Makerbase

Guangzhou Qianhui Information technology Co., Ltd.

SGEN_L Motherboard Datasheet

Makerbase

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Version Update

Version	Modification time	Modification	Remark
V1.0	11th June, 2019	Original version	

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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 ompatible with Smoothieware and Marlin 2.0 firmware. It can be sued 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 pair 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.

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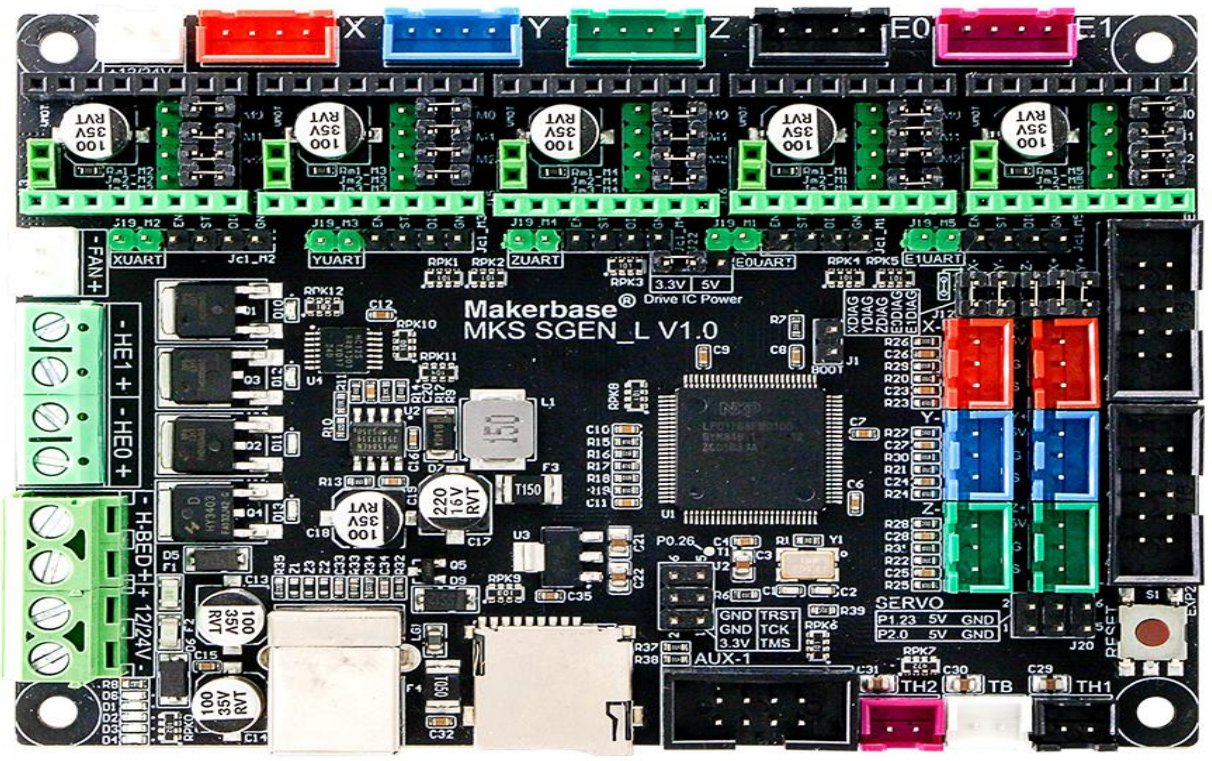
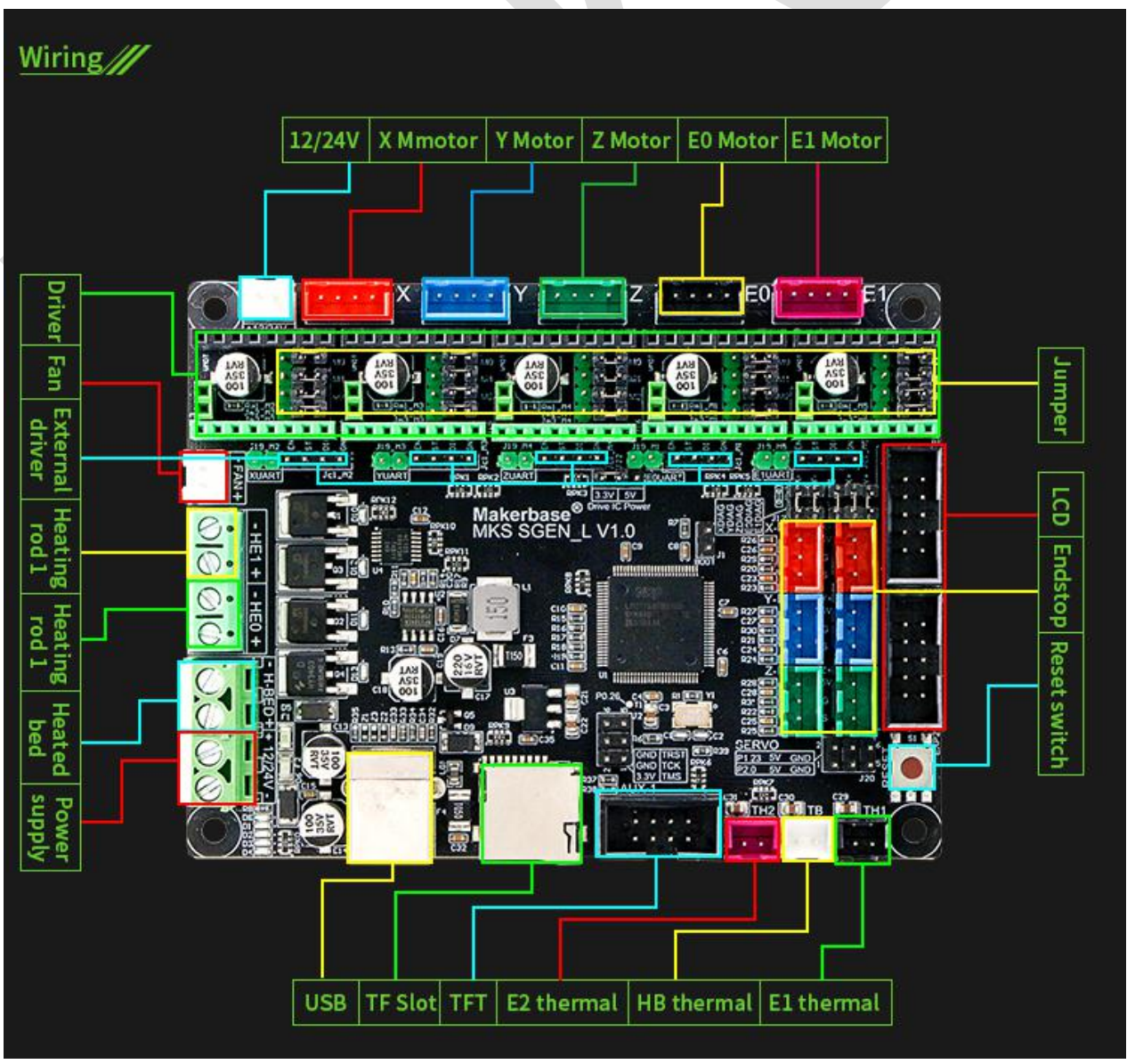
Ⅲ Wiring and size diagram

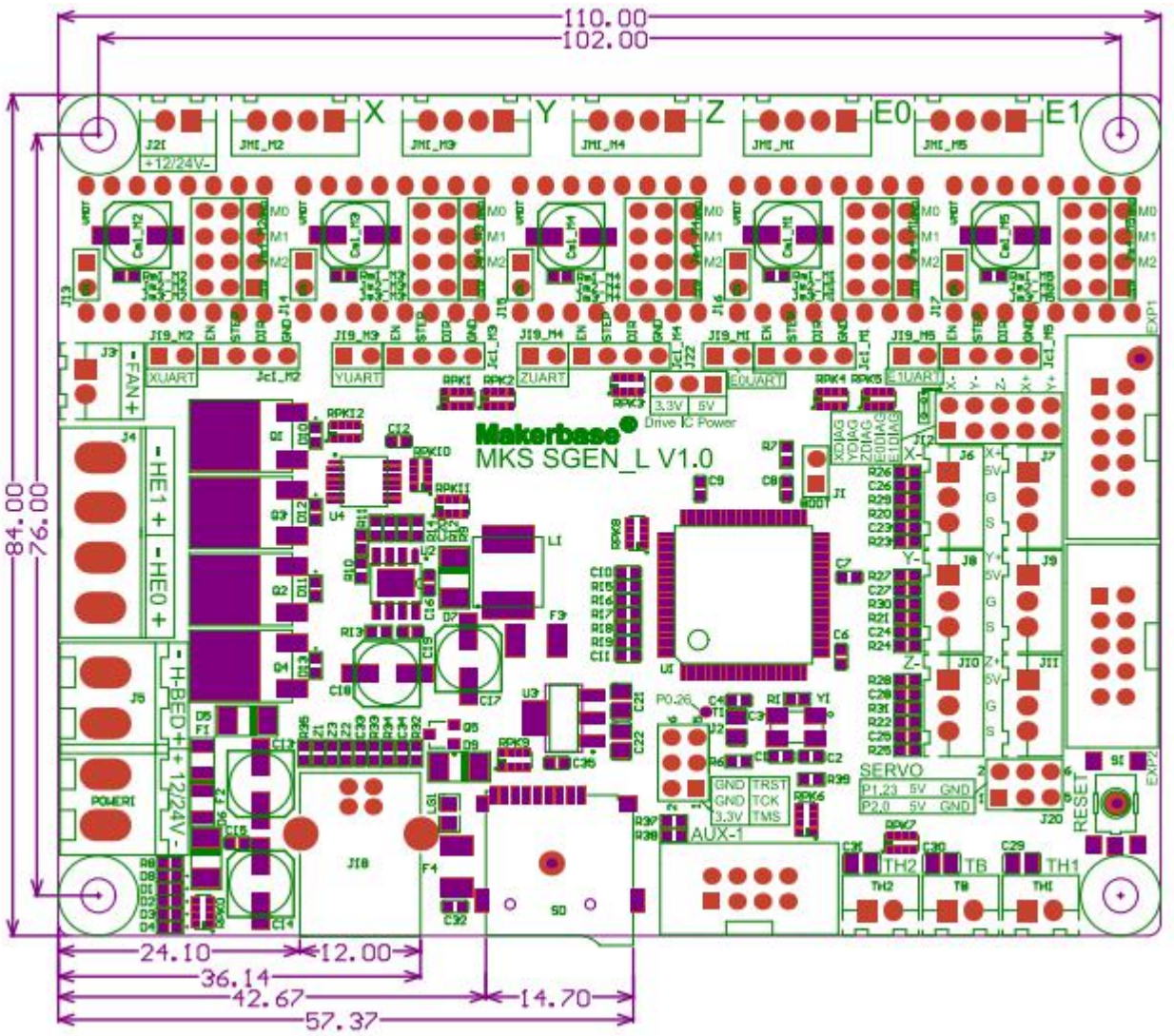
1, MKS SGen-L



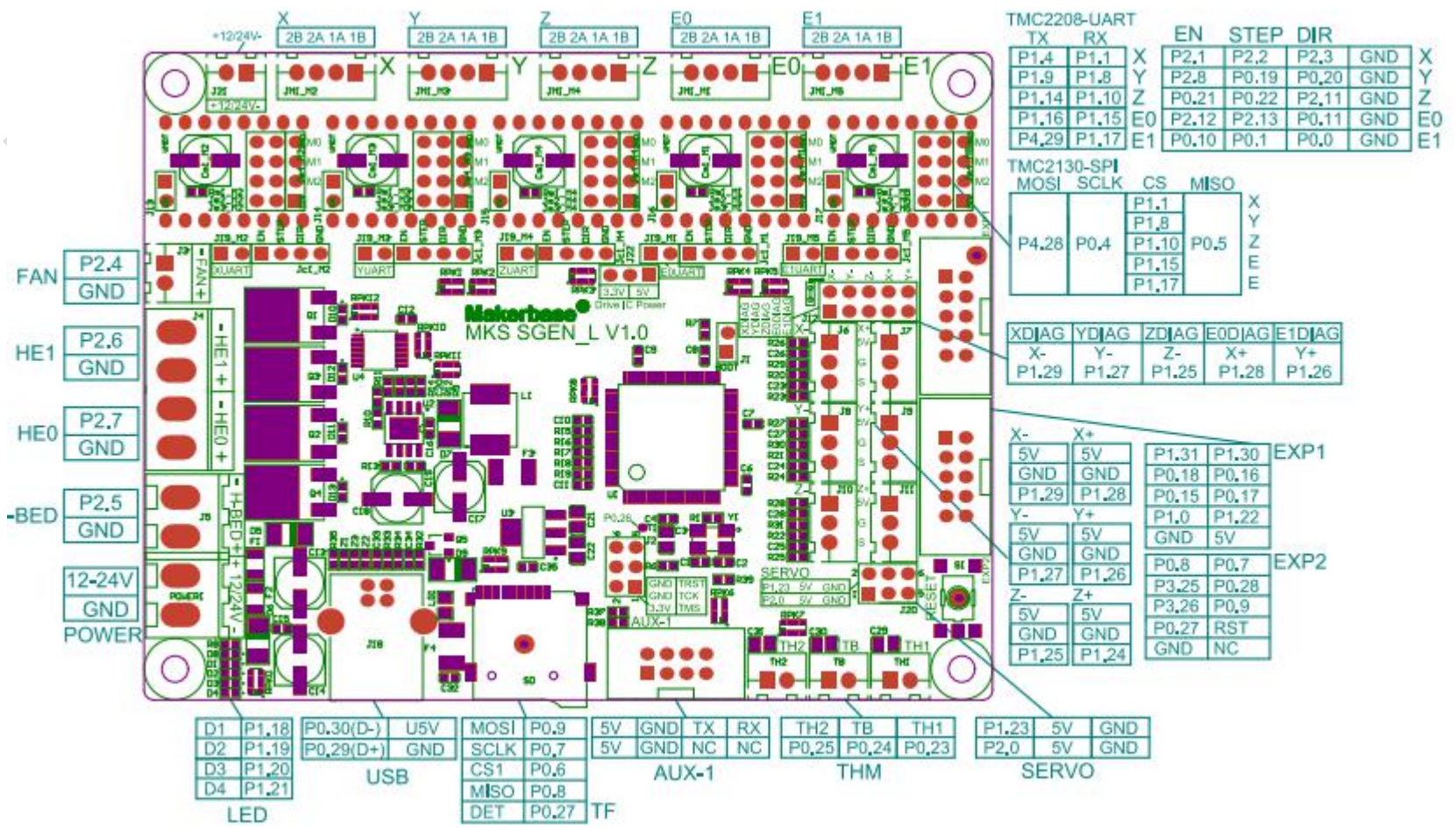
2、MKS SGen_L wiring



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

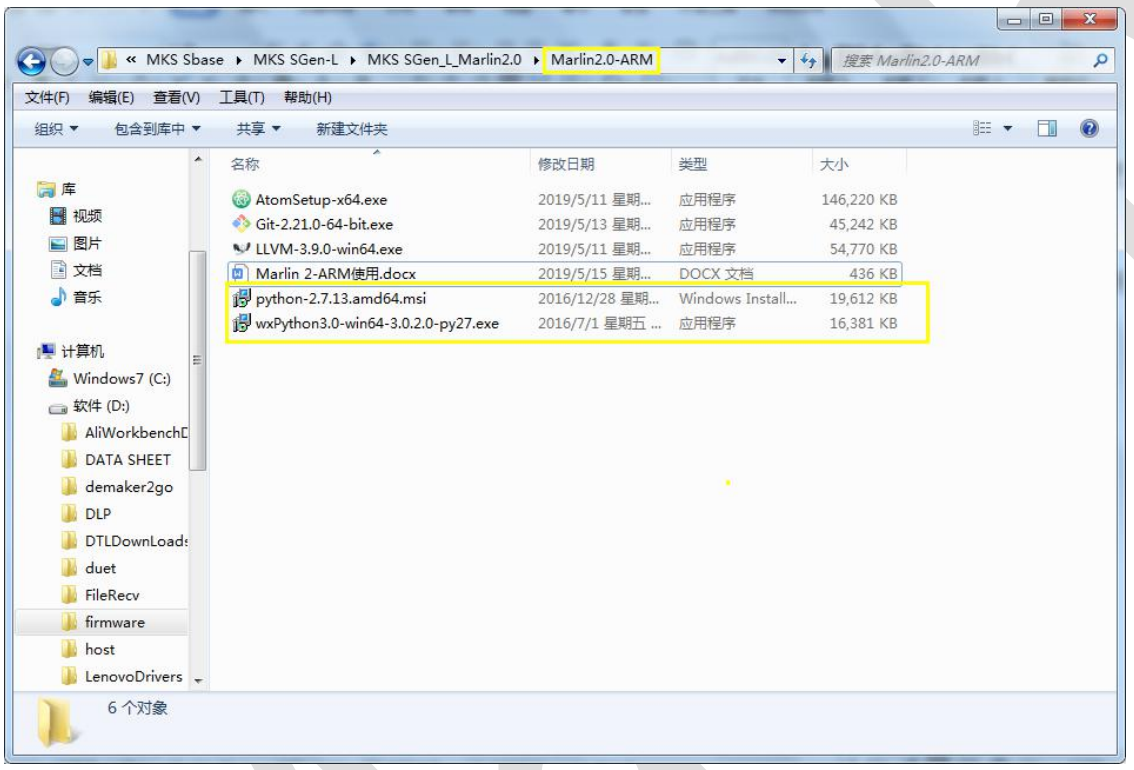
The way to update Marlin 2.0 firmware is similar to smoothieware. Copy the firmware.bin file to TF card and update the motherboard. After updating, The file will become the firmware.CUR file.

