nMotion Mach3 USB Motion Card Installation Manual

Features:

- Fully supporting all Mach3 versions, including the Mach3 R3.043.066 version.
- Supporting Windows series, including Windows2000/XP/Vista/Win7/Win8/Win10.
- No need to install any USB drivers, it can be used aftr plugging in the computer.
- USB bus is the use of magnetic coupling isolation, isolation of real value, different from the general control card optocoupler input and output, do high reliability, absolute guarantee the safety of the computer USB. At the same time to ensure that the strong anti-interference ability of EMC.
- > The single chip, the system stability is more streamlined, multi chip processing generally incomparable
- Dual core ultra high speed CPU (the maximum single core frequency 204MHz), operation processing ability has great redundancy, and ensure the realization of four axis linkage under1500KHz frequency of the pulse output, 6 axis pulse output frequencies up to 800kHz, connected to the servo / step
- Motion control buffer size can be set and ensure the fast interpolation cycle can stable operation, computer running overload can also smooth operation and interpolation cycle adjustable, can adapt to a variety of different needs.
- Has 16 input port, input interface more simple, port of wet and dry contact can be, wiring is simple, dry contact method for as long as the external connected to a physical switch to the wire can be, all 16 input port are indication signal, for low power usually indicating lamp is bright, debugging simple and clear.
- With 8 output ports, a single output drive capability of 170mA max, can be directly driven by DC relay.
- The PWM speed output port can be set, the frequency of PWM, pulse width 0~1000 continuously adjustable.
- With the function of the speed, the actual speed of the spindle in the Mach3 interface, real-time display, accurate and stable measurement.
- With 256 bytes of NVRAM space, can save the coordinates of the 6 axes, the next power without the need to find the mechanical origin.
- > The circuit board is made by the engineer, the design level is clear at a glance.

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• Basic connection diagram (an Overview)



• Mechanical dimensions diagram



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• Prepare Mach3 software



This card is a Mach3 USB interface 3/6 axes external motion card.

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



Mach3 download: as shown below:



Downloads

For previous versions of Mach and LazyCarn, XAL'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



Installation the Mach3: The Parallel Port Driver does not require.

Select Packages Please select the program features that Program Features:	you want to install. lel Port Driver can deselect.
Parallel Port Driver ♥ Wiewele ♥ XML's LazyCam ■ ♥ Screen sets ♥ Standard Mach3Turn screen ♥ Standard Mach3Mill screen ♥ Standard Mach3 Plasma screen	Installs the Parallel Port Driver. This is not needed for external motion control devices. (328 KB)
Total space required: 39.5 MB	k <u>N</u> ext > <u>C</u> ancel

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



A. 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(nMotion.zip)



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 ,

otion Contr	ol Hardware PlugIn sensed!!	
You	system is showing more than one cont	rol device
Ple	ase pick the one you would like this profi	le to use.
	C Normal Printer port Operation.	
	• nMotion-CNC-Control	
	C No Device	
	C No Device	
	C No Device	
C Dont a	ask me this again	OK



Engine Configuration... Ports & Pins

Signal	Enabled	Step Pin#	Dir Pin#	Dir LowActive	Step Low Act	Step Port	Dir Port
K Ax <mark>i</mark> s	4	1	2	*	4	Guggost	° cot to
/ Axis	4	3	4	*	4	^o Setp lov	Active
Z Axis	4	5	6	X	4	0	0
A Axis	4	7	8	X	4	0	0
3 Axis	4	9	10	8	4	0	0
C Axis	4	11	12	*	4	0	0
spindle	4	0	0	*	4	0	0
	/						
	n	ew softwa	ire can c	hange the	STEP and	DIR ord	ler





The Mach3 Menu => Config => Homing/Limits dialog Axes direction, depends on the "Reversed". if you have a MPG ,please let "Reversed" as "X".

gine comigatation... i orto oci mo

4

4

11

0

C Axis

Spindle



0

0

Or you can chang the direction on this page: Dir Low selet "X" or " $\sqrt{}$ "

ort Set <mark>up</mark> and	Axis Selection	Motor Outputs	Input Signals	Output Signals	Encoder/MPG's	Spindle Setup	Mill Optio
Signal	Enabled	Step Pin#	Dir Pin#	Dir LowAc	t ve Step Low	Act Step Port	Di
X Axis	4	1	2	×	chanc	e this to	0
Y Axis	4	3	4	4	chang	je Axis Mo	oving
Z Axis	4	5	6	x	direc	tion _o	0
A Axis	4	7	8	x	4	o	0
B Axis	4	9	10	x	4	0	0

12

0

4

1

0

0

b) Setup the input singles.

