China Colorful life !

# 6090 mini Numerical Control Carving Machine manual -Mach3 version

Shenzhen Scotle Technology Group Limited Chinacncnzone

Address: 038-068 2F Handmade Culture Street, Phase III,

Shuike Road, Bantian, Longgang, Shenzhen, China

Website: www.chinacnczone.com

www.scotle.en.alibaba.com

Email: <a href="mailto:sales@scotle.com">sales@scotle.com</a>

sales@chinacnczone.com

Tel: 0755-89378482

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#### Outline

Chinacnenzone 6090 mini CNC is a kind of small-size product mainly applied in the processing and manufacture of woodworking, advertising, modeling and art ware, particularly appropriate to the carving of the materials such as wood, plastics, acrylic and soft metal as aluminum and copper.

Mach3 CNC control software is an numerical control system developed by ArtSoft based on the Windows as its platform. The new-type of numerical control system which is characterized by simple operation and maintenance, openness, stable performance and low price is a full-functional CNC controller transformed from the standard PC. With its max. 6-axis interlock CNC, it supports input of various file formats such as DXF, BMP, JPG, and HPGL and immediately generates G code displayed by the sight G code. It is controlled by spindle-speed control with multiple relay through hand-held pulse including large quantities of machining strategies and video display. With its digitized touch screen, with full-screen display, the tracking, automatic tool-setting and the routine light-flooding execution (break-point memory) can be achieved.

The system has the functions such as thread pitch error compensation, backlash compensation, length compensation and tool nose radius compensation and wear compensation.

The axial motion acceleration and speed adjustment interface can be adjusted according to the demand to adapt to the high-speed and high-precision processing.

#### PC selection and port installation

1. You must have a desktop with parallel port.

2.The desktop should meet the following requirements: CPU/1GB, internal storage of 512, hard disk capacity of more than 20G, parallel port, Win XP.



# Machine's parameters



Effective working travel		580(X)mm*880(Y)mm*85(Z)mm					
Work table dimens	ion	600mm*900 mm					
Frame materials		aluminum alloy 6063 and 6061 the unique and dedicated mold extrusion profiles. let counterfeiters dwarfs					
acceptable materia	l thickness	≤100mm					
Driving units	X/Y/Z axis	1605 ballscrew					
X axis Sliding units Y axis Z axis		ia.16mm chrome plate shafts					
		via.20mm chrome plate shafts					
		Dia.13mm chrome plate shafts					
Stepping motor type		57 two-phase 3A 150N.cm					
Spindle motor		Brand new 1500W water cooling spindle, 24000RPM					
Principal axis collet		ER20/3.175 mm/6mm					
Repeat accuracy		0.05mm					
Spindle precision		radial beat acuities 0.03 mm					
Software environm	ent	Windows xp, Windows 7					
Maximum speed		0-4000mm/min					
Control unit		Toroidal transformer + PWM power supply module + TB6560 3axis drive board					
Computer connecti	on	25 pins parallel port					
Command code and	d software	G code					
Protection		Emergency stop button					
Operating Voltage		AC220V AC110V will provide voltage changer					

# Highlights for this CNC 6090

- 1. 2200W Water Cooled Spindle
- 2. With live video support
- 3. Ball screw high precision
- 4. Independent power supply for main board, prolong using life
- 5. Mach 3 software is simple and intelligent, can be connected with computer
- 6. Limited switch added
- 7. Auto-Checking function
- 8. With 4 axis, can engrave cylinder object

This 4 Axis CNC 6090 can be widely used

A. Widely used not only for Aluminum but also acrylic, brass, wood, PVC, PCB and so on

B. Ideal for milling, engraving, drilling & routing.

C.For Industry, Technology Research, Advertising Design, Arts Creation, Teaching, Student Project and Hobby Purposes, Building Model Making, Advertising Signs, Artwork, Crafts, Aircraft Models, RC Model parts.

