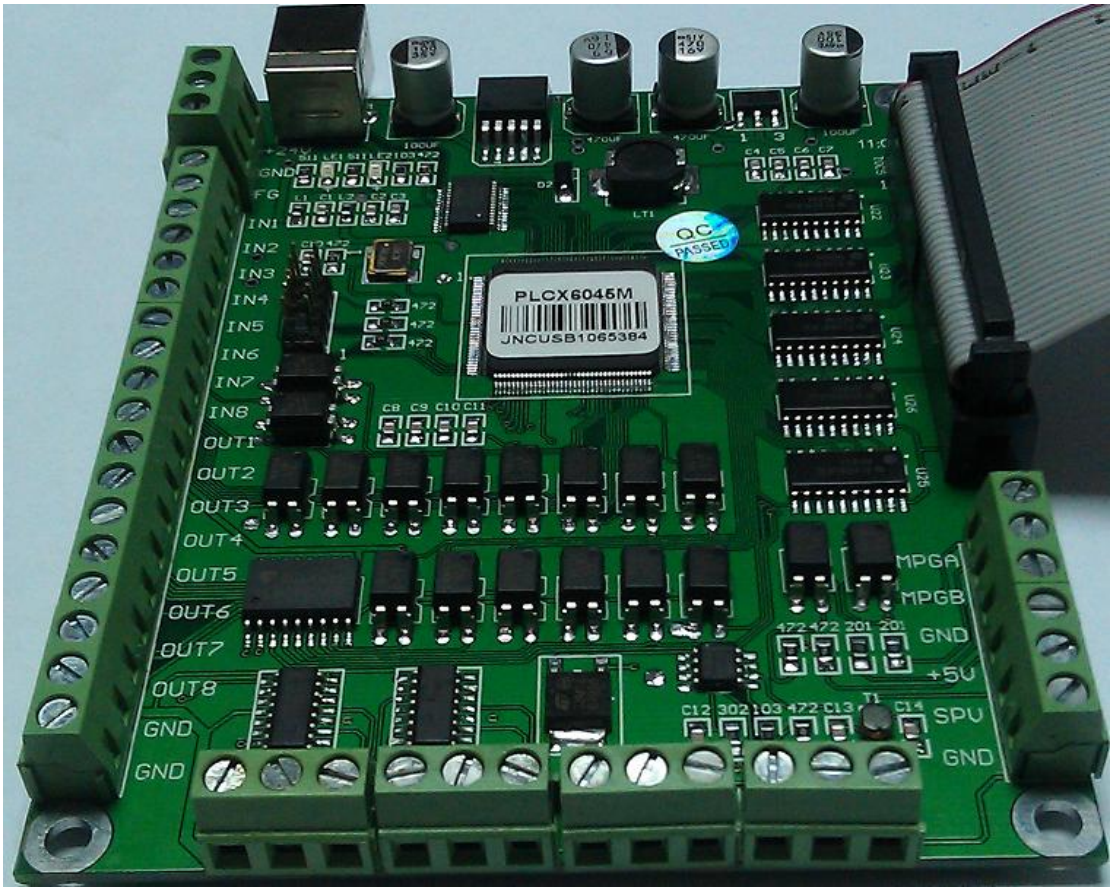
JNC-40M（Compatible with Mach3）



Thank for choosing the product of our company.

This manual will help you acknowledge the product of our company, the information of this chip and MACH3 software configuration. Please read this manual carefully before you use this moving control chip.

It will be sorry for the differences between the software and hardware you receive and the statement in this manual because of the updating of them.

Specification： This control chip is used with MACH3 Software; it is Three-axis linkage interpolation support for the version of R2.60-R3.04. Mach3 digital control software is the product of ArtSoft CNC Software Company. It has good performance, and is easy to use. The copyright of Mach3 digital control software is belong to Artsoft Company, the Material we provide is only used to study. The Homepage of Art software company: http://www.machsupport.com/,

Notice：

1. No hot plug the USB cable connected with the computer；
2. Do not wire and operate when the power is turned on;
3. The shell of computer and engraving machine should connect with ground wire to ensure safety and prevent from inference.
4. Please turn off the power supply when the machine does not work;
5. Unplug when not in use；
6. The longevity of spindle motor bearings is inversely proportional to its speed;
7. The graver is very sharp; don’t touch it by hands, handkerchief or scarves when it is running, in case of accident.

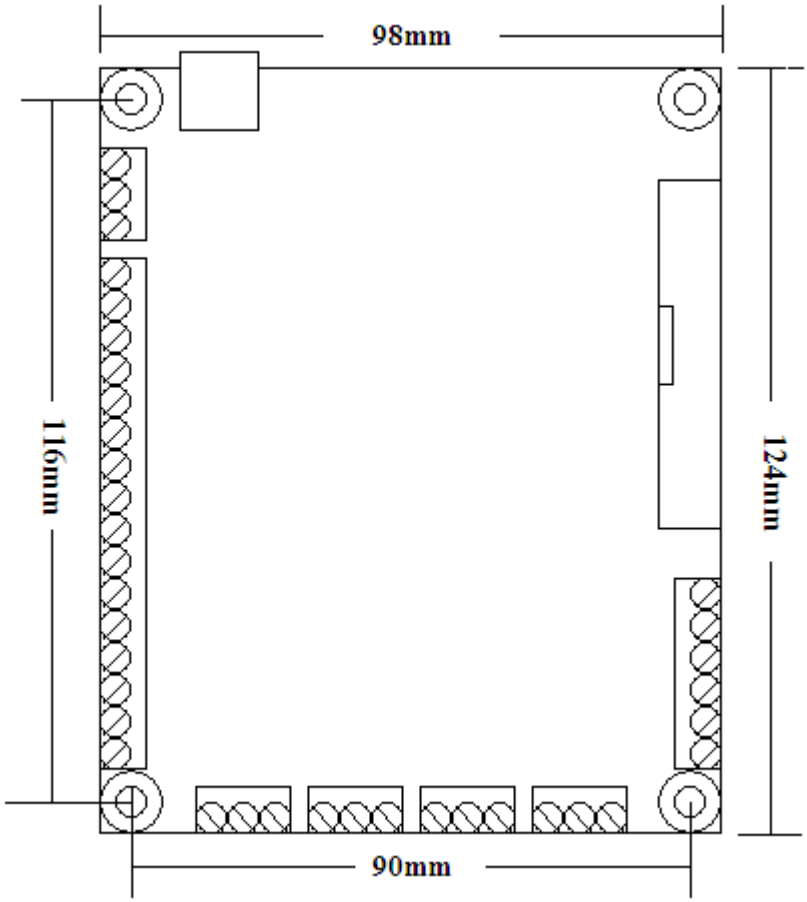
Electrical Specification：

USB2.0 interface，Reliable data transmission distance: 6 meter, axle output signal: differential amp, Long distance control over twisted-pair. Suitable for AC servo driver interface.

Control	**Max AXIS**	3 Axis or 4 Axis
	Stepper motor drive control	support
	AC Servo Motor control	Support
	Motion control chip	OEM by Japan
	Moving speed	6m/min (Accuracy 0.001mm) or 18m/min (Accuracy 0.001mm)
	USB interface	USB 2.0 Compatible with USB 1.1
	USB drive packet	Support Win98_2k_XP_WIN7 Drivers
	Spindle	1
Spindle	**Speed Signal**	Analog signal 0-10V
	D/A Change Accuracy	16 bits
	Position Signal Type	pulse/direction
Drive interface	**Control Signal Type**	Differential signal
	Pulse Frequency	100KHZ or 300KHZ
	Pulse Width	Min 5us or 1us
I/O	**Input**	Independent 32 input (total opt couple, start button can be connected externally)
	Output	Independent 21 output
	Port Address	Mach3 port 1，2
	Pin address	Mach3 pins 1-60 （not include axle output）
Power		DC24V， 900mA
Temp		-10℃-80℃

Mechanical Specification：

Unit：Millimeter

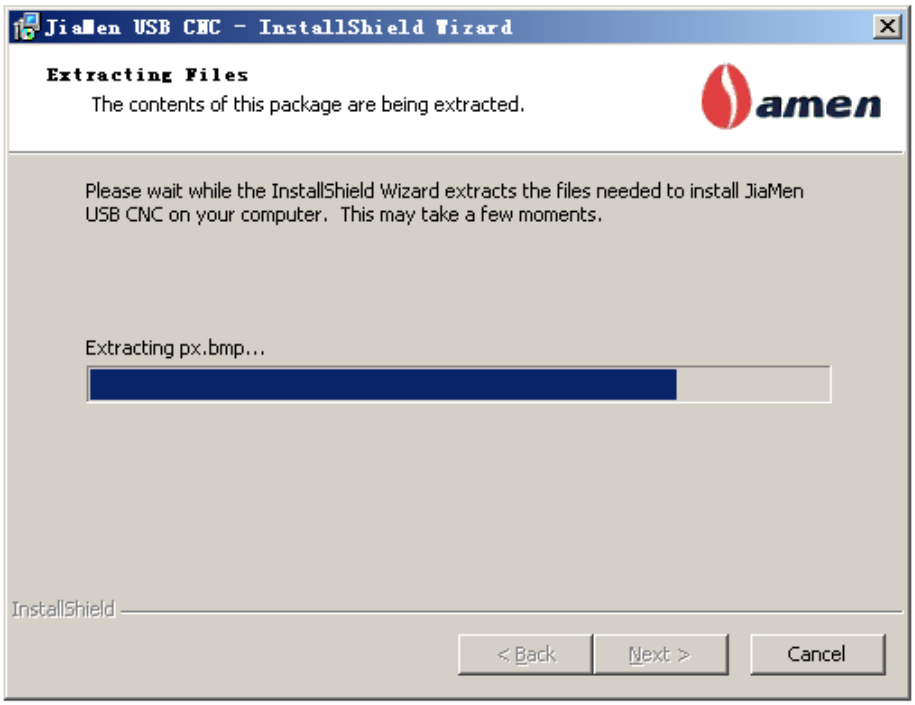


Installation Guide：

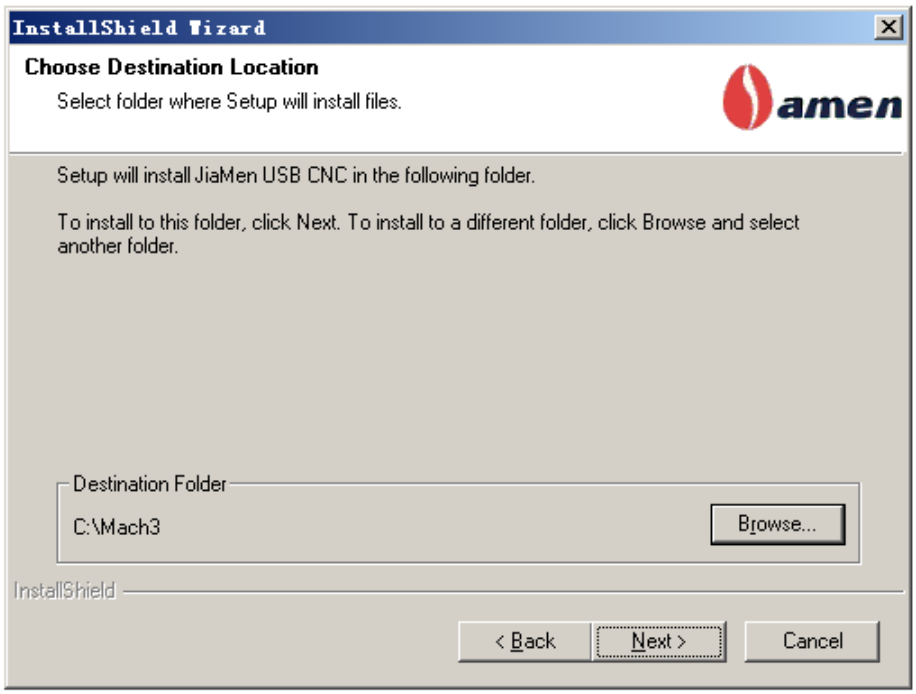
1. The control card used in the Mach3 2.63 or later, supports the latest version of the。
2. Operate System: WindowsXP Windows7， Window2000， CPU Frequency P4-1.6G , Memory 512M。
3. First installed Mach3 Software，Do not power the control board first，Unplug the USB connection, The next step。

Click the CD-ROM “Jamen JNC-40M Vx.x” Installer icon，Installing the USB drive and card control software

4. Wait to begin the installation screen appears, click "Next" a software copyright notice, If you agree to accept the agreement, click "Next" to continue the installation.

