User Manual of 5Axis Breakout Board



Contents

1	Introduction and Features1						
	1.1	Introduction	1				
	1.2	Features	1				
2	Specif	ications	1				
3	Interfa	ces	2				
4	Wiring	g Diagram for Reference	3				
5	MACH	13 Software Settings	3				

1 Introduction and Features

1.1 Introduction

The latest upgraded 5 axis breakout board is specially designed for the CNC single axis 2-phase stepper driver controller, such as M542, M542H, MA860H, 2M542, 2M982, DM542(A), DM860(A) etc. single axis stepper driver controller series. With this 5 axis breakout board, any 1-5 single axis stepper driver controllers can be directly controlled by the PC via the MACH3, EMC2, KCAM4, etc.

1.2 Features

- Maximum support 5-axis stepper motor driver controllers
- Compatible with MACH3, Linux CNC (EMC2) etc. parallel-control CNC software.
- USB power supply and peripherals powered phase are separated to protect computer security.
- All the signals are opto-isolated which can protect your computer security.
- 5-input interface to define the Limit, Emergence-Stop, Cutter alignment, etc.
- Wide input voltage range: 12-24V, and with anti-reverse function.
- One relay output control interface, accessed by the spindle motor or the air pump, water pump, etc.
- Output 0-10V analog voltage for inverter to control the spindle speed.

2 Specifications

Electrical properties(ambient temperature $Tj = 25$ °C)				
Innut Douvon	USB port to directly get power from PC and			
Input Power	12-24V power supply(optional)			
Compatible Stepper Motor Driver	Max 5 2-phase Microstep controllers			
Driver type	Pulse and Direction signal control			
Net/Total Weight	Approx 75g			
Dimensions	90 * 70 * 20mm (L*W*H)			

3 Interfaces



4 Wiring Diagram for Reference



5 MACH3 Software Settings

Note: The settings on MACH3 below is in condition that breakout board and stepper drivers are connected in common anode.

1. Check whether the MACH3 driver is installed correctly.

5 Axis Breakout Board Interface Adapter

🚔 Device Manager	
File Action View Help	
🦛 🏟 🖬 🖺 📔 🚺 👧	
⊿ 📲 Test_PC	
Computer	
Disk drives	
Display adapters	
Human Interface Devices	
IDE ATA/ATAPI controllers	
Keyboards	"!" or "?" should not
International Action of the	be in "MACH3 Driver"
Mach3 Driver	
Mice and other pointing devices	
Monitors	
Network adapters	
▲ 🖓 Other devices	

2. Setup Units: Choose "MM's" in Config->Set Default Units for Setup

Set Default Units for Setup							
Units for Motor Setup Dialog							
⊙ MM's C Inches							
ОК							

3. Click "Config"->"Ports and Pins" on Main Interface.



4. Enter in "Port Setup and Axis Selection" to set "Port#1" and "Kernel Speed" shown as below.

Engine Configuration Ports & Pins	
Port Setup and Axis Selection Motor Outputs input Signais Output Signais Outpu	GR GR
	Click "Apply" when you finish setting OK Cancel Apply

5. Click "Motor Outputs" to set it shown as below.

Engir	Engine Configuration Ports & Pins									
Po	nt Setup and Av	kis Selection M	otor Outputs Inp	ut Signals Out	put Signals Enco	oder/MPG's Sp	indle Setup Mil	Options		
	Signal	Enabled	Step Pin#	Dir Pin#	Dir LowActi	Step Low A	Step Port	Dir Port		
	X Axis	4	2	3	4	4	1	1		
	Y Axis	4	4	5	4	4	1	1		
	Z Axis	4	6	7	4	4	1	1		
	A Axis	4	8	9	4	4	1	1		
	B Axis		16	17	4	4	0	0		
	C Axis	×	0	0	X	X	0	0		
	Spindle	4	1	0	4	4	1	1		
	,	Check If yo	ou use 5 axis	Che Cros	ck if common- s if common-c	-anode wiring athode wirin		lick "Apply" after setting up		
						OK	Can	cel Apply		

