Sanguinololu Users Manual

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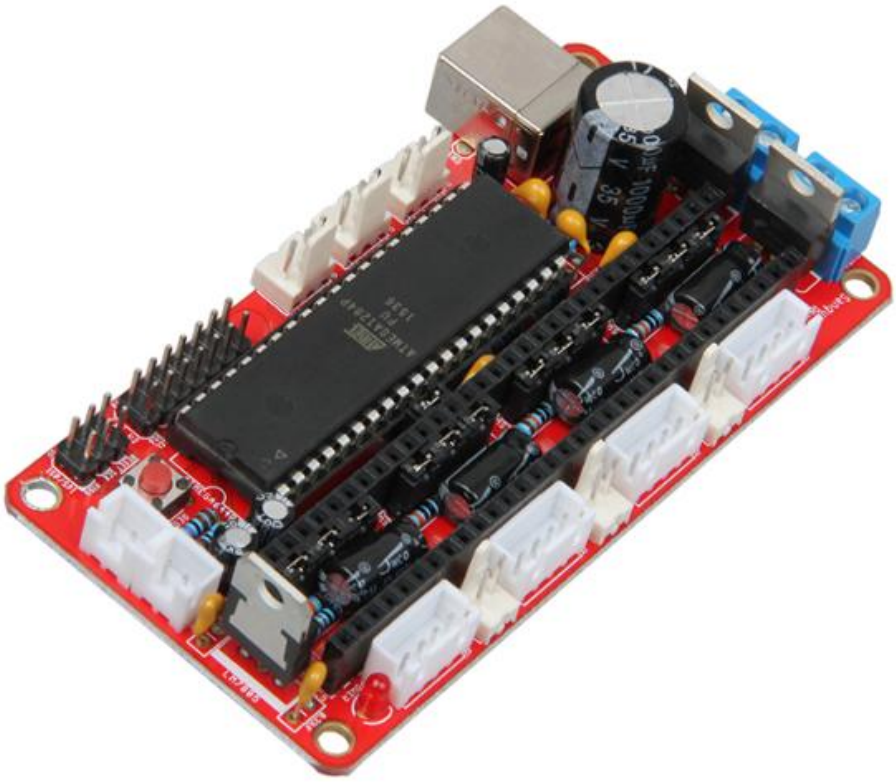


Copyright Declaration

Technical Support

If you are interested in the technology of 3 D printing, flight control and U-home, welcome to Geeetech, we have series of made-up products, main boards, modules and a variety of peripherals for you. Or if you are looking for relevant information or technical support, please login our forum where you can find anything you want about open source. To know more about our new products, please visit www.geeetech.com, we will serve you wholeheartedly.

1 Introduction

Sanguinololu is highly integrated with all the functions that a 3D printer needs. It is of high capacity-price ratio and support Reprap style printer and other CNC devices (Computer numerical control devices). The 4 stepper drivers are completely compatible with A4988 and DRV8825. Sanguinololu adapts developer friendly expansion port supporting I2C，SPI，UART，as well as ADC pins. All 14 expansion pins are reserved to be GPIO as well. Power supply for sanguinololu is also flexible; users can choose ATX-4 power input or the 2pin connector to supply.

Features:

1. Support multiple communication configurations :

   UART1(RX TX)、I2C(SDA SCL)、SPI(MOSI MISO SCK)、PWM PIN(one)、ADC(five)

2. Support multiple power configurations:

   Main board supplied by 5mm screw terminal, and optional 4pin ATX connector: 7v-12v

3. Adapts Atmel's ATMEGA1284P - ATmega1284 drop-in compatible. Currently, we use 1284P, the bootloader has been burned before shipping, and users can put it into use after burning the programming code.

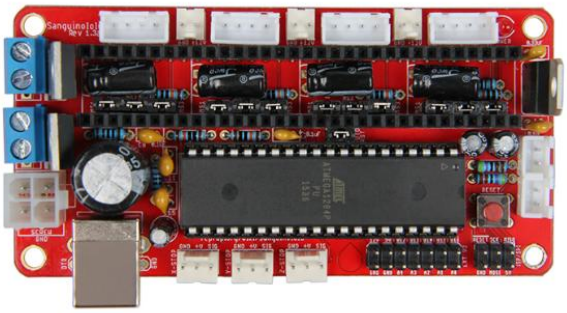
4. Adapts FT232RL on-board for USB connectivity, which is an industrial USB-serial chip, ensuring the stability and convenience of installation.

