



MACH3 Simple USB Card

NVUM_SP

Manual

Manual of NVUM_SP

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Introduction

1.1 Product Introduction

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Chapter 1.

Novusun CNC has engaged in the Numerical control industry for 7 years, specialized in the research, development and production of various CNC controller systems with high quality and high reliability. We produce the Brushless DC motor, Stepper motor driver, and also 1 to 6 aixs CNC motion controllers.

NVUM_SPv1.1 is the 3-6 axis motion controller we spend 4 years to design.

NVUM_SPv1.1 support Mach3 software and standard MPG, through USB to communicate with computer.

NVUM_SPv1.1 motion controller adopts the ARM design framework. The ARM design includes communication, code analytic, underlying algorithm and pulse generation. Rational design, reliable control, convenient operation.

This manual introduces operation, connection and usage schedule of our professional motion controller for engraving machine. Through a lot of the drawing the users can learn quickly how to use this motion controller.

1.2 Products specification

- Support USB;
- 10 ports photoelectric isolated input interface for ordinary digital data;
- 3 ports photoelectric isolated output interface for ordinary digital data;
- 1 port 0-10V spindle speed analog output interface(can change to PWM output);

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can support 3-6 axis stepper systems,100KHz pulse output for every axis;

ARM motion control chip;

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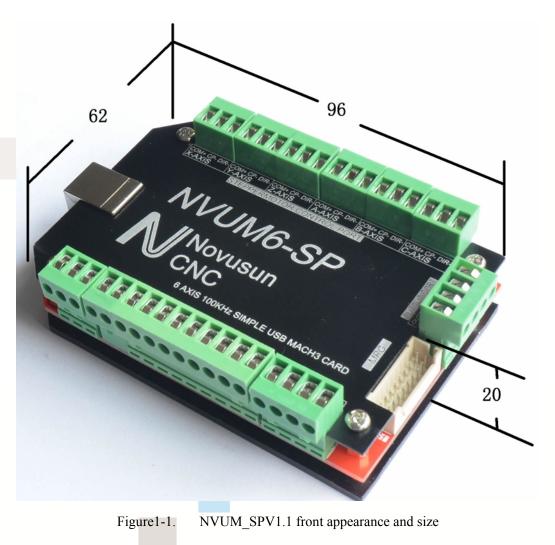
Compatible with MPG input, support the digital display MPG from our company.

1.3 Products Appearance and size

NVUM_SPv1.1 motion controller is with the sealed shell structure, there are 4pcs setting holes at the bottom. We can fix 4pcs 4mm diameter holes at the cabinet, and install the controller into the cabinet. The controller appearance as the Figure 1-1 and Figure 1-2 show:

The products overall size is 96mm*62mm*20mm;

The bottom install size is 50.3mm*81.4mm.



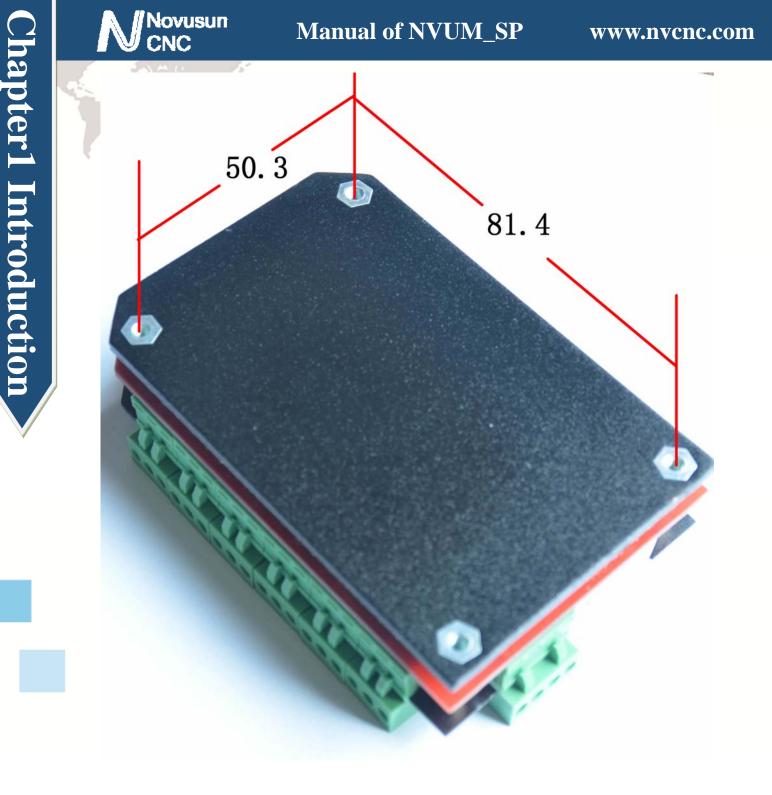


Figure1-2. The other side of NVUM_SPV1.1and installation dimensions

1.4 substantival explanation

When operate the NVUM_SP,where will be a lot of English abbreviation, now we list all of them for your kindly references:

FRO:Feedingadjust:During the operating process,the F value already set,and need to

adjust the current feeding speed, then we can adjust FRO value to realize it.

SRO: Spindle speed adjust: During the operating process, the S value already set, and need to adjust the current spindle speed, then we can adjust SRO value to realize it :

Current Speed S#=setting S*SRO.

SRJ:speed adjust manually

During the operating process, as the manual speed already set, and we need to adjust the current speed, and impossible to fix the value during it is working, then we can revise the SRJ

value to realize it.

Current manual speed FS#=Setting manual speed*SRJ.

F:Feedingspeed,the unit is mm/min.For example F=200,means every minute feeding 2000mm.

S: Spindle Speed. Unit is rad/min.For example S=20000,means 20000 revolution/Minute.

X axis Coordinate

Y axis Coordinate

Z axis Coordinate

A axis Coordinate

B axis Coordinate

C axis Coordinate





1.5 Noting and Waring

JFree from exposure to the electronics without waterproof function.Please environment as dry as possible. This is the icon.

