



# Makerbase

Guangzhou Qianhui Information technology Co., Ltd.

SGEN\_L Motherboard Datasheet

Makerbase

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Document Version 1.0

Release Date: June 11<sup>th</sup>, 2019

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## Version Update

Version	Modification time	Modification	Remark
V1.0	11 <sup>th</sup> June, 2019	Original version	

Makerbase

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## I Overview

MKS-SGen\_L is a 3D printer ARM motherboard developed by Makerbase. It uses a 32-bit Cortex-M3 LPC 1768 processor, whose running frequency is up to 100 MHz. It is compatible with Smoothieware and Marlin 2.0 firmware. It can be used with external and direct-plug drivers, in which, direct-plug driver is compatible with various modes (uart, spi, etc.). it can be connected to multiple LCD screens and MKS series of touch screens. It is a type of motherboard with good performance, high quality and fair price.



## II Features

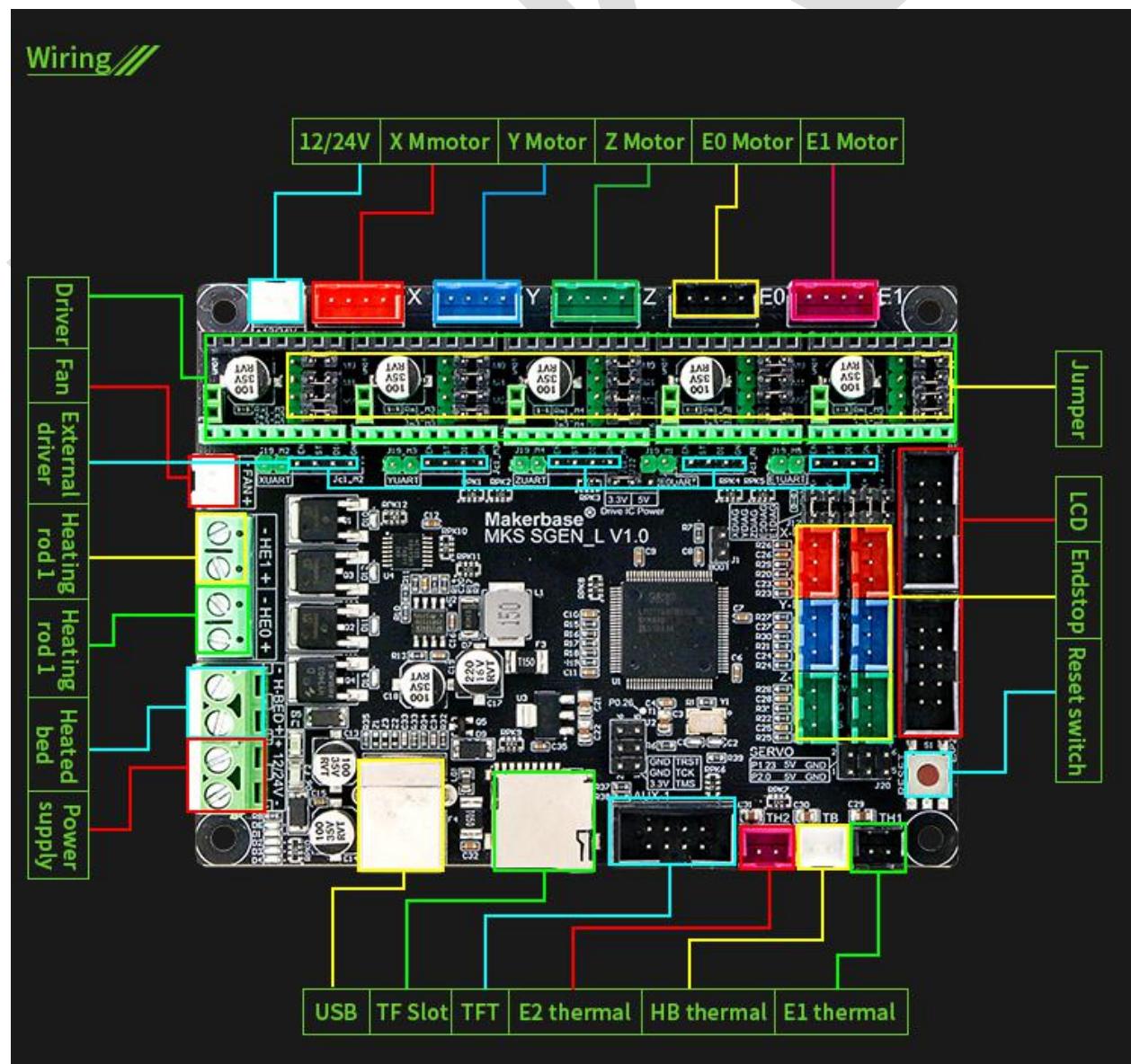
1. Adopt 32-bit Cortex-M3 LPC 1768 chip, 100MHZ frequency, strong computing power, performance greatly improved.
2. In-line and external driver port, more expandable and selective.
3. Compatible with multiple drivers and special modes (TMC2208 UART mode, TMC2130 SPI mode, etc.), dedicated port reservation, convenient for wiring settings .
4. Support lots of open-source firmwares, including smoothie-ware and Marlin V2.0.
5. Use high-quality PCB, and the corresponding pins of each interface are marked with silk screen for easier identification and modification.
6. Using a dedicated power chip, support 12V-24V current input.
7. Support the MKS LCD12864, MKS MINI12864 and other controller boards developed by Makerbase.
- 8.Compatible with all of MKS TFT touch screens.

### III Wiring and size diagram

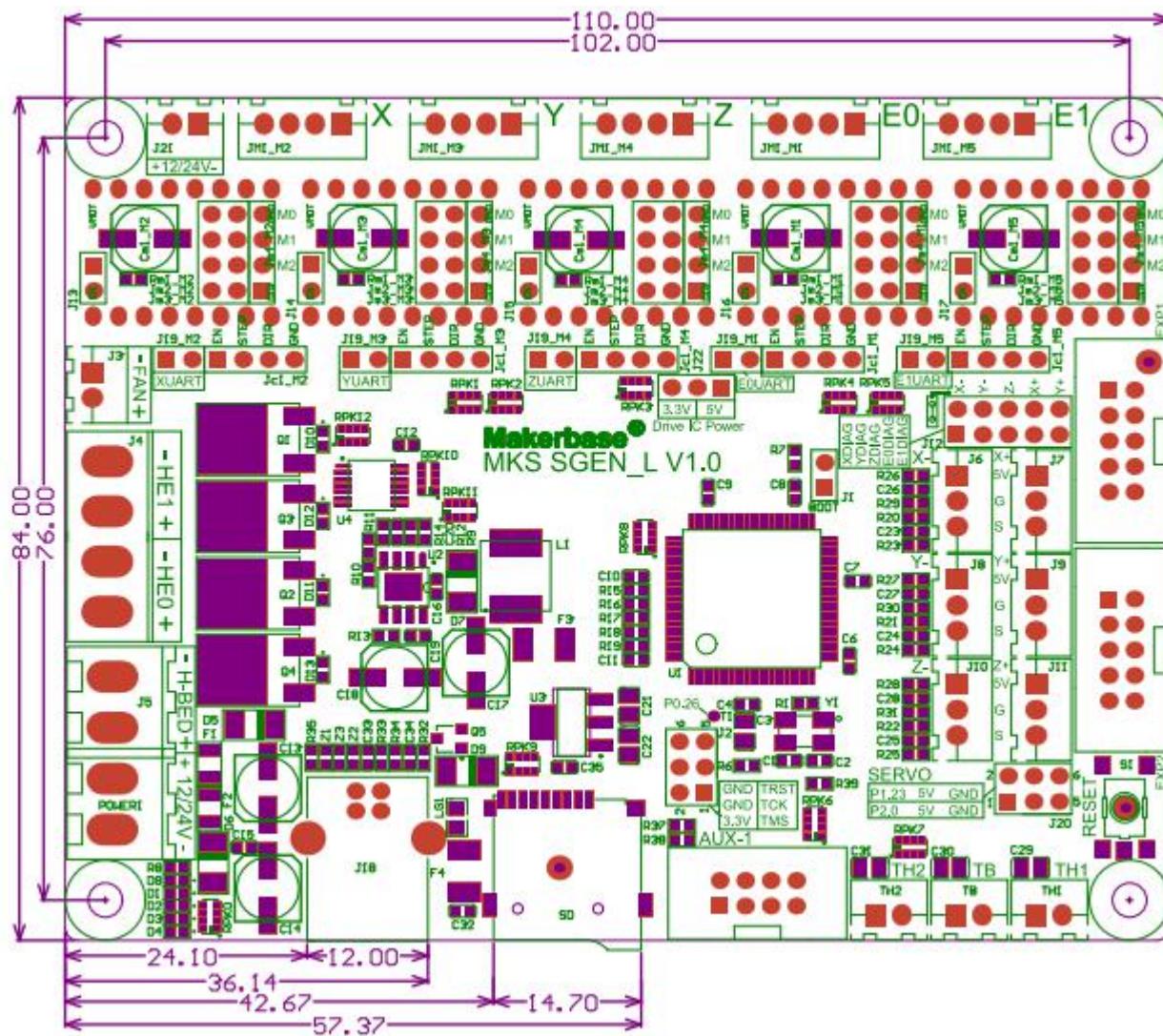
1, MKS SGen-L



2、MKS SGen\_L wiring



### 3、MKS SGen\_L installation diagram



### 4、MKS SGen\_L pin interface diagram



## IV Instruction

### 1,The way to get firmware

- 1.1 Get firmware from customer service staffs or technicians
- 1.2 Download firmware on Makerbase QQ group
- 1.3 Website: <https://github.com/makerbase-mks?tab=repositories>

### 2. The way to update firmware

Including smoothieware and Malin

#### 2.1 Smoothieware update

2.1.1 Copy the update program file to the TF card root directory, including:

1. firmware.bin
2. file config.txt

2.1.3 Insert the TF card into the card slot and power it on again. The new firmware will be upgraded automatically.

After the update is successful, the SD card file will be renamed to “firmware.cur”.

2.1.3 After updating the firmware, the indicator in the upper left corner of the motherboard is normally D1 D4 D7 is always on, and D2 D3 is blinking;

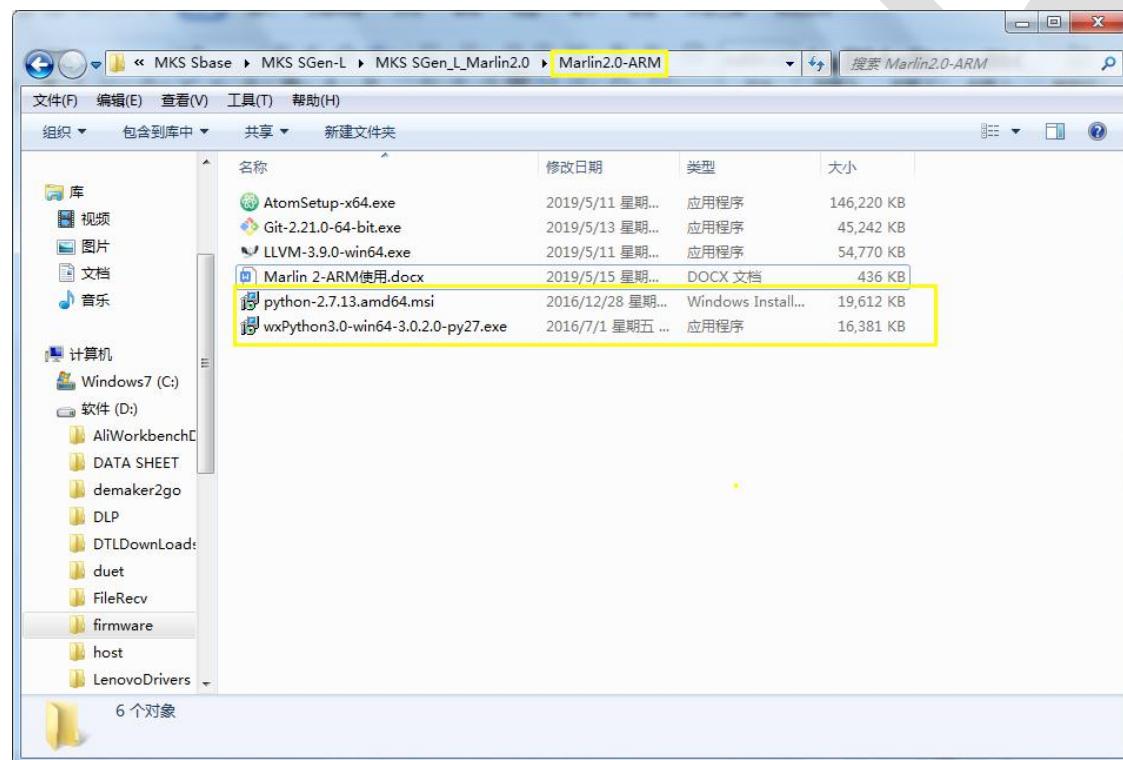
## 2.2 Marlin2.0 update

The way to update Marlin 2.0 firmware is similar to smoothieware. Copy the firmware.bin file to TF card and update the motherboard. After updating, The file will become the firmware.CUR file.

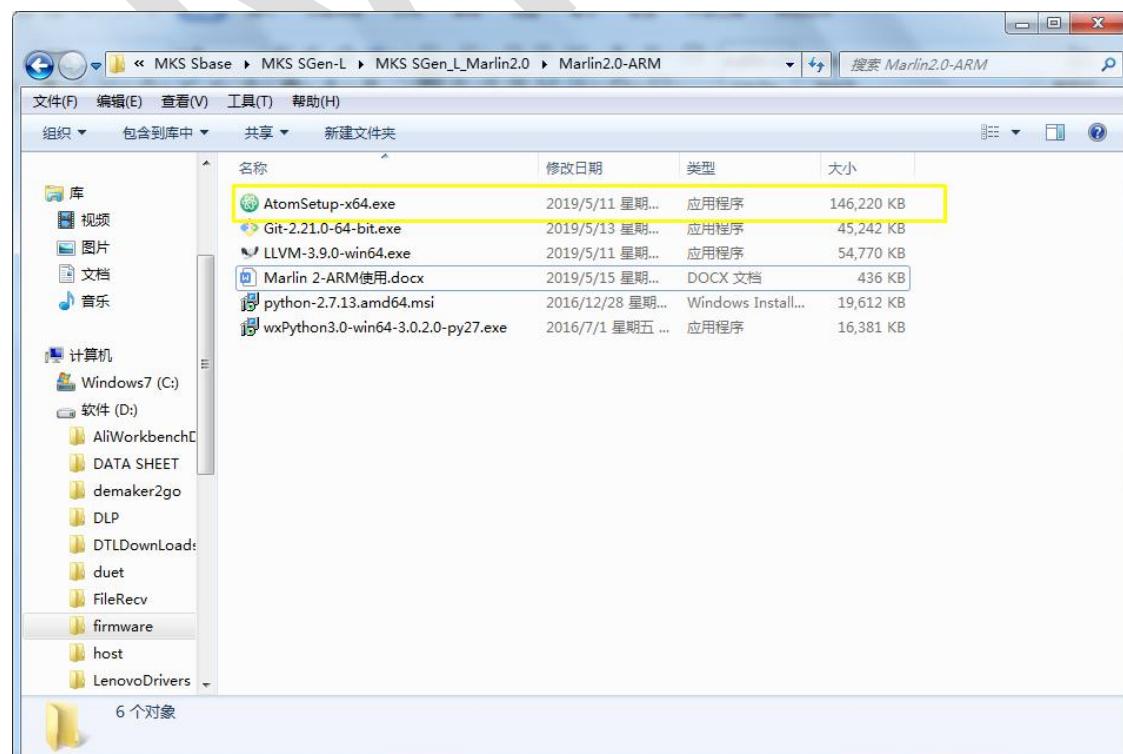
Not the same as smoothieware, marlin 2.0 firmware configuration cannot be modified via “config file”. updating parameter configuration of marlin firmware, must create a new “firmware.bin”file first.

### 2.2.1 Compilation environment built and “bin file” creation

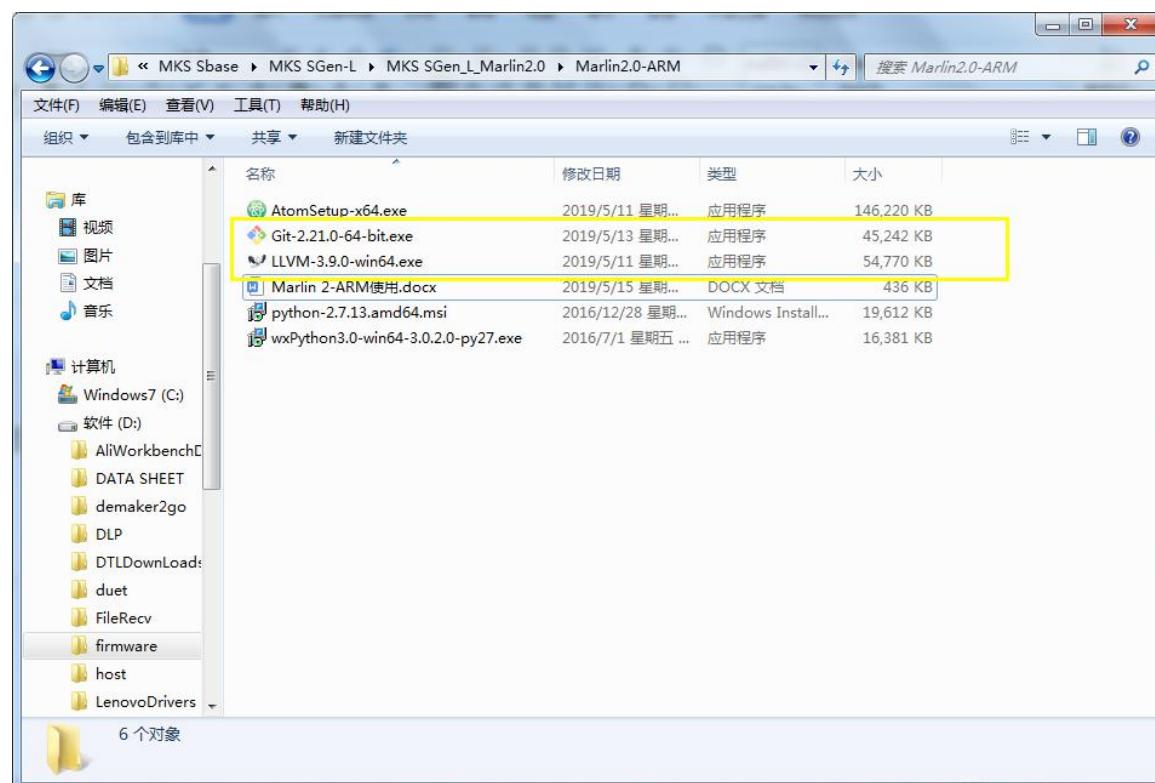
1. Download zipped file of firmware and software from website.
2. Open “marlin2.0-ARM” folder, install “python-2.7” and “wxPython3.0”. click on the zipped file to install, as the following figure shows



3. Atom installation



#### 4. Install Git-2.21.0 and LLVM (only support 3.9.0)

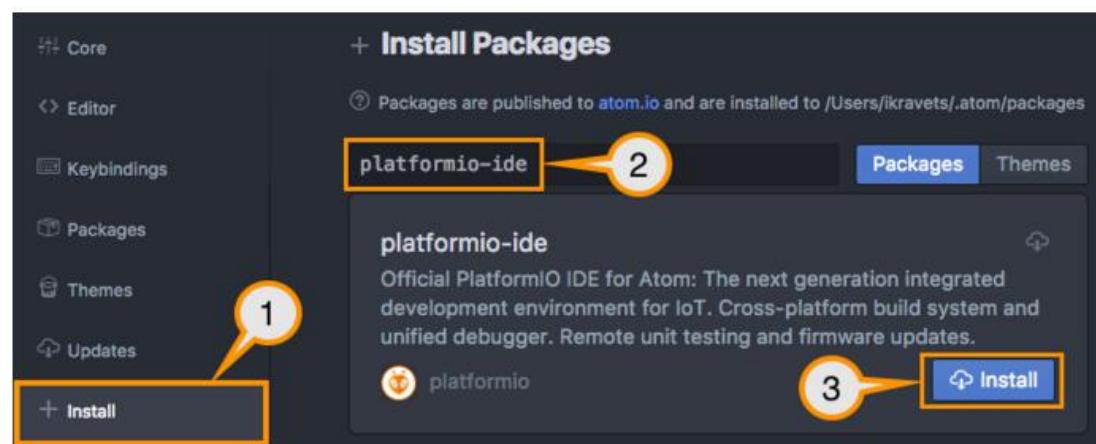
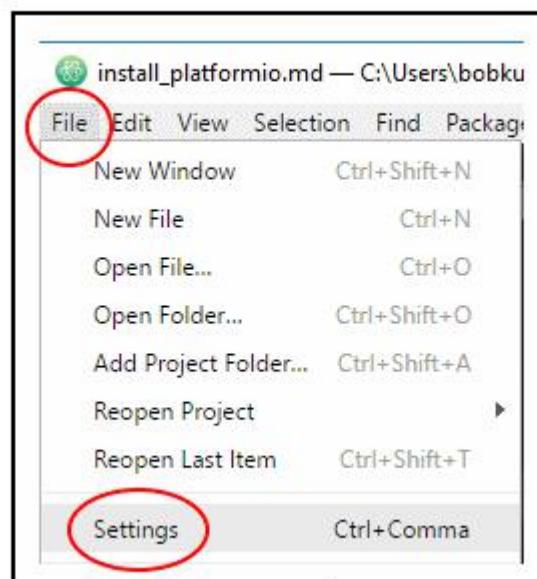


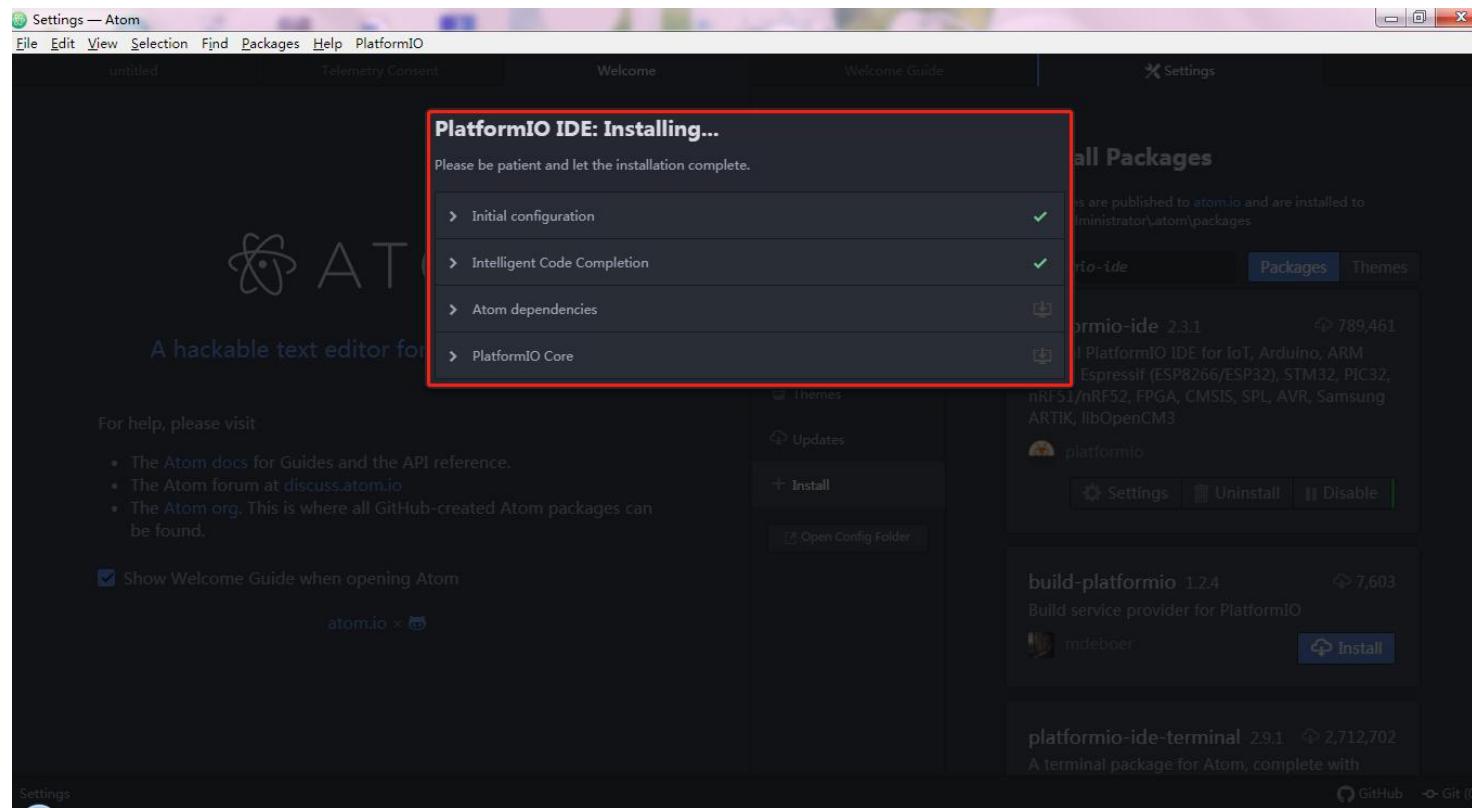
#### 5. Atom software and plug-in installation

After installing Atom, open Atom, open File→Settings→install, it needs to install 2 plug-ins

Search “platformio\_ide” to install.

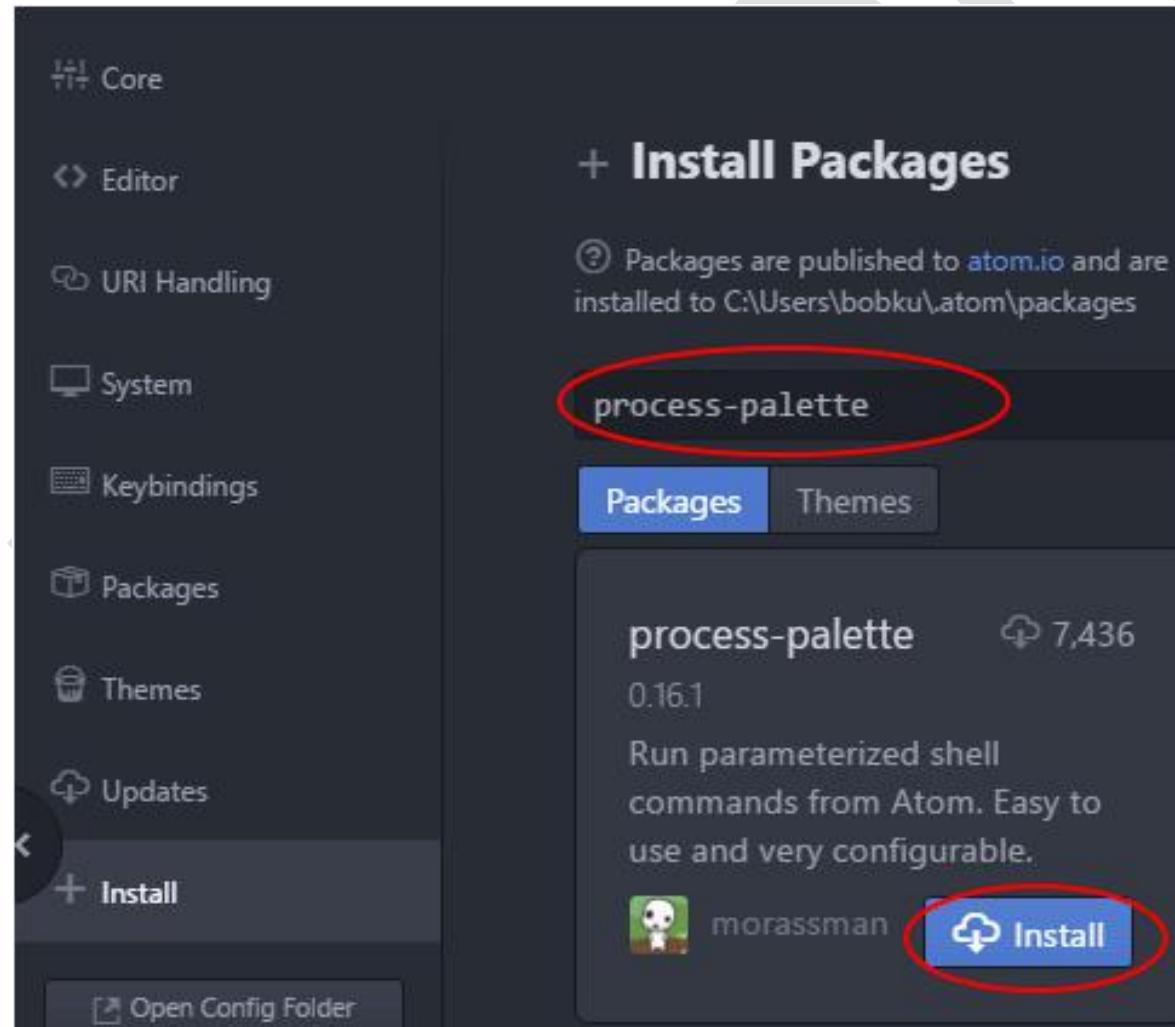
##### ▪ Windows: Click File then click Settings





Waiting for installation to complete

Search “process-palette” to install.



After the installation is completed, import the marlin 2.0 source code for modification and compilation.

After that, the compilation environment is built.

## 6. Compilation of “Bin” file

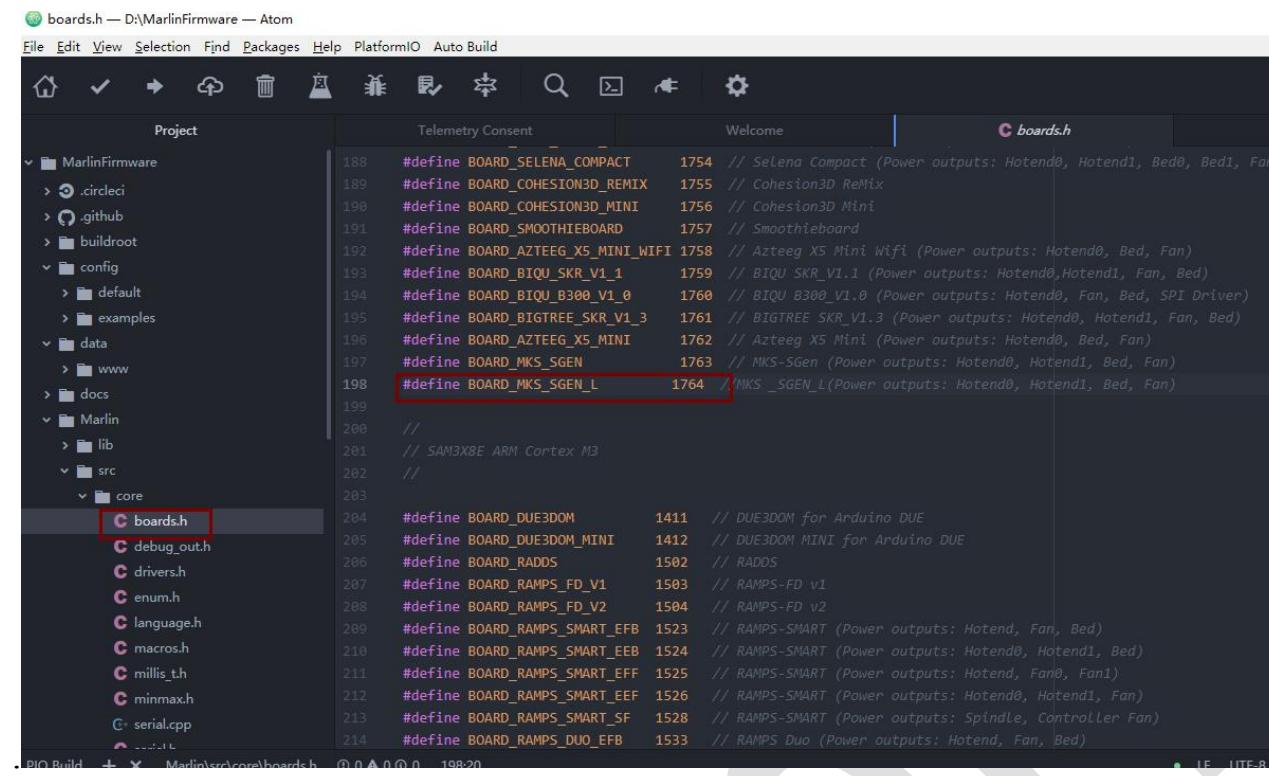
### 1, the input of firmware engineering

(The file path of the Marlin2.0 firmware cannot be Chinese, the recommended path is not too long, otherwise the compilation error) Click File→Open Folder to open the marlin2.0 firmware folder and import the marlin firmware.

### 2, motherboard model definition

Open "board.h", the motherboard type that can find MKS\_SGEN\_L is defined as "BOARD\_MKS\_SGEN\_L".

