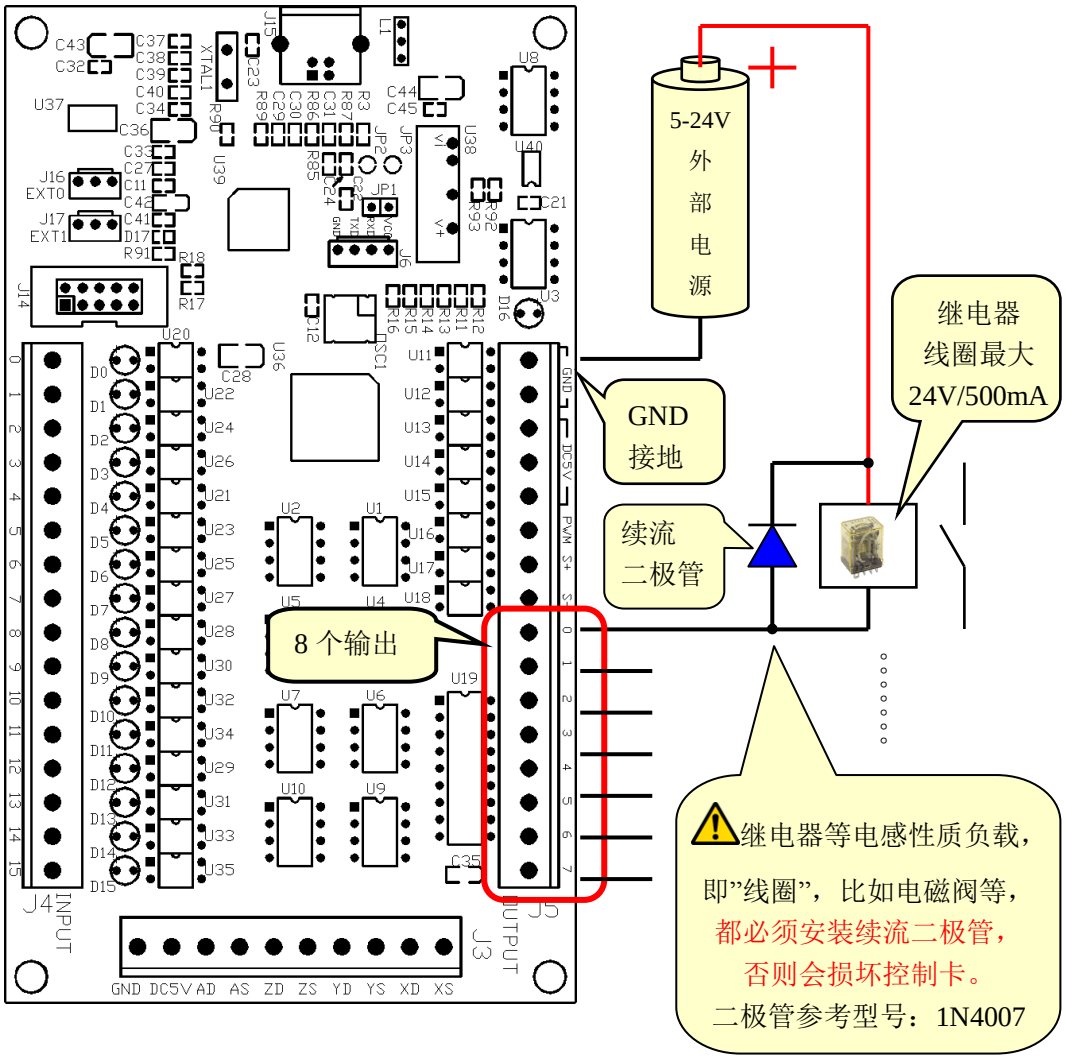
5.4.1 Drive LED with Internal(On-board) power

When drive tiny current loads like LED, driver enable signal etc, internal (on-board) power supply can be used directly.



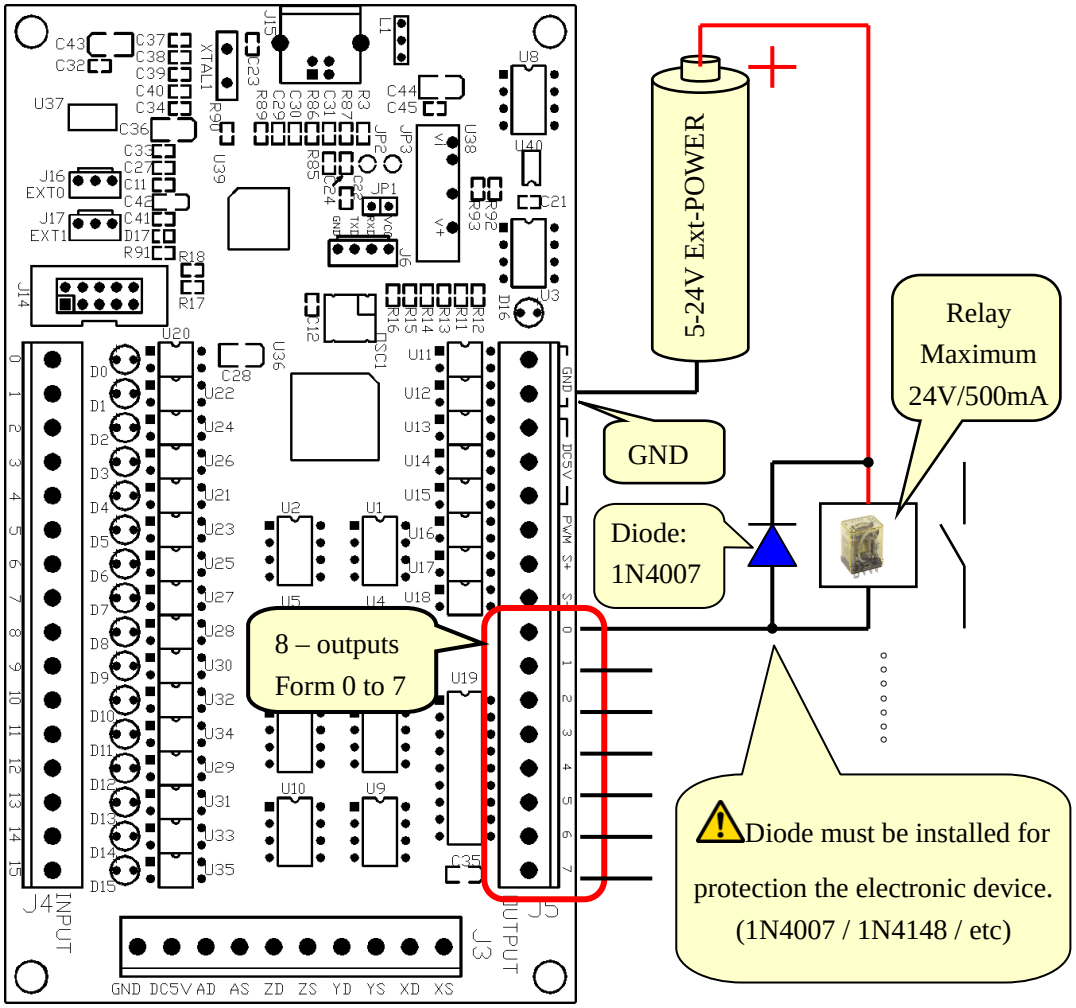
5.4.2 使用 5-24V 外部电源，驱动 500mA 继电器。

驱动大电流负载，例如继电器等，需要使用外部电源供电。



5.4.2 Drive 500mA relay by 5-24V external power supply

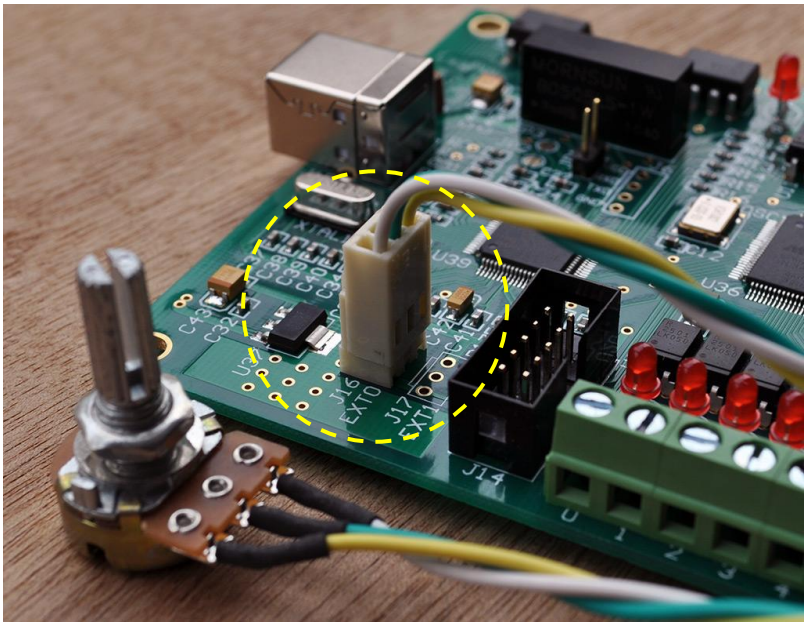
Drver high loading devices, must use external power supply



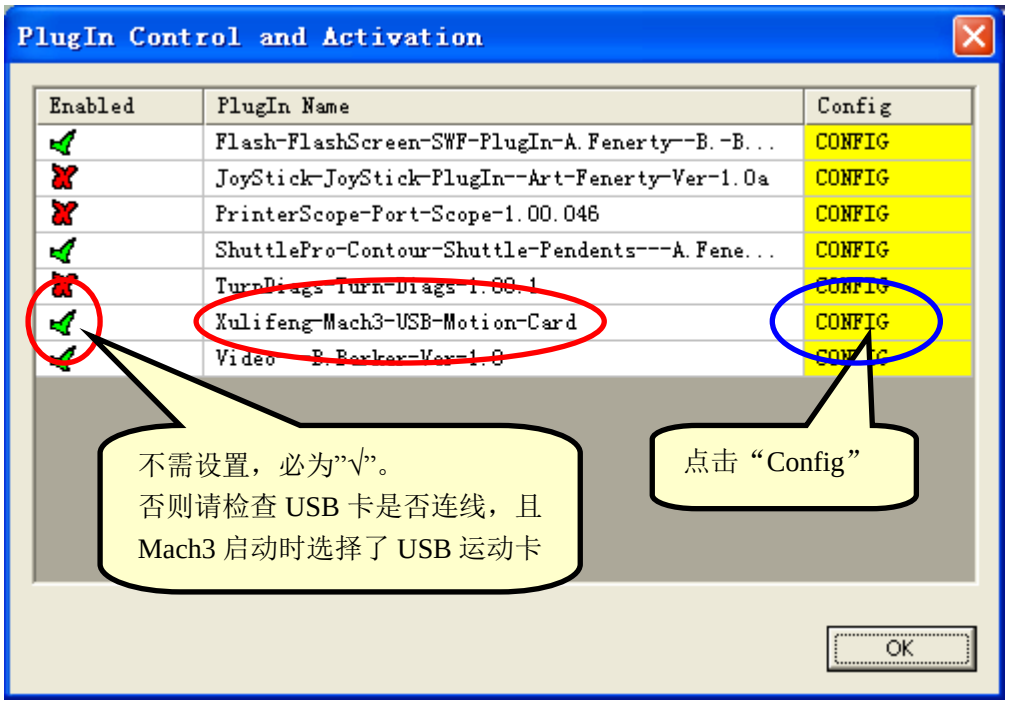
6 外部倍率旋钮

6.1 首先完成本手册第一步“**安装准备**”。

6.2 将倍率旋钮与 USB 卡的倍率旋钮座 EXT0(J16)连接。



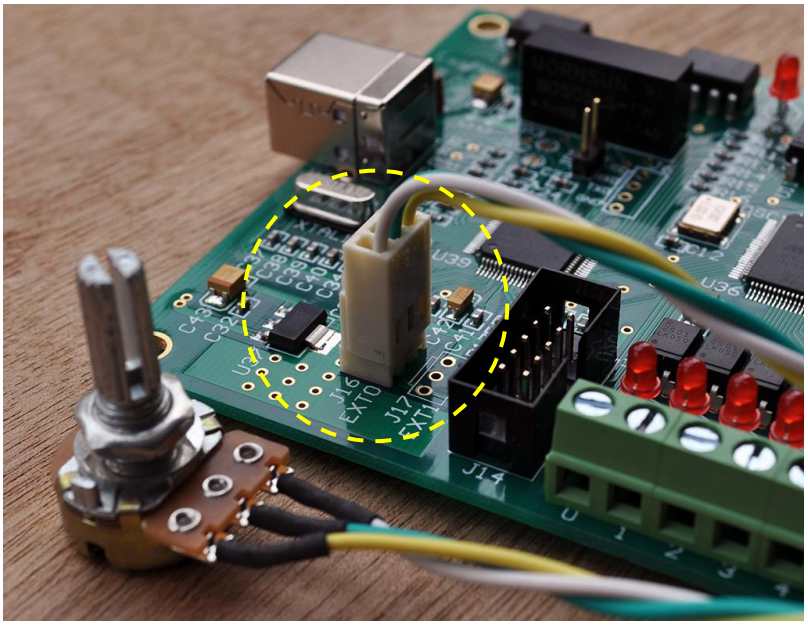
6.3 Mach3 菜单中 Config=>Config Plugins，进入 PlugIn Control and Activation