Wiring warning, the IO input terminal of this equipment support the equipment with source switch (such as Inductive proximity switch.)When using such kind of switch, attention please: avoid the +terminal and -terminal of power supply to connect with GND.This equipment's analogy quantity output terminal of spindlecontrolalos have a certain load capacity. Please avoid this terminal connect with GND.in case that the interior components and parts be brokendown.

Operation warning, Please do the security measures well when connecting with the machine tools. The ESTOP, limit and other things must be perfected. When comes across the emergancy, please press the ESTOP key at once or cut off the power directly, thus avoiding the equipment damage and casualty.

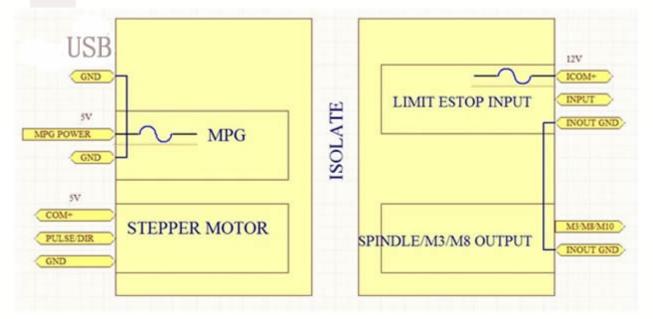
High voltage danger, the primary device is 18-32VDC power supply.Voltage equipment.Pls pay attention to the electricity, safety when conducting the operation Chapter 2

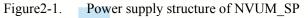
Connection

2.1 Device Power supply Solution

The power supply solution in the field of the Industrial automation is always very complicated, there is a lot of the GND, now we descript the structure of the power supply as below:

The power supply structure as the Figure 2-1,main power supply input and MPG module and stepper control output module are common GND,Limited and Estop input module and Spindle speed adjust M3/M8/M1 module are common GND,between main power supply and output module there are photoelectric isolation. The inputs of limited switch and Estop and so on are Common anode, inside of the device, there is +12VDC as common+,no need to connect external power supply. Based on the reference of output GND interface, output a 0-10V adjustable voltage to adjust the the spindle speed,M3/M8/M10 digital output interface is open-GND. If connect an external relay,need to output GND to refer to,and give the relay an external power supply.





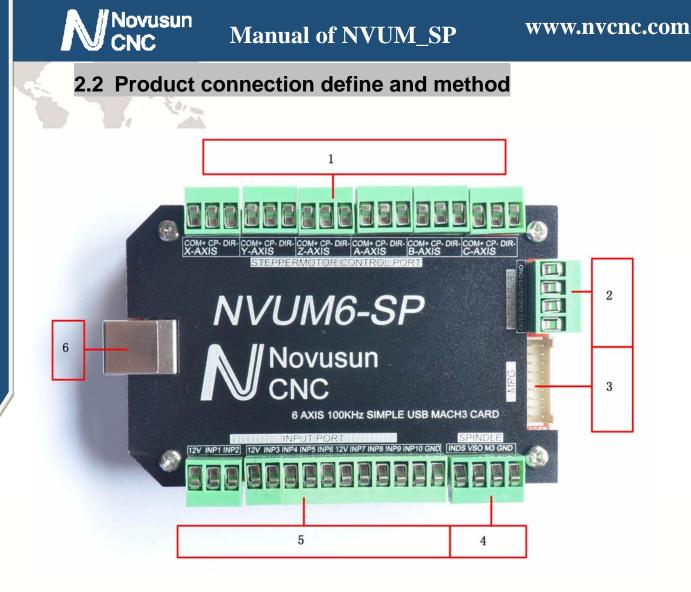


Figure2-2. Product wiring section and interface summary

As the Figure 2-2 showed, the connection of the controller includes USB connection interface, MPG interface, Stepper/Servo control output interface, spindle control output interface, Estop and limited switch and tool setting input interface and so on. Now we descript them in details as below.

2.2.1 Stepper motor control interface

As Figure 2-2 showed,No.1 terminal block is 6 axis stepper driver control output interface, from left to right,there are X,Y,Z,A,,B,C 6 axis output, it's common anode,the cable connection for each axis is COM+/CP-/DIR-, COM is common+ ,CP is Pulse-, DIR is direction-.Connection showed as Figure 2-3.COM+ connect with the SP+ and DIR+.

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Chapter2 Connection	

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Pin mark	Axis	Definition	
COM+	Commom+	common anode +5V	
СРХ-	X axis	Pulse output- for X axis	
DIX-	X axis	Directrion output- for X axis	
СРҮ-	Y axis	Pulse output- for Y axis	
DIY-	Y axis	Directrion output- for Y axis	
CPZ-	Z axis	Pulse output- for Z axis	
DIZ-	Z axis	Directrion output- for Z axis	
CPA- A axis Pulse output- for A axis		Pulse output- for A axis	
DIA-	A axis	Directrion output- for A axis	
СРВ-	B axis	Pulse output- for B axis	
DIB-	B axis	Directrion output- for B axis	
CPC-	C axis	Pulse output- for C axis	
DIC-	C axis	Directrion output- for C axis	

Table 2-1. Stepper driver control interface define



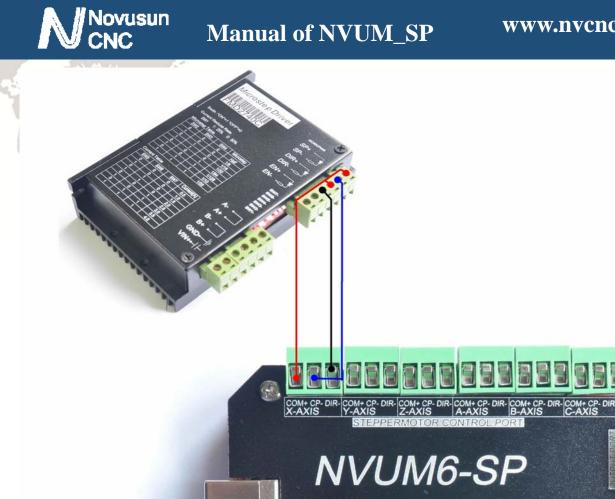
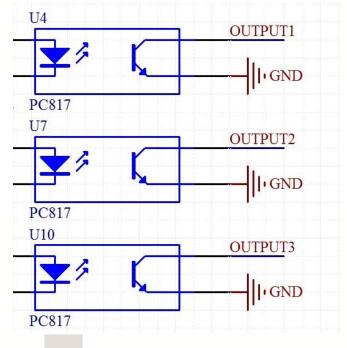


Figure2-3. Stepper driver connection

Common IO output interface 2.2.2

See as Figure 2-2, The port marked 2 is Common IO output interface. Include OUT2\GND\OUT3\GND from down to up,open drainoutput, internal structure as Figure 2-4:



OUT2-OUT3 internal structure Figure2-4.