There are 16 general-purpose input channels. The channels number is from 1 to 16 ,Port Number is 2.

Suggest Active Low =" $\sqrt{}$ " (Set Low signal Level for Inputs)

Enco	der/MPG's	1	Spindl	e Setup	Tunut Signals	Mill Og	tions
rort Setup	and AXIS Sel	ection	motor outp	uts	angur or friday	1 0	utput Signal
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	~
Input #4	*	2	0	X	X	0	
Probe	D' 1 - 1	Ju I	6 1.16	N	2	0	
Index	Pick ticks'	V"	from 1 to 16	X .			
Limit Ovrd	\succ	2	1	12/	Sugges	t pick a cro	DSS "\"
EStop (2	10				
THC On	-	2			to set L	ow signal.	level Activ
THC Up	8	2	0	8	-		
THC Down	X	2	0	*	8	0	
OEM Trig #1	×	2	0	*	8	0	
OEM Trig #2	8	2	0	*	8	0	100
	1	Salar and	-	-		-	1.20
	Pins 10-13	and 15 are inp	puts. Only these	5 pin numbers	may be		
		and pressing					1
	(Enter"?")		Automate	ed Setup of I	inputs
		THUCH T					

c) Setup the Output signals.

There are 8 general-purpose (open-drain) output channels, The channels number is from 9to 16. Port Number is 2.

Suggest Active Low =" $\sqrt{}$ " (Set Low signal Level for outputs)

Signal	Enabled	Port #	Pin Number	Active Low	
Digit Tric		Diale tiales ">/ "	-	× I	
Enable1		FICK UCKS V	2		
Enable2			3		
Enable3		0	4	4	
Enable4					
Enable5		Number rang:	5	<u> </u>	
Enable6	4	-	6		
Output #1	4 L	From 9to 16	17		
Output #2	4		0 Sug	gest to put ticsks"\".	
Output #3	*	0		un airmal lanala a atim	ad
Output #4	8	0	0	w signal levels activ	ed
Pi	- 2 - 9 1 14	18 and 17 are out	and sing Ha affect	E16	~

• Hardware installation of motion control card

PIN function description

Index	Pin Name	Function	Electrical	note
1	PU+	Plus +	Differential signal	AM26LS31 output
2	PU-	Plus-	Differential signal	AM26LS31 output
3	Dir+	Dir+	Differential signal	AM26LS31 output
4	Dir-	Dir-	Differential signal	AM26LS31 output

6 Axis Output Port

16 input terminals (Port Input) pin function description

index	Pin Name	Function	Electrical characteristics	Note
1	GND	Digital signal ground wire		
2	IN1	Input Port		In the MACH3 menu
3	IN2		Type NPN switch	"配置"="端口和引脚"
4	IN3		or contact switch	"Configuration" = >"port and pin"
5	IN4			=>"Input Signals"中
6	IN5			配置功能
7	IN6			= > "Input Signals" in the allocation of
8	IN7			functions
9	IN8			Mach3中端口号 (Port Number)为2,
10	IN9			针脚号(Pin Number)
11	IN10			为1~10亏。 Mach2 in the part
12	IN11			number (Number
13	IN12			Port) for 2, the pin number (Number Pin) for the 1~16
14	IN13			number.
15	IN14			
16	IN15			
17	IN16			
18	GND	Digital signal ground wire	Digital ground , and 24V power supply ground is the same	

Output terminal (Port Out) pin function description

index	Pin Name	Function	Electrical	Note
1	24V+	9~36V DC Power	Minimum power 10W	Power input terminal
2	GND	9~36V DC GND	Minimum power 10W	
3	GND	Signal ground	Input power EGND and control output DGND are isolated	Input power EGND and control output DGND are isolated
4	5V+	output out:5V	max:600mA	Output from 24V to 5V
5	5V+			linear power supply
6	PWM	PWM pulsewidth	OC, 50V/170mA	The spindle speed output, output can be 0~5V or
7	SP+	Speed Signal +	6~15mA	LED Positive input
8	SP-	Speed Signal-	6~15mA	LED Negative input
9	O16	general-purpose	OC (open-drain),	In the MACH3 menu "Configuration" = >"port and
10	015	(open-drain) output	50V /50mA	pin" = > "Output Signals"
11	O14	channels		Configuration function, port number (Number Port)
12	O13			for 2, pin number (Number Pin) for the 8~16 number.
13	012	general-purpose	OC (open-drain),	
14	011	(open-drain) output	100V /170mA	
15	O10			
16	09			
17	GND	Signal ground	Signal ground	Signal ground
18	PE	Grounding wire	Grounding wire	Grounding wire

The card supplied by USB, has installed a power module, the maximum output power of up to 1A.