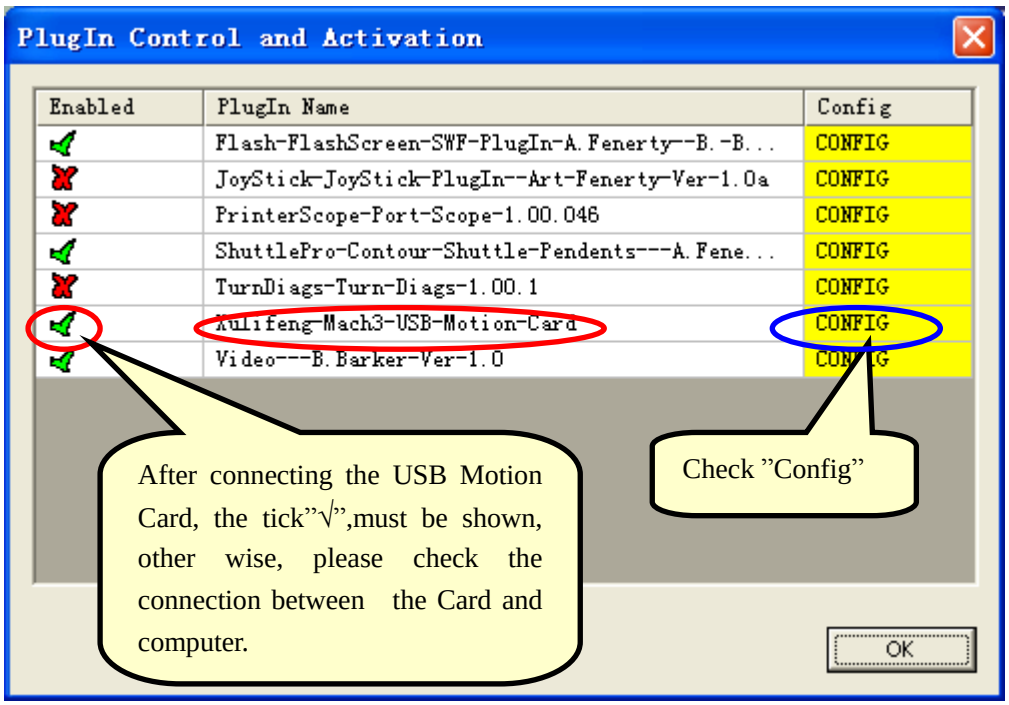
6 Adjustment-knob

6.1 Please complete the step in Chapter 1 (Prepare).

6.2 Connecting the adjustment-knob with the EXT0(J16) of USB Motion Card.

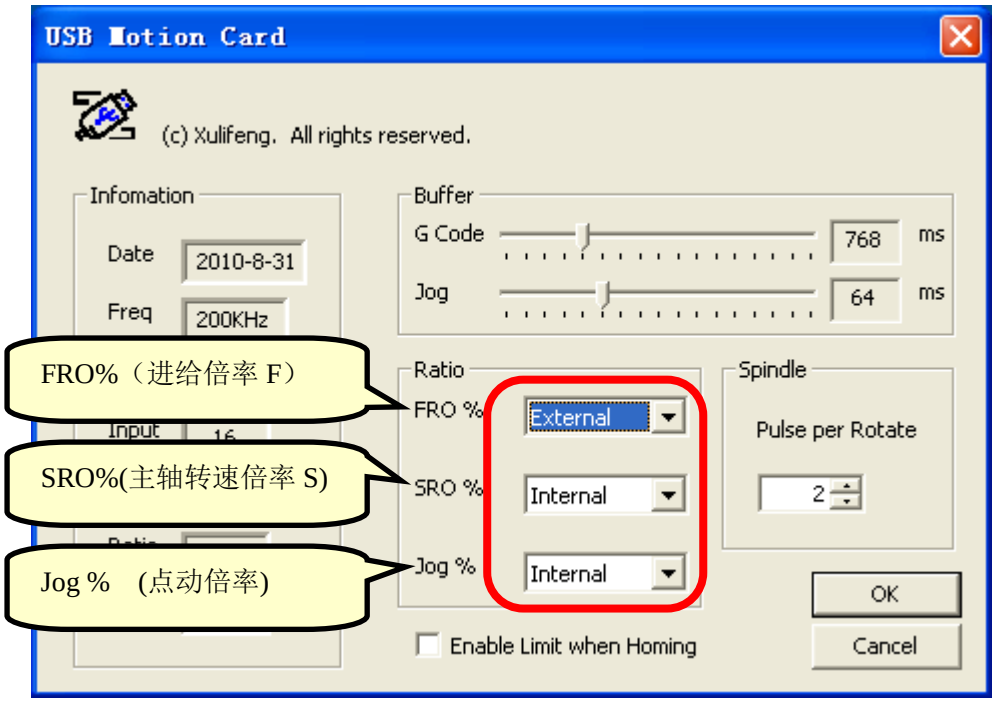


6.3 Go to “Config Plugins” under “Config” to go into “PlugIn Control and Activation”.

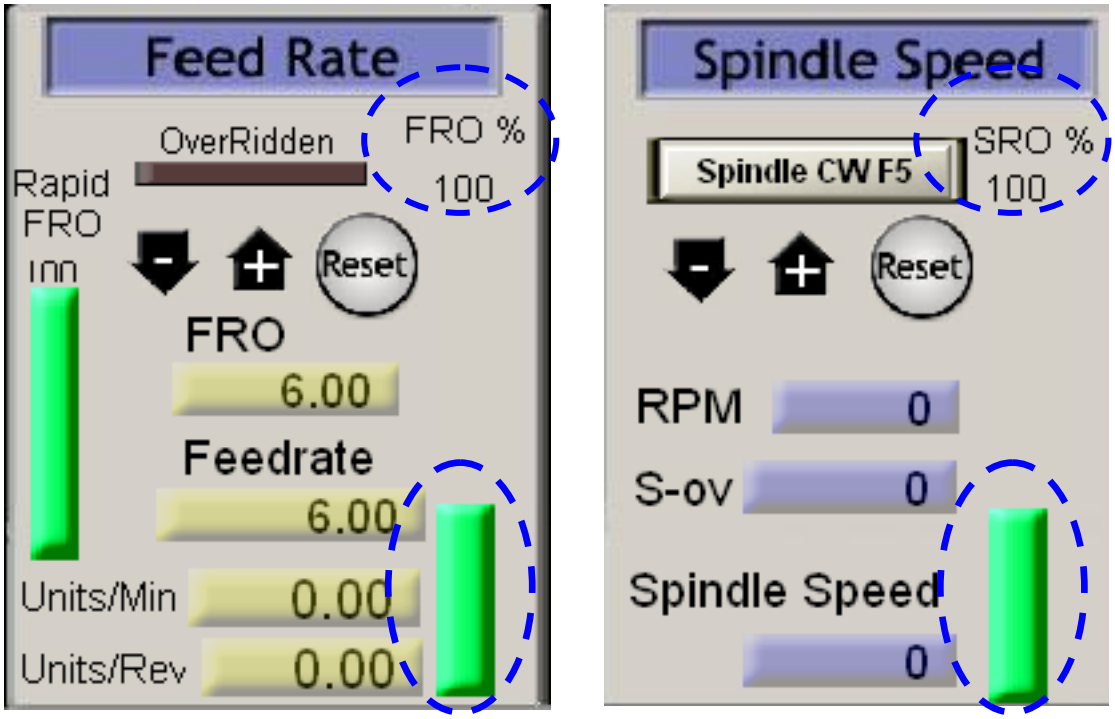


6.4 点击“Config”后出现 USB 卡配置对话框

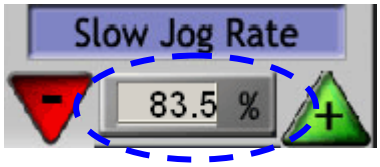
将 FRO%（进给率 F），SRO%（主轴转速倍率），Jog% (点动倍率)设置为外部倍率“External”



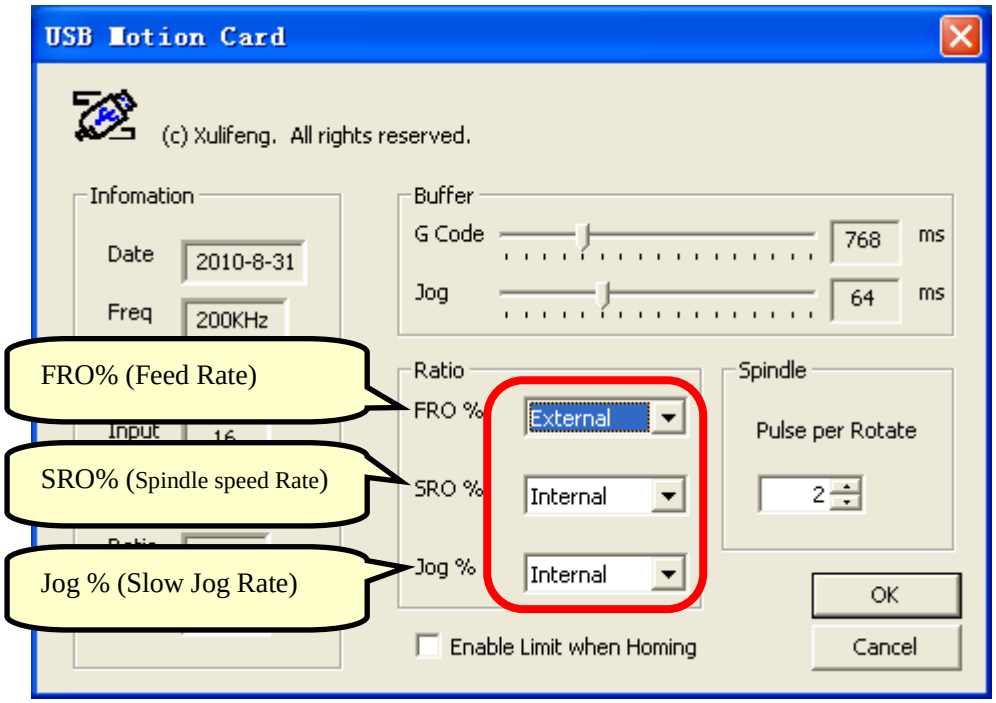
6.5 配置完成后点击“OK”。旋转倍率旋钮 Mach3 界面对应的 FRO%，SRO%数值立刻变化。



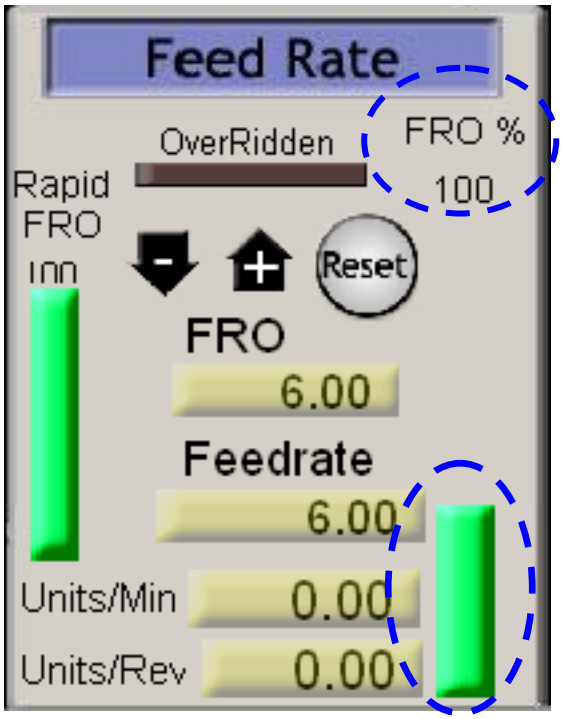
旋转倍率旋钮，Mach3 界面对应的 Slow Jog Rate%数值立刻变化。

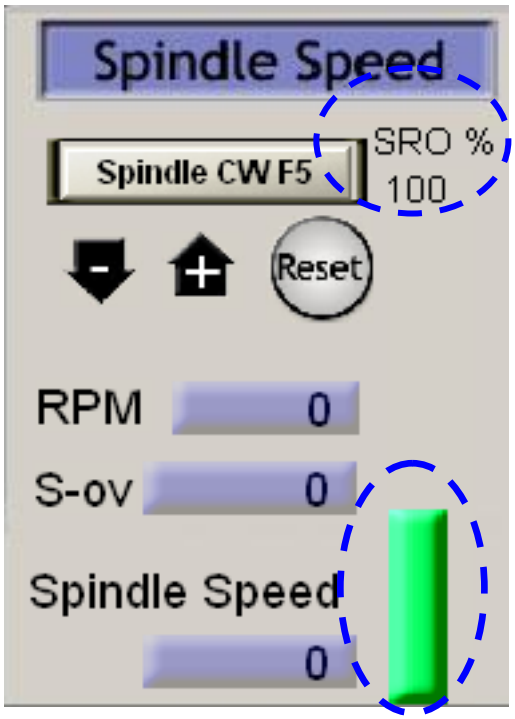


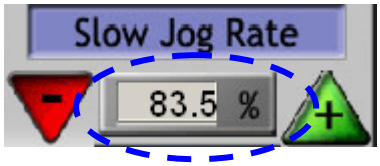
6.4 After check the “Config”, USB Motion Card setting will be shown. You can select one of the functions which is able to controlled by the external knob. Please select “External 0” in your particular setting. Then, click “OK” to exit.



6.5 Now, you can try to turn the knob to adjust your selected function.



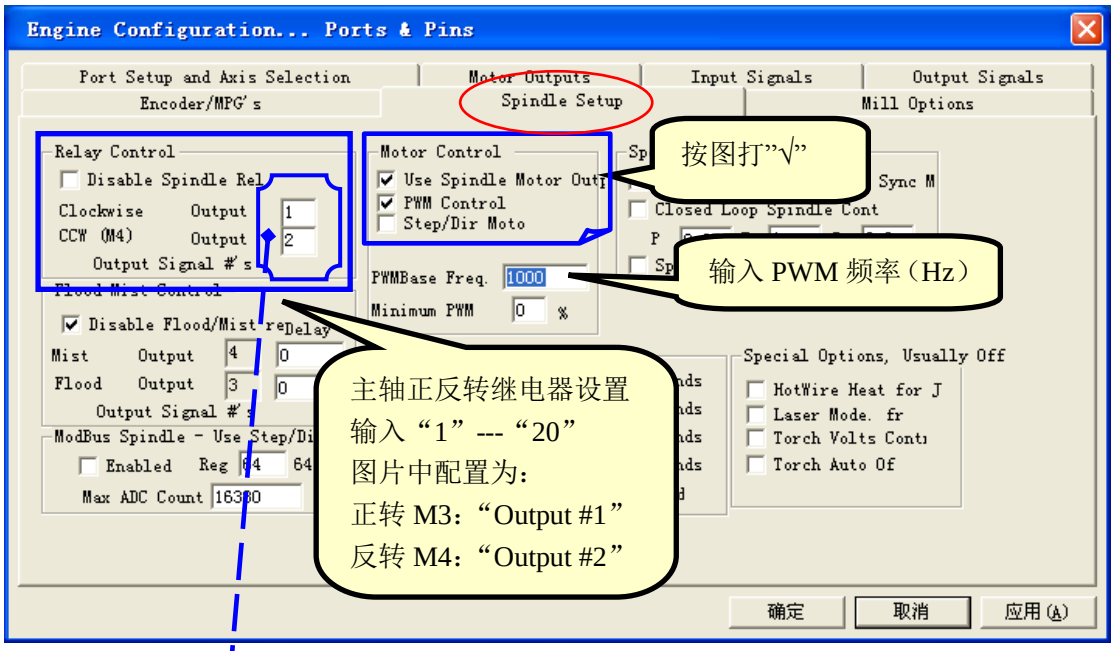




7 主轴调速模拟量输出

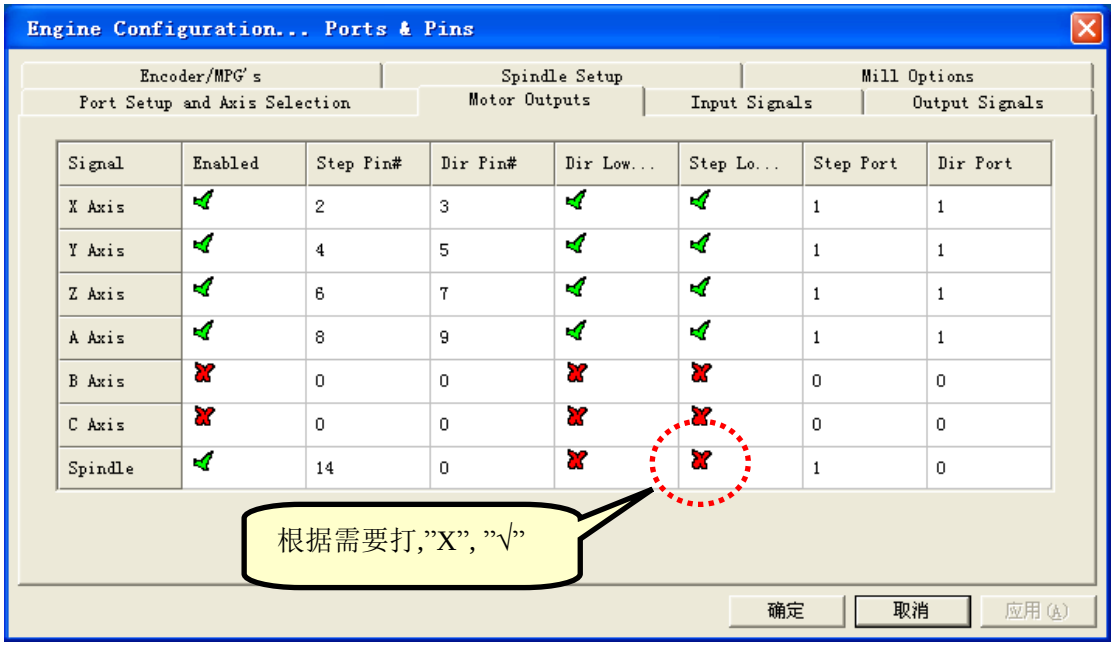
7.1 软件配置

7.1.1 进入主轴设置“Spindle Setup”，勾选“Use Spindle Motor Output”、“PWM Control”。在 PWMBase Freq.中填写所需频率，其单位为 Hz.