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.

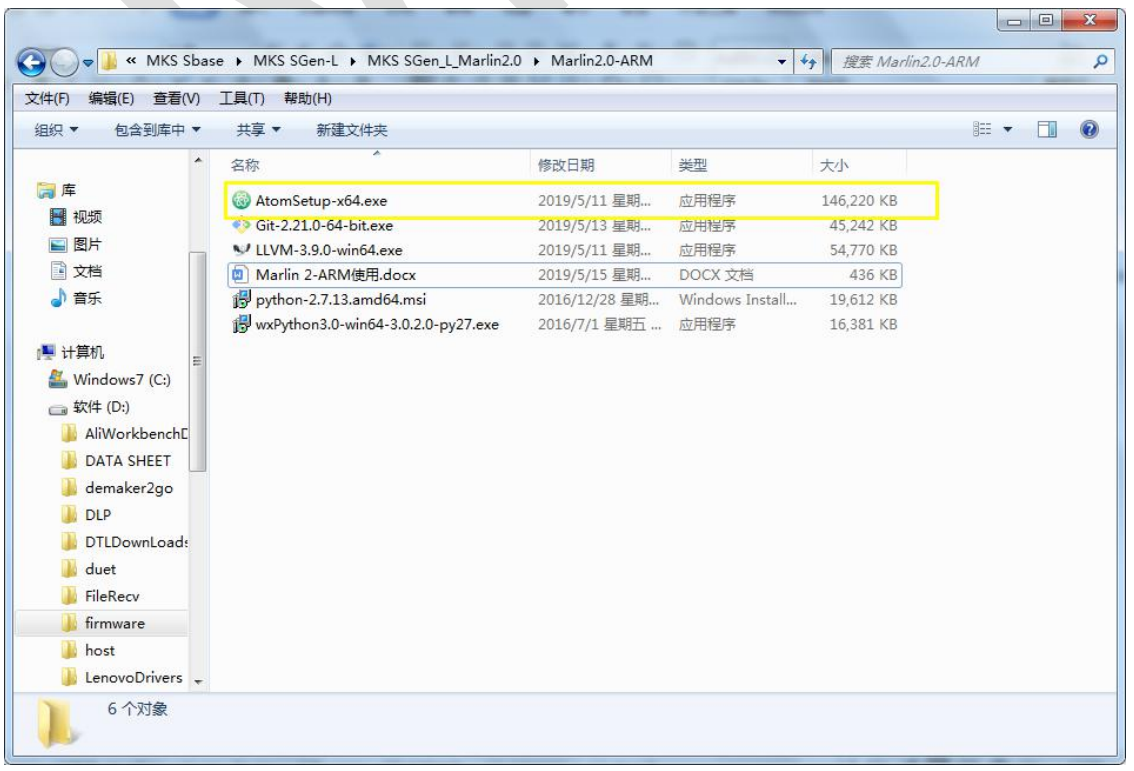
2.2.1 Compilation environment built and “bin file” creation

1. Download zipped file of firmware and software from website.

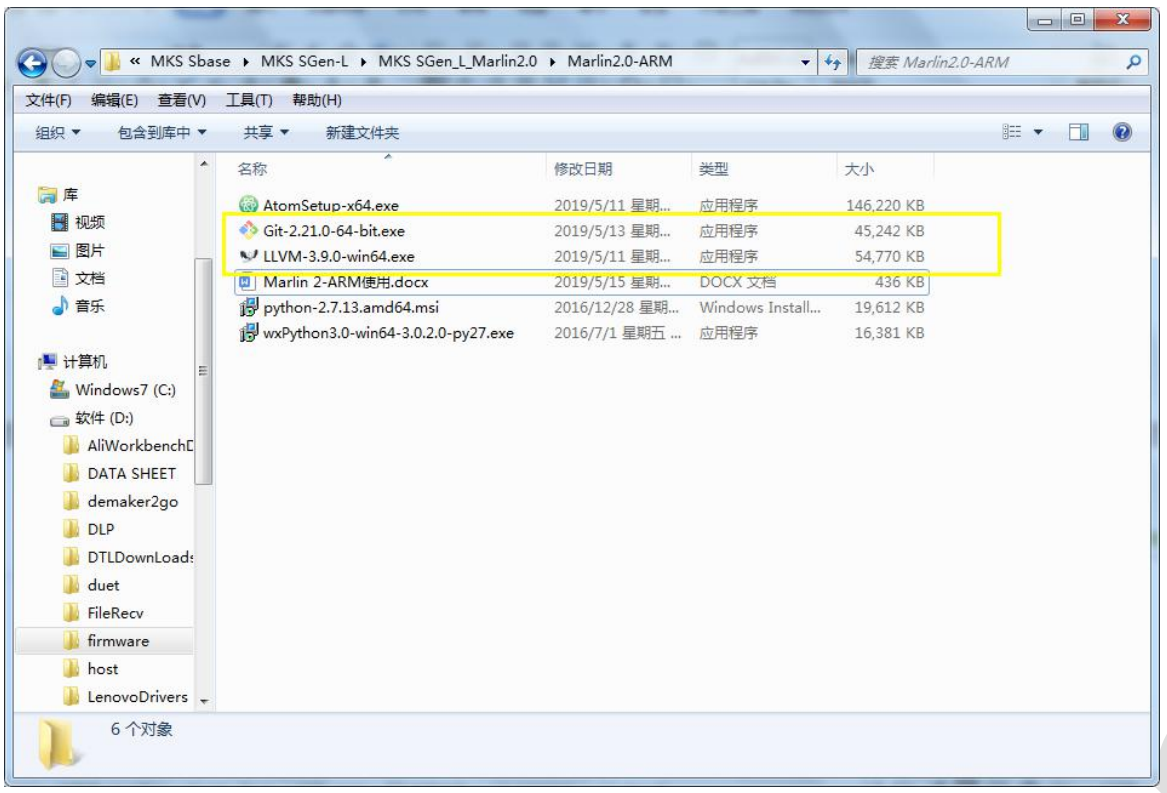
2. Open “marlin2.0-ARM” folder, install “python-2.7” and “wxPython3.0”. click on the zipped file to install, as the following figure shows



3. Atom installation



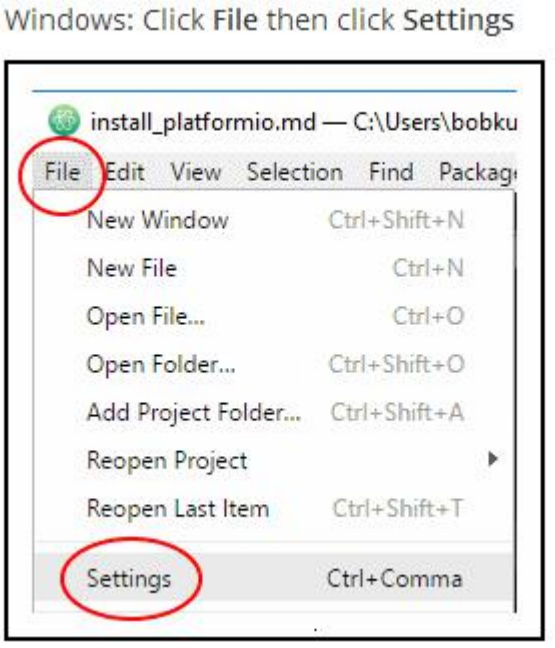
4. Install Git-2.21.0 and LLVM（only support 3.9.0）

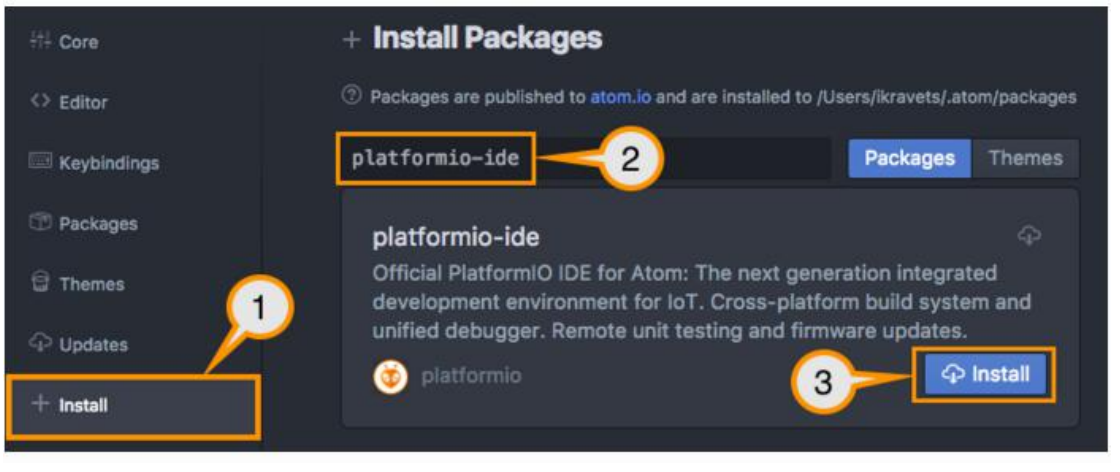


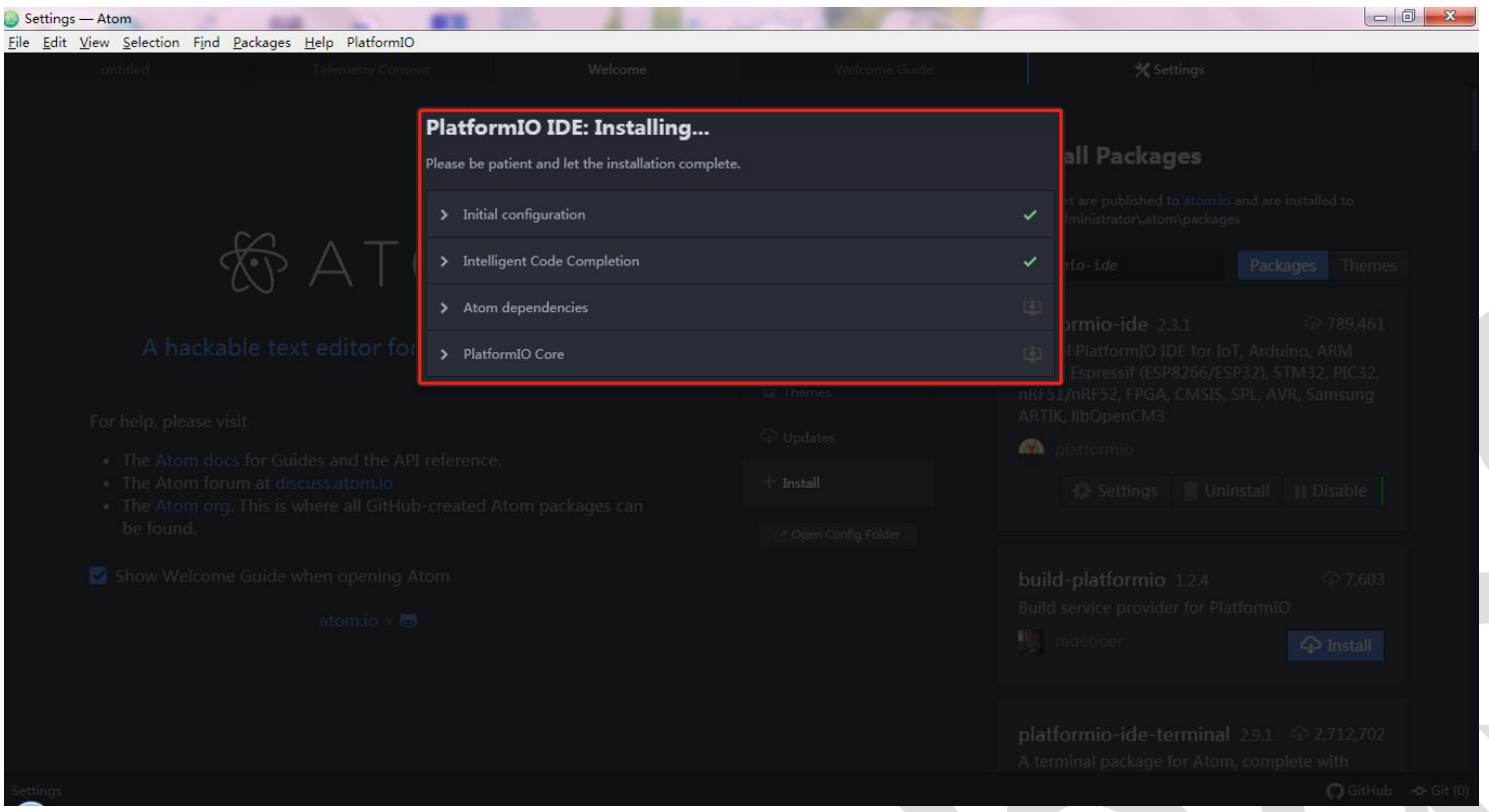
5. Atom software and plug-in installation

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

Search “platformio_ide” to install.