All output, including 6 axis pulse / output / control output / spindle speed output, USB connection after the default output impedance. In the Mach3 after the start level is controlled by Mach3, suggested that all the output signal in Mach3 is set to low level effective.



Input port wiring instructions



There are 16 input port ,can use NPN , or Contact switch

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	AG A12/	<u>A¥+ A6</u>	LATIA	*+			Ŧ		Ŧ		+							1	e loanne
Rs485 DC OUT A+ B- GND 5V+	GND 新卡塔	X Home X東京 II	IN2 gwoH A	Z Home I Z原点 至	A None I and A Rone A	TN5 WPU WPU B	C Home C原点 BNI		YLimit Y限位 副	ZLimit W	ま で ま で な		1112	INTS	Start ■ 开始 II	1N15 당년 당왕	Esto Esto Esto	GND 軒卡發	
	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	Ð	
	Ē		+					_						2		_	ļ		

8 way control output pin position diagram

NPN type low level output mode, O9~12 have the maximum drive current 170mA.O13~16 50mA max.



Principle diagram of Isolate Output



External power knob

Two AI input port, the voltage input range of 0~3.3V, can be used to set the rate of FRO/SRO/JOG

Mach3 menu "Plugins Config"=>"Config", enter "PlugIn Control and Activation".

Status InMotion Powered On Limit or Estop hit Probe Hit Motion in Pause	Outputs Enable Selected for output enable OUT9EN OUT0EN	All ins and outs are Outputs->Mach Pins - Outputs->Mach Pins - Outputs ->Mach Pins - Outputs - O	in Mach3 Inputs->MachPins 단 Pin1 단 Pin9 단 Pin2 단 Pin10	Analog Config C ABS C Incremental FRO%: Incremal
nMotion in Walt condition Interpolated move in progress Velocity move in progress Scan in progress Motion Firmware version:	Coutien Coutien Coutien Coutien Coutien Coutien Coutien	V Out3 V Out12 V Out5 V Out12 V Out5 V Out13 V Out6 V Out14 V Out5 V Out15 V Out8 V Out15 V Out8 V Out16	Pin3 P Pin11 P Pin4 P Pin12 P Pin5 P Pin13 P Pin6 P Pin14 P Pin7 P Pin15 P Pin8 P Pin16	Internal T JOG%: Internal T
Configs Servic Cycle Time: .001 T Seconds per segment Last position save C PC save C NVRAM	it G Code Buffer Time(ms):	Spide Pluse pr 2	er turn: PWM Fred	iuency: IVHz
Homing	Homing Pull Off		Five Axis Sel: (•	XYZABC C XYZACB
Single Stage -H inputs	X Pull Off 2	a Pull Off 2	Deivce Connect	Dharlat
Dual stage- H inputs	Z Pull Off 2	E Pull Off 2	nMotion IP A	ddress:

There are two kinds of application modes of analog quantity input: 1 absolute value model, 2 increment value model

As follows	5:	
-Analog Co	nfig	
C ABS	œ	Incremental

- a. The absolute value of FRO%, SRO%, Jog% under the mode of the value of a linear relationship with the AI, AI level is higher, the greater the value of the corresponding rate.
- b. Incremental value mode FRO%, SRO%, Jog% value with the relative change in volume changes, mainly referring to the last moment of external AI voltage value and present current AI voltage value comparison, if the voltage is relatively higher, corresponding to the rate value is increased, otherwise reduce.
- c. General incremental value model.
- d. FRO% (feed rate of F). SRO% (spindle speed ratio), Jog% (dynamic magnification) set external rate "ExtA1" or "ExtA2