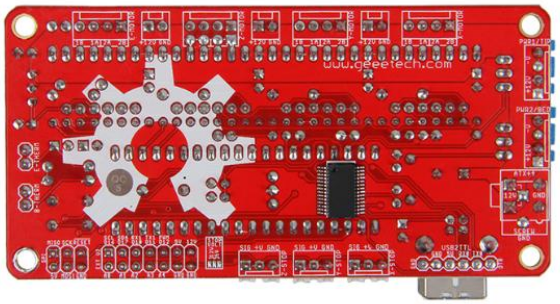
5. Selectable power supply for end stops (5v or12v).

6. With 4 stepper driver on board (Z supports 2 stepper motors)

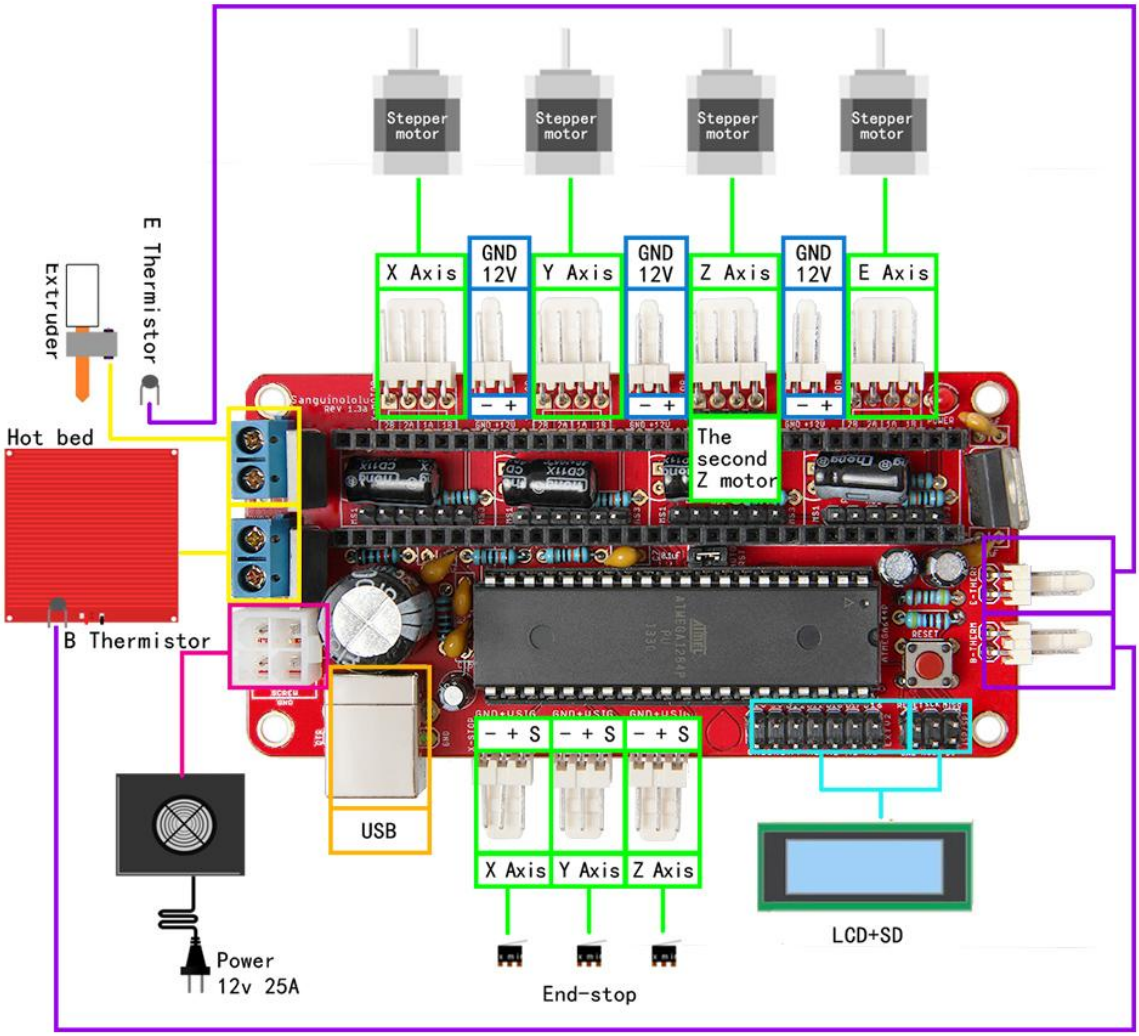
7. 2 N-MOSFETs for extruder/bed, or other peripheral device