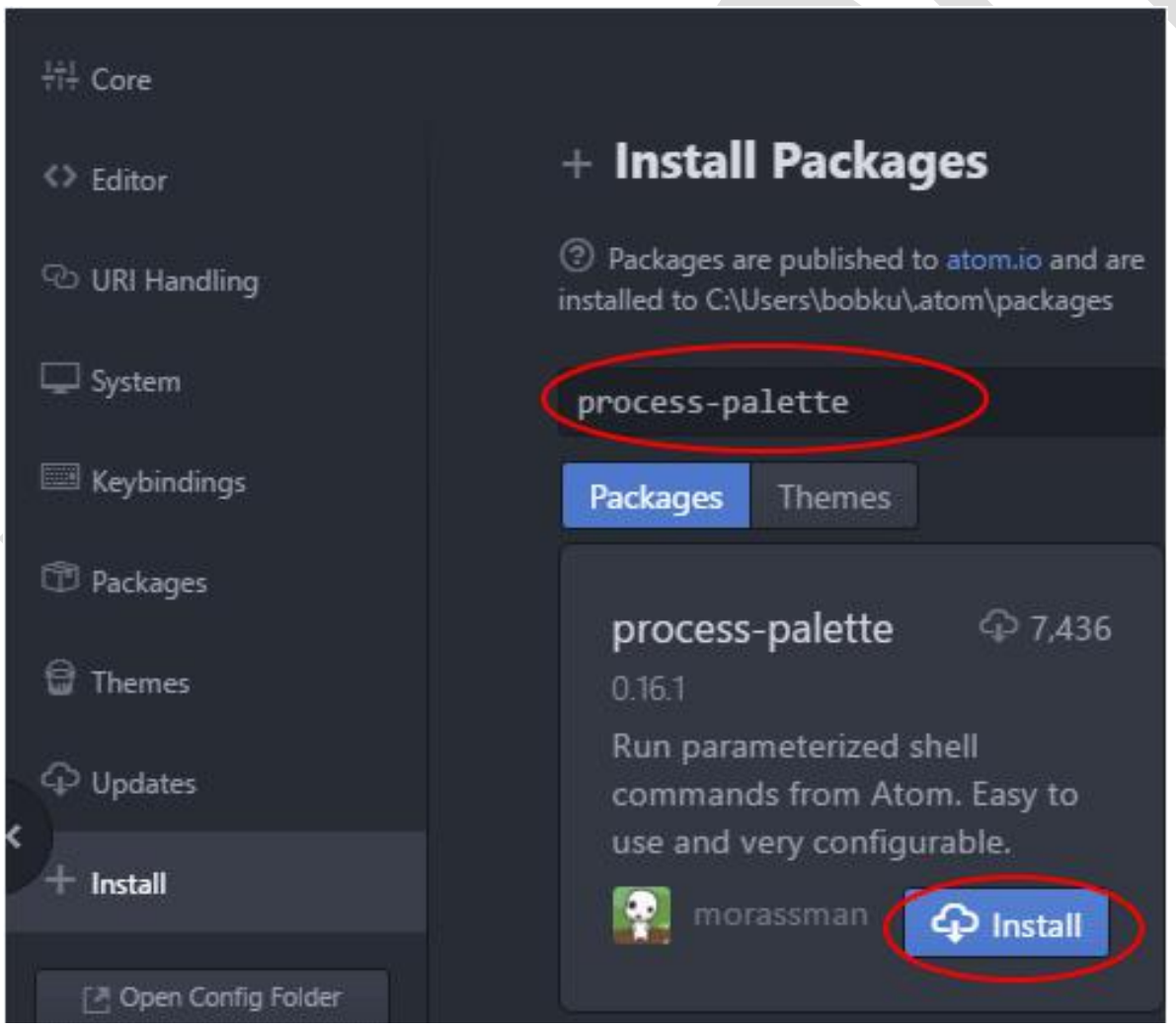






Waiting for installation to complete

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

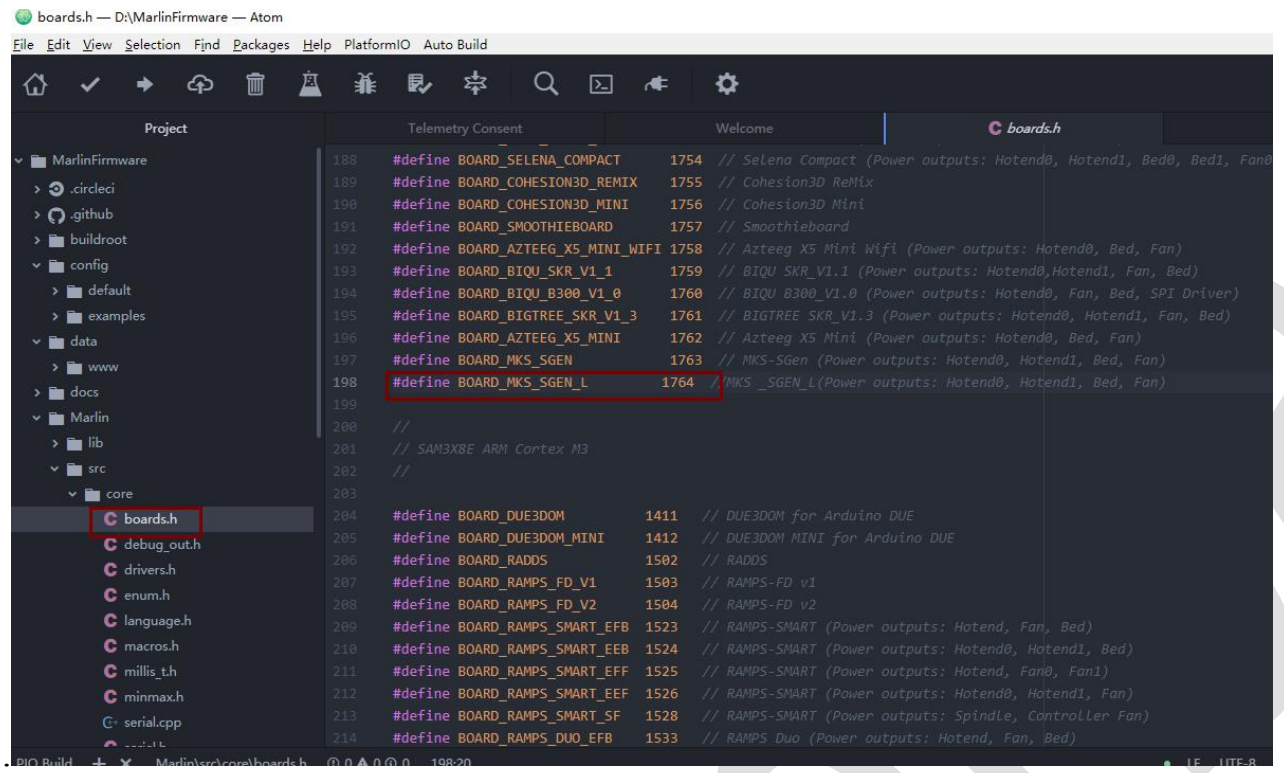
1, the input of firmware engineering

(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.

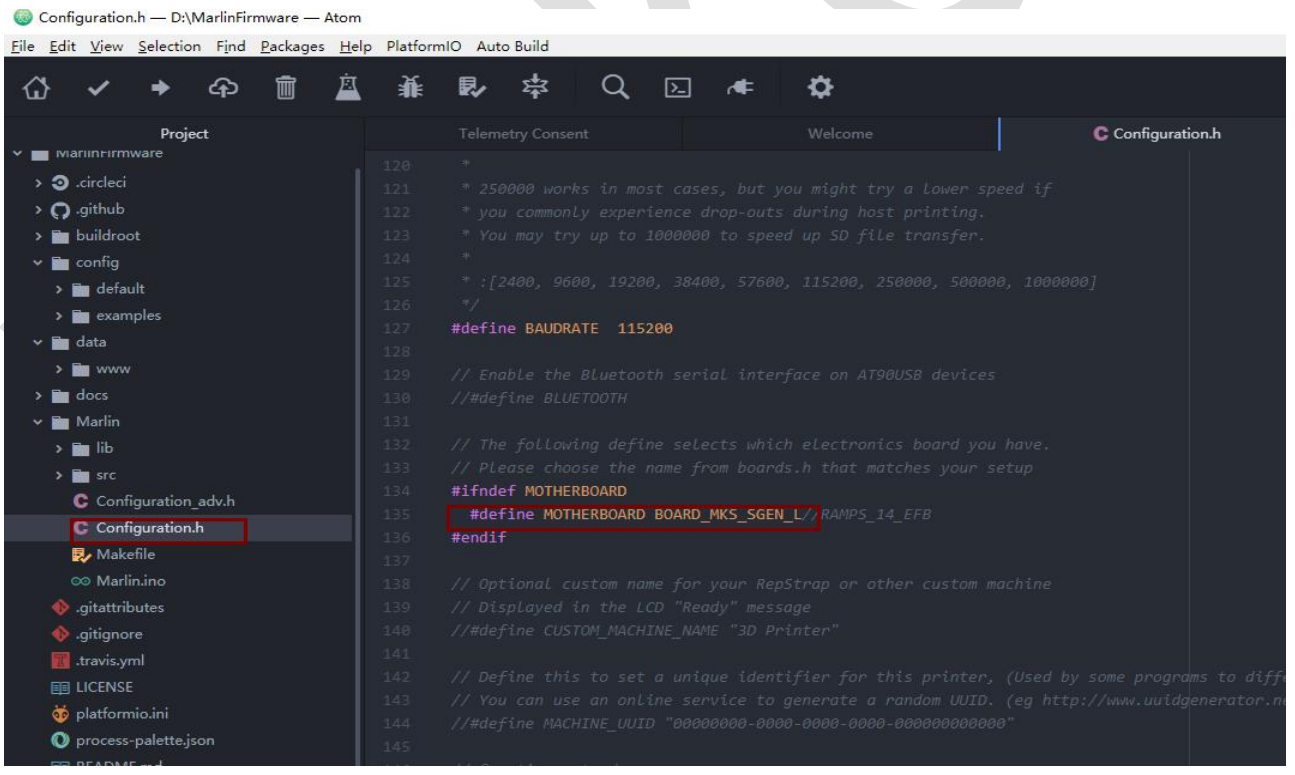
2, motherboard model definition

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



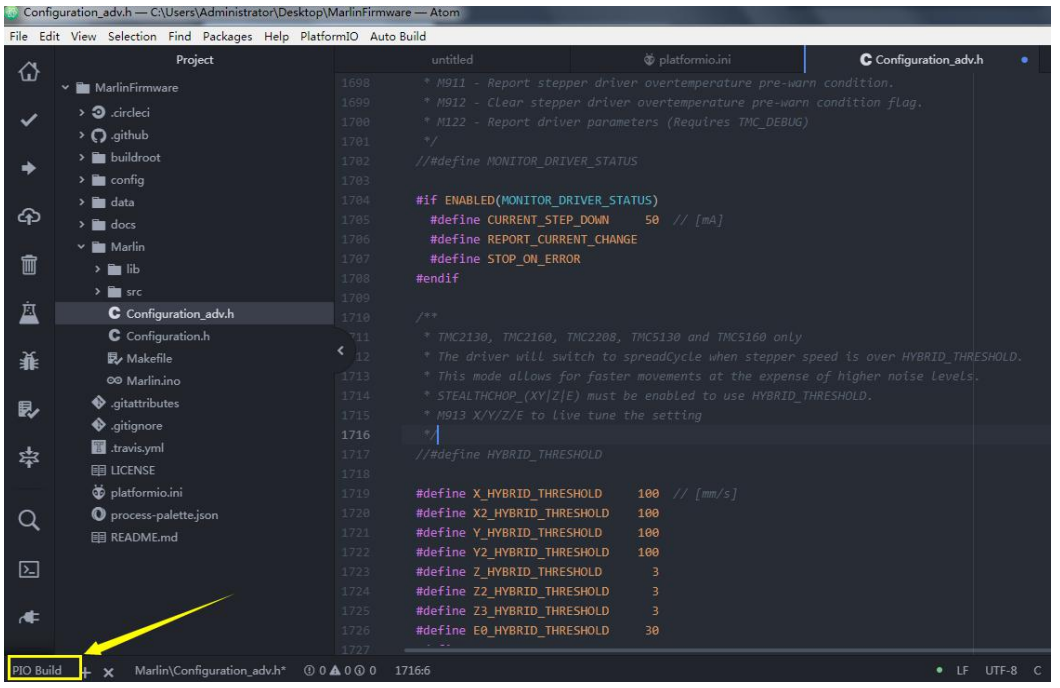
Configure the board type to “BOARD_MKS_SGEN_L” in the “ configuration.h”