Now just make a switch between OUTX(X=1-3) and GND,to control the relay output, the connection as the Figure 2-5.External power supply need to accord with the relay specification,the internal optocoupler GND open circuit only can absorb less than 50mA current, if relay absorb the current over 50mA,pls add current amplifier. In the Figure connect with OUT3, the others similar.

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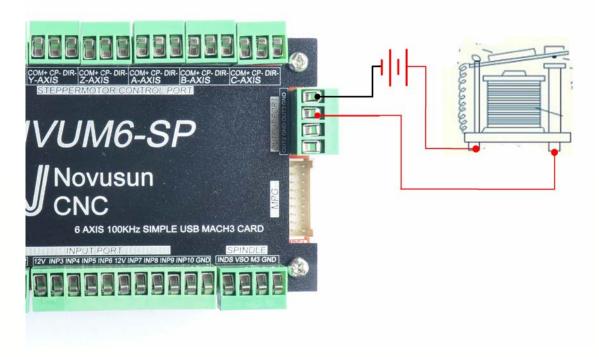


Figure2-5. OUTX connect with external relay method

2.2.3 MPG connection

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The MPG port totally have 18 wiring terminals, Pin number see as Figure 2-6. And the reference of each wiring terminal definition is table 2-2. The reference of corresponding relation between system and MPG wiring is table 2-3 and table 2-4.



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Figure2-6. Pins Number of MPG

Pin No.	MARK	Definition	Notes
1	TXD	MPG serial communication	For the digital display MGP communication
		Output Port	
2	RXD	MPG serial	For the digital display MPG communication
		communicationinput Port	
3	GND	MPG Ground	MPG power supply GND.
4	VDD5	MPG power supply 5V	MPG power supply 5V output
		output	
5	WHA+	MPG A Phases Positive	MPG A Phase differential Input Positive
6	WHB+	MPG B Phases Positive	MPG B Phase differential Input Positive
7	WHA-	MPG A Phases Negative	MPG A Phase differential Input Negative
8	WHB-	MPG B Phases Negative	MPG B Phase differential Input Negative

		ovusun NC	Manual of N	VUM_SP www.nvcnc.com
	9	X-IN	X Axis selected switch	Short connect with GND meanas selecting X
7			2	aixs,cutoff means don't select
	10	Y-IN	Y Axis selected switch	Short connect with GND meanas selecting Y
				aixs,cutoff means don't select
	11	Z-IN	Z Axis selected switch	Short connect with GND meanas selecting Z
				aixs,cutoff means don't select
	12	A-IN	A Axis selected switch	Short connect with GND meanas selecting A
				aixs,cutoff means don't select
	13	B-IN	B Axis selected switch	Short connect with GND meanas selecting B
				aixs,cutoff means don't select
	14	C-IN	C Axis selected switch	Short connect with GND meanas selecting C
				aixs,cutoff means don't select
	15	1X	1 X multiplication	short connect with GND means 1X
			switch	multiplication,cutoff means no pulse
	16	10X	10X multiplication	short connect with GND means 10X
			switch	multiplication,cutoff means no pulse
	17	100X	100X multiplication	short connect with GND means 100X
			switch	multiplication,cutoff means no pulse
	18	ESTOP	MPG Estop	short connect with GND means Estop
				effective,cutoff show invalid

Chapter2 Connection

Table 2-2. $\ensuremath{\texttt{NVUM}_SP}$ on $\ensuremath{\texttt{MPG'}}$ s define and explaination

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NC



NVUM_SP PIN No.	MPG pin No. and color
Estop	С
1multiplication 1	X1
10multiplication 10	X10
100multiplication 100	X100
X selecting	X
Y selecting	Y
Z selecting	Z
A selecting	4
B selecting	5
C selecting	6
A Phase +	A+
A Phase -	A-
B Phase +	B+
B Phase -	В-
GND	0V/CN/COM
+5V-W	+5V

Table 2-3. Connection between Differential MPG and NVUM_SP

Note: It you want to use the single-terminal MPG (namely there is no A-B-MPG), please look at the wiring table, the table 2-4 for reference. As for the unlisted one, please take the differential MPG wiring mode.

NVUM_SP Pin No.	MPG Pin No. and color	
WHA+	A+ green	
WHA-	0V Black	
WHB+	B+ white	
WHB-	0V Black	

Table 2-1. Connection Between Single MPG and $\ensuremath{\operatorname{NVUM_SP}}$

2.2.4 Spindle control output

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We define the interface from left are: INDS(spindle speed feedback input), VSO(0-10V adjustable speed output), M3(Spindle run switch), GND1(Output GND).

Take Nowforeuer inverter as the example. Spindle control output and the inverter connection showed as Figure 2-7.If ACM and DCM are closed,only need to connect one port.

If need the Mach 3 to show the real in time spindle speed, just fix one hall device, every revolution send one pulse between INDS and GND1, pulse voltage is 5V-10V.



Figure2-7. spindle control output and inverter connection

VSO real output voltage=10V*s spindle setting speed/max spindle speed.Forexample, if max spindle speed is 24000, current spindle speed is S=18000, so the VSO output voltage=10*18000/24000=7.5V.