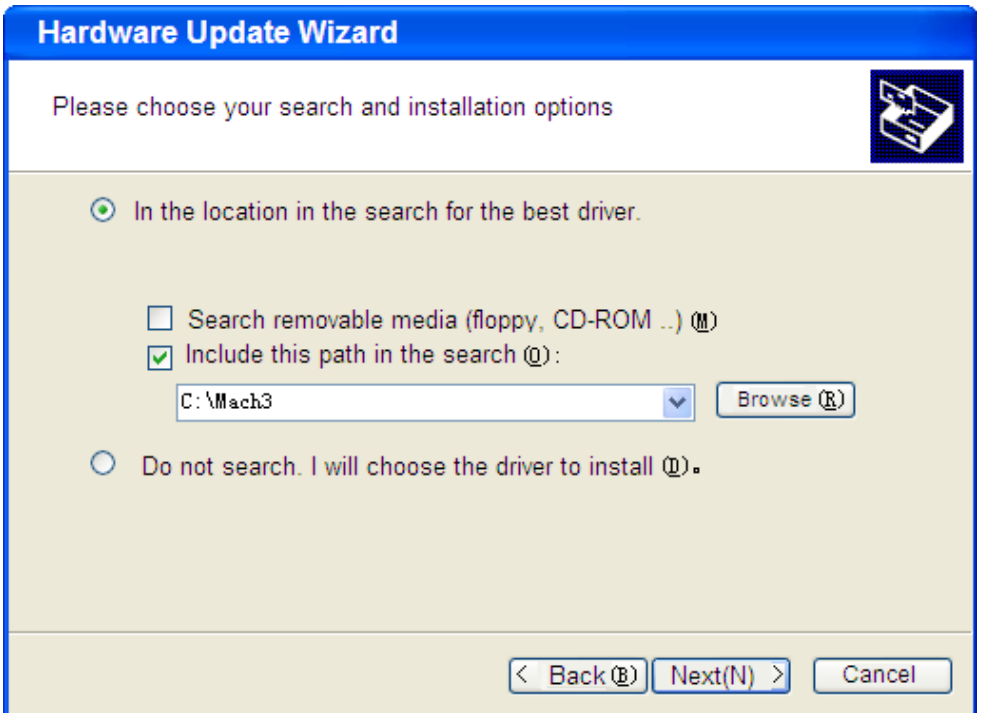


5.In the Installation Path Selection dialog box appears, select the Mach3 software correctly installed in the path, or the next is wrong. (Not complete control)

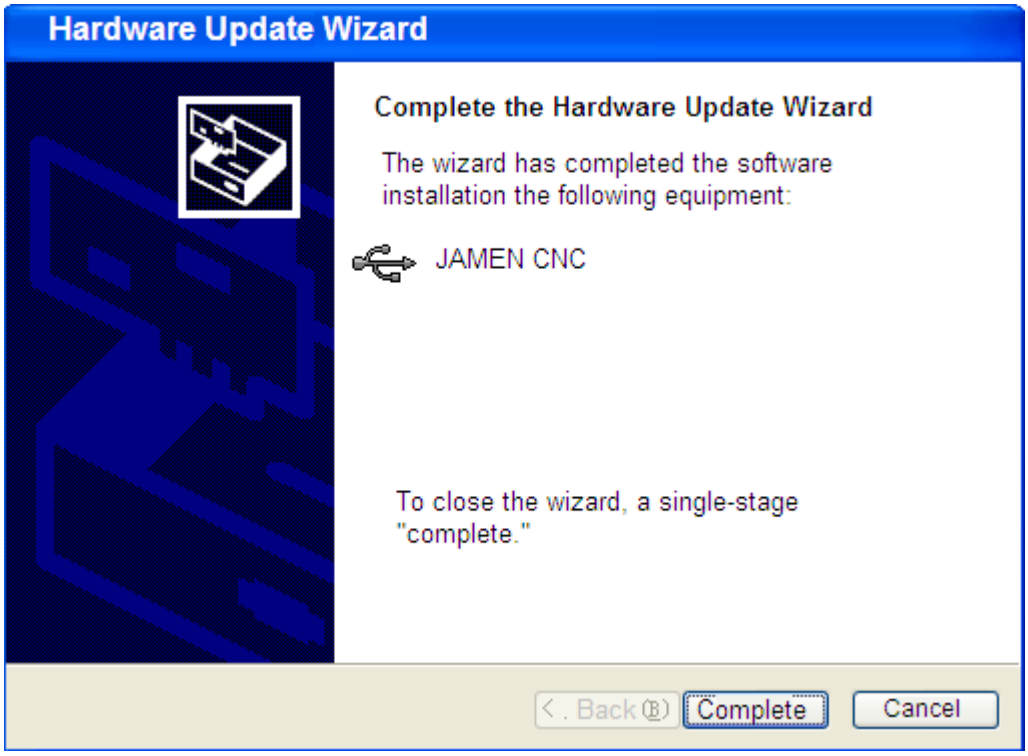


5. After the installation of the driver and the control software “Jamen JNC-40M Vx.x", the control card can be connected with the power. And plug the USB line with the normal work of the electricity. Windows informs to discover the new hardware. (The following illustration is in the usage of the operating system of WINDOWS XP SP2).

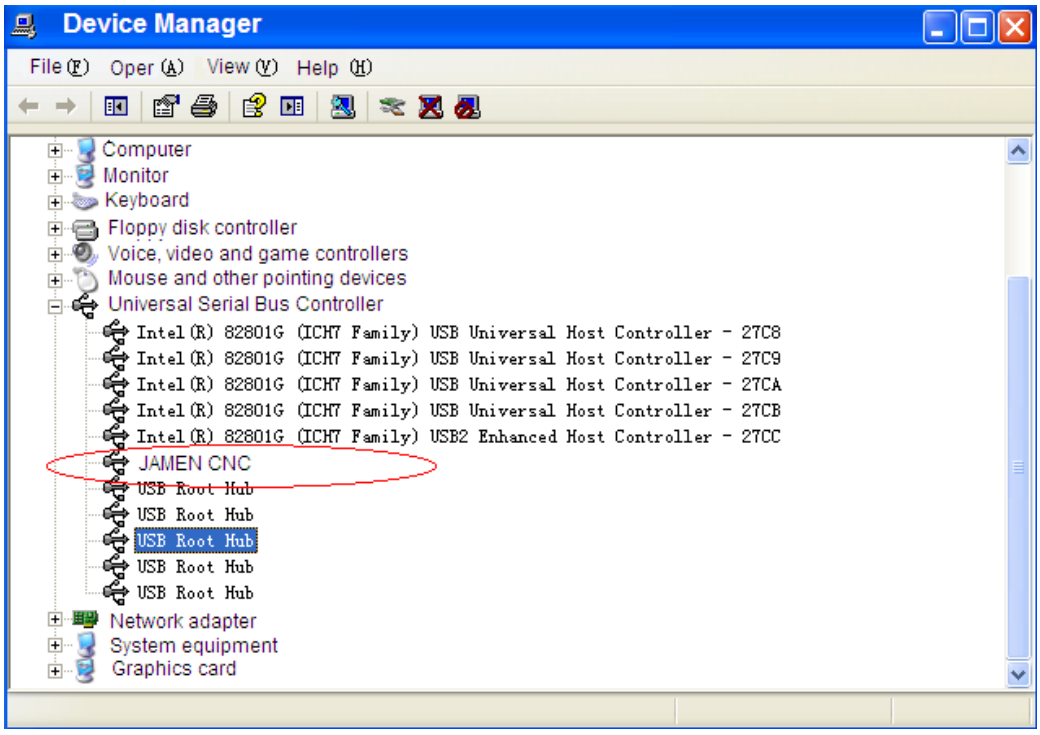
Choose the button of "instal from the list or the designated place" to continue to the next step according to the notes. The button of "instal the software automatically" cannot be selected. Press the button of "browse" in the following dialogue box, and choose the installation path for the software Mach3.



6. Correctly choose the installation path for the software Mach3, and continue to the next step. Complete the installation.



The drive device can be found in the Device Manager of the computer after the installation. Please refer to the following figure:



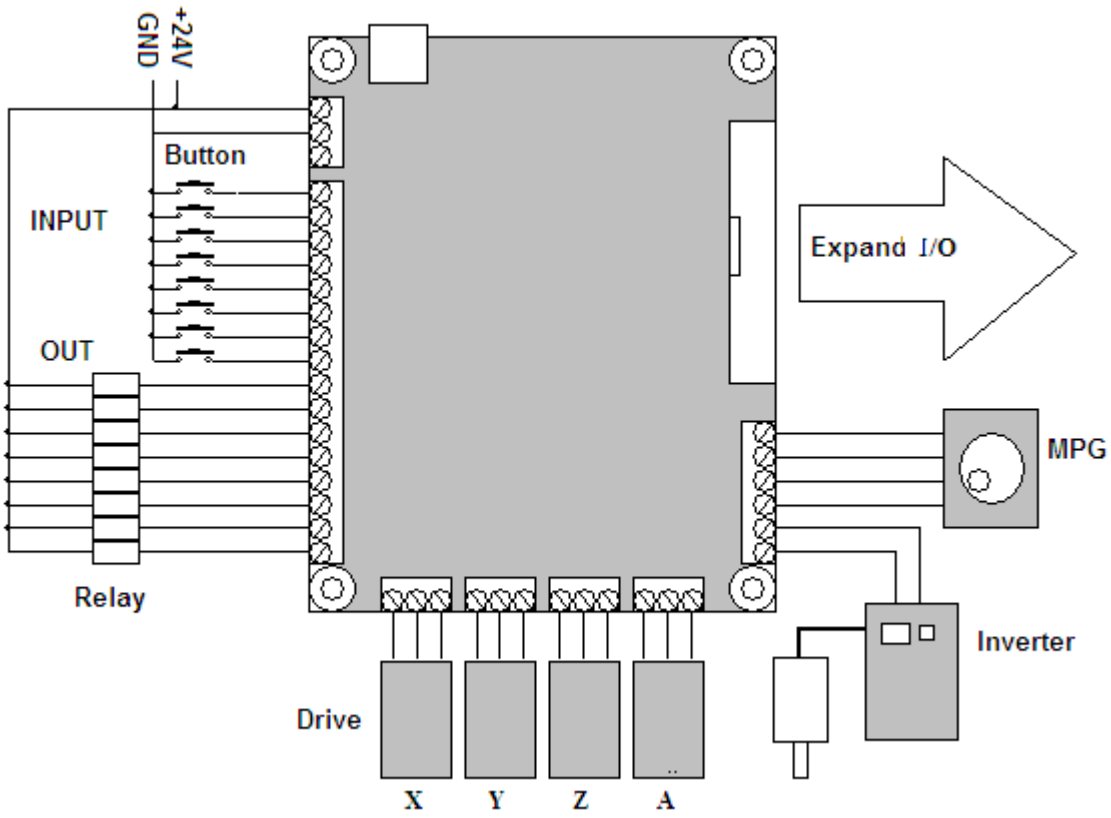
7. If the driver is not well installed, there will be a yellow question mark in front of the icon of the current device. Use the mouse to aim at the icon, click the right button, point the button of "updating the driver". Reinstall the driver, operate the software of Mach3 after the installation of the driver and the control software.