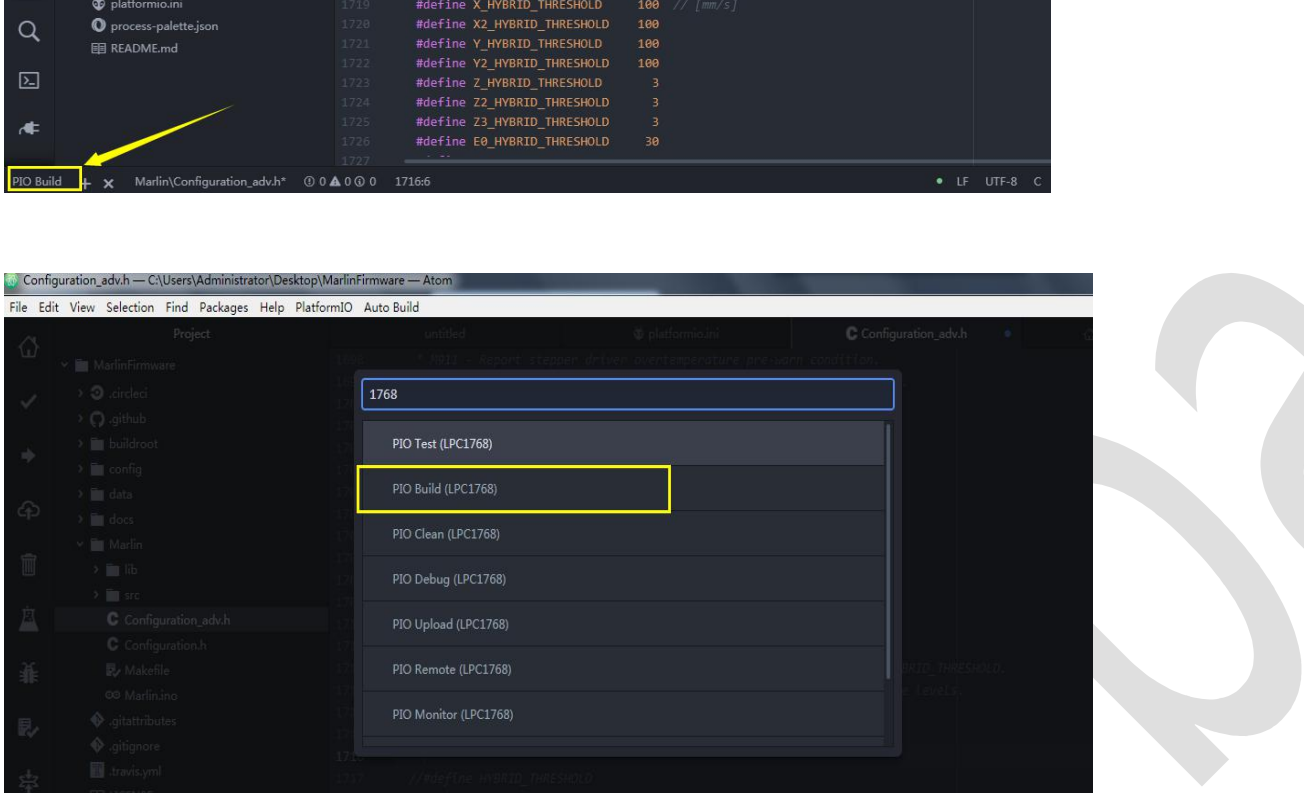


3. Setting parameters according different machine (refer to basic parameter configuration of marlin2.0 for details)

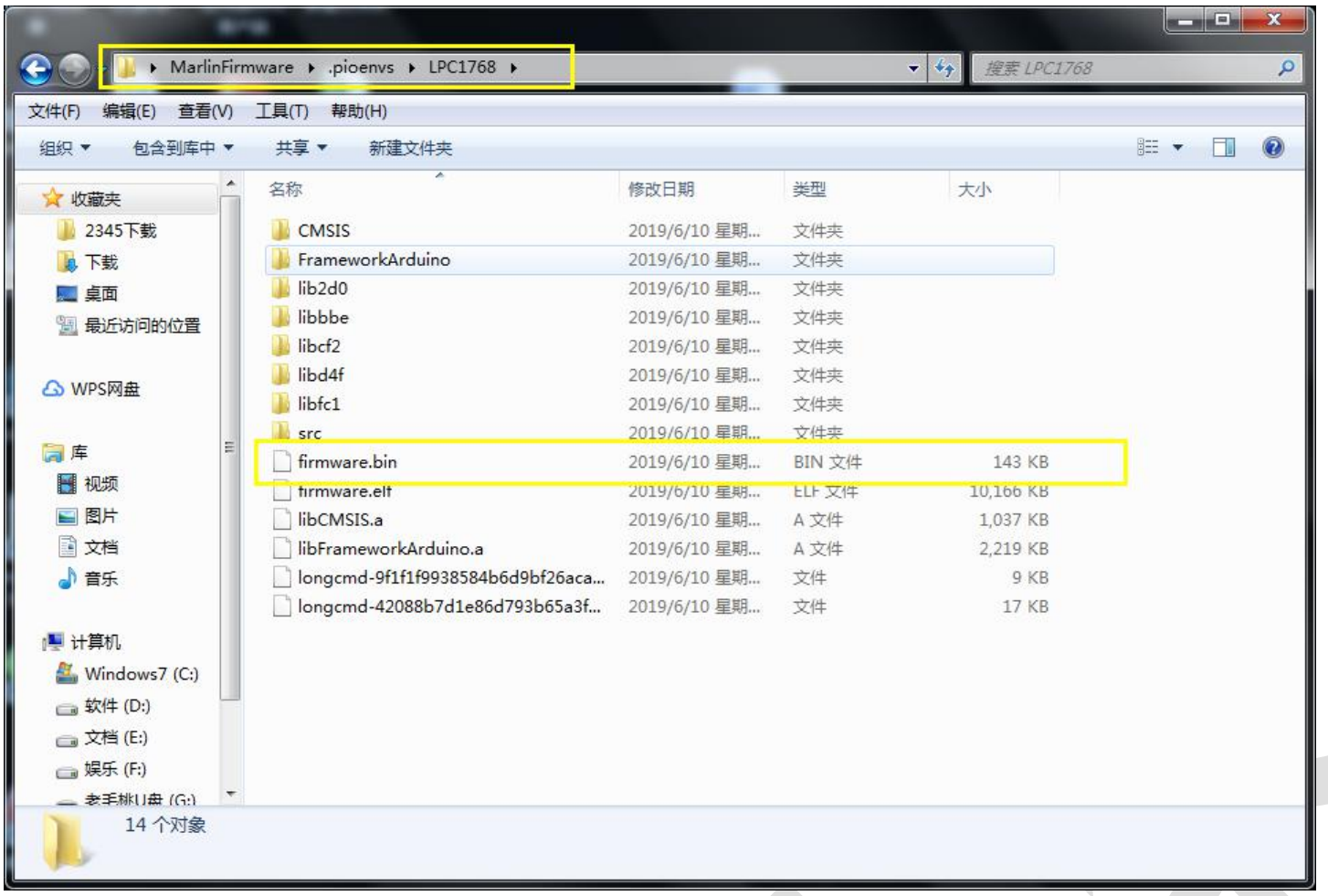
4. Firmware compilation

Click the PIO Buildin 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.


MarlinFirmware ▸ .pioenvs ▸ LPC1768 ▸
搜索 LPC1768
文件(F) 编辑(E) 查看(V) 工具(T) 帮助(H)
组织 包含到库中 共享 新建文件夹
收藏夹
2345下载
下载
桌面
最近访问的位置
WPS网盘
库
视频
图片
文档
音乐
计算机
Windows7 (C:)
软件 (D:)
文档 (E:)
娱乐 (F:)
名称 修改日期 类型 大小
CMSIS 2019/6/10 星期... 文件夹
FrameworkArduino 2019/6/10 星期... 文件夹
lib2d0 2019/6/10 星期... 文件夹
libbbe 2019/6/10 星期... 文件夹
libcf2 2019/6/10 星期... 文件夹
libd4f 2019/6/10 星期... 文件夹
libfc1 2019/6/10 星期... 文件夹
src 2019/6/10 星期... 文件夹
firmware.bin 2019/6/10 星期... BIN 文件 143 KB
firmware.elf 2019/6/10 星期... ELF 文件 10,166 KB
libCMSIS.a 2019/6/10 星期... A 文件 1,037 KB
libFrameworkArduino.a 2019/6/10 星期... A 文件 2,219 KB
longcmd-9f1f1f9938584b6d9bf26aca... 2019/6/10 星期... 文件 9 KB
longcmd-42088b7d1e86d793b65a3f... 2019/6/10 星期... 文件 17 KB
14 个对象

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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,
                                              #例如 200步电机 16细分 用20-2GT同步轮：200*16/40=80
beta_steps_per_mm                 80          # Y轴每走1mm 所需脉冲数
gamma_steps_per_mm                1600        # Z轴每走1mm 所需脉冲数
extruder.hotend.steps_per_mm      140         # 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 senor, 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 s
  ku: 17.7607
  tu: 23.7929
Trying:
  Kp:  10.7
  Ki: 0.045
  Kd:    32
PID Autotune Complete! The settings above have been loaded ir
```

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_comand
```

（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 extrernal 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 extrernal 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

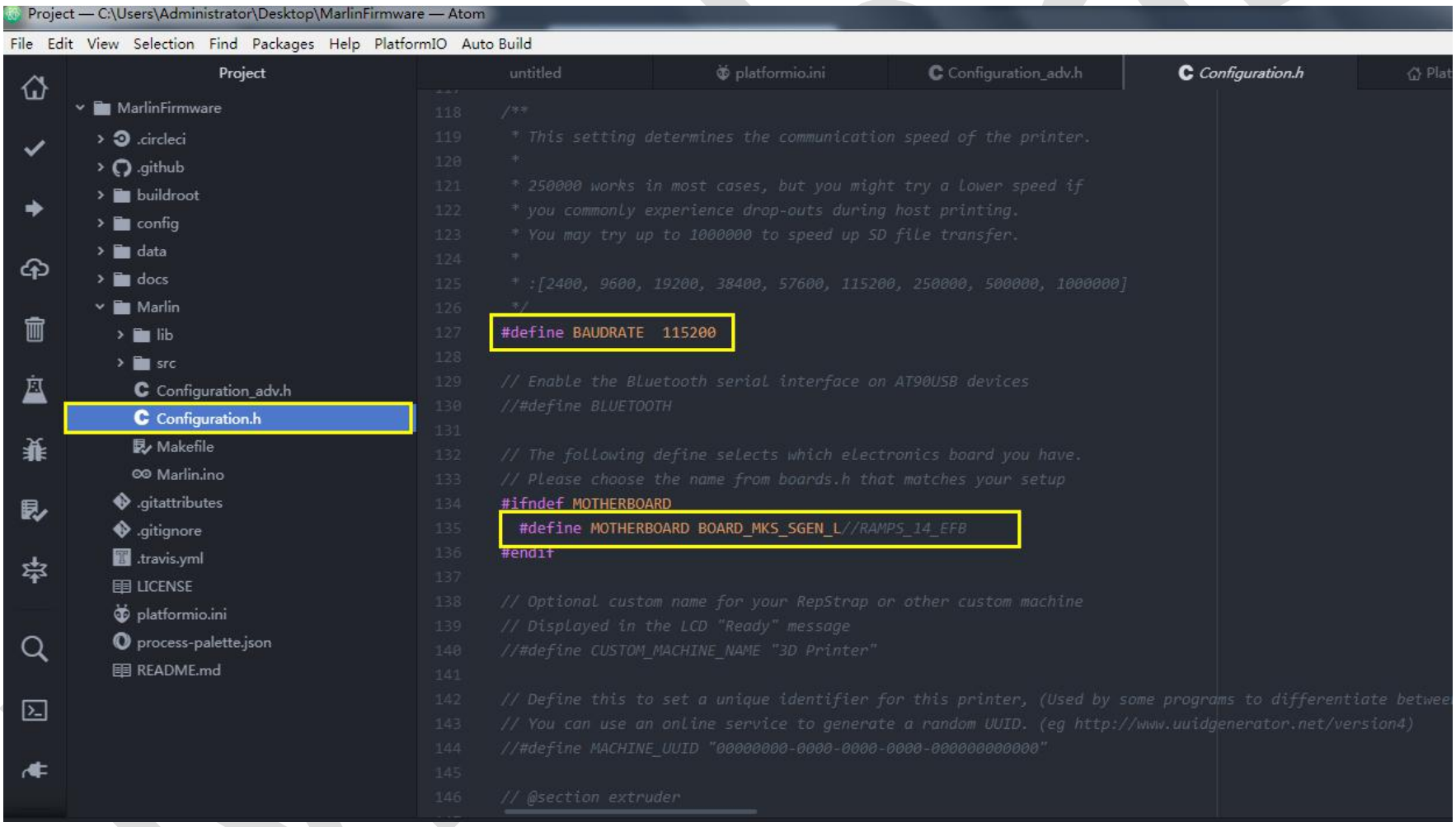
5.2.1 basic parameter setting

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

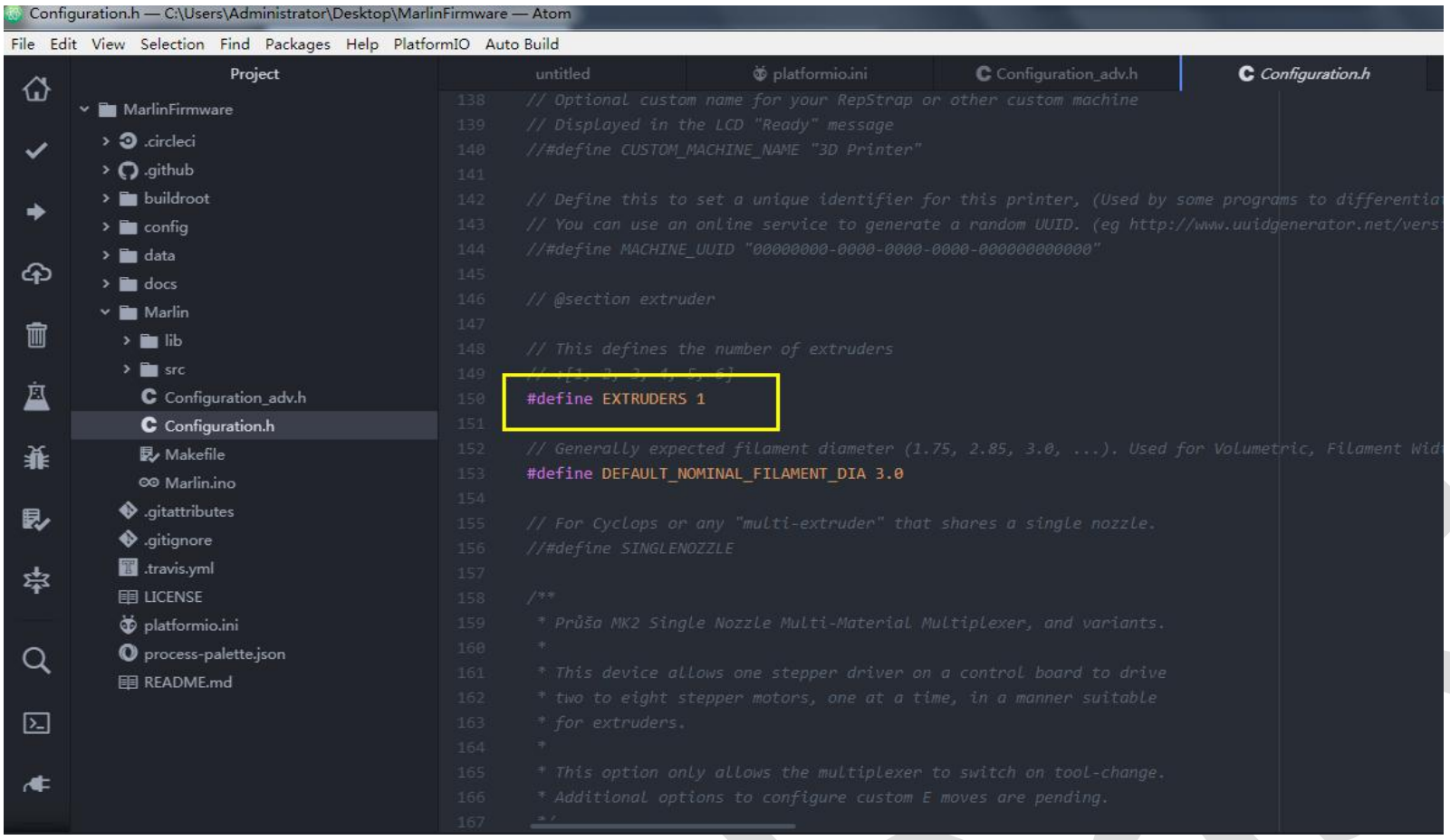
Open marlin firmware via atom, click on “File→Open Folder” (open marlin2.0wirmware folder to input marlin firmware. Open “configuration.h” to setting the basic parameter. The setting contact is similar to marlin version 1.0.