Download the version of marlin2.0 and find the corresponding motherboard type in the board.h file



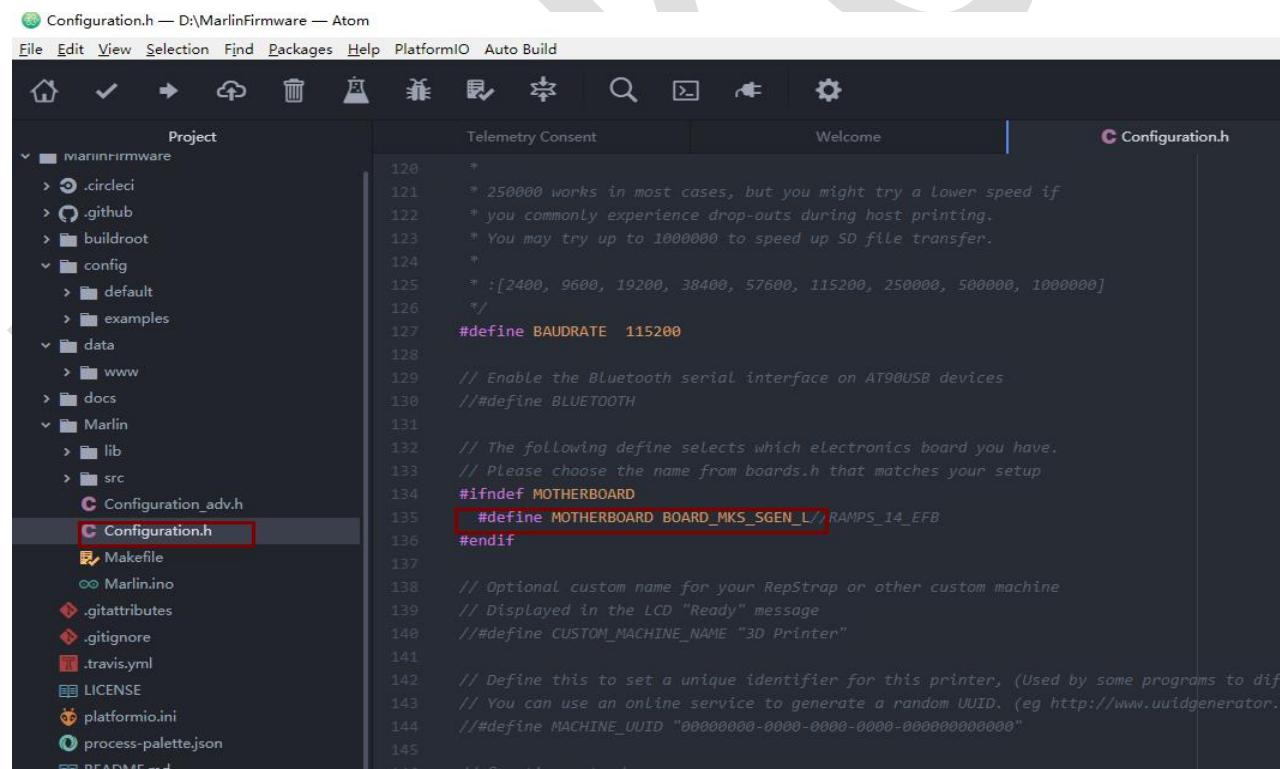
```

boards.h — D:\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

Project Telemetry Consent Welcome C boards.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
    default
    examples
  data
    www
  docs
  Marlin
    lib
    src
      core
        C boards.h
        C debug_out.h
        C drivers.h
        C enum.h
        C language.h
        C macros.h
        C millis_th.h
        C minmax.h
        C serial.cpp
        C util.h
  PIO Build + Marlin\src\core\boards.h @ 0.0.0.0_19820
188 #define BOARD_SELENA_COMPACT 1754 // Selena Compact (Power outputs: Hotend0, Hotend1, Bed0, Bed1, Fan0)
189 #define BOARD_COHESION3D_REMIX 1755 // Cohesion3D Remix
190 #define BOARD_COHESION3D_MINI 1756 // Cohesion3D Mini
191 #define BOARD_SMOOTHIEBOARD 1757 // Smoothieboard
192 #define BOARD_AZTEEG_X5_MINI_WIFI 1758 // Azteeg X5 Mini WiFi (Power outputs: Hotend0, Bed, Fan)
193 #define BOARD_BIQU_SKR_V1_1 1759 // BIQU SKR_V1.1 (Power outputs: Hotend0, Hotend1, Fan, Bed)
194 #define BOARD_BIQU_B300_V1_0 1760 // BIQU B300_V1.0 (Power outputs: Hotend0, Fan, Bed, SPI Driver)
195 #define BOARD_BIGTREE_SKR_V1_3 1761 // BIGTREETECH SKR_V1.3 (Power outputs: Hotend0, Hotend1, Fan, Bed)
196 #define BOARD_AZTEEG_X5_MINI 1762 // Azteeg X5 Mini (Power outputs: Hotend0, Bed, Fan)
197 #define BOARD_MKS_SGEN 1763 // MKS-SGen (Power outputs: Hotend0, Hotend1, Bed, Fan)
198 #define BOARD_MKS_SGEN_L 1764 // MKS_SGEN_L (Power outputs: Hotend0, Hotend1, Bed, Fan)
199 //
200 //
201 // SAM3X8E ARM Cortex M3
202 //
203
204 #define BOARD_DUE3DOM 1411 // DUE3DOM for Arduino DUE
205 #define BOARD_DUE3DOM_MINI 1412 // DUE3DOM MINI for Arduino DUE
206 #define BOARD_RADDY 1502 // RADDY
207 #define BOARD_RAMPS_FD_V1 1503 // RAMPS-FD v1
208 #define BOARD_RAMPS_FD_V2 1504 // RAMPS-FD v2
209 #define BOARD_RAMPS_SMART_EFB 1523 // RAMPS-SMART (Power outputs: Hotend, Fan, Bed)
210 #define BOARD_RAMPS_SMART_EFB 1524 // RAMPS-SMART (Power outputs: Hotend0, Hotend1, Bed)
211 #define BOARD_RAMPS_SMART_EFF 1525 // RAMPS-SMART (Power outputs: Hotend, Fan0, Fan1)
212 #define BOARD_RAMPS_SMART_EEF 1526 // RAMPS-SMART (Power outputs: Hotend0, Hotend1, Fan)
213 #define BOARD_RAMPS_SMART_SF 1528 // RAMPS-SMART (Power outputs: Spindle, Controller Fan)
214 #define BOARD_RAMPS_DUO_EFB 1533 // RAMPS Duo (Power outputs: Hotend, Fan, Bed)

```

Configure the board type to “BOARD\_MKS\_SGEN\_L” in the “configuration.h”



```

Configuration.h — D:\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

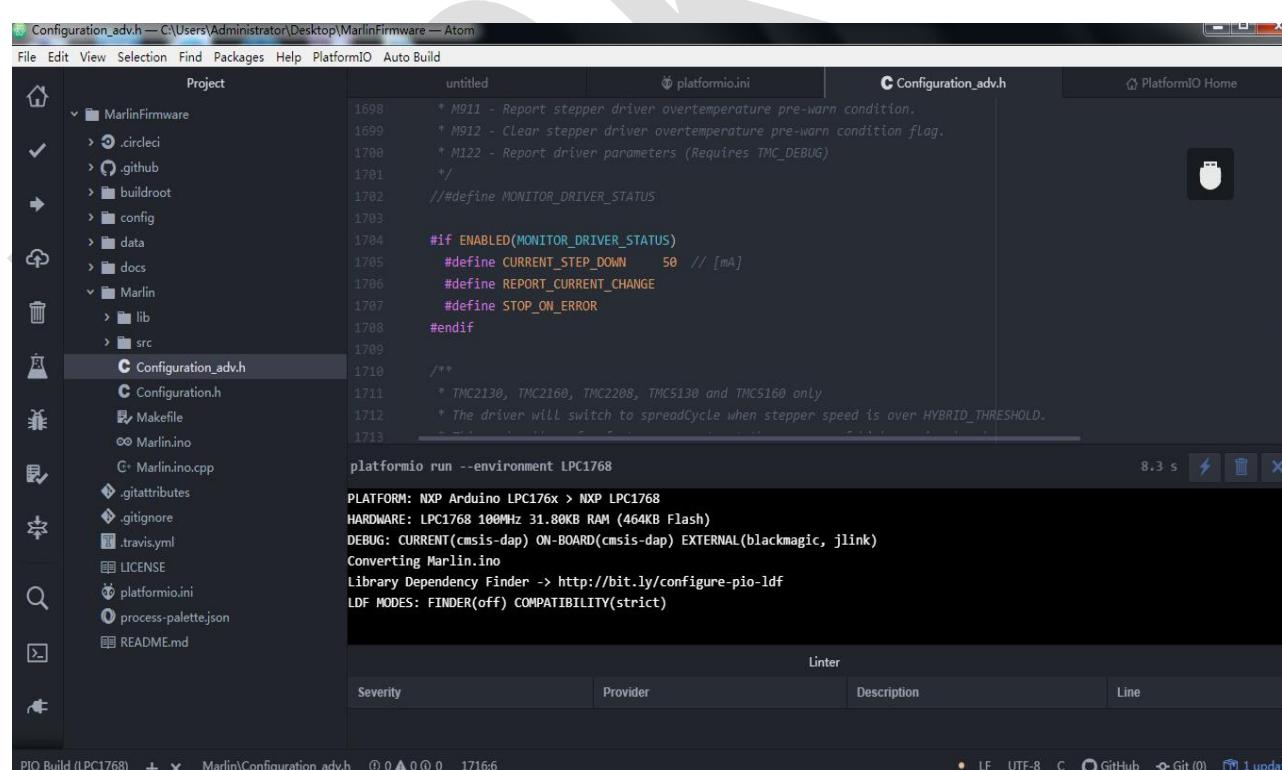
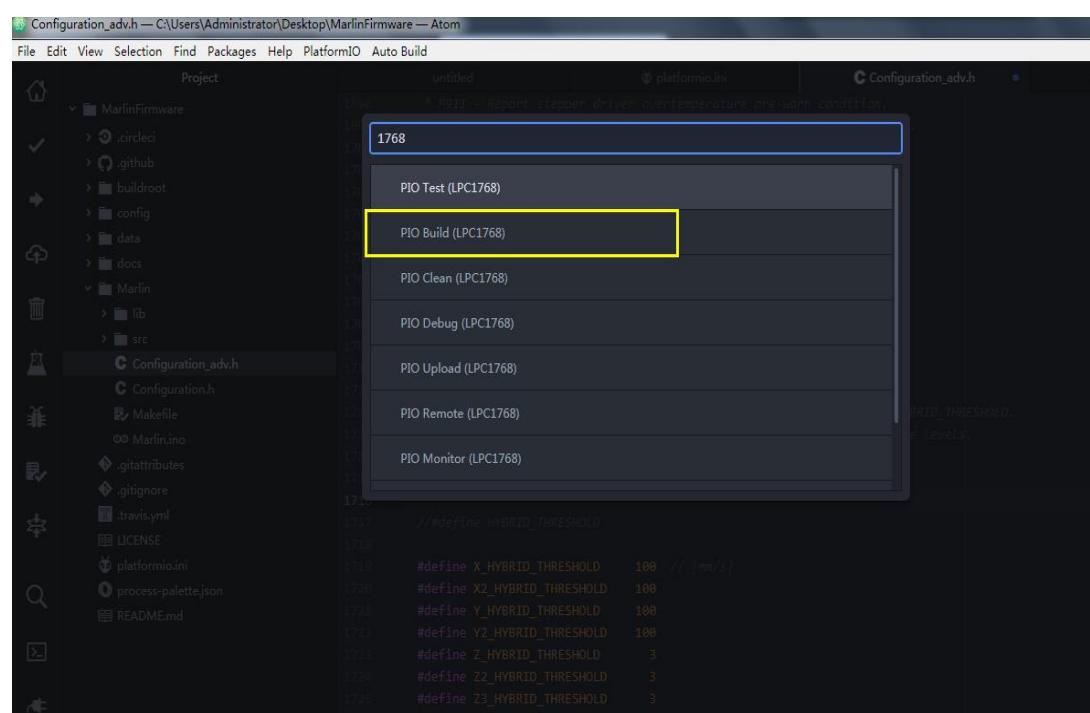
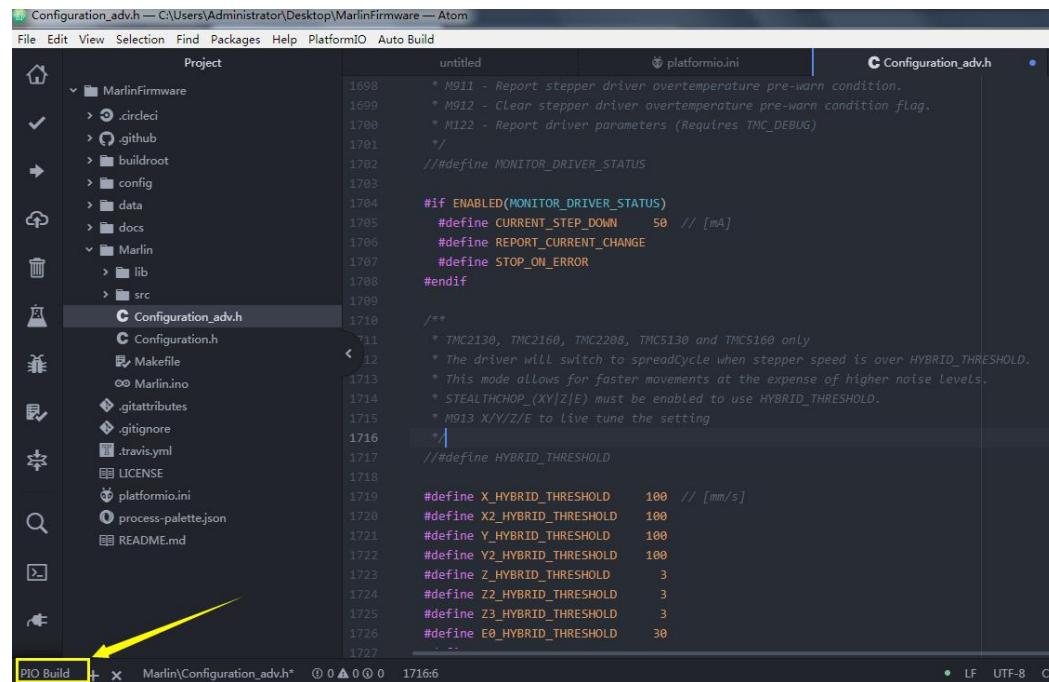
Project Telemetry Consent Welcome C Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
    default
    examples
  data
    www
  docs
  Marlin
    lib
    src
      Configuration_adv.h
        C Configuration.h
        Makefile
        Marlin.ino
      .gitattributes
      .gitignore
      .travis.yml
      LICENSE
      platformio.ini
      process-palette.json
      README.md
  PIO Build + Marlin\src\config\Configuration.h @ 0.0.0.0_19820
120 /*
121 * 250000 works in most cases, but you might try a lower speed if
122 * you commonly experience drop-outs during host printing.
123 * You may try up to 1000000 to speed up SD file transfer.
124 */
125 /* :[2400, 9600, 19200, 38400, 57600, 115200, 250000, 500000, 1000000]
126 */
127 #define BAUDRATE 115200
128 // Enable the Bluetooth serial interface on AT90USB devices
129 //#define BLUETOOTH
130
131 // The following define selects which electronics board you have.
132 // Please choose the name from boards.h that matches your setup
133 #ifndef MOTHERBOARD
134 #define MOTHERBOARD BOARD_MKS_SGEN_L//RAMPS_14_EFB
135 #endif
136
137 // Optional custom name for your RepRap or other custom machine
138 // Displayed in the LCD "Ready" message
139 //#define CUSTOM_MACHINE_NAME "3D Printer"
140
141 // Define this to set a unique identifier for this printer, (Used by some programs to diff
142 // You can use an online service to generate a random UUID. (eg http://www.uuidgenerator.n
143 // #define MACHINE_UUID "00000000-0000-0000-0000-000000000000"
144 // #define MACHINE_UUID "00000000-0000-0000-0000-000000000000"
145

```

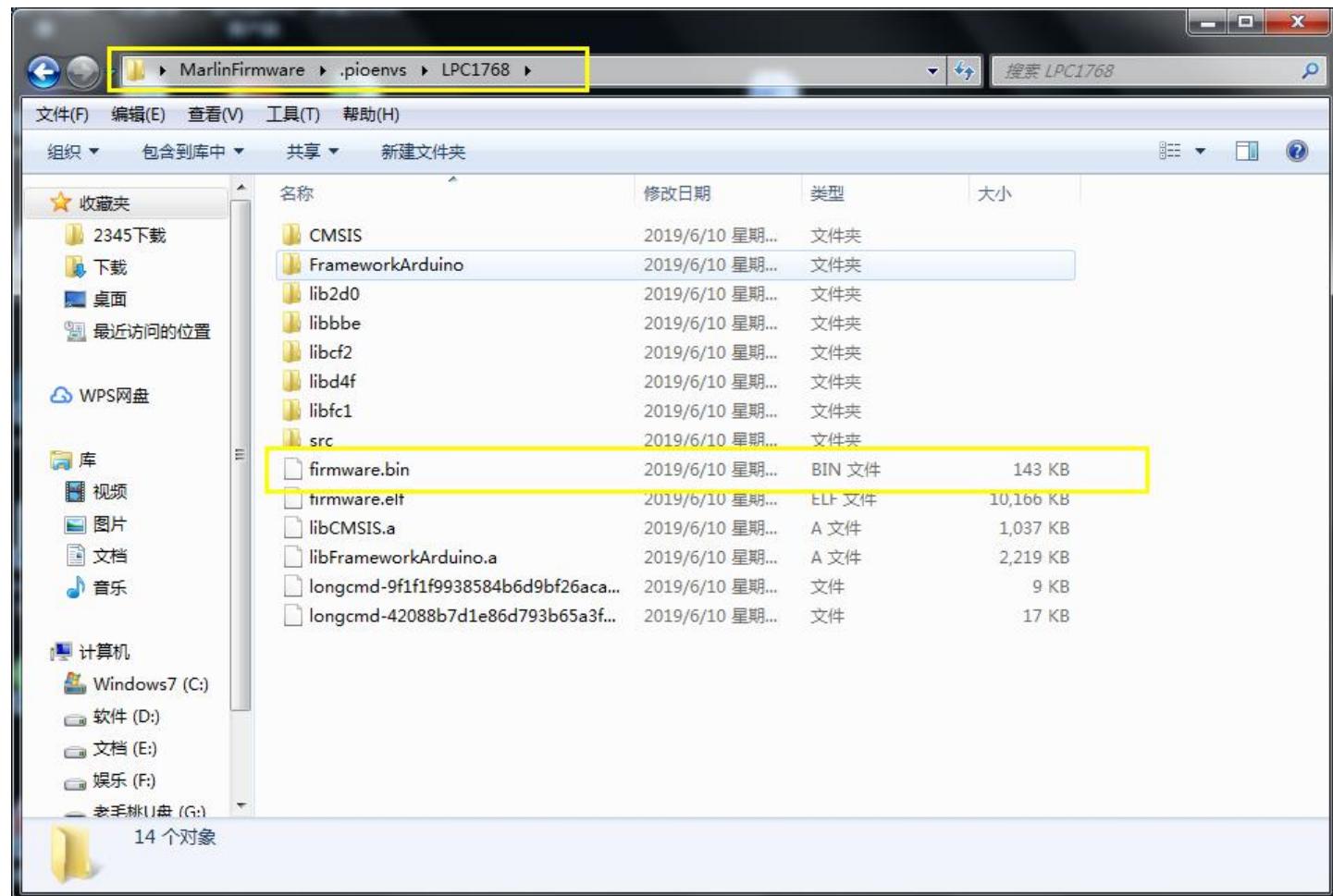
### 3. Setting parameters according different machine ( refer to basic parameter configuration of marlin2.0 for details)

### 4. Firmware compilation

Click the PIO Build in the lower left corner→Input “176” →PIO Clean(LPC1768)→PIO Build(LPC1768). After compiling, open the marlin firmware folder→Open “.pioenvs”→Copy “firmware.bin” to TF card to insert into the motherboard’s card slot to flash firmware.



After the compilation is built, there will be a “firmware.bin” in this path, copy the file to TF card root directory to update.



# V parameter configuration instruction

## 5.1 Smoothieware parameter configuration

### 1. Smoothieware basic parameter configuration

(1) The following parameter modification is based to different machines

Directly modify the “config.txt” file on the SD card, save it and power it on again. The parameter configuration takes effect at once.

```
#以下是经常需要的关键参数
alpha_steps_per_mm          80          # X轴每走1mm 所需脉冲数,
beta_steps_per_mm           80          # 例如 200步电机 16细分 用20-2GT同步轮: 200*16/40=80
gamma_steps_per_mm          1600        # Y轴每走1mm 所需脉冲数
extruder.hotend.steps_per_mm 140         # Z轴每走1mm 所需脉冲数
                                         # E0轴每走1mm 所需脉冲数

#alpha_current                1.0         # X轴电流大小 单位为安培
#beta_current                 1.0         # Y轴电流大小
#gamma_current                1.0         # Z轴电流大小
#delta_current                1.0         # E0轴电流大小

alpha_dir_pin                 2.3         # X轴转动方向, 在后面增加! 可让电机反转
beta_dir_pin                  0.20        # Y轴转动方向, 在后面增加! 可让电机反转
gamma_dir_pin                 2.11        # Z轴转动方向, 在后面增加! 可让电机反转
extruder.hotend.dir_pin       0.11        # E0轴转动方向, 在后面增加! 可让电机反转

network.ip_address            192.168.3.221 # IP地址
network.ip_mask               255.255.255.0 # 子网掩码
network.ip_gateway             192.168.3.1   # 网关

..
```

Note: Since the motor driver has changed to the direct-plug one, the driver current cannot be adjusted in the configuration file. It is adjusted by the knob on the direct-plug driver (refer to the following descriptions for driver current adjustment and precautions).

(2) The following parameter that may need to be modified

```
#以下是可能需要修改的参数

default_feed_rate              4000        # 默认速度 ( mm/分钟 ) for G1/G2/G3 moves
default_seek_rate               4000        # 默认速度 ( mm/分钟 ) for G0 moves
acceleration                   500         # 加速度 mm/平方秒.
z_acceleration                 60          # Z轴加速度
junction_deviation              0.02        # 类似Marlin的 "max_jerk"
                                         # 数值越小, 电机运行效果越好, 但是速度越慢

x_axis_max_speed                10000       # X轴最大速度 mm/min
y_axis_max_speed                10000       # Y轴最大速度 mm/min
z_axis_max_speed                 100         # Z轴最大速度 mm/min

alpha_max_rate                  10000.0     # 要和x_axis_max_speed 一致
beta_max_rate                   10000.0     # 要和y_axis_max_speed 一致
gamma_max_rate                  100.0       # 要和z_axis_max_speed 一致

extruder.hotend.default_feed_rate 600         # E0默认速度 ( mm/分钟 )
extruder.hotend.acceleration      500         # E0轴加速度
extruder.hotend.max_speed         50          # mm/s

alpha_min_endstop                1.29^!     # X轴min限位开关, 在后面增加! 可设置常开还是常闭
beta_min_endstop                 1.27^!     # Y轴min限位开关, 在后面增加! 可设置常开还是常闭
gamma_min_endstop                 1.25^!     # Z轴min限位开关, 在后面增加! 可设置常开还是常闭
```

The speed and acceleration for each axis can be set according to personal needs.

If clicking on “homing” but with no response, Consumers can modify the switch type of the corresponding axis.

### (3) extrusion “E0” parameter setting

```
#打印头E0设置

extruder.hotend.enable          true      # Whether to activate the extruder module at all. All
configuration is ignored if false
extruder.hotend.step_pin         2.13     # Pin for extruder step signal
extruder.hotend.en_pin           2.12     # Pin for extruder enable signal

temperature_control.hotend.enable true      #
temperature_control.hotend.thermistor_pin 0.23   #
temperature_control.hotend.heater_pin    2.7    #
temperature_control.hotend.thermistor    RRRF100K #
temperature_control.hotend.set_m_code    104    #
temperature_control.hotend.set_and_wait_m_code 109 #
temperature_control.hotend.designator   T      #
```

Default setting

### (4) double extruder parameter setting

If using double extrusions, it needs to delete the following “#” before the configuration.

```
# 双打印头设置，如果需要使用双打印头，需要去掉以下设置的注释

#extruder.hotend2.enable          true      #
#extruder.hotend2.steps_per_mm    90       # E1轴每走1mm 所需脉冲数
#extruder.hotend2.default_feed_rate 600     # E1默认速度 ( mm/分钟 )
#extruder.hotend2.acceleration    500     # E1轴加速度
#extruder.hotend2.max_speed       50      # mm/s
#extruder.hotend2.step_pin        0.1      #
#extruder.hotend2.dir_pin         0.0      # E1轴转动方向，在后面增加！可让电机反转
#extruder.hotend2.en_pin          0.10     #
#epsilon_current                  1.2      # E1电流大小

#temperature_control.hotend2.enable true      #
#temperature_control.hotend2.thermistor_pin 0.25   #
#temperature_control.hotend2.heater_pin    2.6    #
#temperature_control.hotend2.thermistor    RRRF100K #
#temperature_control.hotend2.set_m_code    104    #
#temperature_control.hotend2.set_and_wait_m_code 109 #
#temperature_control.hotend2.designator   T1      #
```

It is recommended to use the above default settings if you are not familiar with corresponding pin and type information.

### (5) Heated bed setting

```
#热床设置
temperature_control.bed.enable          true      #
temperature_control.bed.thermistor_pin   0.24     #
temperature_control.bed.heater_pin       2.5      # 2.5
temperature_control.bed.thermistor      RRRF100K  # see http://smoothieware.org/temperaturecontrol#toc5
#temperature_control.bed.beta          3960     # or set the beta value

temperature_control.bed.set_m_code       140      #
temperature_control.bed.set_and_wait_m_code 190      #
temperature_control.bed.designator     B        #

#temperature_control.bed.bang_bang      false     # set to true to use bang bang control rather than PID
#temperature_control.bed.hysteresis    2.0      # set to the temperature in degrees C to use as hysteresis
# when using bang bang
```

The figure above shows how to enable heated bed, “true” can be replaced by “false” (ban heated bed) if consumers don't need this function.

temperature\_control.module\_name.thermistor RRRF100K are 100K NTC. If using another sensor, it need to enter the official firmware website to search the its corresponding items name.

### .PID setting

Solve the problem of excessive temperature fluctuation caused by firmware parameter.

First run the M303 command, for example:

M303 E0 S190

# For the case where the printing head E0 is often warmed up to 190 degree, automatically run PID .

#System Run for about 8 cycles, showing the following information

```
T: 190.4/190.0 @0 0 7/8
T: 190.2/190.0 @0 0 7/8
Cycle 7:
Max: 190.8 Min: 184.3 high time: 48.2s low time: 7.5s
Averages over last 3 cycles: Max: 81.8c Min: 79.0c high :
  ku: 17.7607
  tu: 23.7929
Trying:
  Kp: 10.7
  Ki: 0.045
  Kd: 32
PID Autotune Complete! The settings above have been loaded in
```

Input PID value to “config.txt”, or save the value by running M500 directly.

## (6) Fan setting

```
# 风扇设置
switch.fan.enable true          #
switch.fan.input_on_command M106   #
switch.fan.input_off_command M107   #
switch.fan.output_pin 2.4        #
switch.fan.output_type pwm       # pwm output settable with S parameter in the
                                # input_on_command
```

## (7) Limit switch setting

```
#限位开关设置
endstops_enable true           # the endstop module is enabled by default and can be
disabled here

alpha_max_endstop 1.28^         #
alpha_homing_direction home_to_min # or set to home_to_max and set alpha_max
alpha_min 0                   # this gets loaded after homing when home_to_min is set
alpha_max 250                 # this gets loaded after homing when home_to_max is set

beta_max_endstop 1.26^         #
beta_homing_direction home_to_min #
beta_min 0                   #
beta_max 250                 #

gamma_max_endstop 1.24^         #
gamma_homing_direction home_to_min #
gamma_min 0                   #
gamma_max 120                 #

alpha_fast_homing_rate_mm_s 50    # feedrates in mm/second
beta_fast_homing_rate_mm_s 50    #
gamma_fast_homing_rate_mm_s 4     #
alpha_slow_homing_rate_mm_s 25   #
beta_slow_homing_rate_mm_s 25   #
gamma_slow_homing_rate_mm_s 2     #

alpha_homing_retract_mm 5        # distance in mm
beta_homing_retract_mm 5        #
gamma_homing_retract_mm 1        #
```

If you want to use the limit switch, "endstops\_enable" must be set to "true". refer to the following figure.

Alpha, beta, and gamma correspond to three axes.

Homing\_direction: direction of homing, "home\_to\_min": minimum, "home\_to\_max": maximum.

"Alpha\_min": minimum, "alpha\_max" maximum. The other axes are the same as described above.

## (8) Auto-leveling setting

```
# 自动调平设置
zprobe.enable false            # set to true to enable a zprobe
zprobe.probe_pin 1.25!^        # pin probe is attached to if NC remove the !
zprobe.slow_feedrate 5          # mm/sec probe feed rate
#zprobe.debounce_count 100      # set if noisy
zprobe.fast_feedrate 100        # move feedrate mm/sec
zprobe.probe_height 5           # how much above bed to start probe
```

Only suitable for ordinal switch setting

In leveling process, using the PC software to perform the following process:

1) G32

#perform the following process

2) G28

#homing

3) G0 Z5

#move Z axis up 5mm

4) Manually adjust height of Z-axis until the distance between the printhead and the heated bed is as one paper thickness.

5) M306 Z0

#configure the height to “0”

6) G28

#homing again

7) G0 Z1

#Set the current height to 1mm, and measure whether the printing head is 1mm away from the heat bed.

8) M500

#save current data to EEPROM;

#Note: After executing M500, the system will not read the parameters from config.txt. After running M502 to clear the parameters, the parameters will be read from config.txt at the next startup.

(9) LCD display setting

MKS LCD MINI12864/MKS LCD12864A (12864A needs to remove RPK2 resistor on PCB)

Screen display settings (add # before the line for shielding, or delete the line, the screen will work properly, refer to the following picture)

```
# MKS LCD12864/MINI12864控制面板设置
panel.enable          true      # set to true to enable the panel code
panel.lcd             st7565_glcd # MKS MINI12864
panel.spi_channel     1         # spi channel to use ; GLCD EXP1 Pins 3,5 (MOSI, SCLK)
panel.spi_cs_pin      0.17     # spi chip select ; GLCD EXP1 Pin 4
panel.spi_frequency   500000   # SPI port frequency - some panel need it explicitly set
panel.contrast        0         # Contrast value for panels that support it
panel.encoder_resolution 4
panel.reverse         true     # If set to true, reverse the screen.
panel.busy_pin        nc       #
panel.a0_pin          1.0      # spi A0
panel.rst_pin         nc       #
panel.menu_offset     0         #

panel.encoder_a_pin   3.25!^   # encoder pin ; GLCD EXP2 Pin 3
panel.encoder_b_pin   3.26!^   # encoder pin ; GLCD EXP2 Pin 5
panel.click_button_pin 1.30!^   # click button ; GLCD EXP1 Pin 2
panel.buzz_pin        1.31     # pin for buzzer ; GLCD EXP1 Pin 1
#panel.back_button_pin 2.11!^   # back button ; GLCD EXP2 Pin 8

panel.external_sd     true      # set to true if there is an external sdcard on the panel
panel.external_sd.spi_channel 1       # set spi channel the sdcard is on
panel.external_sd.spi_cs_pin  0.28    # set spi chip select for the sdcard (or any spare pin)
panel.external_sd.sdcd_pin  0.27!^  # sd detect signal (set to nc if no sdcard detect) (or any spare pin)

panel.menu_offset     1         # some panels will need 1 here
panel.alpha_jog_feedrate 6000    # x jogging feedrate in mm/min
panel.beta_jog_feedrate 6000    # y jogging feedrate in mm/min
panel.gamma_jog_feedrate 200     # z jogging feedrate in mm/min
panel.hotend_temperature 185    # temp to set hotend when preheat is selected
panel.bed_temperature  60      # temp to set bed when preheat is selected
```

## MKS LCD 12864 screen setting

You need to add the “#” line ( as the red high-lighted line shows) to make the screen operate normally

```
# MKS 12864控制面板设置
panel.enable          true      # set to true to enable the panel code
panel.lcd             reprap_discount_glcd #
panel.spi_channel     0         # spi channel to use ; GLCD EXP1 Pins 3,5 (MOSI, SCLK)
panel.spi_cs_pin      0.16     # spi chip select ; GLCD EXP1 Pin 4
panel.encoder_a_pin   3.25!^   # encoder pin ; GLCD EXP2 Pin 3
panel.encoder_b_pin   3.26!^   # encoder pin ; GLCD EXP2 Pin 5
panel.click_button_pin 1.30!^   # click button ; GLCD EXP1 Pin 2
panel.buzz_pin        1.31     # pin for buzzer ; GLCD EXP1 Pin 1
#panel.back_button_pin 2.11!^   # back button ; GLCD EXP2 Pin 8

panel.external_sd     true      # set to true if there is an external sdcard on the panel
panel.external_sd.spi_channel 1       # set spi channel the sdcard is on
panel.external_sd.spi_cs_pin  0.28    # set spi chip select for the sdcard (or any spare pin)
panel.external_sd.sdcd_pin  0.27!^  # sd detect signal (set to nc if no sdcard detect) (or any spare pin)

panel.menu_offset     1         # some panels will need 1 here
panel.alpha_jog_feedrate 6000    # x jogging feedrate in mm/min
panel.beta_jog_feedrate 6000    # y jogging feedrate in mm/min
panel.gamma_jog_feedrate 200     # z jogging feedrate in mm/min
panel.hotend_temperature 185    # temp to set hotend when preheat is selected
panel.bed_temperature  60      # temp to set bed when preheat is selected
```

## 5.2 marlin2.0 parameter setting

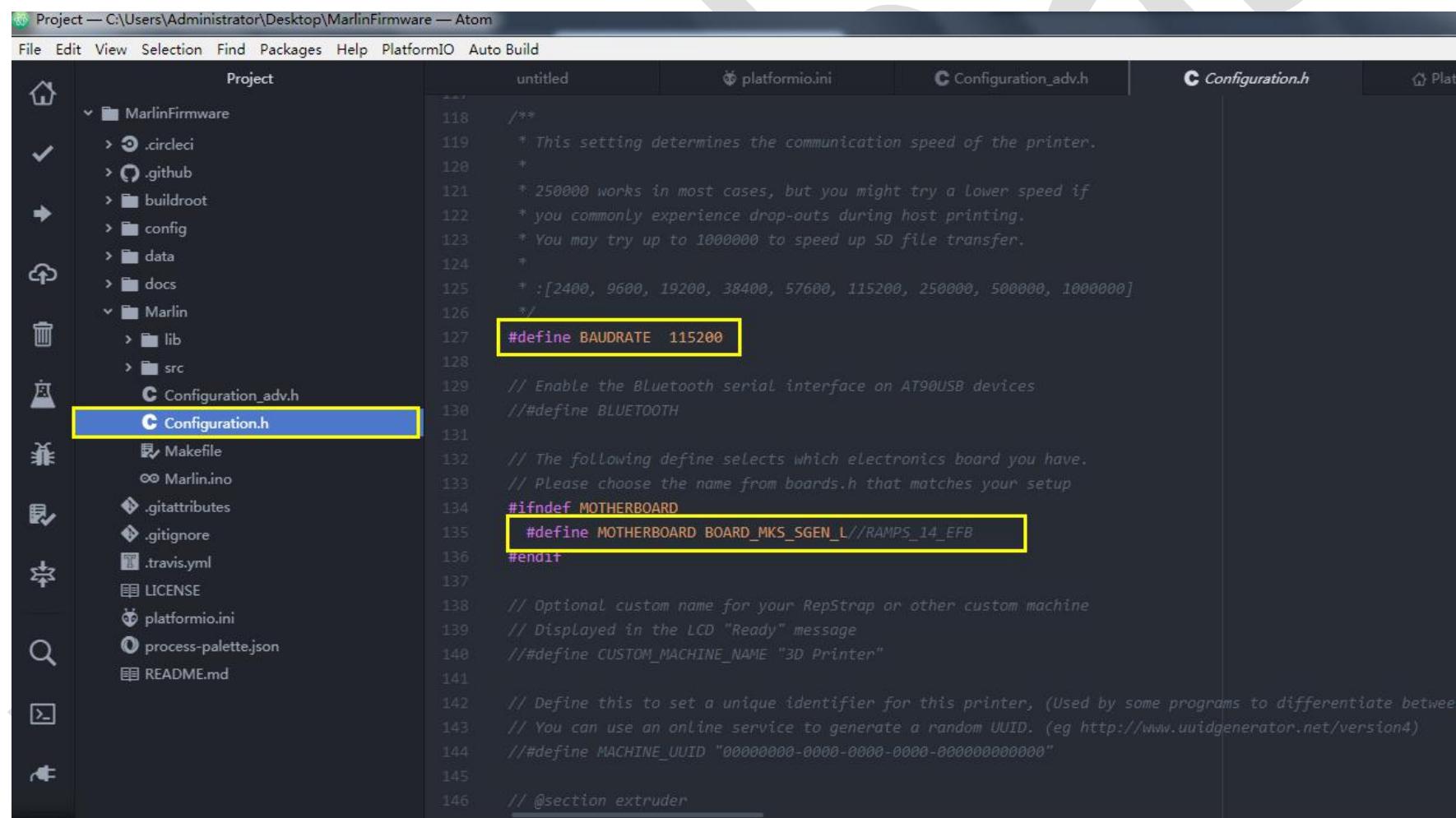
### 5.2.1 basic parameter setting

Marlin2.0 parameter can be modified and built directly via “Atom” software.

