捷泰并联臂三角洲 快速入门手册



现在,请不要忙于开始打印和自动调平命令。这是一套 DIY 产品,打印机的一 些参数可能会各不相同,您需要根据自己打印机的实际情况来修改固件(只有三 处需要修改)。建议您一步一步阅读整个组装手册以便对您将进行的工作有一个 全面的了解,请您严格按照我们的指导。不要遗漏任何细节。

1.1 如何修改、上传固件

在接下来的设置过程中,您需要不断的修改、上传固件。首先,我们来学习下如 何编辑并上传固件。

1. 在这里下载固件:

Firmware for Delta Rostock mini G2 单三角洲固件

Firmware for Delta Rostock mini G2S 双三角洲固件

2.用 USB 线将 GT2560 主板与电脑相连接,安装 FIDI 驱动程序。一般来说,它 会自动安装好。如果不行的话,您需要手动安装。

点击<u>这里</u>下载 FTDI 驱动程序。

3.如果主板的硬件没问题的话,您能在设备管理器中找到 COM 端口。但是每台 计算机的 COM 口不同,您需要自己确认。

4.打开固件,将所有的文件拖入 Arduino IDE 中。我使用的是 Arduino1.0.5,所以选择 Board (Arduino Mega or Mega2560,将ATmega2560(Mega2560)设置为默认处理器。顺序千万别弄错。请在设备处理器中选择 COM 端口。



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💿 sketch_jul23a Ai	rduino 1.0.5-r2			
File Edit Sketch To	pols Help			
	Auto Format Ctrl+T			
	Archive Sketch	- 編輯颜色		
sketch_jul23a	Fix Encoding & Reload	ConfigurationStore.cpp Configuratio		
#ifndef CONFIGUR/	Serial Monitor Ctrl+Shift+M			
#define CONFIGUR				
// This configure	Source Point	Arduino Uno		
// Advanced setti	Senar Port	Arduino Duemilanove w/ Armegaszo		
// BASIC SETTINGS	Programmer 🕨	Arduino Diecimila or Duemilanove w/ Armega108		
	Burn Bootloader	Arduino Nano w/ Armega168		
//		Arduino Maga 2560 or Maga ADK		
//======	========= DELTA Printer ====================================	Arduino Mega (ATmega1280)		
// For a Delta prip	ter replace the configuration files with	Arduino Mega (Armega1200)		
<pre>// example_configur</pre>	ations/delta directory.	Arduino Ecolora		
//		Arduino Espícia		
		Arduino Mini w/ ATmega328		
// User-specified v	ersion info of this build to display in	Arduino Mini w/ Armega169		
// startup. Impleme	ntation of an idea by Prof Braino to inf	Arduino Ethernet		
// build by the use	r nave been successfully uploaded into f TAN CANFIG H DATE "" TIME //	Arduino Eine		
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		LilyPad Arduino w/ ATmega328		
		LilyPad Arduino w/ ATmega168		
		Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328		
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1	Arduino 1.0.5-r2	Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega168		
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5.您需要修改所有部分代码都在 Configuration.h 中。

💿 sketch_jul23a Arduino 1.0.5-r2		
File Edit Sketch Tools Help		
		<mark>.</mark>
sketch_jul23a BlinkM.cpp § BlinkM.h § Configuration.h	ConfigurationStore.cpp	Configuratio 💌 :ore
#ifndef CONFIGURATION_H		
#define CONFIGURATION_H		
<pre>// This configuration file contains the basic settings. // Advanced settings can be found in Configuration_adv.h // BASIC SETTINGS: select your board type, temperature sensor</pre>	type, axis scaling, and er	ndstop configurat
// DELTA Printer		
//		
// For a Delta printer replace the configuration files with th // succession files with the second secon	e files in the	
//		
<i></i>		
// User-specified version info of this build to display in [Pr	onterface, etc] terminal w	vindow during
<pre>// startup. Implementation of an idea by Prof Braino to inform</pre>	user that any changes mad	le to this
// build by the user have been successfully uploaded into firm	Ware.	
#define SIKING_VERSION_CONFIG_ADAIEIIME// build	date and time	-
•		•
72 files added to the sketch.		
1	Arduino Mega 2560 or N	llega ADK on COM8

根据您的打印机找到您编译所需的数值。在编译中,只需点击 (编译)和 (上传) 按钮,您就可以加载控制板所需的固件。注意:上传固件过程中要将 Repetier Host 连接断开。



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sketch_jul23a Arduino 1.0.5-r2		0 0	
File Edit Sketch Tools Help			
			<mark>.</mark>
sketch_jul23a BlinkM.cpp§ BlinkM.h§	Configuration.h	ConfigurationStore.c	pp Configuratio 🔽 ore
<pre>#ifndef CONFIGURATION_H #define CONFIGURATION_H</pre>			_
// This configuration file contains the basic	settings.		
// Advanced settings can be found in Configur	ation_adv.h		
// BASIC SETTINGS: select your board type, te	emperature sensor t	ype, axis scaling, a	nd endstop configurat
//=====================================			
//===== DELTA Printer			
//			
// For a Delta printer replace the configurat	ion files with the	files in the	
<pre>// example_configurations/delta directory.</pre>			
11			
// Mrow-reagified warries info of this build	to dirplow in [Pro	ptorfoco otal tormi	nol window during
// startup_Implementation of an idea by Prof	E Braino to inform	user that any change	s made to this
// build by the user have been successfully u	ploaded into firmw	are.	s made to this
#define STRING_VERSION_CONFIG_HDATE_ " "	TIME_ // build	date and time	
			-
Compiling sketch			
1		Arduino Mega 256	iO or Mega ADK on COM8