8. Supports LCD 2004 module, available for off-line printing.





1.1 Overview and Hardware Resources



1-1

Size：100mm x 60mm

Weight：73g

1.2 Software Resources

Compiling enviroment：Arduino IDE

Firmware：Marlin

PC software：printrun　　Repetier-Host

1.3 Source

Arduino IDE：http://www.geeetech.com/wiki/index.php/Sanguinololu#Software_Resources

Marlin：http://www.geeetech.com/wiki/index.php/Sanguinololu#Software_Resources

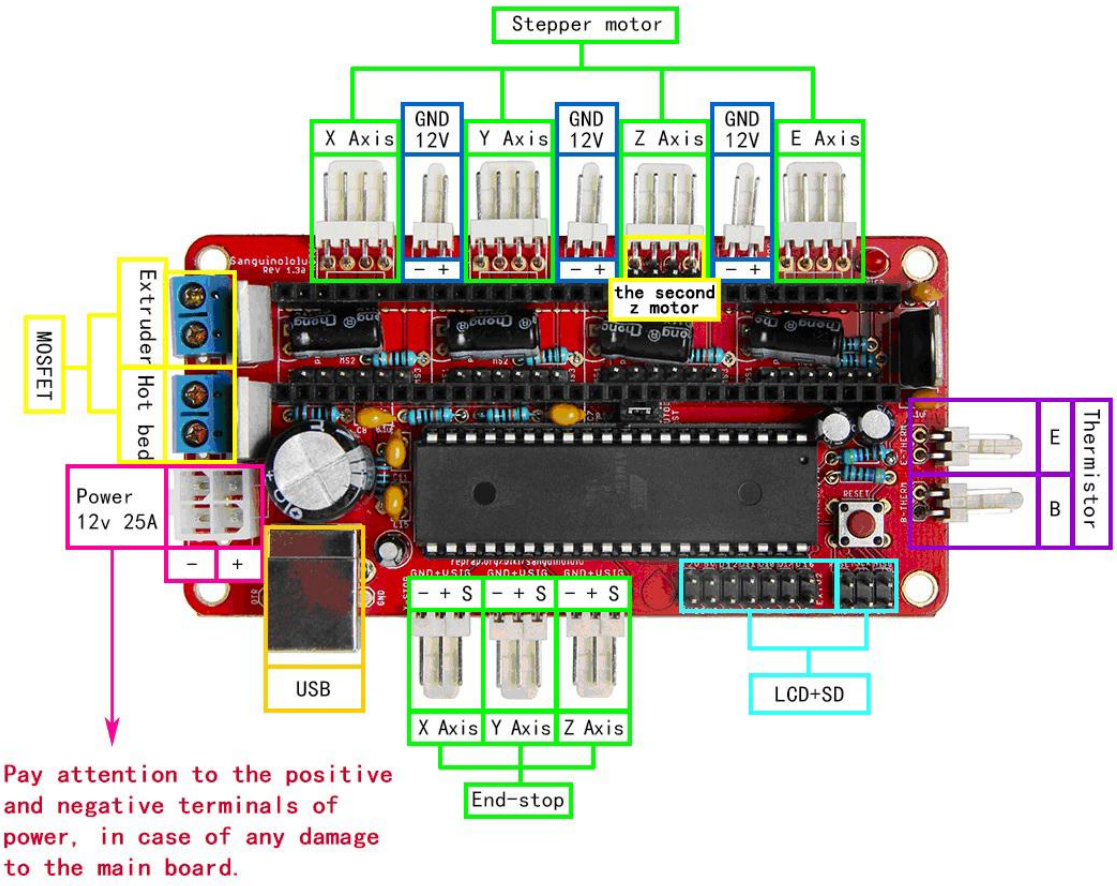
printrun：http://www.geeetech.com/wiki/index.php/Sanguinololu#Software_Resources

Repetier-Host：http://www.geeetech.com/wiki/index.php/Sanguinololu#Software_Resources