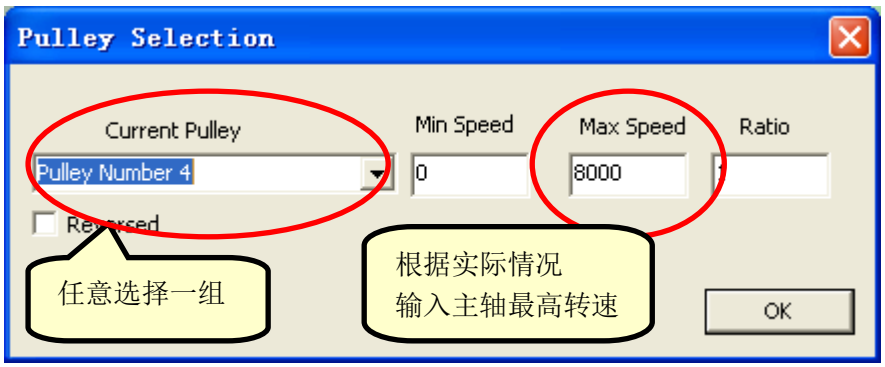


7.1.2 主轴继电器配置

7.1.3 主轴调速信号 PWM 的相位配置



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



7.1.5 主轴其他的配置说明，请参考“**Mach3Chinese-Documents.pdf**”中“**5.5.6 主轴电机设置**”

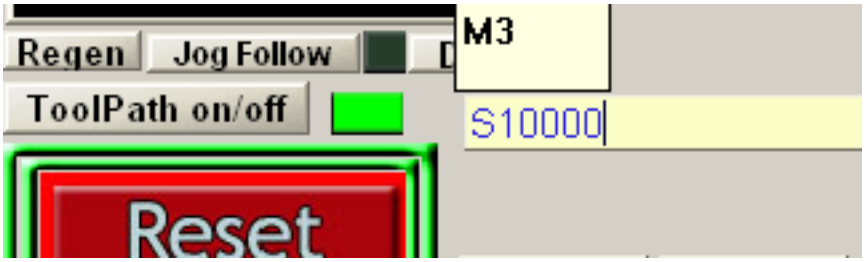
7.2 主轴测试

在手动输入界面上的输入数据框中：

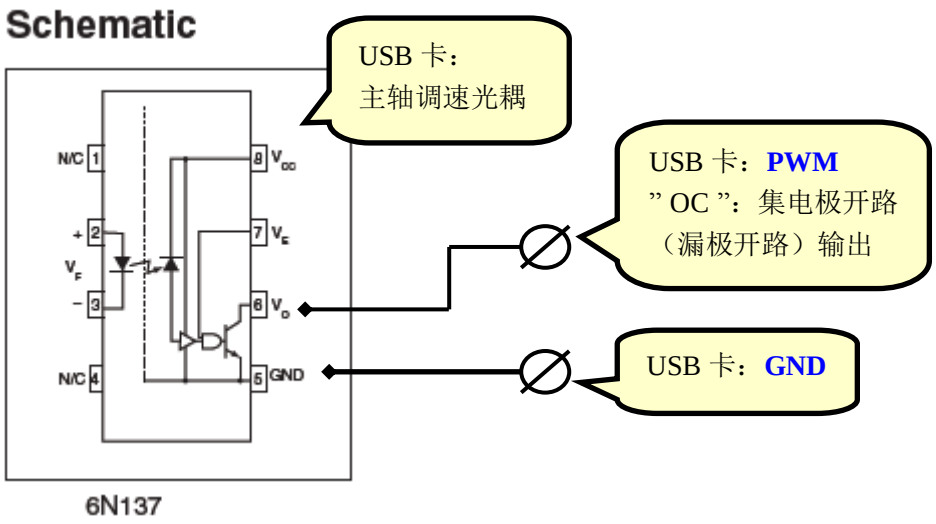
输入“M3”，可听到主轴继电器吸合（如果有配置并安装主轴正转继电器）。

输入“S10000”，主轴旋转。

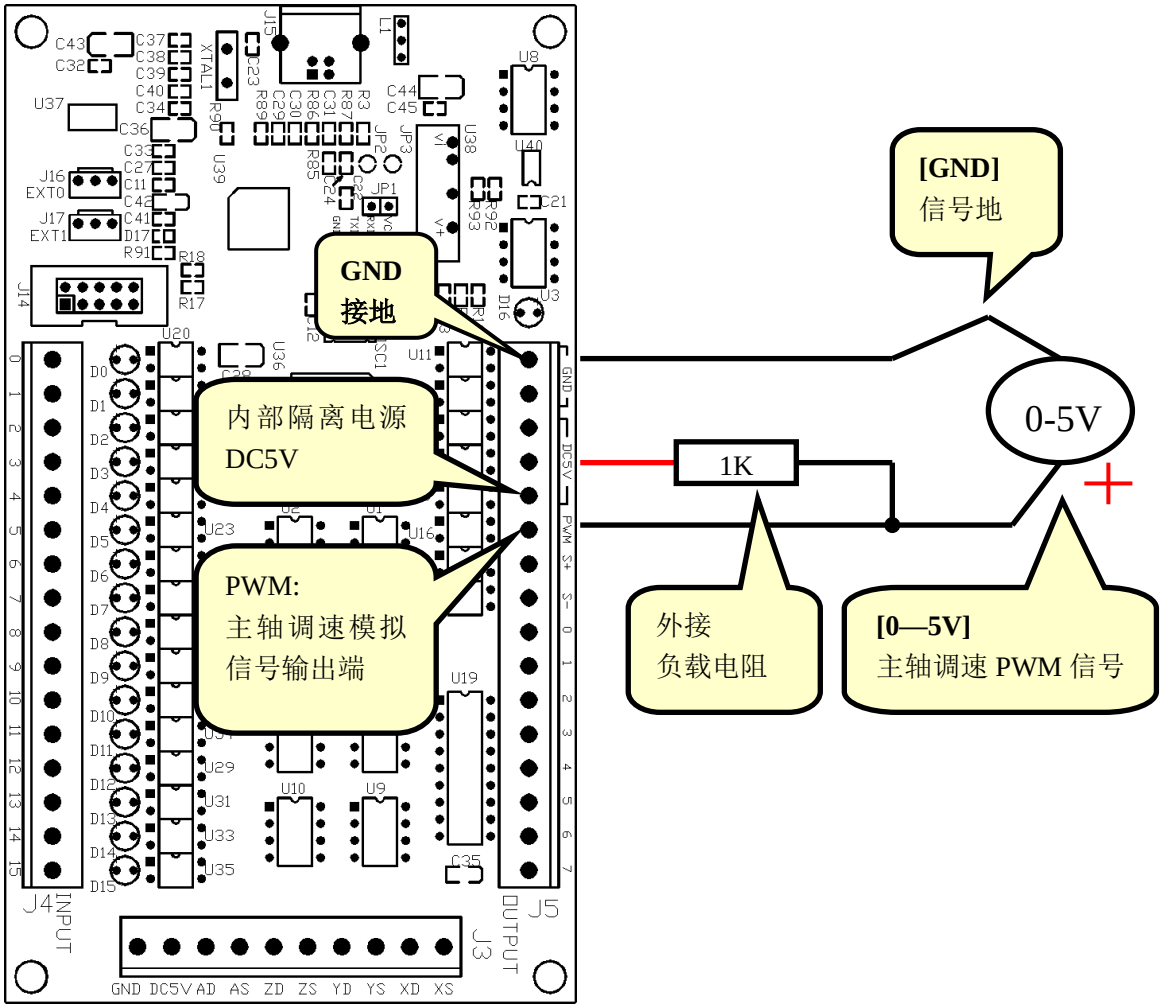
输入“M5”，主轴停转。



7.3 调速模拟输出接口原理图



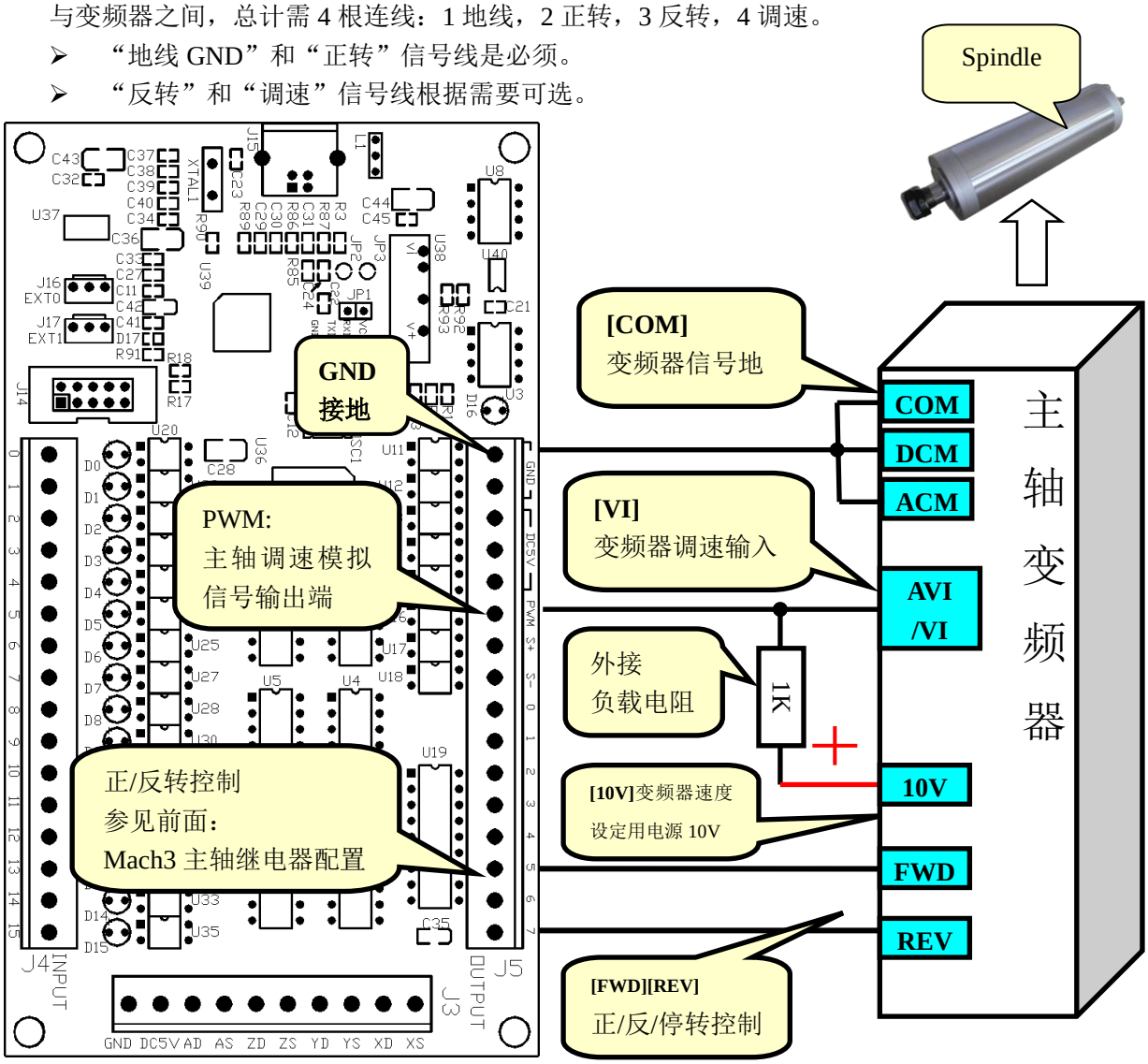
7.4 使用 USB 卡内部电源接线（输出 0-5V）



7.5 使用外部电源接线（输出 0-10V）

与变频器之间，总计需 4 根连线：1 地线，2 正转，3 反转，4 调速。

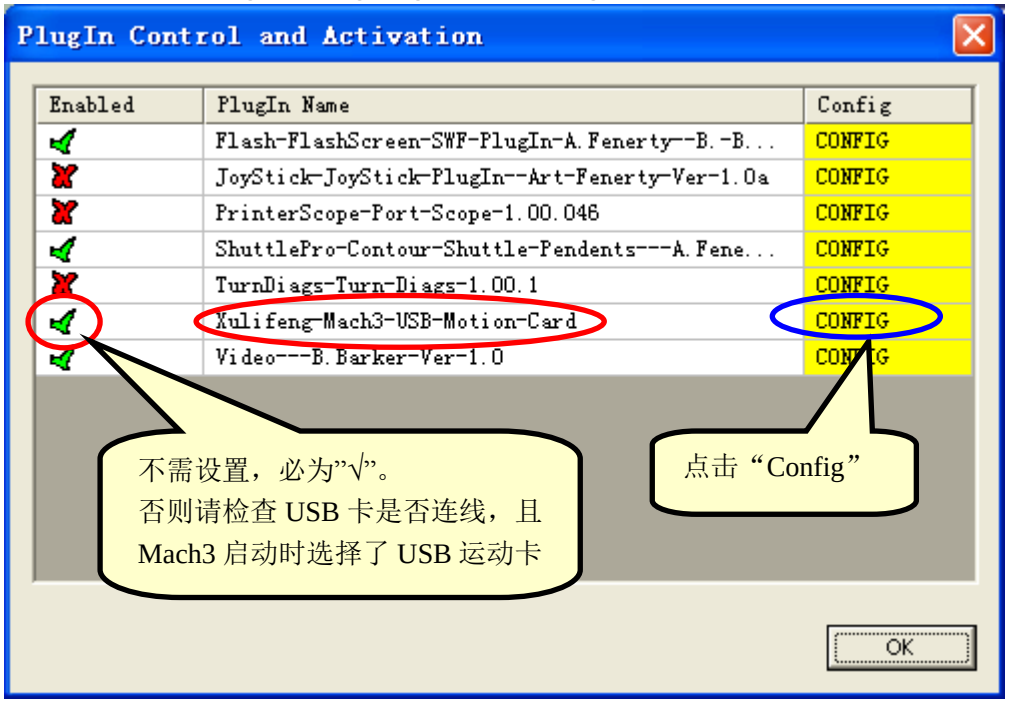
- “地线 GND”和“正转”信号线是必须。
- “反转”和“调速”信号线根据需要可选。



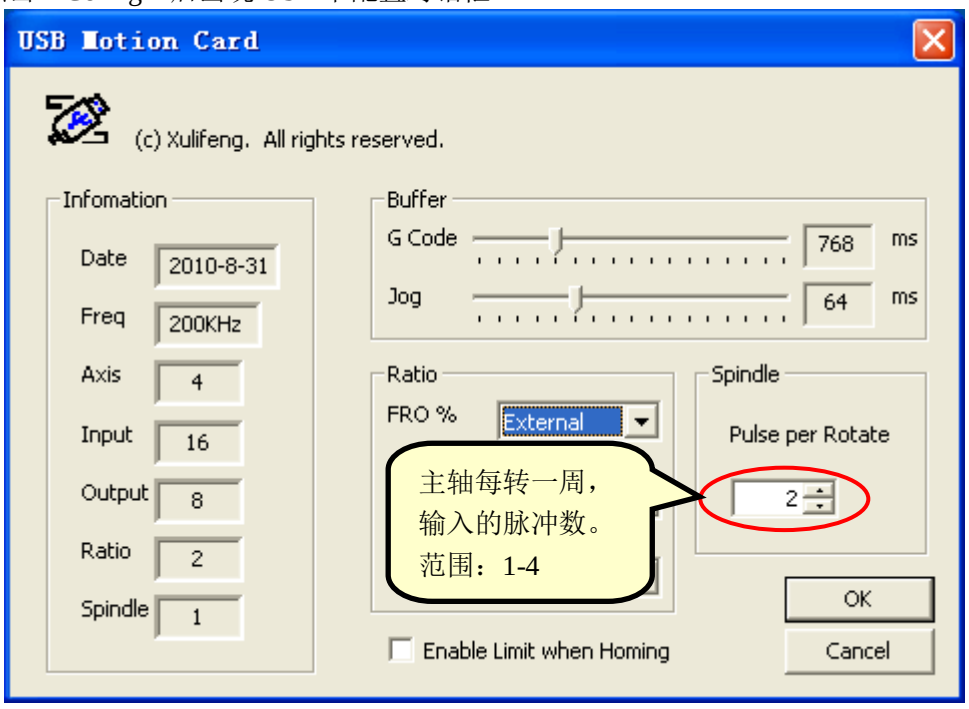
8 主轴测速

8.1 USB 卡配置对话框

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



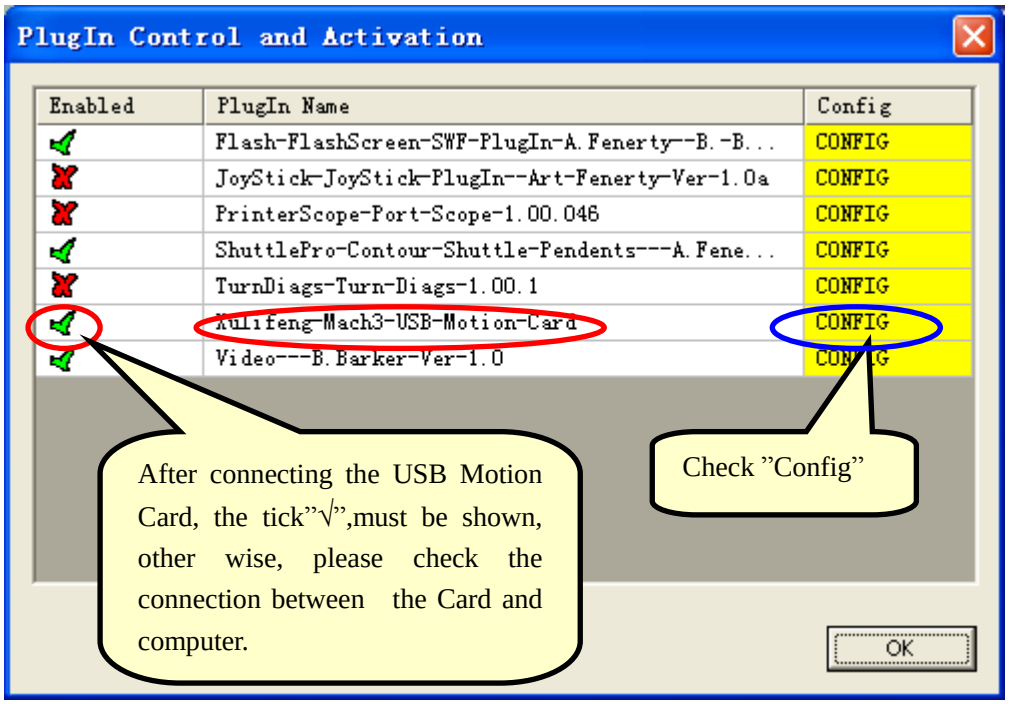
点击“Config”后出现 USB 卡配置对话框



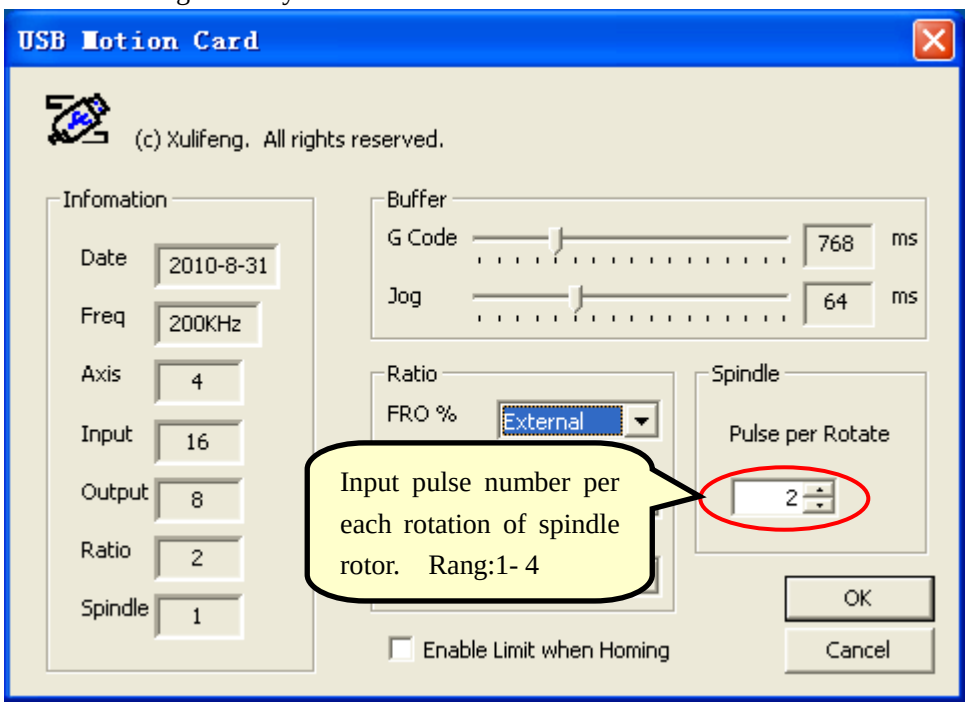
8 Measure the rotating speed of the spindle