编译中





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上传中



上传成功

1.2 打印准备

1. 调整打印床

为了检查打印床是否平整,可以在调整三颗螺栓时,将一个水平仪放在打印床上。如果有一个平整的方条卡在热床下方螺钉位置,使其平整。



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2. 为了防止撞碎打印床和喷嘴,请在打印床上贴上保护胶带。





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1.3 打印设置

第一步:用 USB 线把三角洲与电脑相连接,插上电源。确保连接正确后开启电源,您可以看到 LCD 灯亮起来了,电扇开始工作,也可能听见电机转动的声音。

第二步:打开 Repetier Host,确认您有一个有效的 COM 端口。很简单,点击右 上角打印设置菜单中的"打印设置"。



第三步:点击连接菜单,选择 COM6 端口以及波特率 250000.点击"确认"按键继续。



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Printer Settings						
Printer: delta	▼ 💼					
Connection Printer Ex	truder Printer Shape Scripts Advanced					
Connector: Serial	Connection 👻					
Port:	COM6 -					
Baud Rate:	250000 👻					
Transfer Protocol:	Autodetect 💌					
Reset on Connect	DTR low->high->low •					
Reset on Emergency	Send emergency command and reconnect 🔹					
Receive Cache Size:	127					
Communication Timeou	t:) [s]					
Use Ping-Pong Communication (Send only after ok) The printer settings always correspond to the selected printer at the top. They are stored with every OK or apply. To create a new printer, just enter a new printer name and press apply. The new printer starts with the last settings selected.						
	OK Apply Cancel					

如果您找不到 COM 端口,点击"刷新端口"按钮,再看是否出现。(一般是最 后一个,您可以查看设备管理器了解您是哪个端口)提示:如果您还未能找到端 口,请重新安装 USB 驱动程序。

驱动下载链接:

http://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.00%20WHQL%20Certified.e



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第四步:设定打印速度,设置打印完成后电机不自动解锁

inter octai	.95							1
Printer:	delta							前
Connection	Printer	Extruder	Print	ter Shape	Scripts	Advanced		
Travel Feed Rate: 20				2000		[mm/min]		
Z-Axis Fe	ed Rate:			2000		[mm/min]		
Manual Ex	trusion Sj	peed:		2		20		[mm/s]
Manual Re	traction S	Speed:		30		[mm/s]		
Default E	xtruder To	emperature	:	200		°C		
Default H	eated Bed	Temperatu	re:	55		°c		
🔲 Remove Check eve	temperat ry 3 seco	ure reques nds.	ts fro	om Log				-
Park Posi	tion: X:	0	Y	: 0	Z mi	.n: O	[mm]
📝 Send El	"A to prin	ter displa	y		🔲 Go	to Park Pos	sition a	fter Job/Kill
📝 Disable	e Extruder	after Job	/Kill		📝 Di	sable Heated	l Bed af	ter Job/Kill
📃 Disable	e Motors a	after Job/H	(i11		📝 Pr	inter has SI) card	
Add to com	p. Printi	ng Time 8		[%]				
Invert Dir	ection in	1 Controls	for	X-A3	kis	🔲 Y-Axis		Z-Axis
					0	ĸ	Apply	Cancel

第五步:设置喷头数量,设置喷嘴间距(单挤出机不需要)



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Printer Settings	
Printer: d	lelta 🔹 💼
Connection Pri	inter Extruder Printer Shape Scripts Advanced
Number of Ext	truder: 2
Max. Extruder	r Temperature: 280
Max. Bed Temp	perature: 120
Max. Volume j	per second 12 [mm ³ /s]
📄 Printer h	as a Mixing Extruder (one nozzle for all colors)
-Extruder 1	
Diameter:	0.4 [mm] Temperature Offset: 0 [° C]
Color:	
Offset X:	0 Offset Y: -13 mm]
-Extruder 2	
Diameter:	0.4 [mm] Temperature Offset: 0 [° C]
Color:	
Offset X:	O Offset Y: [13 [mm]
	OK Apply Cancel

第六步:选择打印机形状。这一步十分重要。选择三角洲打印机。(圆形)

X 归位: 0

Y 归位: 0

Z 归位: Max (最大)

打印机半径: 100mm

可打印高度: 200mm



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Printer Settings
Printer: delta 🔹 💼
Connection Printer Extruder Printer Shape Scripts Advanced
Printer Type: Rostock Printer (circular print sha 🔻
Home X: O View Home Y: O View Home Z: Max View
Printable Radius: 100 mm
Printable Height: 200 mm
OK Apply Cancel

第七步:设置按钮代码 1,2,3,4,5

我们可以使用这些快捷代码来将打印头快速移动到相应的位置。对于每一个坐标

点,请保持 Z=2mm。

对于 G2 或者 G2 pro:

① (0,0,2) ② (0,50,2) ③ (43.3,-25,2) ④ (-43.3,-25,-2)

对于 G2S 或者 G2S pro:

1 (0,0,2) 2 (0,63,2) 3 (43.3,-25,2) 4 (-43.3,-25,-2)

于是可以设定以下代码:

Code	G2 or G2 pro	G2s or G2s pro
Script1:	G0 X0 Y0 Z2	G0 X0 Y0 Z2
Script2:	G0 X0 Y50 Z2	G0 X0 Y63 Z2
Script3:	G0 X43.3 Y-25 Z2	G0 X43.3 Y-25 Z2



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Script4:	G0 X-43.3 Y-25 Z2	G0 X-43.3 Y-25 Z2

除了以上4个代码之外,我们还需要增加第5个代码来使打印头保持在空中不掉 下来。

Script 5:

G0 X0 Y0 Z180

M84 S0

当你点击相应的代码时,打印头会移动到下图中所示的相应的测试点位。



在这里写入相应的代码 1,2,3,4,5。我们这里以 G2&G2s 为例。 Script 1: G0 X0 Y0 Z2



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3 repetier-Host v1-50	
File View Config Printer Server Tools Help	
Disconnect Load Start Print Kill Print Toggle Log	Printer Settings Easy Mode Emergency Stop
3D View Temperature Curve	Object Placement Slicer Print Preview Manual Control SB Card
O Triate: Baltis Printer Settings Frinter: Baltis Frinter: Baltis Berright: Berright: Script: Script: Script: Berright: O To To To Ze Descript: Berright: O Apply: Casel	Ubject flacked birg frint freeze mode celloid (3) dra' i dle 6 code: 5 code: 5 code 5 cod
Sher in Log. @Commads Olafos Offernings Offrers @ACK Okato Scroll @Clear Log @Copy 15335924056 End file list 15345920456 EnchActive Extrudes: 0	
Connected: delta Extruder 1: 27.3°C/Off Extruder 2: 27.3°C/Off Bed: 27.5°C/Off	Idle

Script 2: G0 X0 Y50 Z2

Printer Settin	igs		-				
Printer:	delta						
Connection	Printer	Extruder	Printer Shap	e Scripts	Advanced		
Script:	Scrip	ot 2					•
GO XO Y50	72						*
				0	K Appl	y Ca	ncel



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Script 3: G0 X43.3 Y-25 Z2

Printer Settin	gs			_			
Printer:	delta					- i	1
Connection	Printer	Extruder	Printer Shape	Scripts	Advanced		
Script:	Serig	pt 3					•
GO X43.3	(-25 Z2						
				01	K	Apply	Cancel

Script 4: G0 X-43.3 Y-25 Z2



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rinter Settings
Printer: delta 🐨 💼
Connection Printer Extruder Printer Shape Scripts Advanced
Script: Script 4
GO X-43.3 Y-25 Z2
-
OK Apply Cancel

Script 5:

G0 X0 Y0 Z180

M84 S0

注意: 这里我们可以加入"M84 S0"来锁住马达使其在空中的时候不掉下来。



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Printer Settings
Printer: delta 🔹 💼
Connection Printer Extruder Printer Shape Scripts Advanced
Script: Script 5
GO XO YO Z180 M84 SO
OK Apply Cancel

第八步:记住重命名打印机为 delta 或者你喜欢的名字,这样下次你打开 Repetier Host 的时候就只要选择打印机的名称即可,不需要再重新设定上面的参数。



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Printer Settin	igs	
Printer:	delta	▼ [†]
Connection	Printer Extruder Printer Shape Scripts Advanced	
Script:	Script 5	•
GO XO YO Z M84 SO	Ζ180	*
		-
	OK Apply	Cancel

第九步:点击左上角的"连接"按钮。你能看到屏幕下面控制窗口中连接的详细 内容。连接上后,红色按钮会变绿。



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1.4 打印机归位



归位是检测中首要的也是最重要的一步。打印机归位,您可以检查三根轴移动的 方向是否相同。如果不是的话,在运行过程中,有些部件会很容易损坏。

归位前,请完成以下步骤。

1. 在打印设置中选择"打印机"。将运行加料速度和 Z 轴加料速度设置为



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300mm/min.(尽管我们已经在固件中将速度设置成尽可能的慢一些,您仍然需要 在这里调整速度。)

Printer Settin	ngs						20	-
Printer:	delta	_					•	â
Connection	Printer	Extruder	Prin	ter Shape	Scripts	Advanced		
Travel Fe	ed Rate:			300		[mm/min]		
Z-Axis Fe	ed Rate:			300		[mm/min]		
Manual Ex	trusion Sp	peed:		2		20		[mm/s]
Manual Re	traction S	Speed:		30		[mm/s]		
Default H	xtruder Te	emperature	:	200		°C		
Default }	leated Bed	Temperatu	re:	55		°c		
♥ Check ■ Remove Check eve	Extruder (e temperati ery 3 secor	& Bed Temp ure reques nds.	eratu ts fro	re om Log				
Park Posi	tion: X:	0	Y	: 0	Z mi	n: 0	[mm]	
📝 Send E	TA to prin	ter displa	y		📄 Go	to Park Pos	ition aft	ter Job/Kill
📝 Disabl	e Extruder	after Job	/Kill	-	📝 Di	sable Heated	Bed afte	er Job/Kill
📃 Disabl	e Motors a	fter Job/B	G11		📝 Pr	inter has SD	card	
Add to cor	np. Printi:	ng Time 8		[%]				
Invert Di	rection in	. Controls	for	LA-X 📃	is	🔲 Y-Axis		Z-Axis
					0	K	Apply	Cancel

2. 现在不是在测试自动调平的功能,您需要用手把探针打上来。



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换图

3.将挤出头移到中间,准备好紧急停止。你可以点击 repetier host 上的"紧急停止"图标,或者直接切断电源。



如果三根轴移动的方向不同,请检查电机线的连接方向是否一致。或者固件设置 里关于电机的运动方向。

如果三个轴移动方向不正确,比如说其中一个 Y 轴移动方向相反,则需要在固件中找到相应的代码,将"true"改为"false",重新上传固件再归位。(记住重新烧录固件的时候应将打印机和 Repetier host 断开)

// Invert the stepper direction. Change (or reverse the motor connector) if an axis goes the wrong way.