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Status I Motion Powered On Limit or Estop hit Probe Hit Motion in Pause InMotion in Pause InMotion in Wait condition Interpolated move in progress Velocity move in progress Scan in progress Motion Firmware version:	Outputs Enable Selected for output enable I OUT9EN Out10EN Out10EN Out12EN Out12EN Out12EN Out12EN Out15EN Out15EN	All ins and outs are Outputs->Mach Pins V Out2 V Out10 V Out2 V Out11 V Out3 V Out11 V Out4 V Out12 V Out5 V Out13 V Out5 V Out13 V Out5 V Out13 V Out5 V Out15 V Out5 V Out15	in Mach3 Inputs->MachPins V Pin1 V Pin9 V Pin2 V Pin10 V Pin3 V Pin11 V Pin4 V Pin12 V Pin5 V Pin13 V Pin5 V Pin13 V Pin5 V Pin15 V Pin5 V Pin15 V Pin5 V Pin15 V Pin5 V Pin15	Analog Config C ABS C Incremental FRO%: ExtA1 SRO%: SRO%: SRO%: Internal V
Configs Servo Cycle Time: .001 Seconds per segmer Last position save OPC save ONVRAM	K G Code Buffer Time(ms):	788 Spide Pluse pr 2	er turn: PWM Frec	quency:
Homing No Homing Single Stage - H inputs Dual stage - H inputs	Homing Pull Off X Pull Off 2 A Y Pull Off 2 B Z Pull Off 2 C	Pull Off 2 Pull Off 2 Pull Off 2	Five Axis Sel: Deivce Connect USB Motion IP A 127 0 0	XYZABC C XYZACB
Home Switches	1	Apply Configs	Cancel	ок

After the completion of the configuration, click "OK"". Rotation rate knob Mach3 interface corresponding to the SRO%, FRO% numerical immediately change.

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

Analog Config
ABS C Incrementa
FRO%:
ExtA1 💌
SRO%:
ExtA2 💌
JOG%:
Internal 🗾
AdvanceSet

In absolute value mode will be more of a button, used to set the initial voltage of low level and high level at the end of the voltage, such as external input voltage range is 0.5V~2.5V, to rate value by the change of 0-300, low starting level voltage is 0.5V, the high level end voltage 2.5V. Click on the "AdvanceSet" the following dialog:

AI Set					×
AI1 AI-Low	AI-Hi	AI2 AI-Low	AI-Hi	FilterSet	
	-	-	-		
-	-		-	-	
-			-	-	
	-	-	·	-	确定 取消

And a filtering coefficient, filter coefficient is small, rate value response faster, smoothing less, whereas response is slower, the change was more smooth. Generally do not move, set to 10~20 can be.

AI input port as shown below, not marked red terminal 4.4V about power, this power only potentiometer power supply, please don't external use.



Spindle speed PWM analog output

Click on the main menu "config" => "port and pins into the spindle spindle setup settings, tick the" use spindle motor output. In Freq. PWMBase, there is no need to fill in the required frequency. PWM frequency in the nMotion configuration page processing.

Port Setup and Axis Selection	Motor Outputs	Inpu	t Signals	Output Signals
Encoder/MPG's	Spindle Set	up		Mill Options
telay Control Disable Spindle Rel Clockwise Output 1 Output Signal #'s COW (M4) Output 2 Output Signal #'s Clood Mist Control ✓ Disable Flood/Mist repelay ist Output 4 Output 3 Output 3 Output Signal #'s NodBus Spindle - Use Step/Dir as Finabled Reg 64 64 - Max ADC Count 16380	Motor Control Vise Spindle Motor Outp PWM Control Step/Dir Moto FWMBase Freq. 2083 Minimum FWM 0 % General Parameters CW Delay Spin UP 1 CCW Delay Spin UP 1 well] Jelay Spin DOWN 1 CCW Delay Spin DOWN 1 CCW Delay Spin DOWN 1	Special Fun Vse Spin Closed L P 0.25 Spindle Seconds Seconds Seconds Seconds before d	ctions dle Feedback i oop Spindle Co I I D Speed Averagi Special Opti HotWire H Laser Mod Torch Vol	n Sync M nt 0.3 ons, Usually Off eat for J e. fr ts Conti

Spindle PWM (pulse width modulation output frequency in the Mach3 menu Config=>Config plugins into plugin control and selection of activation nMotion card to control the, click on the "config" after USB card configuration dialog.