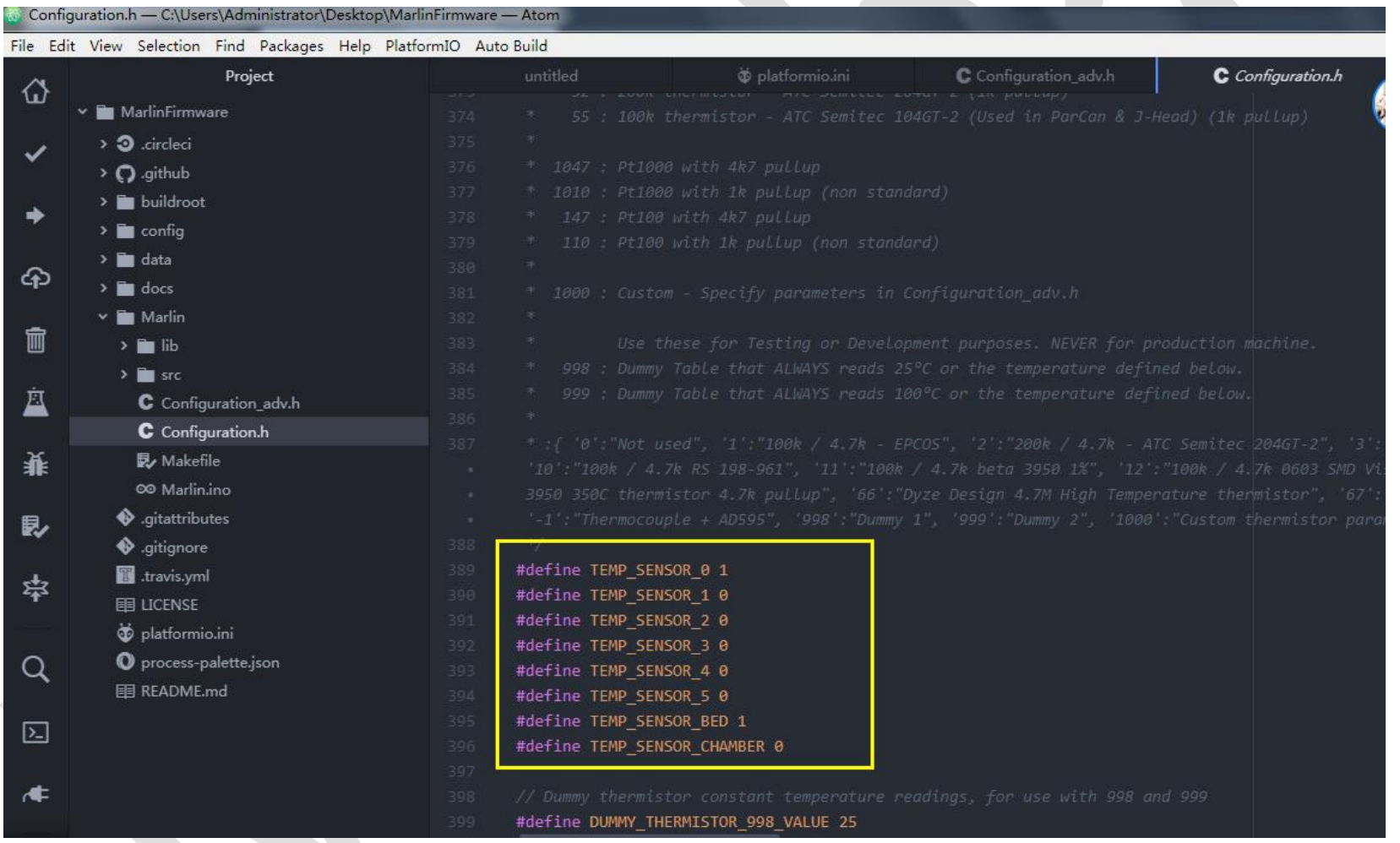
1. Motherboard Baud rate setting

2. motherboard type setting



Extruder quantity and thermal type setting



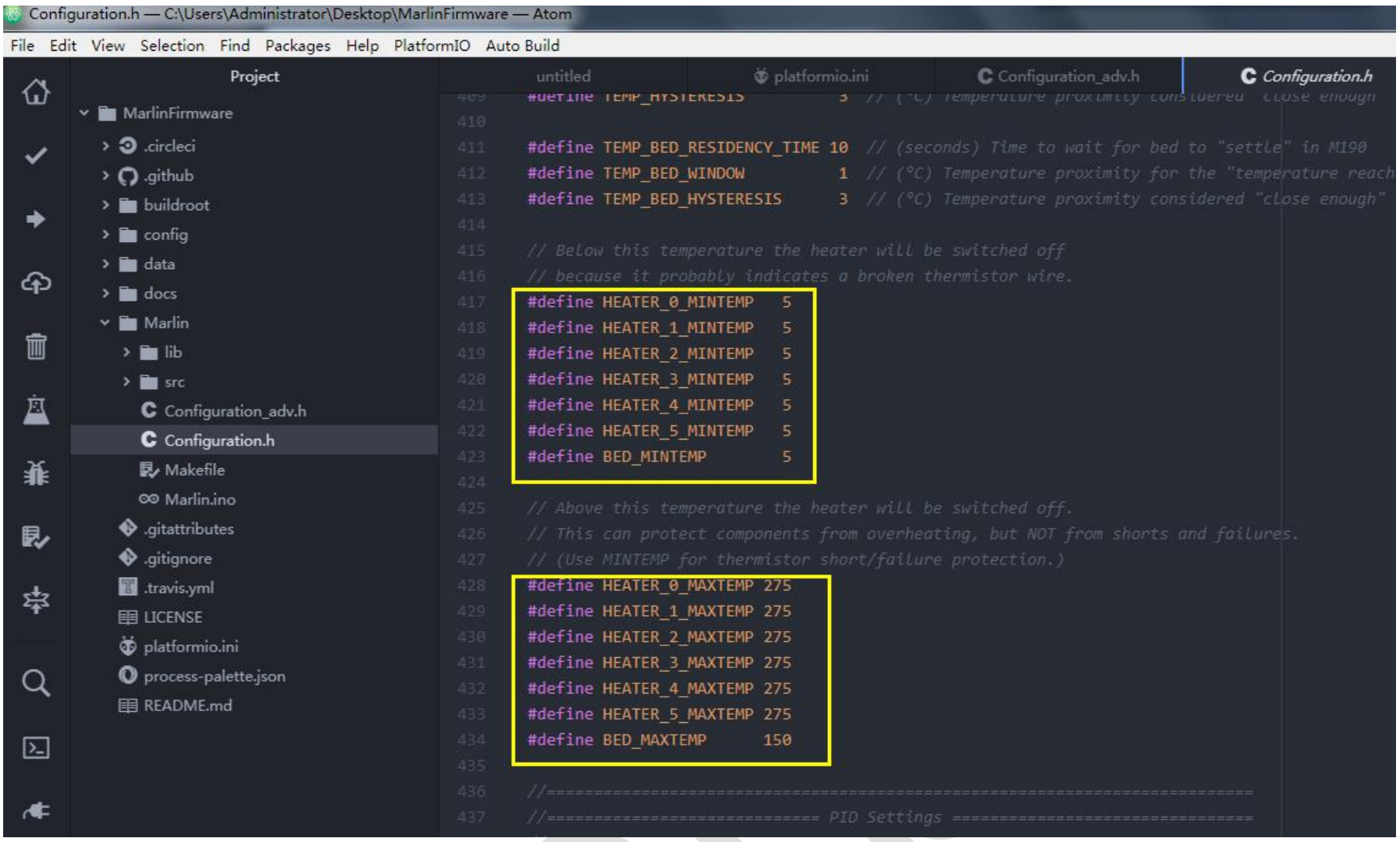


Configure parameter according to the type of temperature sensor

#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)



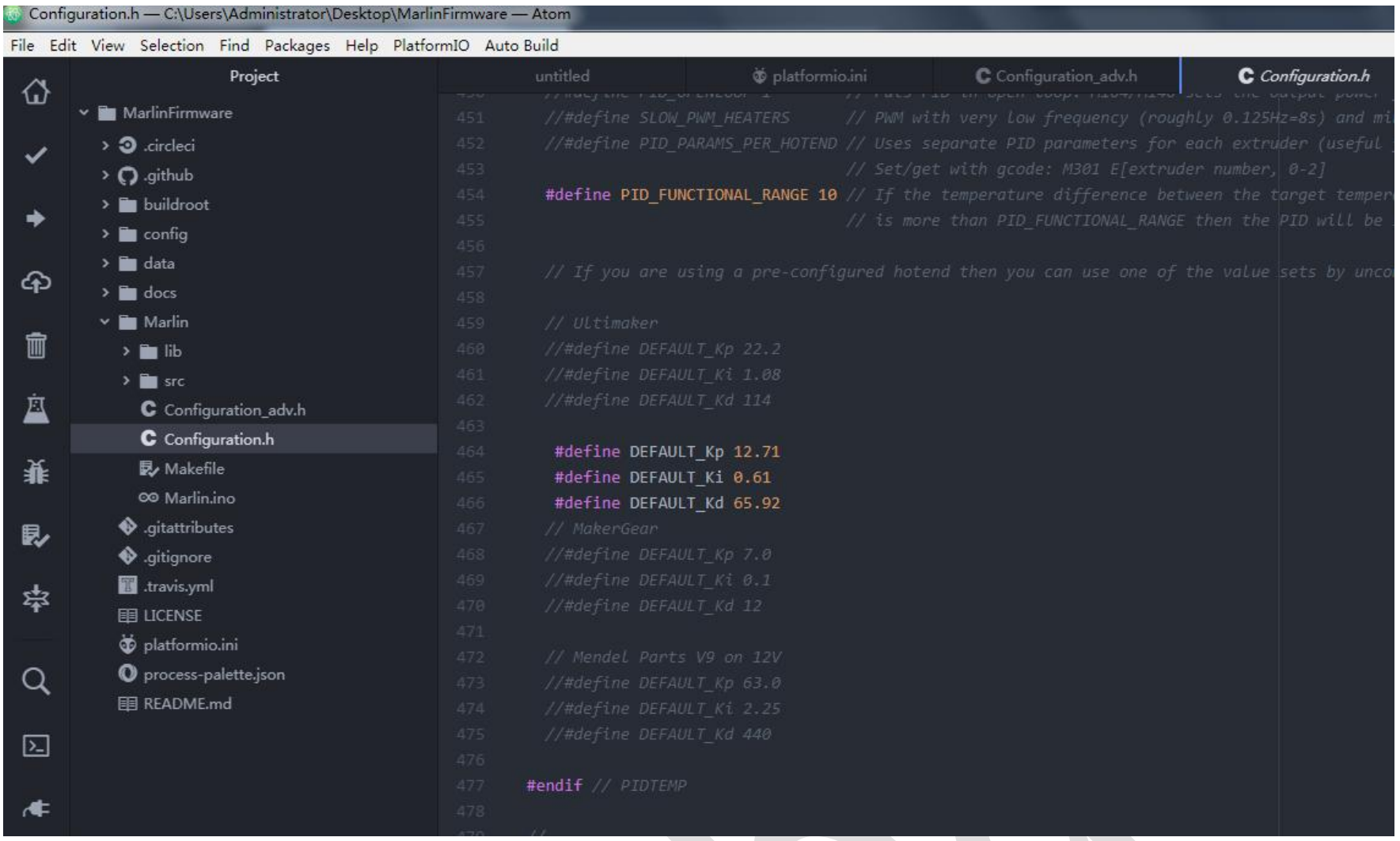
PID setting (generally, it doesn’t need to adjust, default setting is OK)

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

M303 E0 S190

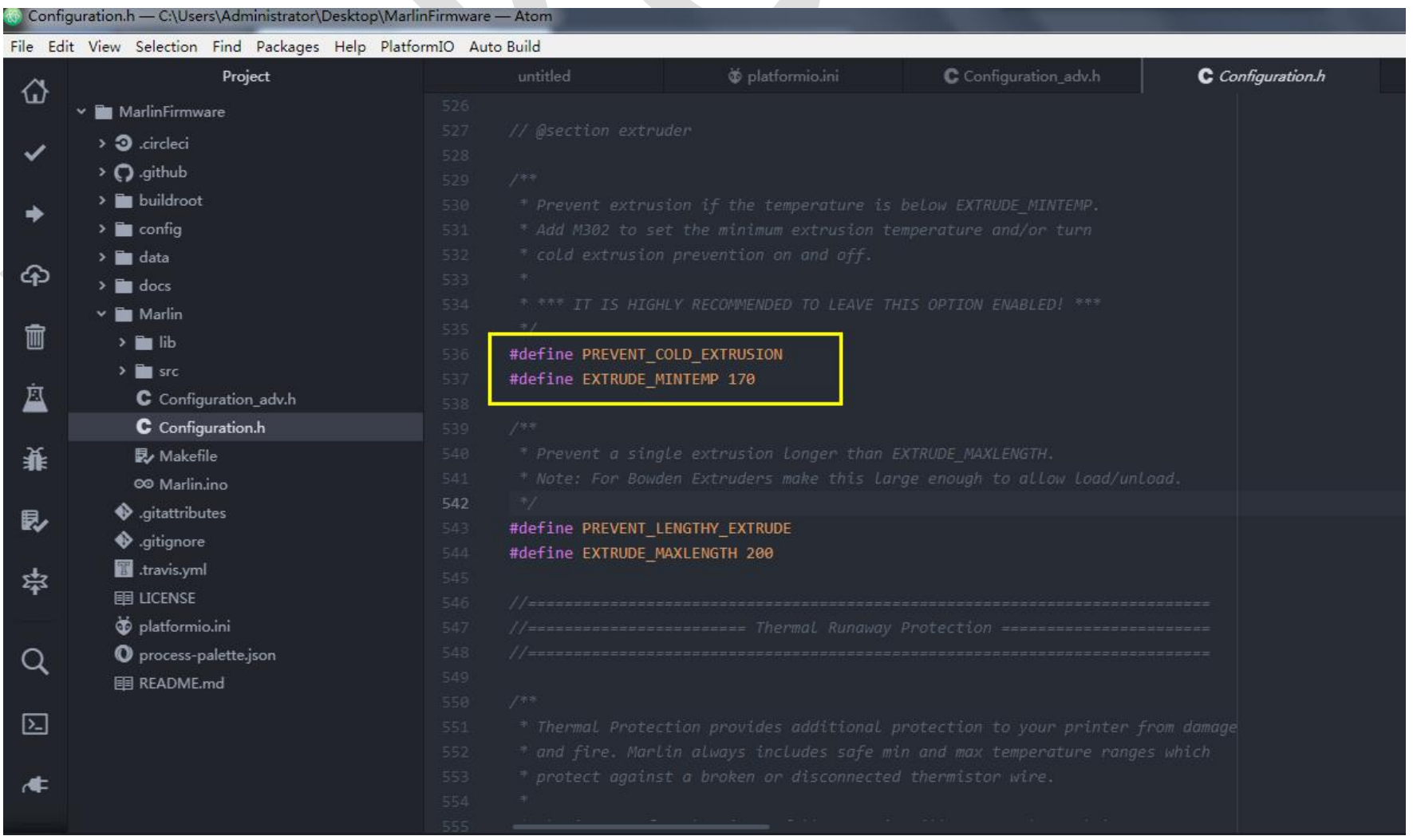
For the case where the printing head E0 is often warmed to 190 degrees, the PID operates automatically. After that, fill the returned value into the firmware.

```
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 s
  ku: 17.7607
  tu: 23.7929
Trying:
  Kp:  10.7
  Ki: 0.045
  Kd:    32
PID Autotune Complete! The settings above have been loaded ir
```



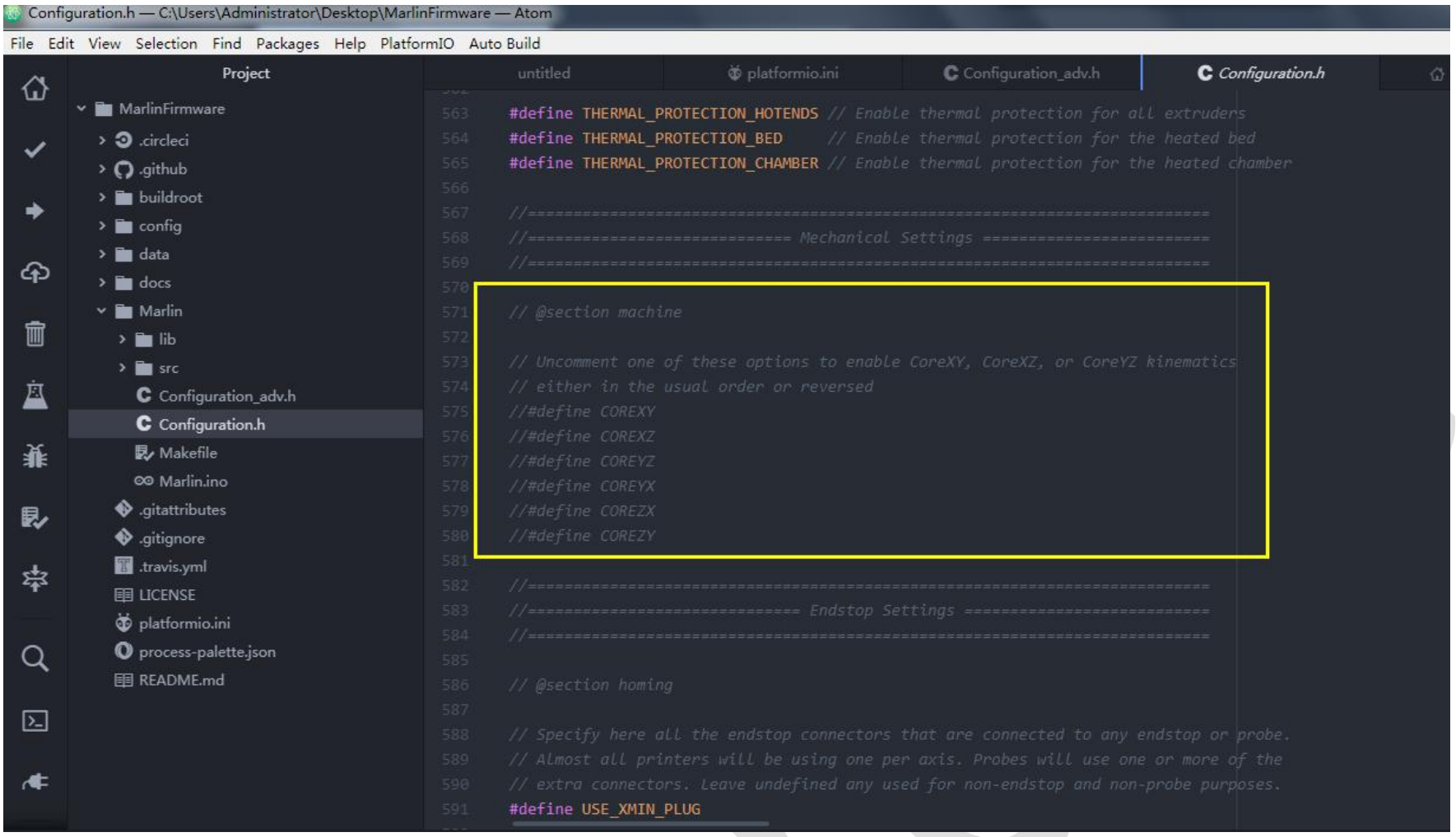
PREVENT_COLD_EXTRUSION

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.