#define INVERT_X_DIR true // DELTA does not invert

#define INVERT_Y_DIR true

#define INVERT_Z_DIR true

#define INVERT_E0_DIR true

#define INVERT_E1_DIR false



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💿 sketch_oct13a Arduino 1.0.5-r2			-		
File Edit Sketch Tools Help					
sketch_oct13a Conditionals.h § Configuration.h Conf	guration_adv.h §	Marlin.h §	Marlin §	Marlin §	Mar
#define DISABLE_X false					
#define DISABLE_Y false					
#define DISABLE_Z false					
#define DISABLE_E false // For all extruders					
#define DISABLE_INACTIVE_EXTRUDER true //disable only inactive	extruders and k	ceep active e	xtruder ens	abled	
// Invert the stepper direction. Change (or reverse the motor #define INVERT_X_DIR true // DELTA does not invert #define INVERT_Y_DIR true	connector) if an	ı axis goes t	he wrong wa	ıy.	
#define INVERT_Z_DIR true					
#define INVERT_EO_DIR false					
#define INVERT_E1_DIR true					
#define INVERT_E2_DIR false					
#define INVERT_E3_DIR false					
// ENDSTOP SETTINGS:					
// Sets direction of endstops when homing: 1=MAX, -1=MIN					
#define X_HOME_DIR 1 // deltas always home to max					
#define Y_HOME_DIR 1					
#define Z HOME DIR 1					

1.5 确认 Z 轴的原始高度

如果打印机能自动归位,三根轴的移动方向是相同,您可以现在设置 Z 轴的初始高度,(这一数值不一定是最终的高度)。 注意:双挤出机以第一个喷头(前面那个)为参考喷头,以下操作都以第一个喷

头为基准。



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1.您可以使用标尺或者数字显卡来测量。Z轴的高度即归位后喷嘴和打印平台的 距离。所以必须在归位之后进行测量。



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2. 或者您可以使用手动控制来移动 Z 轴,先设定较高的 Z 轴高度,如 210mm。1) 固件设置



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∞ Marlin∣ File Edit S	A <mark>rduino</mark> 1.0.5-r2 ketch Tools Help						
Marlin	Conditionals.h	Configuration.h §	Configuration_adv.h	Marlin.h	Marlin	MarlinSerial.cpp	MarlinSerial.h
// D32 is // WARNIN	: currently select G: Setting the wr	ed in the RAMPS 1.3/ ong pin may have und	1.4 pin file. All other expected and potential	er boards wi .y disastrou	ll need ch s outcomes	anges to the respect . Use with caution	ctive pins_XXXXX.h f and do your homewor
//#define	Z_PROBE_ENDSTOP						
#endif // H	NABLE_AUTO_BED_LE	VELING					
<pre>// The posi #define MAN #define BEI // Manual H // For delt #ifdef MANU #define N #define N #define N #endif</pre>	tion of the homin NAL_HOME_POSITION CENTER_AT_0_0 // toming switch loca abots this means NAL_HOME_POSITIONS NANUAL_X_HOME_POS IANUAL_Z_HOME_POS IANUAL_Z_HOME_POS	g switches 5 // If defined, MJ / If defined, the co tions: top and center of th 0 2 210// For delta: Dis	WUAL_*_HOME_POS below enter of the bed is at ne Cartesian print volu stance between nozzle a	will be use (X=0, Y=0) ume. and print su	d rface afte	r homing.	
/** * Movemeni */	SETTINGS						
// delta ho #define HON	ming speeds must 1 IING_FEEDRATE {200:	be the same on xyz *10, 200*10, 200*10,	0} // set the homin;	g speeds (mm	/min)		
// default	settings						

2) 打印机设置需对应



P D

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	Printer Settings
	Object Flacement Slicer Frint Preview M
Printer Settings Printer: delta Connection Printer Extruder Printer Shape Scripts Advanced Printer Type: Rostock Frinter (circular print she v Home X: O v Home Y: O v Home Z: Max v Printable Radius: 100 mm Printable Height: 210 mm	Code: X 0.00 Y 0.00 Z X/Y C C C C C C C C C C C C C C C C C C C
OK Apply Cancel	

将Z轴往下移直到喷嘴触碰到打印床。请慢慢移动Z轴。

3 Repetier-Host V1.5.0	
File View Config Printer Server Tools Help Object - - - - - - Disconnect Load Start Print Toggle Log	Printer Settings Easy Mode Emergency Stop
30 View Isoperature Curve	Object Placement Slicer Print Preview Manual Control SD Card
	00000 1 Labora 1 2000 1 Labora 1 2000 2 5 000 0 Code: 0 0.00 Y 0.00 Z 5.00 Z bruder 1 - (X/Y) 0.00 Z 5.00 Z bruder 1 - (X/
Shee in Log: © Communds Olafos Ofwrnings Otrors @MK OMato Scroll @Clear Log @Copy 3643144.129 End file list 1643144.144 echo:Active Extruder: 0	
Connected: delta Extruder 1: 28.2°C/Off Extruder 2: 28.4°C/Off Bed: 28.2°C/Off	Idle

当喷头离平台距离比较近的时候,每点击一下,移动 0.1mm.

3.当喷嘴刚好碰到打印床时,读取 Z 轴坐标。比如: (0,0,4)时,那么 Z 轴的高



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度是 210-4=206; (0, 0,5) 时,高度是 200-5=205. 以此类推。 (*210 是固件预 先设置的高度,4 是 Z 坐标)

4. 打开 IDE 中的固件,找到以下代码

//Manual homing switch locations:#define MANUAL_HOME_POSITIONS

// MANUAL_*_HOME_POS below will be used

// For deltabots this means top and center of the Cartesian print volume.