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Status	Outputs Enable	All ins and outs are	in Mach3	Analog Config
modian rowered un Linki or Estap hit Probe Hit nMotion in Pause nMotion in Wait condition Interpolated move in progress Velocity move in progress Scan in progress nMotion Firmware version:	Selected for output enable COUTPEN COUTIEN COUTIEN COUTIEN COUTIEN COUTIEN COUTIEN COUTIEN COUTIEN COUTIEN	Outputs->Mach Pins V Out1 V Out2 V Out2 V Out10 V Out3 V Out11 V Out4 V Out12 V Out5 V Out13 V Out5 V Out13 V Out6 V Out14 V Out7 V Out14 V Out7 V Out14 V Out7 V Out16	Inputs->MachPins V Pin1 V Pin9 V Pin2 V Pin10 V Pin3 V Pin11 V Pin3 V Pin12 V Pin5 V Pin13 V Pin6 V Pin14 V Pin6 V Pin16 V Pin6 V Pin16	AB5 Incremental FRO%: ExtA1 I SRO%: SRO%: JOG%: Internal I
Carl Conde Control				
Configs Servo Cycle Time: .001 Seconds per segme Last position save @ PC save @ NVRAM	G Code Buffer Time(ms):	788 Spide Pluse pr 2	er turn: PWM Freq	iuency: KHz
Configs Servo Cycle Time: .001 Seconds per segme Last position save @ PC save @ NVRAM Homing	G Code Buffer Time(ms):	1788	er turn: PWM Freq	Nency: KHz XYZABC C XYZACB
Contrags Servo Cycle Time: 001 Servo Cycle Time: 001 Servo Cycle Time: 001 Servo Contract Service S	Ant G Code Buffer Time(ms): Homing Pull Off X Pull Off 2 A Y Pull Off 2 B Z Pull Off 2 C	1788 Pulse pr 1788 1 18 1	er turn: PWM Freq	KHz KHz XYZABC XYZACB EtherNet ddress:

spindle relay configuration

ne Configura	tion Ports & P	ins				
Encode	er/MPG's	Spi	indle Setup		1 1	Mill Options
Port Setup a	nd Axis Selection	Motor	Outputs	Inp	ut Signals	Output Signals
Signal	Enabled	Port #	Pin Nu	nber	Active Low	
Output #1	4	2	9		4	
Output #2		2	10		4	
Output #3	2	1	0		8	
10 U.S. 10 Carls	ber .		-			

Phase configuration of spindle speed control signal PWM

Signal	Enabled	Step Pin#	Dir Pin#	Dir Low	Step Lo	Step Port	Dir Port
Х Ажіз	4	2	3	-	4	1	1
Y Axis	4	4	5	4	4	1	1
Z Axis	4	6	7	4	4	1	1
A Anis	4	8	9	-	4	1	1
B Axis	×	0	0	×	×	0	0
C Axis	*	0	0	*		0	0
Spindle	4	14	0	× (*	1	0

Mach3 menu " Config=> Spindle Pulleys ", enter " Pulley Selection "



Principle diagram of the spindle speed control analog output interface



VCC_10V have not served, if you use a variable frequency speed control of the spindle and need in PWM feet pick a pull-up resistor to inverter 10V output ports.



nMotion control card of the speed of the input interface schematic





Probe connection



Config (Config => Ports and Pins)

Post Cater	der/mros	li il	Spindle United Outer	e Setup	Toput Signals	Mill Up	tions
fort Setup	and Axis Se.	Lection	motor Outp	uts	riput orginars	1 00	itput Signais
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	*
Input #3	X	1	0	X	X	0	
Input #4	X	1	0	X	X	0	
Probe	4	2	4	4	X	0	
Index	X	1	0	X	X	0	
Limit Ovrd	X	1	0	X	X	0	
Stop	4	2	1	*	X	0	
THC On	X	1	0	X	X	0	
СНС Ир	X	1	0	X	X	0	
THC Down	*	1	0	8	×	0	
DEM Trig #1	X	1	0	*	8	0	-
	l ba			he	b.e	1.2	
	Pins 10-13	and 15 are inp	uts. Only these	5 pin numbers	may be Automate	d Setup of I	nputs

Probe script like this:

Call SetDro (2,GageH)

FeedCurrent = GetOemDRO(818)'Get the current settings, OEM DROs (818)=Feedrate DRO ZCurrent = GetOemDro(802) 'OEM DROs (802)=Z DRO GageH = GetOEMDRO(1001)'OEMDRO(1001)=Gage Block Height ZNew = ZCurrent - 20'probe down 20 mm Code "G90F100" 'slow feed rate to 100 MM/MIN 'Pause 1 second to give time to position probe plate Rem Code "G4 P1" Code "G31 Z" &ZNew While IsMoving() Sleep(10)Wend

'DRO(2)=Z DRO

FinalMove = GageH + 10 Code "G0 Z" &FinalMove Code "F" &FeedCurrent

'restore starting feed rate





MPG use the input pin IN15 and IN16, connect to Encode A and B signal.