# Mach3 controller introduction





#### How to install the step motors in 6090 mini CNC?

Below video link in You-tube show you the correct way and steps of install the step motors in Chinacnenzone 6090 mini CNC.

https://youtu.be/2r3mgSo3UoQ

#### **Software Instillation**

Firstly, open the disk and find Mach3versionR3.041.exe in the file of mach3, open it and install it.

Mach3VersionR3.041.exe 2011/5/24 21:21 应用程序 25,733 KB

After installation, click on "Finish' to complete the setup.

B ArtSoft - USA CNC Softw	vare Inc. Mach3 Setup				
2	Setup Finished				
	Setup has finished installing Mach3 on your computer.				
	Setup can perform the following actions:				
11-	Load Mach3 Driver				
	Install English Wizards				
	🔲 Install LazyCam				
	🔲 Install XML's				
6	Click Finish to complete Setup.				
	K Back Finish Cancel				

Open the "Parameter settings" file folder, and copy the files in it under the installation directory of Mach3.

本地磁盘 (C:) ) Mach3 )			(C) - L + 计算机	】 ▶ 本地磁盘 (F:) ▶ Engraving mach	ine settings ► Mach3 ► Para	meter settings	- 49 A
工具(T) 帮助(H) 刻录 新建文件夹			文件(F) 編編(E) 査査(V) 工具(T) 報知(H)     道(L) そ ● 使用影響先接描述 封愛 新建文件夫				
名称 「PB HY-ARE 「Pp HY-ARE 「Pp HY-ARE 」 Toputs.bin ② key/board.reg ③ key/board.reg ③ key/board.reg ③ Last(Toro.bt ③ Last(Toro.bt ④ Last(Toro.bt ④ Last(Toro.bt ④ Last(Toro.bt ④ Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● Last(Toro.bt ● M1076m1s ● M1076m1s	修改日期           2004/13/231/231/23           2004/13/231/23           2005/5/17           2005/5/17           2005/26           2005/27           2005/26           2005/26           2005/27           2006/27           2006/26           2005/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2006/27           2007/12/28           2008/4/15           12-46	契型 加田セチ BIN 支件 注册発明 定用程序 文本文档 应用程序 外影者面 BMP 图 光影者面 BMP 图 光影者面 BMP 图 光影者面 BMP 图 光影者面 BMP 图 光影者面 BMP 图 光影者面 BMP 图 元本文档 应用程序 MPEG video/au 应用程序	<ul> <li>○ 席</li> <li>三 長久彫筑本</li> <li>三 根次</li> <li>○ 四部</li> <li>○ 文档</li> <li>○ 文档</li> <li>○ 大地茂直(C)</li> <li>○ 本地茂直(C)</li> <li>○ 本地茂道(C)</li> <li>○ 本地茂(C)</li> <li>○ 本地茂(C)</li></ul>	名称 ■ Mach3MilLord ■ Mach3MilLord ■ E 2 个项 特改日時: 2002/1/30 22:08 - 大小 40.4 KB 创建日時: 2012/4/1 14:53	/ 特政日期 2008/8/25 12:13 2002/1/30 22:08 2008/8/25 12:13	类型 dat 媒体文件 XML 文档	大小 1 KB 41 KB

### **Software Data Setup**



select successively metric/English system and click on "确定"to confirm your selection.



Enter "set default unit" and select MM's or Inches. In most cases, MM's.

Unit	s for Moto	r Setup Dialo	og
¢	MM's	C Inche	es
		Ж	

Click on "config" \_\_\_\_\_\_ in the menu and select successively port/kernel

speed, port setting and axis selection.

Encoder/MPG's	Spin	dle Setup		Mill Options
Fort Setup and Axis Sel Fort #1 Dxc880 Fort Entry in Hex 0-9 Kernel Speed © 25000Hz ( 35000Hz ( © 85000Hz ( 75000Hz ( Note: Software must be kernel speed	C 45000Hz C 60000hz cestarted and motors		Input Signals MaxNC Mode Max NC-10 Frogram rest estart if changed Sherline 1/2 Pt ModBus SupputDut TCP ModBus Sup Event Driven Se Servo Serial Li	Output Signals de enabled Wave Drive art ulse mo: put Suppo s FlugLn Supported ord rial Co; nk Feedb:

Pay attention that each PC has a different PortAddress. You need to modify it to your own address of the PCI.