#define MANUAL_X_HOME_POS 0

#define MANUAL_Y_HOME_POS 0

#define MANUAL_Z_HOME_POS 210// For delta: Distance between nozzle and print surface after homing.

然后你可以将高度 210 改动为刚刚测量的高度(比如 206 或者 205),保存下来。 重新加载固件。完成后,您还需要在 Repetier host 中修改打印设置。

选择打印机外形结构。这一步十分重要。选择三角洲打印机(圆形)。

X 归位: 0

Y 归位: 0

Z 归位: Max (最大)

打印机半径: 100mm

可打印高度: 205mm(*设置在固件中的高度)



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Image: Repetitive-Host VI.5.0 File View Config Printer Server Tools Help Image: Start Print - Server Tools Help Image: Start Print - Server Tools Help	
Image: New Coning Printer Server 1000 Print Disconnect Load Sart Print Sill Print Cig Printer Settings Printer Settings Printer Settings Printer Settings Printer Settings Printer Settings Printer Type: Badding: Printer Settings Printer Settings Printer Type: Badding: Printer Settings Printer Type: Badding: Printer Settings Printer Settings Printer Settings Printer Type: Badding: Disconnect Image: Disconnect Printer Settings Printer Settings Printer Type: Badding: Disconnect Image: Disconnect Printer Settings Printer Settings	Image: Process Store Image: Process Store Image: Proces
Skor in Log: ©Commads Olfafos Offernings Olferrors OACK Okato Scroll @Clear Log {bjCopy 18201844-122 End file list 18201844-124 echo:Active Extruder: 0 Connected: delta Extruder 1: 27.6°C/Off Extruder 2: 27.7°C/Off Bed: 27.7°C/Off	Idle
Printer Settings Printer: delta Connection Printer Extruder Printer Shape Scripts Adw Printer Type: Rostock Printer (circular print sha Home X: 0 Home Y: 0 Home Z: Printable Radius: 100 mm Printable Height: 205 mm	anced
ОК	Apply Cancel



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1.6 确认 Z 轴的最终高度

第一步:打印机归位

第二步: 拧紧三个触碰限位开关的螺栓, 尽可能确保三个螺栓伸出来长度接近以 及弹簧压缩较紧。



调整这三个支架上的螺栓。

.第三步:设置三个探测点单挤出机(0,50)、(43.3,-25)、(-43.3,-25),双挤出机 以第一个挤出头为基准(0,63)、(43.3,-2)、(-43.3,-2),使用 G-code 命令按钮 将打印头调整到这三个点,分别记录喷嘴到打印平台的距离。



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单挤出机如下,双挤出机相应为坐标点(0,63)、(43.3,-2)、(-43.3,-2),相应离



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平台 2mm。

1) 按 1 号按钮命令: 中心点 G0 X0 Y0 Z2

2) 按 2 号按钮命令: Z 轴对应点 G0 X0 Y50 Z2

3) 按 3 号按钮命令: Y 轴对应点 G0 X43.3 Y-25 Z2

4) 按 4 号按钮命令: X 轴对应点 G 0 X-43.3 Y-25 Z2

5) 按 5 号按钮命令:移动坐标到 180 高度并锁死电机,防止重量过大滑落 分别按下 2、3、4 号按钮,到达相应的点后以 0.1mm 间距移动 Z 轴向下,如果 Z 轴移动到 0,还没触碰到平台,将相应轴的 endstop 螺钉向上拧;如果还没到 0 就触碰到平台,将相应的 endstop 螺钉向下拧。您可能需要不断调整,直到 3 个 点向下到达 0 时都正好触碰到平台。



到这一步,我们可以试着调整喷嘴和打印表层的距离,使得喷嘴到中心点和其周围的点都在同一平面。也就是说,我们需要确保在喷嘴触碰到打印床时,无论是哪一点,Z坐标的数值应该是相同或是极度相近的。

之前操作使得周围 3 点 Z 轴到达零点时正好触碰到平台,移动坐标到达中心点(按下1号按钮),再让其向下移动,



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如果还没到达零点就触碰到平台,这是一个凸面,您应该减小 DELTA_RADIUS, 例如从 1.0 变成 0.

如果到达零点还触碰到平台,这是一个凹面,您应该增加 DELTA_RADIUS,例 如从 1.0 变成 2.0.

注意:(DELTA_RADIUS 每 1.0 个单位减少或增加, Z 打印高度都会减少或增加 0.2 个单元)

#define DELTA_RADIUS

(DELTA_SMOOTH_ROD_OFFSET-DELTA_EFFECTOR_OFFSET-DELTA_CARR

 $IAGE_OFFSET+1.0$)

💿 sketch_oct13a Arduino 1.0.5-r2								
File Edit Sketch Tools Help								
sketch_oct13a Conditionals.h Configuration.h S Configura	ation_adv.h § Marlin.h §							
<pre>// Center-to-center distance of the holes in the diagonal push rod: #define DELTA_DIAGONAL_ROD 196 // mm</pre>	5.							
<pre>// Horizontal offset from middle of printer to smooth rod center. #define DELTA_SMOOTH_ROD_OFFSET 160 // mm</pre>								
// Horizontal offset of the universal joints on the end effector. #define DELTA_EFFECTOR_OFFSET 36 // mm								
/ // Horizontal offset of the universal joints on the carriages. #define DELTA_CARRIAGE_OFFSET 33 // mm								
<pre>// Horizontal distance bridged by diagonal push rods when effector is centered. #define DELTA_ (DELTA_SMOOTH_ROD_OFFSET-DELTA_EFFECTOR_OFFSET-DELTA_CARRIAGE_OFFSET+1)</pre>								
<pre>// Print surface diameter/2 minus unreachable space (avoid collisi #define DELTA_PRINTABLE_ 90</pre>	ons with vertical towers							
//								