8.1 USB Motion Card Configuration dialog

Go to “Config Plugins” under “Config” to go into “PlugIn Control and Activation”.

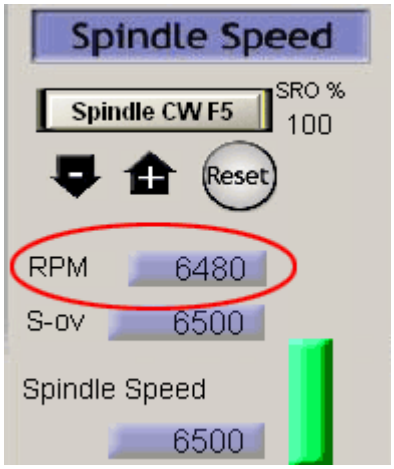


Check the “Config” to entry the “USB Motion Card”



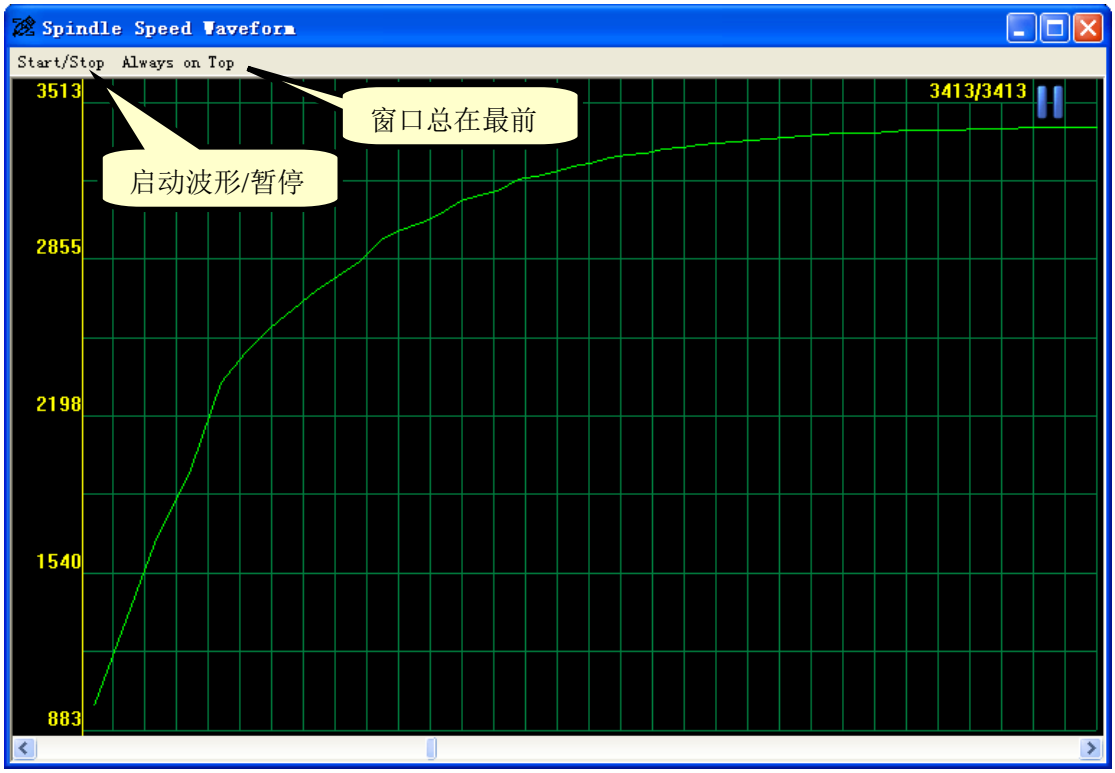
8.2 主轴转速显示

测量到的转速会在 Mach3 中显示



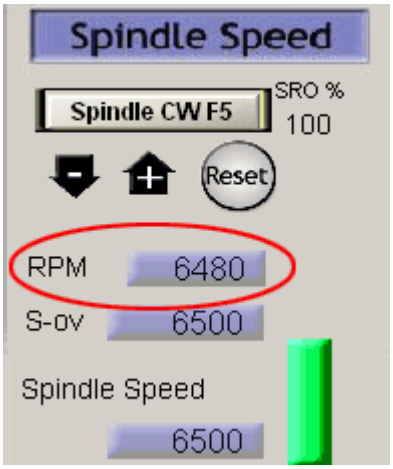
另外还可开启主轴转速实时波形显示

下图为：测量某主轴启动时的转速曲线

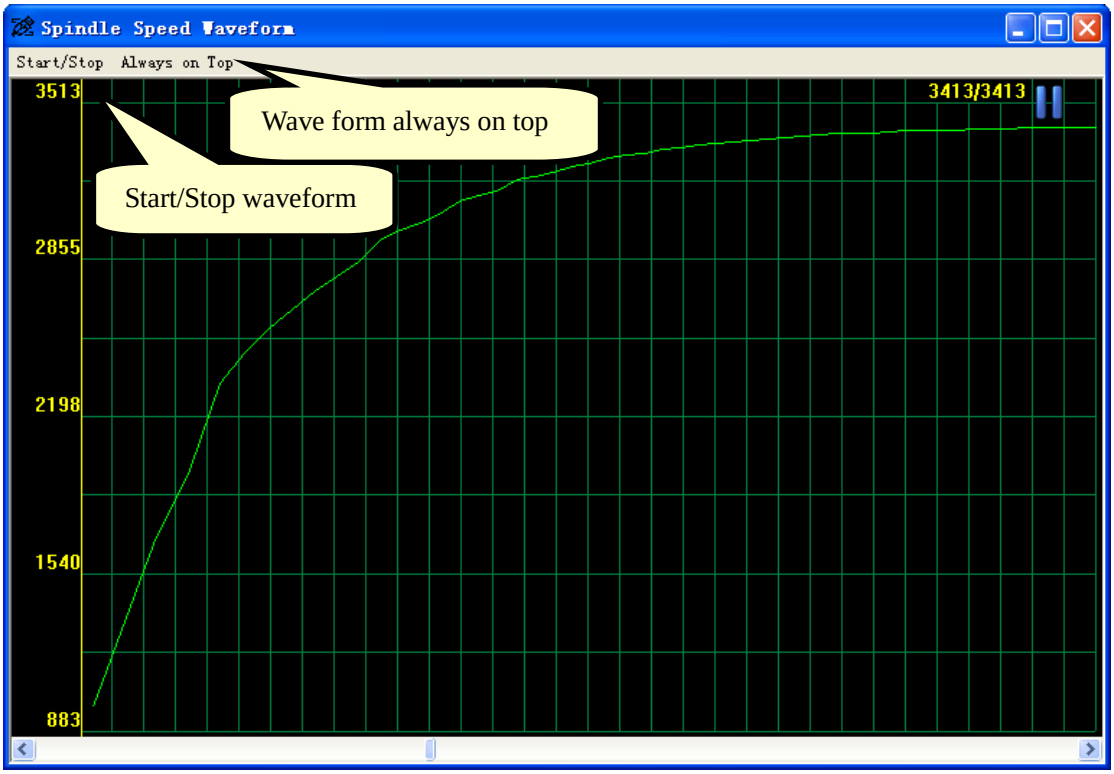


8.2 Show Spindle Speed

Measured speed will be displayed in the Mach3 as shown below

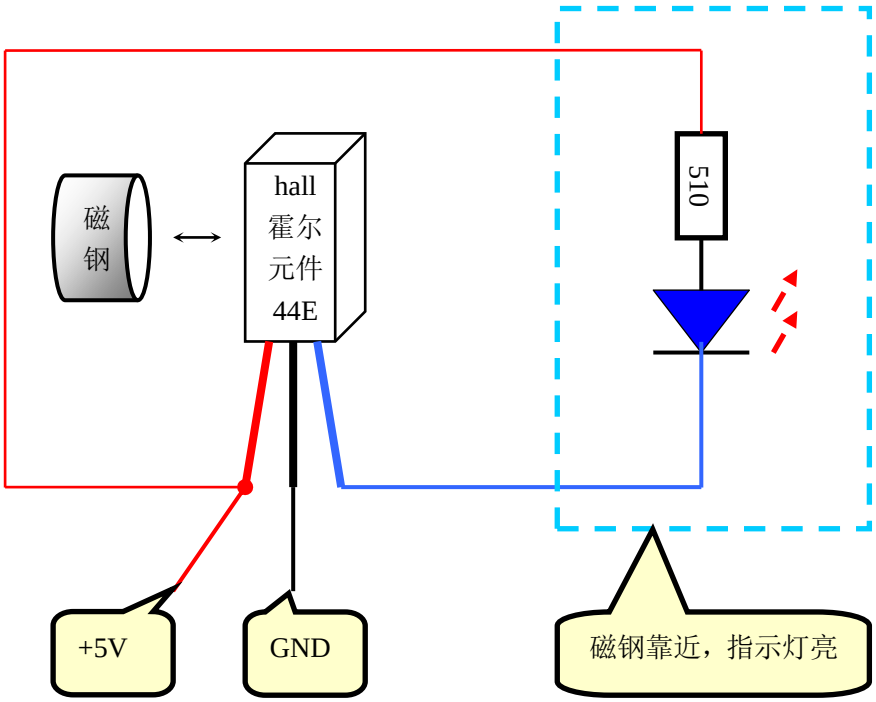


In addition, you can open the spindle speed real-time waveform display



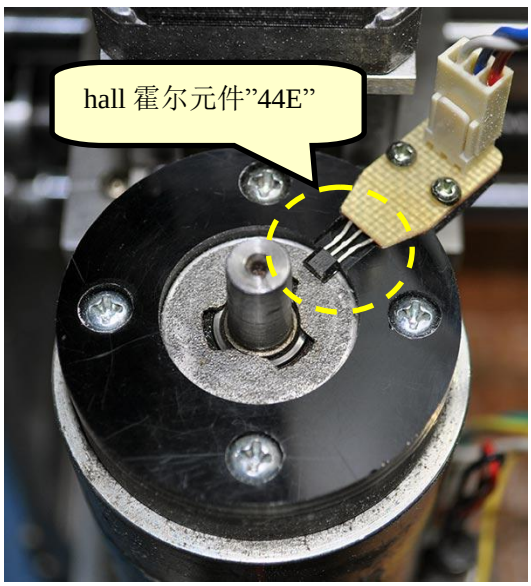
8.3 测速霍尔元件工作示意图

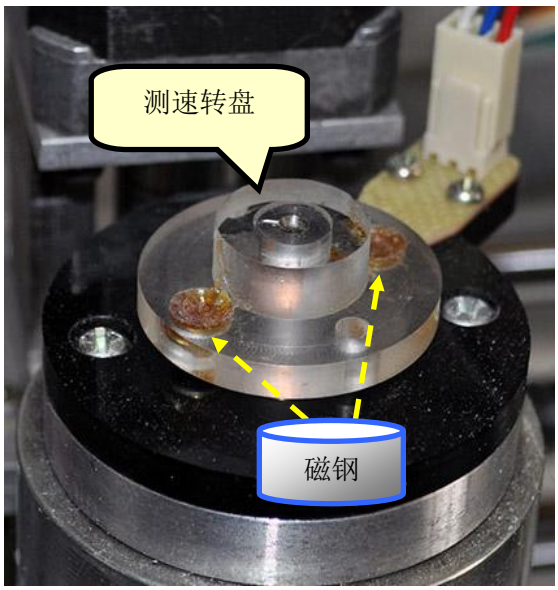
霍尔元件”44E”为集电极开路（漏极开路）输出，即 OC 输出。



8.4 测速霍尔元件/转盘安装示意图

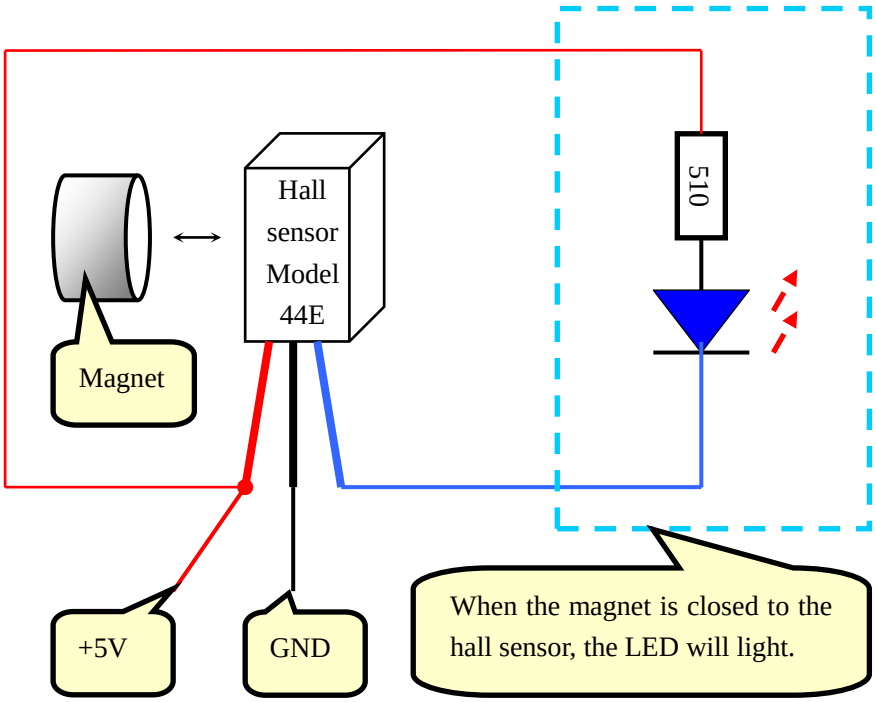
注意：磁钢有 SN 极，安装时注意调整。





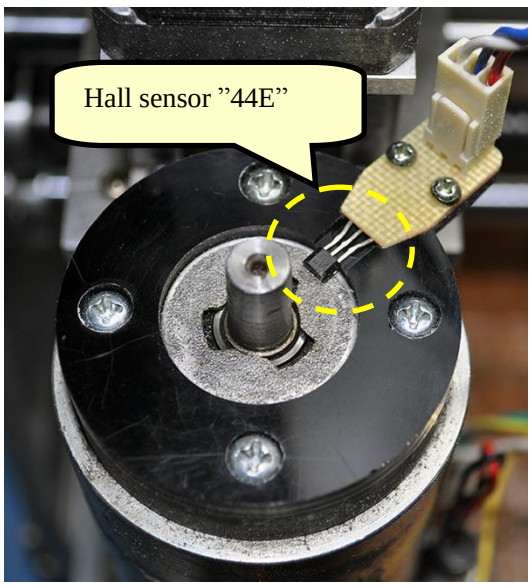
8.3 Hall sensor test circuit

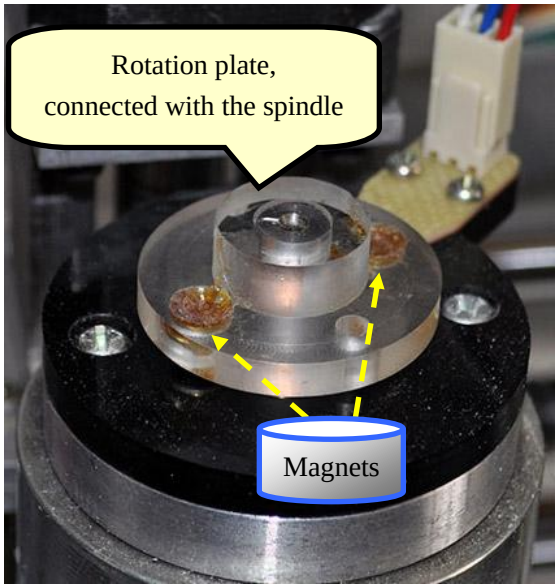
Hall sensor Model"44E", open-drain output (OC).



