SHENZHEN BIG TREE TECHNOLOGY CO.,LTD . BIGTREETECH

BIGTREETECH TMC5160 PRO-V1.1

User Manual

1.Introduction

TMC5160 is a control chip of high-power stepper motor with MOS power expansion, 20A maximum current and low heat generation.

StealthChop2 mode for TRINAMICs eliminates motor noise by reducing resonance. StallGuard2 filament blockage detection enables stepper motor torque control or back to zero without a sensor, which is a safe detection of motor stopping and the replacement of mechanical stop switch. DcStep allows the motor to run near its load limit and speed limit, achieving 10x or higher range without any pulse loss. SpreadCycle is high precision chopping algorithm for highly dynamic motor motion and generating absolutely clean current waves. Low noise, low resonance and low vibration chopper. CoolStep current control optimizes driver performance and energy efficiency, enables smooth and silent drive, balances speed and motor torque, reduces energy consumption by 75 %.

TMC5160 is an upgrade of TMC2100, TMC2130 and TMC5130 series, with higher voltage and motor currents.

2.Product Parameters

Driver Chip: TMC5160-WA; Product Size: 15.3mm*20.4mm; Supply Voltage: 8V---56V; Maximum Current: 3A (maximum current of 2.54 single-row pins-3A) Maximum Segmentation: 256; Working Mode: SPI Mode, SD Mode

3. Advantages

- 1. External power MOS tube, for higher current
- 2. Ultra-silent mode
- 3. Less motor jittering
- 4, less pulse loss
- 5. It is able to drive 57 stepper motor

4.Pins Instruction

4.1. Names of pins



4.2. Functions of pins

J1	Functions	J2	Functions		
1	EN	1	VM		
2	SDI/CFG1	2	GND		
3	SCK/CFG2	3	A2		
4	CSN/CFG3	4	A1		
5	SDO/CFG0	5	B1		
6	CLK	6	В2		
7	STEP	7	VCC_IO		
8	DIR	8	GND		

4.3, Product Size



5.Driver installation

The pins with white boxes on the driver are enable (EN) pins:



6.SD_MODE

The factory default mode $SD_MODE = 1$, the STEP / DIR input pins control the driver as shown:



To use SD_MODE =0, step signal is made by internal ramp generator the resistor is welded to the other side as shown:



7.Heat dissipation

It is recommended to add active heat dissipation to the TMC5160 Pro When the current is over 1A.

With an 12V/5V LDO inside, excessive differential pressure brings more heat. It is recommended to add active heat dissipation to the TMC5160 Pro to ensure the stability of the printing system when the voltage is higher than 40V.

8.Firmware Configuration

1. Marlin

a. Set the driver as TMC5160 in Configuration.h



b. If there is independent SPI port, set TMC_USE_SW_SPI

in Configuration_adv.h



c.If the motherboard needs custom pins, customize the CS signal lines in the "pins_xxx.h" and the SPI signal lines in "Configuration_adv