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为了使中心点和周围的点(按钮 2、3、4 号对应的点)在同一平面(喷嘴和打印床的距离),您可能需要进行多次调整。

在固件中优化,上传固件,再测试。最终 Z 轴的高度会有细微变化。到目前为止,我们已经获得了 Z 轴准确的高度。将高度输入到固件中,烧录到主板。

1.7 slic3r 配置

完成以上设置后,我们可以继续自动调平设置。

1. 导入 Slic3r 配置文件

下载版本 Slic3r,V1.2.0 以上,进入切片设置。

						Q ^a	EASY	\odot
						Printer Settings	Easy Mode	Emergency S
				Object Placement	Slicer	Print Preview	Manual Contr	ol SD Card
💈 Slic3r					X	Slic3r		Kill Slicing
File Window Help								
Load Config	Ctrl+L						-	0 2 Manager
Export Config	Ctrl+E				Â		the Constitution	
Event Config Bundle			0.2	mm			Court	guration
Export Coning Bundle			0.3	mm or %		175		
Quick Slice	Ctrl+U		0.0			175		•
Quick Slice and Save As	Ctrl+Alt+U							
Repeat Last Quick Slice	Ctrl+Shift+U				E	175		•
Slice to SVG	Ctrl+G		4	🚔 (minimum)		175		•
Repair STL file								
Preferences	Ctrl+,					5		
Quit						to Uverride		
	Solid layers:		Top: 3	Bottom: 3				
						nm		
	Quality (slower s	licing)				0		20%
	Extra perimeters	if needed:			-	mb		
	Avoid crossing r	orimotore			•			
						tte ar	*	
	-							

选择需要的切片设置

🐌 RKMB_G	T2560_G2S	2015-09-18 17:56	文件夹
🗿 G2S		2015-09-22 18:20	配置设置



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💋 Slic3r			- • ×	
File Window He	elp			
Print Settings Fila	ment Settings	Printer Settings		
G2S.ini	-	Size and coordinates		
General ﷺ Custom G-cod W Extruder 1	le	Bed shape:		
Extruder 2		0 mm	E	
	Varning	— X		
	Your configuration was imported. However, Slic3r is currently only able to import settings for the first defined filament. We recommend you don't use exported configuration files for multi-extruder setups and rely on the built-in preset management system instead.			
		确定 yse	• Fest	
Version 1.2.9 - Rem	Version 1.2.9 - Remember to check for updates at http://slic3r.org/			

保存三个设置

💋 Slic3r			_ _ X
File Window Help			
Print Settings Filament Settings	Printer Settings		
G2S.ini 👻 📕 🗎	Layer height		^
Layers and perimeters	Layer height:	0.2	mm
Infill Skirt and brim	First layer height:	0.3	mm or %
 in Support material io Speed in Multiple Extruders in Advanced in Output options in Notes 	Vertical shells Perimeters: Spiral vase:	3	E (minimum)
	Horizontal shells Solid layers:	Top: 3	Bottom: 3
Version 1.2.9 - Remember to chec	Quality (slower slicing) Extra perimeters if needed:		-



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💋 Slic3r				x
<u>File Window H</u> elp				
Print Settings Filament Settings	Printer Settings			
G2S Save preset	-X- Hight			-
	eight:	0.2	mm	
G2S	✓ er height:	0.3		
	col			
	cei			=
Multiple Extruders	and is			_
🌽 Advanced	Perimeters:	3	(minimum)	
🕞 Output options	Spiral vase:			
🛃 Notes				
	Horizontal shells			
	Solid layers:	Top: 3	Bottom: 3	
	Quality (slower slicing)			
	Extra perimeters if needed:	\checkmark		_
	Avaid crossing parimeters:			+
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/			

💋 Slic3r			
File Window Help			
Print Settings Filament Settings	Printer Settings		
G2S.ini 🗸 🔚 🖻	Filament		
Search Filament	Color:		
🔀 Cooling	Diameter:	1.75	mm
	Extrusion multiplier:	1	j
	Temperature (°C)	First Javan 200	Cther Javorry 200
	Extruder:	First layer: 200	Other layers: 200
	Bed:	First layer: 55	Ther layers: 55
	٠	m	4
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/		



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<u>File W</u> indow <u>H</u> elp
Print Settings Filament Settings Printer Settings
G2S.ini Save preset Filam Save filament settings as: G2S OK Cancel Temperature (°C)
Extruder: First layer: 200 Other layers: 200
Bed: First layer: 55 Other layers: 55

💋 Slic3r		x
File Window Help		
Print Settings Filament Settings	Printer Settings	
G2S.ini 🗸 🔚 🖯	Size and coordinates	*
General Custom G-code Extruder 1	Bed shape:	
₩ Extruder 2	0 mm	Ш
	Capabilities Extruders: 2	
	OctoPrint upload	
	API Key:	
Version 1.2.9 - Remember to check	c for updates at http://slic3r.org/	



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💋 Slic3r				x
<u>F</u> ile <u>W</u> indow <u>H</u> elp				
Print Settings Filament Setting	s Printer Settings			
G2S.ini Save preset	rdinates			Â
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W Extru	Cancel	0	mm	Ε
				_
	Capabilities			_
	Extruders:	2		
	OctoPrint upload			_
	Host or IP:		GBrowse]
	API Key:			-
		III		
Version 1.2.9 - Remember to ch	eck for updates at http://slic3r.org/			

