

DIGITALDREAM **MACH3 ETHERNET CONTROLLER EC300V5**





Contects



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Introduction

1.1 Product Introduction

Chapter 1.

Digitaldream CNC has engaged in the Numerical control industry for 10years, 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.

EC300V5 is the 6 axis motion controller spend 4 years to design. This controller's control cycle is 2ms. The maximum pulse frequency of each axis is 300KHz. The highest division is 256. The highest current is 6A.

EC300V5 support Mach3 software and serial port MPG, through ethernet to communicate with computer.

EC300V5 motion controller adopts the ARM design framework. The ARM design includes communication, codeanalytic, underlying algorithm and pulse gerneration. Rational design, reliablecontrol, 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 EtherNET;
- 12ports input interface for ordinary digital data;
- 10 ports output interface for ordinary digital data;

- 1 port 0-10V spindle speed analog output interface(can change to PWM output);
- can support 4 axis stepper systems,300KHz pulse output for every axis;
- ARM motion control chip;
- Compatible with MPG input, support stardand MPG & the digital display MPG of our company_o

1.3Products Appearance and size

EC300V5 motion controller is with the plastic shell structure. The controller appearance as the Figure 1-1 show: The products overall size is 171mm*106mm*20.5mm; Install size is







Figure1-2. Install size

1.4substantival explanation

When operate the EC300V5, 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 : X axis Coordinate, Y : Y axis Coordinate

Z :Z axis Coordinate, A :A axis Coordinate

1.5 Noting and Waring

Free 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 24VDC power supply. Voltage equipment. Pls pay attention to the electricity, safety when conducting the operation



Connection

2.1 Product connection define and method



Figure2-1. Product wiring section and interface summary

As the Figure 2-1 showed, the connection of the controller includes Ethernet connection interface, MPG interface and Power input port etc. Now we descript them in details as below.

2.2.1 Ethernet port

As shown in Figure 2-1, the position marked with 1 is the Ethernet interface, through which the controller can be connected to the computer. The controller supports both router mode and network cable direct connection mode. This will be described in detail in later chapters.

2.2.2 Power input port

As shown in Figure 2-2, the port marked with GND/24V/COM -/COM+, where GND/24V is the system power interface and COM -/COM+ is the IO power interface. The power supply voltage

range is 24V. The power supply is recommended to be no less than 50W. The system power supply and IO power supply can share a 24V switching power supply, or they can be powered separately by two 24V switching power supplies.

2.2.3 FRO/SRO/SJR adjust interface

As shown in Figure 2-1, the interface marked with 3 is the FRO/SRO/SJR quick parameter adjustment interface. This adjustment interface can adjust the FRO/SRO/SJR 3 parameters by using 2 gear switches+a digital potentiometer, which is original to our company. For the wiring method, refer to Figure 2-2. Among them, the potentiometer adjusts the SRO value when SRO and COM are short circuited, the potentiometer adjusts the SJR value when SJR and COM are short circuited, and the potentiometer adjusts the FRO value when SRO/SJR are disconnected.





2.2.4 Universal input interface

As shown in Figure 2-1, the position marked with 4 is a universal input interface, which is

composed of a 4P2edg terminal and a 12P2edg terminal. The specific definition is printed on the

housing. Now, the detailed definition of the interface is described as follows.

NO.	MARK	Definition	
1	COM-	Common terminal-	

Chapter2 Connection

2	IN01	INPUT PIN1
3	СОМ-	Common terminal-
4	INO2	INPUT PIN2
5	COM-	Common terminal-
6	INO3	INPUT PIN3
7	INO4	INPUT PIN4
8	IN05	INPUT PIN5
9	IN06	INPUT PIN6
10	IN07	INPUT PIN7
11	IN08	INPUT PIN8
12	IN09	INPUT PIN9
13	IN10	INPUT PIN10
14	IN11	INPUT PIN11
15	IN12	INPUT PIN12
16	COM+	Common+, External supply 24V

Table 2-1. Detailed Description of Definition of General Input Interface





Wiring mode of two-wire switch





2.2.5 Extended serial port

As shown in Figure 2-1, the position marked with 5 is the extended serial port position, and the position marked with RXD/TXD/GND is the serial port receiving/serial port sending/public ground respectively. The extended serial port can be used to extend the HMI coordinate display.