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Max. spindle speed setting ports as showed sa Figure 2-8,open it from Pulley from Menu config. The current spindle speed can be set by S directive or Mach 3 spindle setting speed module.

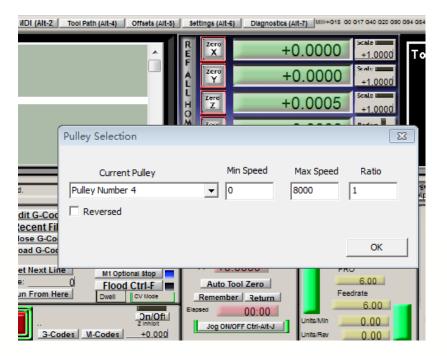


Figure2-8. Max spindle speed setting position

2.2.5 Estop limited Tool setting input interface

.As the Figure 2-2 showed, Marked No. 5 position is the Estop limited ect. they are the optical isolatedInput interface, from the left, there are 12V, INP1, INP2, 12V, INP3, INP4, INP5,

INP6, 12V,INP7, INP8,INP9,INP10,GND. Internal structure Figure of Input interface see as Figure 2-9.

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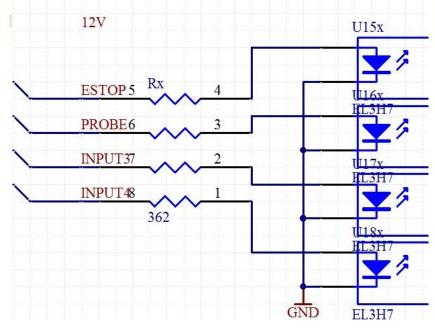


Figure2-9. Internal structure drawing of Input interface

2 lines Proximity Switch/ordinary fretting switch/ESTOP/probe drawing see as Figure 2-10



Figure2-10. 2 lines Proximity Switch/ordinary fretting switch/ESTOP/probe drawing

3 lines Proximity Switch connection Figure 2-11, brown cable for Proximity switch connect

with 12V,Black cable connect channel,blue cable connect with GND1.

Only support PNP 3lines proximity switch.



Figure2-11. PNP 3 lines Proximity Switch connection drawing

2.2.6 USB Port

As the Figure 2-2 show, The marked No. 6 port is USB communication port, NVUM_SP

communicate with mach 3 through it.

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>>> Chapter 3	. Software Installa	tion
3.1 MACH3 Insta	all	
When you purchase our p	roduct, we will supply a CD-ROM, which	ch contains the MACH3

installation, registration, and USB plug-ins. See as Figure 3-1



First run the installation Mach3Version3.043.066

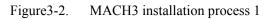
Mach3Version3.043.066 Setup Application

.Into the first

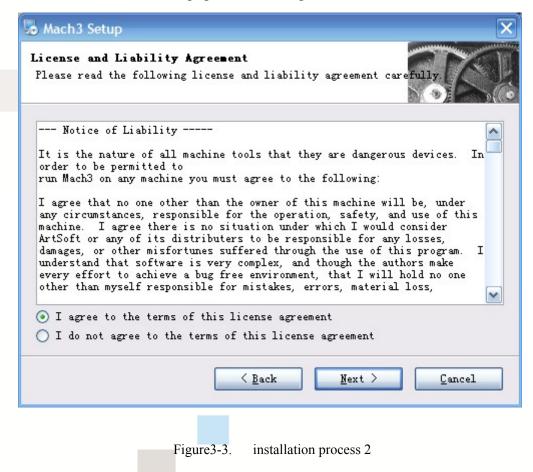
page. See as Figure 3-2.



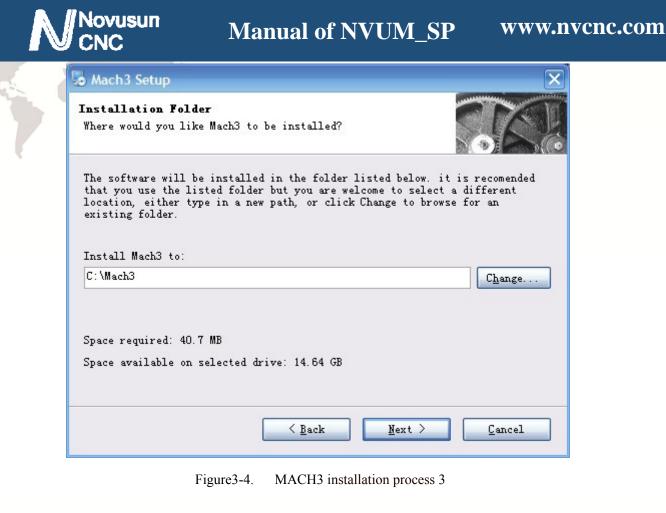




Click Next and then enter the page shown in Figure 3-3



Select I agree and click Next, See as Figure 3-4.



Select the installation path, click Next (it can be installed on any disk, and recommended

to install the C drive or the D drive) See as Figure 3-5



Figure 3-5. MACH3 installation process 4

Click Next until completion. Then restart the computer.



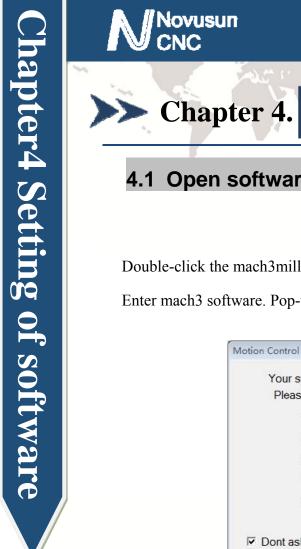
3.2 NVUM_SP Plug-in installation



Copy the file NVUM_SP.dll NVUM_SP.dll to X:\Mach3\PlugIns, X is the disk where the

soft is installed.