Open marlin firmware via atom, click on “File→Open Folder” ( open marlin2.0wirmware folder to input marlin firmware. Open “configuration.h” to setting the basic parameter. The setting contact is similar to marlin version 1.0.

#### 1. Motherboard Baud rate setting

#### 2. motherboard type setting



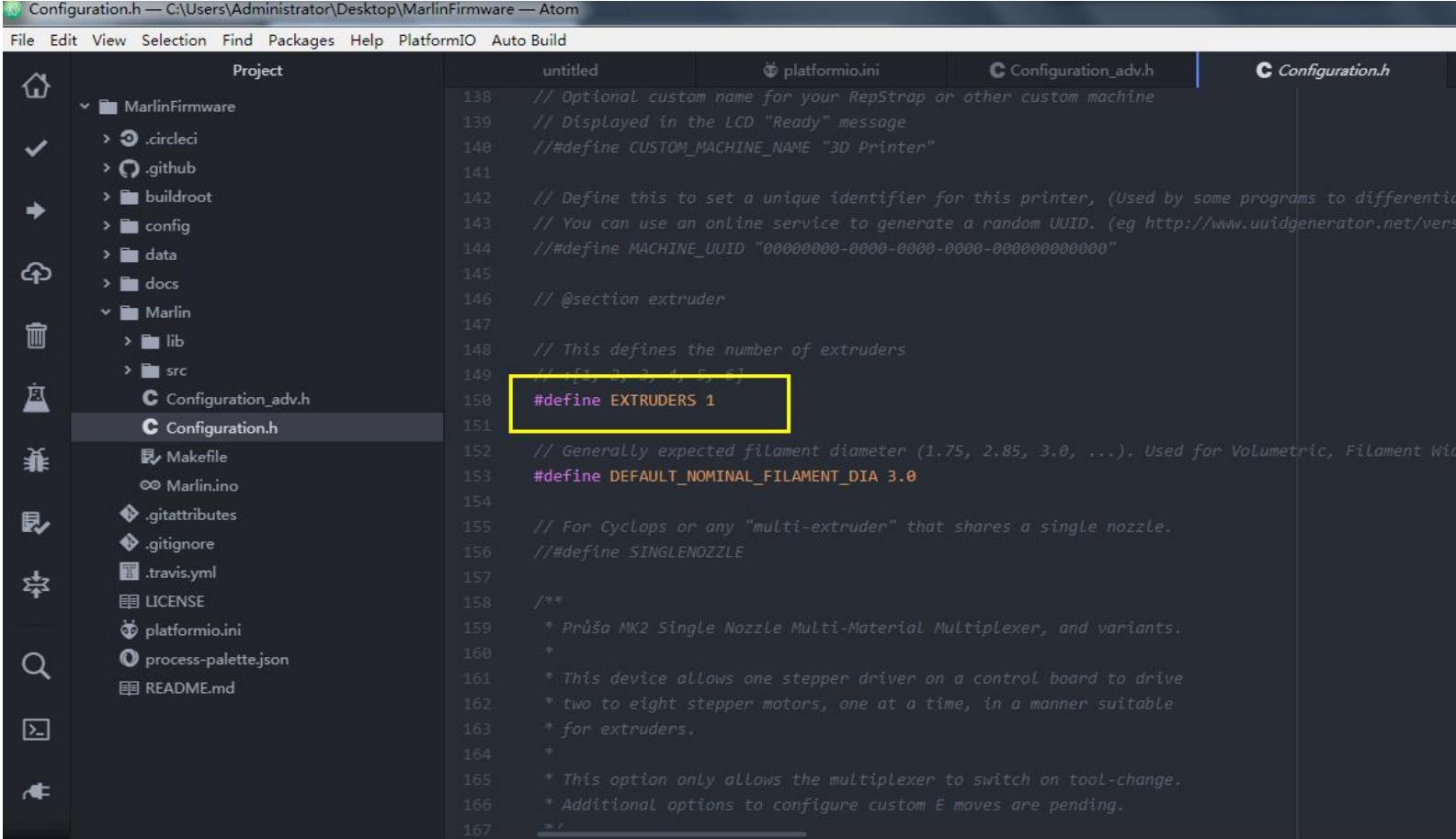
The screenshot shows the Atom code editor interface with the following details:

- Project Path:** C:\Users\Administrator\Desktop\MarlinFirmware
- File List:** MarlinFirmware, .circleci, .github, buildroot, config, data, docs, Marlin, lib, src, Configuration\_adv.h, Configuration.h (highlighted with a yellow box).
- Code Editor:** Untitled tab, showing configuration.h content.
- Code Content (Baud Rate):**

```
118 /**
119 * This setting determines the communication speed of the printer.
120 *
121 * 250000 works in most cases, but you might try a lower speed if
122 * you commonly experience drop-outs during host printing.
123 * You may try up to 1000000 to speed up SD file transfer.
124 *
125 * :[2400, 9600, 19200, 38400, 57600, 115200, 250000, 500000, 1000000]
126 */
127 #define BAUDRATE 115200
```
- Code Content (Motherboard):**

```
129 // Enable the Bluetooth serial interface on AT90USB devices
130 //#define BLUETOOTH
131
132 // The following define selects which electronics board you have.
133 // Please choose the name from boards.h that matches your setup
134 #ifndef MOTHERBOARD
135 #define MOTHERBOARD BOARD_MKS_SGEN_L//RAMPs_14_EFB
136 #endif
137
138 // Optional custom name for your RepStrap or other custom machine
139 // Displayed in the LCD "Ready" message
140 //#define CUSTOM_MACHINE_NAME "3D Printer"
141
142 // Define this to set a unique identifier for this printer, (Used by some programs to differentiate between
143 // You can use an online service to generate a random UUID. (eg http://www.uuidgenerator.net/version4)
144 //#define MACHINE_UUID "00000000-0000-0000-0000-000000000000"
145
146 // @section extruder
```

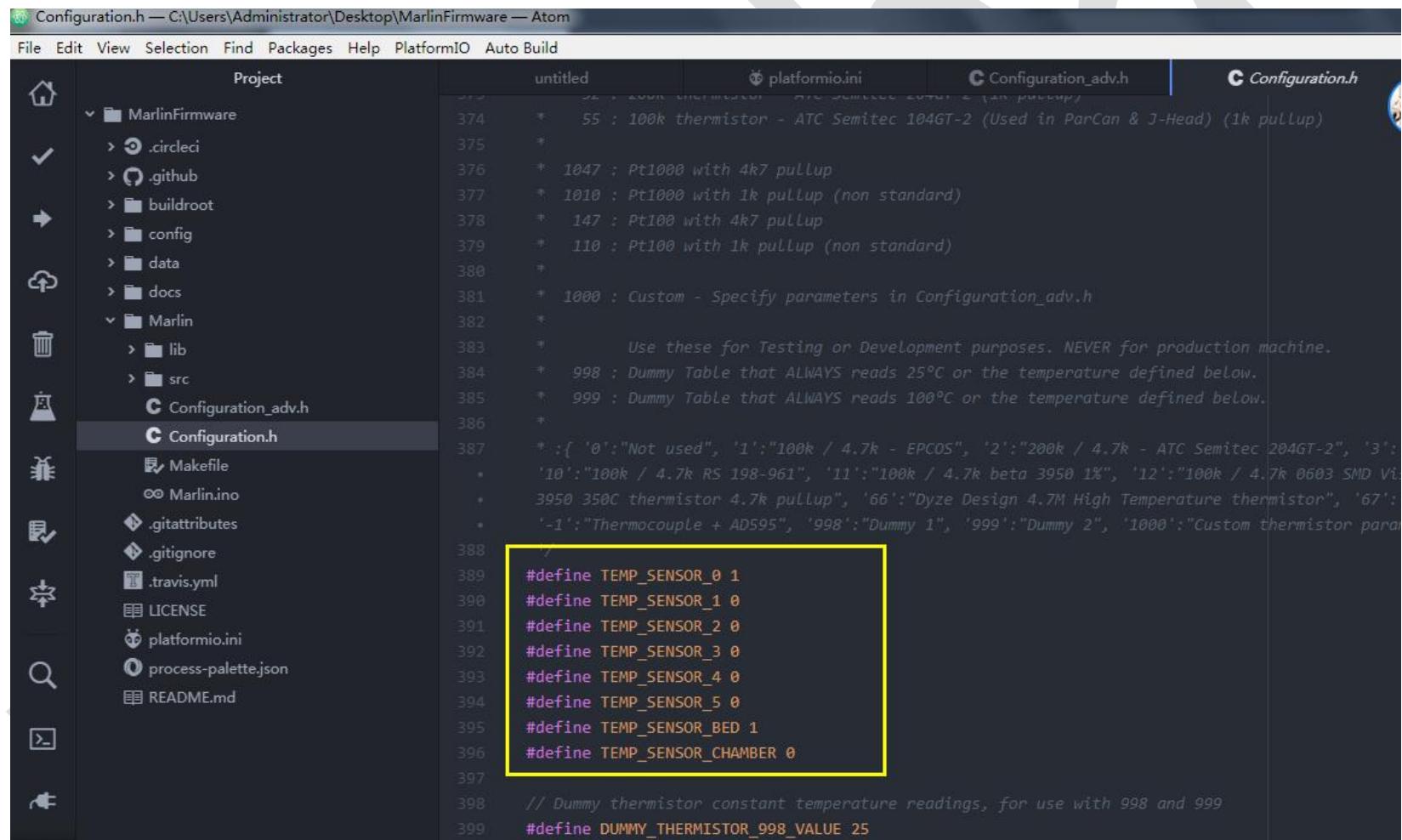
## Extruder quantity and thermal type setting



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h
138 // Optional custom name for your RepStrap or other custom machine
139 // Displayed in the LCD "Ready" message
140 // #define CUSTOM_MACHINE_NAME "3D Printer"
141
142 // Define this to set a unique identifier for this printer, (Used by some programs to differentiate)
143 // You can use an online service to generate a random UUID. (eg http://www.uuidgenerator.net/version4)
144 // #define MACHINE_UID "00000000-0000-0000-0000-000000000000"
145
146 // @section extruder
147
148 // This defines the number of extruders
149 // [[1, 2, 3, 4, 5, 6]
150 #define EXTRUDERS 1
151
152 // Generally expected filament diameter (1.75, 2.85, 3.0, ...). Used for Volumetric, Filament Width
153 #define DEFAULT_NOMINAL_FILAMENT_DIA 3.0
154
155 // For Cyclops or any "multi-extruder" that shares a single nozzle.
156 // #define SINGLENOZZLE
157
158 /**
159 * Prusa MK2 Single Nozzle Multi-Material Multiplexer, and variants.
160 *
161 * This device allows one stepper driver on a control board to drive
162 * two to eight stepper motors, one at a time, in a manner suitable
163 * for extruders.
164 *
165 * This option only allows the multiplexer to switch on tool-change.
166 * Additional options to configure custom E moves are pending.
167 */

```

```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h
374 * 55 : 100k thermistor - ATC Semitec 104GT-2 (Used in ParCan & J-Head) (1k pullup)
375 *
376 * 1047 : Pt1000 with 4k7 pullup
377 * 1010 : Pt1000 with 1k pullup (non standard)
378 * 147 : Pt100 with 4k7 pullup
379 * 110 : Pt100 with 1k pullup (non standard)
380 *
381 * 1000 : Custom - Specify parameters in Configuration_adv.h
382 *
383 * Use these for Testing or Development purposes. NEVER for production machine.
384 * 998 : Dummy Table that ALWAYS reads 25°C or the temperature defined below.
385 * 999 : Dummy Table that ALWAYS reads 100°C or the temperature defined below.
386 *
387 * :{ '0':"Not used", '1':"100k / 4.7k - EPCOS", '2':"200k / 4.7k - ATC Semitec 204GT-2", '3':
388 * '10':'100k / 4.7k RS 198-961", '11':'100k / 4.7k beta 3950 1%", '12':'100k / 4.7k 0603 SMD Vi
389 * '3950 350C thermistor 4.7k pullup", '66':'Dyze Design 4.7M High Temperature thermistor", '67':
390 * '-1':'Thermocouple + AD595", '998':'Dummy 1", '999':'Dummy 2", '1000':'Custom thermistor para
391
392 #define TEMP_SENSOR_0 1
393 #define TEMP_SENSOR_1 0
394 #define TEMP_SENSOR_2 0
395 #define TEMP_SENSOR_3 0
396 #define TEMP_SENSOR_4 0
397 #define TEMP_SENSOR_5 0
398 #define TEMP_SENSOR_BED 1
399 #define TEMP_SENSOR_CHAMBER 0
400
401 // Dummy thermistor constant temperature readings, for use with 998 and 999
402 #define DUMMY_THERMISTOR_998_VALUE 25

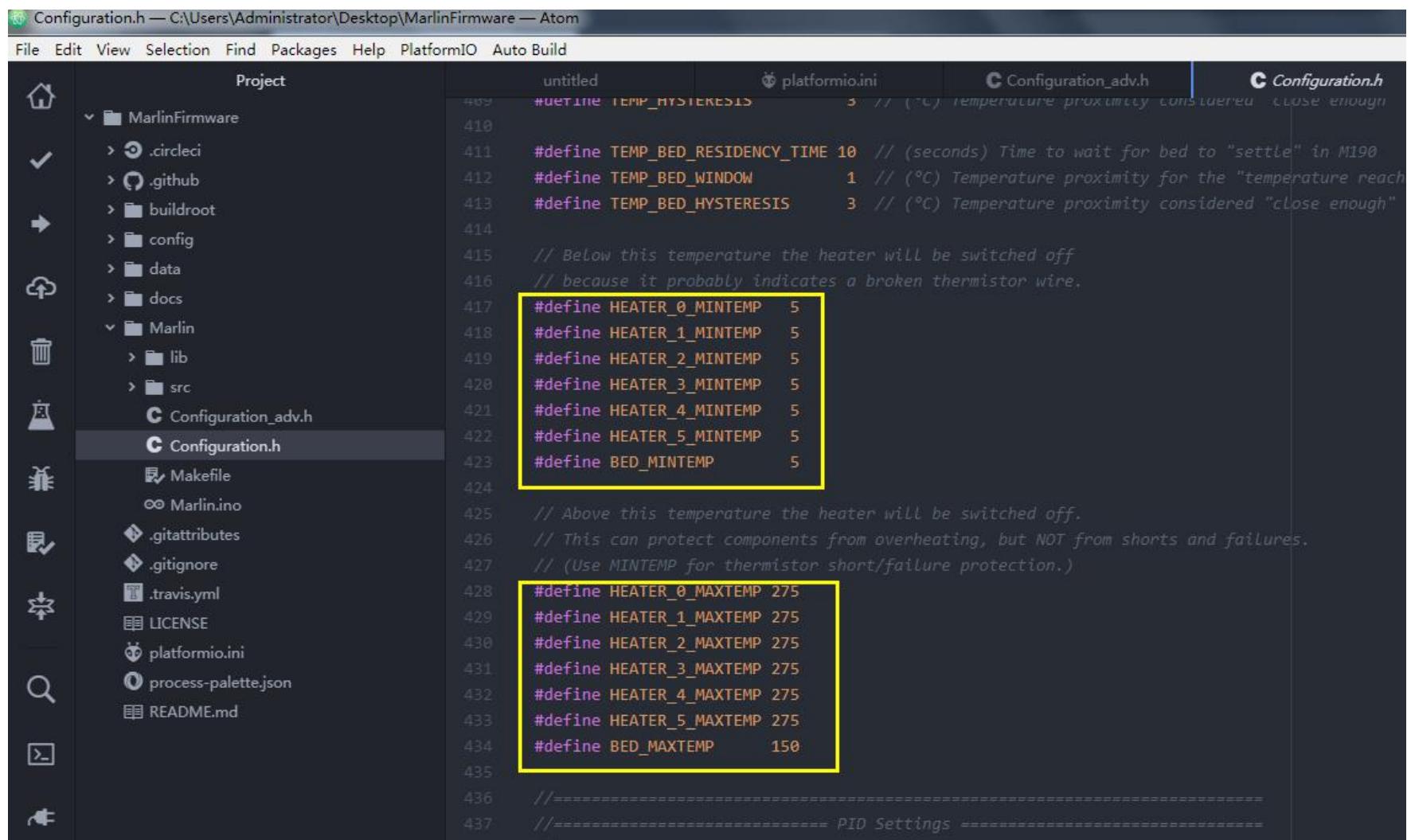
```

Configure parameter according to the type of temperature sensor

#define TEMP\_SENSOR\_BED 1 (this item is the heated bed setting item, set to “0” means heated bed is not enabled, and other numbers are corresponding to sensors)

## Temperature setting

Maximum and minimum temperature setting (if detected the actual temperature is not within this range, the motherboard will report an error automatically)



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

Project          untitled      platformio.ini      Configuration_adv.h      Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
  data
  docs
  Marlin
    lib
    src
    Configuration_adv.h
    Configuration.h
  Makefile
  Marlin.ino
  .gitattributes
  .gitignore
  .travis.yml
  LICENSE
  process-palette.json
  README.md

409 #define TEMP_HYSTERESIS
410
411 #define TEMP_BED_RESIDENCY_TIME 10 // (seconds) Time to wait for bed to "settle" in M190
412 #define TEMP_BED_WINDOW 1 // (°C) Temperature proximity for the "temperature reach"
413 #define TEMP_BED_HYSTERESIS 3 // (°C) Temperature proximity considered "close enough"
414
415 // Below this temperature the heater will be switched off
416 // because it probably indicates a broken thermistor wire.
417 #define HEATER_0_MINTEMP 5
418 #define HEATER_1_MINTEMP 5
419 #define HEATER_2_MINTEMP 5
420 #define HEATER_3_MINTEMP 5
421 #define HEATER_4_MINTEMP 5
422 #define HEATER_5_MINTEMP 5
423 #define BED_MINTEMP 5
424
425 // Above this temperature the heater will be switched off.
426 // This can protect components from overheating, but NOT from shorts and failures.
427 // (Use MINTEMP for thermistor short/failure protection.)
428 #define HEATER_0_MAXTEMP 275
429 #define HEATER_1_MAXTEMP 275
430 #define HEATER_2_MAXTEMP 275
431 #define HEATER_3_MAXTEMP 275
432 #define HEATER_4_MAXTEMP 275
433 #define HEATER_5_MAXTEMP 275
434 #define BED_MAXTEMP 150
435
436 //=====
437 //===== PID Settings =====

```

PID setting (generally, it doesn't need to adjust, default setting is OK)

The adjustment method is the same as smoothieware. Use the M303 command, for example:

M303 E0 S190

# For the case where the printing head E0 is often warmed to 190 degrees, the PID operates automatically.

After that, fill the returned value into the firmware.

```

T: 190.4/190.0 @0 0 7/8
T: 190.2/190.0 @0 0 7/8
Cycle 7:
Max: 190.8 Min: 184.3 high time: 48.2s low time: 7.5s
Averages over last 3 cycles: Max: 81.8c Min: 79.0c high :
  ku: 17.7607
  tu: 23.7929
Trying:
  Kp: 10.7
  Ki: 0.045
  Kd: 32
PID Autotune Complete! The settings above have been loaded in

```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom

File Edit View Selection Find Packages Help PlatformIO Auto Build

Project

```

untitled          platformio.ini      Configuration_adv.h      Configuration.h
451 //##define SLOW_PWM_HEATERS // PWM with very low frequency (roughly 0.125Hz=8s) and mi
452 //##define PID_PARAMS_PER_HOTEND // Uses separate PID parameters for each extruder (useful
453 // Set/get with gcode: M301 E[extruder number, 0-2]
454 #define PID_FUNCTIONAL_RANGE 10 // If the temperature difference between the target temper
455 // is more than PID_FUNCTIONAL_RANGE then the PID will be
456
457 // If you are using a pre-configured hotend then you can use one of the value sets by unco
458
459 // Ultimaker
460 //##define DEFAULT_Kp 22.2
461 //##define DEFAULT_Ki 1.08
462 //##define DEFAULT_Kd 114
463
464 #define DEFAULT_Kp 12.71
465 #define DEFAULT_Ki 0.61
466 #define DEFAULT_Kd 65.92
467 // MakerGear
468 //##define DEFAULT_Kp 7.0
469 //##define DEFAULT_Ki 0.1
470 //##define DEFAULT_Kd 12
471
472 // Mendel Parts V9 on 12V
473 //##define DEFAULT_Kp 63.0
474 //##define DEFAULT_Ki 2.25
475 //##define DEFAULT_Kd 440
476
477 #endif // PIDTEMP
478
479

```

## PREVENT\_COLD\_EXTRUSION

It is 170 degree by default, only when warmed up to 170 degree can the extruder work. You need to reduce the extruder temperature if it doesn't need to warm up.

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom

File Edit View Selection Find Packages Help PlatformIO Auto Build

Project

```

untitled          platformio.ini      Configuration_adv.h      Configuration.h
526 // @section extruder
527 /**
528 */
529 /**
530 * Prevent extrusion if the temperature is below EXTRUDE_MINTEMP.
531 * Add M302 to set the minimum extrusion temperature and/or turn
532 * cold extrusion prevention on and off.
533 *
534 * *** IT IS HIGHLY RECOMMENDED TO LEAVE THIS OPTION ENABLED! ***
535 */
536 #define PREVENT_COLD_EXTRUSION
537 #define EXTRUDE_MINTEMP 170
538
539 /**
540 * Prevent a single extrusion Longer than EXTRUDE_MAXLENGTH.
541 * Note: For Bowden Extruders make this large enough to allow load/unload.
542 */
543 #define PREVENT_LENGTHY_EXTRUDE
544 #define EXTRUDE_MAXLENGTH 200
545
546 /**
547 *----- Thermal Runaway Protection -----
548 *-----
549 */
550 /**
551 * Thermal Protection provides additional protection to your printer from damage
552 * and fire. Marlin always includes safe min and max temperature ranges which
553 * protect against a broken or disconnected thermistor wire.
554 */
555

```

## Machine setting

Machine structure setting, default structure is xyz. If it is corexy or other structure, it needs to enable the corresponding type.

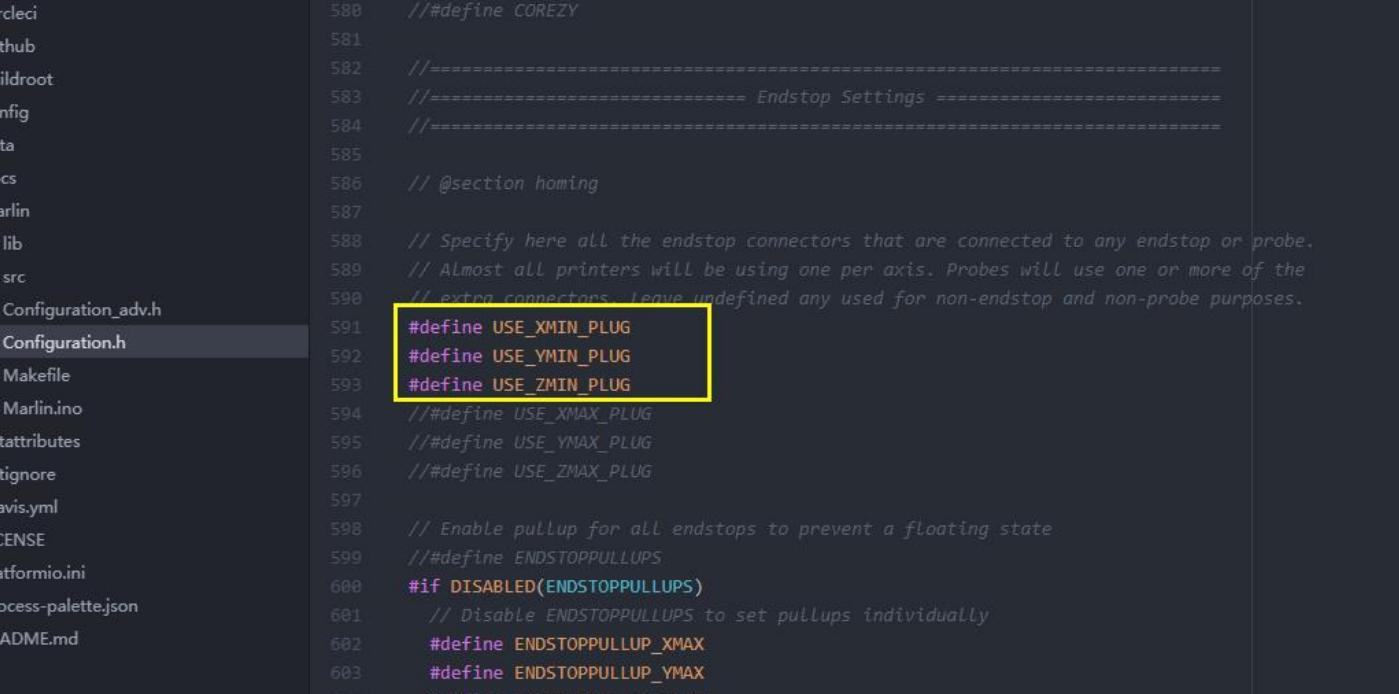
The screenshot shows the Atom code editor interface with the following details:

- File Path:** Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
- Menu Bar:** File Edit View Selection Find Packages Help PlatformIO Auto Build
- Toolbars:** Project, Untitled, platformio.ini, Configuration\_adv.h, Configuration.h
- Project Tree:** MarlinFirmware (expanded) containing .circleci, .github, buildroot, config, data, docs, Marlin (expanded) containing lib, src, Configuration\_adv.h, Configuration.h (selected), Makefile, Marlin.ino, .gitattributes, .gitignore, .travis.yml, LICENSE, platformio.ini, process-palette.json, README.md.
- Code Editor:** The Configuration.h file is open. A yellow box highlights the kinematics section (lines 571-631). The code includes comments about uncommenting options for CoreXY, CoreXZ, or CoreYZ kinematics.
- Bottom Status Bar:** Line numbers 563 through 591 are visible.

```
#define THERMAL_PROTECTION_HOTENDS // Enable thermal protection for all extruders
#define THERMAL_PROTECTION_BED // Enable thermal protection for the heated bed
#define THERMAL_PROTECTION_CHAMBER // Enable thermal protection for the heated chamber
//=====
//===== Mechanical Settings =====
// @section machine
// Uncomment one of these options to enable CoreXY, CoreXZ, or CoreYZ kinematics
// either in the usual order or reversed
//#define COREXY
//#define COREXZ
//#define COREYZ
//#define COREYX
//#define COREZX
//#define COREZY
//=====
//===== Endstop Settings =====
// @section homing
// Specify here all the endstop connectors that are connected to any endstop or probe.
// Almost all printers will be using one per axis. Probes will use one or more of the
// extra connectors. Leave undefined any used for non-endstop and non-probe purposes.
#define USE_XMIN_PLUG
```

## Limit switch setting

## Enable limit switch



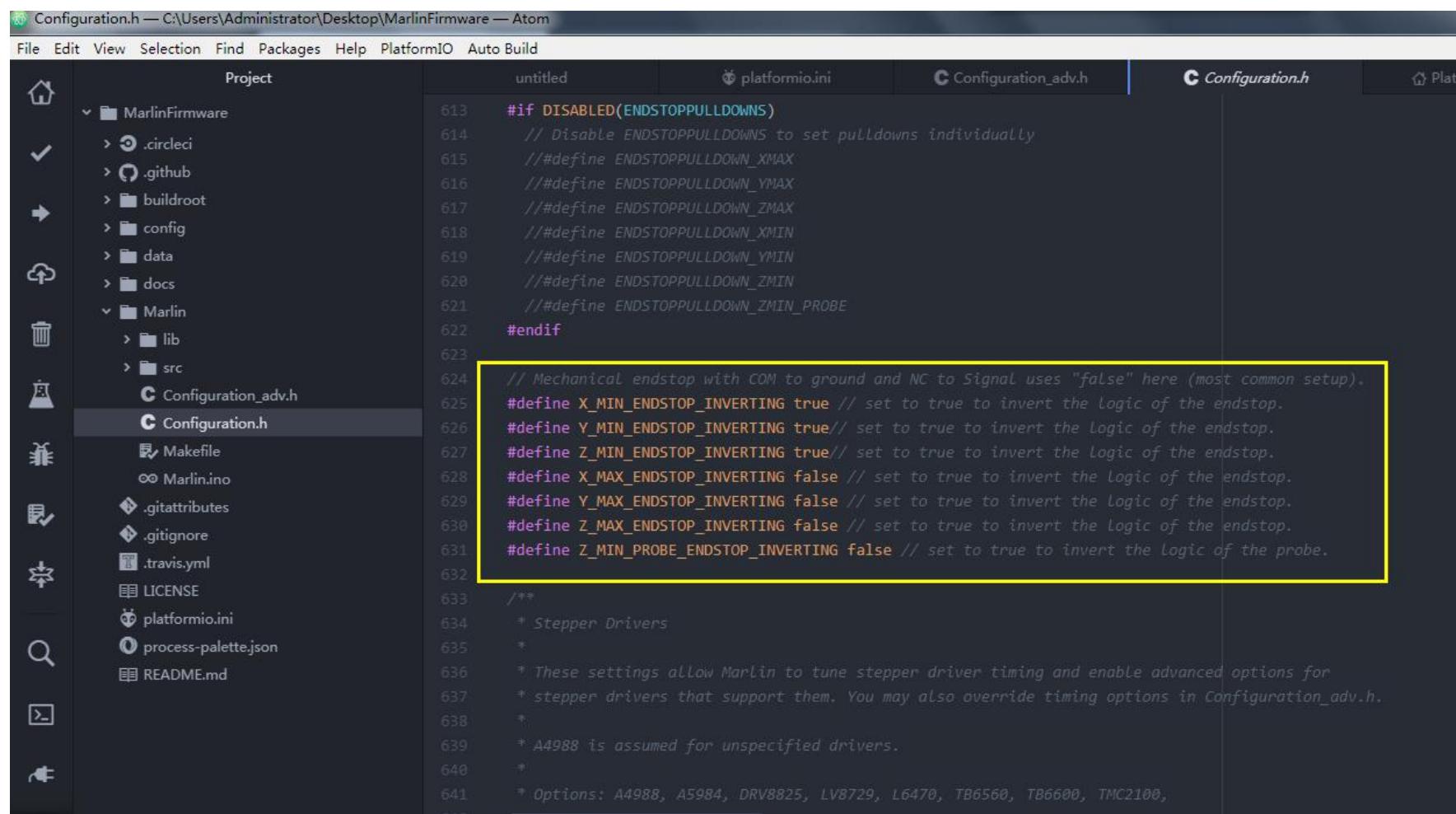
The screenshot shows the Atom code editor interface with the following details:

- Project Tree:** On the left, under the "MarlinFirmware" project, the "Configuration.h" file is selected.
- Editor Tabs:** The tabs include "Configuration.h" (active), "platformio.ini", "Configuration\_adv.h", and "PlatformIO".
- Code Content:** The "Configuration.h" tab displays C code. A yellow box highlights the following lines:

```
#define USE_XMIN_PLUG
#define USE_YMIN_PLUG
#define USE_ZMIN_PLUG
```
- Code Structure:** The code includes sections for endstop settings and pullup definitions.