If you use a full function MPG with Rate switch and Axis select,

1	+5V	9	Encoder A
2		10	Encoder B
3	C axis SEL	11	GND
4	ESTOP	12	A axis SEL
5	B Axis SEL	13	Z axis SEL
6	X1	14	Y axis SEL
7	X10	15	X axis SEL
8	X100		

The DB15 head PIN order is like this :

Software configuration

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

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En	coder/MPG's	Í	1 100	Spindle Set	1p		Mill Options	or ginar s
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	4	2	15	2	16	4	100.00	
MPG #2	×	0	0	0	0	1.000000	100.00	
MPG #3	×	0	0	0	0	1.000000	100.00	

Press "TAB" key,like this



MPG soft mode: (no longer use)

This mode fix the MPG with Mach3, so all this need mach3 to do MPG work.



Press "Shuttle Mode" button, Shuttle Mode LED is off, the MPG woke on Soft mode.

MPG hard mode

Press "Shuttle Mode" button, Shuttle Mode LED is on, the MPG woke on Hard mode.



If your MPG have a white button as Enable, please hold the white button all the time when you use the MPG to control the machine.

In hard mode, the plugin set need to set something.

1. MPG Mini Step, in "X1", the MPG 1 step need to move a short distance, this need to set the "Config Plugins", and there is a setting like this, "MPG Set" ->"Min Step".

Min Step:	0.01	-
Min Step:	0.01	-

2. fifth Axis selection (no longer use)

motion Status & Config zhang	zm19808126.com			1
Satus Problem Trovered On	Outputs Enable Selected for output enable IF OUTSEN IF OUTSEN	All ins and outs are in Outputs-Mitch Pris Product Product Product Product Product Product Product Product Product Product Pro	Madr3 Tiputs=MachPirs Tiputs=MachPirs Pro2 to Pin1 Pro2 to Pin1 Pro2 to Pin1 Pro2 to Pin1 Pro3 to Pin1 Pro3 to Pin1 Pro3 to Pin1 Pro3 to Pin15 Pro3 to Pin15 turn: PWM Preque	Analog Config C ABS © Incremental FRCMs: Internal ¥ \$800%; Internal ¥ 300%; Internal ¥ anay; Internal ¥ Internal X Internal X
Homing Pib Homing Single Stage -H inputs Dual stage -H inputs Home Svetches X Y Z A	oming Pull Off X Pull Off 2 Y Pull Off 2 Z Pull Off 2	A Pull Off 2 B Pull Off 2 C Pull Off 2 Apply Configs	Five Axis Sel: B Delvce Connect USB Motion IP Add 127 . 0 . 0 Cancel	Axis C C Axis EtherNet ress:

If you want to use the BSEL pin to select C Axis ,you can set the config like this below.

Five Axis Sel:	🔘 B Axis	 C Axis
----------------	----------	----------------------------

• Using NVRAM

Select "PC save", the position is saved in PC ,and Select"NVRAM", the Mechanical position saved in NVRAM.

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Motion Status & Config 15502169252@126.com

Status	Outputs Enable	All too and other out	in March 9	Analog Config
nMotion Powered On Limit or Estop hit Probe Hit nMotion in Pause nMotion in Wait condition Interpolated move in progress Velocity move in progress Firmware version: 0.0	Selected for output enable V OUT9EN V Out10EN V Out11EN OUT2EN OUT2EN OUT3EN OUT3EN OUT4EN OUT7EN OUT5EN OUT5EN OUT5EN OUT5EN OUT9EN OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT9EN V OUT1EN V OUT1EN V OUT12EN V OUT16EN V OUT16EN	Outputs->Mach Pins- Outputs->Mach Pins- Out1 Out9 Out2 Out10 Out3 Out11 Out4 Out12 Out5 Out13 Out6 Out14 Out7 Out15 Out8 Out16	Inputs->MachPins Inputs->MachPins Pin1 Pin9 Pin2 Pin10 Pin3 Pin11 Pin4 Pin12 Pin5 Pin13 Pin6 Pin14 Pin7 Pin15 Pin8 Pin16	 ● ABS ○ Incremental FRO%: Internal ▼ SRO%: Internal ▼ JOG%: Internal ▼ AdvanceSet
Configs Servo Cycle Time: .002 Seconds per Last position save PC save C NVRAM	G Code Buffer	1 Spidle Pluse pe 1487	er turn: PWM Fred	quency:
Homing	Homing Pull Off		Five Axis Sel: ()	B Axis C C Axis
 No Homing Single Stage -H inputs Dual stage- H inputs 	X Pull Off 3 A Y Pull Off 3 B Z Pull Off 3 C	Pull Off 3 Pull Off 3 Pull Off 3	Deivce Connect	C EtherNet ddress:
Home Switches	Advance Set	ting	Cancel	ОК