Setting of software

4.1 Open software



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

Motion Control Hardware PlugIn sensed!!	23
Your system is showing more than one control device	
Please pick the one you would like this profile to use.	
C Normal Printer port Operation.	
NVUM-Novusun-PlugIn-Ver-2.0a	
C No Device	
○ No Device	
C No Device	
☑ Dont ask me this again OK	

Figure4-1. Plugin selection dialog

Choose our plugin NVUM SP Novusun-PlugIn---Ver-2.0a. Then press OK. If you do not want to the dialog box appear again next time, you can select Don't ask me this again. If connect successfully, Status bar will show "NVUM SP device is connected to your computer". See as Figure4-2.

> Load Wizards File: No File Loaded NFS Wizards Edit G-Code Rewind Ctrl-W **Tool Information** ycle Star <Alt-R> Recent File Single BLK Alt-N Tool 0 Close G-Code Reverse Run Load G-Code eed Hold <Spc> Dia +0.0000 Block Delete +0.0000 н Set Next Line M1 Optional Stop Stop Alt-S> Flood Ctrl-F Auto Tool Zero Run From Here Remember Return Emergen zinnior 00:00 Reset Press Reset Jog ON/OFF Ctrl-Alt-J +0.000 G-Codes M-Codes History Clear Status: Invem device is o Profile: M

Figure4-2. connect successfully



4.2 Software Common settings

4.2.1 Check NVUM_SP plugin

Click config plugins to input PluginConfig, you can seeNVUM_SP. See as Figure4-4.

🕽 🛯 a	ach3 CNC Licensed	To: IaoΔ楢↑	花袍 onar			
File	Config Function Cfg's	<u>V</u> iew Wizards	Operator	PlugIn Contr	ol Help	
Pr		DI (Alt-2)		th (Alt-4)	Offsets (Alt-5)	Setti REF ALL HOME
F	Save Settings	_	_			

Figure4-3. Input Config plugins

Enabled	PlugIn Name	Config
4	Flash-FlashScreen-SWF-PlugIn-A.FenertyBBar	CONFIG
X	JoyStick-JoyStick-PlugInArt-Fenerty-Ver-1.0a	CONFIG
4	NVUM_SP-Novusun-PlugIn-Ver-2.0a	CONFIG
X	PrinterScope-Port-Scope-1.00.046	CONFIG
X	TurnDiags-Turn-Diags-1.00.1	CONFIG
4	VideoB.Barker-Ver-1.0	CONFIG
•	m	
•	III	
		ОК

Figure4-4.



4.2.2 Motor operating parameters setting

File Config Function Cfg's Pr Select Native Units Ports and Pins	View Wizards Operator PlugIn Control Help II (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-4)
Motor Tuning General Config System Hotkeys Homing/Limits ToolPath Slave Axis Backlash Fixtures ToolTable Config Plugins Spindle Pulleys Safe_Z Setup Save Settings	R Zero X Zero U Zero 4 CFFLINE CZE

Figure4-5. Motor operating parameter setting menu entry

See as Figure 4-5.From submenu "motor tuning" of the menu "config" into the motor

parameter settings dialog. See as Figure 4-6

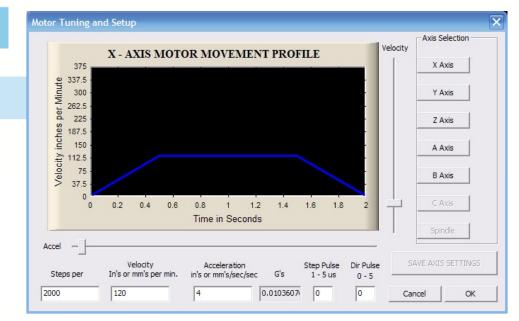


Figure4-6. Motor operating parameter settings dialog

The parameters are defined as follows:

Steps per: Pulse equivalent ,it is number of pulses required with axial movement 1mm, This can be calculated by lead screw pitch and motor drive segment. Such as pitch 2.5mm,2-phase

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motor 8 segments, Calculation method is 8*200/2.5=640.

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

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

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

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

Attention: The parameters for each axis is not necessarily the same, To select the axis,

and then set parameters. You should click "SAVE AXIS SETTINGS" After setting.

4.2.3 Port Settings

ار 🙆 Eile		l To: MaoA褚站在他的ar View Wizards Operator PlugIn Control Help	
Pr	Select Native Units Ports and Pins	I (Alt-2) Tool Path (Alt-4) Offsets (Alt-5)	Settings (Alt-
	Motor Tuning General Config System Hotkeys Homing/Limits ToolPath Slave Axis Backlash Fixtures ToolTable Config Plugins Spindle Pulleys Safe_Z Setup Save Settings		R Zero K Zero H Zero M Zero 4
F	ile: No File Loaded.		
F		dit G Code Rewind Ctrl W	Tralle
		Figure4-7. Port setting intr	у

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

dialog box.





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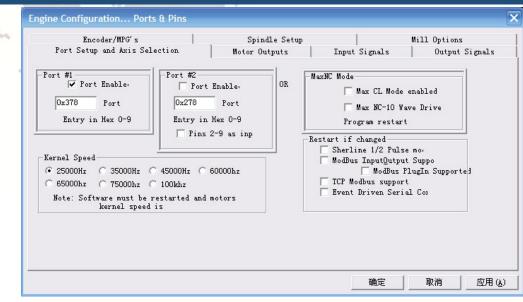


Figure4-8. Pin&Port Dialog

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

To make the Z axis to the same direction, Z axis's "Dir low" should be set to" $\sqrt{}$ ".Other axes's should be set as system need.

	ucoder/MPG's up and Axis Se	 lection	Spin Motor O	ndle Setup Mutputs	 Input Signal)ptions Output Signal
Signal	Enabled	Step Pin#	Dir Pin#	Dir LowAc	Step Low	Step Port	Dir Port
X Axis	4	0	0	X	2	1	1
Y Axis	4	0	0	X	2	1	1
Z Axis	4	0	0	4	8	1	1
A Axis	4	0	0	×	8	1	1
B Axis	4	0	0	X	2	0	0
C Axis	4	0	0	×	X	0	0
Spindle	4	0	0	×	×	0	0