2.2.6 MPG Port

As shown in Figure 2-1, the position marked with 6 is the MPG interface. The MPG interface is a three row DB15 interface. The interface definition is printed on the cover. Now, the detailed definition of the interface is described as follows

- 8 -

15	8
	EP
	X100
	ZIN
YIN	XIN
B-	B+
A-	A+
GND	5V
RXD	
9	1

Figure2-5. sequence of MPG port

No.	Mark	definition		
1	TX/BIN	Serial port sending pin		
		/ B axis select pin		
2	5V	5V power pin		
3	A+	encoder A+		
4	В+	encoder B+		
5	Х	X axis select pin		
6	Z	Z axis select pin		
7	100	X100 rate select pin		
8	EP	Estop		
9	RX/CIN	Serial port receiving pin/		
		C axis select pin		
10	OV	COM ground		
11	A-	encoder A-		
12	В-	encoder B-		

13	Y	Y axis select pin
14	А	A axis select pin
15	10	X10 rate select pin

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Table 2-2. MPG interface define

Note: When the level switch next to the MPG interface is selected to STD, it means that the MPG is connected to the universal MPG. At this time, PIN1 and PIN9 are the B channel selection and C channel selection functions respectively. When the level switch is selected to NV, it means that the MPG interface is connected to the NVMPG serial port hand pulse. At this time, PIN1 and PIN9 are the serial port communication TXD/RXD functions respectively.

2.2.7 Universal output port

As shown in Fig. 2-1, the DB9 interface marked with 7 is a universal output interface. The housing silk screen is marked OUTPUT, and the specific definition is shown in Figure 2-6. In addition, there is an indicator on the right side of the universal output interface, and each channel corresponds to one indicator. When the output is connected, the corresponding indicator is on.



2.2.8 stepper motor port

As shown in Figure 2-1, the ports marked 8/9/10/11/12/13 are stepper motor control interfaces, which respectively correspond to XYZABC axis stepper motor control signals. EC300 has a total of 4 3/4/5/6 axis products, which share a set of hardware and are limited to 3/4/5/6 axis only in software. Each axis is a 4PIN terminal, and the maximum output frequency of each channel is 300K. EC300 only supports stepping motor driver with differential input signal. Refer to Table 2-3 for the definition of stepping motor interface

No.	Mark	definition
XP+	Х	X axis pulse signal+
XP-	Х	X axis pulse signal-
XD+	Х	X axis direction signal+
XD-	Х	X axis direction signal-
ҮР+	Y	Y axis pulse signal+
YP-	Y	Y axis pulse signal-
YD+	Y	Y axis direction signal+
YD-	Y	Y axis direction signal-
ZP+	Ζ	Z axis pulse signal+
ZP-	Ζ	Z axis pulse signal-
ZD+	Ζ	Z axis direction signal+
ZD-	Ζ	Z axis direction signal-
AP+	А	A axis pulse signal+
AP-	А	A axis pulse signal-
AD+	А	A axis direction signal+

AD-	А	A axis direction signal-
BP+	В	B axis pulse signal+
BP-	В	B axis pulse signal-
BD+	В	B axis direction signal+
BD-	В	B axis direction signal-
CP+	С	C axis pulse signal+
CP-	С	C axis pulse signal-
CD+	С	C axis direction signal+
CD-	С	C axis direction signal-

Table 2-3. Stepper driver interface define

2.2.9 Spindle Port

As shown in Figure 2-2, the port marked with 14 is the spindle control interface. The

definition of spindle control connection is shown in Table 2-3 .

MARK	definition
GNDS	Spindle common -, shared ACM/DCM
VSO	Spindle speed regulation output, regulating range 0-10V
0T1	Universal output 1, which can be configured as spindle
	forward rotation
0T2	Universal output 2, which can be configured for spindle
	inversion
INDEX	Spindle speed feedback signal, one pulse per cycle

Table 2-4. Detailed Description Spindle Interface

OT1 can be used to control the starting and stopping of the spindle forward rotation, OT2 can

control the starting and stopping of the spindle reverse rotation, and VSO can be used to control the spindle speed. The configuration of the spindle will be described in detail in the following chapters. For the connection method between the spindle control interface and the frequency converter, refer to Figure 2-7. GNDS connects the frequency converter ACM/DCM, OT1 connects the frequency converter FWD, OT2 connects the frequency converter REV, and VSO connects the frequency converter AVI. INDEX can be connected to ordinary NPN type 2-wire Hall switch. Refer to Figure 2-7 for connection mode of EC300 and frequency converter



Figure 2-7. Connection between EC300V5 and inverter





Software Installation

3.1 MACH3 Install

When you purchase our product, we will supply a CD-ROM, which 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.