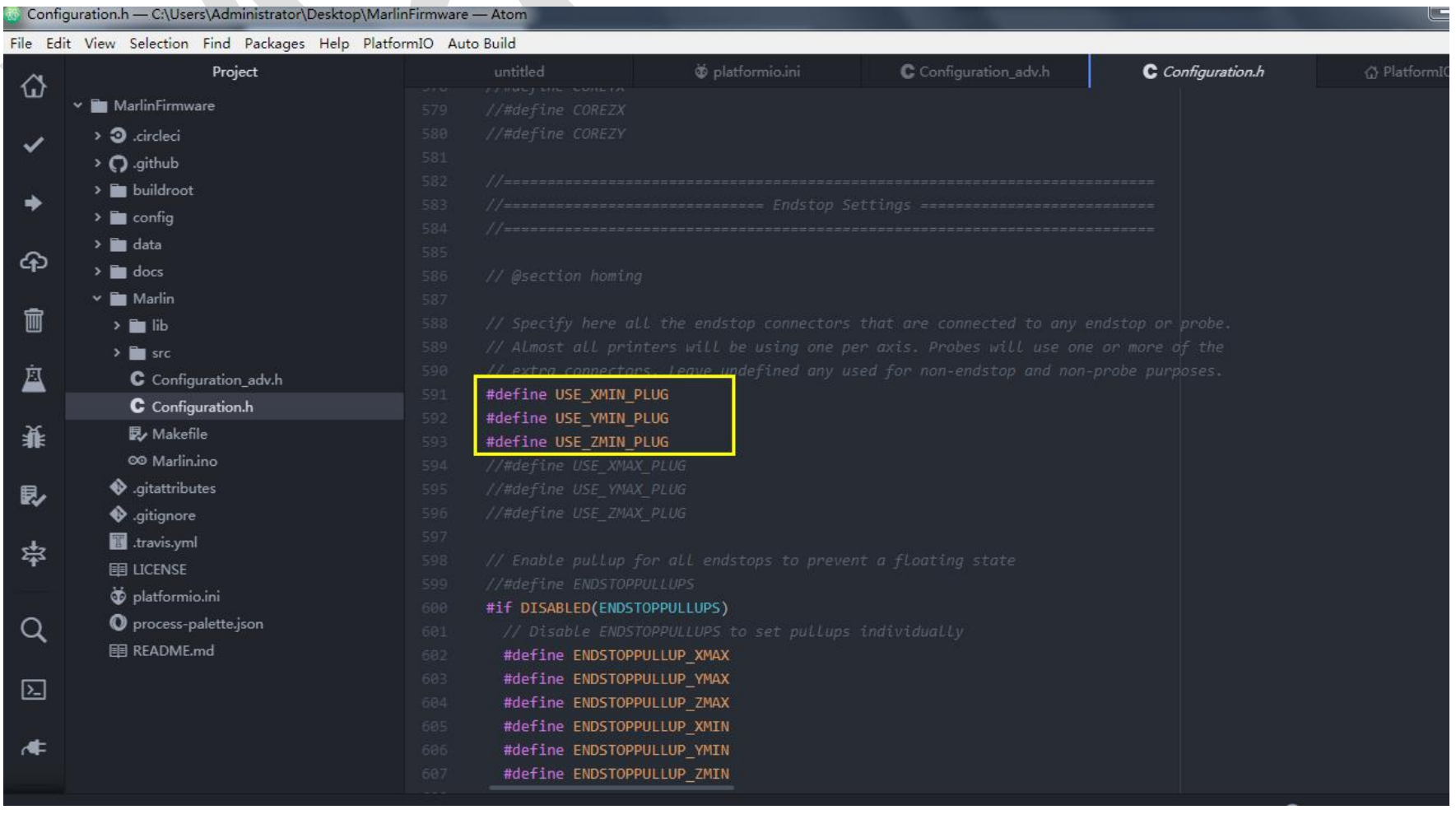
Machine setting

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



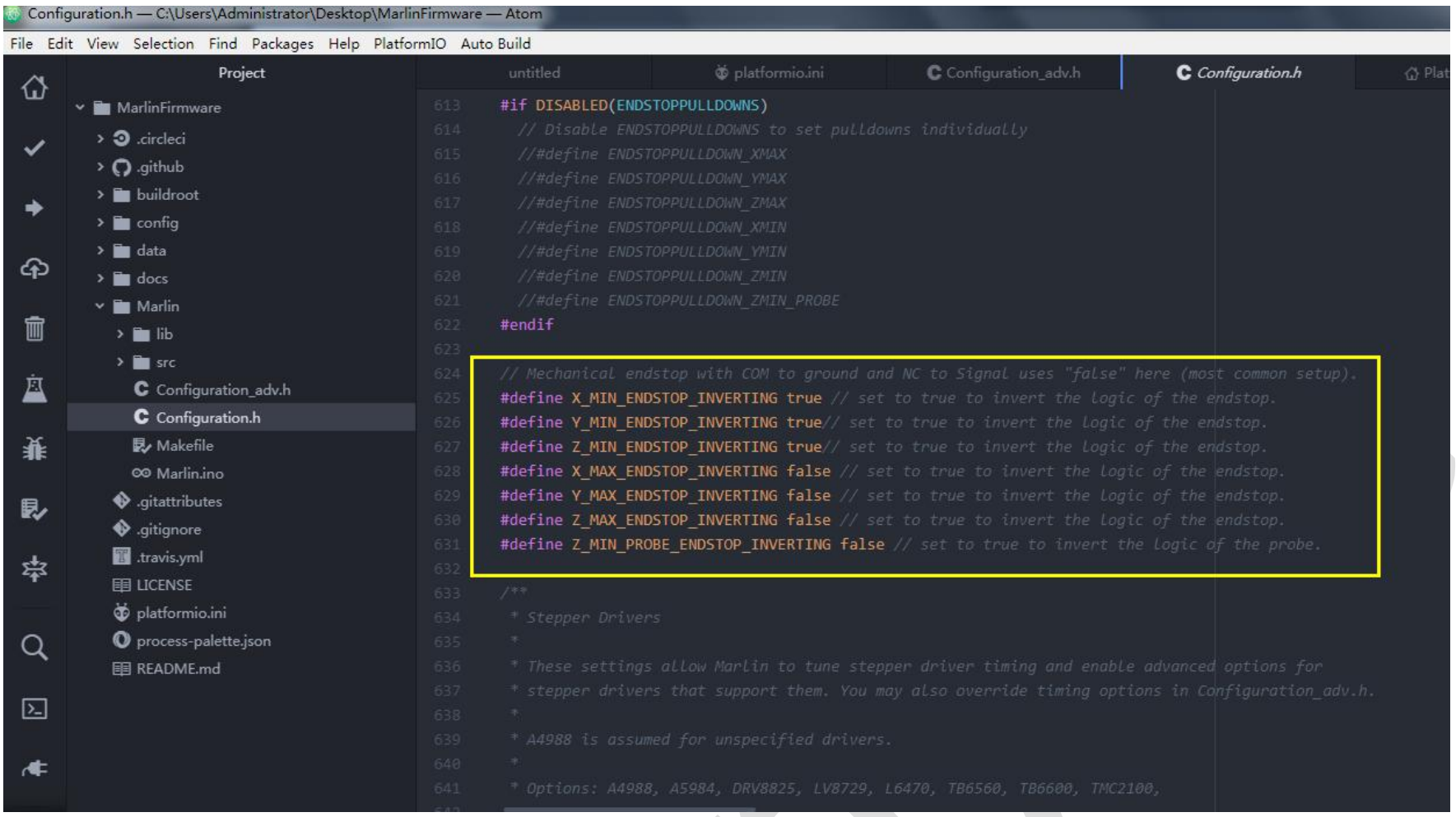
Limit switch setting

Enable limit switch



Switch type setting (normally open / normally closed)

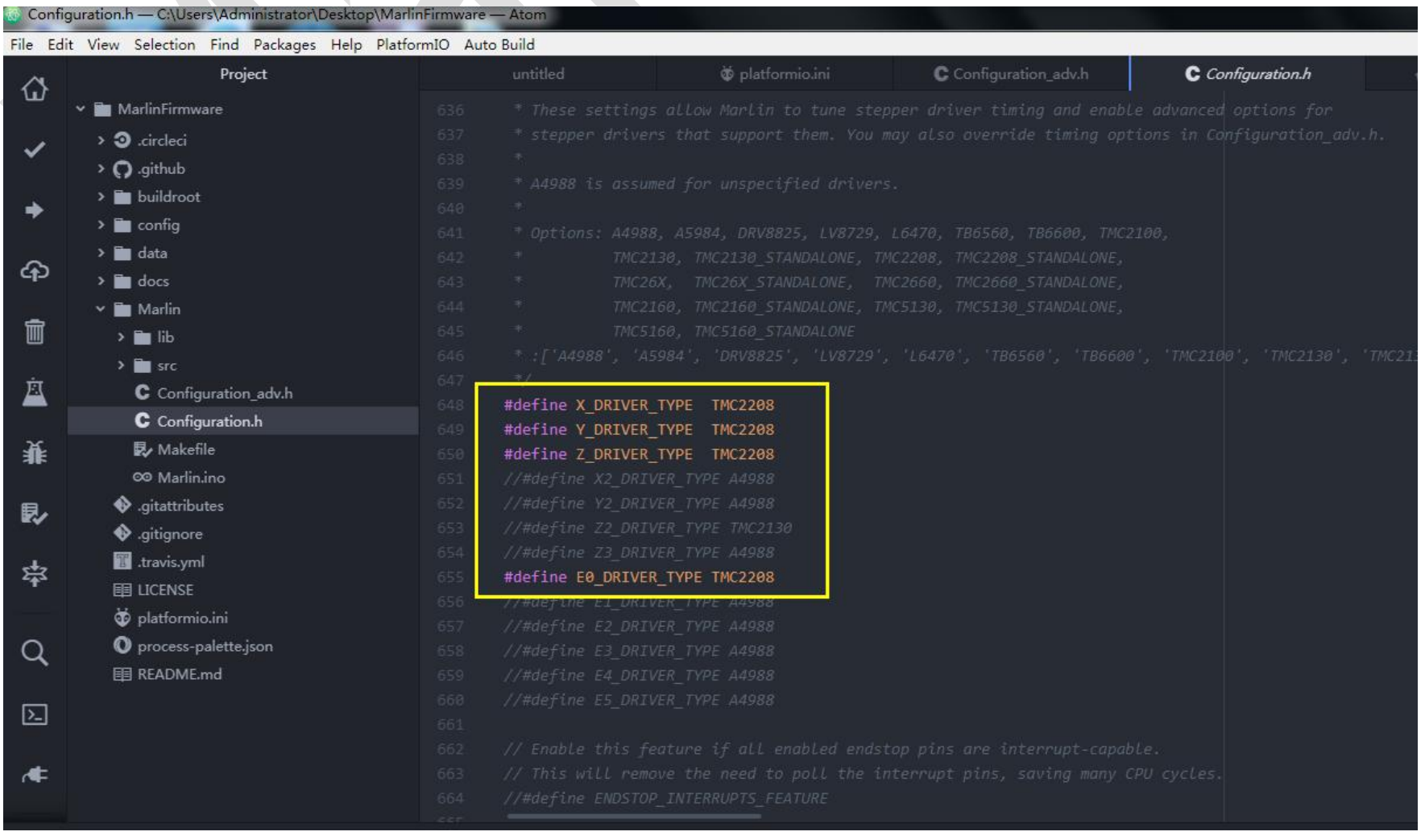
Note: If the setting type is reversed, it may cause homing error.



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.

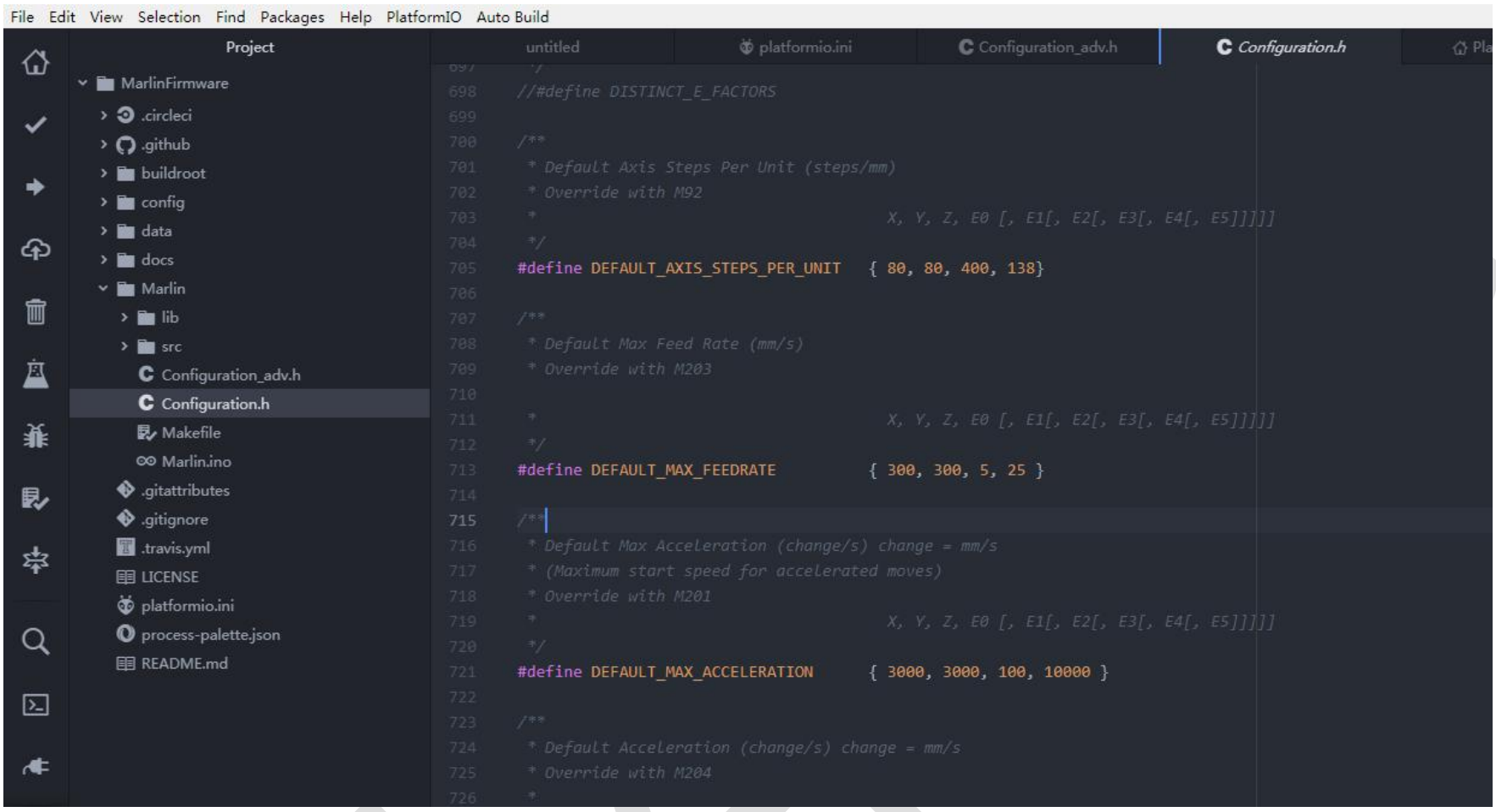


Motor steps per setting (#define DEFAULT_AXIS_STEPS_PER_UNIT)