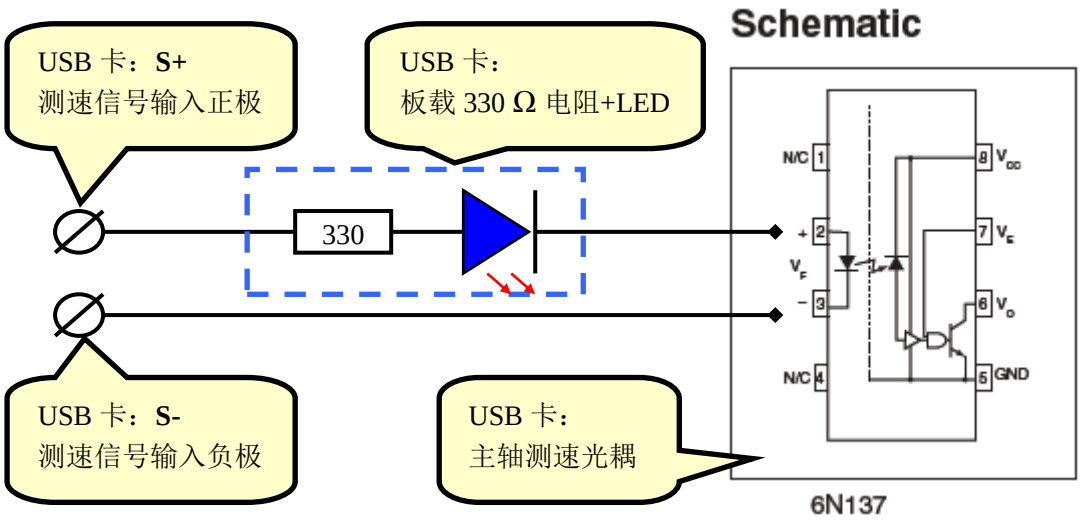
8.4 Hall sensor /Rotation plate install

Note: Be carefully about the direction of the magnetic poles of the magnet.

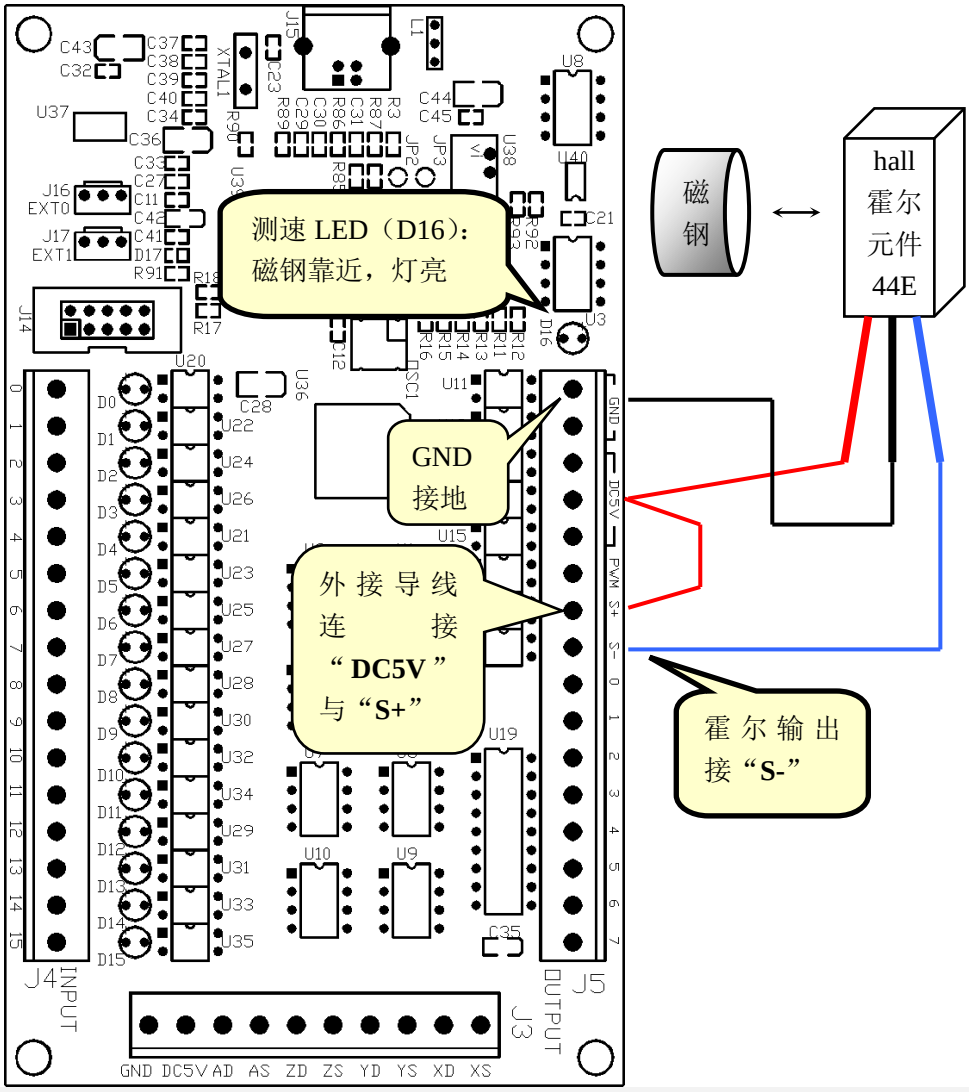




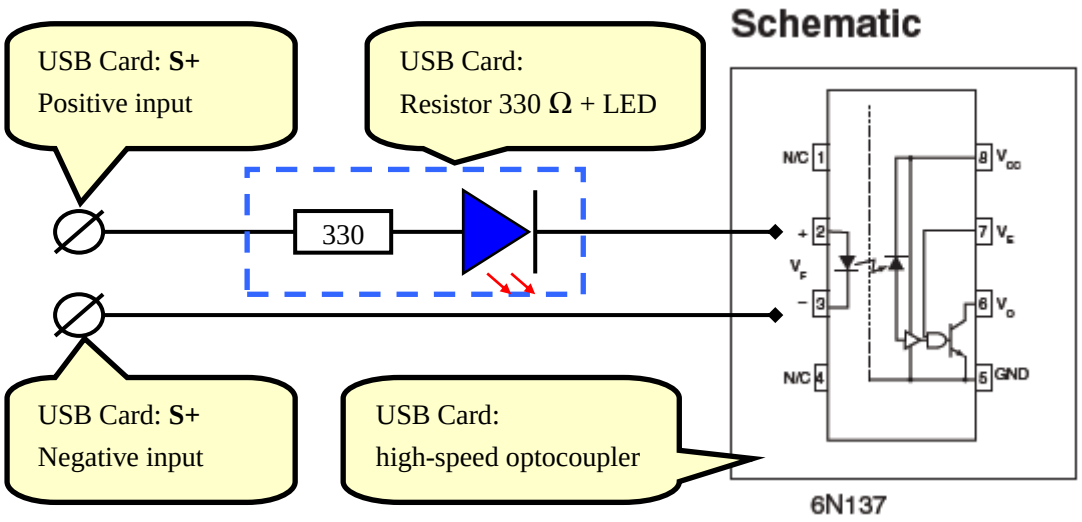
8.5 USB 卡的测速输入接口原理图



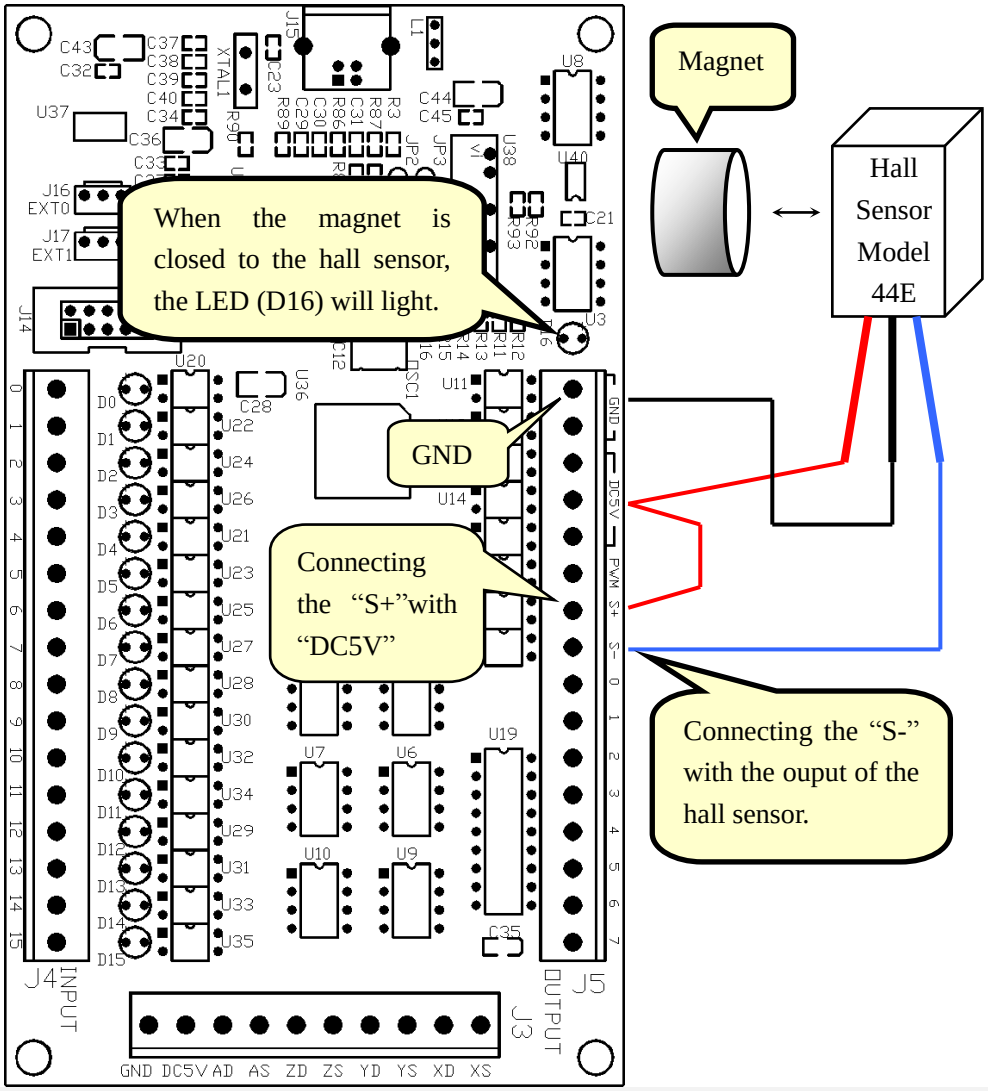
8.6 测速霍尔元件 USB 卡接线



8.5 Diagram of the spindle speed sensor part of the USB Motion Card



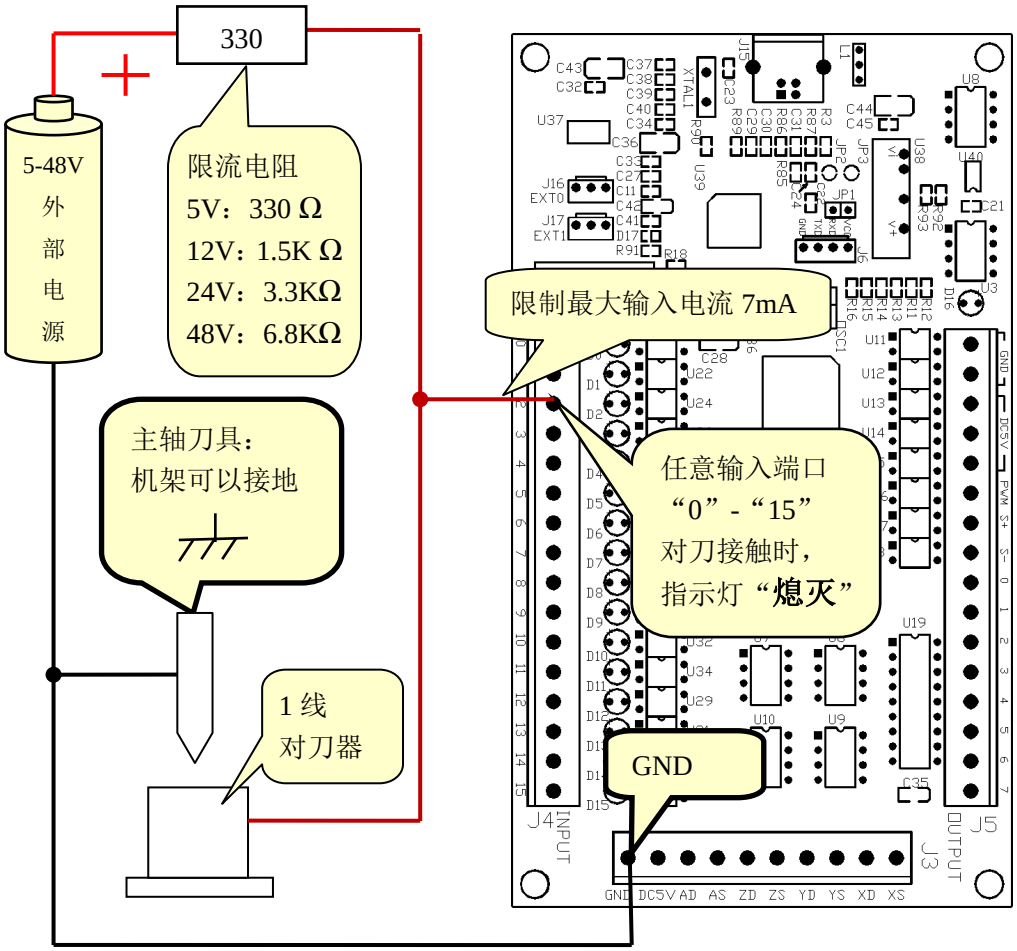
8.6 Connection Diagram of the hall sensor