Sanguinololu drive：　http://www.geeetech.com/wiki/index.php/Sanguinololu

2 Interfaces

2.1 Interface Layout



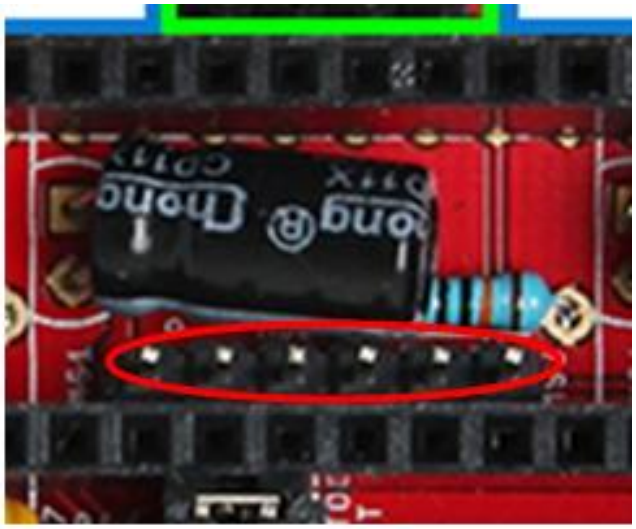
2.2 Interface specifications

1. 2 ADC interfaces for thermometry: one for extruder and another for hotbed.
2. 3 PWM to control extruder, hotbed and fan.
3. 3 end stops for x/y/z axis(mechanical, optical or hall sensor)

2.3 Jumper Instruction

2-2

Boot jumper cap: do remember to put the jumper cap, or it will affect the connection with PC(the system can't detect the corresponding COM port) and the upload of firmware.



2-3

Step size of stepper driver (A4988)

jumper		Yes/No	stepsize
ms1	ms2	ms3	
no	no	no	fullstep
yes	no	no	halfstep
no	yes	no	1/4step
yes	yes	no	1/8step
yes	yes	yes	1/16step

Step size of stepper driver (Drv8825)

jumper		Yes/No	step size
ms1	ms2	ms3	
no	no	no	full step
yes	no	no	half step
no	yes	no	1/4 step
yes	yes	no	1/4 step
no	no	yes	1/16 step
yes	no	yes	1/32 step
no	yes	yes	1/32step
yes	yes	yes	1/32step