• Advance Setting

Advance Setting ×					
IN Call Setting IN5 Call For Code"M905" IN9 Call For Code"M909" IN13 Call For Code"M915 IN1 Call For Code"M902" IN6 Call For Code"M906" IN10 Call For Code"M910 IN14 Call For Code"M914 IN3 Call For Code"M903" IN7 Call For Code"M907" IN11 Call For Code"M911 IN15 Call For Code"M915 IN4 Call For Code"M904" IN8 Call For Code"M908" IN12 Call For Code"M912 IN16 Call For Code"M916					
Motion Pin config					
X_STEP XS 💌 A_STEP: AS 💌 X Axis Step+Dir 💌 Y Axis Mode: Step+Dir 💌					
X_DIR: XD 💌 A_DIR: AD 💌 Z Axis Mode: Step+Dir 💌 A Axis Step+Dir 💌					
Y_STEP: YS B_STEP: BS B Axis Mode: Step+Dir C Axis Step+Dir					
Y_DIR: YD ▼ B_DIR: BD ▼ Z_STEP ZS ▼ C_STEP: CS ▼ Z_DIR: ZD ▼ CDIR: CD ▼ (© Step Or Dir out C Spindle Step Set					
Default Set					
Offline MPG Work					
OK Cancel					

1.use INPUT pin to call a M Code run:(this only work when mach3 is in stop statue),M901~M916 is write by your self.

Х

nMo	- IN Call Setting -
🗖 Limi	□ IN1 Call For Code"M901" □ IN5 Call For Code"M905" □ IN9 Call For Code"M909" □ IN13 Call For Code"M912
Prot	🔲 IN2 Call For Code"M902" 🔰 IN6 Call For Code"M906" 📄 IN10 Call For Code"M91(🗍 IN14 Call For Code"M914
nMo	TIN3 Call For Code"M903" TIN7 Call For Code"M907" TIN11 Call For Code"M911 TIN15 Call For Code"M915
Inte	🔲 IN4 Call For Code"M904" 👘 IN8 Call For Code"M908" 👘 IN12 Call For Code"M912 🗍 IN16 Call For Code"M916
Velc	
Sca	Motion Pin config
Firmwa	X_STEP XS 💌 A_STEP: AS 💌 X Axis Step+Dir 💌 Y Axis Mode: Step+Dir 💌
Configs	X_DIR: XD 💌 A_DIR: AD 💌 Z Axis Mode: Step+Dir 💌 A Axis Step+Dir 💌
Servo C	Y_STEP YS V B_STEP: BS V B Axis Mode: Step+Dir V C Axis Step+Dir V
-Last po	Y_DIR: YD V B_DIR: BD V
@ PC	Z_STEP ZS V C_STEP: CS V
	Z_DIR: ZD V C_DIR: CD V C Step Or Dir out C Spindle Step Set
-Homing	Default Set
C Sing	
(Dual	

$2.\,\mathrm{change}$ the STEP and DIR pin order

You can change the X axis step to any pin of XS, XD, YS.....CS, CD. Use this configure function.

status -	dvance setting	
nMc Limi Prot nMc nMc Inte Velc	IN Call Setting IN1 Call For Code"M901" IN5 Call For Code"M905" IN9 Call For Code"M909" IN13 Call For Code"M91 IN2 Call For Code"M902" IN6 Call For Code"M906" IN10 Call For Code"M91(IN14 Call For Code"M91 IN3 Call For Code"M903" IN7 Call For Code"M907" IN11 Call For Code"M911 IN15 Call For Code"M91 IN4 Call For Code"M904" IN8 Call For Code"M908" IN12 Call For Code"M912 IN16 Call For Code"M91	s t
Firmwa	Motion Pin confin X_STEP XS A_STEP: AS X Axis Step+Dir Y Axis Mode: Step+Dir Y	
Configs	X_DIR: XD 💌 A_DIR: AD 💌 Z Axis Mode: Step+Dir 💌 A Axis Step+Dir 💌	
.002	Y_STEP YS V B_STEP: BS V B Axis Mode: Step+Dir V C Axis Step+Dir V	
Last po	Y_DIR: YD	
(• PC	Z_DIR: ZD	
Homing	Default Set	
Sing Dual	Offline MPG Work	
lome S	OK Cancel	

3.change CS pin function

CS pin of step and dir prot can set to Step or DIR out for Motion axis ,or as spindle step out.

If you use a servo as spindle .