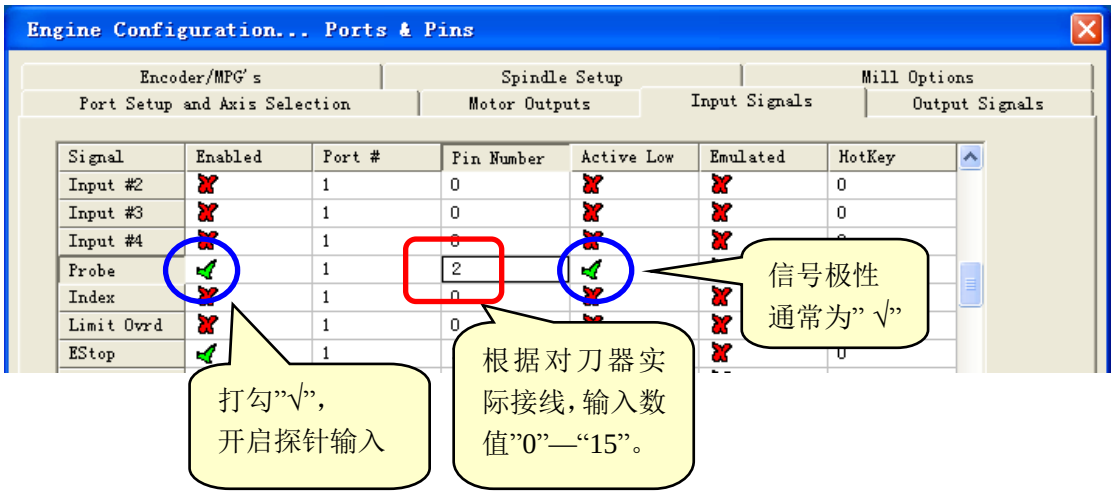
9 自动对刀

9.1 对刀器接线

9.1.1 “1 线”简易对刀器接线：



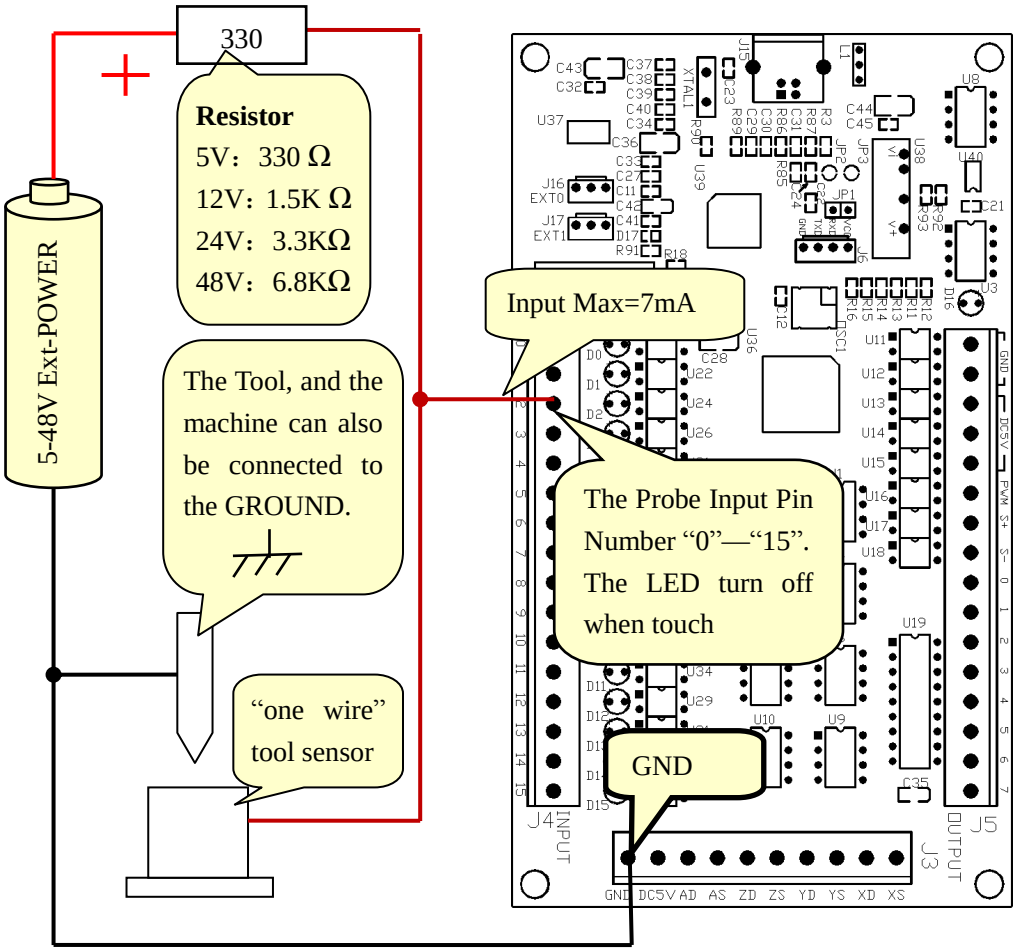
Mach3 中对刀输入信号配置，如下图所示：(Config => Ports and Pins)



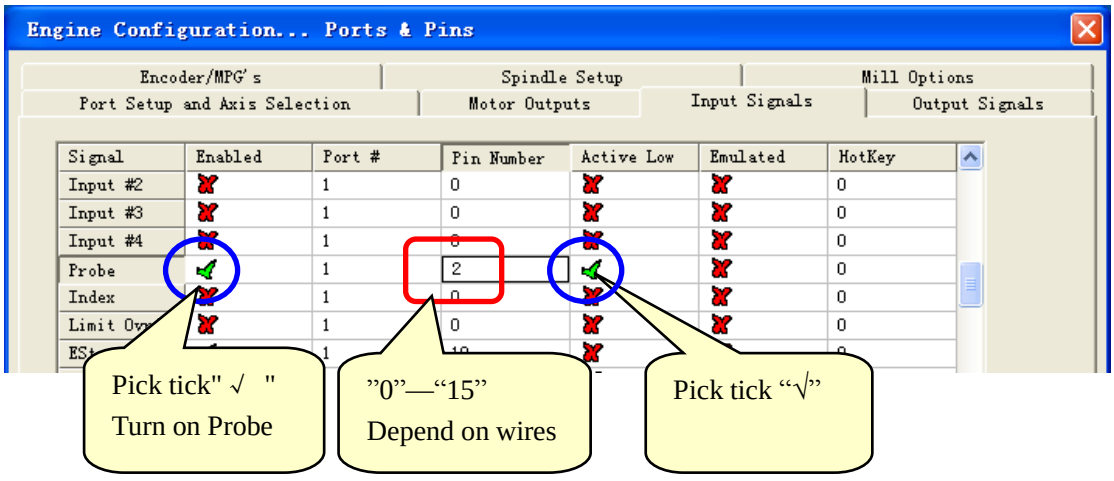
9 Auto tool zero

9.1 Tool touch sensor wires

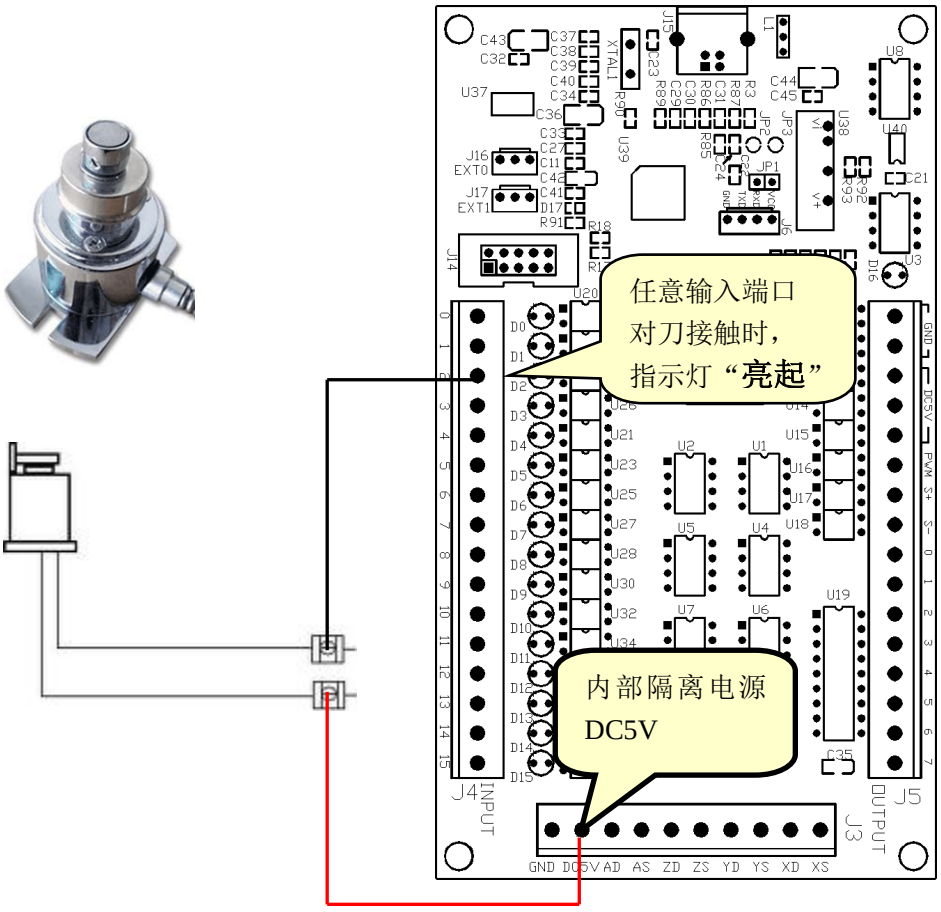
9.1.1 “one wire” simple tool touch sensor:



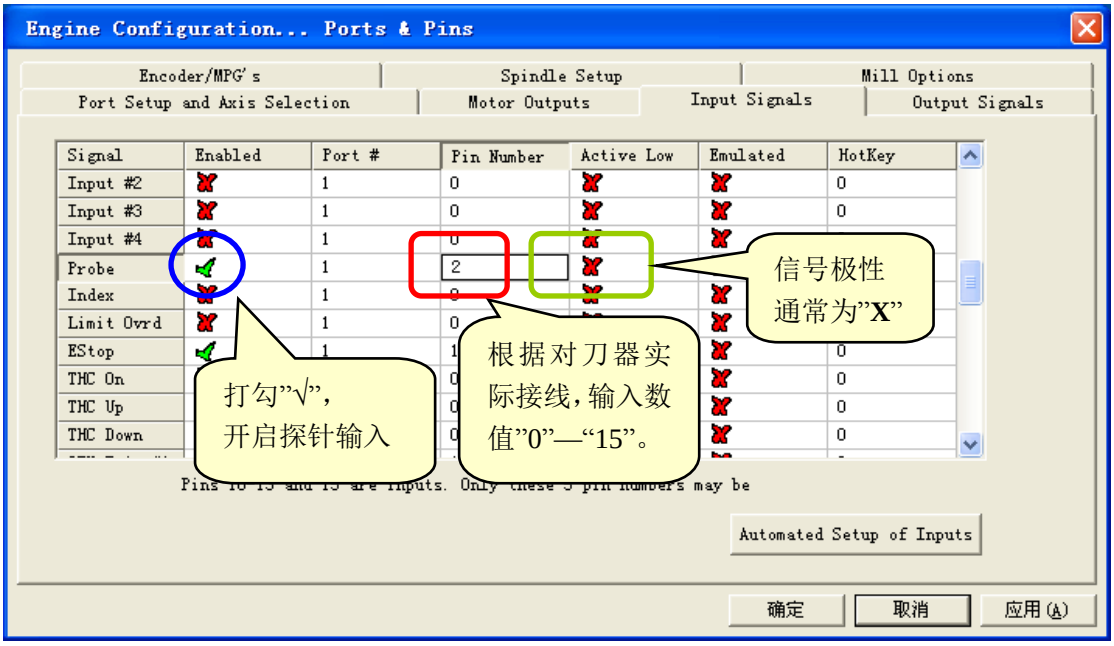
Setup Probe input signal, as shown below: (Config => Ports and Pins)



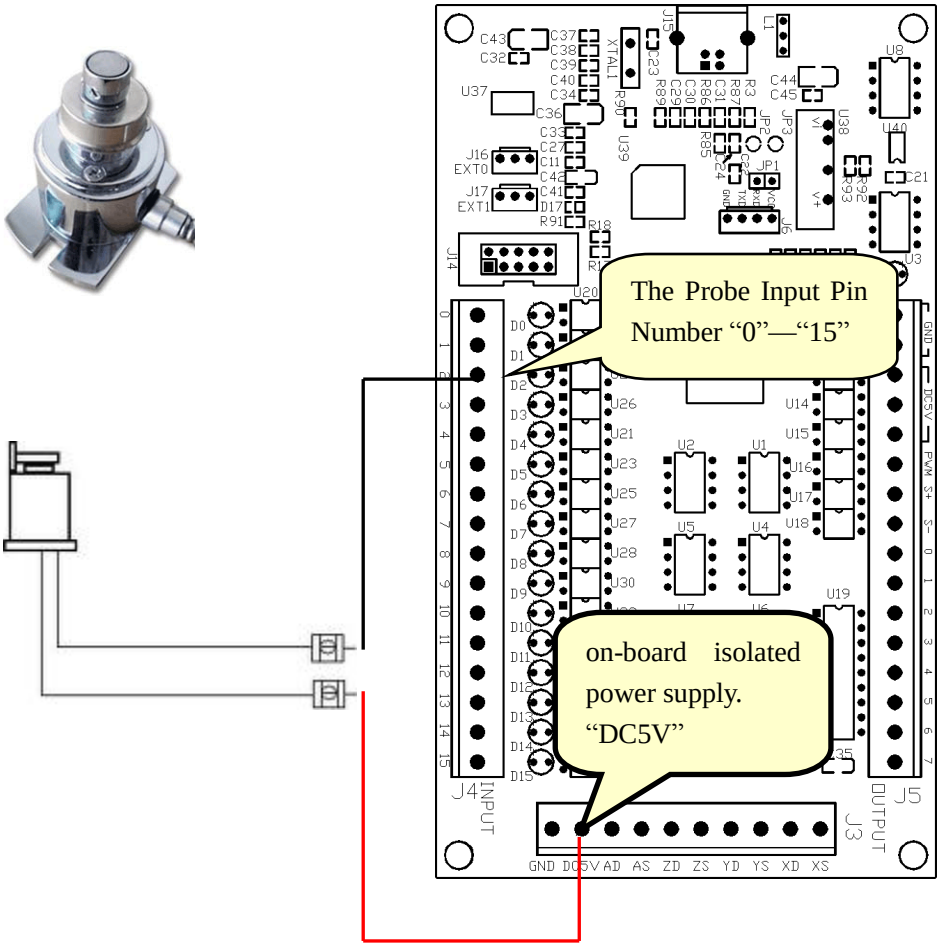
9.1.2 “2 线”对刀器接线：



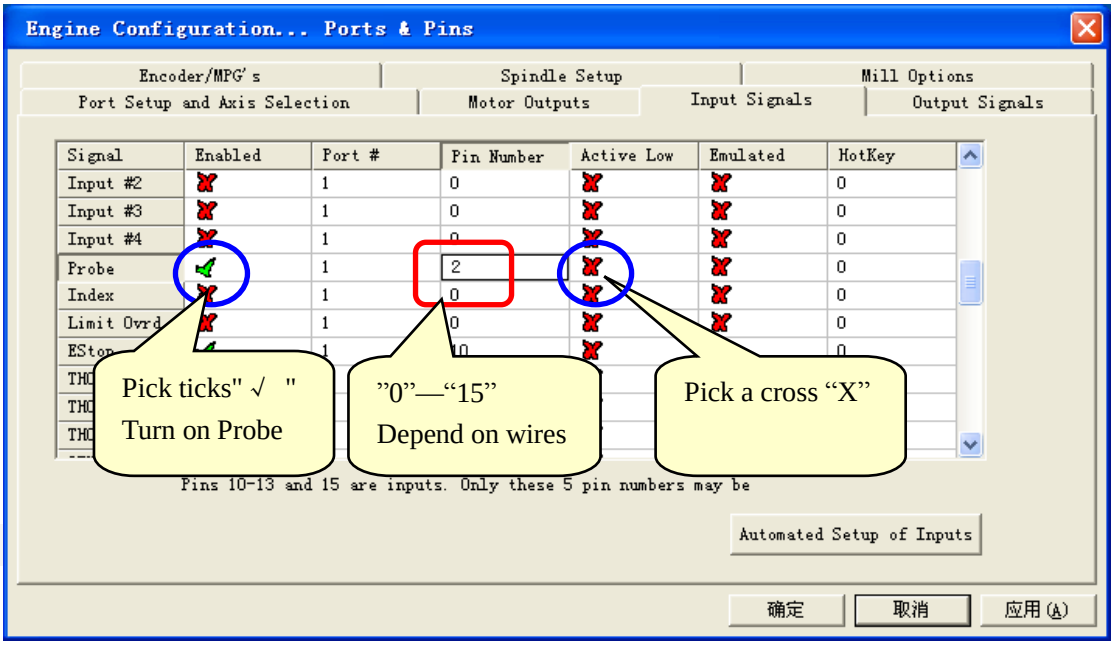
Mach3 中对刀输入信号配置，如下图所示：(Config => Ports and Pins)



9.1.2 “two-wire” Tool touch sensor:



Setup Probe input signal, as shown below: (Config => Ports and Pins)