Switch type setting (normally open / normally closed)

Note: If the setting type is reversed, it may cause homing error.



```

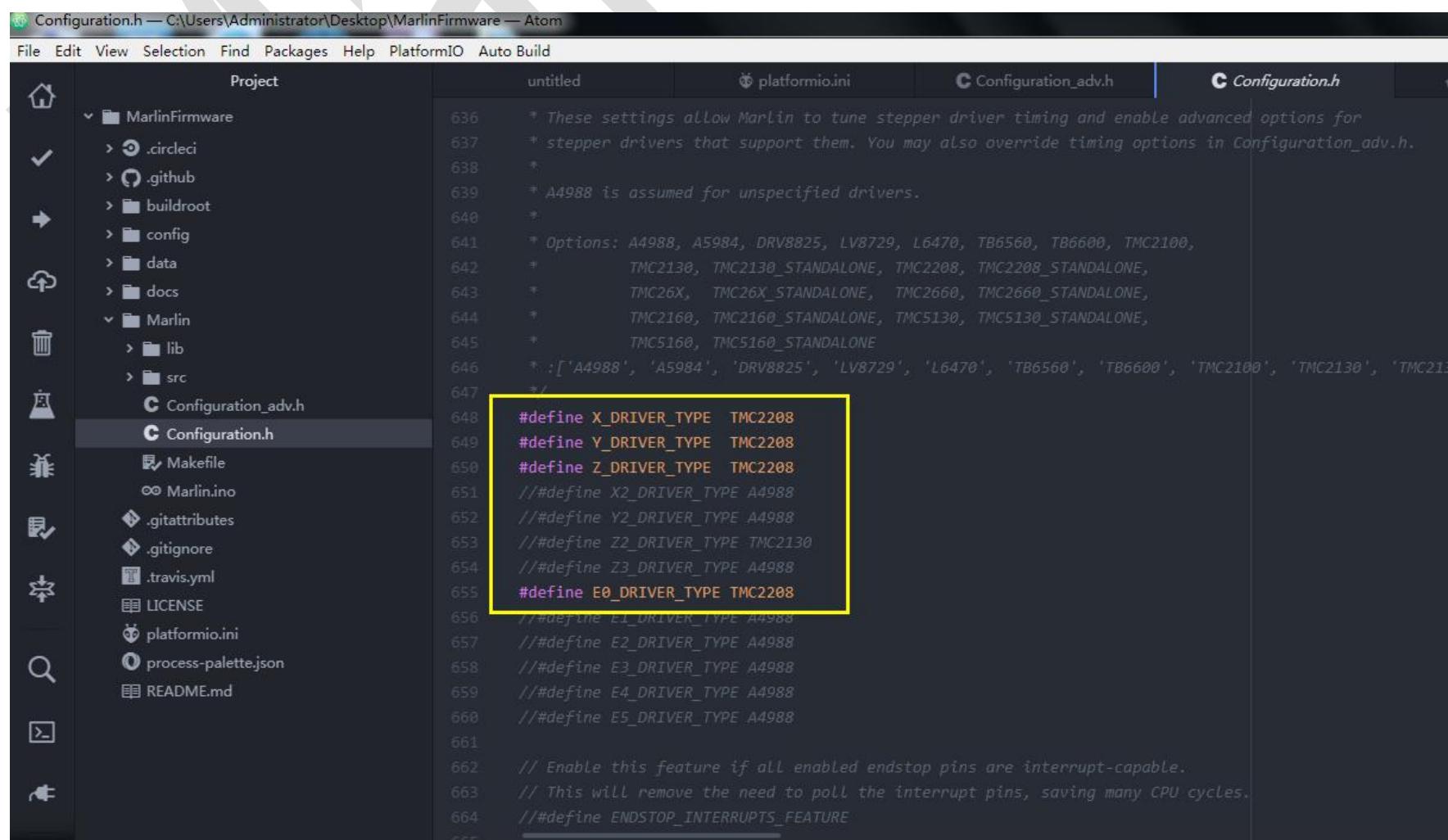
Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h Plat
613 #if DISABLED(ENDSTOPPULLDOWNS)
614 // Disable ENDSTOPPULLDOWNS to set pulldowns individually
615 //#define ENDSTOPPULLDOWN_XMAX
616 //#define ENDSTOPPULLDOWN_YMAX
617 //#define ENDSTOPPULLDOWN_ZMAX
618 //#define ENDSTOPPULLDOWN_XMIN
619 //#define ENDSTOPPULLDOWN_YMIN
620 //#define ENDSTOPPULLDOWN_ZMIN
621 //#define ENDSTOPPULLDOWN_ZMIN_PROBE
622 #endif
623
624 // Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).
625 #define X_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
626 #define Y_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
627 #define Z_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
628 #define X_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
629 #define Y_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
630 #define Z_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
631 #define Z_MIN_PROBE_ENDSTOP_INVERTING false // set to true to invert the logic of the probe.
632
633 /**
634 * Stepper Drivers
635 *
636 * These settings allow Marlin to tune stepper driver timing and enable advanced options for
637 * stepper drivers that support them. You may also override timing options in Configuration_adv.h.
638 *
639 * A4988 is assumed for unspecified drivers.
640 *
641 * Options: A4988, A5984, DRV8825, LV8729, L6470, TB6560, TB6600, TMC2100,
642 */

```

## Driver type

Only when driver type is confirmed, can it configure the corresponding special mode ( TMC2208 is compatible with Uart mode, TMC2130 compatible with SPI mode)

The driver is set to normal mode by default without enabling corresponding item.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h Plat
636 * These settings allow Marlin to tune stepper driver timing and enable advanced options for
637 * stepper drivers that support them. You may also override timing options in Configuration_adv.h.
638 *
639 * A4988 is assumed for unspecified drivers.
640 *
641 * Options: A4988, A5984, DRV8825, LV8729, L6470, TB6560, TB6600, TMC2100,
642 * TMC2130, TMC2130_STANDALONE, TMC2208, TMC2208_STANDALONE,
643 * TMC26X, TMC26X_STANDALONE, TMC2660, TMC2660_STANDALONE,
644 * TMC2160, TMC2160_STANDALONE, TMC5130, TMC5130_STANDALONE,
645 * TMC5160, TMC5160_STANDALONE
646 * :['A4988', 'A5984', 'DRV8825', 'LV8729', 'L6470', 'TB6560', 'TB6600', 'TMC2100', 'TMC2130', 'TMC2130_STANDALONE', 'TMC2208', 'TMC2208_STANDALONE', 'TMC26X', 'TMC26X_STANDALONE', 'TMC2660', 'TMC2660_STANDALONE', 'TMC2160', 'TMC2160_STANDALONE', 'TMC5130', 'TMC5130_STANDALONE', 'TMC5160', 'TMC5160_STANDALONE']
647
648 #define X_DRIVER_TYPE TMC2208
649 #define Y_DRIVER_TYPE TMC2208
650 #define Z_DRIVER_TYPE TMC2208
651 //#define X2_DRIVER_TYPE A4988
652 //#define Y2_DRIVER_TYPE A4988
653 //#define Z2_DRIVER_TYPE TMC2130
654 //#define Z3_DRIVER_TYPE A4988
655 #define E0_DRIVER_TYPE TMC2208
656
657 //##define E1_DRIVER_TYPE A4988
658 //##define E2_DRIVER_TYPE A4988
659 //##define E3_DRIVER_TYPE A4988
660 //##define E4_DRIVER_TYPE A4988
661 //##define E5_DRIVER_TYPE A4988
662 // Enable this feature if all enabled endstop pins are interrupt-capable.
663 // This will remove the need to poll the interrupt pins, saving many CPU cycles.
664 //##define ENDSTOP_INTERRUPTS_FEATURE
665

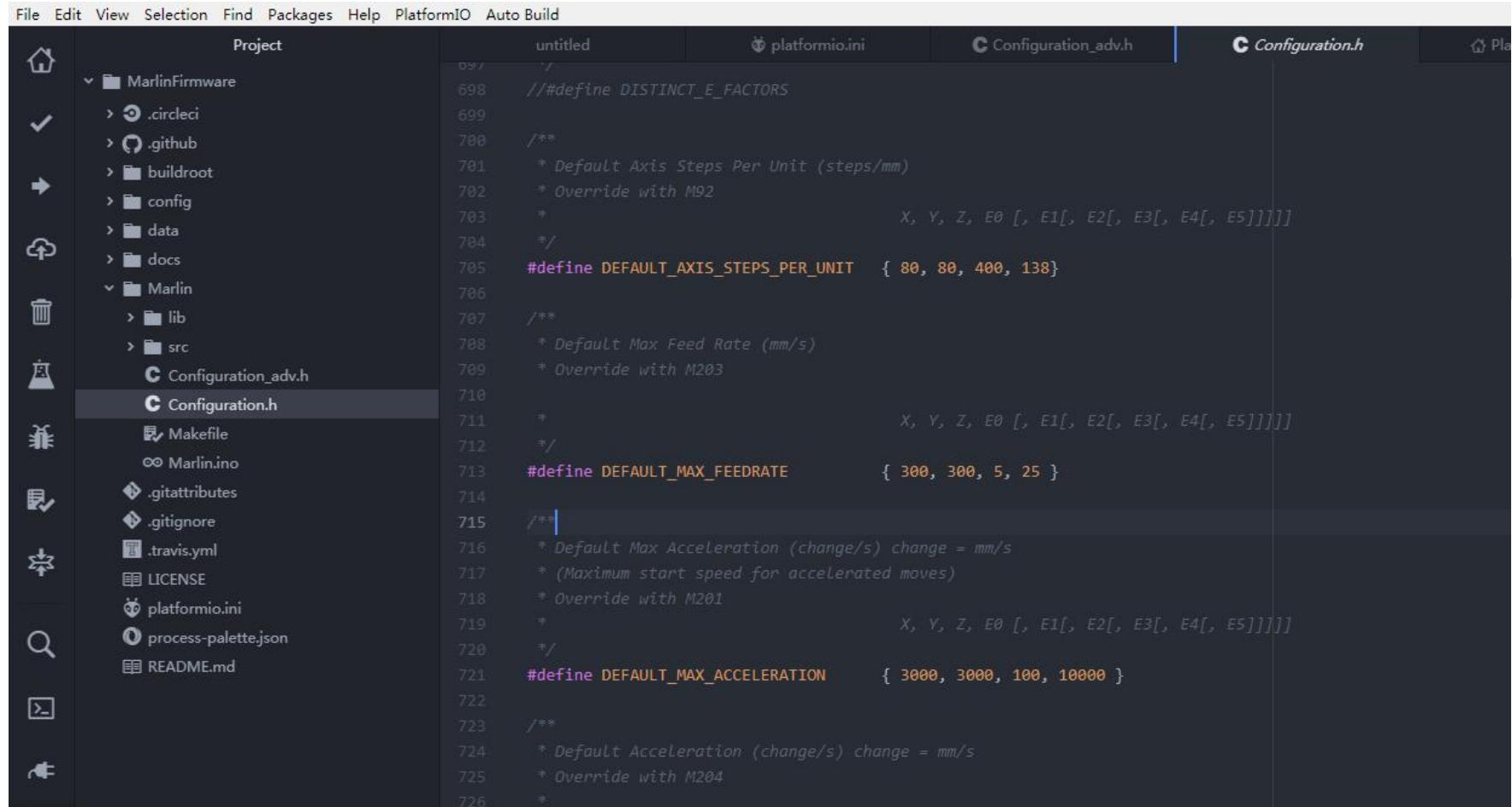
```

Motor steps per setting (#define DEFAULT\_AXIS\_STEPS\_PER\_UNIT)

It can be calculated by formula according to mechanical conditions

The formula of the number of pulses of the synchronous wheel motor / mm is:  $(360 \div \text{step angle}) \times \text{microstep}$  (diameter  $\times 3.14$ );

The formula of the number of pulses of the screw motor / mm is:  $(360 \div \text{step angle}) \times \text{microstep} \div \text{lead}$



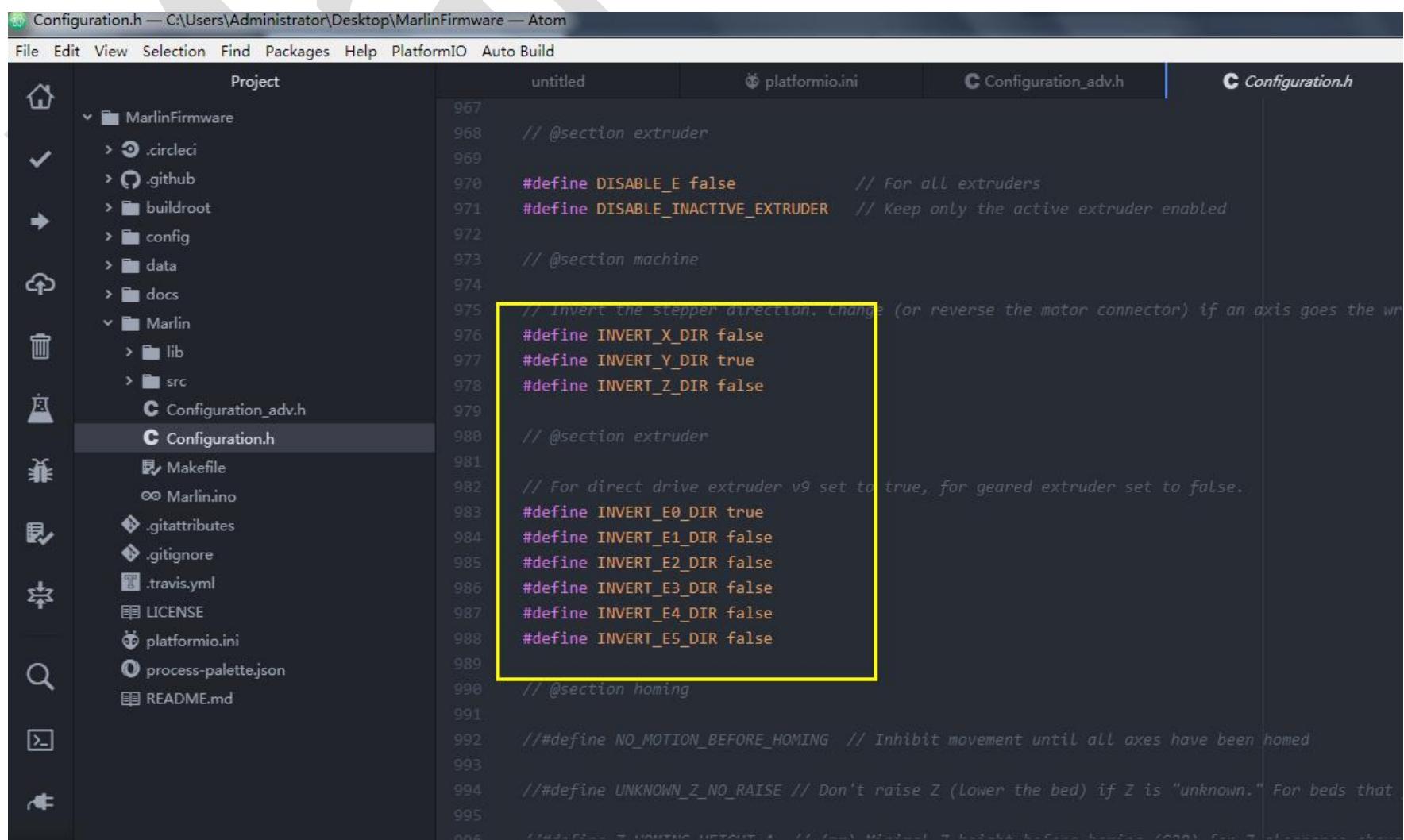
```

File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h
097  /*
698 // #define DISTINCT_E_FACTORS
699 /**
700 * Default Axis Steps Per Unit (steps/mm)
701 * Override with M92
702 *
703 * X, Y, Z, E0 [, E1[, E2[, E3[, E4[, E5]]]]]
704 */
705 #define DEFAULT_AXIS_STEPS_PER_UNIT { 80, 80, 400, 138}
706
707 /**
708 * Default Max Feed Rate (mm/s)
709 * Override with M203
710 *
711 * X, Y, Z, E0 [, E1[, E2[, E3[, E4[, E5]]]]]
712 */
713 #define DEFAULT_MAX_FEEDRATE { 300, 300, 5, 25 }
714
715 /**
716 * Default Max Acceleration (change/s) change = mm/s
717 * (Maximum start speed for accelerated moves)
718 * Override with M201
719 *
720 * X, Y, Z, E0 [, E1[, E2[, E3[, E4[, E5]]]]]
721 */
722 #define DEFAULT_MAX_ACCELERATION { 3000, 3000, 100, 10000 }
723
724 /**
725 * Default Acceleration (change/s) change = mm/s
726 * Override with M204
727 */

```

## Motor direction setting

adjust parameter( true or false) to modified motor direction



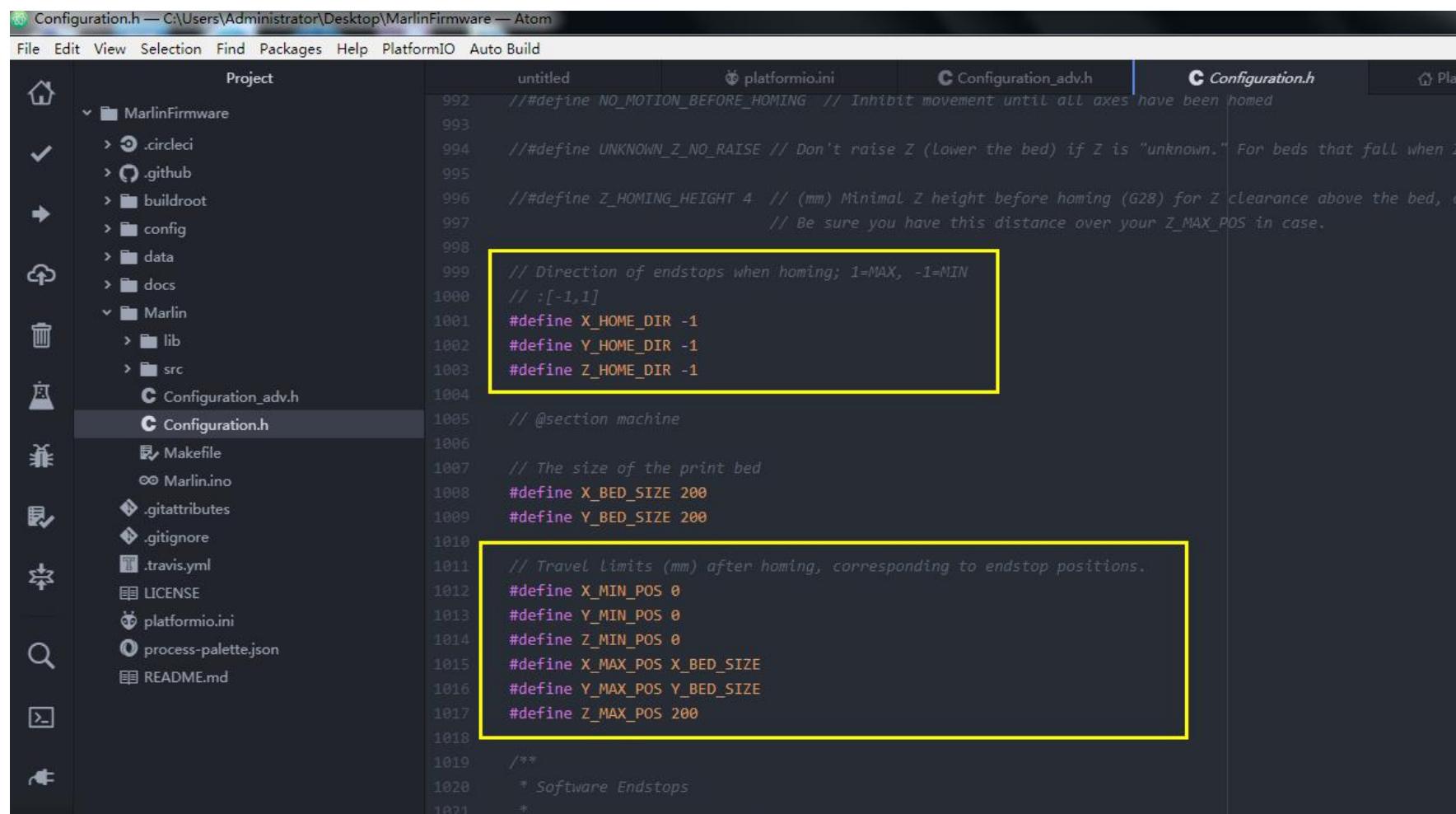
```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build
Project untitled platformio.ini Configuration_adv.h Configuration.h
967 /**
968 // @section extruder
969
970 #define DISABLE_E false // For all extruders
971 #define DISABLE_INACTIVE_EXTRUDER // Keep only the active extruder enabled
972
973 // @section machine
974
975 // Invert the stepper direction, change (or reverse the motor connector) if an axis goes the wrong way
976 #define INVERT_X_DIR false
977 #define INVERT_Y_DIR true
978 #define INVERT_Z_DIR false
979
980 // @section extruder
981
982 // For direct drive extruder v9 set to true, for geared extruder set to false.
983 #define INVERT_E0_DIR true
984 #define INVERT_E1_DIR false
985 #define INVERT_E2_DIR false
986 #define INVERT_E3_DIR false
987 #define INVERT_E4_DIR false
988 #define INVERT_E5_DIR false
989
990 // @section homing
991
992 // #define NO_MOTION_BEFORE_HOMING // Inhibit movement until all axes have been homed
993
994 // #define UNKNOWN_Z_NO_RAISE // Don't raise Z (lower the bed) if Z is "unknown." For beds that
995
996

```

Direction of Homing: “-1” is the minimum, and “1” is the maximum.

Travel limit: Set the maximum running distance of the xyz axis.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

Project          untitled      platformio.ini  Configuration_adv.h  Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
  data
  docs
  Marlin
    lib
    src
    Configuration_adv.h
    Configuration.h
  Makefile
  Marlin.ino
  .gitattributes
  .gitignore
  .travis.yml
  LICENSE
  platformio.ini
  process-palette.json
  README.md

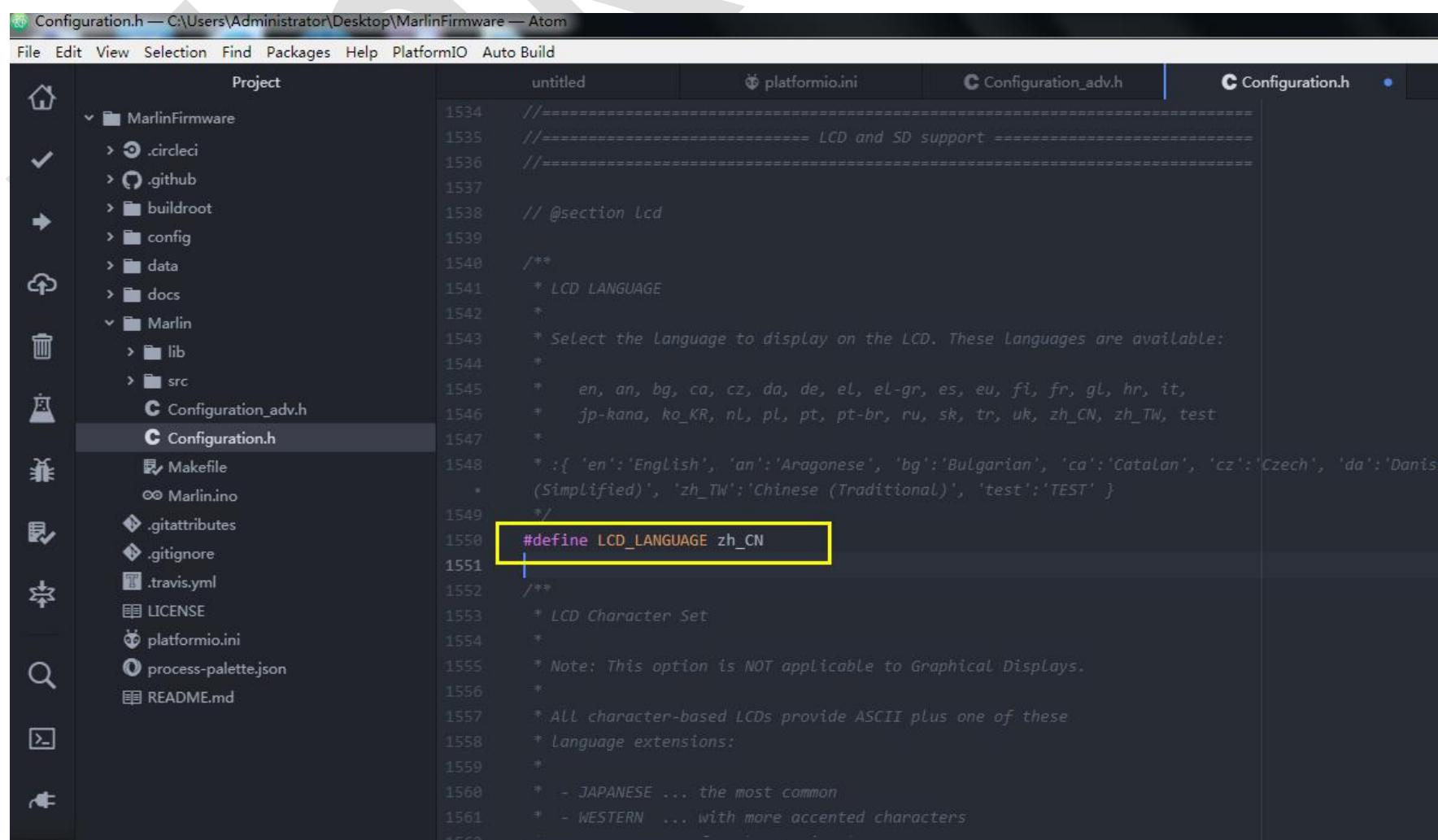
1 #define X_HOME_DIR -1
2 #define Y_HOME_DIR -1
3 #define Z_HOME_DIR -1
4
5 // @section machine
6
7 // The size of the print bed
8 #define X_BED_SIZE 200
9 #define Y_BED_SIZE 200
10
11 // Travel limits (mm) after homing, corresponding to endstop positions.
12 #define X_MIN_POS 0
13 #define Y_MIN_POS 0
14 #define Z_MIN_POS 0
15 #define X_MAX_POS X_BED_SIZE
16 #define Y_MAX_POS Y_BED_SIZE
17 #define Z_MAX_POS 200
18
19 /**
20 * Software Endstops
21 */

```

## LCD screen setting

Language setting: zh\_CN is Simplified Chinese, en is English.

Language settings can be made according to your needs.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

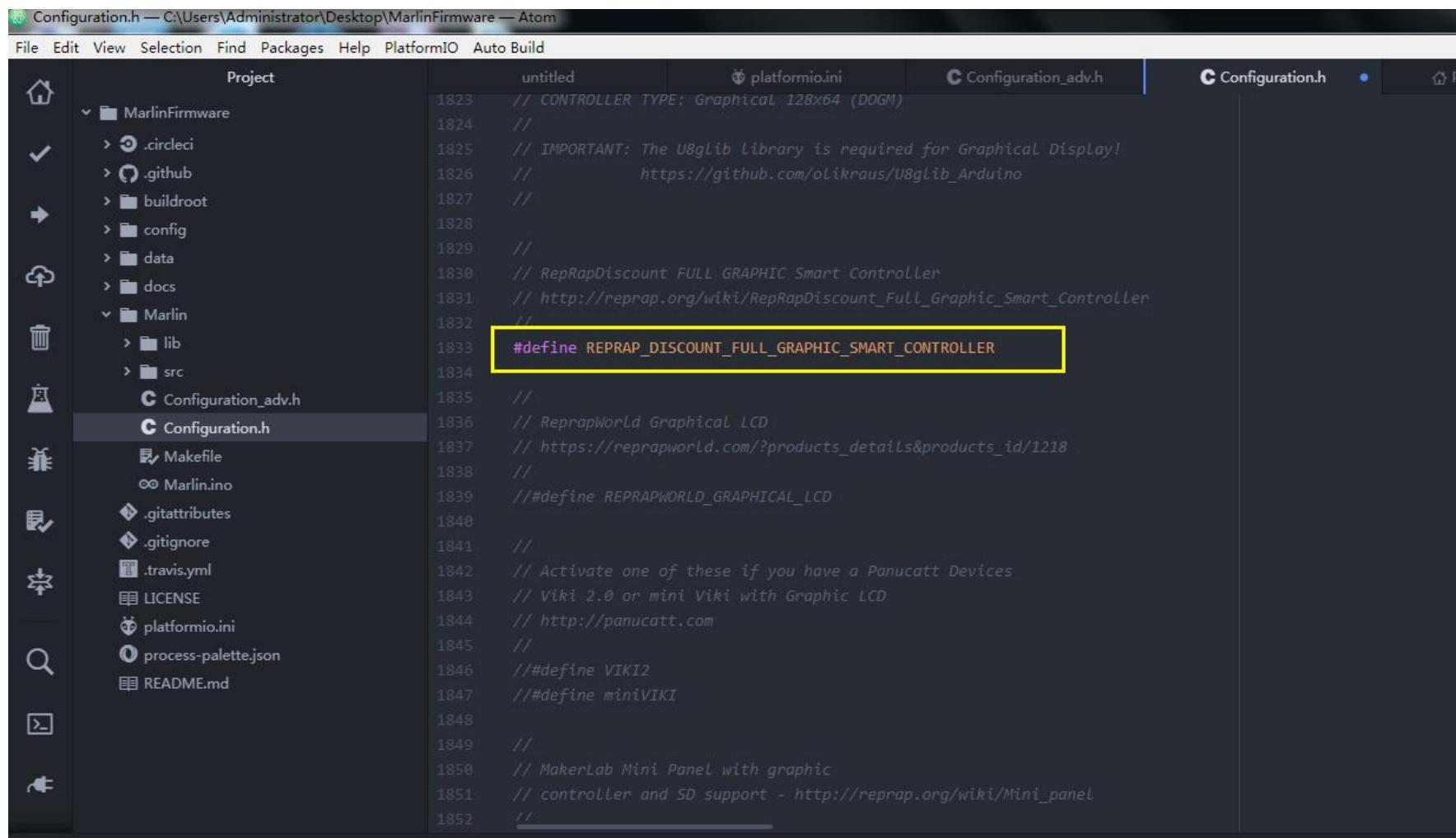
Project          untitled      platformio.ini  Configuration_adv.h  Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
  data
  docs
  Marlin
    lib
    src
    Configuration_adv.h
    Configuration.h
  Makefile
  Marlin.ino
  .gitattributes
  .gitignore
  .travis.yml
  LICENSE
  platformio.ini
  process-palette.json
  README.md

1 //=====
2 //===== LCD and SD support =====
3
4 // @section lcd
5
6 /**
7 * LCD LANGUAGE
8 *
9 * Select the Language to display on the LCD. These Languages are available:
10 *
11 * en, an, bg, ca, cz, da, de, el, el-gr, es, eu, fi, fr, gl, hr, it,
12 * jp-kana, ko_KR, nl, pl, pt, pt-br, ru, sk, tr, uk, zh_CN, zh_TW, test
13 *
14 * :{ 'en':'English', 'an':'Aragonese', 'bg':'Bulgarian', 'ca':'Catalan', 'cz':'Czech', 'da':'Danish',
15 *   '(Simplified)', 'zh_TW':'Chinese (Traditional)', 'test':'TEST' }
16 */
17
18 #define LCD_LANGUAGE zh_CN
19
20 /**
21 * LCD Character Set
22 *
23 * Note: This option is NOT applicable to Graphical Displays.
24 *
25 * All character-based LCDs provide ASCII plus one of these
26 * Language extensions:
27 *
28 * - JAPANESE ... the most common
29 * - WESTERN ... with more accented characters
30 */

```

## Screen type enable

Do not enable multiple screens at the same time. It is easy to cause errors LCD12864 enabled