It can be calculated by formula according to mechanical conditions

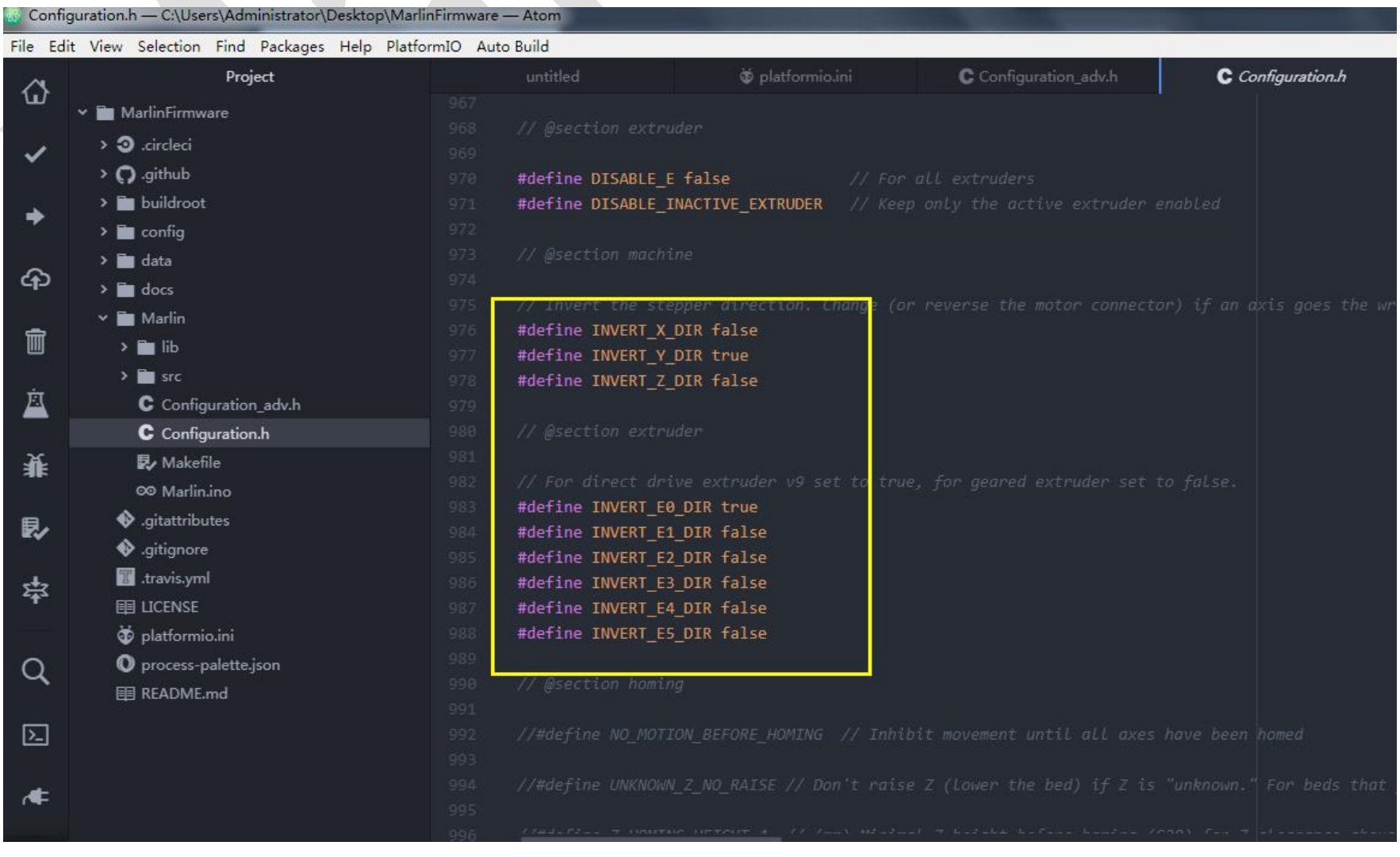
The formula of the number of pulses of the synchronous wheel motor / mm is: (360 ÷ step angle) × microstep (diameter × 3.14);

The formula of the number of pulses of the screw motor / mm is: (360 ÷ step angle) × microstep ÷ lead



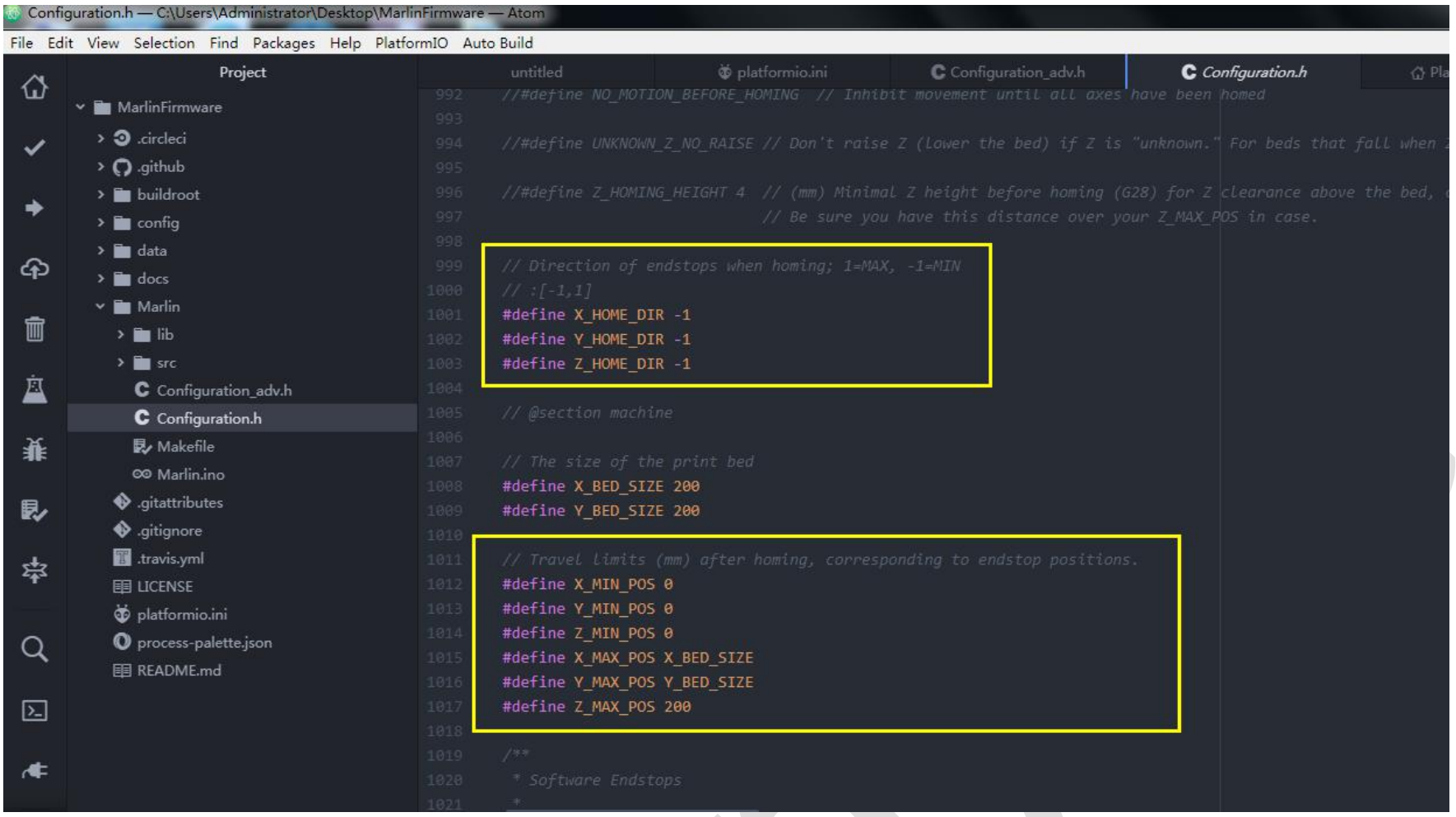
Motor direction setting

adjust parameter(true or false) to modified motor direction



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

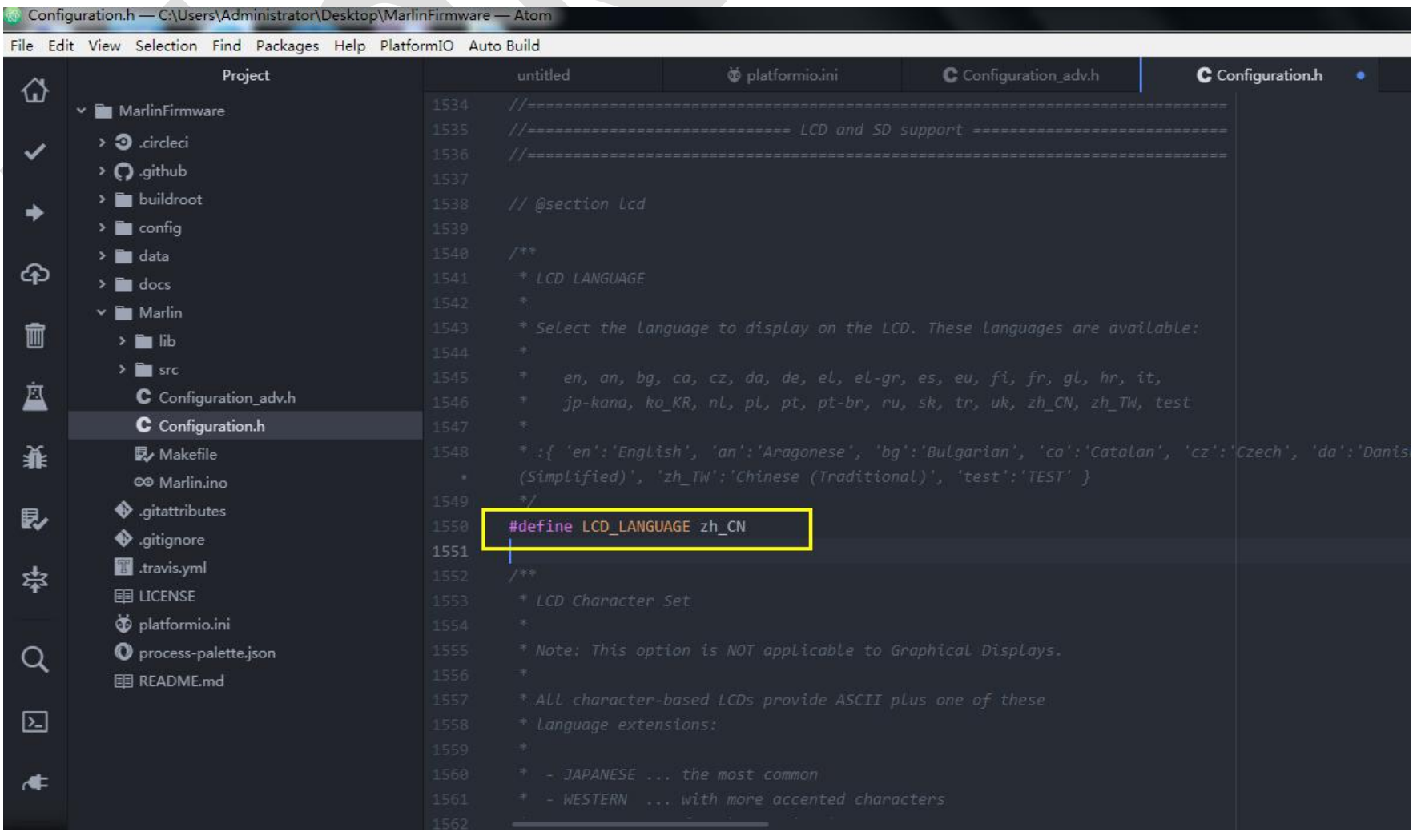
Travel limit: Set the maximum running distance of the xyz axis.



LCD screen setting

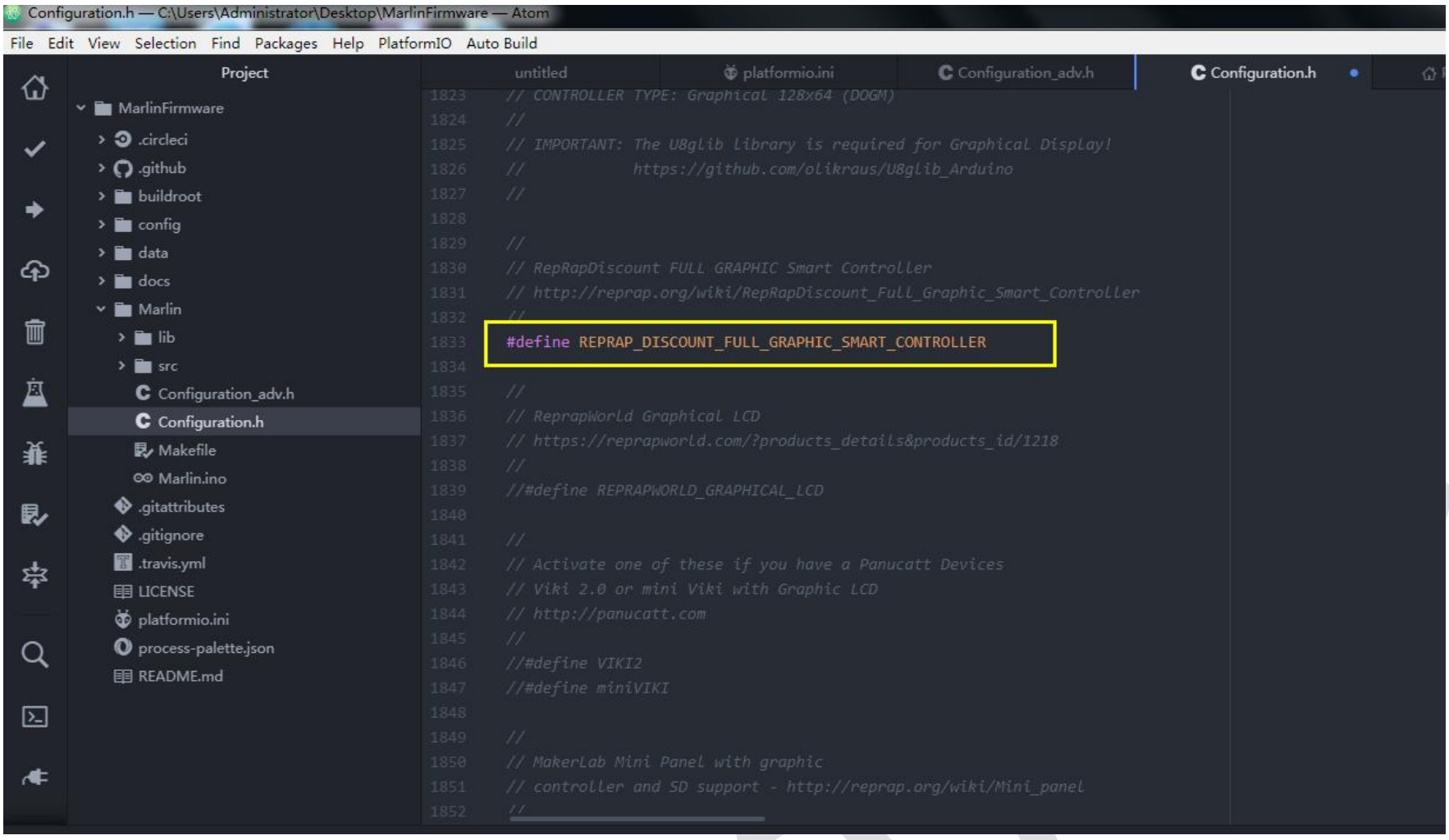
Language setting: zh_CN is Simplified Chinese, en is English.