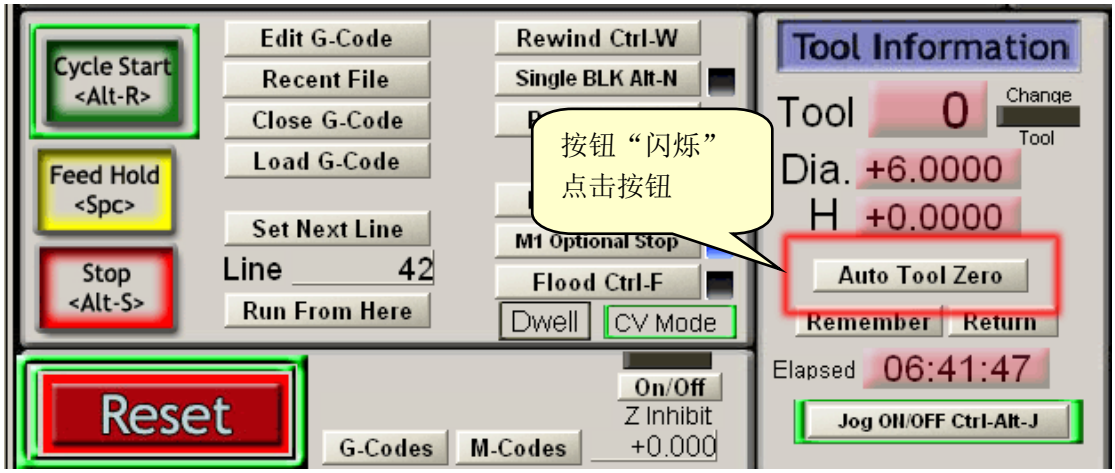


9.2 为自动对刀按钮，加载 VB 代码

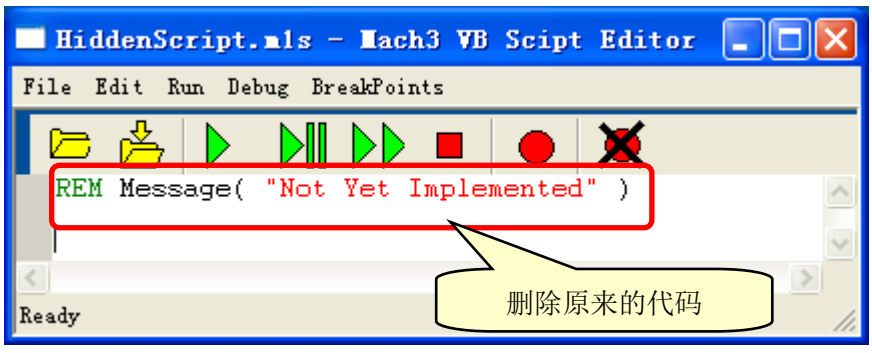
Mach3 的可以对现有的一些屏幕上的按钮自定义功能，比如将自动刀具对零按钮，设置自动对刀 VB 代码。

9.2.1 Mach3 菜单 (Operator => Edit Button Script)

9.2.2 点击**闪烁**中的“**Auto Tool Zero**“按钮



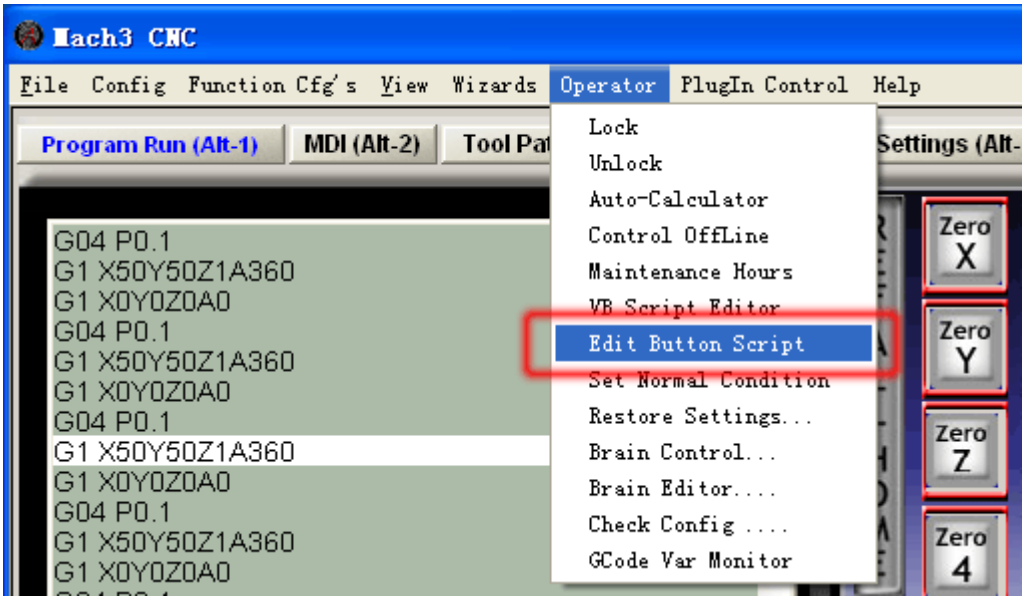
9.2.3 弹出 VB 编辑器，删除代码。



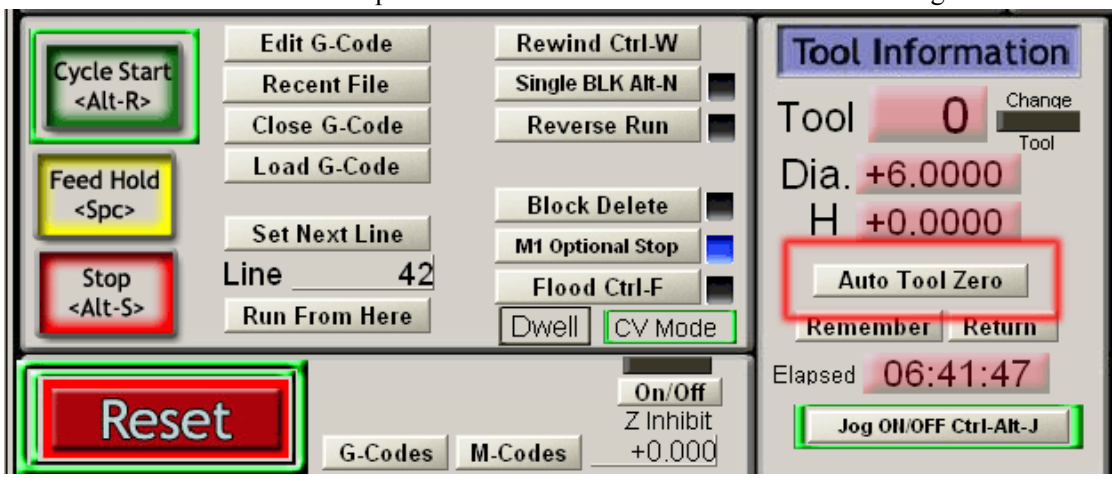
9.2 Loading the VB Script to the Auto Tool Zero Button

That Mach3 provides for customizable, user-defined button macros on some of the existing screen buttons is what makes this possible without having to do Mach3 screen designs to add new buttons. The Auto Tool Zero button on the Programs Run screen is the one used for this purpose.

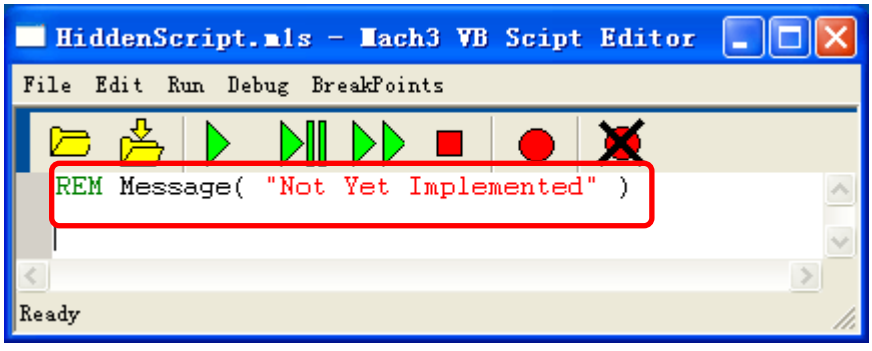
9.2.1 From the Mach3 Program Run screen, click “Operator” on the Menu bar



9.2.2 then click “Edit Button Script”. The buttons that are editable will start flashing.

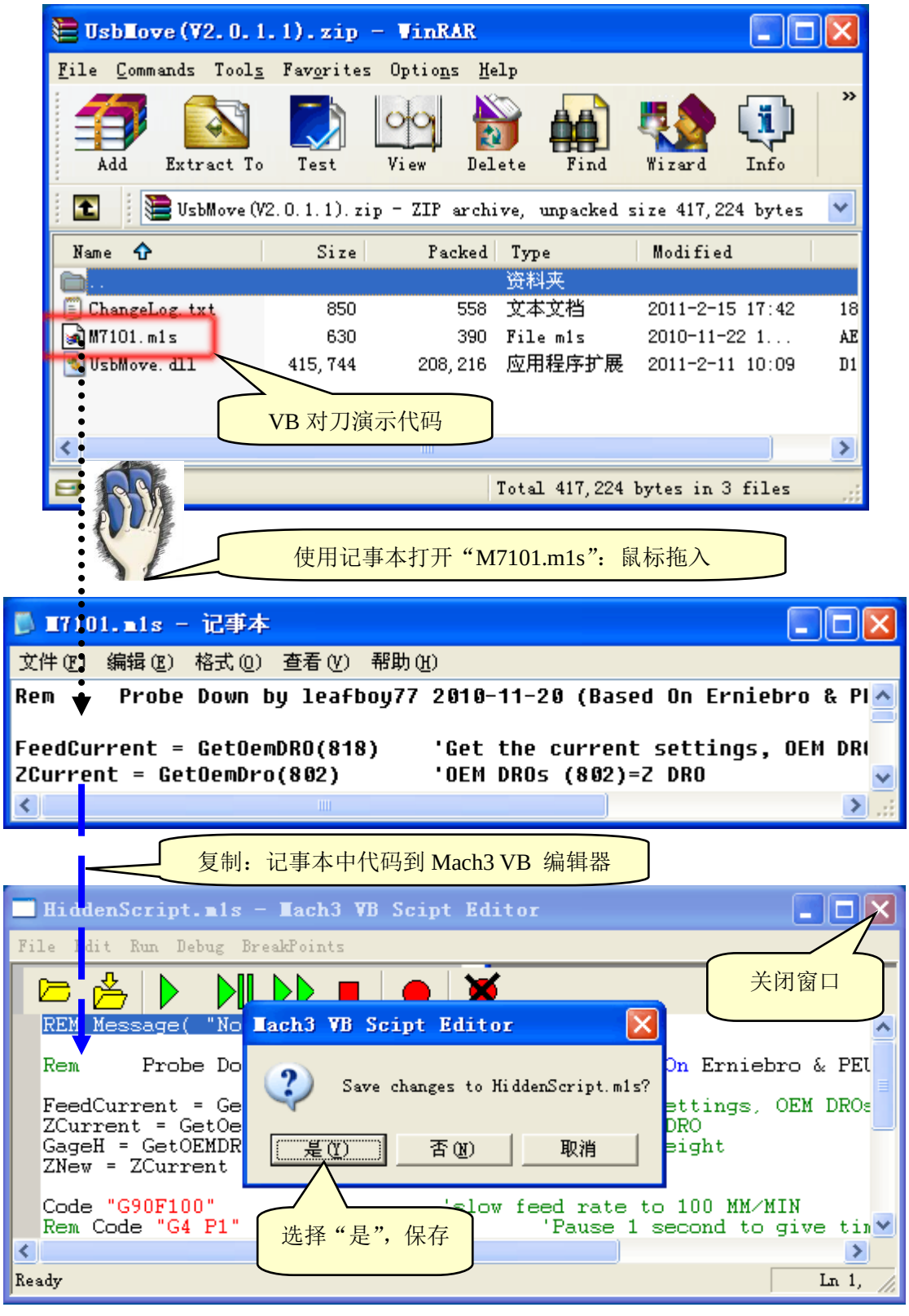


9.2.3 click the flashing Auto Tool Zero button. The Mach3 VB Script Editor window will open. By default this file will always be named "HiddenScript.m1s and at first there is one line of code in the edit window that may have a “Not Implemented” message in it.



9.2.4 将 VB 对刀代码，输入在 VB 编辑器中。

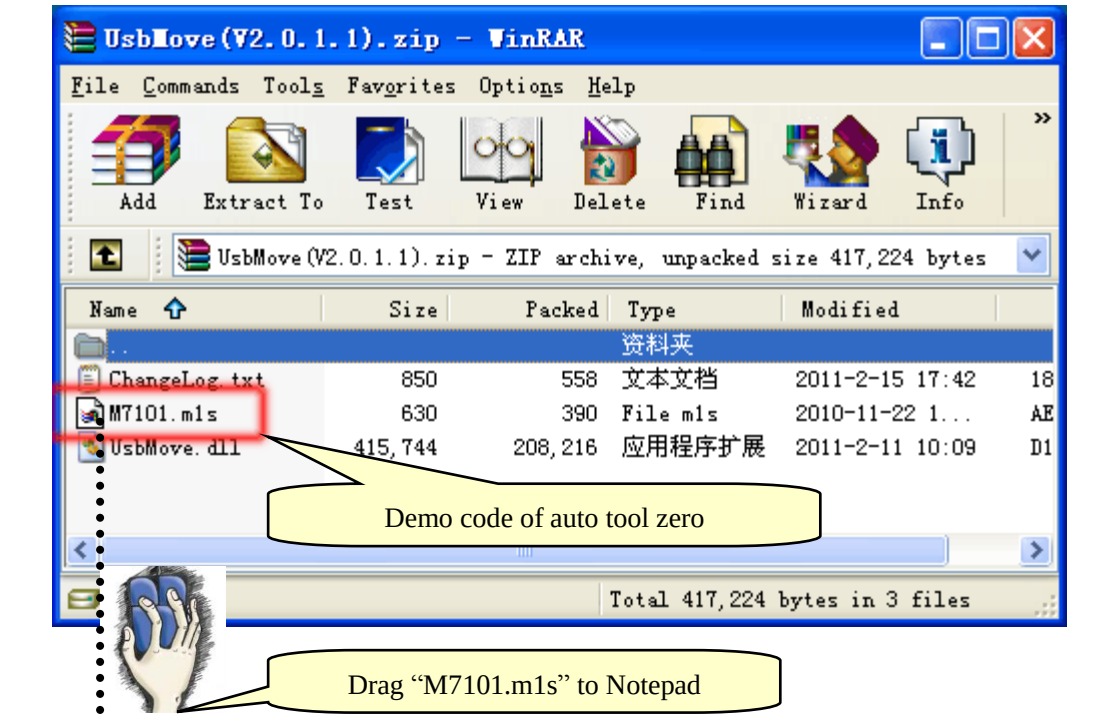
USB 卡附带的 **usbmove.zip** 中提供了 VB 对刀演示代码“**M7101.m1s**”，使用记事本打开。

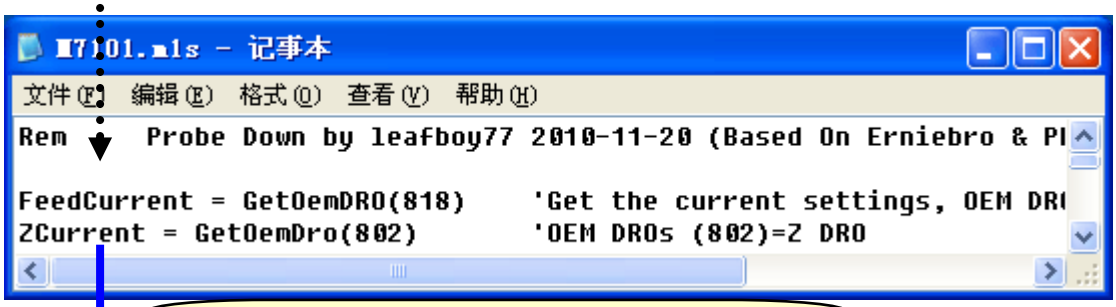


9.2.5．测试：点击“**Auto Tool Zero**“按钮，测试对刀动作。

VB 对刀演示代码，根据实际需要更改。

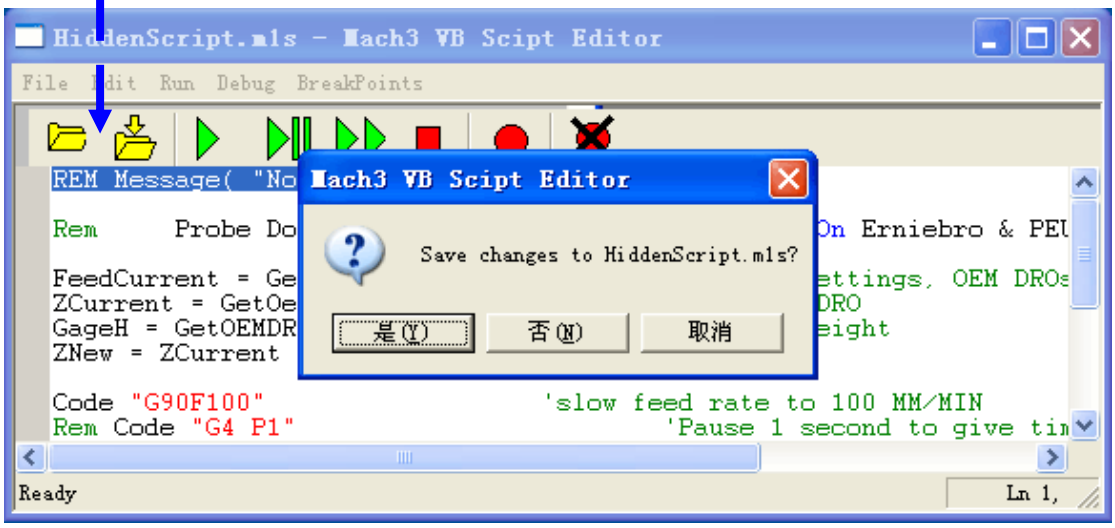
9.2.4 Click any where in the edit window's white space. Highlight any lines by typing Ctrl+A and press the Delete key or click Edit > Select All > press Delete key.