The general connection diagram of the control card

The power inputs 24V of the direct current, and the power output utilizes the differential motion, which improves the reliability of the pulse output. It can control the AC servo drive and the Stepper Motor Drivers. The eight basic ports of I/O for input and output use the optocoupler for segregation. The drive capability of the eight basic output ports is 500mA. They can connect with the DC 24V of the relay. IDC5 is the extensional input and output, and utilizes the HC244 driver, and the drive capability is 50mA. It cannot connect with the direct drive relay. Normally, IDC5 works as the input and output of the operation panel. There are 32 inputs and 21 outputs, and the total power consumption is 900mA.

There are error protection of hetero-polarity and the over-current protection. Please confirm your power in the case of not connecting with the control card. The power that is not in conformity with the specifications is likely to burn the CRD card.

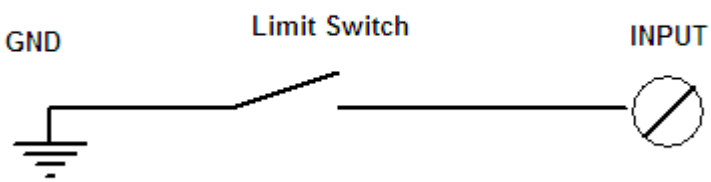
The following figure shows the general connection diagram of the control card.



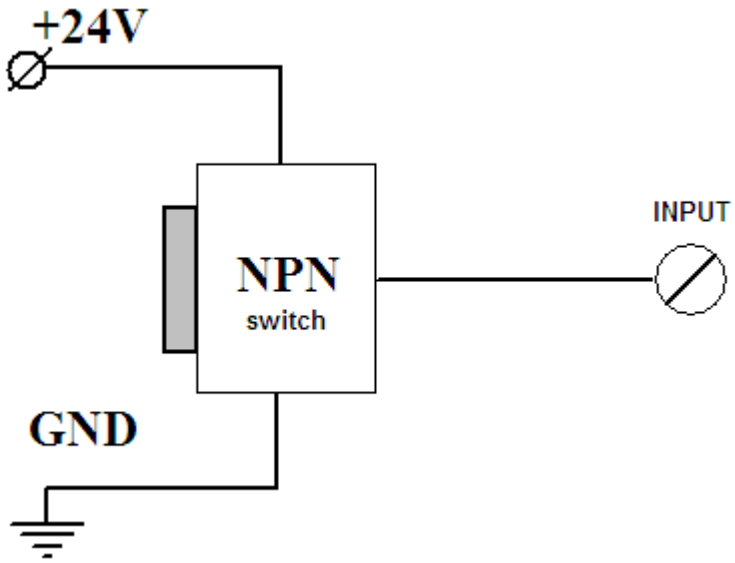
The connection and the setting of the input

There is optocoupler for segregation in the input port（PC817), and it has strong capacity of resisting disturbance. The internal optocoupler device connects with +24V, thus the low level of the input port is effective. Its outside connects with the lead limit switch, or NPN style closed switch.

The connection diagram of the the lead limit switch:



The connection diagram of the NPN style closed switch.

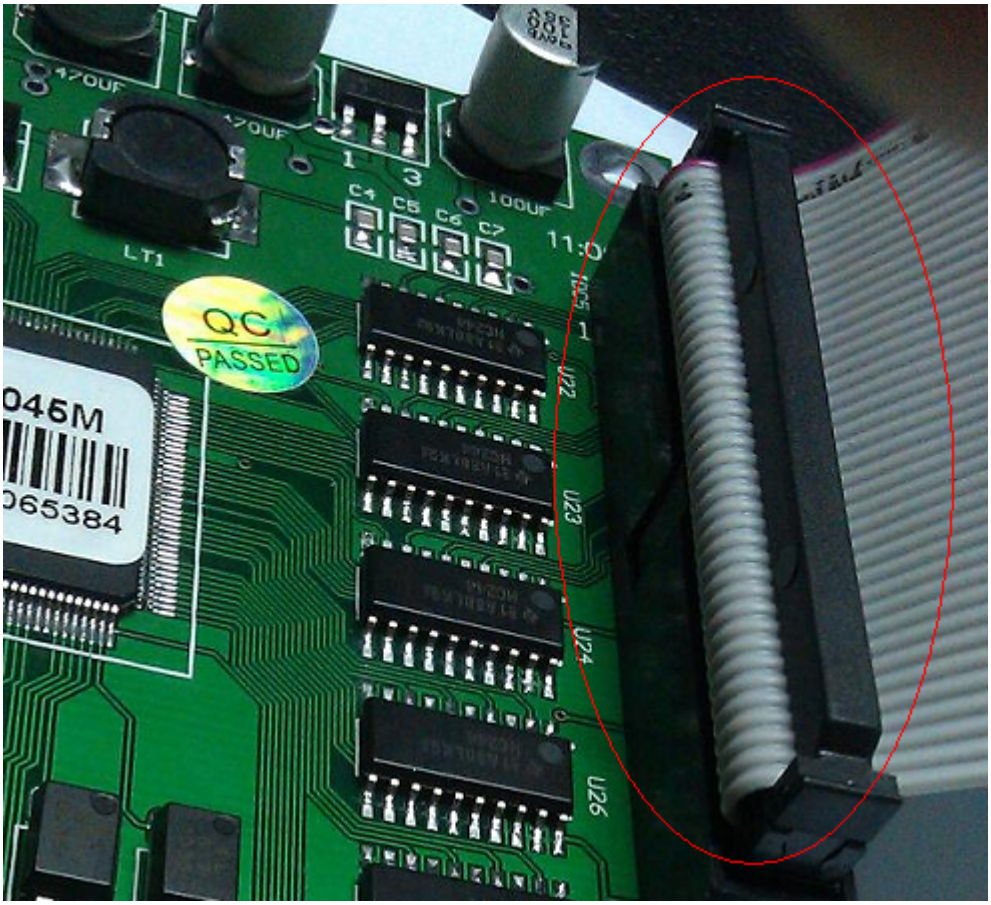


All the input subsubscripts are in the software of Mach3, and set the port as 1. Set IN1 as the first subsubscript, the IN8 as the eighth subsubscript according to the subsubscript. **IDC5** is the extensive /O. All the subsubscripts can define all the functions of the software of Mach3.

The input functions that leaves the factory are defined as the following table:

The Corresponding subscript NO. Of MACH3	**Input terminal**	**Function**
1	IN1	X axis Home
2	IN2	Y axis Home
3	IN3	Z axis Home
4	IN4	A axis Home
5	IN5	The limitation of the hardware of the axises of XYZA
6	IN6	
7	IN7	The input of the tool presetter
8	IN8	Emergency Pause

The extensive input is in the socket of IDC 5, and the functions that leave the factory are defined as the following table:



the corresponding subscript NO. Of MACH3	The subsubsubscript NO of IDC5	Function
9	1	Circulated start
10	2	Pause of the process
11	3	Reset the X axis
12	4	Reset the Y axis
13	5	Reset the Z axis
14	6	The multiplying power of the speed of the Spindle +
15	7	The multiplying power of the speed of the Spindle -
16	8	The corotation of the Spindle
17	9	The multiplying power of the feed speed+
18	10	The multiplying power of the

		feed speed-
19	11	cooling liquid
20	12	A axis+inching button
21	13	A axis-inching button
22	14	Zaxis+inching button
23	15	Z axis-inching button
24	16	Button for returning to the origin
25	17	X axis+inching button
26	18	X axis-inching button
27	19	Yaxis+inching button
28	20	Y axis-inching button
29	21	The manual changing-over button
30	22	The multiplying power of the inching+
31	23	The multiplying power of the increment
32	24	The multiplying power of the inching-

Notes: the extensive input of IDC5 does not have optocoupler for segregation. Because that the low level is effective, the other side of the button or the switch uses “GND” on the board.

The following is the example for setting the software of MACH3.

E.g: Define an input of an emergency pausing signal.

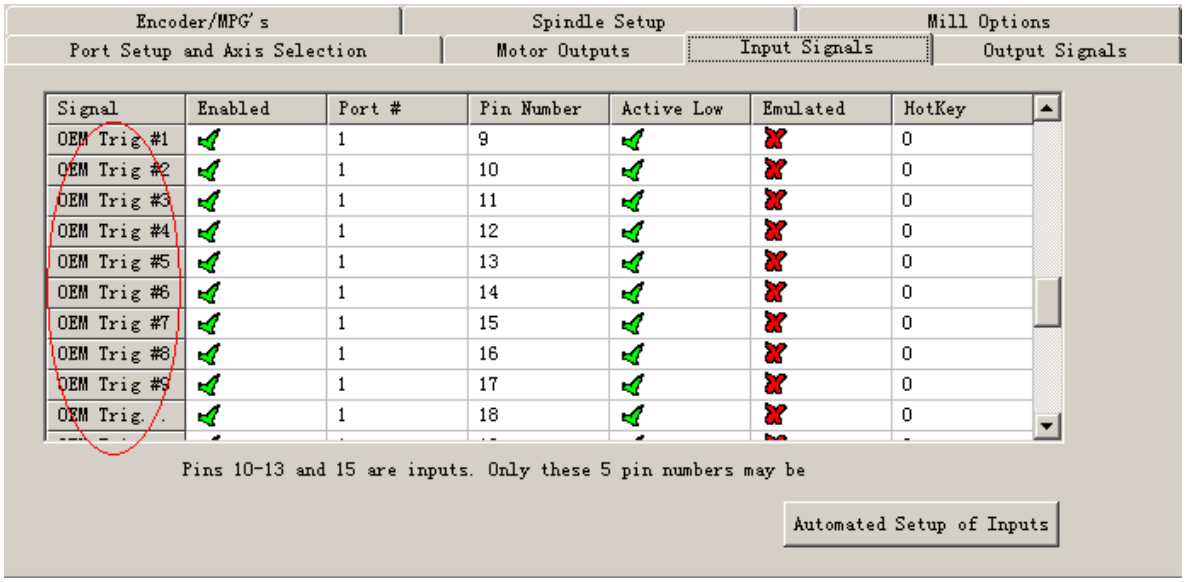
Define at the port 1, NO 12 of the subsubsubscript, namely, the 12th

subsubsubscript of the control card, which is at the extensive port of IDC5. Other input signals are defined according to this example, such as the definition of the signal of returning to the origin, the overtravel-limit switch, including the functional button of OEM etc.

How to set the input trigger function of OEMButton

Such as the "running of the program", "urgent pause" and "single step", as well as the "origin" and "reset" etc. The buttons that are on the software can all be settled on the outer button, namely, the OEM code.