```

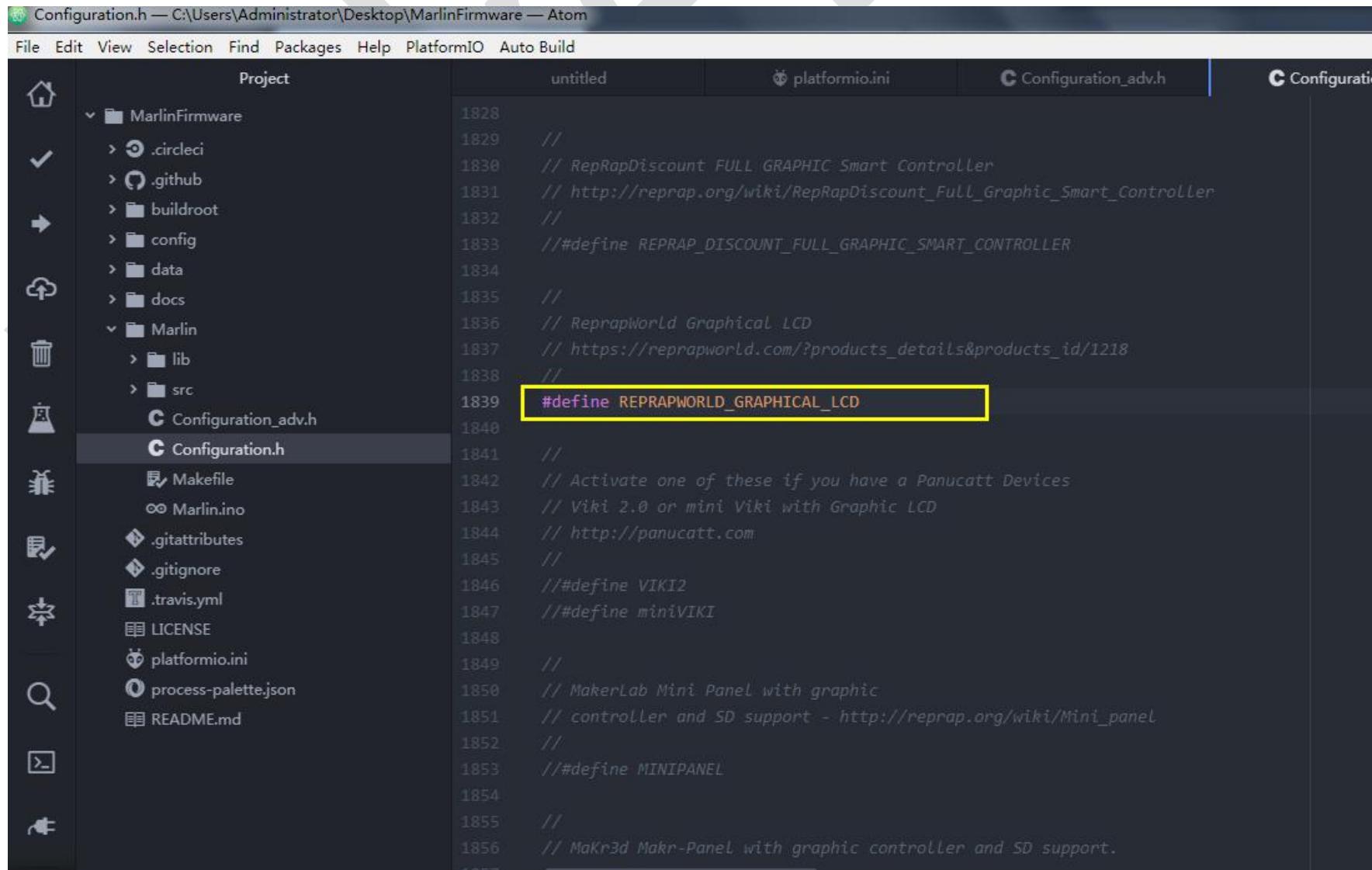
Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

Project          untitled      platformio.ini   Configuration_adv.h   Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
  data
  docs
  Marlin
    lib
    src
  Configuration_adv.h
  Configuration.h
  Makefile
  Marlin.ino
  .gitattributes
  .gitignore
  .travis.yml
  LICENSE
  platformio.ini
  process-palette.json
  README.md

1823 // CONTROLLER TYPE: Graphical 128x64 (DOGM)
1824 //
1825 // IMPORTANT: The U8glib Library is required for Graphical Display!
1826 // https://github.com/olikraus/U8glib_Arduino
1827 //
1828 //
1829 //
1830 // RepRapDiscount FULL GRAPHIC Smart Controller
1831 // http://reprap.org/wiki/RepRapDiscount_Full_Graphic_Smart_Controller
1832 //
1833 #define REPRAP_DISCOUNT_FULL_GRAPHIC_SMART_CONTROLLER
1834 //
1835 //
1836 // RepRapWorld Graphical LCD
1837 // https://reprapworld.com/?products_details&products_id/1218
1838 //
1839 // #define REPRAPWORLD_GRAPHICAL_LCD
1840 //
1841 //
1842 // Activate one of these if you have a Panucatt Devices
1843 // Viki 2.0 or mini Viki with Graphic LCD
1844 // http://panucatt.com
1845 //
1846 // #define VIKI2
1847 // #define miniVIKI
1848 //
1849 //
1850 // MakerLab Mini Panel with graphic
1851 // controller and SD support - http://reprap.org/wiki/Mini_panel
1852 //

```

## LCD2004 enable



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom
File Edit View Selection Find Packages Help PlatformIO Auto Build

Project          untitled      platformio.ini   Configuration_adv.h   Configuration.h
MarlinFirmware
  .circleci
  .github
  buildroot
  config
  data
  docs
  Marlin
    lib
    src
  Configuration_adv.h
  Configuration.h
  Makefile
  Marlin.ino
  .gitattributes
  .gitignore
  .travis.yml
  LICENSE
  platformio.ini
  process-palette.json
  README.md

1828
1829 //
1830 // RepRapDiscount FULL GRAPHIC Smart Controller
1831 // http://reprap.org/wiki/RepRapDiscount_Full_Graphic_Smart_Controller
1832 //
1833 // #define REPRAP_DISCOUNT_FULL_GRAPHIC_SMART_CONTROLLER
1834 //
1835 //
1836 // RepRapWorld Graphical LCD
1837 // https://reprapworld.com/?products_details&products_id/1218
1838 //
1839 #define REPRAPWORLD_GRAPHICAL_LCD
1840 //
1841 //
1842 // Activate one of these if you have a Panucatt Devices
1843 // Viki 2.0 or mini Viki with Graphic LCD
1844 // http://panucatt.com
1845 //
1846 // #define VIKI2
1847 // #define miniVIKI
1848 //
1849 //
1850 // MakerLab Mini Panel with graphic
1851 // controller and SD support - http://reprap.org/wiki/Mini_panel
1852 //
1853 // #define MINIPANEL
1854 //
1855 //
1856 // MaKr3d Makr-Panel with graphic controller and SD support.

```

## Mini12864 and LCD12864A enable

If you use the 12864A, you need to modify the contrast of the screen in the firmware before uploading the file. Can be used again. (mini12864 does not need this operation)



Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware — Atom

File Edit View Selection Find Packages Help PlatformIO Auto Build

Project      untitled      platformio.ini      Configuration\_adv.h      Configuration.h

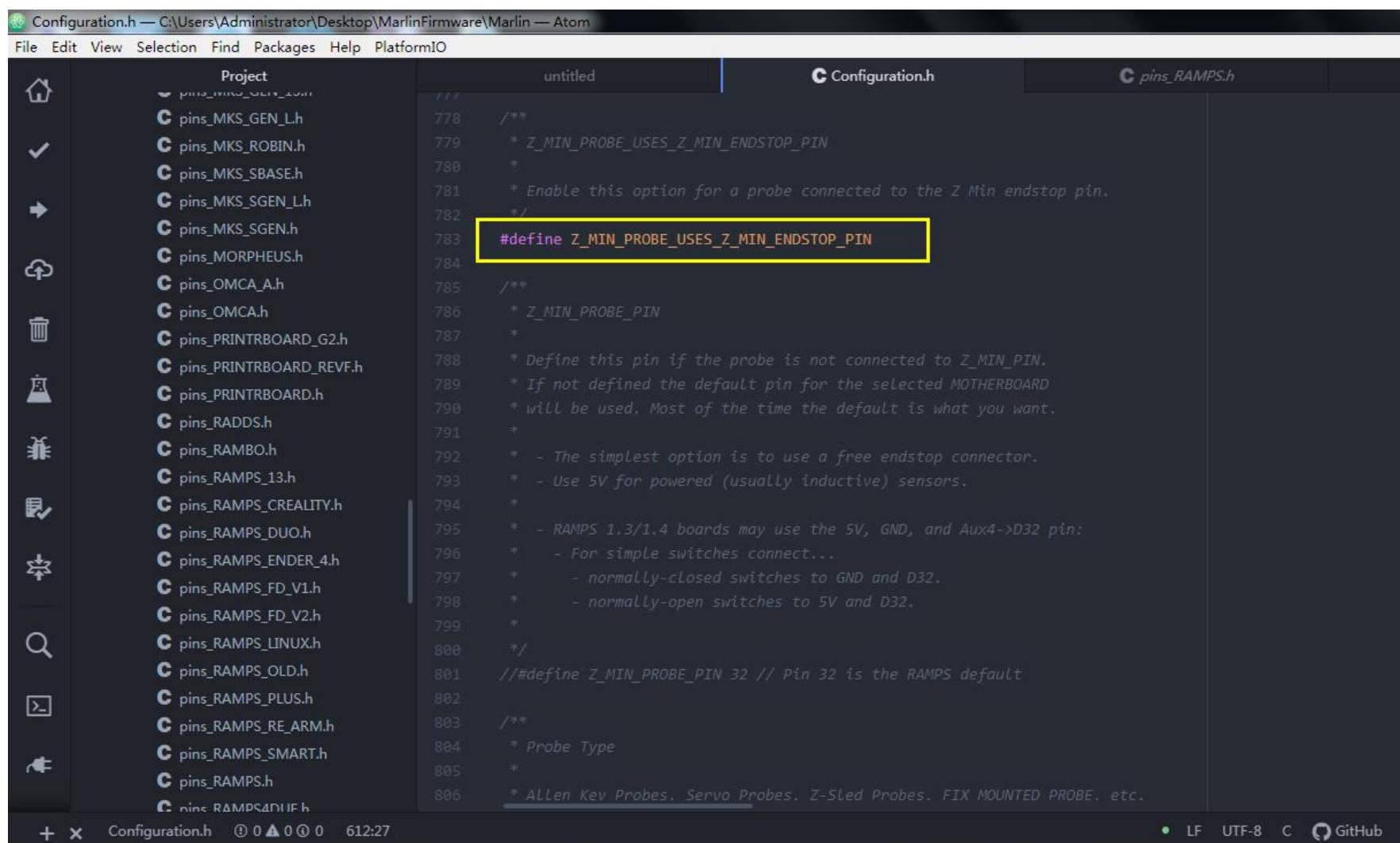
```
1892 // #define SAV_3DGLCD
1893 #if ENABLED(SAV_3DGLCD)
1894 // #define U8GLIB_SSD1306
1895 #define U8GLIB_SH1106
1896 #endif
1897 //
1898 // Original Ulticontroller from Ultimaker 2 printer with SSD1309 I2C display and encoder
1899 // https://github.com/Ultimaker/Ultimaker2/tree/master/1249_Ulticontroller_Board_(x1)
1900 //
1901 // #define ULTI_CONTROLLER
1902 //
1903 // TinyBoy2 128x64 OLED / Encoder Panel
1904 //
1905 // #define OLED_PANEL_TINYBOY2
1906 //
1907 // #define MKS_MINI_12864
1908 //
1909 // MKS MINI12864 with graphic controller and SD support
1910 // http://reprap.org/wiki/MKS_MINI_12864
1911 //
1912 // #define MKS_MINI_12864
1913 // FYSETC variant of the MINI12864 graphic controller with SD support
1914 // https://wiki.fyetc.com/MINI12864_Panel/?fbclid=IwAR1FyjuNdV00y9_xzky3qqa_WeM5h-4gpRnnWhQr_01Ef3h0AFr
1915 //
1916 // FYSETC variant of the MINI12864 graphic controller with SD support
1917 // https://wiki.fyetc.com/MINI12864_Panel/?fbclid=IwAR1FyjuNdV00y9_xzky3qqa_WeM5h-4gpRnnWhQr_01Ef3h0AFr
1918 //
1919 // #define FYSETC_MINI_12864_1_2 // Type C/D/E/F. Simple RGB Backlight (always on)
1920 // #define FYSETC_MINI_12864_2_0 // Type A/B. Discreet RGB Backlight
```

### 5.2.2 Automatic Leveling Setting

The configuration on the Marlin 2.0 firmware mainly refers to the "3D touch datasheet"

If using the Z-limit as the trigger limit for the leveling switch, enable the following item.

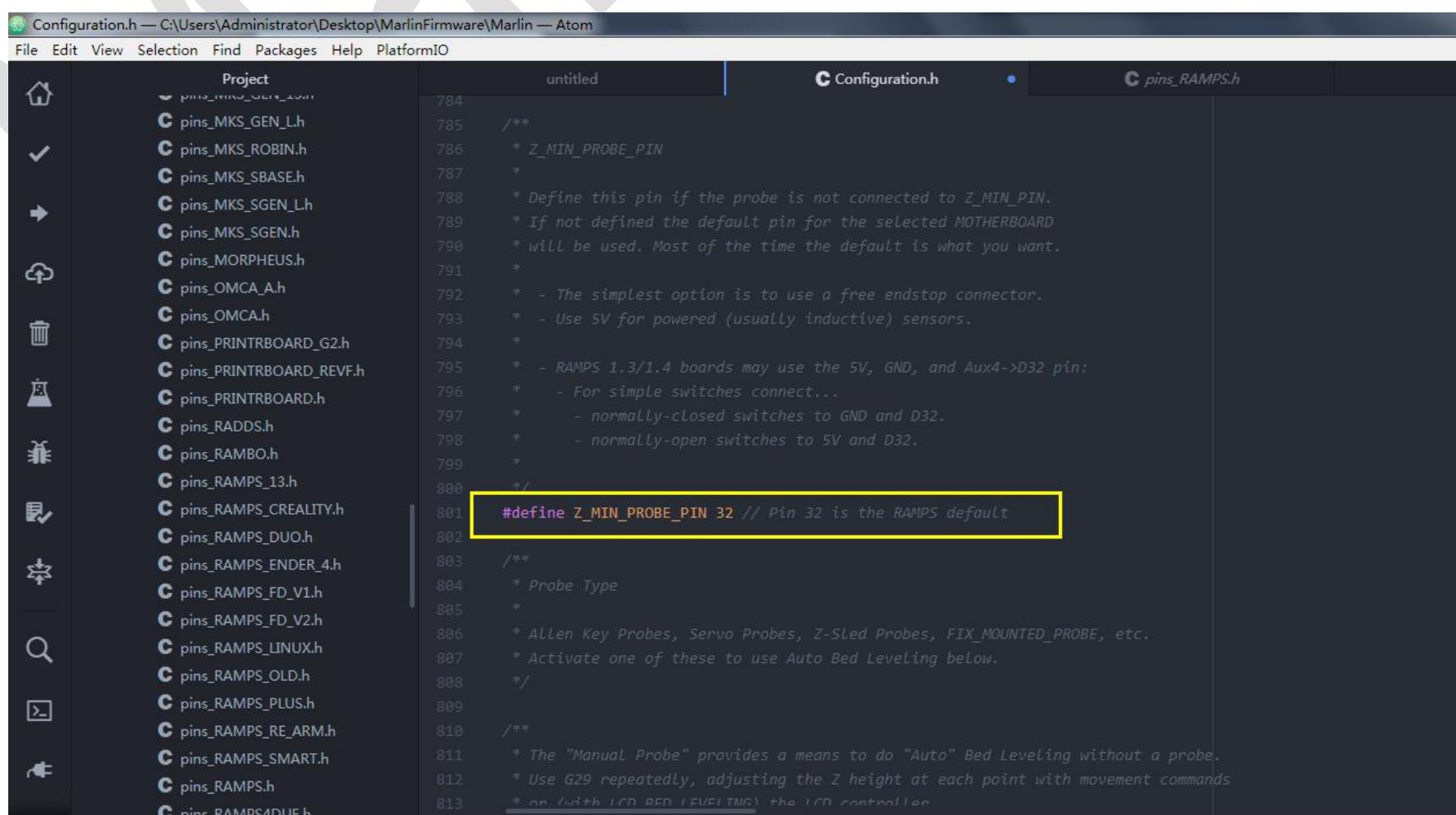
```
#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
```



```
Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project pins_MKSDRIVER.h
pins_MKS_GEN_L.h
pins_MKS_ROBIN.h
pins_MKS_SBASE.h
pins_MKS_SGEN_L.h
pins_MKS_SGEN.h
pins_MORPHEUS.h
pins_OMCA_A.h
pins_OMCA.h
pins_PRINTRBOARD_G2.h
pins_PRINTRBOARD_REVF.h
pins_PRINTRBOARD.h
pins_RADDS.h
pins_RAMBO.h
pins_RAMPS_13.h
pins_RAMPS_CREALITY.h
pins_RAMPS_DUO.h
pins_RAMPS_ENDER_4.h
pins_RAMPS_FD_V1.h
pins_RAMPS_FD_V2.h
pins_RAMPS_LINUX.h
pins_RAMPS_OLD.h
pins_RAMPS_PLUS.h
pins_RAMPS_RE_ARM.h
pins_RAMPS_SMART.h
pins_RAMPS.h
pins_RAMPS4DUF.h
untitled
C Configuration.h
C pins_RAMPS.h
778 /**
779 * Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
780 *
781 * Enable this option for a probe connected to the Z Min endstop pin.
782 */
783 #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
784 /**
785 * Z_MIN_PROBE_PIN
786 *
787 * Define this pin if the probe is not connected to Z_MIN_PIN.
788 * If not defined the default pin for the selected MOTHERBOARD
789 * will be used. Most of the time the default is what you want.
790 *
791 * - The simplest option is to use a free endstop connector.
792 * - Use 5V for powered (usually inductive) sensors.
793 *
794 * - RAMPS 1.3/1.4 boards may use the 5V, GND, and Aux4->D32 pin:
795 * - For simple switches connect...
796 * - normally-closed switches to GND and D32.
797 * - normally-open switches to 5V and D32.
798 *
799 */
800 //#define Z_MIN_PROBE_PIN 32 // Pin 32 is the RAMPS default
801 /**
802 * Probe Type
803 *
804 * ALLEN Key Probes, Servo Probes, Z-Sled Probes, FIX_MOUNTED_PROBE, etc.
805 *
806 * Activate one of these to use Auto Bed Leveling below.
807 */
808 /**
809 * The "Manual Probe" provides a means to do "Auto" Bed Leveling without a probe.
810 * Use G29 repeatedly, adjusting the Z height at each point with movement commands
811 * on /with LCD_BED_LEVELING the LCD controller
812 *
813 */
+ × Configuration.h ① 0 ▲ 0 ① 0 612:27 LF UTF-8 C GitHub
```

If you want to enable on other endstop's pin, you can enable the following item and modify the pin of the corresponding limit.

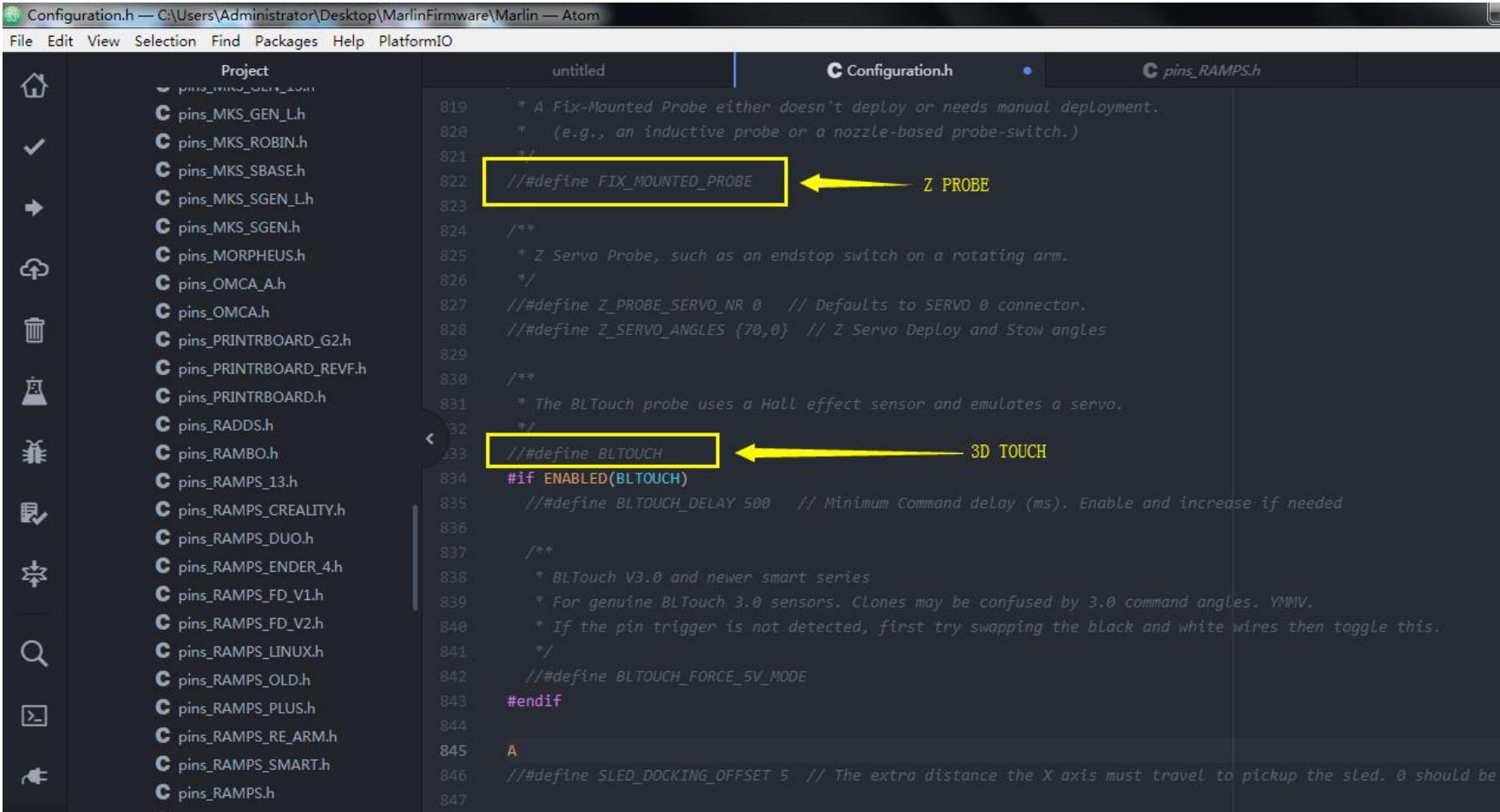
```
#define Z_MIN_PROBE_PIN 32
```



```
Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project pins_MKSDRIVER.h
pins_MKS_GEN_L.h
pins_MKS_ROBIN.h
pins_MKS_SBASE.h
pins_MKS_SGEN_L.h
pins_MKS_SGEN.h
pins_MORPHEUS.h
pins_OMCA_A.h
pins_OMCA.h
pins_PRINTRBOARD_G2.h
pins_PRINTRBOARD_REVF.h
pins_PRINTRBOARD.h
pins_RADDS.h
pins_RAMBO.h
pins_RAMPS_13.h
pins_RAMPS_CREALITY.h
pins_RAMPS_DUO.h
pins_RAMPS_ENDER_4.h
pins_RAMPS_FD_V1.h
pins_RAMPS_FD_V2.h
pins_RAMPS_LINUX.h
pins_RAMPS_OLD.h
pins_RAMPS_PLUS.h
pins_RAMPS_RE_ARM.h
pins_RAMPS_SMART.h
pins_RAMPS.h
pins_RAMPS4DUF.h
untitled
C Configuration.h
C pins_RAMPS.h
784 /**
785 * Z_MIN_PROBE_PIN
786 *
787 * Define this pin if the probe is not connected to Z_MIN_PIN.
788 * If not defined the default pin for the selected MOTHERBOARD
789 * will be used. Most of the time the default is what you want.
790 *
791 * - The simplest option is to use a free endstop connector.
792 * - Use 5V for powered (usually inductive) sensors.
793 *
794 * - RAMPS 1.3/1.4 boards may use the 5V, GND, and Aux4->D32 pin:
795 * - For simple switches connect...
796 * - normally-closed switches to GND and D32.
797 * - normally-open switches to 5V and D32.
798 *
799 */
800 #define Z_MIN_PROBE_PIN 32 // Pin 32 is the RAMPS default
801 /**
802 * Probe Type
803 *
804 * ALLEN Key Probes, Servo Probes, Z-Sled Probes, FIX_MOUNTED_PROBE, etc.
805 *
806 * Activate one of these to use Auto Bed Leveling below.
807 */
808 /**
809 * The "Manual Probe" provides a means to do "Auto" Bed Leveling without a probe.
810 * Use G29 repeatedly, adjusting the Z height at each point with movement commands
811 * on /with LCD_BED_LEVELING the LCD controller
812 *
813 */
+ × Configuration.h ① 0 ▲ 0 ① 0 612:27 LF UTF-8 C GitHub
```

Look at the following figure, If you use Z-probe, enable the first item. If you use 3dtouch, enable the second one.

Cannot enable multiple items at the same time, because it will cause errors. If you enable one item, you need to shield another one.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project
pins_MMU2.h
pins_MKS_GEN_L.h
pins_MKS_ROBIN.h
pins_MKS_SBASE.h
pins_MKS_SGEN_L.h
pins_MKS_SGEN.h
pins_MORPHEUS.h
pins_OMCA_A.h
pins_OMCA.h
pins_PRINTRBOARD_G2.h
pins_PRINTRBOARD_REV.F.h
pins_PRINTRBOARD.h
pins_RADD.S.h
pins_RAMBO.h
pins_RAMPS_13.h
pins_RAMPS_CREALITY.h
pins_RAMPS_DUO.h
pins_RAMPS_ENDER_4.h
pins_RAMPS_FD_V1.h
pins_RAMPS_FD_V2.h
pins_RAMPS_LINUX.h
pins_RAMPS_OLD.h
pins_RAMPS_PLUS.h
pins_RAMPS_RE_ARM.h
pins_RAMPS_SMART.h
pins_RAMPS.h
pins_RAMPS4DU.F.h

untitled
Configuration.h
pins_RAMPS.h

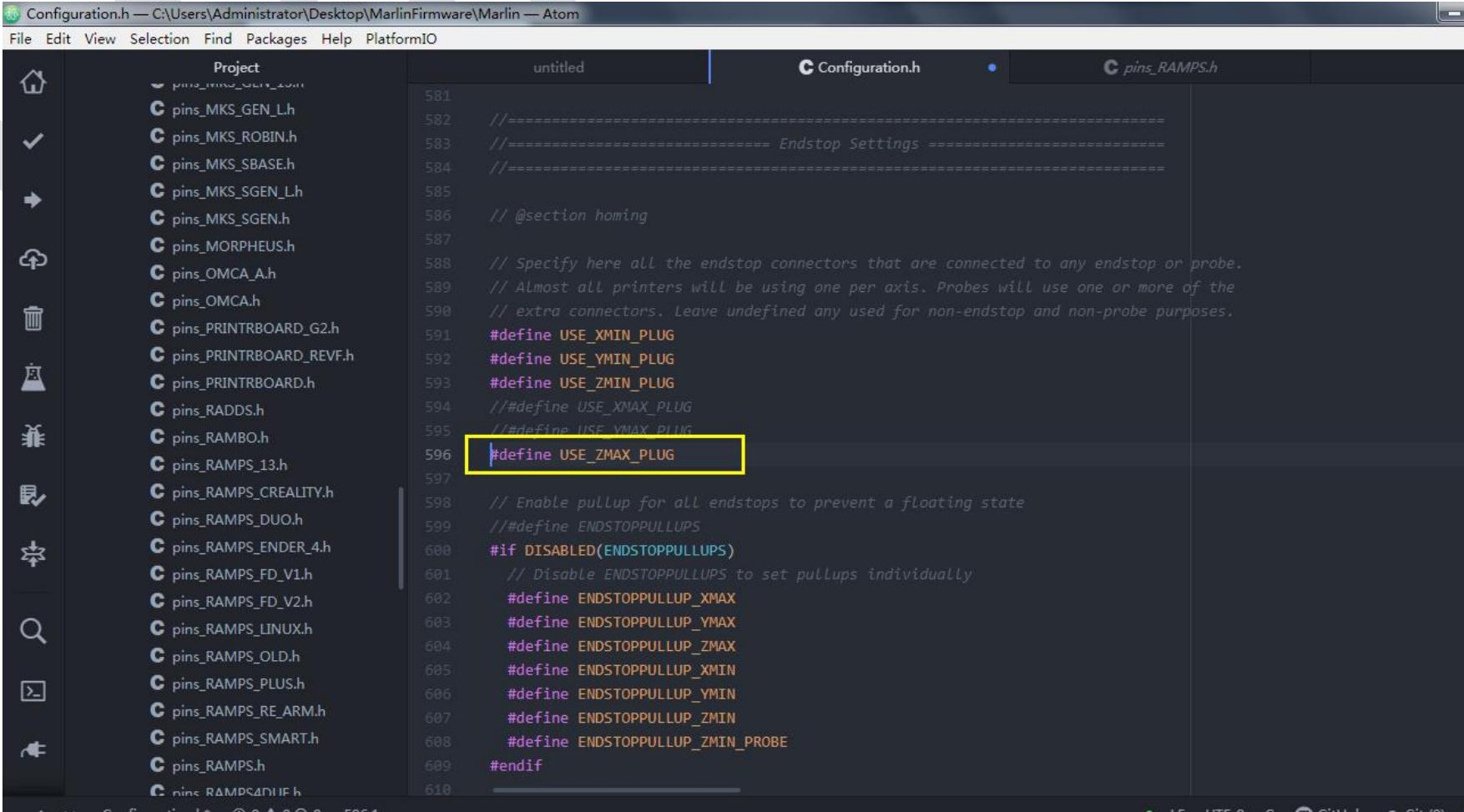
819 * A Fix-Mounted Probe either doesn't deploy or needs manual deployment.
820 * (e.g., an inductive probe or a nozzle-based probe-switch.)
821 */
822 // #define FIX_MOUNTED_PROBE
823 /**
824 * Z Servo Probe, such as an endstop switch on a rotating arm.
825 */
826 // #define Z_PROBE_SERVO_NR 0 // Defaults to SERVO 0 connector.
827 // #define Z_SERVO_ANGLES {70,0} // Z Servo Deploy and Stow angles
828 /**
829 * The BLTouch probe uses a Hall effect sensor and emulates a servo.
830 */
831 // #define BLTOUCH
832 #if ENABLED(BLTOUCH)
833 // #define BLTOUCH_DELAY 500 // Minimum Command delay (ms). Enable and increase if needed
834 /**
835 * BLTouch V3.0 and newer smart series
836 * For genuine BLTouch 3.0 sensors. Clones may be confused by 3.0 command angles. YMMV.
837 */
838 // #define BLTOUCH_FORCE_5V_MODE
839 #endif
840 A
841 // #define SLED_DOCKING_OFFSET 5 // The extra distance the X axis must travel to pickup the sled. 0 should be
842
843
844
845
846
847

```

The code shows two probe configuration sections. The first section, labeled 'Z PROBE' with a yellow arrow, contains the line `// #define FIX\_MOUNTED\_PROBE`. The second section, labeled '3D TOUCH' with a yellow arrow, contains the line `// #define BLTOUCH`. Both sections are preceded by multi-line comments describing their respective probe types and behaviors.

If the leveling switch is used with the relevant endstop, it must be enabled.

Generally, the default setting is false. Thus, the switch type ( normally open or normally closed ) should also be set correctly.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project
pins_MMU2.h
pins_MKS_GEN_L.h
pins_MKS_ROBIN.h
pins_MKS_SBASE.h
pins_MKS_SGEN_L.h
pins_MKS_SGEN.h
pins_MORPHEUS.h
pins_OMCA_A.h
pins_OMCA.h
pins_PRINTRBOARD_G2.h
pins_PRINTRBOARD_REV.F.h
pins_PRINTRBOARD.h
pins_RADD.S.h
pins_RAMBO.h
pins_RAMPS_13.h
pins_RAMPS_CREALITY.h
pins_RAMPS_DUO.h
pins_RAMPS_ENDER_4.h
pins_RAMPS_FD_V1.h
pins_RAMPS_FD_V2.h
pins_RAMPS_LINUX.h
pins_RAMPS_OLD.h
pins_RAMPS_PLUS.h
pins_RAMPS_RE_ARM.h
pins_RAMPS_SMART.h
pins_RAMPS.h
pins_RAMPS4DU.F.h

untitled
Configuration.h
pins_RAMPS.h

581 //=====
582 //===== Endstop Settings =====
583 //=====
584 /**
585 */
586 // @section homing
587
588 // Specify here all the endstop connectors that are connected to any endstop or probe.
589 // Almost all printers will be using one per axis. Probes will use one or more of the
590 // extra connectors. Leave undefined any used for non-endstop and non-probe purposes.
591 #define USE_XMIN_PLUG
592 #define USE_YMIN_PLUG
593 #define USE_ZMIN_PLUG
594 // #define USE_XMAX_PLUG
595 // #define USE_YMAX_PLUG
596 #define USE_ZMAX_PLUG
597
598 // Enable pullup for all endstops to prevent a floating state
599 // #define ENDSTOPPULLUPS
600 #if DISABLED(ENDSTOPPULLUPS)
601 // Disable ENDSTOPPULLUPS to set pullups individually
602 #define ENDSTOPPULLUP_XMAX
603 #define ENDSTOPPULLUP_YMAX
604 #define ENDSTOPPULLUP_ZMAX
605 #define ENDSTOPPULLUP_XMIN
606 #define ENDSTOPPULLUP_YMIN
607 #define ENDSTOPPULLUP_ZMIN
608 #define ENDSTOPPULLUP_ZMIN_PROBE
609#endif
610

```

The code shows the `#define USE\_ZMAX\_PLUG` line highlighted with a yellow box. This line is part of a larger block of code related to endstop settings, specifically defining which connectors are used for each axis.