3 Development Environment setting

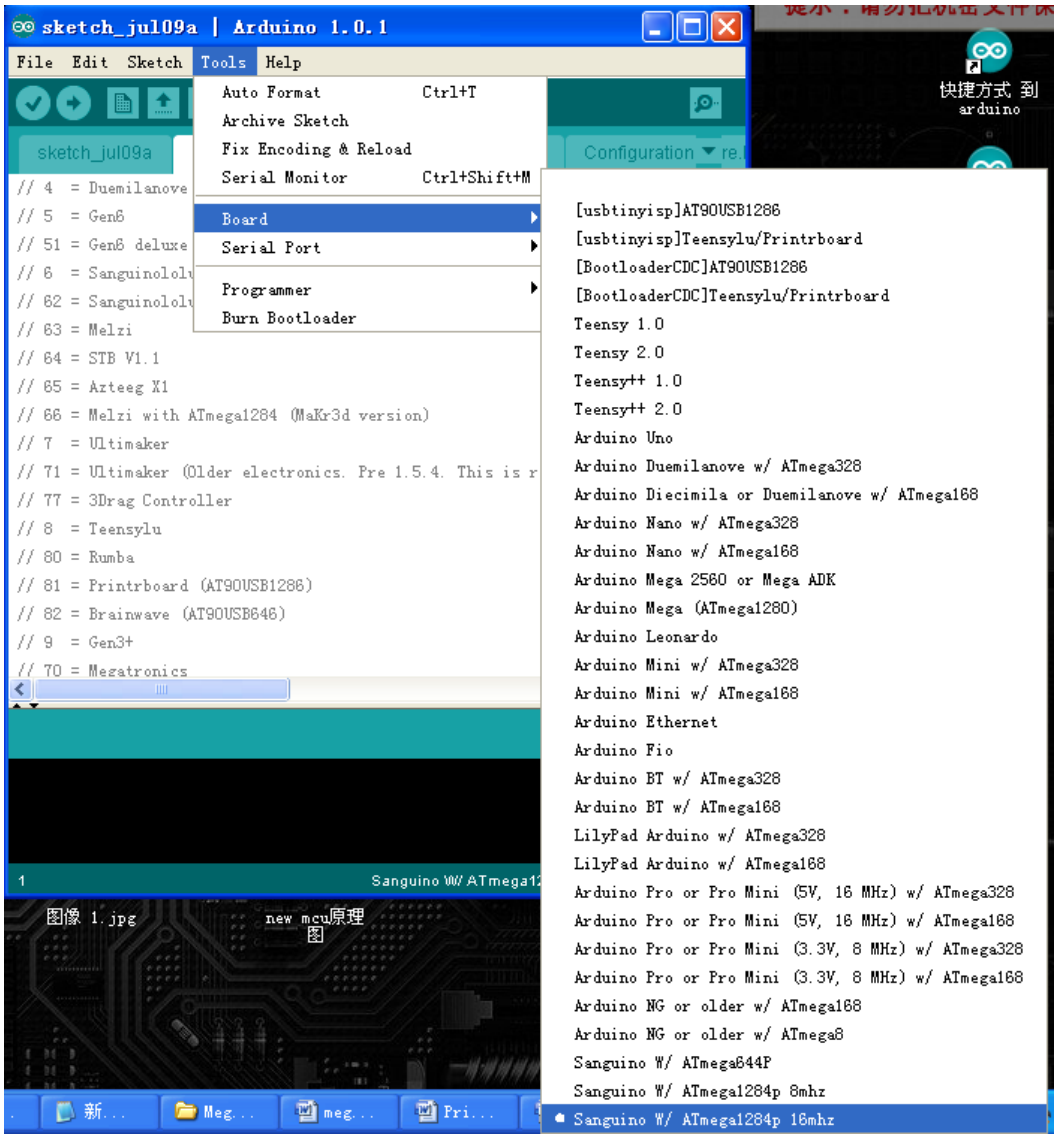
3.1 Interface Connecting and Setting

3-1

Pay attention to the Plus-n-Minus of power supply, in case the inverse connection may cause damage to the board.

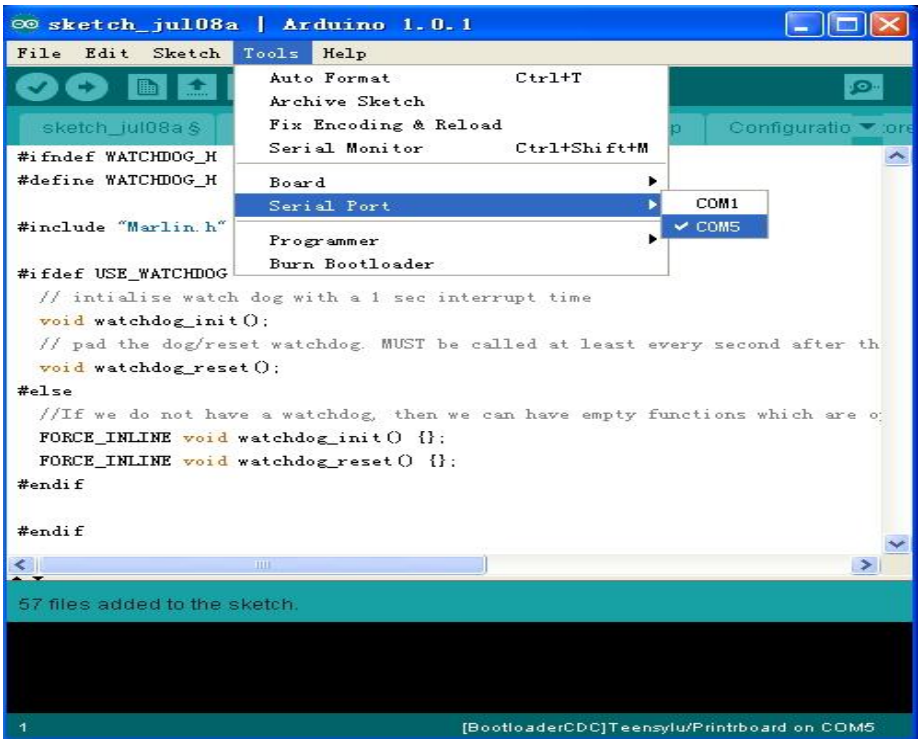
2.4File Burning

Windows users need install driver before uploading. The board: Tools > Board > sanguino W/ATMEGA1284P 16, as shown below.