Encoder/MPG's	Spindle Setup		Mill Options
Port Setup and Axis Selection Port #1 Port Enable: Port #2 Port #2 Port #2 Dxc880 For Entry in Hex 0.9 Carcel Speed C 25000Hz C 35000Hz C 45000Hz C 45000Hz C 45000Hz Note: Software must be restarted an kernel speed is	Motor Outputs rt Enable: Port in Hex 0-9 ns 2-9 as inp C 60000hz numotors	Input Signal: MaxNC Mode Max NC Max NC- Program re estart if changed Sherline 1/2 WodBus Input( ModBus Input( TCP ModBus su Event Driven Servo Serial	s Output Signals Mode enabled 10 Wave Drive start Pulse mov hutput Suppo Bus PlugIn Supported Serial Cos Link Feedb:
			1

To check the port address, click the right-hand button of "my computer" and select "manage". Then enter device manager, find your port of PCI, click the right-hand button of "properties" and enter "resource" to check.



Click on "motor outputs" again. And the setup process is as follows. Pay attention if you haveAxisA, you should select AAxis. If no, leave it there.

ine Cor	figuration	Porte &	Ping	Toon au A			Jeang
Fort Se	Incoder/MPG's tup and Axis Se	lection	Spin Motor Ou	dle Setup atputs	 Input Signs	Mill ( ls	)ptions Output Signals
Signal	Enabled	Step Pin#	Dir Pin#	Dir Low	Step Low	Step Port	Dir Port
X Axis	4	4	5	4	4	1	1
Y Axis	4	6	7	4	4	1	1
Z Axis	4	8	9	4	4	1	1
A Axis	×	17	18	×	×	1	1
B Axis	×	0	0	×	*	0	0
C Axis	×	0	0	×	*	0	0
1.20700.2200	4	1	0	X	4	1	1

Click on "Motor outputs" according to the chart display settings Then the first point of application re-election confirmed

gine Configuration						
Pares cover a Par a ca a c	n Ports &	Pins				
Encoder/MPG's	1	Spindle	a Satun	1	Mill Opt	tions
Port Setup and Axis S	Selection	Motor Outp	uts 🤇	Input Signals		tput Signal
Signal Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	
Input #4	1	0	*	X	0	-17
Probe 💥	1	0	X	*	0	-
Index 💥	1	0	X	×	0	-
Limit Ovrd 💥	1	0	X	X	0	
EStop 🖌	1	12	4	×	0	=
THC On 🐰	1	0	X	X	0	
тнс Vр 🐰	1	0	2	X	0	
THC Down 🐹	1	0	X	X	0	
OEM Trig #1 💥	1	0	X	X	0	
OEM Trig #2 🐹	1	0	<b>X</b>	×	0	~
landar i sa l <b>ha</b>	1.4	1.4	1 ha	1 ha	1.2	
Pins 10-13	5 and 15 are inp	uts. Unly these	5 pin numbers	may be		
				Antomate	d Setun of Tr	muts

Click "input Signals" and the setup process is as follows.

Then point the application

Click "output Signals" again and the setup process is as follows.



When the setup is over, click "确定" to confirm the operation.

Click "config" Config in the menu again, and enter "Motor turning" and execute the setup. Pay attention that the setup of X and y axis is the same. After the setup, click on "SaveAxis Settings".



Aach3 CNC

The click on Z Axis and the setup process is as follows.



The click on the principal axis and the setup process is as follows. After the setups are over, click on "OK".



Click "config"

in the menu again and enter successively "general

config" and the setup process is as follows.