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



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

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	manus and a series
I nstallation Folder Where would you like Mach3 to be installed?	5.6
The software will be installed in the folder listed below that you use the listed folder but you are welcome to sel location, either type in a new path, or click Change to b existing folder.	. it is recomended ect a different rowse for an
Install Mach3 to: C:\Mach3	Change
Space required: 40.7 MB Space available on selected drive: 14.64 GB	

Figure 3-4. MACH3 installation process 3

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 EC300V5 Plug-in installation



Copy the file DIGITALDREAM.dll _20220920.dll to X:\Mach3\PlugIns, X is the disk where the soft is installed.

3.3 IP Setting

EC300V5 supports fixed IP and router connection. Under fixed IP, please set the local IP

to 192.168.4. X (X=7 \sim 254) and turn off the firewall

In router mode, please set the address of the router to 192.168.4.1





Figure 4-1. Plugin selection dialog

Choose our plugin DIGITALDREAM. 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 the connection is successful, the connection indicator light (blue light) will be on. On the plugin page, you can see the connection device (config ->config plugins ->DIGITALDREAM_CONFIG). See as Figure4-2.

••	vice Info Serious: Model: Link: Serial No:	Nv serious LAN5160 Ethernet NMSwtdZA	Performa Axis: Freq:	6 300K Config N	NV-MPG
F	Firmware:	0.0.0.1			



4.2 Software Common settings

4.2.1 Check EC300V5 plugin

Click config plugins to input PluginConfig, you can see EC300V5. See as Figure 4-4.

<u>F</u> ile Config Function Cfg's <u>V</u> iew Wizards Operator PlugIn Control Help	
Pr Select Native Units Ports and Pins Motor Tuning General Config System Hotkeys Homing/Limits ToolPath Slave Axis Backlash Fixtures ToolTable Config Plugins Spindle Pulleys Safe_Z Setup Save Settings	Setti FLIN

Figure4-3. Input Config plugins



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ugin control a		
Enabled	PlugIn Name	Config
4	DIGITALDREAM_20220920-DigitalDream-PlugIn	CONFIG
4	Flash-FlashScreen-SWF-PlugIn-A.FenertyBBar	CONFIG
X	JoyStick-JoyStick-PlugInArt-Fenerty-Ver-1.0a	CONFIG
X	PrinterScope-Port-Scope-1.00.046	CONFIG
X	TurnDiags-Turn-Diags-1.00.1	CONFIG
4	VideoB.Barker-Ver-1.0	CONFIG
٢		
		OK

Figure4-4. LAN5160 Plugin

4.2.2 Motor operating parameters setting

() N	Aach3 CNC Licensed	To: MaoA楢-牤袖onar
Eile	Config Function Cfg's	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-6
	Motor Tuning	P Zoro
	General Config System Hotkeys Homing/Limits ToolPath Slave Axis Backlash Fixtures ToolTable Config Plugins Spindle Pulleys Safe_Z Setup Save Settings	F X F A Zero Y H Zero 4 Zero 4 CFFLINE GC
F	ile: No File Loaded.	

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:

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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 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

Pr	Select Native Units	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 L Zero H Zero Zero Zero 4

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

dialog box.

Encoder/MPG's	Spindle Setup		Mill Options
Port Setup and Axis Selection Port #1 V Port Enable: Dx378 Port Entry in Hex 0-9 Conception Kernel Speed 25000Hz C 35000Hz C 45000H 65000hz C 75000hz C 100khz Note: Software must be restarted kernel speed is	Motor Outputs #2 Port Enable: 778 Port ry in Hex 0-9 Pins 2-9 as inp z C 60000hz d and motors	Input Signals MaxNC Mode Max CL Mod Program resta Sherline 1/2 Pul ModBus InpuQut ModBus Supp(Event Driven Ser	Output Signals e enabled Wave Drive rt .se mo: .ut Suppo PlugIn Supported .rt .ial Co:
			757 359.