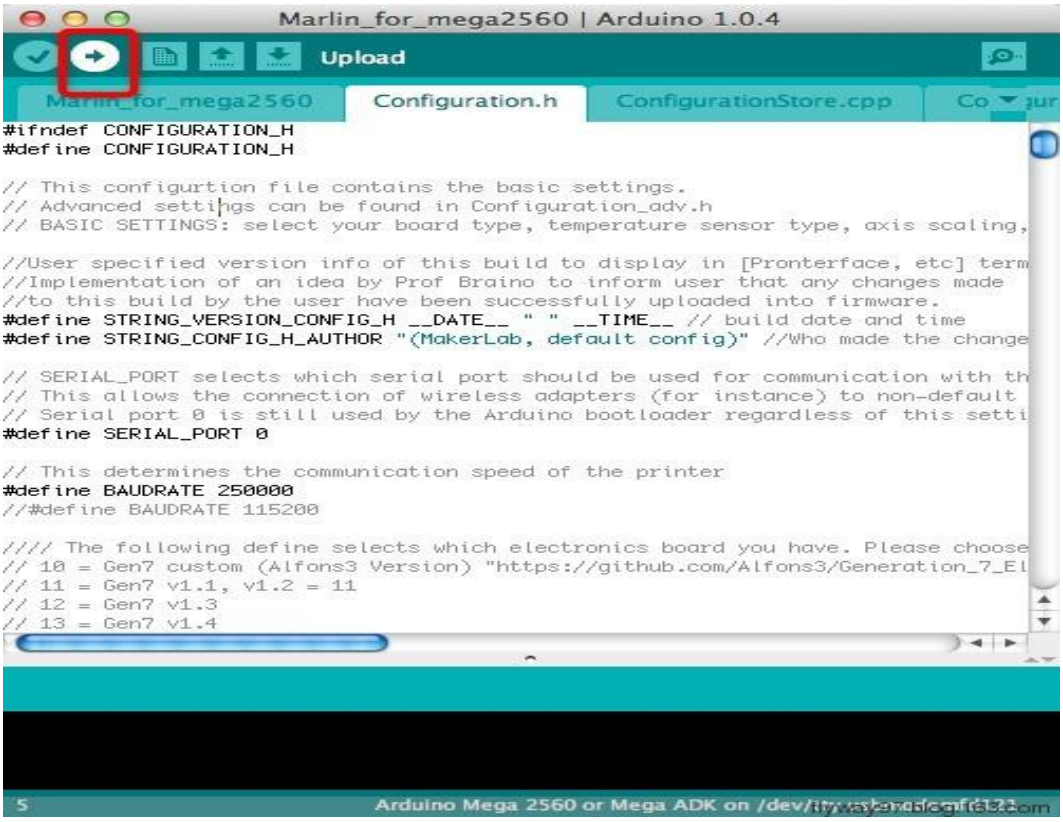
3-2

Configuring serial interface: Tools > Serial Port > the corresponding COM Port of Sanguinololu is usually the last one. As shown below



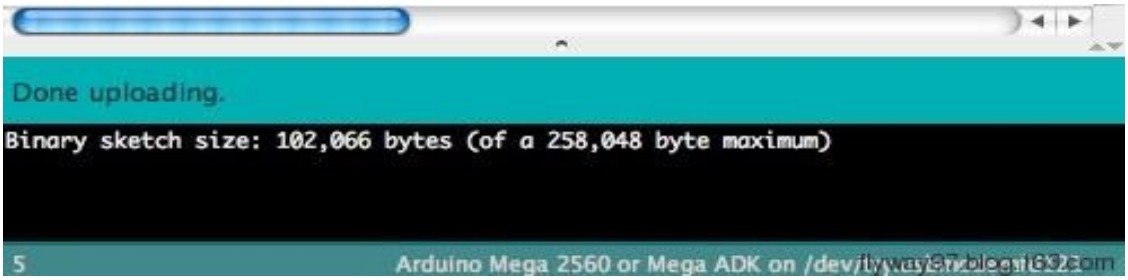
3-3

Click the "check ( )" button to check if it is right and then click the " " button to upload firmware, as shown below.



3-4

Upon uploading, IDE will display the rate of progress; when done uploading appears, the uploading process succeeded.



3-5

After uploading, you can go on to the next step. If you cannot upload, check the dialog box below to identify the problem and solve it. The common mistakes are the wrong select of type of board or serial port etc.

2.5Software Setting

Arduino IDE Installation

Move the file sanguine into Arduino> hardware, reopen IDE.

Windows will prompt that a new USB device, named FT232R USB UART was found when connecting USB with Sanguinololu to the PC.