6. Click "**Iutput Signals**" to set it shown as below.

5 Axis Breakout Board Interface Adapter

(++ 4 (4 (Home 8		12	4	X	0	=
(4 (Home X	1	12	. 4			
(Home	•		4	X	0	
	. 0	0	X	×	0	
(++ 🛛	′ 1	13	4	X	0	
(4	' 1	13	4	X	0	
(Home 🛛 🕷	0	0	×	X	0	
<u>/</u> ++	' 1	15	4	X	0	
I 🖌	' 1	15	4	X	0	
I Home 🛛 🕷	0	0	X	X	0	-

Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey	*
Input #3	X	0	0	X	X	0	
Input #4	X	0	0	X	X	0	
Probe	4	1	11	4	X	0	
Index	X	0	0	X	X	0	E
Limit Ovrd	×	0	0	X	X	0	
EStop	4	1	10	4	X	0	
THC On	×	0	0	X	X	0	
THC Up	×	0	0	X	X	0	
THC Down	×	0	0	X	×	0	-
	Pins 10-13 and	d 15 are inputs. Or	nly these 5 pin numb	oers may be used	on this screen	ated Saturn of Inc	u de l

7. Click "**Output Signals**" to set it shown as below.

-	Enabled	Port #	Pin Number	Active Low Motor Enable setur
Digit Trig	X	0	0	X
Enable1	4	1	14	×
Enable2	X	0	0	X
Enable3	X	0	0	X
Enable4	X	0	0	Spindle relay switch setur
Enable5	X	0	0	8
Enable6	X	0	0	X
Output #1	4	1	17	X
Output #2	X	0	0	X
O #7	*	0	0	× ×

8. Click "Spindle Setup" to set it shown as below.

Engine Configuration Ports & Pins Port Setup and Axis Selection Motor Outp	uts Input Signals Output Signals Encoder/M	IPG's Spindle Setup Mill Options
Relay Control Disable Spindle Relays Clockwise (M3) Output # 1 CCW (M4) Output Signal #'s 1-6 Flood Mist Control ✓ Disable Rood/Mist relays Disable Rood/Mist relays Delay Mist M7 Output # ¶ 0 Plood M8 Output # 3 0 Output Signal #'s 1-6 ModBus Spindle - Use Step/Dir as well Enabled Enabled Reg 64 64 64 - 127 Max ADC Count 16380	Motor Control Use Spindle Motor Output Very WM Control Step/Dir Motor WMBase Freq. 100 Minimum PWM 0 % General Parameters CW Delay Spin UP 1 CCW Delay Spin UP 1 CCW Delay Spin UP 1 CCW Delay Spin DOWN 1 Seconds CCW Delay Spin DOWN 1 Seconds	tions dle Feedback in Sync Modes oop Spindle Control I 1 D 0.3 Speed Averaging Special Options, Usually Off Hot Wire Heat for Jog Laser Mode. freq I Torch Volts Control
		OK Cancel Apply

If you use PWM to control the spindle speed, you have to click "**Pulley Selection**" to set it shown as below.

Pulley Selection	17,004	1.000	
Current Pulley Pulley Number 1	Min Speed	Max Speed	Ratio
Reversed		,	,
			ОК

9. Motor debugging. Click Config->Motor Turning and Setup

Motor Tuning and Setup	Γ
X - AXIS MOTOR MOVEMENT PROFILE	
3281.25 X Axis	
• 2953.13 · 2625 · Y Axis	Setup X V 7 A Avis
2 2296.88 - Z Axis	separately
E 1312.5 A Axis	
5984.375	
> 328.125	
0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 CAxis	Click this button after
Steps per:Steps required to mobile 1 mm Time in Seconds	setting, or it will not
in manual control	save the data
Accel	
Velocity Acceleration Step Pulse Dir Pulse SAVE AXIS SETTINGS	
320 200 100 0.050988 5 5 Cancel OK	
	<u>l</u>
This value is calculated in the following formula:	
Steps per=(360/1.8)*x/i; x:Microstep. I:screw pitch. E.G. Microstep=8, screw pitch = 5mm, then Steps per = 320	

10. Click "**System HotKeys Setup**". Set X, Y, Z axis hotkey shown as below. Then you can manual control the corresponding axis motor turning via hotkeys.

System HotKe	ys Setup		152
Jog Hotkey	s ScanCode 39	X	ScanCode
Y++	38	Y	40
	33		34