IN1 Call For Cod	e"M901"	IN5 Call For Cod	le"M905"	IN9 Call For Cod	le"M909"	IN13 Call For Co	de"M913
IN2 Call For Cod	e"M902"	IN6 Call For Coc	le"M906"	IN10 Call For Co	de"M91(IN14 Call For Co	de"M914
IN3 Call For Cod	e"M903"	IN7 Call For Cod	de"M907"	IN11 Call For Co	de"M911	IN15 Call For Co	de"M915
IN4 Call For Cod	e"M904"	IN8 Call For Cod	le"M908"	IN12 Call For Co	ode"M912	IN16 Call For Co	de"M91€
otion Pin config							
STEP XS	A_STEP: A	5 💌	X Axis	Step+Dir 💌	Y Axis Mo	de: Step+Dir 💌	
DIR: XD	A_DIR: A	•	Z Axis Mo	de: Step+Dir 💌	A Axis	Step+Dir 👻	
STEP YS	B_STEP: BS	· •	B Axis Mo	de: Step+Dir 💌	C Axis	Step+Dir 💌	
DIR: YD	B_DIR: BI	•	- CS EU	action Select:			
_STEP ZS	C_STEP: C	5 👻	Coru	iction Select.			
_DIR: ZD		•	6	Step Or Dir out	🔿 Spi	ndle Step Set	
	Default Set]					
ffline MPG Work							
		R	eset Offline I	MPG Set			

4. offline MPG work function

If you want to use MPG to control machine to move with out start the computer, you can use this function, set all the configure as your machine work, and then, select the function, press "OK" button, some data will write to nMotion card. and then the nest time, you no need to open the computer, you can also use MPG to move axis. This can only work when your MPG ESTOP button was press down, or your MPG have no ESTOP button.

IN1 Call For Code"M901" IN2 Call For Code"M902" IN3 Call For Code"M903" IN3 Call For Code"M903"	IN5 Call For (IN6 Call For (IN7 Call For (IN8 Call For (Code"M905" IN9 Call For Code Code"M906" IN10 Call For Cod Code"M907" IN11 Call For Cod Code"M908" IN12 Call For Cod	Je"M909 I INIS Call For Code M913 Je"M911 I INIS Call For Code"M913 Je"M911 I INIS Call For Code"M913 Je"M912 I INIS Call For Code"M916
Motion Pin config			
X_STEP XS A_ST	EP: AS	X Axis	Y Axis Mode: Step+Dir
X_DIR: XD • A_DI	R: AD 🔽	Z Axis Mode: Step+Dir 💌	A Axis Step+Dir 💌
Y_STEP YS V B_ST	EP: BS 💌	B Axis Mode: Step+Dir 💌	C Axis Step+Dir 💌
Y_DIR: YD V B_DI	R: BD 💌	CC Eurotian Solarty	
Z_STEP ZS V C_ST	EP: CS 💌	Co Function Select.	
Z_DIR: ZD C_DI	R: CD 💌	Step Or Dir out	○ Spindle Step Set
Default S	et	<u>н</u>	
Offline MPG Work	v	Reset Offline MPG Set	

5. nMotion CNC controller support Step/Dir Motor as spindle.

Port Setup and Axis Selection	Motor Outputs Input Signals Output	Signals Encoder/MPG's S
Relay Control	Motor Control	Special Functions
 Disable Spindle Relays Clockwise Output # CCW (M4) Output # 	Use Spindle Motor Out PWM Control Step/Dir Motor	tput 🗆 Use Spindle Feed Closed Loop Spi P 0.25 I
Output Signal #'s 1-6 Flood Mist Control	PWMBase Freq. 9 Minimum 0 %	Spindle Speed A
Mist Output # 4 Flood Output # 3	0 General Parameters 0 CW Delay Spin UP 0 CCW Delay Spin UP	1 Seconds I 1 Seconds I

When you select to use Step/dir Motor like this above, the spindle speed control by step speed, if CS function is not set to spindle mode, '09' will be the step pin for spindle, '010' will be the direction of spindle.

And us 'CS' function as Spindle mode, 'CS' will be the step pin for spindle. 'CD' will be the Dir pin for spindle.

SPINDLE MOTOR MOVEMENT PROFILE	Axis Selection
3750 3375	X Axis
3000 mm	Y Axis
2250 · · · · · · · · · · · · · · · · · · ·	Z Axis
	A Axis
	B Axis
0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5	C Axis
	Spindle
Accel Velocity Acceleration Step Pulse Dir Steps per In's or mm's per in's or G's 1 - 5 us 0 - 5	SAVE AXIS SETTINGS
20 0 4 0.0004079(5 5	Cancel OK

Spindle motor configure as below,

"Step per" refers to the number of pulses required for each rotation of the spindle. This is different form X, Y, Z or A, B, C axis. And Acceleration of spindle also need to set.