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. See as Figure4-9. You only need to check Enabled is $\sqrt{}$ here.

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.

En Port Setu	coder/MPG's 1p and Axis Se	 lection	Spir Motor O	udle Setup utputs	 Input Signal	Mill (Ls	Dptions Output Signal
Signal	Enabled	Step Pin#	Dir Pin#	Dir LowAc	Step Low	Step Port	Dir Port
X Axis	4	2	3	8	2	1	1
Y Axis	4	4	5	×	2	1	1
Z Axis	4	6	7	4	×	1	1
A Axis	4	8	9	X	8	1	1
B Axis	×	0	0	×	*	0	0
C Axis	8	0	0	×	2	0	0
Spindle	4	1	0	*	×	1	1

Figure 4-9. Stepper motor port settings dialog

Click Input Signals to enter the input signal setting page. We assume IN1 as the emergency

stop, IN2 as tool setting, and IN3-IN6 as the positive limit and origin of XYZA axis, as shown in

Figure 4-10.



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A A Home		Port #	Pin Number	Active Low	Emulated	HotKey	
A Home	X	1	0	X	X	0	
	4	1	6	4	X	0	
B ++	X	1	0	X	X	0	
В	X	1	0	X	X	0	
B Home	X	1	0	X	X	0	
C ++	X	1	0	X	X	0	
C	X	1	0	X	X	0	
C Home	X	1	0	X	X	0	
nput #1	X	1	0	X	X	0	
nput #2	X	1	0	X	X	0	
nnut #3	X	1	n	X	X	0	¥ .
		Figure4	4-10. Input	Settings d	确定 ialog	取消	
e Configuratio	on Ports & Pir	Figure4	4-10. Input	Settings d	确定 ialog		Mill Op
e Configuration t Setup and A	on Ports & Pir xis Selection	Figure4	1-10. Input Input Signals Ou	Settings d	确定 ialog ncoder/MPG's	取消 Spindle Setup	Mill Op
e Configuration t Setup and A Signal	on Ports & Pir xis Selection	Figure4	4-10. Input 5 Input Signals OL Pin Number	Settings di Itput Signals En Active Low	确定 ialog ncoder/MPG's Emulated	取消 Spindle Setup	Mill Op
e Configuration t Setup and A Signal Input #1	on Ports & Pir xis Selection Enabled	Figure4	4-10. Input i Input Signals Ou Pin Number 0	Settings di utput Signals Ei Active Low	确定 ialog ncoder/MPG's	Spindle Setup HotKey 0	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2	on Ports & Pir xis Selection	Figure4	Input Signals Ou Pin Number 0 0	Settings di utput Signals Ei Active Low	确定 ialog ncoder/MPG's Emulated	Spindle Setup HotKey 0 0	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4	on Ports & Pir xis Selection	Figure4	Input Signals Ou Pin Number 0 0 0 0	Settings d	确定 ialog ncoder/MPG's Emulated	Spindle Setup HotKey 0 0 0	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe	on Ports & Pir xis Selection	Figure4	4-10. Input input Signals Out Pin Number 0 0 0 0 0 2	Settings di utput Signals Ei Active Low X X X X X X X	确定 ialog ncoder/MPG's Emulated	Spindle Setup HotKey 0 0 0 0	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe	on Ports & Pir xis Selection	Figure4	4-10. Input input Signals Out Pin Number 0 0 0 0 0 0 0 0 0 0 0 0 0	Settings di utput Signals En Active Low X X X X X X X X X X X X X	·····································	Spindle Setup HotKey 0 0 0 0 0 0	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe Index	Dn Ports & Pir xis Selection	Figure4	Input Signals Ou Pin Number 0 0 0 0 0 0 0 0 0 0 0 0 0	Settings d	确定 ialog ncoder/MPG's Emulated 说 说 说 说 说		Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe Index Limit Ovrd	Don Ports & Pir xis Selection	Figure4 IS Motor Outputs 1 1 1 1 1 1 1 1 1 1 1 1 1	4-10. Input s Input Signals Ou Pin Number 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Settings di utput Signals Ei Active Low X X X X X X X X X X X X X	确定 ialog ncoder/MPG's Emulated 第 第 第 第 第 第 第 第 第 第	Spindle Setup 日本1000000000000000000000000000000000000	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe Index Limit Ovrd EStop	on Ports & Pir xis Selection	Figure4 15 Motor Outputs 10 1 1 1 1 1 1 1 1 1 1 1 1 1	Input Signals Out Input Signals Out Pin Number Out 0 0 Out	Settings di utput Signals Ei Active Low X X X X X X X X X X X X X	ialog incoder/MPG's Emulated 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第	Spindle Setup 日本1000000000000000000000000000000000000	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe Index Limit Ovrd EStop THC On	on Ports & Pir xis Selection Enabled X X X X X X X X X X X X X X X X X X X	Figure4	4-10. Input s Input Signals Ou Pin Number 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Settings di utput Signals Ei Active Low X X X X X X X X X X X X X	ialog ialog mcoder/MPG's Emulated 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第	Spindle Setup 日本ののでのでのでは、 日本のでのでのでのでのでのでのでのでのでのでのでのでのでのでのでのでのでのでので	Mill Op
e Configuration t Setup and A Signal Input #1 Input #2 Input #3 Input #4 Probe Index Limit Ovrd EStop THC On THC Up	Don Ports & Pir xis Selection	Figure4 TS Motor Outputs 1 1 1 1 1 1 1 1 1 1 1 1 1	4-10. Input s Input Signals Ou Pin Number 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Settings di utput Signals Ei Active Low X X X X X X X X X X X X X	ialog incoder/MPG's Emulated 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第 第	取消 Spindle Setup HotKey 0	Mill Op