Figure 4-9. Stepper motor port settings dialog

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



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Port Setu	coder/MPG's up and Axis Sel	ection.	Spindle Motor Outp		 Input Signals	Mill Op† Ou	tions tput Signa
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	*
X ++	4	1	3	4	X	0	E
X	4	1	4	4	X	0	
X Home	2	1	0	*	*	0	
Y ++	4	1	5	4	*	0	
Y	4	1	6	4	X	0	
Y Home	2	1	0	X	X	0	
Z ++	4	1	7	4	×	0	-
• Configura	ation Ports &	Pins			确定		
En	ation Ports & coder/MPG's p and Axis Sel	T	Spindle		确定 Input Signals	Mill Op	-
En Port Setu	coder/MPG's	T	1	uts	T	Mill Op	tions
End Port Setu Signal	coder/MPG's p and Axis Sel	ection	Motor Outp	uts	 Input Signals	Mill Op	tions utput Signs
End Port Setu Signal Z	coder/MPG's p and Axis Sel Enabled	ection	Motor Outp	uts Active Low	 Input Signals Emulated	Mill Op 01 HotKey	tions atput Signe
Env Port Setu Signal Z Z Home	coder/MPG's p and Axis Sel Enabled	ection Port# 1	Pin Number 8	Active Low	Input Signals Emulated	Mill Op 0 HotKey 0	tions utput Signs
En Port Setu Signal Z Z Home A ++	coder/MPG's p and Axis Sel Enabled	Port # 1 1	Motor Outp Pin Number 8 0	Active Low	Input Signals	Mill 0p 0 HotKey 0 0	tions utput Signs
Ene	coder/MPG's p and Axis Sel Enabled 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	 ection 	Motor Outp Pin Number 8 0 9	Active Low	Input Signals Emulated	Mill 0p 0 HotKey 0 0 0	tions utput Signs
Eno Port Setu Signal Z Z Home A ++ A A Home	coder/MPG's p and Axis Sel Enabled 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Port # 1 1 1 1 1 1	Motor Outp Pin Number 8 0 9 10	Active Low	Input Signals Emulated	Mill Op 0 HotKey 0 0 0 0 0	tions utput Signs
End Port Setu Signal Z Z Home A ++ A	soder/MPG's p and Axis Sel Enabled d d d d d d d d d d d d d d d d d d	Port # 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Motor Outp Pin Number 8 0 9 10 0	Active Low	Input Signals Emulated	Mill 0p 0 HotKey 0 0 0 0 0 0 0	tions utput Signs

Figure4-10. limited Input Settings dialog

Here you can configure according to your actual needs the corresponding function. Optional

Function include XYZABC6axis's Upper and lower limit, XYZABC6axis's HOME point.

	oder/MPG's	1	Spindle	-	1	Mill O	
Port Setup	and Axis Sel	.ection	Motor Outp	uts	Input Signals	0	utput Signals)
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	*
Input #3	×	1	0	×	2	0	
Input #4	*	1	0	X	×	0	
Probe	4	1	2	4	X	0	E
Index	4	1	0	4	X	49	
Limit Ovrd	X	1	0	×	X	0	_
EStop	4	1	1	4	X	0	
THC On	X	1	0	X	×	0	- +
	Pins 10-13 a	and 15 are ing	puts. Only these	5 pin numbers	may be	d Setup of I	Inputs

Figure 4-11. Estop Probe and index Setting dialog

PROBE, ESTOP and Spindle speed back index Setting see as Figure 4-11, PIN of index

should be set to 0, and probe's pin number is 2, estop's pin number is 1.

Click "Spindle Setup" switch to the spindle settings page. See as Figure4-12.

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Motor Control	100 100 000 000 000 000 000 000 000 000	rtions Le Feedback in	Svnc M
PWMBase Freq. 2083 Minimum FWM 0 % General Parameters CW Delay Spin UP 1 CCW Delay Spin UP 1 	P 0.25 Spindle S Seconds Seconds Seconds Seconds	Special Option	ns, Usually Off at for J . fr s Contu
0	Minimum PWM 0 % General Parameters W Delay Spin VP 1 CCW Delay Spin VP 1 Sil Delay Spind DOWN 1 CCW Delay Spin DOWN 1	MMBase Freq. 2003 Minimum PWM O % General Parameters CW Delay Spin VP 1 Seconds CCW Delay Spin VP 1 Seconds Sil Delay Spind DOWN 1 Seconds	Minimum FWM 0 % General Parameters Special Option CW Delay Spin UP 1 Seconds CW Delay Spin UP 1 Seconds CW Delay Spin UP 1 Seconds CW Delay Spin DOWN 1 Seconds CW Delay Spin DOWN 1 Seconds CW Delay Spin DOWN 1 Seconds

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Figure4-12. Spindle Settings dialog

Here we can configure the spindle rotates CW、 Reverse CCW、 Mist、 Flood pin, See as Figure4-13, They have been configured as 1、2、3、4. Corresponding to output#1~output#4 in Figure4-14.output#1~output#6 in Output Signal Setup dialog can be Configured into these 4 signals. Here we only configure CW \MIST\FLOOD. They are M3\M7 and M8 in G-code file. CW is controlled by OUT1 and MIST is controlled by OUT2 and Flood is controlled by OUT3. Here we note correspondence between 2 page. Please select "use spindle motor output" if required PWM speed spindle. And select " PWM Control". Our PWM pin fixedly arranged on a special pin, it's no need to be set.

Encoder/			indle Setup		11 Options Output Signals
Port Setup and	Axis Selection	Motor	Outputs I	nput Signals	Output Signals
Signal	Enabled	Port #	Pin Number	Active Low	*
Output #1	4	2	1	4	
Output #2	4	2	2	4	
Output #3	4	2	3	4	E
Output #4	X	1	0	×	
Output #5	*	1	0	×	
Output #6	*	1	0	*	
Charge Pump	×	1	0	*	
Charge Dump?	1	1	0	*	•
Pins	2 - 9 , 1, 14, 16	ó, and 17 are ou	itput pins. No othe	r pin	

Figure4-13. Spindle setting corresponds to the output configuration



>>> Chapter 5. Using of software

5.1 Set Machine Coordinate system

Firstly Open the software, as the drawing 5-1 shows, at this time, the software can operate the machine movements, but before the setting machine coordinate system, there is no connection between the software and machine. So first step is to set the machine coordinate system.