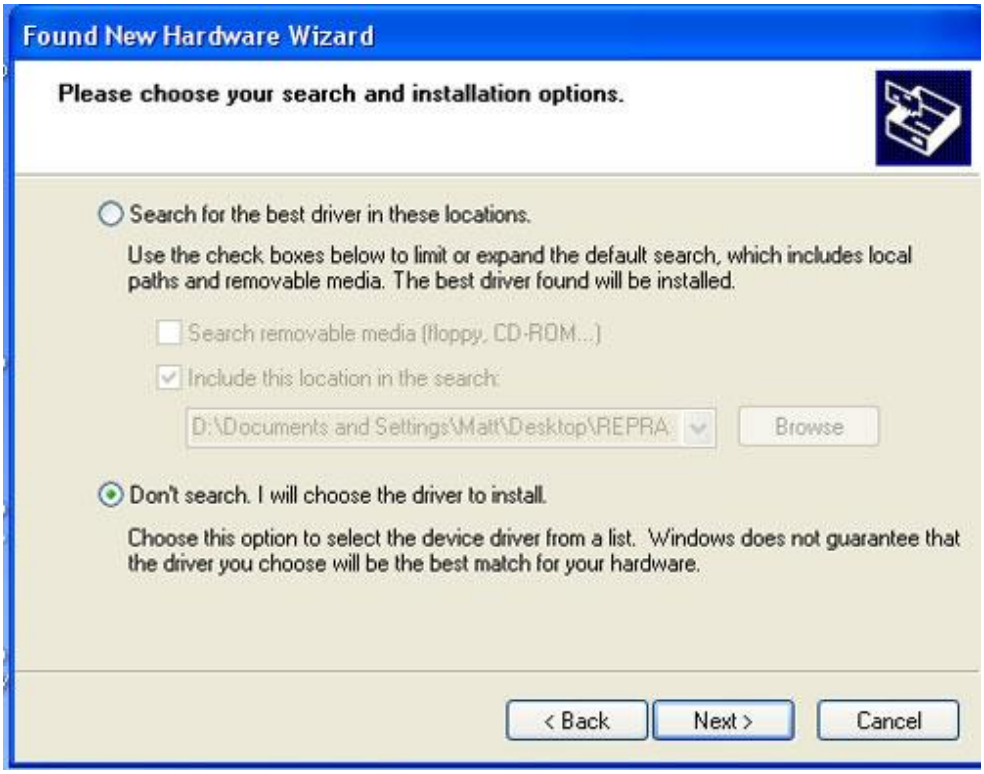
Then, windows will open the dialog box “found new hardware wizard”, check “no, not this time”, then click “next” to continue.

3-6

Check “install from a list or specific location (advanced)”, then click “next”.

3-7

Specify “drivers” in Arduino 1.0.1 installation directory to install driver.



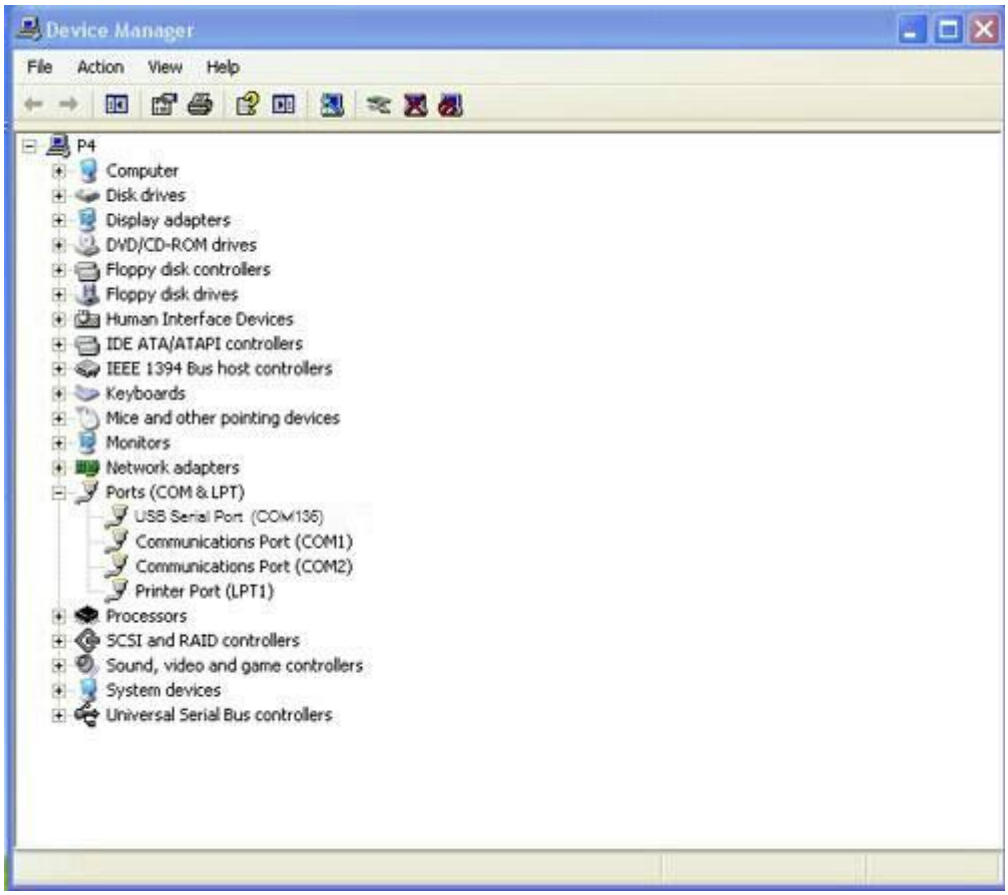
3-8

If everything goes well, windows will install the corresponding driver.