G20,G21 Control	Editor	Shuttle Wheel Setting	Inputs Signal Debouncing/Noise rejection
Lock DRO's to setup units	GCode Editor Browse	Shuttle Accel.	Debounce Interval
Tool Change C. Janore Tool Change	\WinNT\Notepad.exe	1 Seconds	Index Debounce 0 x 400s
Gance Teol Change     Stop Spinde, Wall for Cycle Stat.     AutoTol Changer     Angla Properties     Unchecked for Linear     Advis is Angular     CAvis is Angular     CAvis is Angular     CAvis is Angular     Perform G32.1     Famour for all outputs     Famour food 000 see to the second output     Renove Tool 000 see     Renove Tool 000 see     Turn 010 Spinde     MOT Control     Stop on ML Command     Seisl Output     Stop on ML Command     Seisl Output     @ Stap 1 Stop - 7 Bit 2Stop     Program Safety	Statup Modes Initialization Sting G60 Motion Mode Constant Velocity © Exact Stop Diarce Mode Catione Mode Of Movement Catione Plane of Movement Catione Postion 1 0.0007 Use S93 to Control Jog Catione S93 to Control Jog Catione Plane of Catione Catione Plane of Movement Catione Plane of Movement Cati	Ceneral Configuration     Z is 2.50 on Dutput #6     Home Sw. Safety     LookAheed 20     Lines     Igrore M cals white loading     M9-Execute after Block     UDP Pendent Control     Run Macro Pump     ChargePwilde Peniati     No System Menu in Mach3     Une Keg/Clack     Home Slove with Master Avia     Include TLD in Z from G31     Include TLD in Z from G31     Include TLD in Z form G31     Rot 300 rover     Ang Short Rot on G0     Ratational Soft Limits     Screen Control     HiRes Screens     HiRes Screens     Home Starking	□         □           □         □
Program Safety Lockout his disables program translation while the	Position 10 0.0001	<ul> <li>Auto Screen Enlarge</li> <li>Flash Errors and comments.</li> </ul>	<ul> <li>Persistent DRUs</li> <li>Conv 654 from 659 253 on startun</li> </ul>
External Activation #1 input is activated.			
			OK

Click again on "config"

in the menu and enter successively "Safe\_Z

Setup". The setup process is as follows.

IODAI Set		Maure
L	IV Allow Sate_2	Moves
Gata     Sate     Sat	feZ DRO is in Mac	hine Coordinates
C Sa	feZ DRO is in Wo	rk Coordinates
C Sa	feZ is an increme	ntal Rise
Safe	_Z 10	
ptional -		
	Goto SafeZ when	Stop button is hi
		C

The setup is completed...

#### Testing

pgup Key{Axis Z turn forward to +} pgdn Key{Axis Z turn reversely to -}

After the setup, test if each direction is correct and the motion directions of Axis X,Y, and Z. Click on "arrow up" on the keyboard {Axis turn forward to Y +}, "arrow down" {Axis Y turn reversely to -}, "arrow left" {Axis X turn forward to +} and "arrow right" {Axis turn reversely to -}.

And click on "pgup" {Axis Z turn forward to +} and "pgdn" {Axis Z turn to -}



Test the operation of the spindle and input a spindle speed and click on "enter" and then click on "spindle CW F5".

Spi	ndle Spe	eed
Spin	dle CW F5	sro % 100
RPM	0	
S-ov	10000	-
Spindle Sp	beed	
	10000	

# Work-piece Placement and Tool-setting Method

Work-piece placement



Installation instruction of the pressing plate



In the chart below, each of the axis should be zero clearing, then make the spindle touch  $X^+$  first and then X-. Calculate the distance between  $X^+$  and X-, divided by 2 and the result is the central point of X. Input the result inAxis X.



Pay attention that Axis Y is the same operation and Axis Z will be zero clearing when touching the surface of the workpiece. If you have any questions about the too-setting, watch the video for the instructions.