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File Config Function Cfg's View Wizards Operator PlugIn Control Help	
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7) MIII->G15 G1 G17 G40 G20 G90 G94 G54 G49 G99 G64 G97	
A 7 + 10.9845 + 10.000	
E Zero +0.0000 Radius Correct	
OFFLINE GOTTO TO GO Machine Coord's Soft Limits	
File: No Sile Last Wizard Regen. Display J	og
	llow
Edit G-Code Rewind Ctrl-W Tool Information Feed Rate Spindle Spee Cycle Start Recent File Single BLK Alt-N Tool Information Feed Rate Spindle Spee	
Close G-Code Reverse Run Tool Ourrend Rapid Spindle CW F5 SR	0 % 100
Feed Hold Spece Block Delete Block Delete H +0,0000 H +0,0000	
Stop Line: 0 Flood Ctrl-F Auto Tool Zero 6.00 RPM 0	
Elapsed CO	
Reset Z Inhibit Jog ON/OFF CtrI-AltJ Units/Min 0.00 Spindle Speed	
G-Codes M-Codes +0.000 Units/Rev 0.00 0	
History Clear Status: Profile: Mach3Mill	

Figure 5-1. Main Screen of mach3

1. Set the machine original position switch

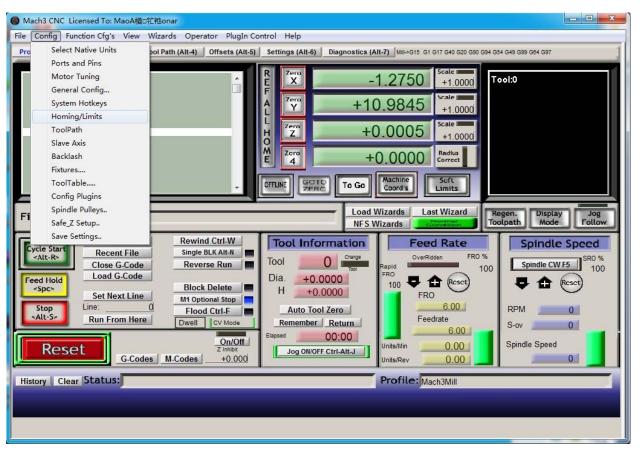
As our request, some machine set the original point at the coordinate positive direction, some machines set the original point at the coordinate negative direction. Mach 3 can search out the machine original point direction by the software setting. As the pic 5-2 shows, open Homing on the config menu. Then as pic 5-3 shows. On this page, Home Neg is for searching for the machine



orginal point direction, \times means searching original point at negative direction; $\sqrt{}$ means searching

original points at the positive direction. As the pincture 5-3 shows, X axis's original position is at

the negative direction, Y and Z's original points are at the positive direction.



Fi	gure5-2.	

Click homing of Config

Motor Home/SoftLimits

Axis	Revers	Soft Max	Soft Min	Slow Z	Home	Home Neg	Auto Ze	Speed %
x	*	270	0	1.00	0.0000	X	X	20
Y	*	0	-390	1.00	0.0000	4	×	20
Z	8	0	-100.00	1.00	0.0000	4	8	20
A	*	100.00	-100.00	1.00	0.0000	X	X	20
В	8	100.00	-100.00	1.00	0.0000	X	X	20
с	8	100.00	-100.00	1.00	0.0000	X	X	20

Figure 5-3. Motor Home and Softlimits dialog

2、Set soft limits



As Figure 5-3 shows, this page also can set machine soft limit points, Soft Max is positive direction soft limited points, soft Min is negative direction soft limited points. The soft limited points values is according the references to the machine coordinate system, so as this example shows, Y and Z axis's max value is 0, all the effective coordinate data is less than 0. As the Figure shows, according to our current request, we set our XYZ axis soft limited points area as [0,270] [-390,0] [-100,0].

3. Searching for machine original points

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File Config Function Cfg's View Wizards Operator PlugIn Control Help
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7) Mill>G15 G1 G17 G40 G20 G90 G94 G54 G49 G99 G64 G97
Image: Constraint of the second se
File: No File Loaded. Load Wizards Last Wizard Regen, Display Mode Follow
Edit G-Code Recent File Rewind Ctrl-W single BLK Alt-N Close G-Code Tool Information Tool Feed Rate Spindle Speed Feed Hold <spc> Set Next Line Block Delete Tool Tool 200 Tool Spindle CW F5 Snow Stop <alt-s> Set Next Line M1 Optional Stop M1 Optional Stop Tool 200 FRO 100 Tool No FRO No Tool Spindle CW F5 Snow Snow Stop Line: 0 Divelil CV Mode FRO 100 FRO SoverRidge RPM 0 Sover Sover Spindle Speed Sover Spindle Speed Sover Spindle Speed Spindle Speed<!--</th--></alt-s></spc>
G.Codes M.Codes +0.000 Units/Rev 0.00 0 History Clear Status: Profile: Mach3Mill

Figure 5-4. Click REF ALL HOME to HOME all axis

As Figure 5-4 shows, press REF ALL HOME at main display page, then XYZ A4 start to search for the original points, if you need more axis's operation, edit macro command, or press Alt+7 into Diagnostics display page, you can search original point for every axis. Diagnostics

5.2 Set workpiece coordinate system

Because every working material is hold in different position on the machine, we need to set

one or more workpiece coordinate system.

1. Move to current working piece 0 point

Firstly hold down the material, use keyboard or pendant to move tool tip at the 0 point, so this 0 point is the working piece 0 point, it related with the working G code file, so the user must be very familiar to his own working G code. As our example shows, the 0 point is on the center of the working piece surface, so we just move the tool tip to this position.