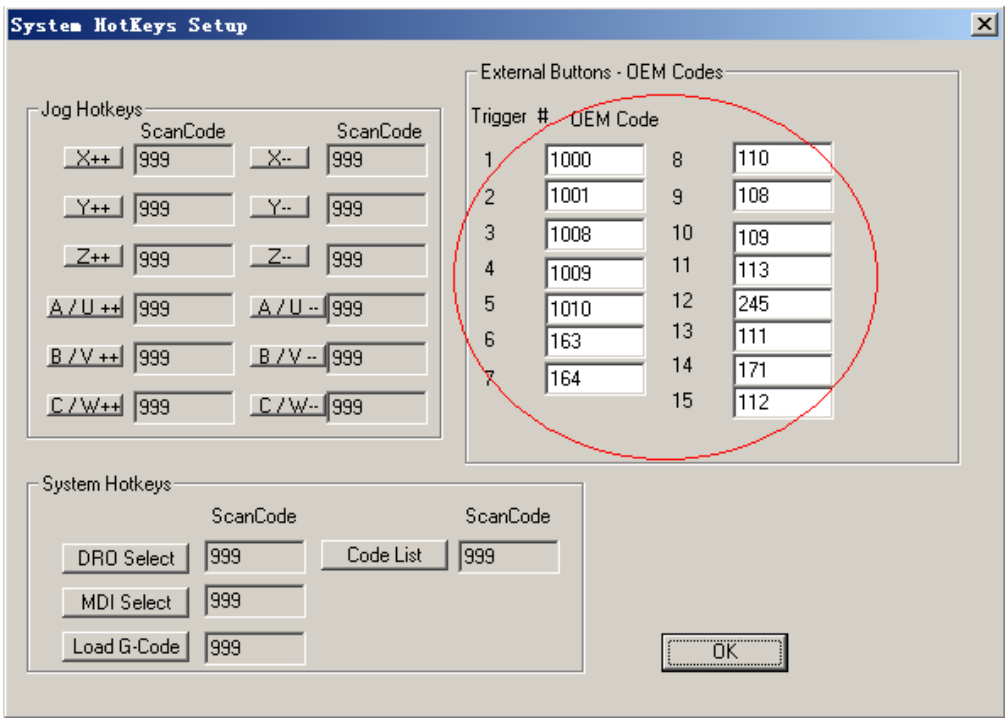
The first step: first set the input subscript, and open the dialogue box of “Ports and Pins” in the menu of the software. Set according to the following figure on the tag page of “Input Signals”.



The input port is 1(Port#), and the number of the subscript is the specific subscript that you need to define. The number of the subscript is selected according to the above illustration, and the numbers of 1 to 8 of

the subscript are at the ports of the board. Commonly, they will not be defined as other functions. The functional button of OEM is better defined at the extensive input, namely, the input subscript on the socket of IDC5.

After setting of the input subscript, open the dialogue box of “System Hotkeys” in the menu of the software. Define the function of each input in the functional input box of the trigger button of OEM. As the following figure shows:



The table of the functional number of the regular OEM button:

Function digit	Function declaration	Function digit	Function declaration
1000	circulation	1029	The changing of the soft limit
1001	pause	1008	X reset
1002	Tape rewinding	1009	Y reset
1003	stop	1010	Z reset
1004	The implementation of the simple link	163	The multiplying power of the speed of the Spindle +
1006	compile the document	164	The multiplying power of the speed of the Spindle -
1016	Start from here	110	The corotation of the Spindle
1021	Reset	108	The multiplying power of the feed speed+
113	open the cooling liquid	109	The multiplying power of the feed speed-
245	select the manual operating method	171	Increment/grade
169	close the current document	111	The speed of the inching+
112	The inching speed-		

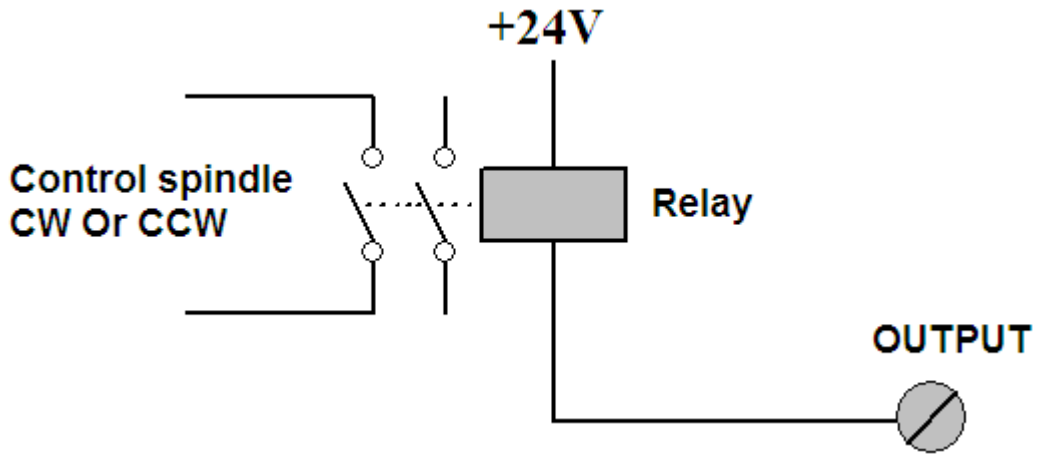
For other codes, please refer to the instruction of the "Function table of Mach3 OEM".

The connection and the setting of the output

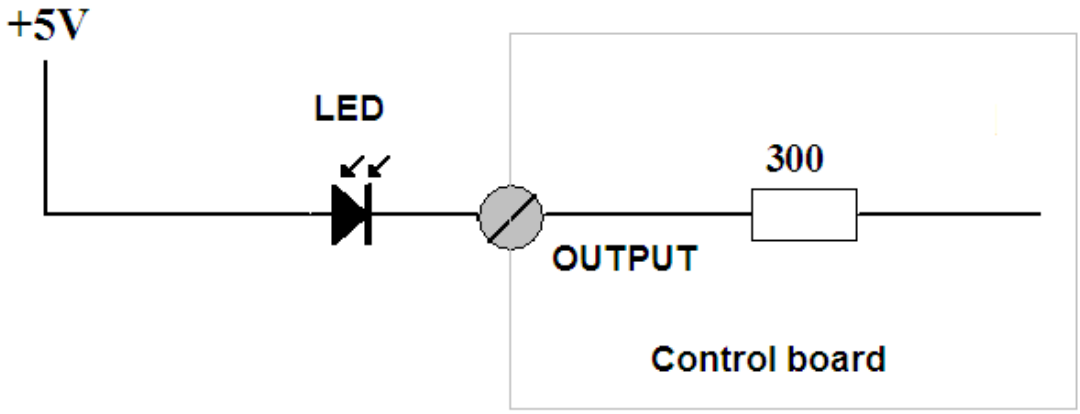
The output port utilizes the large current drive. There are eight output subscripts on the board, and the drive capability can reach 500mA(ULN2803A). Please take advantage of the 5V relay for

connection if you are not familiar with the circuit. The low level of the output is effective. When there is an output, the subscript of the port is the low level, and it is of high electricity-resistance at ordinary times. The output of IDC5 only has 30mA, and it cannot connect with the drive relay directly. It can only drive the LED diode, or other amplifying circuits.

The drive circuit of the relay：



The drive circuit of the LED diode:



The output functions that leaves the factory are defined as the following table:

The corresponding subscript NO. Of MACH3	Input terminals	Function
1	OUT1	Spindle CW
2	OUT 2	Spindle CCW
3	OUT 3	Cooling liquid（M08）
4	OUT 4	Cooling gas（M07）
5	OUT 5	not defined
6	OUT 6	not defined
7	OUT 7	not defined
8	OUT 8	not defined

The extensive output is in the socket of IDC5. The pre-definition function of the extensive output is the control of PLC in Mach3, and it needs other controls to self-develop the PLC program. The initial definition functions that leave the factory are defined as the following table:

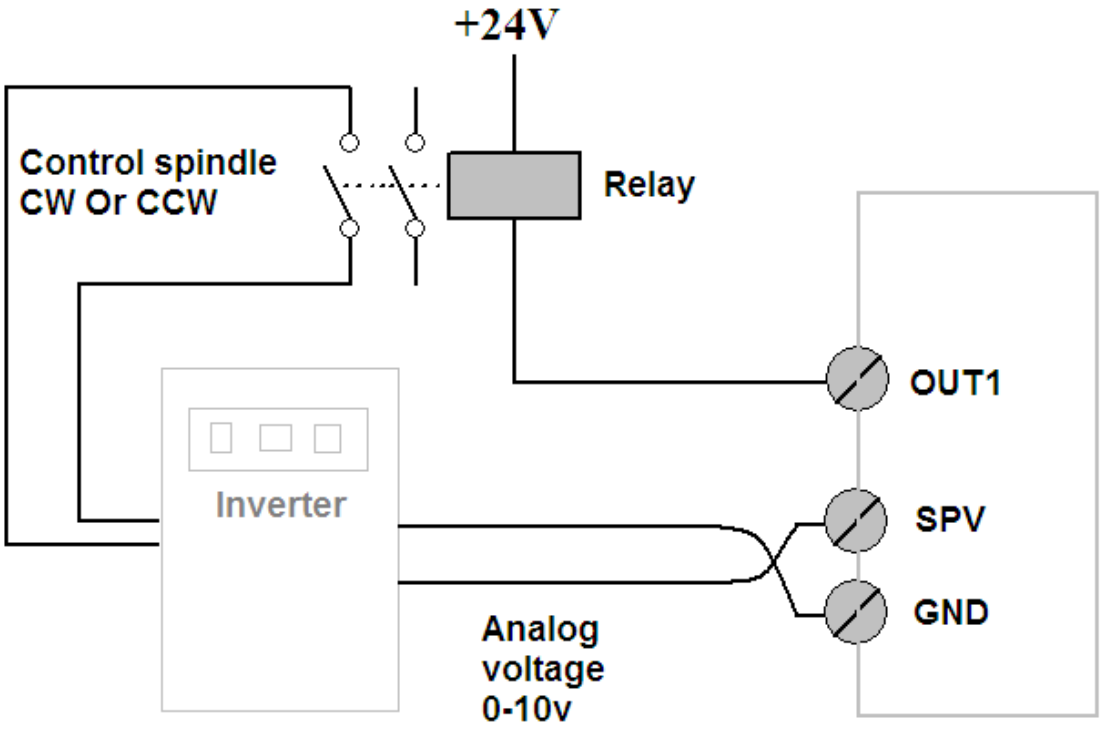
MACH3 Port	The Corresponding subscript NO. Of MACH3	The Corresponding subscript NO. Of IDC5	Function
2	9	25	the indicator light of the urgent pause
2	10	26	the indicator light of the circulation
2	11	27	the indicator light of the positive turning of the Spindle
2	12	28	the indicator light of the cooling liquids
2	13	29	the indicator light of the manual work
2	14	30	The multiplying power of the increment X1 light

2	15	31	The multiplying power of the increment X10 light
2	16	32	The multiplying power of the increment X100 light
2	17	33	The multiplying power of the increment X1000 light
2	18	34	The multiplying power of the inching 10% light
2	19	35	The multiplying power of the inching 30% light
2	20	36	The multiplying power of the inching 50% light
2	21	37	The multiplying power of the inching 100% light
		38	GND
		39	+5V
		40	GND