C Con	figuration.h 1, M	C Configuration_adv.h 1, M	C pins_E	STT_OCTOPU	S_V1_common.h 8 ×	
Marlin > src > pins > stm32f4 > C pins_BTT_OCTOPUS_V1_common.h >						
153	//					
154	#define X STEP	DTN	DE13	// MOTOR		
155	#define X DTR P	TN	DE12			
156	#define X ENABL	E DTN	PF14			
157	#ifndef X CS PT					
158	#define X CS	PTN	PC4			
159	#endif	1.417				
169	"CHULT					
161	#define V STEP	PTN	PGA	// MOTOR		
162	#define V DIR P	TN	PG1			
163	#define V ENARI	E DTN	DE15			
164	#ifndef V CS PT					
165	#define V CS	PTN	PD11			
	#ondif					
167	nendi i					
	#define 7 STEP	DTN	DE11	// MOTOR		
160	#define 7 DTR D	TN	PG3			
170	#define 7 ENABL		PGS			
171	#ifndof 7 CS DI	N N				
172	#dofing 7 CS	DTN	DC6			
172	#ondif	F 1N	FCO			
174	#CHUIT					
175	#dofing 72 STED	DTN	DCA	ZZ MOTOR		
175	#define 72 DTP		DC1			
170	#define 72 ENAP		DAG			
170	#uerine ZZ_ENAD		PAO			
170	#1111ue1 22 C5 P	DTN	DOT			
100	#uerine 22_cs	PIN	PCZ			
100	#enuir					
101	#dofing EQ STED	DTN				
102	#define E0_STEP		DE10			
101	#define E0_DIN_		000			
104	#ifndof EQ CS D	TN STATE	F.GZ			
105	#dofino EA CS	DTN	DED			
197	#ondif					
107	#enults					
189	#define F1 STEP	DTN	PC13	// MOTOR		
100	#define F1 DTR	DTN	DEQ			
101	#define E1_ENAB		DE1			
102	#ifndef E1 CS D					
102	#define F1 CS	DTN	DEA			
10/	#endif					
405	#CIMITI					
C Config	uration.h 1, M C Co	nfiguration_adv.h 1, M 🗙 🛛 C pins_BT	T_OCTOPUS_V1	_common.h 8		
Marlin >	C Configuration_adv.h > .					
		n for SPI driven drivers (TMC2	130, TMC2160	9, TMC2660,	TMC5130 and TMC5160).	
				files,		
2777		erride or define them here.				
27/8	#define TWC NCC C					

#define TMC_SW_MOSI #define TMC_SW_MISO

2786 2781

d.Set the sampling resistance to 0.075 (the sampling resistance value of the driver is 0.075), and set the current and subdivision according to your own needs.



2. Klipper

Set the current and subdivision according.

For more details, please refer to

https://www.klipper3d.org/Config Reference.html#tmc

<u>5160</u>

✿ printer.cfg ×				
C: > Users > Administrator > Desktop > Canbus-Toolboard > 🌼 printer.cfg				
360	[tmc5160 stepper x]			
361	cs pin: PC4			
362	sense resistor: 0.075			
363	interpolate: True			
364	run_current: 1.5			
	hold_current: 0.5			
	stealthchop_threshold: 0			
367	spi_bus: spi1			
	#diag1_pin: !PG6 # Pin connected to TMC DIAG1 pin (or use diag0_pin / DIAG0 pin)			
	<pre>#driver_SGT: 2 # -64 is most sensitive value, 63 is least sensitive</pre>			
370	#driver_TPFD: 0			
371	#driver_TOFF: 4			
372	#driver_HEND: 2			
373	#driver_HSTRT: 1			
374	#driver_DISS2G: 12			
375	#driver_DISS2VS: 12			
376				
377				
378	[tmc5160 stepper_y]			
379	cs_pin: PD11			
380	sense_resistor: 0.075			
381	interpolate: True			
382	run_current: 1.5			
383	hold_current: 0.5			
384	stealthchop_threshold: 0			
385	spi_bus: spi1			
386	#diag1_pin: ^!PG9 # Pin connected to TMC DIAG1 pin (or use diag0_pin / DIAG0 pin)			
387	#driver_SGT: 3 # -64 is most sensitive value, 63 is least sensitive			
388	#driver_TPFD: 0			
389	#driver_TOFF: 4			
390	#driver_HEND: 2			
391	#driver_HSTRT: 1			
392	#driver_DISS2G: 12			
393	#driver_DISS2VS: 12			

9.Caution

1、Disconnect the power supply before driver installation.

2、Confirm the direction of driver to avoid reverse insertion.

3、 Do not plug and unplug the driver module when power is on to avoid damage.

4. Please note that the heat sink cannot contact with the pins to prevent the driver from short circuit.

5、TMC5160 is sensitive to static electricity, please be careful.

6. It is recommended to add the active heat dissipation when using higher current or higher voltage.

7、No touching after power on to avoid accident (especially when the power input is 36V or higher.)

10. Download link

https://github.com/bigtreetech/BIGTREETECH-Stepper-M

otor-Driver