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Figure 4-11. Estop Probe and index Setting dialog

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

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

Relay Control Disable Spindle Relays Clockwise Output # 1 CCW (M4) Output # 1	Motor Control Vuse Spindle Motor Output PWM Control Step/Dir Motor	Special Funct Use Spind Closed Lo P 0.25	ions lle Feedback in Sync Mode op Spindle Control I I D 0.3
Output Signal #'s 1-6 Flood Mist Control T Disable Flood/Mist relays Delay Mist Output # 2 1 Flood Output # 3 1	PWMBase Freq. 2083 Minimum 0 % General Parameters CW Delay Spin UP 1 CCW Delay Spin UP 1 1	Seconds	Special Options, Usually Off
Output Signal #'s 1-6 ModBus Spindle - Use Step/Dir as well Enabled Reg 64 64 - 127 Max ADC 16380	CW Delay Spin DOWN 1 CW Delay Spin DOWN 1 CCW Delay Spin DOWN 1 Immediate Relay off before	Seconds Seconds Seconds Seconds	☐ Laser Mode. freq ☐ Torch Volts Control ☐ Torch Auto Off

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 on stepper motor config page see as figure 4-9.

Signal	Enable	d Port #	Pin Number	Active Low	^
Digit Trig	×	1	0	×	_
Enable1	×	1	0	2	
Enable2	×	1	0	2	
Enable3	×	1	0	X	
Enable4	X	1	0	×	
Enable5	×	1	0	×	
Enable6	×	1	0	×	
Output #1	4	2	1	X	
Output #2	4	2	2	X	
Output #3	4	2	3	×	
Output #4	×	1	0	X	~
Ρ	ins 2 - 9 , 1, 1	14, 16, and 17 are output pi	ns. No other pin numbers	should be	
				14-1 L	

Figure4-13. Spindle setting corresponds to the output configuration

4.2.4 MPG Setting

Open the plug-in page. Path Config ->Config plugin ->DIGITALDREAM_CONFIG

PlugIn Control a	and Activation	×
Enabled	PlugIn Name	Config
4	DIGITALDREAM_20220920-DigitalDream-PlugIn	CONFIG
4	Flash-FlashScreen-SWF-PlugIn-A.FenertyB-bar	CONFIG
X	JoyStick-JoyStick-PlugInArt-Fenerty-Ver-1.0a	CONFIG
X	PrinterScope-Port-Scope-1.00.046	CONFIG
X	TurnDiags-Turn-Diags-1.00.1	CONFIG
4	VideoB.Barker-Ver-1.0	CONFIG
<		>
		OK

Figure4-14. Open the plug-in page

On the plug-in page, you can select the serial port MPG and the standard MPG. NV-MPG is the serial port MPG of our company, and Standard MPG is the standard MPG.