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom

```

File Edit View Selection Find Packages Help PlatformIO

Project
C pins_MKSDLUF.h
C pins_MKS_GEN_L.h
C pins_MKS_ROBIN.h
C pins_MKS_SBASE.h
C pins_MKS_SGEN_L.h
C pins_MKS_SGEN.h
C pins_MORPHEUS.h
C pins_OMCA_A.h
C pins_OMCA.h
C pins_PRINTRBOARD_G2.h
C pins_PRINTRBOARD_REVF.h
C pins_PRINTRBOARD.h
C pins_RADDSh.h
C pins_RAMBO.h
C pins_RAMPS_13.h
C pins_RAMPS_CREALITY.h
C pins_RAMPS_DUO.h
C pins_RAMPS_ENDER_4.h
C pins_RAMPS_FD_V1.h
C pins_RAMPS_FD_V2.h
C pins_RAMPS_LINUX.h
C pins_RAMPS_OLD.h
C pins_RAMPS_PLUS.h
C pins_RAMPS_RE_ARM.h
C pins_RAMPS_SMART.h
C pins_RAMPS.h
C pins_RAMPS4DUF.h

untitled
C Configuration.h
C pins_RAMPS.h

612 //##define ENDSTOPPULLDOWNS
613 #if DISABLED(ENDSTOPPULLDOWNS)
614 // Disable ENDSTOPPULLDOWNS to set pulldowns individually
615 //##define ENDSTOPPULLDOWN_XMAX
616 //##define ENDSTOPPULLDOWN_YMAX
617 //##define ENDSTOPPULLDOWN_ZMAX
618 //##define ENDSTOPPULLDOWN_XMIN
619 //##define ENDSTOPPULLDOWN_YMIN
620 //##define ENDSTOPPULLDOWN_ZMIN
621 //##define ENDSTOPPULLDOWN_ZMIN_PROBE
622 #endif
623
624 // Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).
625 #define X_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
626 #define Y_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
627 #define Z_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
628 #define X_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
629 #define Y_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
630 #define Z_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
631 #define Z_MIN_PROBE_ENDSTOP_INVERTING false // set to true to invert the logic of the probe.
632
633 /**
634 * Stepper Drivers
635 *
636 * These settings allow Marlin to tune stepper driver timing and enable advanced options for
637 * stepper drivers that support them. You may also override timing options in Configuration_adv.h.
638 *
639 * A4988 is assumed for unspecified drivers.
640 *
641 */

```

Select leveling mode, enable: #define AUTO\_BED\_LEVELING\_BILINEAR

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom

```

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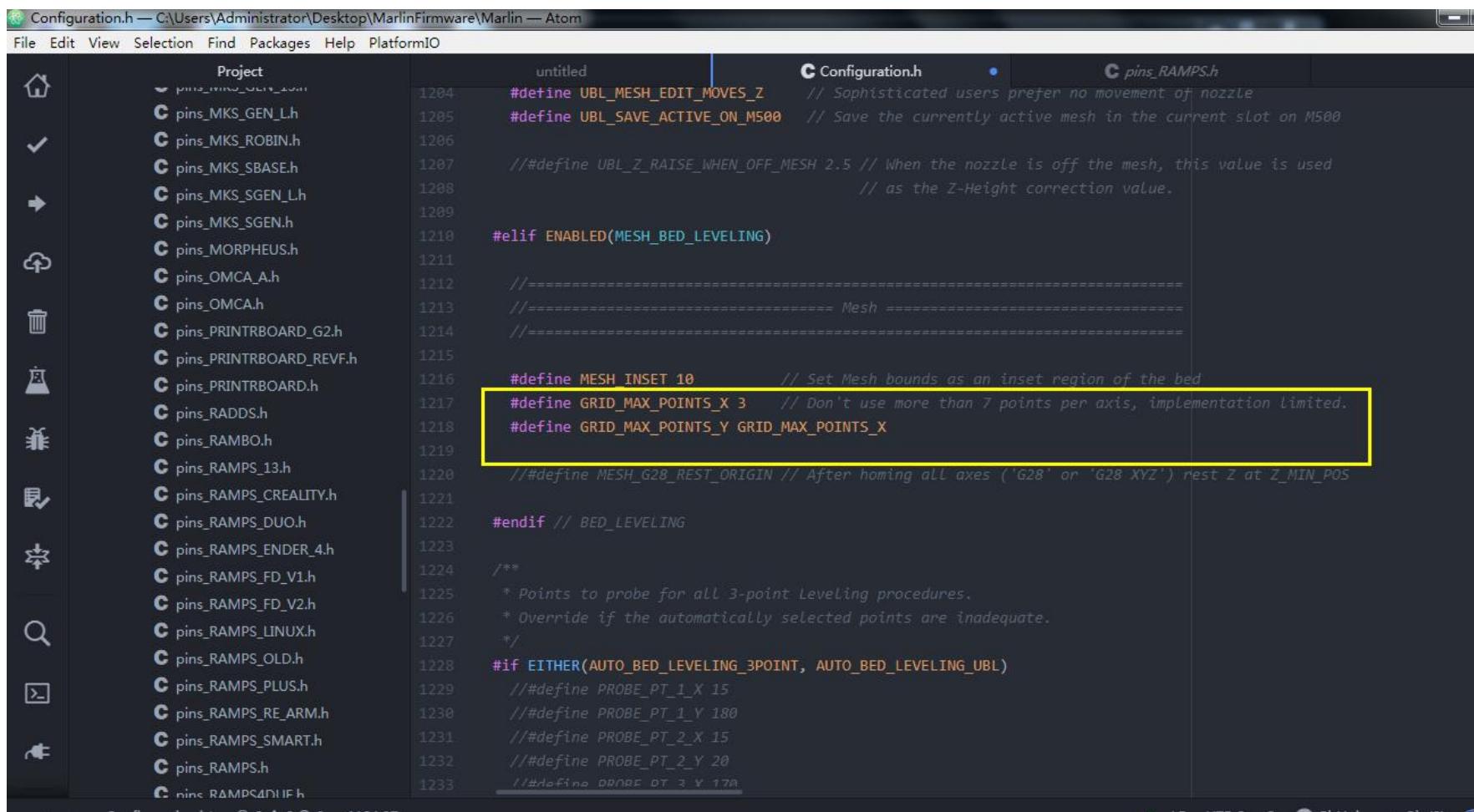
Project
C pins_MKSDLUF.h
C pins_MKS_GEN_L.h
C pins_MKS_ROBIN.h
C pins_MKS_SBASE.h
C pins_MKS_SGEN_L.h
C pins_MKS_SGEN.h
C pins_MORPHEUS.h
C pins_OMCA_A.h
C pins_OMCA.h
C pins_PRINTRBOARD_G2.h
C pins_PRINTRBOARD_REVF.h
C pins_PRINTRBOARD.h
C pins_RADDSh.h
C pins_RAMBO.h
C pins_RAMPS_13.h
C pins_RAMPS_CREALITY.h
C pins_RAMPS_DUO.h
C pins_RAMPS_ENDER_4.h
C pins_RAMPS_FD_V1.h
C pins_RAMPS_FD_V2.h
C pins_RAMPS_LINUX.h
C pins_RAMPS_OLD.h
C pins_RAMPS_PLUS.h
C pins_RAMPS_RE_ARM.h
C pins_RAMPS_SMART.h
C pins_RAMPS.h
C pins_RAMPS4DUF.h

untitled
C Configuration.h
C pins_RAMPS.h

1104 * of other systems. UBL also includes integrated Mesh Generation, Mesh
1105 * Validation and Mesh Editing systems.
1106 *
1107 * - MESH_BED_LEVELING
1108 * Probe a grid manually
1109 * The result is a mesh, suitable for large or uneven beds. (See BILINEAR.)
1110 * For machines without a probe, Mesh Bed Leveling provides a method to perform
1111 * Leveling in steps so you can manually adjust the Z height at each grid-point.
1112 * With an LCD controller the process is guided step-by-step.
1113 */
1114 //##define AUTO_BED_LEVELING_3POINT
1115 //##define AUTO_BED_LEVELING_LINEAR
1116 #define AUTO_BED_LEVELING_BILINEAR
1117 //##define AUTO_BED_LEVELING_UBL
1118 //##define MESH_BED_LEVELING
1119
1120 /**
1121 * Normally G28 Leaves Leveling disabled on completion. Enable
1122 * this option to have G28 restore the prior Leveling state.
1123 */
1124 //##define RESTORE_LEVELING_AFTER_G28
1125
1126 /**
1127 * Enable detailed Logging of G28, G29, M48, etc.
1128 * Turn on with the command 'M111 S32'.
1129 * NOTE: Requires a Lot of PROGMEM!
1130 */
1131 //##define DEBUG_LEVELING_FEATURE
1132

```

## Leveling point setting



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project
pins_MKSDL10.h
pins_MKS_GEN_Lh
pins_MKS_ROBIN.h
pins_MKS_SBASE.h
pins_MKS_SGEN_Lh
pins_MKS_SGEN.h
pins_MORPHEUS.h
pins_OMCA_A.h
pins_OMCA.h
pins_PRINTRBOARD_G2.h
pins_PRINTRBOARD_REVf.h
pins_PRINTRBOARD.h
pins_RADDS.h
pins_RAMBO.h
pins_RAMPS_13.h
pins_RAMPS_CREALITY.h
pins_RAMPS_DUO.h
pins_RAMPS_ENDER_4.h
pins_RAMPS_FD_V1.h
pins_RAMPS_FD_V2.h
pins_RAMPS_LINUX.h
pins_RAMPS_OLD.h
pins_RAMPS_PLUS.h
pins_RAMPS_RE_ARM.h
pins_RAMPS_SMART.h
pins_RAMPS.h
pins_RAMPS4DIF.h

untitled
C Configuration.h
pins_RAMPS.h

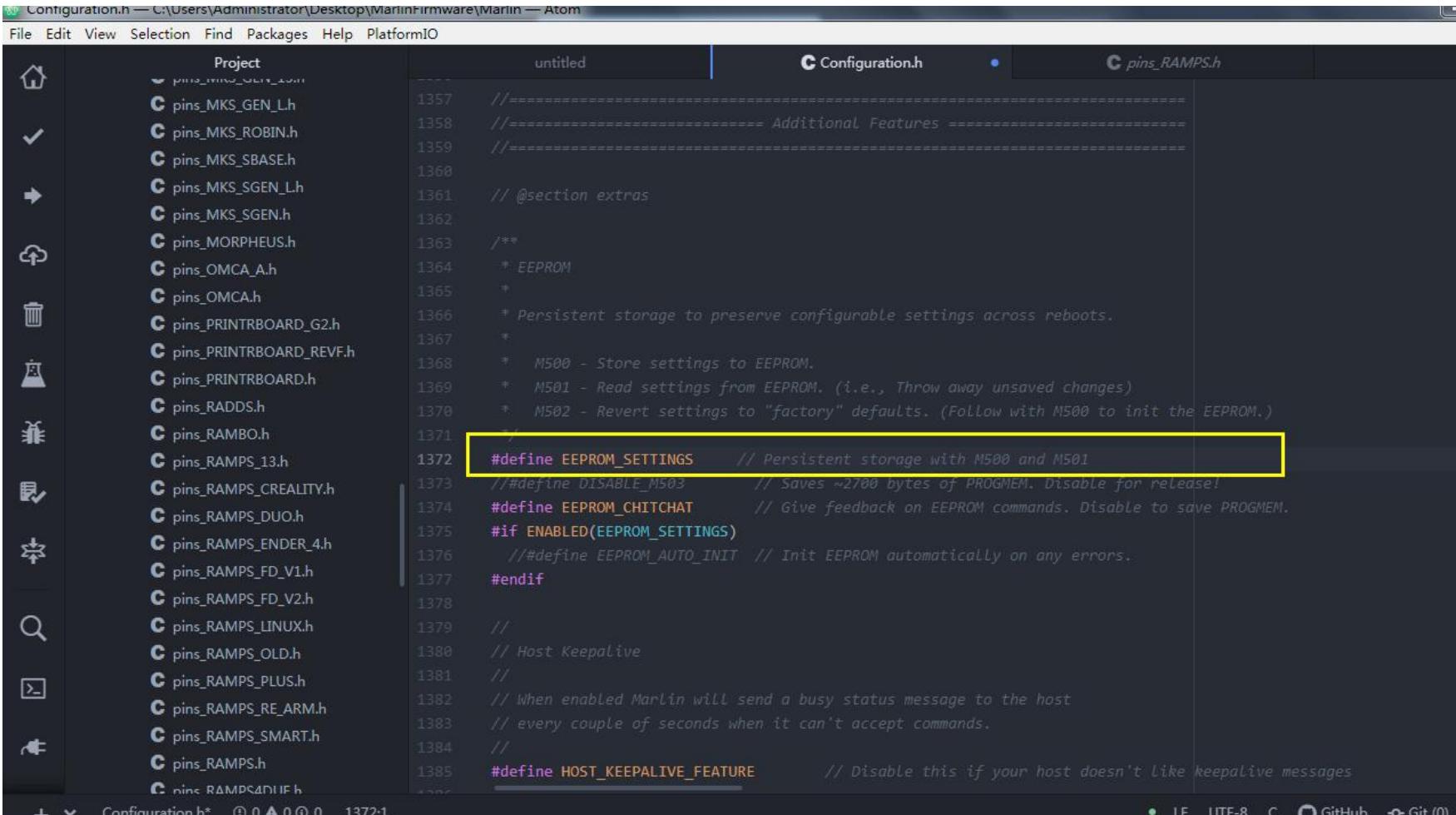
1204 #define UBL_MESH_EDIT_MOVES_Z
1205 // Sophisticated users prefer no movement of nozzle
1206 #define UBL_SAVE_ACTIVE_ON_M500 // Save the currently active mesh in the current slot on M500
1207 //##define UBL_Z_RAISE_WHEN_OFF_MESH 2.5 // When the nozzle is off the mesh, this value is used
1208 // as the Z-Height correction value.
1209
1210 #elif ENABLED(MESH_BED_LEVELING)
1211
1212 //=====
1213 //===== Mesh =====
1214 //=====
1215
1216 #define MESH_INSET 10 // Set Mesh bounds as an inset region of the bed
1217 #define GRID_MAX_POINTS_X 3 // Don't use more than 7 points per axis, implementation Limited.
1218 #define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X
1219
1220 //##define MESH_G28_REST_ORIGIN // After homing all axes ('G28' or 'G28 XYZ') rest Z at Z_MIN_POS
1221
1222 #endif // BED_LEVELING
1223
1224 /**
1225 * Points to probe for all 3-point Leveling procedures.
1226 * Override if the automatically selected points are inadequate.
1227 */
1228 #if EITHER(AUTO_BED_LEVELING_3POINT, AUTO_BED_LEVELING_UBL)
1229 //##define PROBE_PT_1_X 15
1230 //##define PROBE_PT_1_Y 180
1231 //##define PROBE_PT_2_X 15
1232 //##define PROBE_PT_2_Y 20
1233 //##define PROBE_PT_3_X 170
1234
1235 #endif // MESH_G28_REST_ORIGIN
1236
1237 /**
1238 * Number of servos
1239 *
1240 * For some servo-related options NUM_SERVOS will be set automatically.
1241 * Set this manually if there are extra servos needing manual control.
1242 * Leave undefined or set to 0 to entirely disable the servo subsystem.
1243 */
1244
1245 #define NUM_SERVOS 1 // Servo index starts with 0 for M280 command
1246
1247
1248 // Delay (in milliseconds) before the next move will start, to give the servo time to reach its target angle.
1249 // 300ms is a good value but you can try less delay.
1250 // If the servo can't reach the requested position, increase it.
1251 #define SERVO_DELAY { 300 }
1252
1253
1254 // Only power servos during movement, otherwise leave off to prevent jitter
1255 //##define DEACTIVATE_SERVOS_AFTER_MOVE
1256
1257 // Allow servo angle to be edited and saved to EEPROM
1258 //##define EDITABLE_SERVO_ANGLES
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```

## Leveling data saving settings

Need to enable first: #define EEPROM\_SETTINGS first

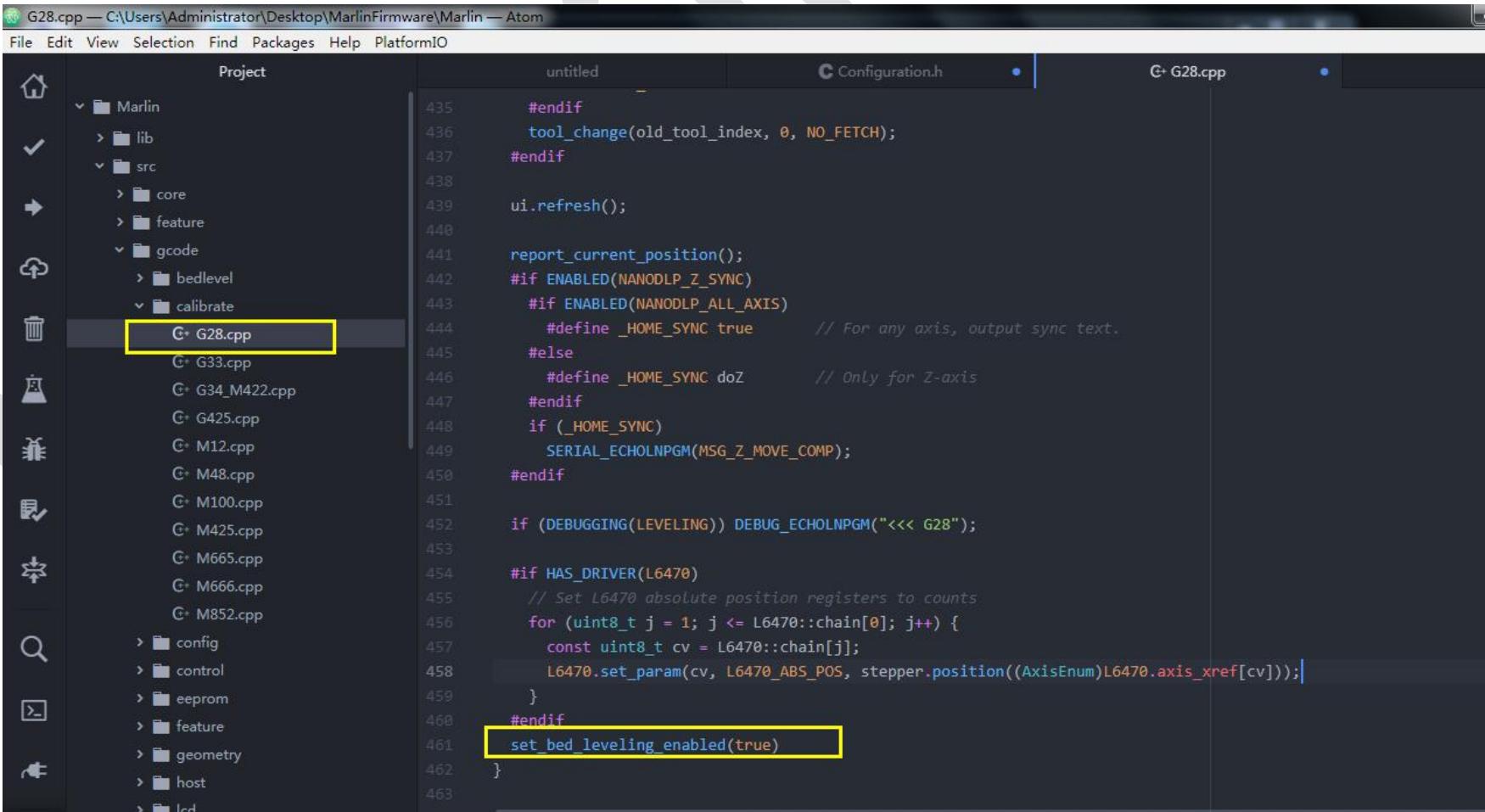
“Add set\_bed\_leveling\_enabled(true) ”to the “gcode- calibrate-G28.cpp ”file, as the following figure shows.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project untitled Configuration.h pins_RAMPS.h
1357 //=====
1358 //===== Additional Features =====
1359 //=====
1360 // @section extras
1361 /**
1362 * EEPROM
1363 */
1364 * Persistent storage to preserve configurable settings across reboots.
1365 *
1366 * M500 - Store settings to EEPROM.
1367 * M501 - Read settings from EEPROM. (i.e., Throw away unsaved changes)
1368 * M502 - Revert settings to "factory" defaults. (Follow with M500 to init the EEPROM.)
1369 */
1370 /**
1371 */
1372 #define EEPROM_SETTINGS // Persistent storage with M500 and M501
1373 //##define DISABLE_M503 // Saves ~2700 bytes of PROGMEM. Disable for release!
1374 #define EEPROM_CHITCHAT // Give feedback on EEPROM commands. Disable to save PROGMEM.
1375 #if ENABLED(EEPROM_SETTINGS)
1376 //##define EEPROM_AUTO_INIT // Init EEPROM automatically on any errors.
1377 #endif
1378 /**
1379 */
1380 // Host Keepalive
1381 /**
1382 // When enabled Marlin will send a busy status message to the host
1383 // every couple of seconds when it can't accept commands.
1384 /**
1385 #define HOST_KEEPALIVE_FEATURE // Disable this if your host doesn't like keepalive messages
1386

```



```

G28.cpp — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project untitled Configuration.h G28.cpp
435 #endif
436 tool_change(old_tool_index, 0, NO_FETCH);
437#endif
438
439 ui.refresh();
440
441 report_current_position();
442 #if ENABLED(NANODLP_Z_SYNC)
443 #if ENABLED(NANODLP_ALL_AXIS)
444 #define _HOME_SYNC true // For any axis, output sync text.
445 #else
446 #define _HOME_SYNC doZ // Only for Z-axis
447#endif
448 if (_HOME_SYNC)
449 SERIAL_ECHOLNPGM(MSG_Z_MOVE_COMP);
450#endif
451
452 if (DEBUGGING(LEVELING)) DEBUG_ECHOLNPGM("<<< G28");
453
454 #if HAS_DRIVER(L6470)
455 // Set L6470 absolute position registers to counts
456 for (uint8_t j = 1; j <= L6470::chain[0]; j++) {
457 const uint8_t cv = L6470::chain[j];
458 L6470.set_param(cv, L6470_ABS_POS, stepper.position((AxisEnum)L6470.axis_xref[cv]));
459 }
460#endif
461 set_bed_leveling_enabled(true)
462

```

Those are the auto-leveling setting.

### 5.2.3 Driver mode setting

Driver mode is composed by 3 types: normal mode, UART mode, and SPI mode

Note: the following driver setting is based on mks series of drivers, other manufacturers may have different driver setting steps.

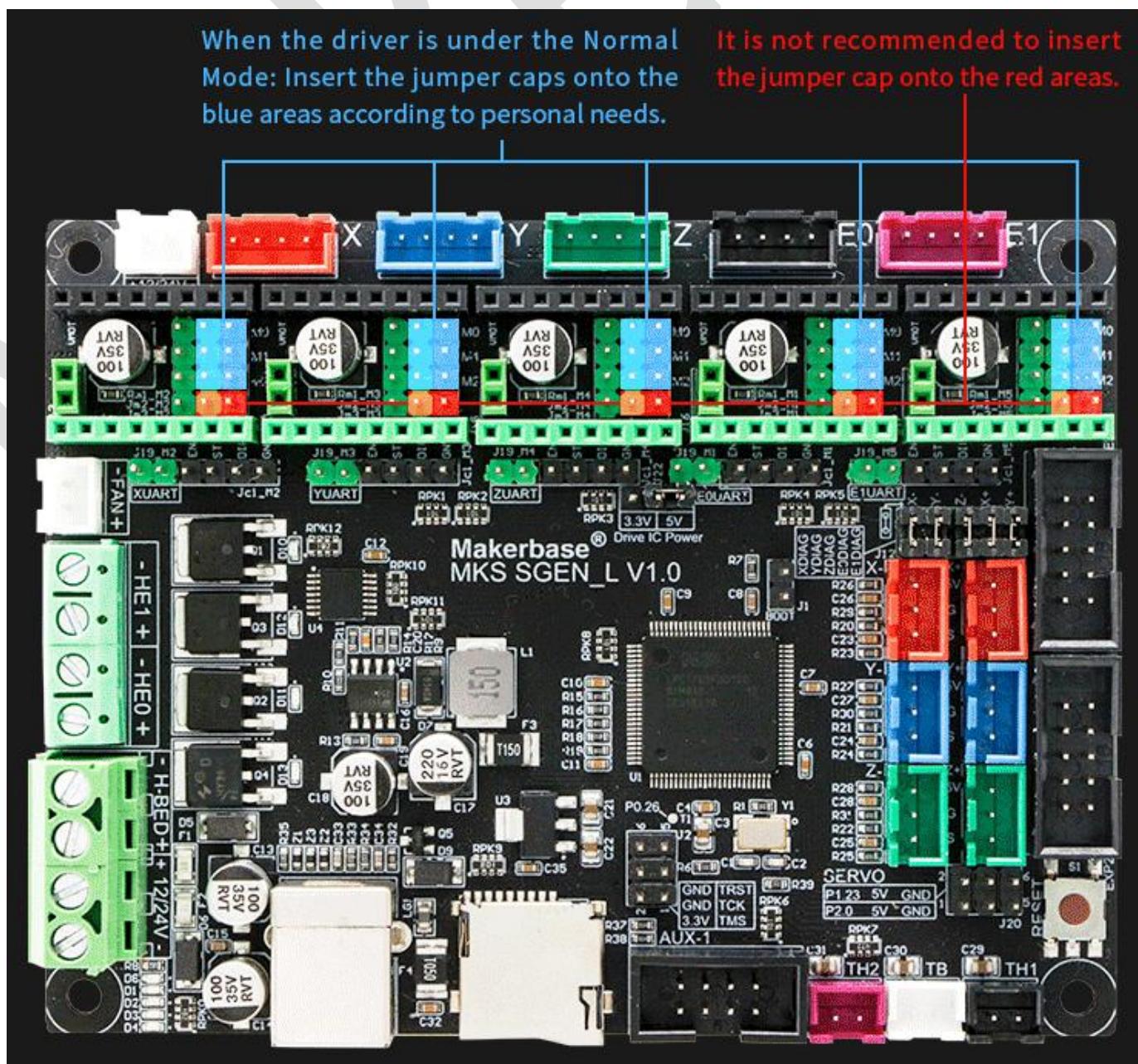
#### Normal mode (step/dir mode)

normal mode: Generally, it is available for all drivers.

Adjust the driving microstep by the jumper caps according to your own needs, the jumper caps can be inserted into the M0, M1, M2 of the two rows of black pin headers on the right side to adjust microsteps

Note: In the normal mode, the fourth pin doesn't need jumper caps,because wearing jumper caps may affect the normal use of some drivers. (eg TB67S109)

It is not recommended to insert jumper cap on the fourth pin, because it may affect the normal use of some drivers. (eg TB67S109)

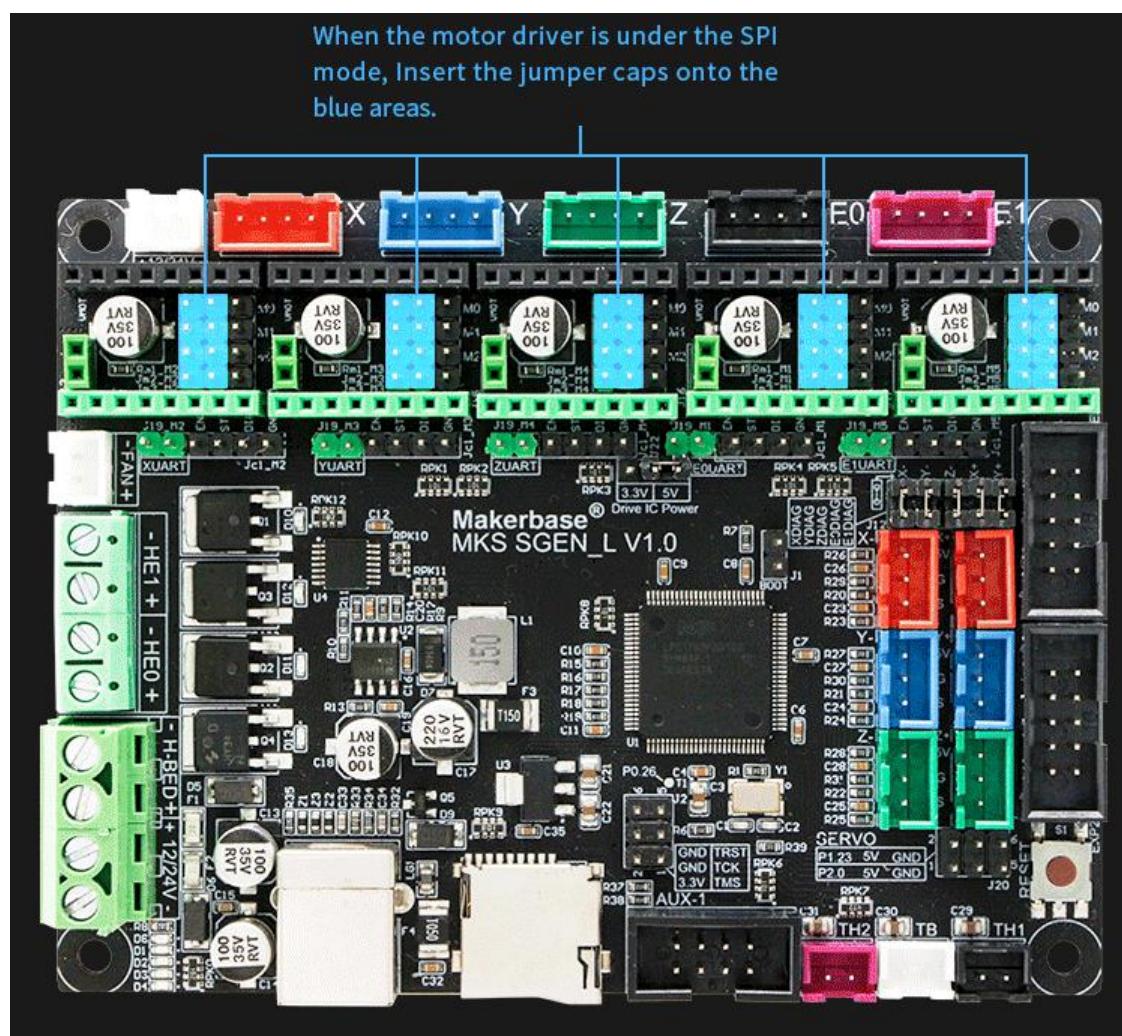


## TMC2130 SPI mode setting

MKS TMC2130 SPI mode is composed of hardware and software setting.

Hardware setting: The motherboard jumper cap setting, only need to insert the jumper cap according to the requirements, no need jumper. as the picture shows

Just insert the four rows of jumper caps on the left side.



Software setting: configure SPI parameter in marlin firmware2.0, specific setting steps are as follow:

1. Driver type is set: TMC2130

```

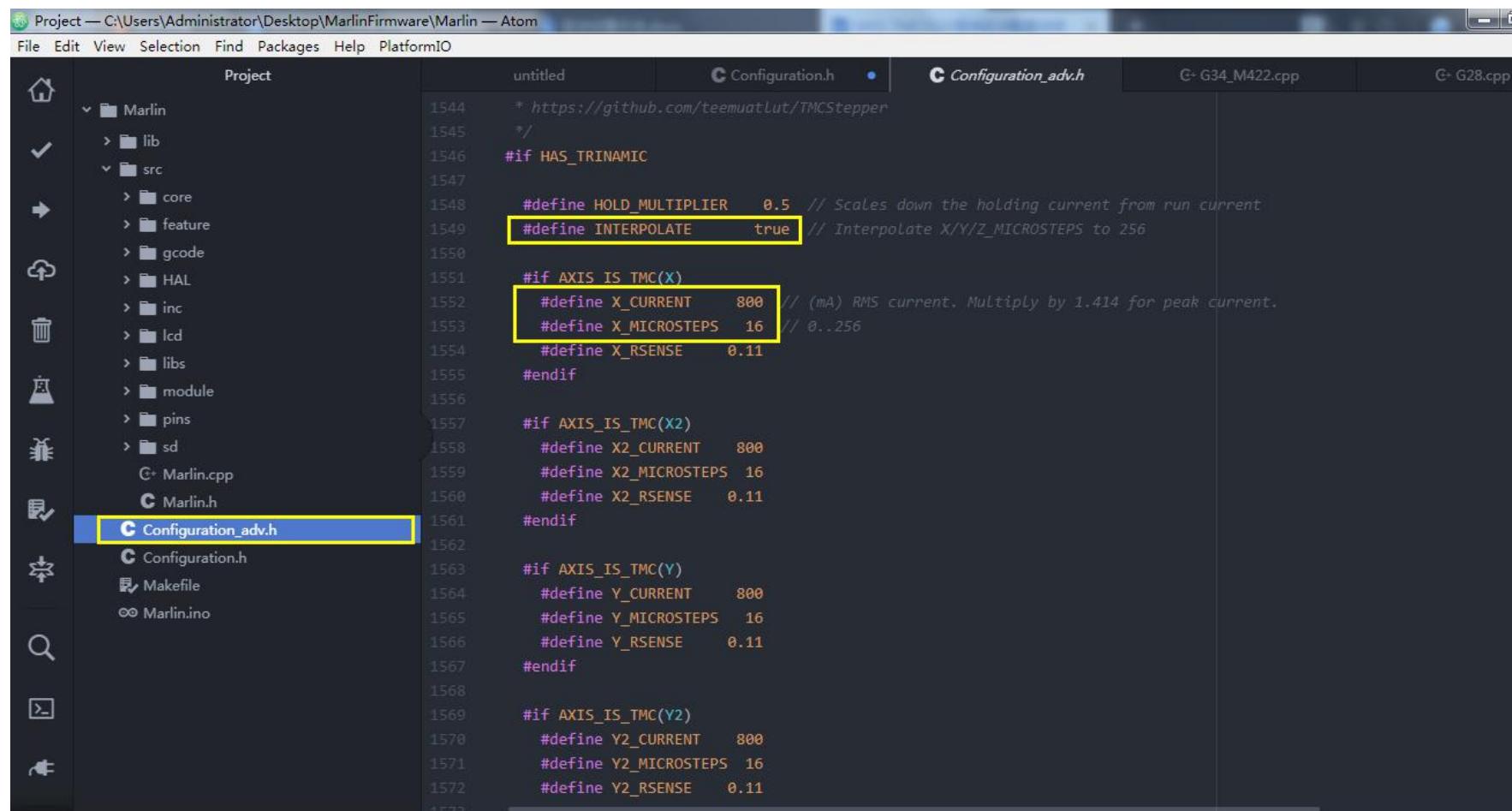
Project — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project          untitled          Configuration.h          G+ G34_M422.cpp
Project
  Marlin
    lib
    src
      core
      feature
      gcode
      HAL
      inc
      lcd
      libs
      module
      pins
      sd
        Marlin.cpp
      Marlin.h
      Configuration_adv.h
      Configuration.h
      Makefile
      Marlin.ino
Configuration.h
  Configuration.h
  Configuration_adv.h
  Makefile
  Marlin.ino