The graph below shows installation completed.

3-9

Now, you can find the corresponding Sanguinololu device in device manager of windows.



3-10

4 Get Started

Sanguinololu is the CPU of a 3D printer, manipulating the whole process of printing. Sanguinololu can't be put in use directly without uploading firmware.

1. Firmware uploading- marlin.

2. Setting parameters of the firmware

The parameters that need setting are as below, for those not mentioned just leave them as default.

#define BAUDRATE 250000

This parameter is for the baud rate of serial port. Note: a successful communication can be realized only when the Baud rate of upper computer is identical with that of Firmware. The Baud rate is not

set in random. The common Baud rate are: 2400 , 9600 , 19200 , 38400 , 57600 , 115200 , 250000. The last three are frequently used for 3D Printer.

#define MOTHERBOARD 62

This parameter is set for board type. 3D Printer has many types of main board, and the settings of IOs are different, therefore, the parameter has to correspond to the type of your board, or it can't operate normally. The parameter of Sanguinololu should be 62(single- nozzle). For other board, you can refer to the annotation on the board.

#define TEMP_SENSOR_0 3

#define TEMP_SENSOR_BED 3

The two parameters are set for the type of temperature sensor respectively. They are the critical parameter to check if the sensor read temperature correctly. The printer can't operate normally, even has potential risk (damage the device and even worse). You must modify depending on the temperature sensor you use.

#define EXTRUDE_MINTEMP 170

This parameter is set to avoid potential risks when the extruder operates before reaching the rated temperature. If you use other 3D Printer, such as printer to make Chocolates, 45℃ is appropriate, so that the parameter configured to a lower value(such as 40℃).

const bool X_ENDSTOPS_INVERTING = true;

const bool Y_ENDSTOPS_INVERTING = true;

const bool Z_ENDSTOPS_INVERTING = true.

The three parameters are set for the end stops of three axes. If the configuration is true, the end stop outputs 1 in default condition, and outputs 0 when triggered. That is to say, mechanical end stop should connect to the NO (normally open) contactor. If it is connected to the NC (normally closed), true should be changed to false.

#define INVERT_X_DIR false

#define INVERT_Y_DIR true

Mistakes are often made in the above two parameters. The parameters are different for different machinery. In principle, the origin should be at lower-left corner of the print platform (origin: [0, 0]), or at up-right corner (origin: [max, max]). Only in this way will the printing be correct, otherwise, the printing is the mirror image of one axis which is not what expected.

#define X_HOME_DIR -1

#define Y_HOME_DIR -1

#define Z_HOME_DIR -1

If the position of the origin is the minimum, the parameter is -1; if it is the maximum, the parameter is 1.

#define X_MAX_POS 205

#define X_MIN_POS 0

#define Y_MAX_POS 205

#define Y_MIN_POS 0

#define Z_MAX_POS 200

#define Z_MIN_POS 0

These parameters are crucial to the printing size. Fill in parameters by reference to the coordinate graphs. It is important to note that the origin is not the printing center and the real printing center usually lies at [(x.max - x.min)/2, (y.max -y.min/2)]. The coordinate of central will be used in the slice tool. The printing center's coordinate must correspond to the parameter

configuration, or it will print to the outside of the platform.

#define HOMING_FEEDRATE {50*60, 50*60, 4*60, 0}

The parameter means the homing speeds (mm/min). This parameter can be set as default if you use the x-axis and y-axis adopt synchronous belt drive and z-axis adopts screw drive.

#define DEFAULT_AXIS_STEPS_PER_UNIT {85.3333, 85.3333, 2560, 158.8308}

These parameters are crucial to the printing size. These parameters indicate the pulse the axis need when operating 1mm. they are corresponding to x, y, z axis and extruder respectively. In most cases these figure should be calculated by yourself, you can refer to: http://calculator.josefprusa.cz/#steppers.

So far, the commonest parameters have been configured and the printer can work now. In addition, if the 2004 LCD needs verifying, you should delete the "//" from "//#define REPRAP_DISCOUNT_SMART_CONTROLLER" to ensure the normal working.

5 FAQS

1. The LED doesn't light when connected to USB and 5v external power supply.

① LED is broken ②LED is not well welded ③ the power supply doesn't work.

2.How to solve it if the driver installation failed?

Click here to reinstall the driver（http://www.geeetech.com/wiki/index.php/Sanguinololu）in Arduino IDE/hardware

3. What type of printer can Printrboard be applied to?

Solidoodle，printrbot，and most type of reprap（with 2 stepper motor drivers for Z axis and single extruder）