Enabled	PlugIn Nam	e	Config	ALL ALL
ialog	DIGITALOPE	ANA 20220020 DisitelDecem Divola	X	
Device Info Serious: 1 Model: 1 Link: 1 Serial No: 1	Nv serious LAN5160 Ethernet NMSwtdZA	Axis: 6 VV-MPG Freq: 300K Standar Config Motor Driver	danc	
Firmware: (0.0.0.1	Copyright DigitalDream software @2020	0 - ver 1.0.5	

Figure4-15. Select MPG Type

Check the MPG on the MPG configuration page. The path is Port&Pins ->Encoder/MPG's, as shown in Figure 4-19. After configuration, close the window to use the MPG normally

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Port Setup and Axis Selection	Motor Outputs	Input Signals	Output Signals	Encoder/MPG's	Spindle Setup	Mill Options
-------------------------------	---------------	---------------	----------------	---------------	---------------	--------------

Signal	Enabled	A -Port #	A -Pin #	B -Port #	B-Pin #	Counts/Unit	Velocity
Encoder1	X	0	0	0	0	1.000000	100.000000
Encoder2	X	0	0	0	0	1.000000	100.000000
Encoder3	X	0	0	0	0	1.000000	100.000000
Encoder4	X	0	0	0	0	1.000000	100.000000
MPG #1	4	0	0	0	0	1.000000	100.000000
MPG #2	X	0	0	0	0	1.000000	100.000000
MPG #3	×	0	0	0	0	1.000000	100.000000



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>>> 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.

● Mach3 CNC Licensed To: MaoA楢□拉袍onar	
File Config Function Cfg's View Wizards Operator PlugIn Control Help	
Program Run (Ait-1) MDI (Ait-2) Iool Path (Ait-4) Offsets (Ait-5) Settings (Ait-5) Diagnostics (Ait-5)	IT./] Mil≫G15 G1 G17 G40 G20 G90 G94 G64 G49 G99 G64 G97
R Zero A Zero H Zero	1.2750 +1.0000 0.9845 +1.0000 0.0005 +1.0000 0.0000 Radius Correct Soft Limits
File: No File Loaded.	Vizards Last Wizard Regen. Display Jog Vizards Conductor Toolpath Mode Follow
Edit G-Code Rewind Ctrl-W Recent File Single BLK Alt-N Close G-Code Reverse Run Load G-Code Block Delete Stop Set Next Line Line: 0 Alt-S> Run From Here Dwell CV Mode	Feed Rate Spindle Speed OverRidden FR0 % 100 100 FRO 100 Sov 0
Concore 2 Inhibit G-Codes M-Codes +0.000	Unts/Rev 0.00 Spindle Speed
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.



- Figure5-2.
- Click homing of Config

Motor Home/SoftLimits

	Revers	Soft Max	Soft Min	Slow Z	Home	Home Neg	Auto Ze	Speed %
x	X	270	0	1.00	0.0000	X	X	20
Y	X	0	-390	1.00	0.0000	4	X	20
z	*	0	-100.00	1.00	0.0000	4	X	20
4	2	100.00	-100.00	1.00	0.0000	X	X	20
В	X	100.00	-100.00	1.00	0.0000	X	X	20
c	×	100.00	-100.00	1.00	0.0000	X	X	20

Figure 5-3. Motor Home and Softlimits dialog

2、Set soft limits

Chapter7 Contract us

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



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.