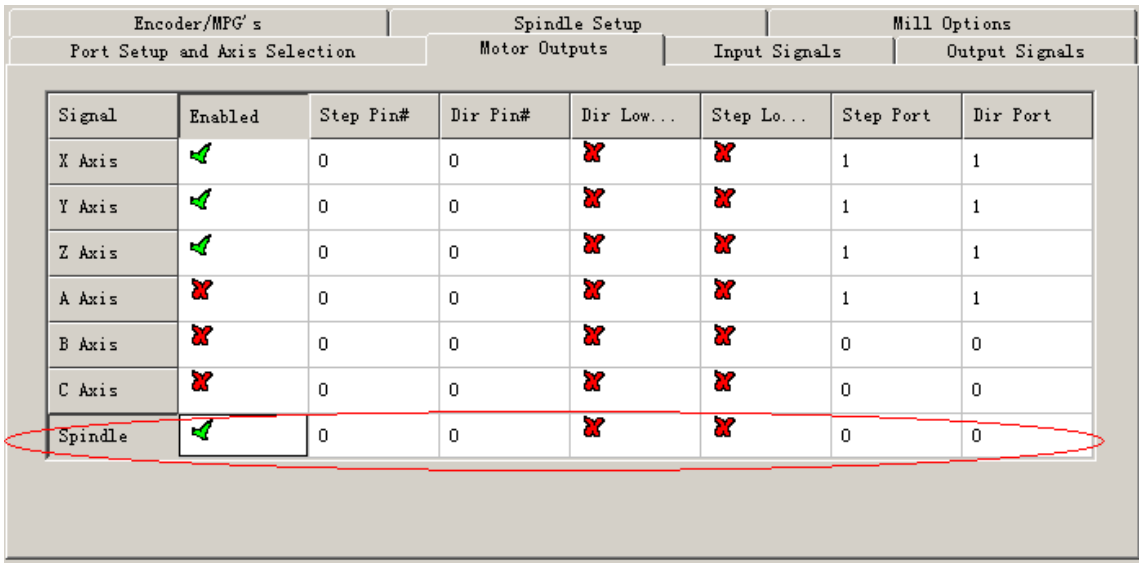
The low level output of the subscript of IDC5 refers that the subscript is the low level when there is an output. There are 300 ohmic resistance to limit the current, thus as for the other side of the loaded please connect with +5V power. If you utilize +24V power, please tandem connect with the 4.7K electric resistance to limit the current, or it will burn the board.

The connection and the setting of the Spindle

The Spindle utilizes the analog quantity to control the output (0V-10V output). The voltage changes with the alteration of the S directive to realize the stepless speed regulating. The connection is showed as the following figure:



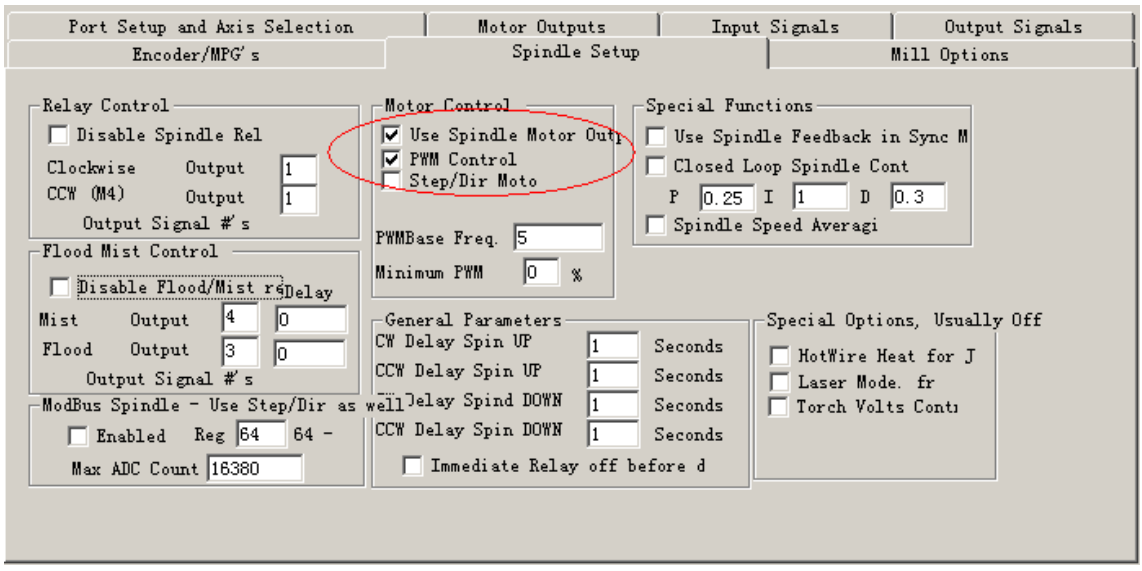
In the case of the control by the Spindle, set a 24V relay outside. One side of the relay connects with the +24V power, and the other side connects with the output port of “OUT1”. “GND” is the simulated circuit, and it connects with the frequency converters of “GND”. “SPV” is the output of the modulus voltage, and it is commonly connected with the frequency converters of “IV”. The “FRD”of the frequency converters connects with the normally opened contact terminal of the relay. The other side of the normally opened contact terminal is normally connected with the public port of “COM” in the frequency converters.



Signal	Enabled	Step Pin#	Dir Pin#	Dir Low...	Step Lo...	Step Port	Dir Port
X Axis	✓	0	0	✗	✗	1	1
Y Axis	✓	0	0	✗	✗	1	1
Z Axis	✓	0	0	✗	✗	1	1
A Axis	✗	0	0	✗	✗	1	1
B Axis	✗	0	0	✗	✗	0	0
C Axis	✗	0	0	✗	✗	0	0
Spindle	✓	0	0	✗	✗	0	0

The setting of the software of Mach3 is as follow:

Control the output of the Spindle in the tag page of “Motor Outputs” first.



Choose the PWM output in the tag page of "the setting of the Spindle ", and do not set the others. In addition, set M3 and M4 outputs. The pulley ratio must be also set, as well as the highest speed, which will

affect the output of the realistic voltage.

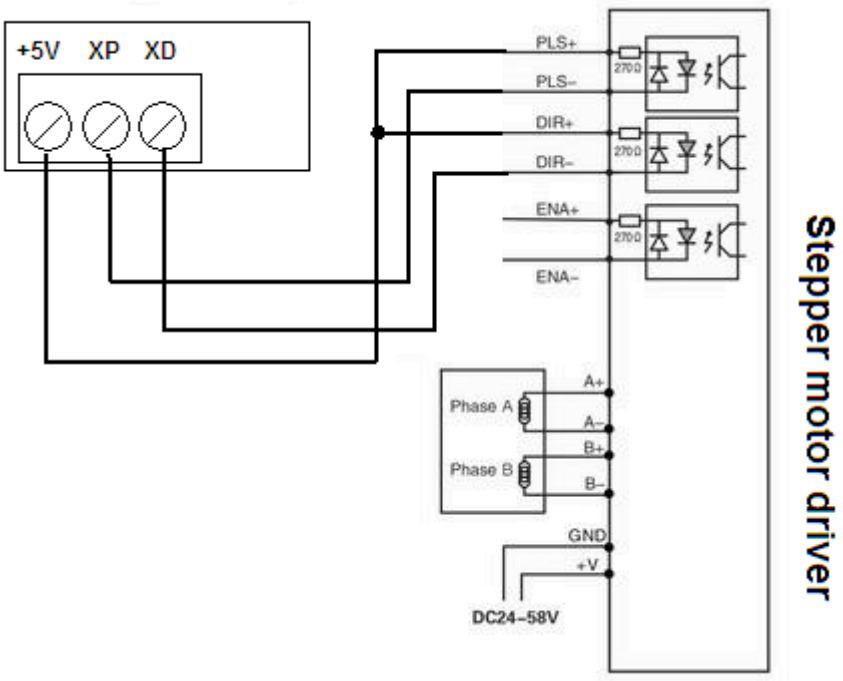
The connection and the setting of the output of the electrical machine

Such moving control card can control the stepping driver and the AC servo driver. utilize the method of Yang when it is connected with the stepping motor driver.

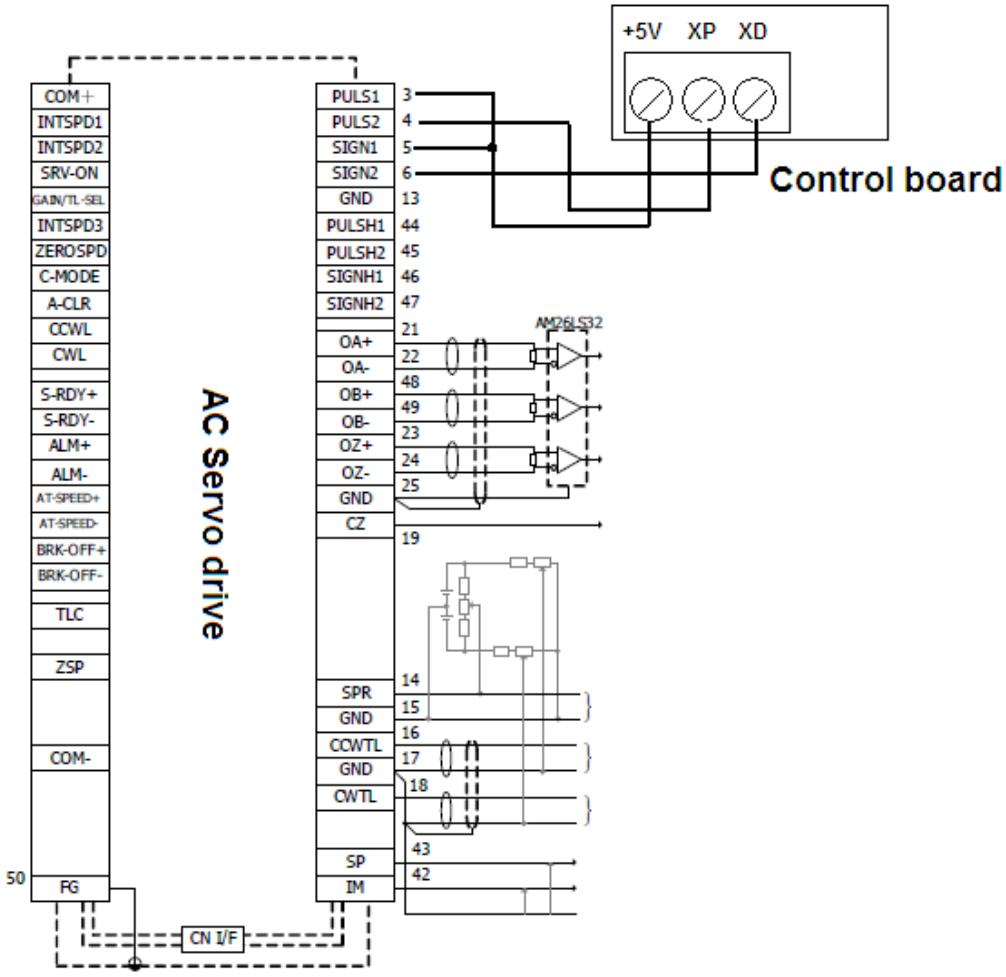
The explanation of the input signal of the axis

The identification of CRD card	**The explanation o of the signal**
+5V	Power output
XP	Pulse output of the X axis (effective in low level)
XD	Output in the direction of X axis
YP	Pulse output of the Y axis (effective in low level)
YD	Output in the direction of Y axis
ZP	Pulse output of the Z axis (effective in low level)
ZD	Output in the direction of Z axis
AP	Pulse output of the A axis (effective in low level)
AD	Output in the direction of A axis

The wiring diagram of typical step-by-step driver:



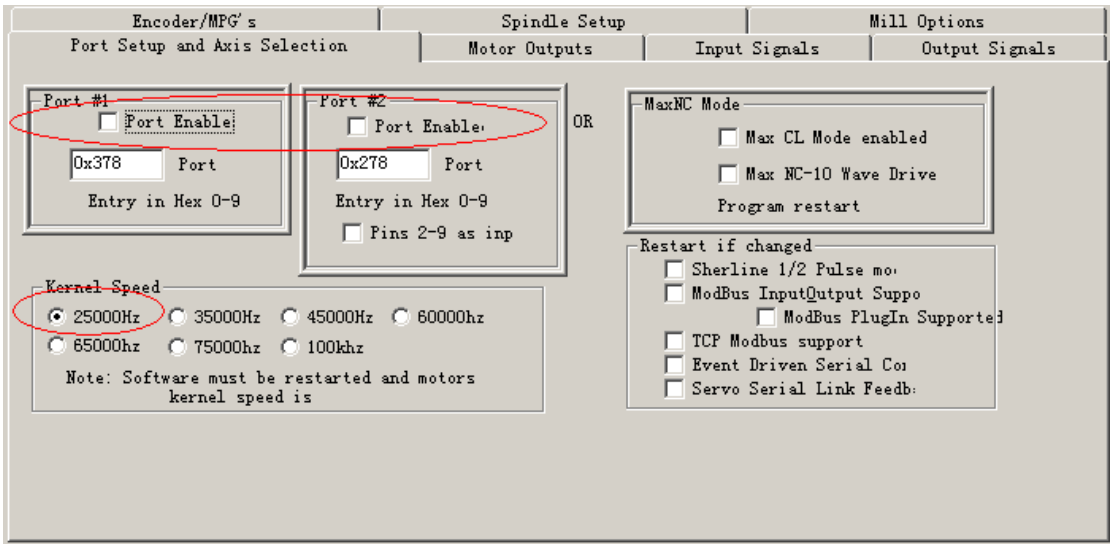
The wiring diagram of typical AC servo driver:



When using the AC servo driver, the control of the AC servo driver should be set as the way of pulse+direction

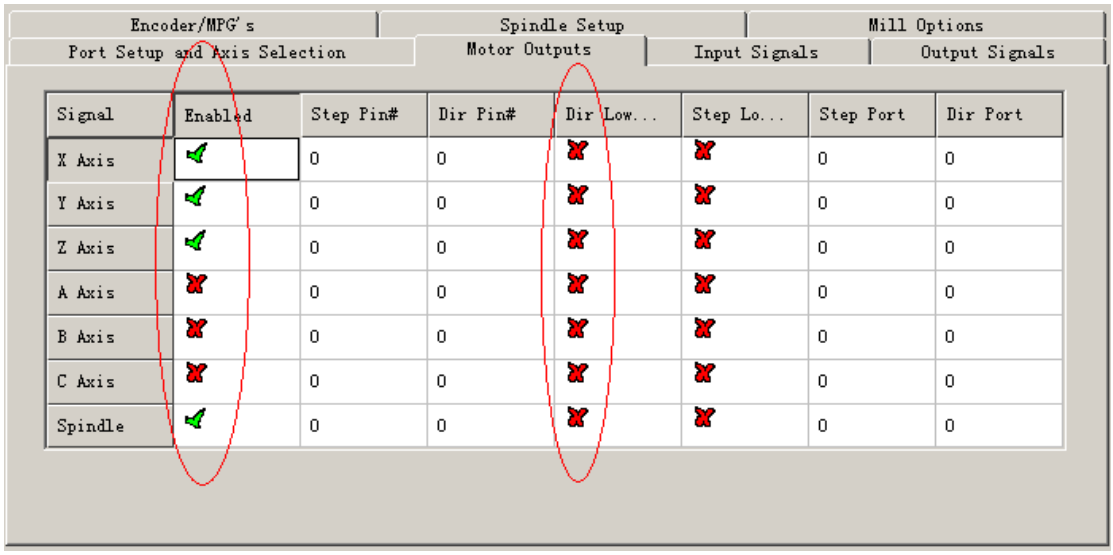
The setting of the axis output of the software of Mach3

Open the dialogue box of “Config”, set as follows in the tag page of “Port Setup and Axis Selection”:



Because it is the output of the motion control card, and the parallel port is no longer used. Both of the application of the two ports are no longer used. Auto select the "100KHZ" or "300KHZ" as the core speed.

In the tag page of “Motor Outputs”, the application needs the output axis, tick below the “Enabled”. It is no need to set the numbers of the ports as well as the subscripts. Here set it as the "0" . “dir Low” can change the moving direction of the axis, just as the following figure shows:



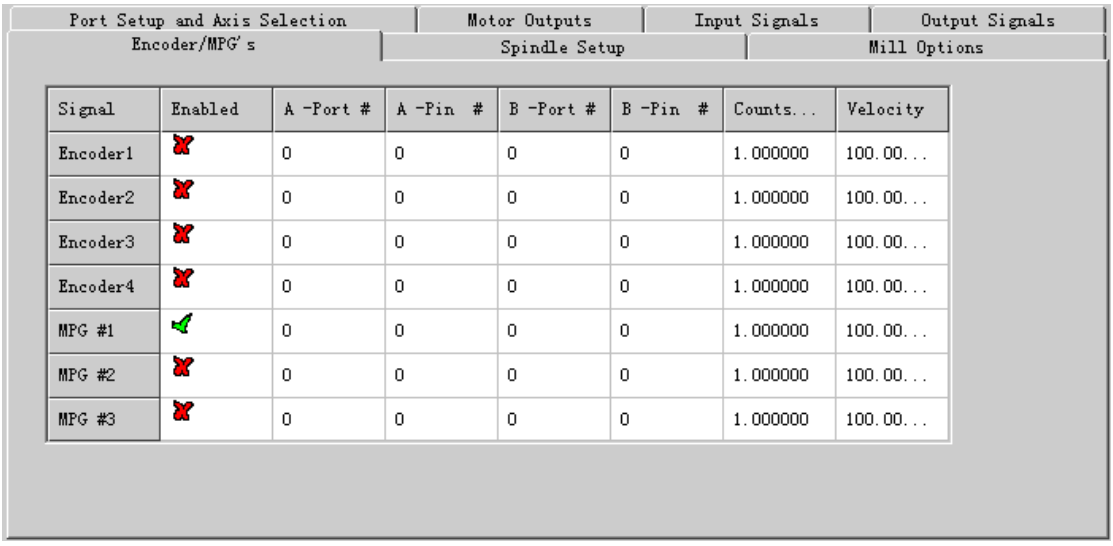
Here you are basically setting the matching of this card and the software of MACH3. In the case of adjusting, you need to set the reasonable speed and the accelerated speed. In the case of control by the stepping motor, the faster accelerated speed is needless, or it is easy to lose the step. However, too small accelerated speed will enable the manufacturing to become distort. You should measure and adjust between these two.

The connection and the setting of hand wheel pulse instrument

When using the hand wheel, please use the hand wheel whose power is +5V. Since that most of the signal of the number of the hand wheel is the +5V electrical level. If using the hand wheel of +12V, the power must be matched additionally, and use the +5V hand wheel.

In the dialogue box of the disposition of the software of MACH3,

choose the first application of MPG, and do not choose the other selections, just as the following figure:



Signal	Enabled	A -Port #	A -Pin #	B -Port #	B -Pin #	Counts...	Velocity
Encoder1	✗	0	0	0	0	1.000000	100.00...
Encoder2	✗	0	0	0	0	1.000000	100.00...
Encoder3	✗	0	0	0	0	1.000000	100.00...
Encoder4	✗	0	0	0	0	1.000000	100.00...
MPG #1	✓	0	0	0	0	1.000000	100.00...
MPG #2	✗	0	0	0	0	1.000000	100.00...
MPG #3	✗	0	0	0	0	1.000000	100.00...

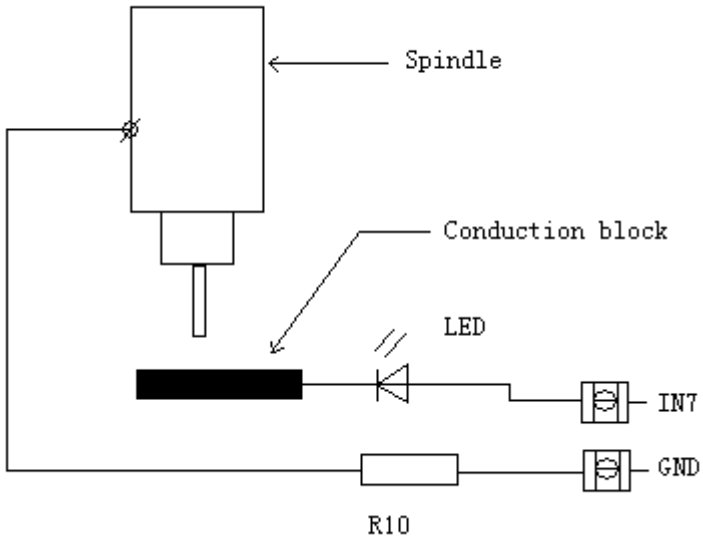
Choose 100 as the resolution ratio of the hand wheel coder, and the AB signals connect with two ports of the “MPGA” and “MPGB” fixedly. It is needless to set this number of the subscript in the configuration.

The A output of the hand wheel connects to the input port of “MPGA” of the card, and the B output connects to the input port of “MPGB”. The power of the hand wheel connects to the two ports of “+5V” and “GND”. Press the button of “TAB” of the computer, the "inching dialogue box" occurs. Choose the "method of hand wheel" and the corresponding axis, thus the axis can be moved.

How to measure the coordinate system of the workpiece of the z axis automatically (the function of the option)

This function can set the measurement for the coordinate system of the workpiece in the negative direction of the z axis with high precision. It is needless to use manual intervention for completion and possessing the simplest outer appearance. You can only use a block gauge or a piece of iron with electric conduction. After the simple connection, it can can automatically measure and set the coordinate system of the workpiece of the z axis. The precision is +- 0.002mm.

The wire connection of the electrical line 1: the machine tool does not connect to the ground.



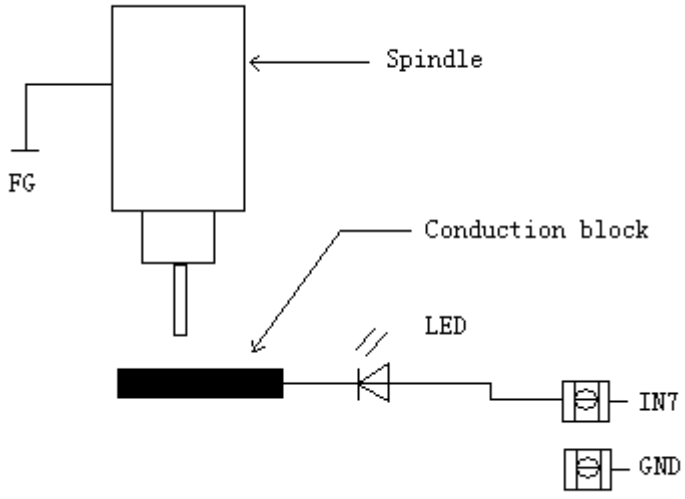
This method is to undertake the wire connection in the absolute insulation of the machine tool, and the absolute insulation refers to that the machine tool itself will not form the circuit of the power, including the existence of the leakage of the voltage. If we use the red pen of theuniversal meter to connect with +24V, and the black pen to connect with the frame, the machine tool is insulated if there is no display of the

voltage.