如果你的 slic3r 不是最新版本,您可以点击这里<u>here</u>,更新或者下载,把他们拖入到你之前 slic3r 的目录中。请不要删除以前的版本。重新启动 Repetier,继续。 2.确认切片重要参数

1)确认开始及结束 G 代码

W Repetiel-Host V1.5.0		
File View Config Printer Server Tools	Help	
Connect Load Toggle Log		Printer Settings Easy Mode Emergency Stop
3D View Temperature Curve		Object Placement Slicer Print Preview Manual Control SD Card
	Sitcar File Window Help Print Settings Print Settings Start G-code Casersal Casera Casera <	Slice with Slic3r Kill Slicing
Show in Log: Commands OInfos OWarnings 09:40:51.518 <slic3r> log4cplus:FBBOR No</slic3r>	OErrors OACK OAuto Scroll Clear Log (COpy appenders could be found for logger (AdSyncNamespace).	
09:40:51.518 <slic3r> log4cplus:ERROR PI</slic3r>	ease initialize the log4cplus system properly.	
09:40:51.518 <slic3r> log4cplus:ERROR No</slic3r>	appenders could be found for logger (AdSyncNamespace).	
Disconnected: delta	ence survaurate one solitobran alonem brobersi.	Idle
Disconnected, dents		



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💋 Slic3r			x
File Window Help			
Print Settings Filament Settings	Printer Settings		
G2S ▼ ⊟©	Start G-code		
☐ General	G28 ; home all axes G1 Z5 F5000 ; lift nozzle M84 S0	*	E
	End G-code M104 S0 ; turn off Extruder temperature M190 S0 ; turn off Bed temperature G28 X0 ; home X axis ;M84 ; disable motors	*	
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/		-

2) 确认喷嘴间距

💋 Slic3r			
File Window Help			
Print Settings Filament Settings	Printer Settings		
G2S (modified) ▼ 📙 🤤	Size		
General	Nozzle diameter:	0.4	mm
First First <t< td=""><td>Position (for multi-extruder printe Extruder offset:</td><td>rs) x: 0 y: -13</td><td>mm</td></t<>	Position (for multi-extruder printe Extruder offset:	rs) x: 0 y: -13	mm
	Retraction		
	Length:	2.5	mm (zero to disable)
	Lift Z:	0	mm
	Speed:	20	mm/s
	Extra length on restart:	0	mm
	Minimum travel after retraction:	2	mm
	Retract on layer change:		-
	Wipe while retracting:		-
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/		



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💋 Slic3r				×
File Window Help				
Print Settings Filament Settings	Printer Settings			
G2S (modified) 🔹 🔚 🤤	Size			
General	Nozzle diameter:	0.4	mm	
Vertical Structure 1	Position (for multi-extruder printe Extruder offset:	rs) x: 0 y: 13	mm	
	Retraction			-
	Length:	2.5	mm (zero to disable)	
	Lift Z:	0	mm	
	Speed:	20	mm/s	
	Extra length on restart:	0	mm	
	Minimum travel after retraction:	2	mm	
	Retract on layer change:	V		
	Wipe while retracting:			-
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/			

3) 如果您的是单挤出机

只需在切片设置里的打印机设置挤出机 2 改为 1 的就可以了

💋 Slic3r				
File Window Help				
Print Settings Filament Settings	Printer Settings			
G2S 🗸 📕 🤤	Size and coordinates			
General Custom G-code Extruder 1	Bed shape:			
₩ Extruder 2	0 mm ≡ Z offset:			
	Capabilities Extruders: 2			
	OctoPrint upload			
	Host or IP:			
	API Key:			
Version 1.2.9 - Remember to check for updates at http://slic3r.org/				



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💋 Slic3r				
File Window Help				
Print Settings Filament Settings	Printer Settings			
G2S 🔻 🗒 🥥	Size and coordinates			
☐ General ﷺ Custom G-code ▼ Extruder 1	Bed shape:			
	0 mm E			
	Capabilities Extruders:			
	OctoPrint upload			
	Host or IP: CBrowse			
	API Key:			
Version 1.2.9 - Remember to check for updates at http://slic3r.org/				

4)其他参数需要根据自己需求或打印模型结构等因素进行调整(这些需要您自 主学习及经验积累)

1.8 喷嘴调平

通过松紧上方 M6 螺母(贴着加热块上面的螺丝千万别松,否则会产生严重后 果),旋转螺杆调节高度,再拧紧螺母,使得两个喷头平齐。归位后,再下降到 刚好两个喷头一齐触碰到平台,说明喷头平齐。平齐后的 Z 轴喷头刚好触碰到 平台的高度为最终高度。输入高度到固件再上传,调平完成。

(单挤出机不需要进行此操作)

1.9 打印测试

三角洲打印机擅长打印旋转类平滑模型及薄壁模型,具有高速打印此类模型的特点,外观平整好看。复杂模型需要自己根据模型的结构进行切片的参数设置(速度、温度、支撑等比较重要),需要自主学习积累。建议先使用单头对简易模型



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进行打印测试,熟练打印后再进行双挤出打印及复杂模型打印。由易到难,这样可以让自己的 **DIY** 更加顺利自如。

第十章 自动调平功能使用

10.1 自动调平切片设置

尽管我们已经在三角洲上安装了自动调平探针,但是一般说来 sli3er 中没有 G-代码。所以我们需要添加 G29 命令。

第一步:在 Slic3r 中开启 G29 命令。

点击"切片"和"设置",等一分钟,切片窗口快速出现。

		Printer Settings	Easy Mode	Emergency Stop
Object Placement	Slicer	Print Preview	Manual Contro	1 SD Card
► Slic	e wit	h Slic3r		Kill Slicing
Slicer: Slic3r	-		-	& Manager
			🔹 Config	uration
Print Setting:	G2S			
Printer Settings:	G2S			-
Filament settings:				
Extruder 1:	G2S			-
Extruder 2:	G2S			-