Copy all of the lines in the script from this document

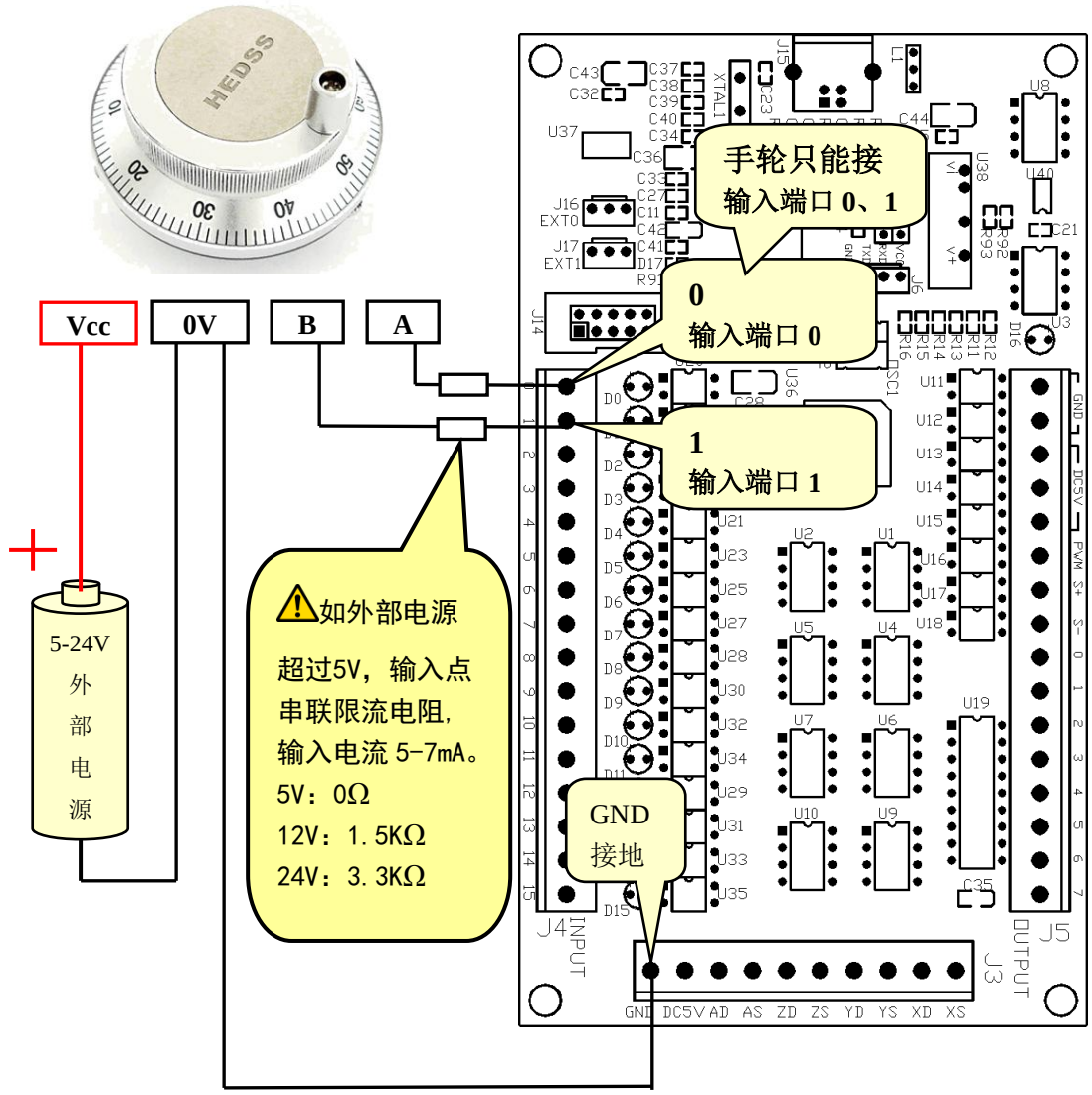
Paste them into the VB Script Editor window then click File > Save.



9.2.5 Note: http://buildyourtools.com/phpBB3/viewtopic.php?f=5&t=985

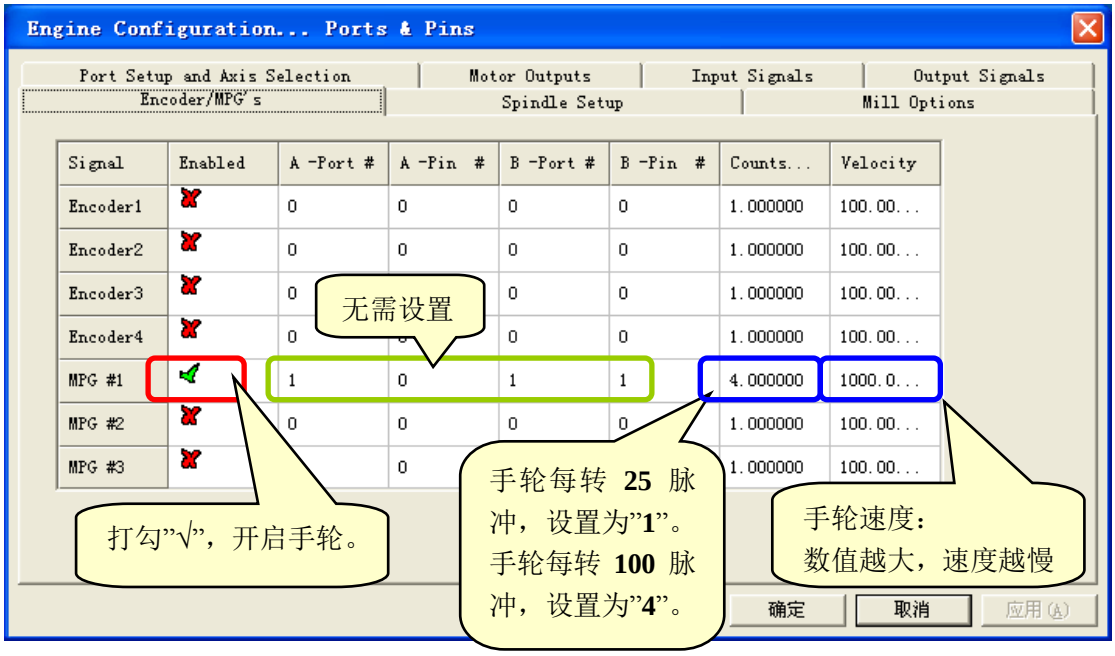
10. 电子手轮

10.1 外部电源供电(推荐)

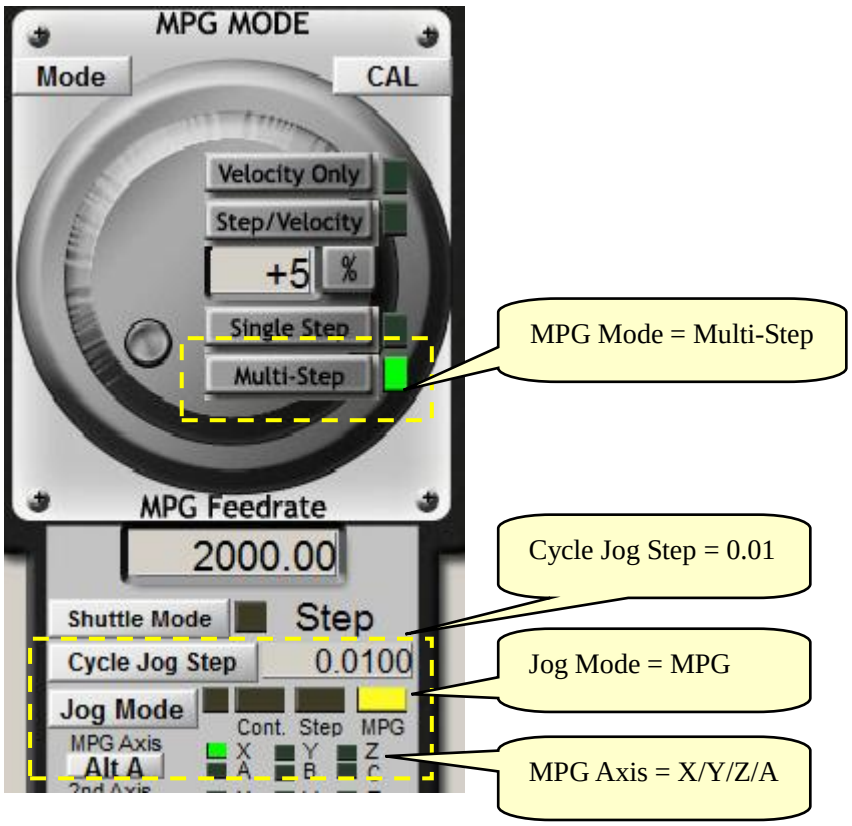


10.2 软件配置

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

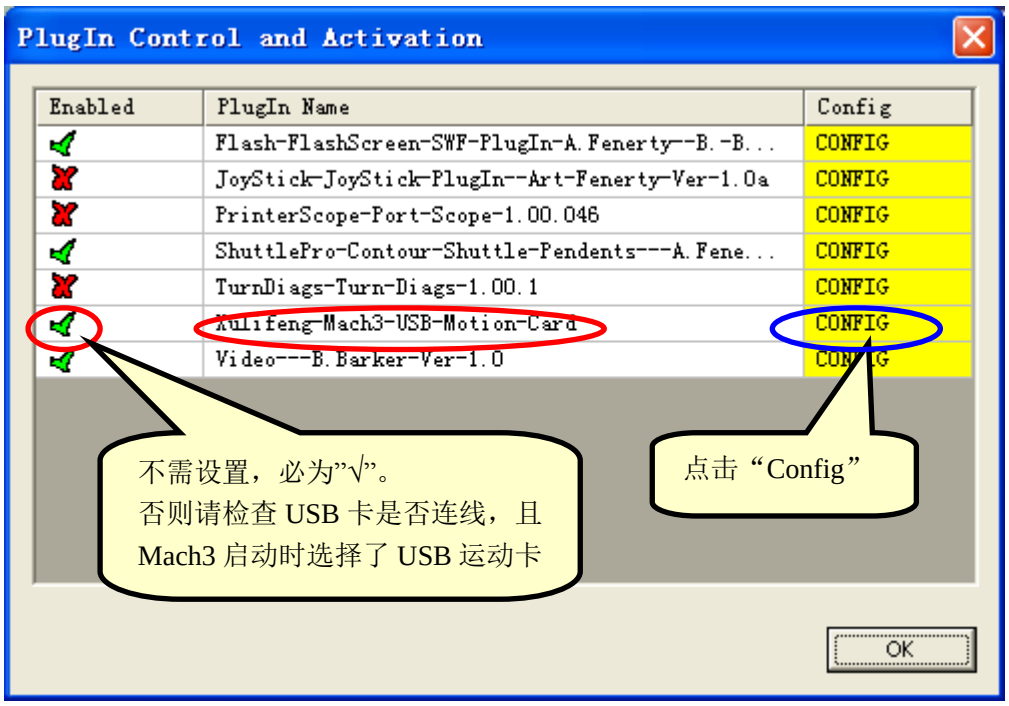


10.2.2 按键盘"TAB",如下所示设置

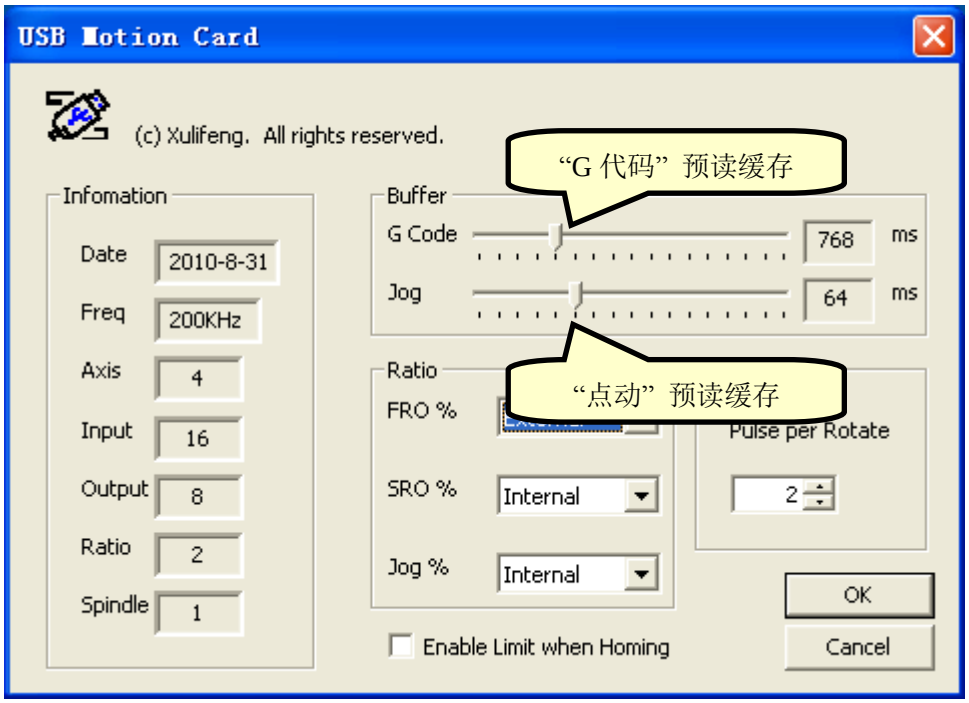


11 USB 运动控制卡的预读缓冲设置

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

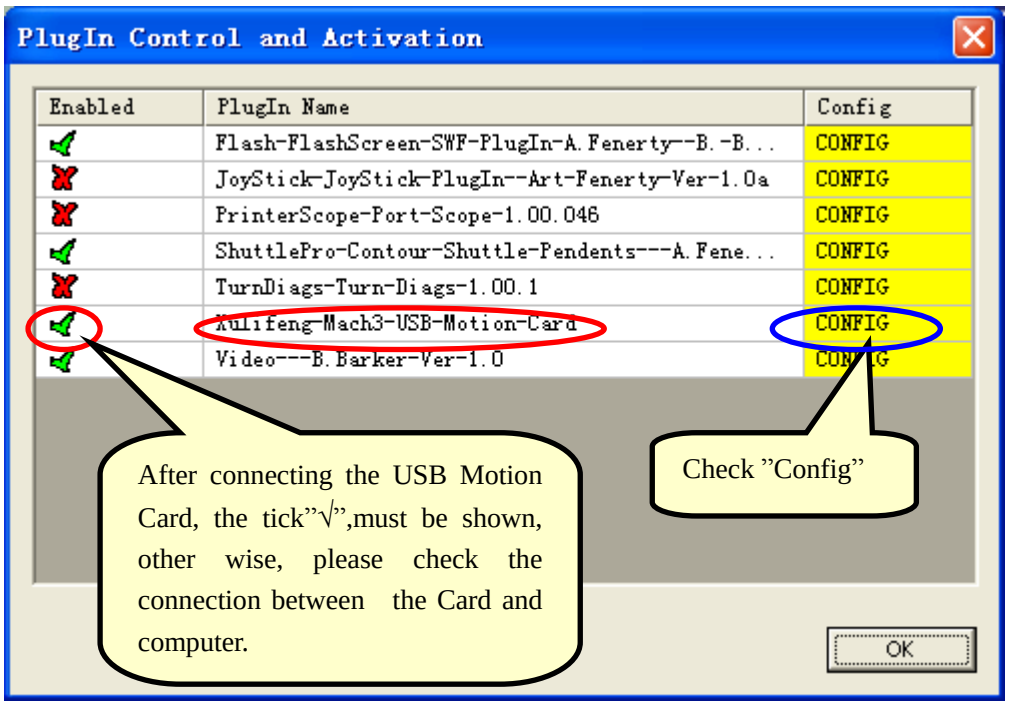


11.2 依据所用 PC 机性能，设置预读缓存。调整缓存时间，使运行流畅。



11 Read-ahead buffer setting

11.1 Go to “Config Plugins” under “Config” to go into “PlugIn Control and Activation”.



11.2 In accordance with the performance of a PC, set the read-ahead buffer. Adjust the buffer time to run smoothly.