640  /*
641   * Options: A4988, A5984, DRV8825, LV8729, L6470, TB6560, TB6600, TMC2100,
642   *           TMC2130, TMC2130_STANDALONE, TMC2208, TMC2208_STANDALONE,
643   *           TMC26X, TMC26X_STANDALONE, TMC2660, TMC2660_STANDALONE,
644   *           TMC2160, TMC2160_STANDALONE, TMC5130, TMC5130_STANDALONE,
645   *           TMC5160, TMC5160_STANDALONE
646   * :['A4988', 'A5984', 'DRV8825', 'LV8729', 'L6470', 'TB6560', 'TB6600', 'TMC2100', 'TMC2130',
647   */
648 #define X_DRIVER_TYPE TMC2130
649 #define Y_DRIVER_TYPE TMC2130
650 #define Z_DRIVER_TYPE TMC2130
651 // #define X2_DRIVER_TYPE A4988
652 // #define Y2_DRIVER_TYPE A4988
653 // #define Z2_DRIVER_TYPE TMC2130
654 // #define Z3_DRIVER_TYPE A4988
655 #define E0_DRIVER_TYPE TMC2130
656 // #define E1_DRIVER_TYPE A4988
657 // #define E2_DRIVER_TYPE A4988
658 // #define E3_DRIVER_TYPE A4988
659 // #define E4_DRIVER_TYPE A4988
660 // #define E5_DRIVER_TYPE A4988
661
662 // Enable this feature if all enabled endstop pins are interrupt-capable.
663 // This will remove the need to poll the interrupt pins, saving many CPU cycles.
664 // #define ENDSTOP_INTERRUPTS_FEATURE
665 /**
666 */
667 /* Endstop Noise Threshold

```

## 2. Configure microstep and current in “Configuration\_adv.h”



```

1544 * https://github.com/teemuatlut/TMCStepper
1545 */
1546 #if HAS_TRINAMIC
1547     #define HOLD_MULTIPLIER    0.5 // Scales down the holding current from run current
1548     #define INTERPOLATE        true // Interpolate X/Y/Z_MICROSTEPS to 256
1549
1550     #if AXIS_IS_TMC(X)
1551         #define X_CURRENT        800 // (mA) RMS current. Multiply by 1.414 for peak current.
1552         #define X_MICROSTEPS      16 // 0..256
1553         #define X_RSENSE          0.11
1554     #endif
1555
1556     #if AXIS_IS_TMC(X2)
1557         #define X2_CURRENT       800
1558         #define X2_MICROSTEPS     16
1559         #define X2_RSENSE         0.11
1560     #endif
1561
1562     #if AXIS_IS_TMC(Y)
1563         #define Y_CURRENT        800
1564         #define Y_MICROSTEPS      16
1565         #define Y_RSENSE          0.11
1566     #endif
1567
1568     #if AXIS_IS_TMC(Y2)
1569         #define Y2_CURRENT       800
1570         #define Y2_MICROSTEPS     16
1571         #define Y2_RSENSE         0.11
1572
1573

```

**Microstep setting:** X\_MICROSTEPS, default setting is 16 microsteps, because after you enable #define INTERPOLATE true, the chip internally will expand the 16 microsteps into 256 microsteps

Current setting: #define X\_CURRENT, “800” is current value, TMC2130 driving current is 500-600mA. Current can’t be over 600mA because the driver will warm up seriously if the heat dissipation condition is not good . If the heat dissipation condition is good (heat sink and heat dissipation fan) it can be exceed 600mA, but the maximum value can’t be exceed 1000mA. If temperature is too high, it can affect the operation of the chip and may result in losing steps.

The actual driving current value is 1.414 times as the setting one, so care should be taken not to exceed the maximum current of the driver or motor.

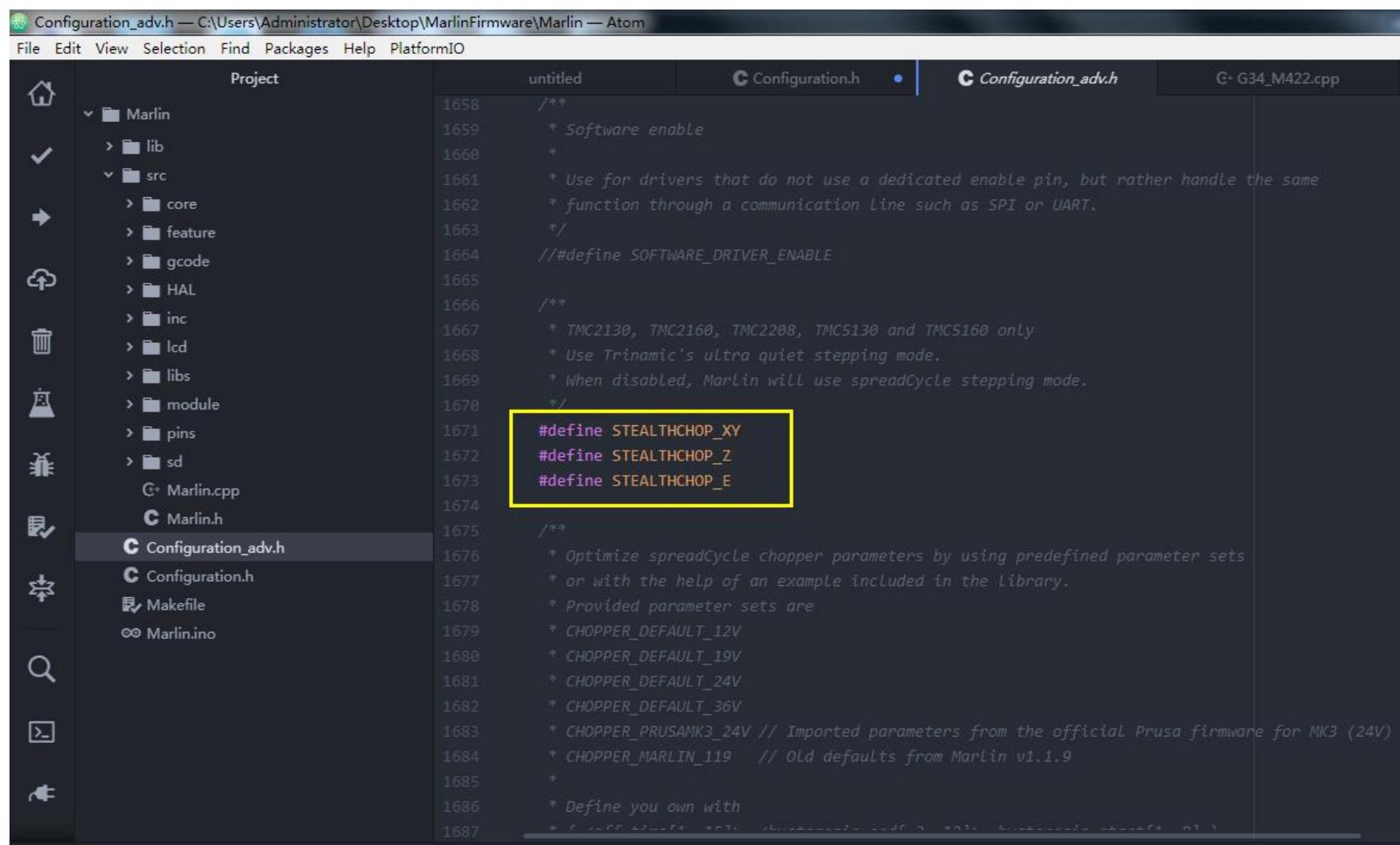
For example: the picture shows that the current is 800mA, but the actual running current  $I=1.414*800\text{mA}$ .

## 3. Operating mode selection

The SPI mode adopts software IO to simulate SPI mode, which does not need to define the hardware SPI mode in the firmware.

Configure parameter in the Configuration\_adv.h file

Enable “STEALTHCHOP” : silent mode. If you delete “STEALTHCHOP” (double slash before the item) //:the spreadCycle mode.



```

Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project Configuration.h Configuration_adv.h G+ G34_M422.cpp
1658 /**
1659 * Software enable
1660 *
1661 * Use for drivers that do not use a dedicated enable pin, but rather handle the same
1662 * function through a communication line such as SPI or UART.
1663 */
1664 // #define SOFTWARE_DRIVER_ENABLE
1665 /**
1666 * TMC2130, TMC2160, TMC2208, TMC5130 and TMC5160 only
1667 * Use Trinamic's ultra quiet stepping mode.
1668 * When disabled, Marlin will use spreadCycle stepping mode.
1669 */
1670
1671 #define STEALTHCHOP_XY
1672 #define STEALTHCHOP_Z
1673 #define STEALTHCHOP_E
1674
1675 /**
1676 * Optimize spreadCycle chopper parameters by using predefined parameter sets
1677 * or with the help of an example included in the library.
1678 * Provided parameter sets are
1679 * CHOPPER_DEFAULT_12V
1680 * CHOPPER_DEFAULT_19V
1681 * CHOPPER_DEFAULT_24V
1682 * CHOPPER_DEFAULT_36V
1683 * CHOPPER_PRUSAMK3_24V // Imported parameters from the official Prusa firmware for MK3 (24V)
1684 * CHOPPER_MARLIN_119 // Old defaults from Marlin v1.1.9
1685 *
1686 * Define your own with
1687 */

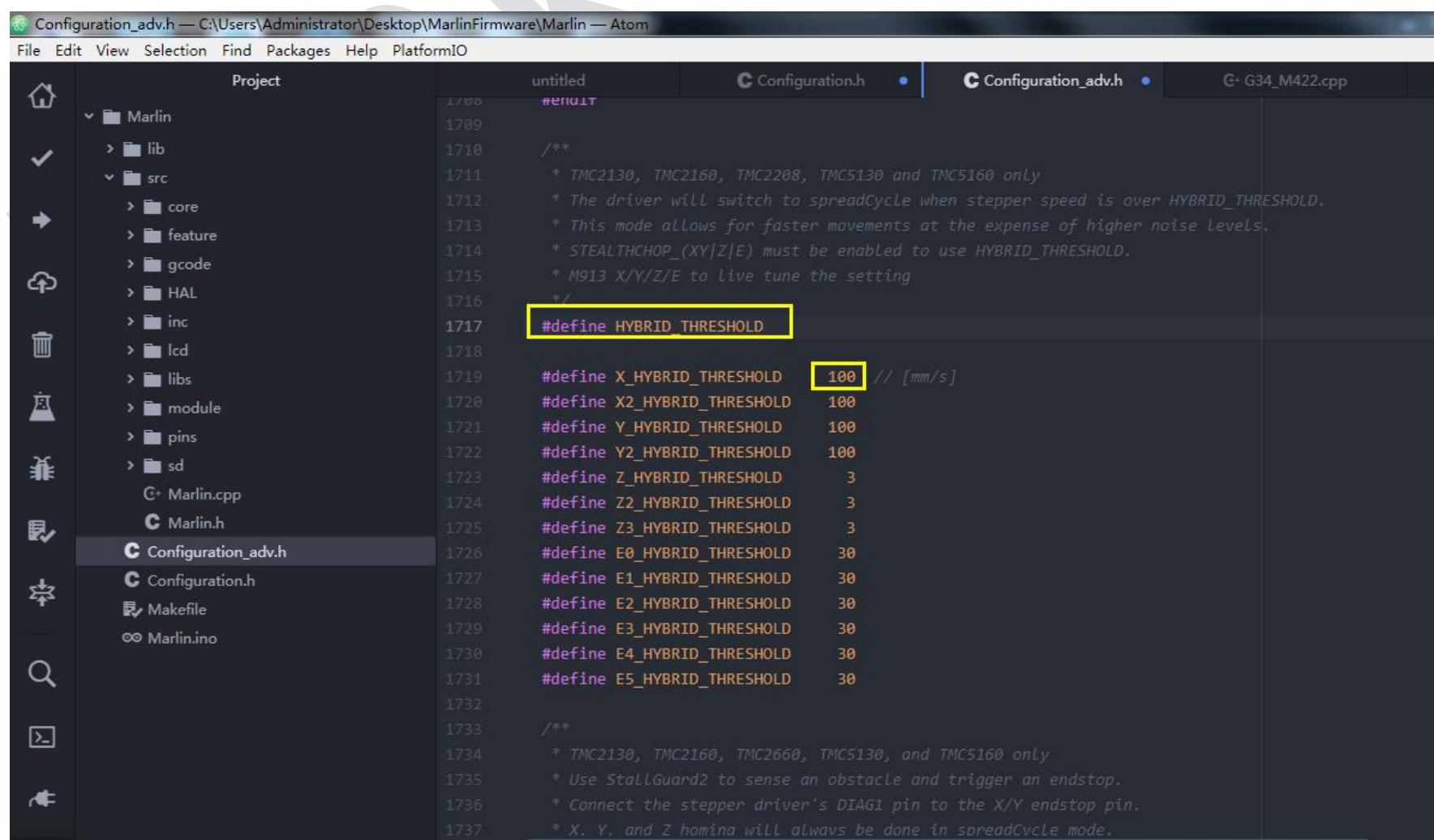
```

If you want to configure the Hybrid mode, you must first enable the STEALTHCHOP (silent mode)

Enable `#define HYBRID_THRESHOLD`

The corresponding value after “HYBRID\_THRESHOLD” is the value of the mode switching. If the motor runs 100mm/s faster than the setting value, it will switch to the spreadcycle mode, if below 100mm/s, it will be the stealthchop mode.

Mixed mode can be configured according to your own needs



```

Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project Configuration.h Configuration_adv.h G+ G34_M422.cpp
1700 /**
1701 * TMC2130, TMC2160, TMC2208, TMC5130 and TMC5160 only
1702 * The driver will switch to spreadCycle when stepper speed is over HYBRID_THRESHOLD.
1703 * This mode allows for faster movements at the expense of higher noise levels.
1704 * STEALTHCHOP_(XY/Z/E) must be enabled to use HYBRID_THRESHOLD.
1705 * M913 X/Y/Z/E to live tune the setting
1706 */
1707
1708 #define HYBRID_THRESHOLD
1709
1710 #define X_HYBRID_THRESHOLD 100 // [mm/s]
1711 #define X2_HYBRID_THRESHOLD 100
1712 #define Y_HYBRID_THRESHOLD 100
1713 #define Y2_HYBRID_THRESHOLD 100
1714 #define Z_HYBRID_THRESHOLD 3
1715 #define Z2_HYBRID_THRESHOLD 3
1716 #define Z3_HYBRID_THRESHOLD 3
1717 #define E0_HYBRID_THRESHOLD 30
1718 #define E1_HYBRID_THRESHOLD 30
1719 #define E2_HYBRID_THRESHOLD 30
1720 #define E3_HYBRID_THRESHOLD 30
1721 #define E4_HYBRID_THRESHOLD 30
1722 #define E5_HYBRID_THRESHOLD 30
1723
1724 /**
1725 * TMC2130, TMC2160, TMC2660, TMC5130, and TMC5160 only
1726 * Use StallGuard2 to sense an obstacle and trigger an endstop.
1727 * Connect the stepper driver's DIAG1 pin to the X/Y endstop pin.
1728 * X, Y, and Z homing will always be done in spreadCycle mode.
1729 */
1730
1731 /**
1732 * TMC2130, TMC2160, TMC2660, TMC5130, and TMC5160 only
1733 * Use StallGuard2 to sense an obstacle and trigger an endstop.
1734 * Connect the stepper driver's DIAG1 pin to the X/Y endstop pin.
1735 * X, Y, and Z homing will always be done in spreadCycle mode.
1736 */
1737

```

## 4.CS pin setting

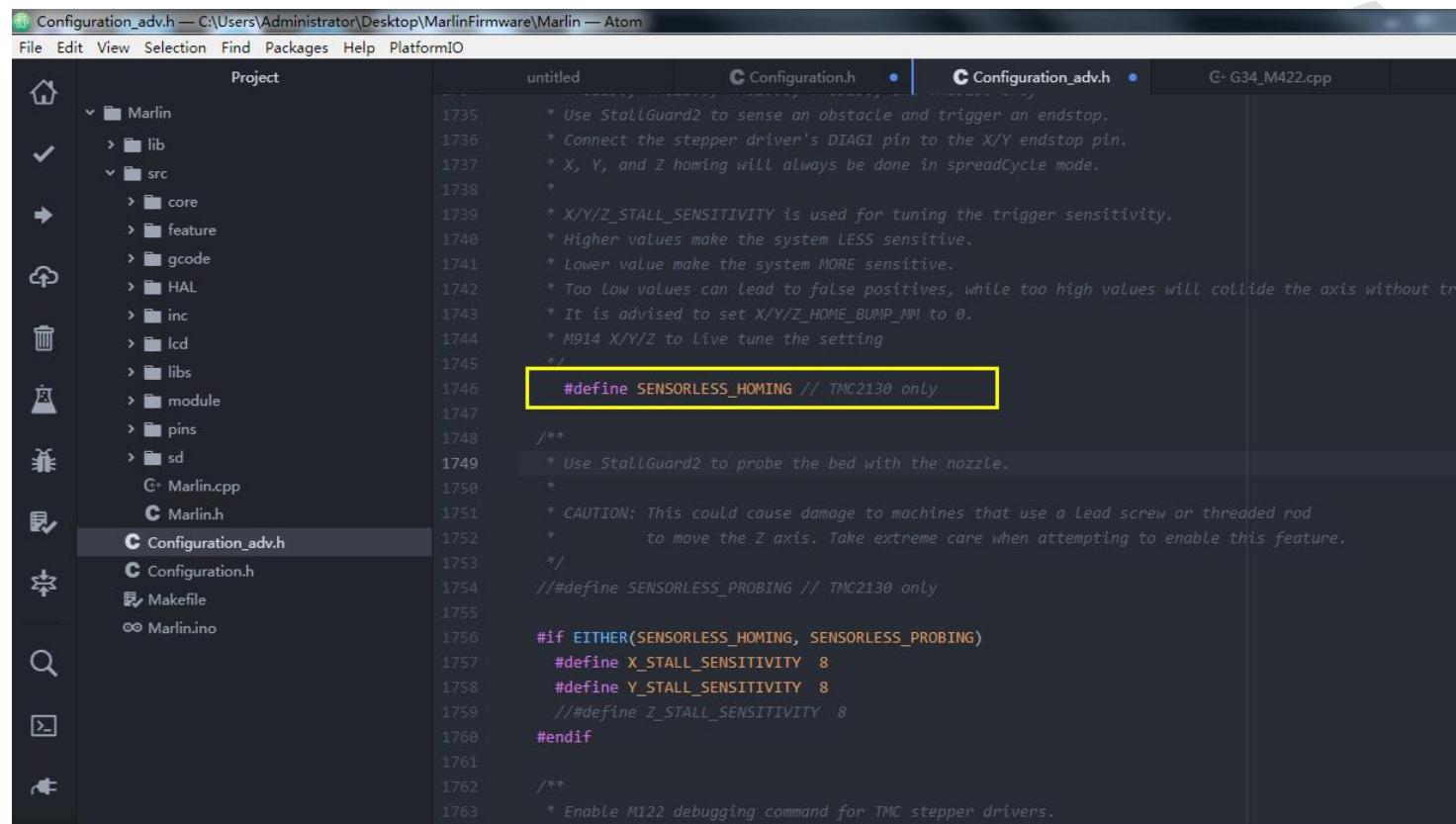
Because the wires are integrated internally to SGEN\_L, and the pin file has been set, which doesn't need to modified.

Homing without limit setting

5.Homing without limit configuration (different to configure, Optionally )

If you use the ordinary mechanical limit, you can not configure this item.

Enable `#define SENSORLESS_HOMING` in the “Configuration\_adv.h”



```

Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project Configuration.h Configuration_adv.h G+ G34_M422.cpp
untitled
1735 * Use StallGuard2 to sense an obstacle and trigger an endstop.
1736 * Connect the stepper driver's DIAG1 pin to the X/Y endstop pin.
1737 * X, Y, and Z homing will always be done in spreadCycle mode.
1738 *
1739 * X/Y/Z_STALL_SENSITIVITY is used for tuning the trigger sensitivity.
1740 * Higher values make the system LESS sensitive.
1741 * Lower value make the system MORE sensitive.
1742 * Too low values can lead to false positives, while too high values will collide the axis without triggering.
1743 * It is advised to set X/Y/Z_HOME_BUMP_MM to 0.
1744 * M914 X/Y/Z to live tune the setting
1745 */
1746 #define SENSORLESS_HOMING // TMC2130 only
1747 /**
1748 * Use StallGuard2 to probe the bed with the nozzle.
1749 *
1750 * CAUTION: This could cause damage to machines that use a lead screw or threaded rod
1751 * to move the Z axis. Take extreme care when attempting to enable this feature.
1752 */
1753 // #define SENSORLESS_PROBING // TMC2130 only
1754
1755 #if EITHER(SENSORLESS_HOMING, SENSORLESS_PROBING)
1756 #define X_STALL_SENSITIVITY 8
1757 #define Y_STALL_SENSITIVITY 8
1758 // #define Z_STALL_SENSITIVITY 8
1759 #endif
1760 /**
1761 * Enable M122 debugging command for TMC stepper drivers.
1762 */
1763

```

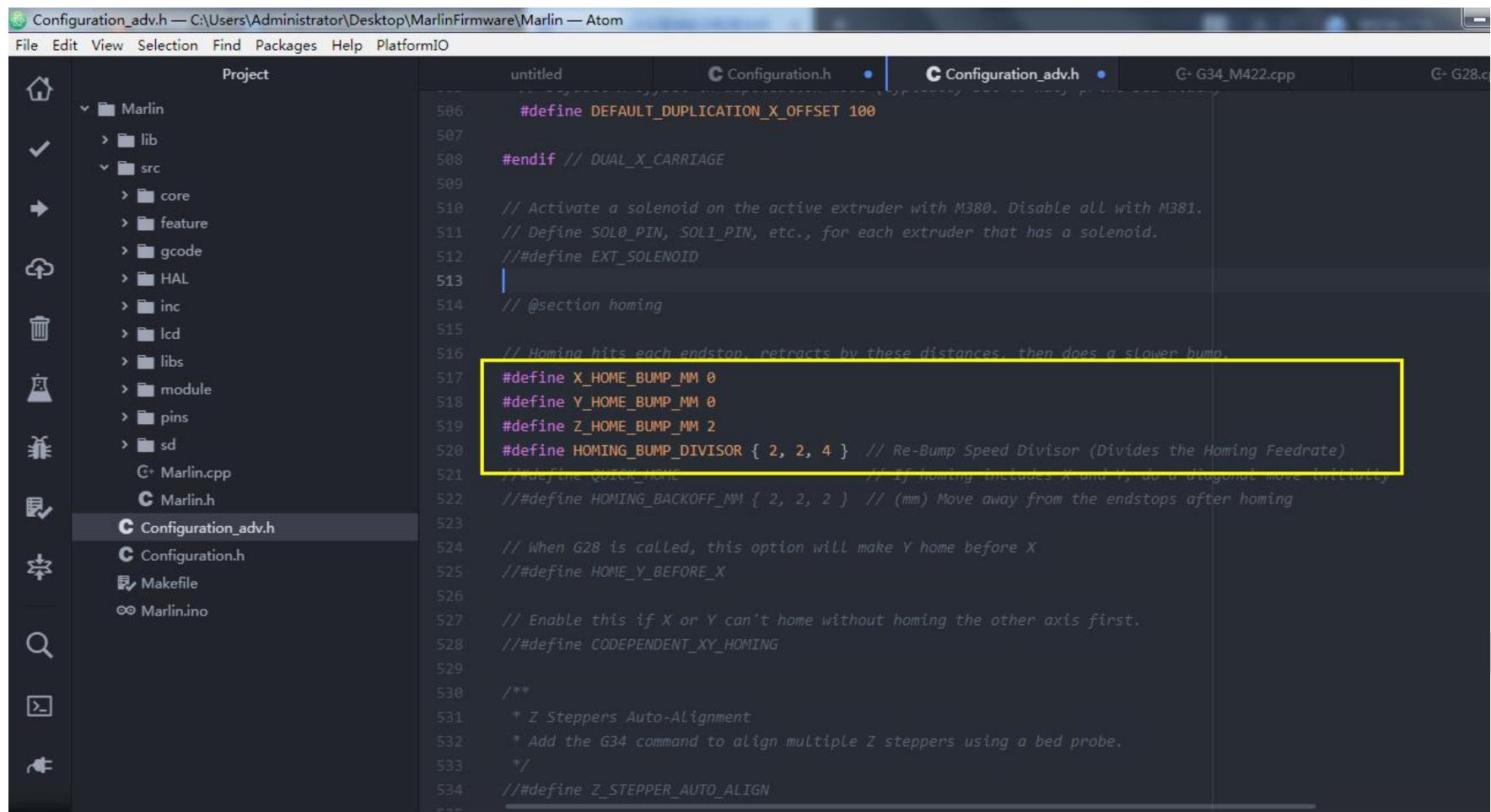
Note: The wire of the driver DIAG1 pin needs to be connected to the X / Y limit pin. (Z axis is temporarily not supported)

using the TMC2130 SGL version doesn't need jumper.

X, Y and Z homing will only be done in spreadCycle mode.

X / Y / Z\_HOMING\_SENSITIVITY is used to adjust the trigger sensitivity. higher the value is, lower the system sensitivity will be. Lower values make the system more sensitive. If the value that is too low, it can cause error, while if the value that is too high it may hit the axis without triggering.

It is recommended to set X / Y / Z\_HOME\_BUMP\_MM to 0.

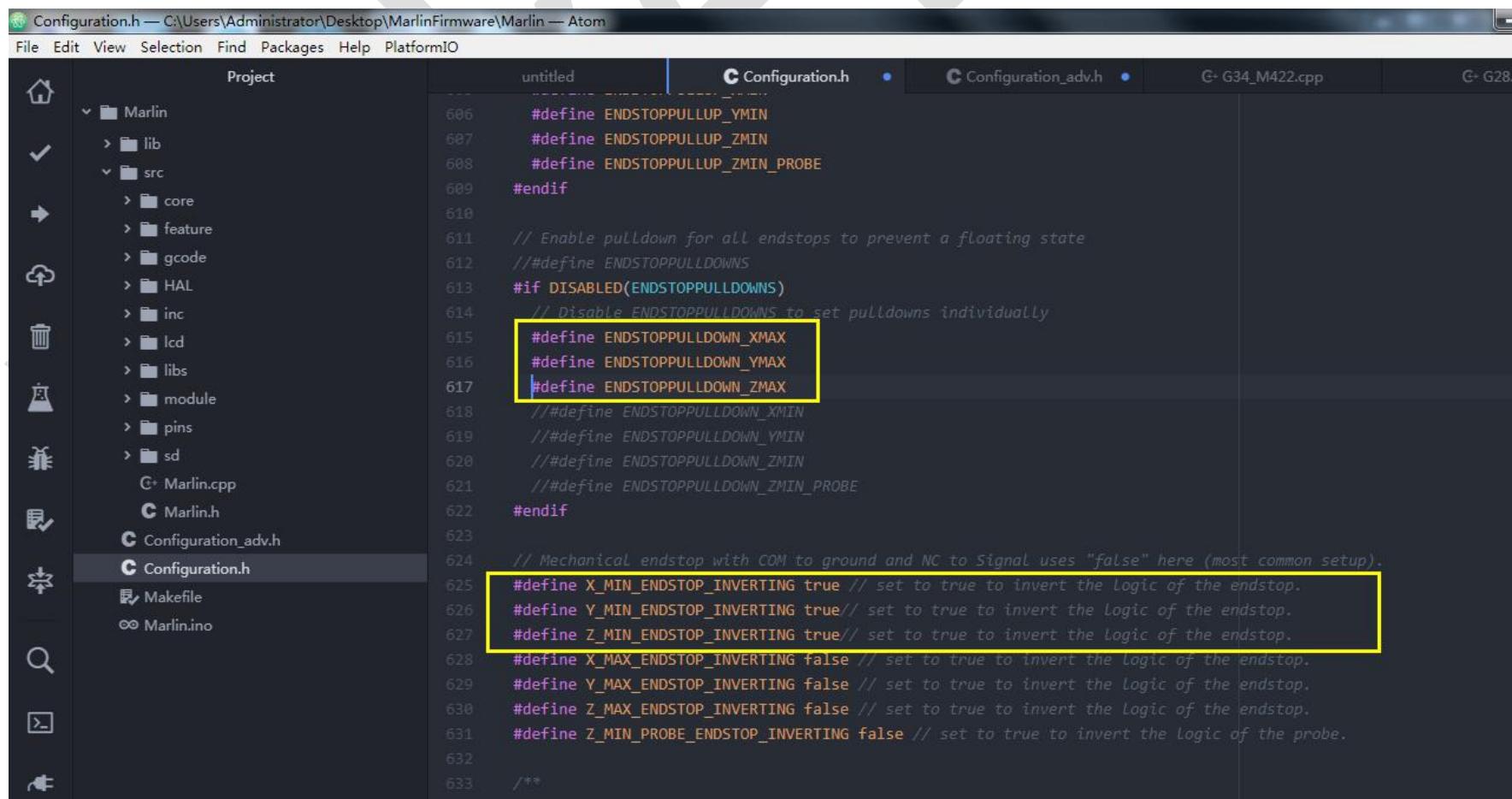


```

Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28.c
untitled Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28.c
506 #define DEFAULT_DUPPLICATION_X_OFFSET 100
507
508 #endif // DUAL_X_CARRIAGE
509
510 // Activate a solenoid on the active extruder with M380. Disable all with M381.
511 // Define SOL0_PIN, SOL1_PIN, etc., for each extruder that has a solenoid.
512 // #define EXT_SOLENOID
513
514 // @section homing
515
516 // Homing hits each endstop, retracts by these distances, then does a slower bump.
517 #define X_HOME_BUMP_MM 0
518 #define Y_HOME_BUMP_MM 0
519 #define Z_HOME_BUMP_MM 2
520 #define HOMING_BUMP_DIVISOR { 2, 2, 4 } // Re-Bump Speed Divisor (Divides the Homing Feedrate)
521 // #define QUICK_HOME // If homing includes X and Y, do a diagonal move initially
522 // #define HOMING_BACKOFF_MM { 2, 2, 2 } // (mm) Move away from the endstops after homing
523
524 // When G28 is called, this option will make Y home before X
525 // #define HOME_Y_BEFORE_X
526
527 // Enable this if X or Y can't home without homing the other axis first.
528 // #define CODEPENDENT_XY_HOMING
529
530 /**
531 * Z Steppers Auto-Alignment
532 * Add the G34 command to align multiple Z steppers using a bed probe.
533 */
534 // #define Z_STEPPER_AUTO_ALIGN

```

Note: Since the logic signal of the blocking detection processed by the TMC2130 is true, when the blocking detection is used as the limit, the limit level can only be set to true, otherwise the compilation will prompt an error; the Marlin firmware Z-axis cannot temporarily use the blocking detection as the For the limit position, the limit switch signal is also required when blocking detection is used as the limit. It is not recommended to use the block detection as the limit.



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28.c
untitled Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28.c
606 #define ENDSTOPPULLUP_YMIN
607 #define ENDSTOPPULLUP_ZMIN
608 #define ENDSTOPPULLUP_ZMIN_PROBE
609 #endif
610
611 // Enable pulldown for all endstops to prevent a floating state
612 // #define ENDSTOPPULLDOWNS
613 #if DISABLED(ENDSTOPPULLDOWNS)
614 // Disable ENDSTOPPULLDOWNS to set pulldowns individually
615 #define ENDSTOPPULLDOWN_XMAX
616 #define ENDSTOPPULLDOWN_YMAX
617 #define ENDSTOPPULLDOWN_ZMAX
618 // #define ENDSTOPPULLDOWN_XMIN
619 // #define ENDSTOPPULLDOWN_YMIN
620 // #define ENDSTOPPULLDOWN_ZMIN
621 // #define ENDSTOPPULLDOWN_ZMIN_PROBE
622 #endif
623
624 // Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).
625 #define X_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
626 #define Y_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
627 #define Z_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
628 #define X_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
629 #define Y_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
630 #define Z_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
631 #define Z_MIN_PROBE_ENDSTOP_INVERTING false // set to true to invert the logic of the probe.
632
633 /**
634 * Stepper Drivers

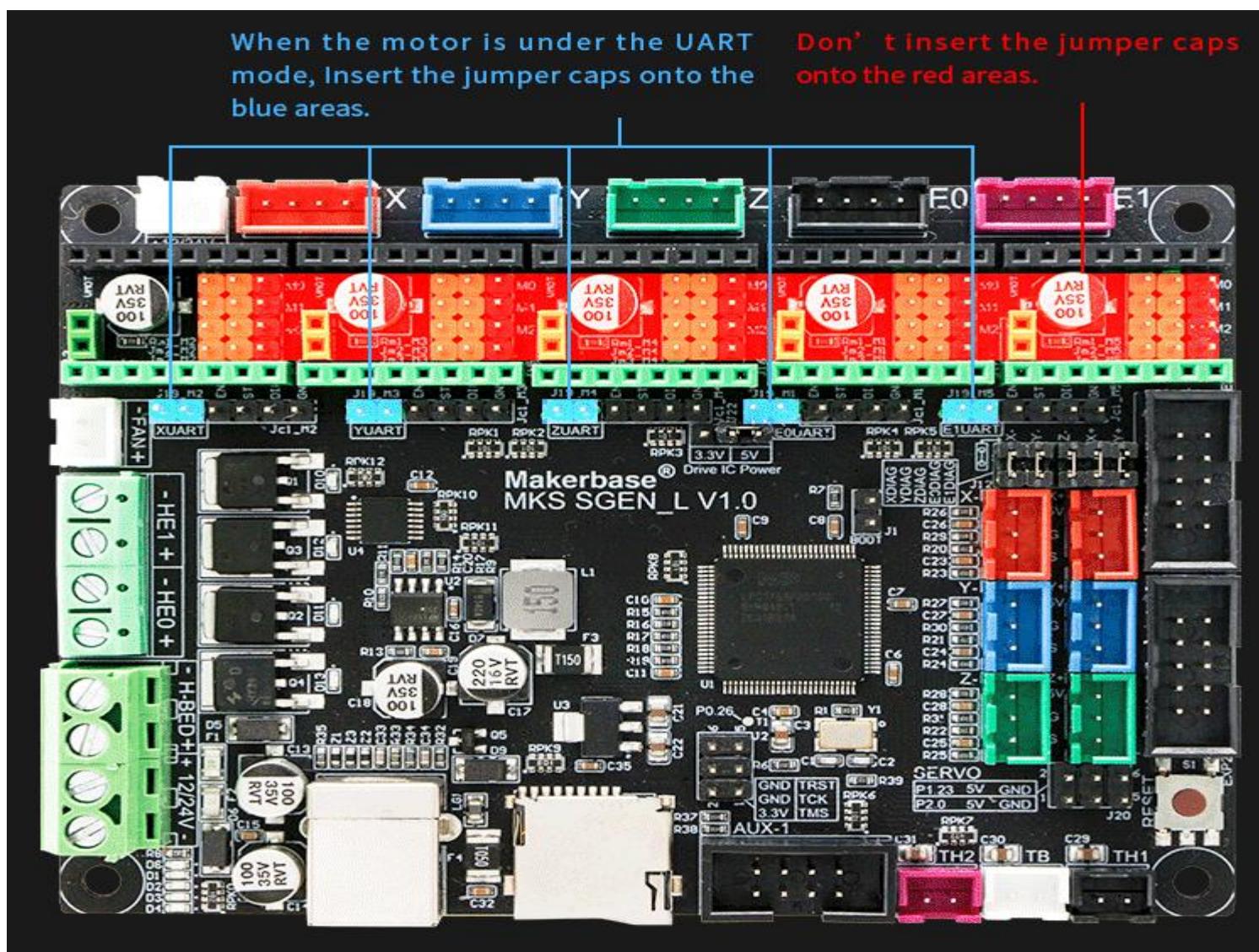
```