第二步:选择打印设置--定制 G 代码 您可以从开始的 G 代码中看到,这里没有 G29



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💋 Slic3r		- O X	
File Window Help			
Print Settings Filament Settings	Printer Settings		
G2S V	Start G-code		
General	G28 ; home all axes G1 Z5 F5000 ; lift nozzle M84 S0	÷.	
🐺 Extruder 2			
	End G-code		
	M104 S0 ; turn off Extruder temperature M190 S0 ; turn off Bed temperature G28 X0 ; home X axis ;M84 ; disable motors	*	
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/		
Version 1.2.9 - Remember to check for updates at http://slic3r.org/			

所以您需要再 G28 后面添加 G29 来启动。并将 Z5 改成 Z50。

💋 Slic3r			×	
File Window Help				
Print Settings Filament Settings	Printer Settings			
G2S (modified) 🔹 🗒 🤤	Start G-code		ר ר	
General Custom G-code Fatruder 1 Extruder 2	G28 ; home all axes G29 G1 Z50 F5000 ; lift nozzle M84 S0	* *	E	
	End G-code M104 S0 ; turn off Extruder temperature M190 S0 ; turn off Bed temperature G28 X0 ; home X axis ;M84 ; disable motors	*		•
Version 1.2.9 - Remember to chec	k for updates at http://slic3r.org/			

省去通用的打印设置,点击"确定"键继续。



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🧕 Slic3r		23	J
<u>File Window H</u> elp			
Print Settings Filament Settings Printer Settings			
G2S (modified) Viat G-code			
General G28 ; home all axes G29 Fxtruder 1 Fxtruder 2 Save printer settings as: G2S OK Cancel End G-code	A v	E	
M104 S0 ; turn off Extruder temperature M190 S0 ; turn off Bed temperature G28 X0 ; home X axis ;M84 ; disable motors	~	-	
Version 1.2.9 - Remember to check for updates at http://slic3r.org/			

1.10 确认自动调平限位开关状态

在进行自动调平前,我们需要确认限位开关的状态。在此之前需要查看限位开关 接线是否连接为1和3接口(左侧两个接口)。

1. 打印机归位

2. 放下自动调平探针

3. 发送 M119 命令

先发送 M119 命令检查限位开关



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您能看见 Repetier Host 底部的一下信息

```
Reporting endstop status
x_max: TRIGGERED
y_max: TRIGGERED
z_min: open
z_max: TRIGGERED
```

*限位开关 X-Max, Y-Max, Z-Max:
触动限位开关,就会显示 triggered;
没有触动限位开关,就会显示 open。
探针 Z-min:
放下探针,就会显示 open。
勾住探针,就会显示 triggered。



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如果状态正常,我们就能继续自动调平装配。

1.11 确认 Z 探针的 offset

您可以根据这一步骤计算 Z_PROBE_OFFSET 数值: 放下探针。归零后缓慢移动打印头向下运动,当探针快接触打印平台时降低移动 速度,以 0.1mm 或者 0.01mm 下降,当听见限位开关触动的声音时,您就能在 Repetier host 上获取坐标。就我而言,Z 轴坐标为 1.2mm。 数据添加到接下来的设置中。

#define X_PROBE_OFFSET_FROM_EXTRUDER -19
#define Y_PROBE_OFFSET_FROM_EXTRUDER -11
#define Z_PROBE_OFFSET_FROM_EXTRUDER -1.2
然后优化固件中的Z 探针相位差,并重新上传。

1.12 自动调平校准

G29 命令控制探针自动调平,但像这是一台 DIY 3D 打印机,您可能需要手动辅助它完成调平。

1.您需要用手放下自动调平的探针,归零。
 为了防止打印床刮伤,现在不要急于测试自动调平命令。



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2.发送 G29 命令(发送 G29 命令之前必须归位,否则会出错)



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3.自动调平探针将会探查之前设定的方形探测区域,探测之后,打印头会上升一 点然后停止工作。

4.用手把探针打上来。



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在开始打印前,校准工作需要多次进行。您可以参考这一指导。

1.用手放下探针,发送 M119 命令检查 Z-min 有没有打开。
 2.发送 G28 命令到打印机的自动归位。



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3. 发送 G29 命令开始自动调平。

*可能出现碰撞,请随时准备切断电源。

4.发送 G29 命令后,打印头将会往下移动,击中设定好的探测点。探测后,打印 头会上升。

5.调平后,打印头会上升、停止,意味着调平完成。您应该把探针归位。(因为 探针上的弹簧有一点紧,为了更好完成,您可以用手指把探针往上推)

6.发送 G1X0Y0 命令,将打印头移动到(0,0)。

7.点击手动控制上的 Z 图标,将打印头往下移直到刚好碰到打印床。发送 M114 命令,获取现在的坐标。如果坐标是(0,0,0),那么自动调平就成功完成了。如果 不是,您需要优化

Z_PROBE_OFFSET_FROM_EXTRUDER,比如:将-0.3 降低到-0.5,然后再上传固件,重新测试。

8.您可以需要测试不止一次,但是为了打印出更好的东西,请耐心完成。

一旦自动调平完成,用手勾住探针。然后您就可以使用自动调平打印你的一件物品啦。

请耐心完成校准,如需任何帮助,请将问题发到我们的论坛<u>forum</u>。我们的技术 支持将会帮助您解决。