Utilize a electrical resistance of 1/2 watt of the power (10 ohm), with one port connecting with the fixed seat or the frame that is closed to the tool, and the other port connect with the binding post of “GND” of the card. (the electrical resistance cannot be omitted. Connect the fuselage cover with the “GND” of the board will lead to the damage of the board due to the electricity leakage from the transducer.

The input port of “IN7” is fixed as the input port of the measuring signal. You can not utilize it in other functions in that case. From the lead of the input terminal of “IN7”, you can connect with a luminous diode, and you can also do not connect it. The luminous diode is mainly playing the role of identification. (Note that the long leg of the luminous diode （+）connect with the terminal of “IN7”, and the short leg connects with the conducting strip for measurement via the lead.

The wire connection of the electrical line: (the machine tool connects with the ground)

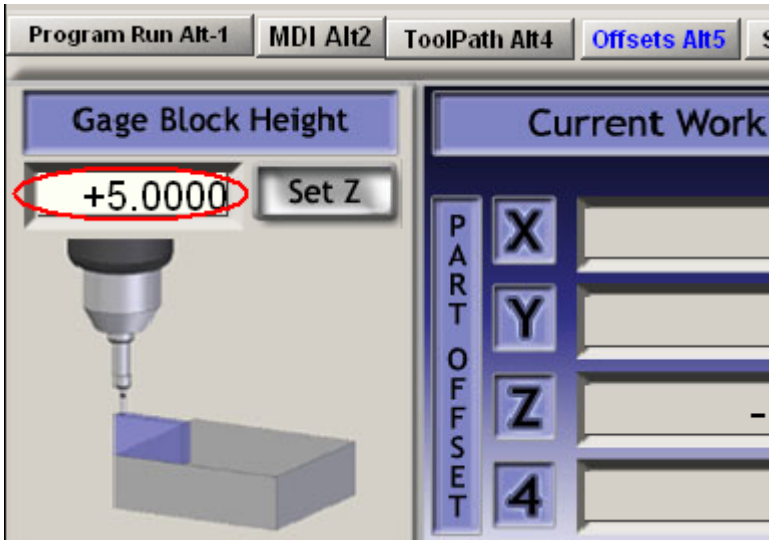


This method is in the case that the machine tool has the reliable ground connection, if we use the red pen of the universal meter to connect with +24V, and the black pen connects with frame, the machine tool is connected with the ground if there is the display of the voltage （12V-24V） .(Notes: please use the voltage grade).

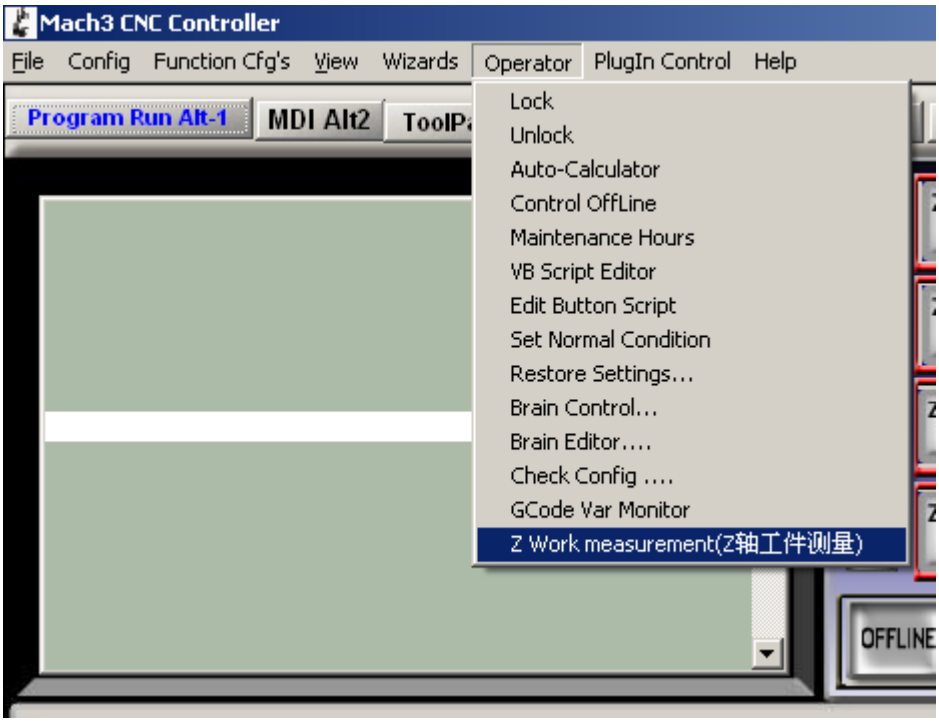
The input port of “IN7” is fixed as the input port for the measurement of the signal. You can not utilize it in other functions in that case. From the lead of the input terminal of “IN7”, you can connect with a luminous diode, and you can also do not connect it. The luminous diode is mainly playing the role of identification. (Note that the long leg of the luminous diode （+）connect with the terminal of “IN7”, and the short leg connects with the conducting strip for measurement via the lead.

The operation of the measurement:

First we must input the thickness of your measuring block in the “GAEG BLOCK HEIGHT”(the highness of the gauge block) in the picture of “OFFSETS”(the setting of the excursion) in the software of MACH3. Just as the following figure:



Click “Z Work measurement (the measurement of the workpiece of the z axis)" for performing in the menu of "Operator” (with the Chinese edition as the "operation" in the option of the "Menu" of the software of MACH3. (The menu will not be here if there is no such selection function.)



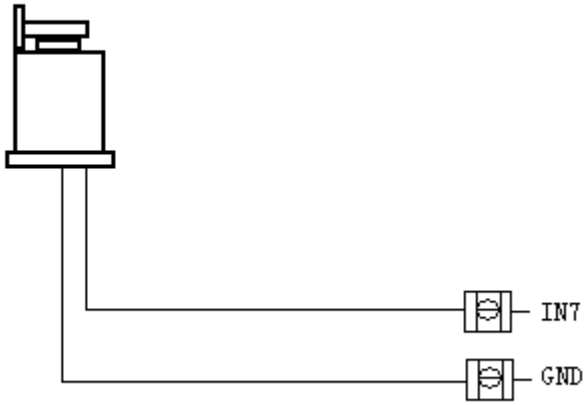
When undertaking the measurement for the workpiece of the Z, the Z axis is moving toward along the negative direction with low speed. When the knife is touching with the gauge block, it must be stopped immediately. (Note that the gauge block must be placed with the machine tool with insulation). The current number of the coordinate of the Z axis must be set as the internal parameter,and then the Z axis will return to the mechanical zero automatically, and the setting of the coordinate system of the workpiece of the Z axis is thus completed. .

In the case of no retreating occurs when the gauge block is stopped, which is mainly due to the poor connection with the circuit, or the poor connection between the knife and the gauge block. Click the button of "Reset" to resume the measurement.

How to realize the measurement of the length of the knife automatically (it cannot be utilized simultaneously with the above function)

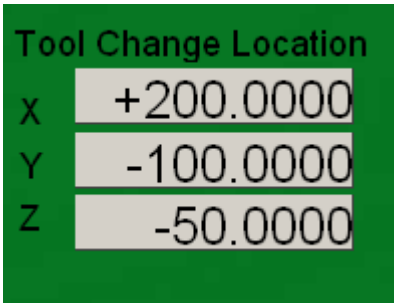
The tool setting is used in the case that you have installed the tool machine. The tool setting is undertaken for twice, and refer to the median value as the compensation value. And the compensation method is the absolute coordinate system. The precision of the tool setting is 0.005mm (for specific values, please refer to your own tool setting).

The wire connection with the tool setting：

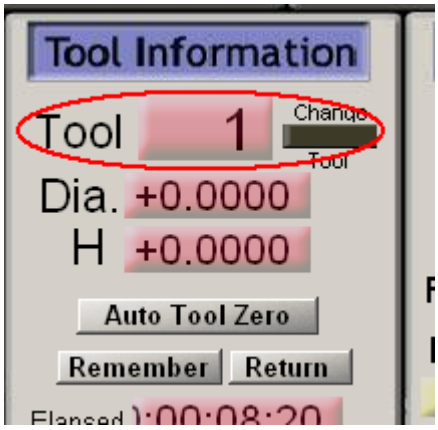


This method is the wire connection with the switch tool setting. “IN7”and “GND” must connect with the touching switch of the tool setting, and the switch must be normally open. When the tool setting is the type of Hall photoelectricity, connect the application energy with the input terminal of “IN7”, and choose the switch of the Hall photoelectricity as the type of NPN. In addition, the switch of the procedure of the tool setting may be in series connection with jerk switch.

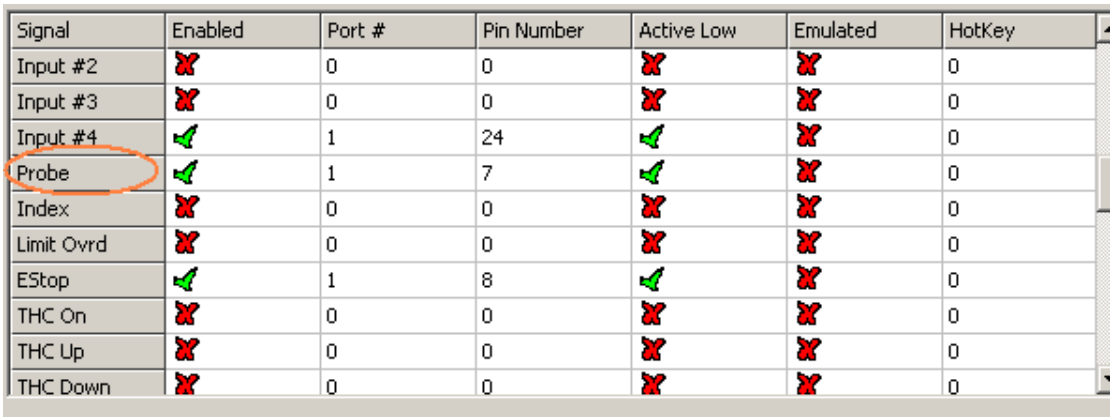
After the installation of the wire connection, we can adjust the function of tool setting. The beginning of the tool setting is to input “M900” with the method of “MDI”. “M900” is the adjustable VB macro-program, and the procedure of the program will be illustrated in the end. First we input the place of the tool setting in “TOOL CHANGE LOCATION”(the place of changing of the knife) in the page of “OFFSETS” of the MACH3 software, just as the following figure:



Note that the hight of the number of Z axis will be of 5 to 10MM high than that of the tool setting. Such as that your connection side of the too setting is Z - 68.000 mm, then the place of the knife changing of the Z direction is Z - 63.000 mm. After the setting of the tool setting, we can input “M900” in the input box of “MDI” in the page of "Program", and press the button of return for performing. Please choose the number of the knife before, just as the following figure:



Note that when using the function of this knife, make sure that the probe is inputed with the application, just as the following figure:



Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey
Input #2	✗	0	0	✗	✗	0
Input #3	✗	0	0	✗	✗	0
Input #4	✓	1	24	✓	✗	0
Probe	✓	1	7	✓	✗	0
Index	✗	0	0	✗	✗	0
Limit Ovrd	✗	0	0	✗	✗	0
EStop	✓	1	8	✓	✗	0
THC On	✗	0	0	✗	✗	0
THC Up	✗	0	0	✗	✗	0
THC Down	✗	0	0	✗	✗	0

The explanation of the macro-code of M900:

（The files for the document: “C:\Mach3\macros\Mach3Mill”M900.mls）

```
REM Context 10003
Dim MyToolPos
code "G90G80"    //absolute
code "G59"//coordinate system
Call setoemdro(45,0)
Call SetoemDRO( 42, 0 )//rest
code "G1Z0 F2000" //return to the zero
Call setoemdro(3,0)
Call setoemdro(45,10)
x = GetUserDRO( 1200 )//achieving the place of knife changing of the X axis
y = GetUserDRO( 1201 )// achieving the place of knife changing of the Y axis
z = GetUserDRO( 1202 )// achieving the place of knife changing of the Z axis
code "G1X" & x & "Y" & y    & "Z" & z //move to the place of the knife changing
Code "G31Z-100 F300" //first tool setting
While IsMoving()
Wend
DoOEMButton(146)
MyToolPos=GetoemDRO( 42 ) //store the first data
Call SetoemDRO( 42, 0 )//Reset
code"G91"
code "G01 Z5 f500" //Retreat5MM
Code "G31Z-100 F50" //second tool setting
While IsMoving()
Wend
DoOEMButton(146)
MyToolPos=(MyToolPos+GetoemDRO( 42 ))/2    //acquire the median value
```

```
Call SetoemDRO( 42, MyToolPos ) //set the complementary of the tool setting
code "G28 Z0 " //return to the mechanical zero
code "G90" //end
```

The above codes are in conformity with the application of the board of JNC-40.