(a) Mach3 CNC Licensed To: MaoA檔□ 拉抱onar
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
Image: Sector of the sector

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) D	iagnostics (Alt-7) Mill->G15 G1 G10 G17 G40 G20 G90 G94 G54 G49 G99 G84 G97
R Zero F A Zero H Zero H Zero Zero E Zero Zero E Zero	+0.0000 +1.0000 +0.0000 +0.0000 +0.0000 Correct To Go Machine Soft Limits
File: No File Loaded.	Load Wizards Last Wizard Regen. Display Jog NFS Wizards Contraction Toolpath Mode Follow
Edit G-Code Rewind Ctrl-W Recent File Single BLK Alt-N Close G-Code Reverse Run Load G-Code Block Delete Stop Set Next Line Line: Pload Ctrl-F Run From Here Dwell Op/Off Elapsed	Feed Rate Spindle Speed OverRidden FR0 % 100 FR0 00 FR0 100 FR0 FR0 FR0 100 FR0 FR0 FR0
Reset G.Codes M.Codes +0.000	rI-Alt-J Units/Rev 0,00 Spindle Speed
History Clear Status:	Profile: Mach3Mill

Figure 5-6. Main Screen after ZERO all axis

5.3 Open G code file and run

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.





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-5) Diagnostics (Alt-7) Mail-015 61 610 617 640 620 690 694 649 699 694 697 Image: Control Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7) Mail-015 61 610 617 640 620 690 694 697 Image: Control Path (Alt-4) Offsets (Alt-6) Settings (Alt-7) Mail-015 61 610 617 640 620 690 694 697 Image: Control Path (Alt-4) Offsets (Alt-6) Settings (Alt-7) Mail-015 61 610 617 640 620 690 694 697 Image: Control Path (Alt-4) Offsets (Alt-6) Settings (Alt-7) Mail-015 61 610 617 640 620 690 694 697 Image: Control Path (Alt-4) Offsets (Alt-6) Settings (Alt-7) Mail-015 61 610 617 640 620 690 694 697 Image: Control Path (Alt-4) Offsets (Alt-7) Image: Control Path (Alt-4) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: Control Path (Alt-4) Image: Control Path (Alt-4) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: Control Path (Alt-7) Image: C				
File: No File Loaded. Cycle Start Alt-R- Stop Alt-S- Stop Cycle Start Cycle Start Cycle Start Cycle Start Cycle Start Cycle Start Recent File Load G-Code Block Delete M1 Optional Stop Flood Ctrl-F Dwell Cycle Start Cycle Start Start Cycle Start Cycle Start	Load Wizards Last Wizard Regen. Toolpath Display Mode Toolpath Tool Information Tool Charge Dia. Feed Rate Tool Spindle Spece Dia. +0.0000 H +0.0000 Foo FRO 100 FRO FOO 100 Auto Tool Zero Remember Return FRO Feedrate Spindle Spece Load Wizards FRO Tool Compatibility Spindle CW FS Jog ON/OFF Ctri-Alt-J Units/Kin 0.00 Spindle Speed			
History Clear Status:	Profile: Mach3Mill			



Mach3 CNC Licensed To: MaoA檔口花被onar File Config Function Cfg's View Wizards Operator PlugIn Cor	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 G10 G17 G40 G20 G90 G94 G54 G49 G99 G84 G97
G0Z5.00 F500 M03 s14000 G0X.000Y0.000 G0X.49 973-50 02525.000 G1Z-0 826F200.0 G1X-49.921F300.0 X-49.766 X-49.714Z-0.848	Re 7erro +0.0000 scale +1.0000 P P +0.0000 scale +1.0000 P P +0.0000 scale +1.0000 P P +0.0000 scale +1.0000 M Zerro +0.0000 Radius Correct OFFLINE GOTO To Go Machine Soft DorfLine GOTO To Go Soft Limits
File: H1G12mmnewtap	Load Wizards Last Wizard Regen. Display Jog NFS Wizards Construction Mode Follow
Cycle Start (Alt-R) Edit G-Code Recent File Rewind Ctrl-W Close G-Code Load G-Code Single BLK Alt-II Feed Hold (spc) Set Next Line Block Delete Stop (Alt-S) Block Delete M1 Optional Stop Flood Ctrl-F Run From Here Dwell Cv Mode Codes M-Codes +0.000	Tool Information Feed Rate Tool OuerRidden FR0 % Dia. +0.0000 0 0 H +0.0000 FR0 100 © CerRidden FR0 % Auto Tool Zero FR0 6.00 FR0 0 © Cerritate Image 0.00 Image 0.00 0 Spindle CW F5 100 Jog ON/OFF Ctri-Ait-J Units/Min 0.00 0 Spindle Speed 0
History Clear Status:	Profile: Mach3Mill

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