2、 clear Coordinate

As 5-5 shows, press Zero button on each axis, then clear to 0 for each axis. After operation, the result shows as Figure 5-6.

l Mach3 CNC Licensed To: MaoA楢□牤袍onar	
File Config Function Cfg's View Wizards Operator PlugIn Co	ntrol Help
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5)	Settings (Alt-6) Diagnostics (Alt-7) Mill>G15 G1 G17 G40 G20 G90 G94 G54 G49 G99 G84 G97
	R Zera -1.2750 \$cale +1.0000 Y +10.9845 +1.0000 +1.0000 Zera +0.0005 \$cale +1.0000 Zera +0.0000 Radius Correct OFFLIKE GOTO To Go Machine Soft
File: No File Loaded.	Load Wizards Last Wizard Regen. Display Jog NFS Wizards Company Hole Follow Mode Follow
Cycle Start Edit G-Code Rewind Ctrl-W Alt-R- Close G-Code Single BLK Alt-II Close G-Code Deverse Run Cose G-Code Block Delete Stop Set Next Line Ine: 0 Flood Ctrl-F Dwell Cv Mode On/Off Z Inhibit G-Codes M-Codes +0.000	Tool Information Tool O Tool O Dia. +0.0000 H +0.0000 Auto Tool Zero FR0 Remember Return Elapsed O0:00 Jog ON/OFF Ctrl-Alt.J Units/Min
History Clear Status:	Profile: Mach3Mill

Figure 5-5. Press Zero on each axis, all clear to 0



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File Config Function Cfg's View Wizards Operator PlugIn Control Help		
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7) Mill>G15 G1 G10 G17 G40 G20 G90 G94 G54 G49 G99 G84 G97		
R Z +0.0000 Scale F A Y +0.0000 Scale F A Y +0.0000 Scale H Z +0.0000 Scale H Z +0.0000 Scale Y +0.0000 Scale +1.00 M Z +0.0000 Scale Y +0.0000 Scale Scale Correct Y +0.0000 Scale T GOTO To Go Machine Soft Limits Soft Soft Soft Soft	00	
File: No File Loaded. Load Wizards Last Wizard Regen. Display Jog NFS Wizards Construction Mode Follow		
Edit G-Code Rewind Ctrl-W Single BLK Ait-N Single BLK Ait-N Close G-Code Reverse Run Load G-Code Block Delete M1 Optional Stop Dia. Stop Set Next Line Line: OverRidden Flood Ctrl-F Divelit Owell OverRidden Stop Set Next Line Line: Owell Owell Cv Mode On/Offi Dig ON/OFF Ctrl-Ait-J Jog ON/OFF Ctrl-Ait-J Units/Min	FRO % 100 spindle CW F5 SRO % 100 FRO % FRO % 100 FRO % FRO %	
History Clear Status: Profile: Mach3Mill		

Figure 5-6. Main Screen after ZERO all axis

5.3 Open G code file and run

Novusun

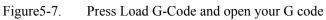
As Figure 5-7 shows, press "load G code" botton at the main page or open "Load G code" at main menu "File", open your G code. It displayed as Figure 5-8 showing, then press button "cycle start" then machine start to work.



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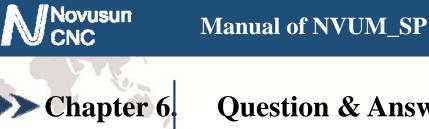
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File Config Function Cfg's View Wizards Operator PlugIn Co	ntrol Help	
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5)	Settings (Alt-6) Diagnostics (Alt-7) MII->G15 G1 G10 G17 G40 G20 G90 G94 G54 G49 G99 G84 G97	
	R 7ero +0.0000 scale +1.0000 F A +0.0000 scale +1.0000 F - +0.0000 scale +1.0000 V +0.0000 scale +1.0000 Zero +0.0000 Scale - V +0.0000 Scale - Zero +0.0000 Correct - OFFLIKE GOTO To Go Machine Soft Umits - Soft - -	
File: No File Loaded. Load Wizards Last Wizard Regen. Display Jog Mode Follow		
Cycle Start Edit G-Code Rewind Ctrl-W *Alt-R* Recent File Single BLK Alt-N Close G-Code Reverse Run Load G-Code Block Delete Stop Stop *Alt-S* Run From Here Dwell CV Mode	Tool Information Feed Rate Tool 0 Tool Dia. +0.0000 H +0.0000 Auto Tool Zero FRO Remember Return Elapsed 00:00 UnitsMin 0.00 Spindle Speed Spindle Speed	
Reset G-Codes M-Codes +0.000	Jog ON/OFF Ctri-Alt-J Units/Rev 0.00	
History Clear Status:	Profile: Mach3Mill	



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File Config Function Cfg's View Wizards Operator PlugIn Control Help			
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7) MII>G15 G1 G10 G17 G40 G20 G90 G94 G64 G49 G99 G84 G97			
G025.00 F500 M03 s14000 G0X0 0000	0.0000 +1.0000 0.0000 +1.0000 0.0000 Scale +1.0000 0.0000 Radius Correct Machine Soft Limits		
File: H/G/2mmnewtap	Wizards Last Wizard Regen. Display Jog Nizards Constituted Toolpath Mode Follow		
Cycle Start Edit G-Code Rewind Ctrl-W Single BLK Alt-H Tool Information Close G-Code Reverse Run Tool O Tool Feed Hold Load G-Code Block Delete Dia. +0,0000 Stop Set Next Line M1 Optional Stop Auto Tool Zero Alt-S> Run From Here Dwell CV Mode	Feed Rate Spindle Speed OverRidden FR0 % 100 100 FRO Reset FRO 6.00 Feedrate S-ov		
G-Codes M-Codes +0.000	Units/Min 0.00 Spindle Speed Units/Rev 0.00 0		
History Clear Status:	Profile: Mach3Mill		

Figure 5-8. After opening G code, press "Cycle Start" and start to work



Question & Answer

www.nvcnc.com

6.1 Q&A for Hardware



6.2 Q&A for Software







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- Support Email: Support@nvcnc.com