## Common Faults and Maintenance of NC Carving machine

#### **Common faults**

- I. Uncontrollable Axis Z
  - 1. Loose control card or fault in the control card;
  - 2. Electrostatic interference;
  - 3. Failure in the motor wire of axis Z;
  - 4. Wrong file path;
  - 5. Converter interference;
  - 6. Problem or virus in the computer system;
  - 7. Mis-operation
- II. Errors
  - 1. Loose control card or fault in the control card;
  - 2. Failure in the driver;
  - 3. Failure in the stepping motor;
  - 4. Electrostatic interference;
  - 5. Failure in the motor wire;
  - 6. Failure in the data line;
  - 7. Wrong path;
  - 8. Loose coupling or rupture in the coupling;
  - 9. Too rapid processing speed; 10. Problem or virus in the computer system
- III. Regular carving
  - 1. Loose control card or fault in the control card
  - 2. Failure in the stepping motor

3. Failure in the driver or inconsistent settings of electricity subdivision and software

- 4. Failure in the motor wire of Axis Z;
- 5. Motor fault of spindle
- 6. Converter interference or wrong data setting
- 7. Electrostatic interference;
- 8. Problem or virus in the computer system
- IV . Uncontrollable carving machine
  - 1. Fault in the control card;
  - 2. Converter interference;
  - 3. Wrong file path
  - 4. Electrostatic interference;
  - 5. Problem in the software setup;
  - 6. Failure in the driver or wrong electricity subdivision setup;
  - 7. Failure in data line;
  - 8. Problem or virus in the computer system
- V. Uneven milling bottom
  - 1. Out of plumb of the spindle and the table-board;
  - 2. Problem in the tool;
  - 3. Problem in the control card;
  - 4. Problem in the driver of Axis Z
- VI. Spindle off
  - 1. Internal short of the spindle;
  - 2. Electricity shielding;
  - 3. Wrong setting of the parameter of the frequency converter;
  - 4. Fault in the control card;
  - 5. Spindle short or data line short
- VII . Abnormal sound of the spindle
  - 1. Fault in the setting of the frequency converter;
  - 2. Spindle off;
  - 3. The problem of the spindle
- VIII . Opposite Direction of Motion or Back to Mechanical Origin
  - 1. Alter the file in the wordpad;
  - 2. Alteration of the connection method of the frequency converter;
  - 3. The direction of roll out in the software
- IX . Unable to Return to Mechanical origin
  - 1. Opposite direction;
  - 2. Loose control card or fault in the control card;
  - 3. Fault in the limit switch or data line;
  - 4. Failure in the driver;
  - 5. Failure in the stepping motor
- X . Incontrollable Spindle
  - 1. Fault in the control card;
  - 2. Failure in the frequency converter

XI. Error Prompt of "Failure in Read the Card, Please Check"

1. Check if the driver of the board card is installed correctly or change a PCI slot for the board card;

2. Re install the two data connecting lines and check if the needle is broken;

3. Replace the board card if it is its problem.

#### **Daily maintenance**

1. The machine should be placed in a dry and well-ventilated place (avoid long time exposure in the sun)

2. The machine must be configured with a reliable voltage stabilizer to ensure safe earthing of the ground electrode.

3. Try to avoid using the PC with internet access to output the file to the carving machine.

4. Maintain the machine once every month (paint appropriate amount of lubricating oil on the lead screw)

5. The control cabinet should be placed in a well-ventilated place and avoid the operation in the high-temperature area.

6. Check if the circuit of the carving machine is loose regularly.

7. Don't place stuffs (like magnetic materials, dead weight cargo and liquid) on the drilling crew or nose of the carving machine.

8. Don't keep the machine working in the same corner in a long time (to avoid the unsuccessful lubrication due to the failure of contacting of the lead screw and guide rail with the cross member for a long time)

9. Keep the lubrication in the good state by regular checking, cleaning the lead screw, and adding or changing the grease or oil in order to remain the moving parts such as the lead screw and cross member lubricated and thus reduce the rate of wear of the machine.