Descriptions above are TMC2130 SPI mode setting

## UART mode setting (MKS TMC2209, MKS TMC2208 V2.0)

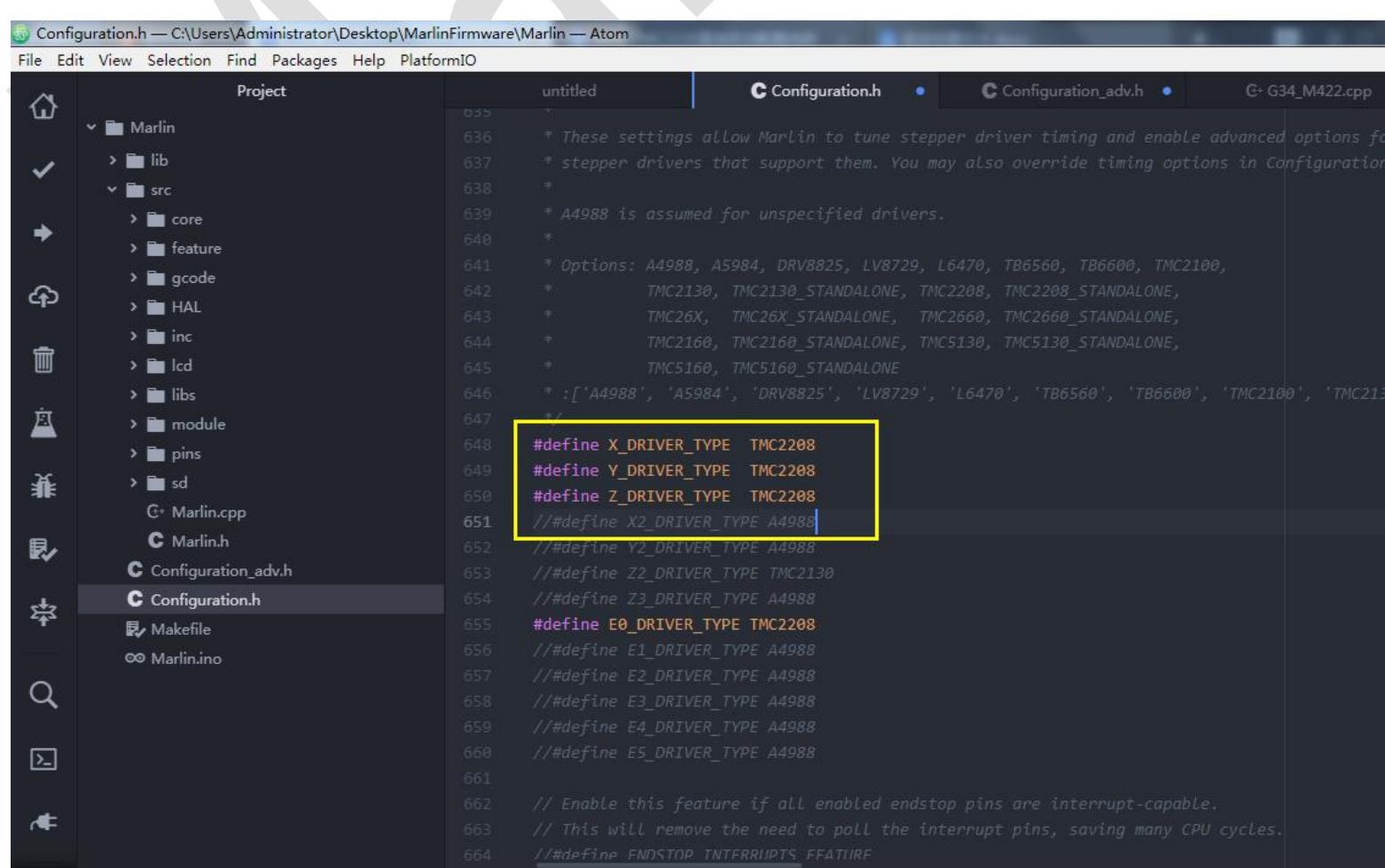
SGEN-L motherboard used with TMC2208V2.0 or TMC2209, requires hardware and software configuration.

The hardware configuration refers to the following picture to set up the jumper caps. If using the TMC2208 V2.0 version, you don't need to connect NC and uart on the driver. However, it doesn't need to connect NC and uart port if using TMC2209



Software Configuration: The configuration method of UART Marlin 2.0 is similar to the 2130.

### 1. Driver type setting



```

Configuration.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project: Marlin
untitled Configuration.h Configuration_adv.h G34_M422.cpp
File Edit View Selection Find Packages Help PlatformIO

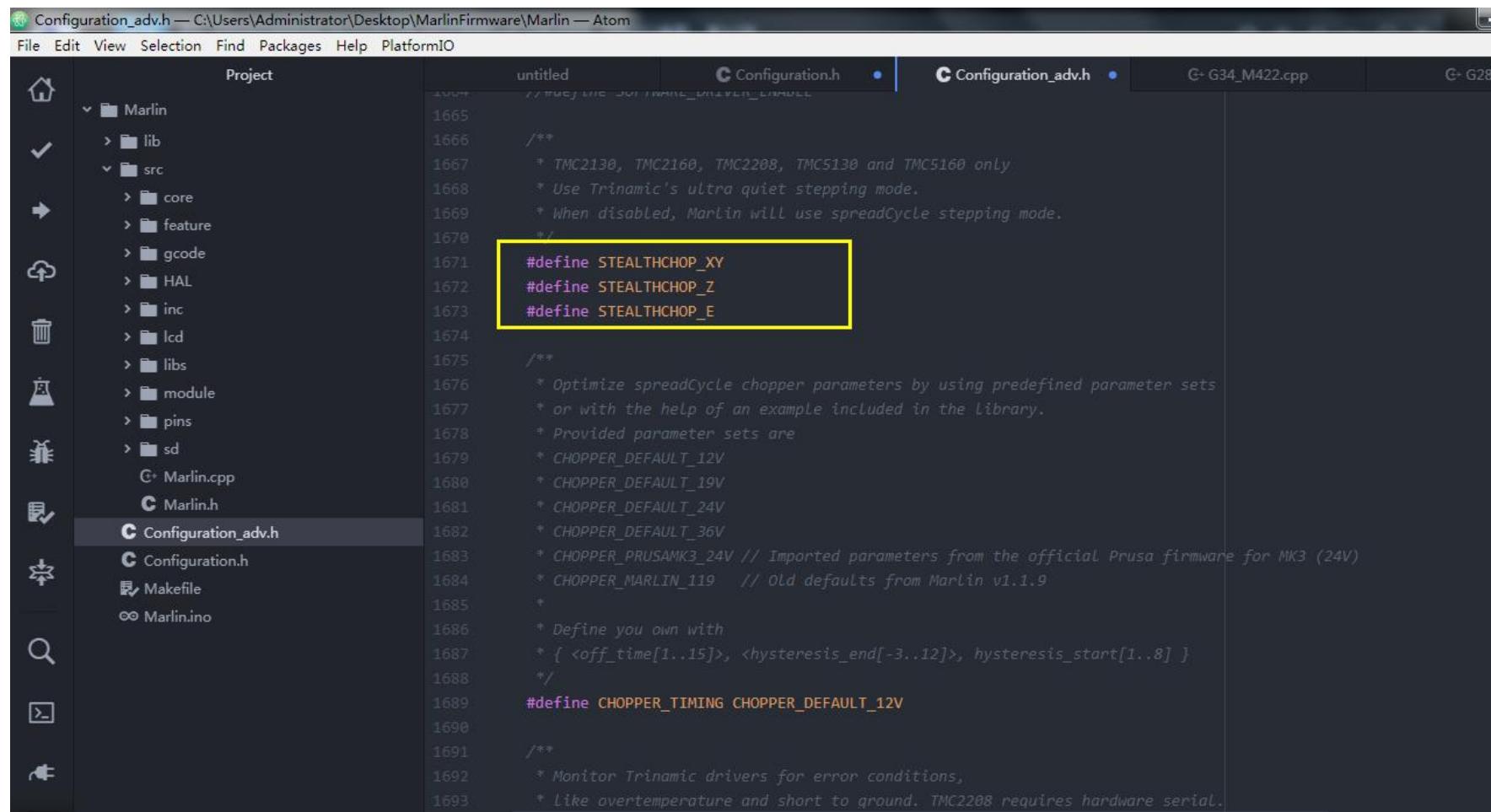
1. Driver type setting

#define X_DRIVER_TYPE TMC2208
#define Y_DRIVER_TYPE TMC2208
#define Z_DRIVER_TYPE TMC2208
//#define X2_DRIVER_TYPE A4988
//#define Y2_DRIVER_TYPE TMC2130
//#define Z2_DRIVER_TYPE A4988
#define E0_DRIVER_TYPE TMC2208
//#define E1_DRIVER_TYPE A4988
//#define E2_DRIVER_TYPE A4988
//#define E3_DRIVER_TYPE A4988
//#define E4_DRIVER_TYPE A4988
//#define E5_DRIVER_TYPE A4988
// Enable this feature if all enabled endstop pins are interrupt-capable.
// This will remove the need to poll the interrupt pins, saving many CPU cycles.
//#define ENDSTOP_INTERRUPTS_FEATURE

```

## 2. Operation mode selection

It will be in Silent drive mode when STEALTHCHOP is enabled. If STEALTHCHOP is commented out (add : “//” before the item) ), it will be in SpreadCycle.



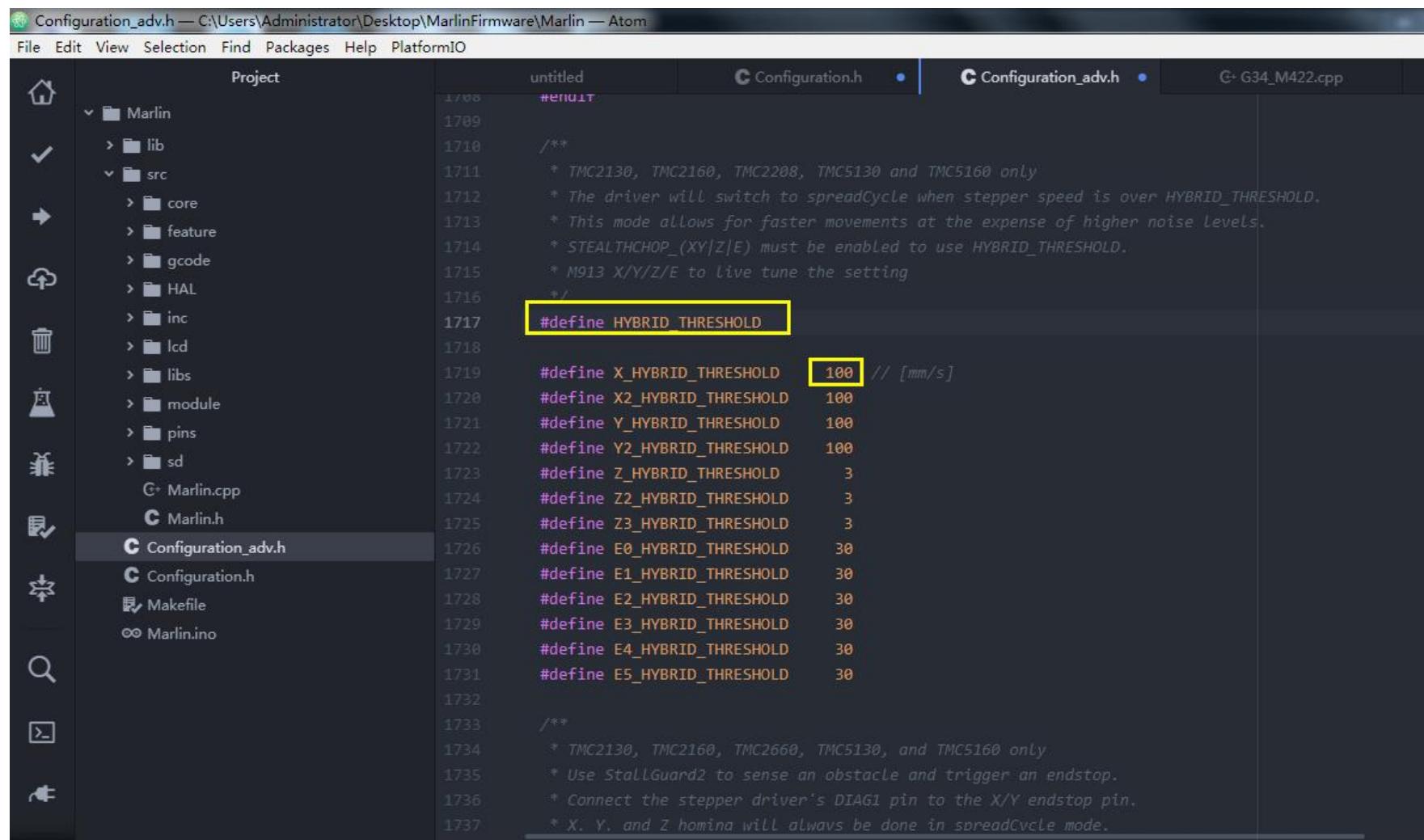
```
Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO
Project Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28
Marlin
  lib
  src
    core
    feature
    gcode
    HAL
    inc
    lcd
    libs
    module
    pins
    sd
  Marlin.cpp
  Marlin.h
  Configuration_adv.h
  Configuration.h
  Makefile
  Marlin.ino
untitled
1665 /**
1666 * TMC2130, TMC2160, TMC2208, TMC5130 and TMC5160 only
1667 * Use Trinamic's ultra quiet stepping mode.
1668 * When disabled, Marlin will use spreadCycle stepping mode.
1669 */
1670
1671 #define STEALTHCHOP_XY
1672 #define STEALTHCHOP_Z
1673 #define STEALTHCHOP_E
1674
1675 /**
1676 * Optimize spreadCycle chopper parameters by using predefined parameter sets
1677 * or with the help of an example included in the library.
1678 * Provided parameter sets are
1679 * CHOPPER_DEFAULT_12V
1680 * CHOPPER_DEFAULT_19V
1681 * CHOPPER_DEFAULT_24V
1682 * CHOPPER_DEFAULT_36V
1683 * CHOPPER_PRUSAMK3_24V // Imported parameters from the official Prusa firmware for MK3 (24V)
1684 * CHOPPER_MARLIN_119 // Old defaults from Marlin v1.1.9
1685 *
1686 * Define your own with
1687 * { <off_time[1..15]>, <hysteresis_end[-3..12]>, hysteresis_start[1..8] }
1688 */
1689 #define CHOPPER_TIMING CHOPPER_DEFAULT_12V
1690
1691 /**
1692 * Monitor Trinamic drivers for error conditions,
1693 * like overtemperature and short to ground. TMC2208 requires hardware serial.
```

If you want to configure the hybrid mode, you must first enable the STEALTHCHOP mode.

Enable `#define HYBRID_THRESHOLD`

The value corresponding to the HYBRID\_THRESHOLD item is the value of the mode switch. If the motor runs over 100mm/s faster than the setting value, it will be switched to the spreadcycle mode automatically, and below 100mm/s it will be the stealthchop mode.

Mixed mode can be selectively configured according to your own needs



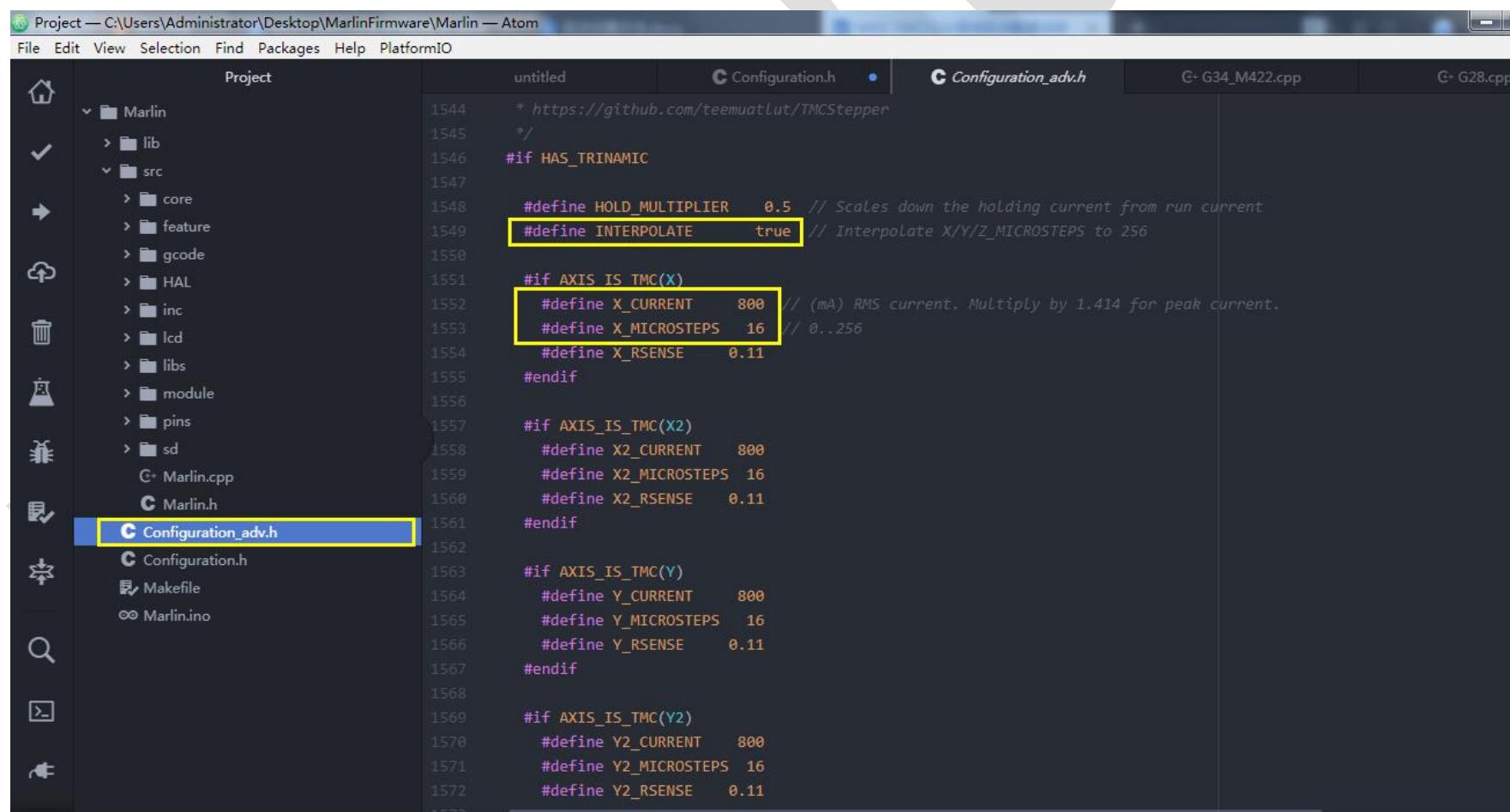
```

Configuration_adv.h — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project
untitled Configuration.h Configuration_adv.h G+ G34_M422.cpp
1708 #ifndef
1709
1710 /**
1711 * TMC2130, TMC2160, TMC2208, TMC5130 and TMC5160 only
1712 * The driver will switch to spreadCycle when stepper speed is over HYBRID_THRESHOLD.
1713 * This mode allows for faster movements at the expense of higher noise levels.
1714 * STEALTHCHOP_(XY/Z/E) must be enabled to use HYBRID_THRESHOLD.
1715 * M913 X/Y/Z/E to live tune the setting
1716 */
1717 #define HYBRID_THRESHOLD
1718
1719 #define X_HYBRID_THRESHOLD 100 // [mm/s]
1720 #define X2_HYBRID_THRESHOLD 100
1721 #define Y_HYBRID_THRESHOLD 100
1722 #define Y2_HYBRID_THRESHOLD 100
1723 #define Z_HYBRID_THRESHOLD 3
1724 #define Z2_HYBRID_THRESHOLD 3
1725 #define Z3_HYBRID_THRESHOLD 3
1726 #define E0_HYBRID_THRESHOLD 30
1727 #define E1_HYBRID_THRESHOLD 30
1728 #define E2_HYBRID_THRESHOLD 30
1729 #define E3_HYBRID_THRESHOLD 30
1730 #define E4_HYBRID_THRESHOLD 30
1731 #define E5_HYBRID_THRESHOLD 30
1732
1733 /**
1734 * TMC2130, TMC2160, TMC2660, TMC5130, and TMC5160 only
1735 * Use StallGuard2 to sense an obstacle and trigger an endstop.
1736 * Connect the stepper driver's DIAG1 pin to the X/Y endstop pin.
1737 * X, Y, and Z homing will always be done in spreadCycle mode.

```

## 1. Driver current setting



```

Project — C:\Users\Administrator\Desktop\MarlinFirmware\Marlin — Atom
File Edit View Selection Find Packages Help PlatformIO

Project
untitled Configuration.h Configuration_adv.h G+ G34_M422.cpp G+ G28.cpp
1544 * https://github.com/teemuatlut/TMCStepper
1545 */
1546 #if HAS_TRINAMIC
1547
1548 #define HOLD_MULTIPLIER 0.5 // Scales down the holding current from run current
1549 #define INTERPOLATE true // Interpolate X/Y/Z_MICROSTEPS to 256
1550
1551 #if AXIS_IS_TMC(X)
1552 #define X_CURRENT 800 // (mA) RMS current. Multiply by 1.414 for peak current.
1553 #define X_MICROSTEPS 16 // 0..256
1554 #define X_RSENSE 0.11
1555#endif
1556
1557 #if AXIS_IS_TMC(X2)
1558 #define X2_CURRENT 800
1559 #define X2_MICROSTEPS 16
1560 #define X2_RSENSE 0.11
1561#endif
1562
1563 #if AXIS_IS_TMC(Y)
1564 #define Y_CURRENT 800
1565 #define Y_MICROSTEPS 16
1566 #define Y_RSENSE 0.11
1567#endif
1568
1569 #if AXIS_IS_TMC(Y2)
1570 #define Y2_CURRENT 800
1571 #define Y2_MICROSTEPS 16
1572 #define Y2_RSENSE 0.11
1573

```

**Microstep setting:** X\_MICROSTEPS. Generally, it will be set as 16 microsteps, because enable #define INTERPOLATE true, chip will internally expand it to 256 microsteps.

The real current value of driver is 1.414 times as the setting one. Thus, it is not recommend to set the current over the maximum current of driver or motor.

#### 4. UART (RX 与 TX) pin setting

Because the wires are internally integrated to motherboard, pcb file “pin” setting has been finished., which needn't to be modified.

That is all contents about the driver setting.

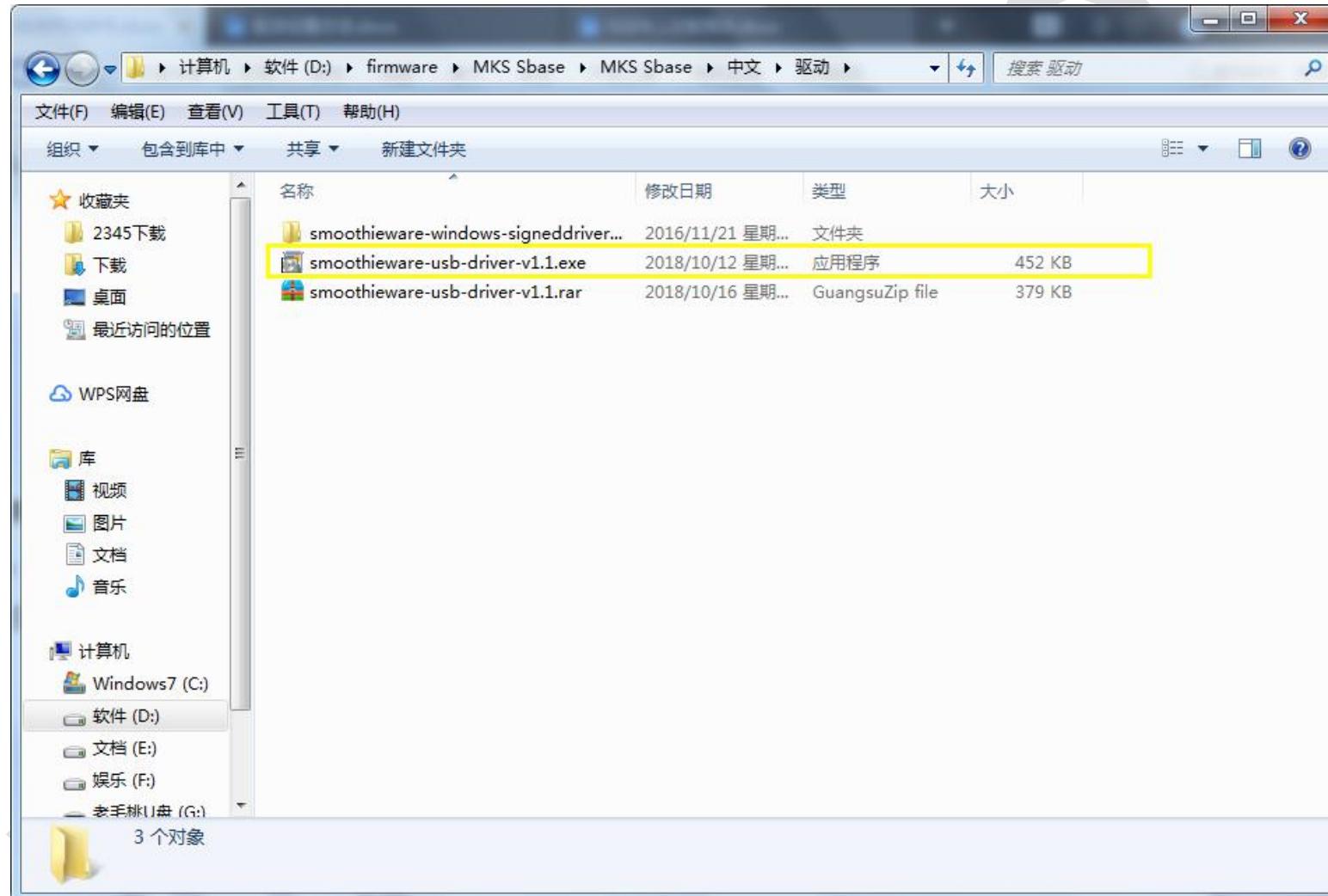


## VI Printing connection and driver installation

If it needs to connect computer to print, the computer needs to be installed a USB driver to recognized the COM port.

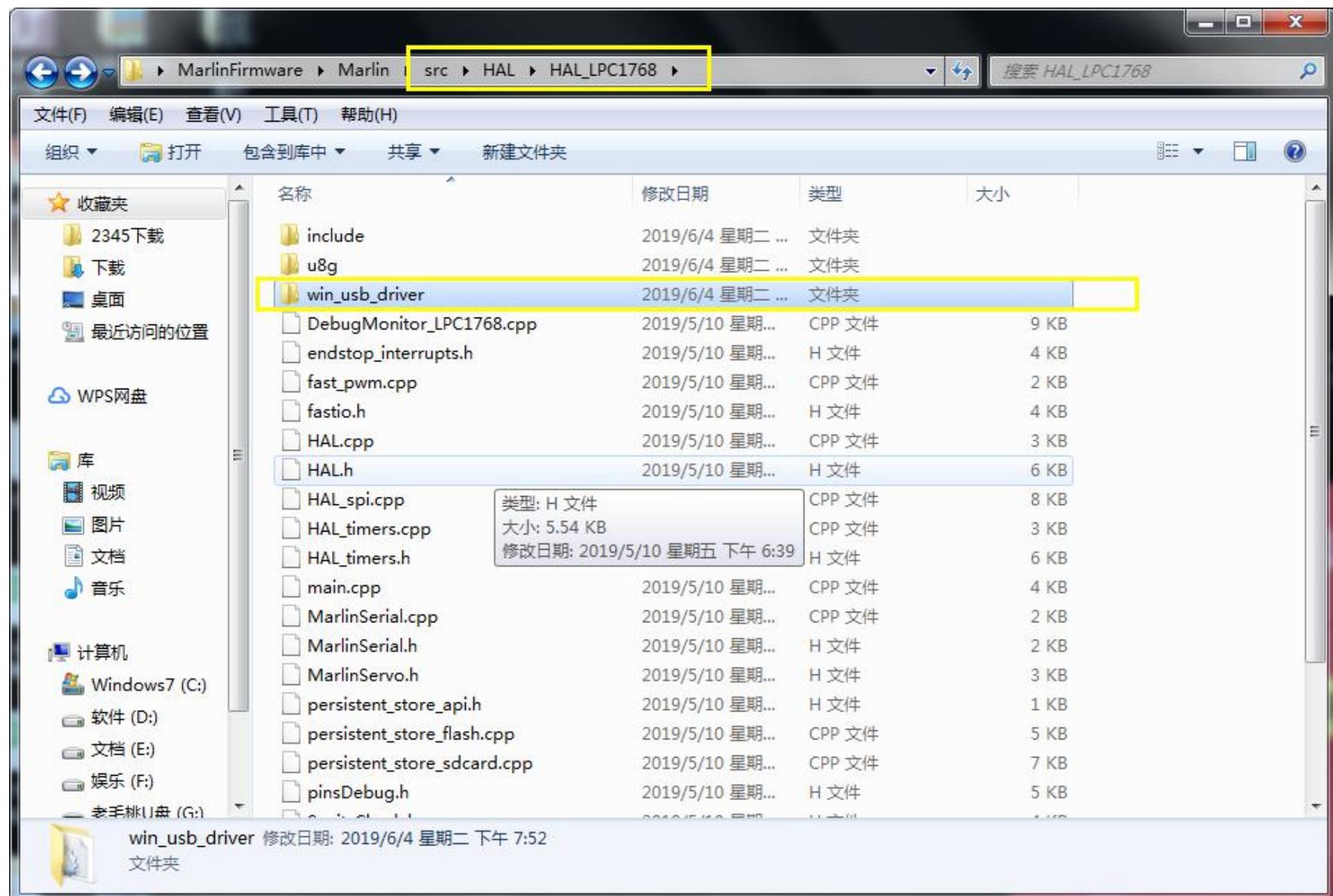
Note: only update the motherboard firmware, can motherboard COM port be recognized by computer.

The USB driver of Smoothieware can be download and install via official website, or get zipped files from customer service staffs and technicians.



## MARLIN2.0 firmware

If the marlin firmware is updated, but the computer recognizes it as an unknown device, you can right-click to select the update driver and select the path to update the driver.



## VII Technical support and guarantee

1. All our products have a power-on test before delivery to ensure its normal use.

2. Welcome to join Blog: <http://flyway97.blog.163.com>

3. Custom 3D printer motherboard, please contact:

Mr.Huang:13148932315

Mr.Tan:15521395023

Mr.Peng: 13427595835

E-MAIL:caixindong@makerbase.com.cn

4. Any problems, Please contact our customer service staffs and technicians. We are glad to help you.



Official website