The setting with high speed and high precision

1. The tactful manufacturing:

There are two moving methods in the MACH3 software: 1, constant speed, 2, precise pause. The "constant speed" refers to G64, and the "precise pause" refers to G 61. In the initialization of the first installation of the software is the "constant speed".

The movement of the "constant speed" refers to unchanging speed of the walking of the tool setting, including the closed angle and the curve of the abrupt slope. It is just like driving the car in the curving mountainous road with high velocity. The driving pathway produces the cutting in the corner due to its constant velocity. Set the parameter not according to the features of the tool setting is easy to make the circle not round, and the distortion of the curve surface. Most seriously, it will make the circle manufactured as the ellipse.

The movement of "precise pause" refers to that the walking of the knife will stop with accuracy and slower its speed in every program. Due to the fact that every program will undertake the decelerated motion, the feeling of the whole motion is somewhat vibrate. Such method is not used in the manufacturing of the curve.

The above generally talks about two runin moving methods. Due to the fact that the second method will slow the speed until its stop in every procedure, and cause the fact of discontinuous between section and section. Thus the vibration is produced. We often use the first method, which is equivalent with the corner and the curve surface of the steep slope. The manufacturing will become distort. Subsequently, we will talk about how to make the precision of the manufacturing higher and the velocity of the manufacturing faster via the adjustment of the parameter.

The macro compiler of the MACH3 VBMach3

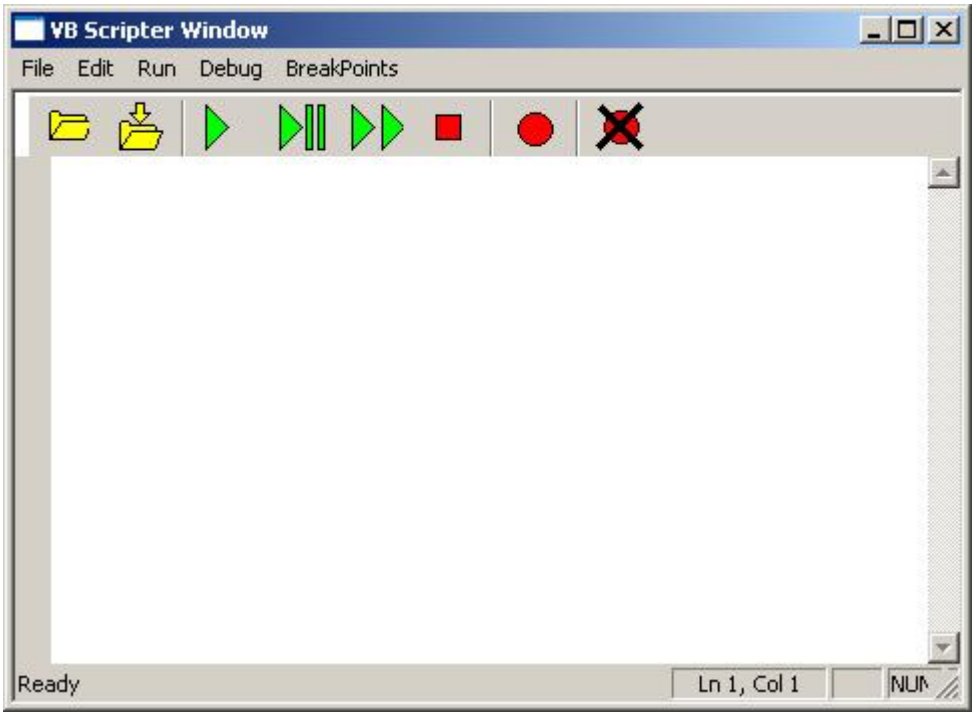
There is a compiler for the macro/subscript to develop the environment. The engine of the subscript make you compile the standard M code, and at the same time, enable you to create the self-defined M-, which can call from your G-code. A typical example for this is the revise of the automatic knife changing for the macro-operation of M6.

Another application of the engine of the subscript is the subscript of the button. There is an operating macro on the button of the screen of Mach3. When you click the button (RefAll button, one of them), such macros can change the work. For instance, RefAll button can change so that make the axis return to the origin with different orders or the same time etc. It is easy to add their own buttons and the internal macros in it to perform the special thing).

You can use the notebook program to create and compile the macros,

whereas the internal compiling of Mach3 has great functions in the aspects like grammar counting, single step and breakpoint as well as the writing assistance. Measure and adjust the complex macros. Such compiler, compared with the modern IDE, is easy and simple to be used.

Start the option operation/VB subscript compiler in the compiler, just as the following figure:



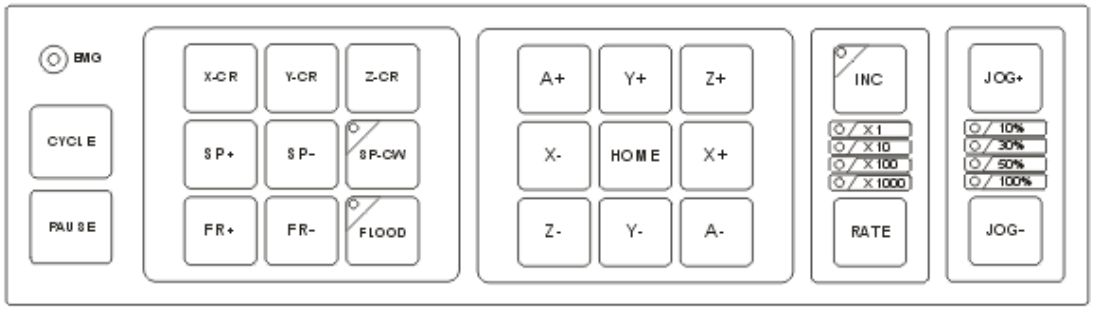
There are many languages of Mach3 are themacro-call directives. Such directives can read all kinds of values (GetDRO）in the DRO, and acquire the luminous diode of Mach3 (GetLED reviewing condition value), and tell the Mach3 to move to a certain kind of place (code “G0X10”）. Such you can all use the VB language to develop and use.

For instance, we want to create a button, "the screen across the cycle".

There is a macrocall in the code. GetPage（），return to an integer, which illustrates that it is a displayed time on the screen. What we need to do is add a number, and then call another directive. The "push" of DoOEMButton（）is the correct screen optional button. There are 50 screens displaying the directive DoOEMButton as （）via calling the numbers of 1 to 50 of the screen in Mach3. There are 6 screens for the standard Mach3 screenset, thus the codes we wrote can only displayed in the preceding 6 screens.

Appendix: JOP-410 board

Appearance Dimension:



This operating board can be plugged in IDC5 socket. The initial parameters of software installation are compatible with this board. This operating board is cute and easy to use. It is convenience when you check knife and set up components axle.

The function of each key and LED indicator is described briefly as follows:

EMG

This LED indicator will be on when the system halt, the system is broken down when the warning light is red. You should press “RESET” button on the software interface, if the system can not reset, you should find where the problem is.

“CYCLE”- CYCLE begin to run. If you open program file, the current file will run.

“PAUSE”- The program file will pause when you press this button. If you want to continue to run, press “CYCLE”.

X Axle DRO clear button, it always be used when set up components’ coordinate system. Press this button will set up the components X axle value to the current component coordinate system, such as G54.

Y Axle DRO clear button, it always be used when set up components’ coordinate system. Press this button will set up the component’s Y axle value to the current component coordinate system, such as G54.

Z Axle DRO clear button, it always be used when set up components' coordinate system. Press this button will set up the component's Z axle value to the current component coordinate system, such as G54.

Adjust spindle speed rate, the two button mainly adjust the current spindle's speed, which will change 10% when press the two button. "SP+"is speed increasing button, "SP- " is speed decreasing button. You can change the spindle's speed by the two buttons.

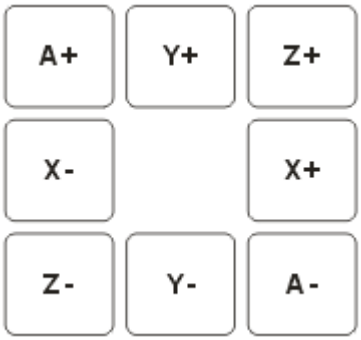
"SP-CW" - Spindle forward whirl order button, the spindle will whirl when press this button, The LED light on the top right will on; The spindle will halt when you press the button again, and the LED light on the top right will off. This button is corresponding to "M03" and " M05" order.

Adjust feeding rate, the two buttons mainly adjust current feeding rate, which will change "10%" if you press it once. "FR+" is speeding up

button; “FR-” is speeding down button. You can change current feeding rate by pressing these two buttons.

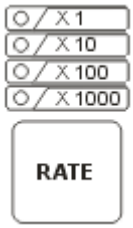
“FLOOD” – cooling fluid output button, the cooling fluid will on when press this button, the top right LED light will be on; The cooling fluid will on when press this button again, the top right LED light will be off. This button is corresponding to “M08” and “M09” order.

Mache tool back to home button. Machine tool will look for mechanical home switch by default order, it will set up current mechanical coordinate system when success.

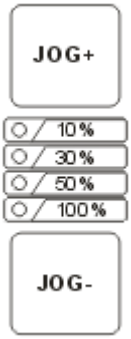


Feed shaft activate button, the corresponding axle will move when press different button; and it will stop when stop pressing. Activate speed can be adjust by pressing “JOG+” “JOG-”.

Activate mode change button, it is normally continuous moving. The top right LED light will be on when press this button, and it is in “increment” mode. The axle does not move continuously when in “increment” mode. The axle move by the default length which is choosing by “RATE” button. This button will change to increment mode when set up knife and component. So it can locate the axle’s motion accurately.



“Increment” feeding value choose button and LED display. “RATE” button choose the default length. The corresponding LED light will be on when change the length. “x1” is 0.001mm, “x10” is 0.01mm, “x100” is 0.1mm, “x1000” is 1mm。



Feed axle activate speed calibration and LED display of speed value.

The activate speed will change 10% when press the button once. “JOG+” is activating increasing button, “JOG-” is activate decreasing button. The speed rate can be reach to 100%.

Note: The operator panel is not a product of standard spare parts, We do not sell this product, we only provide design drawings for you.

Document type : (CorelDRAW 9) operator panel.cdr

As the manual for typographical errors, we will continue to correct the error, I hope you valuable advice. Thank you。