Language settings can be made according to your needs.

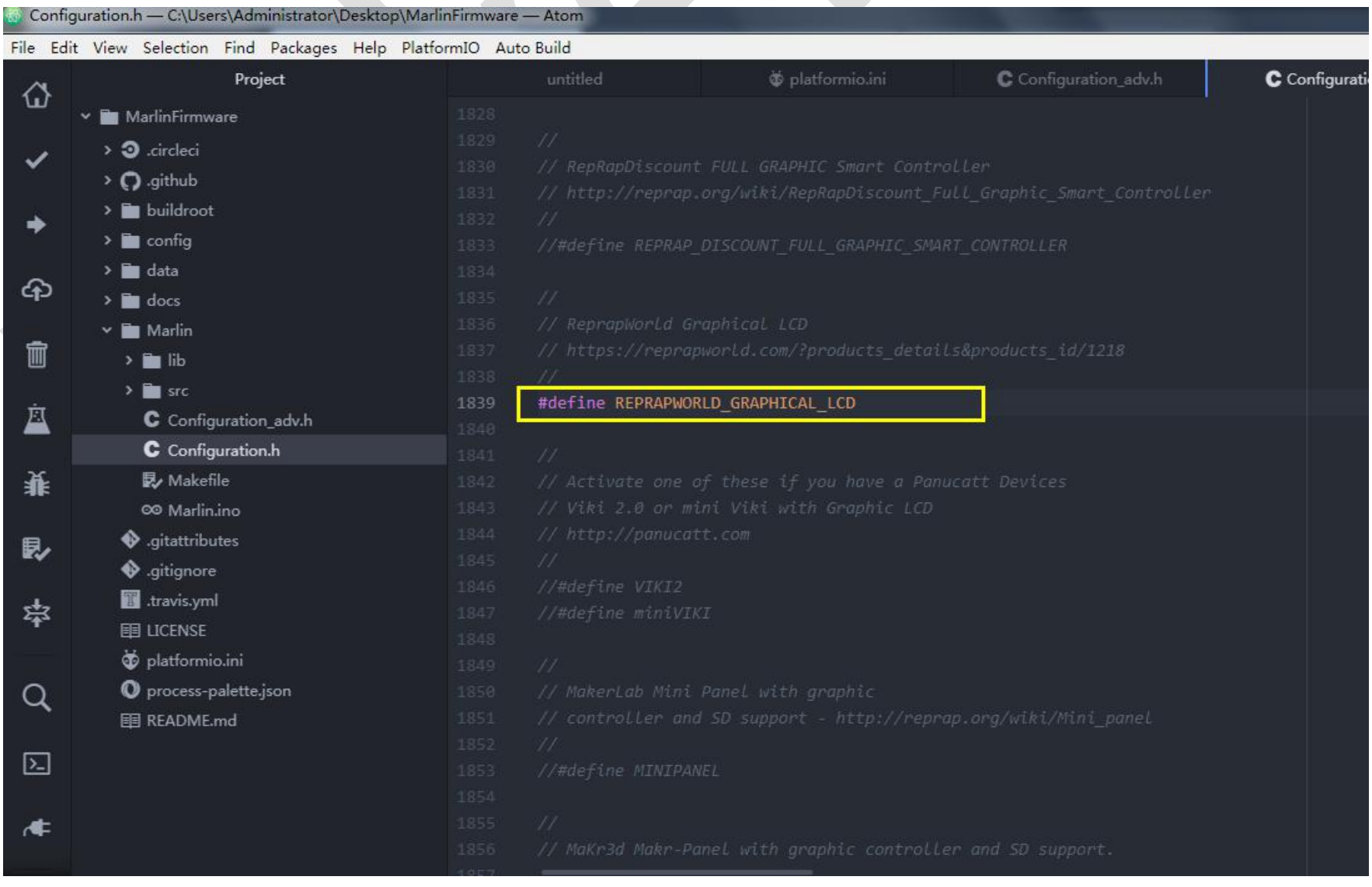


Screen type enable

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

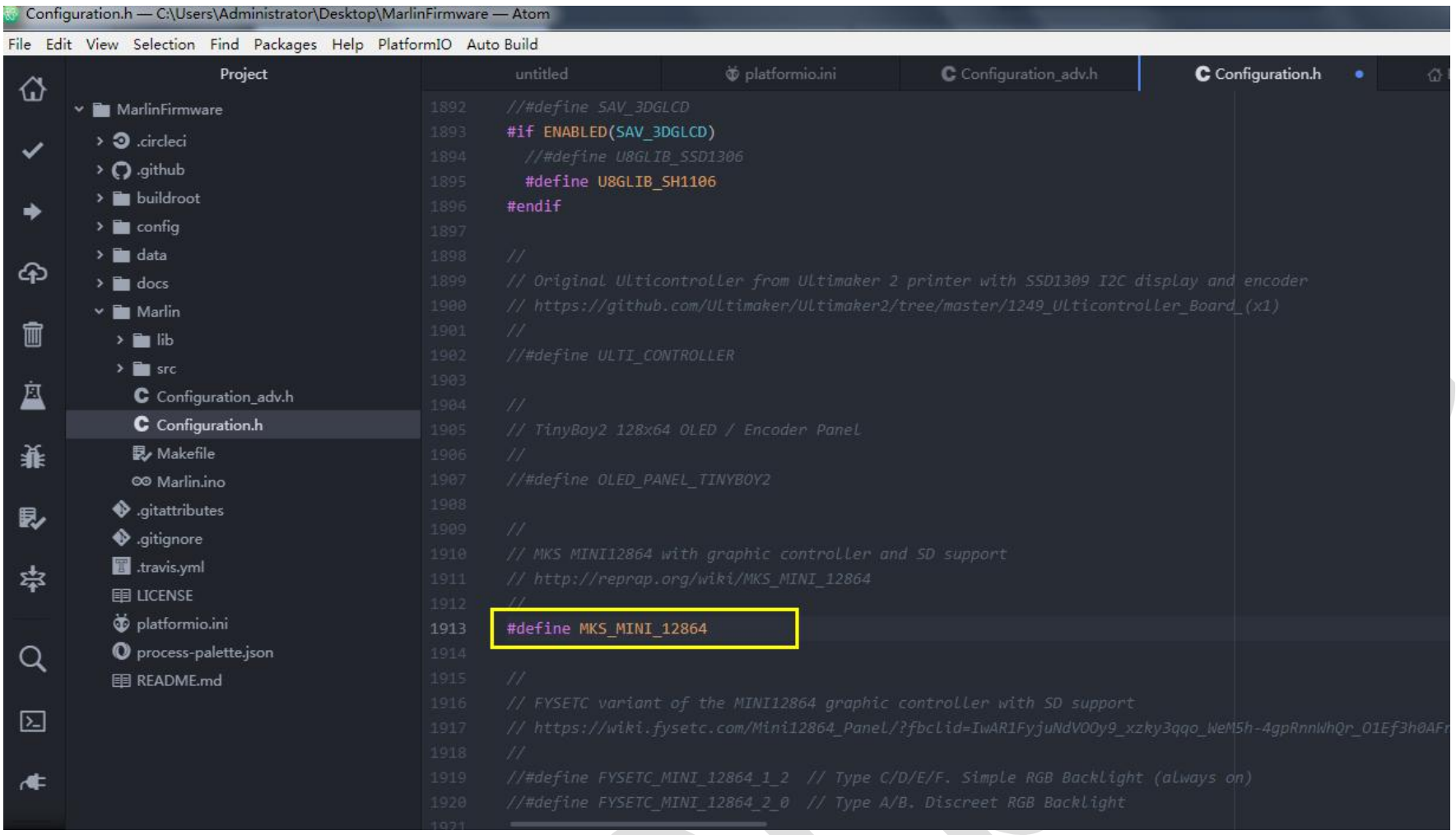


LCD2004 enable



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)

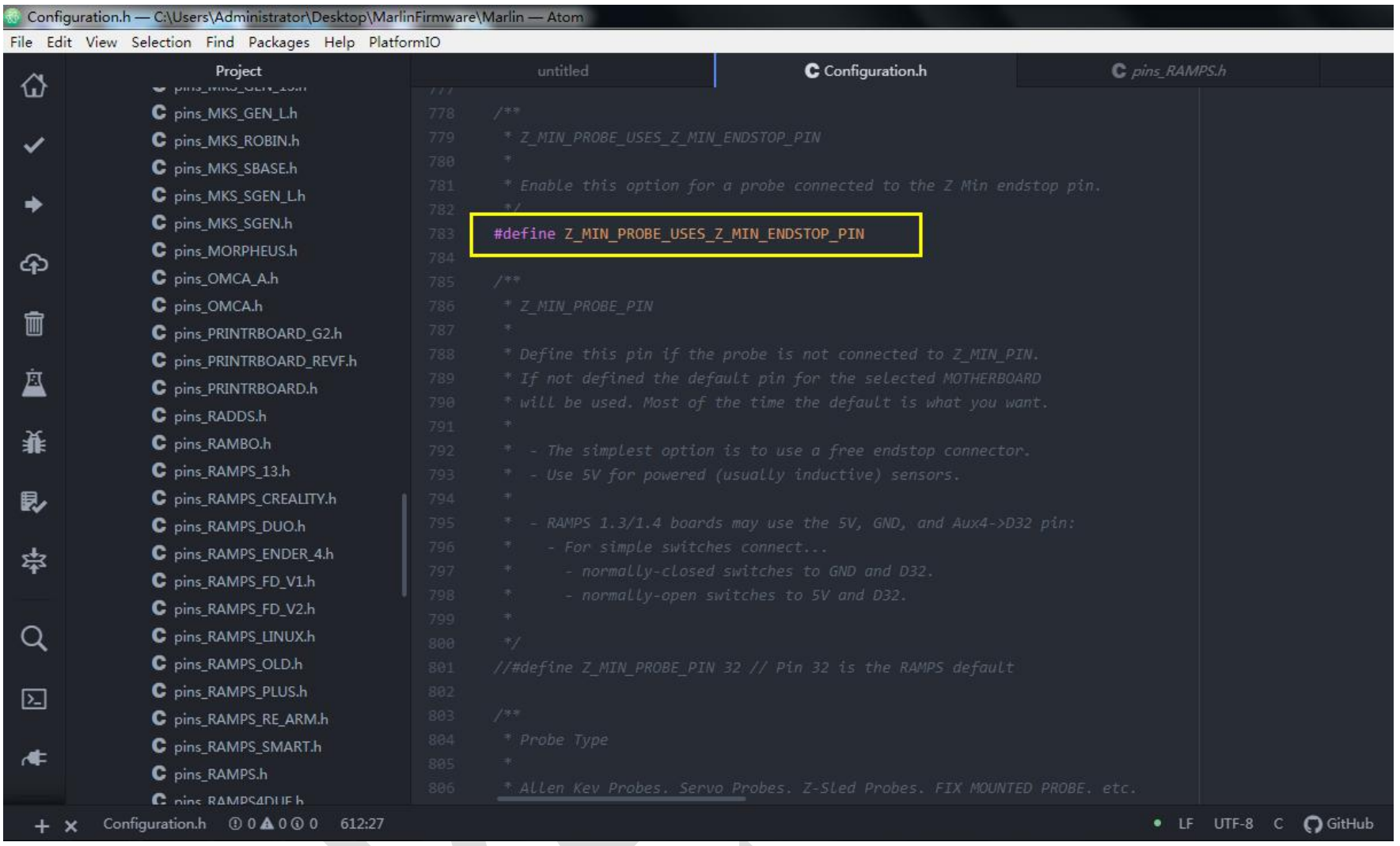


5.2.2 Automatic Leveling Setting

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

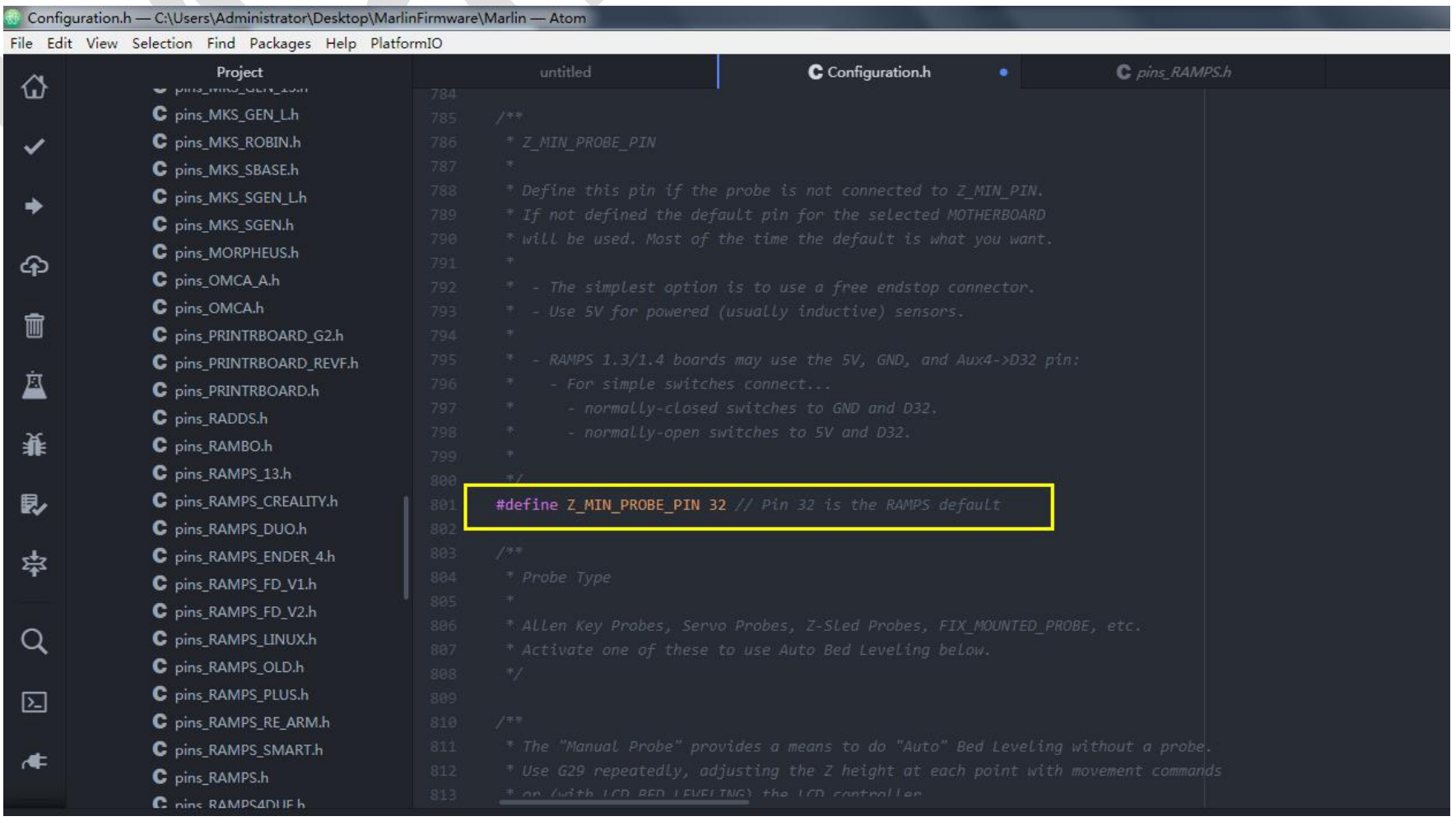
If using the Z-limit as the trigger limit for the leveling switch, enable the following item.

#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN

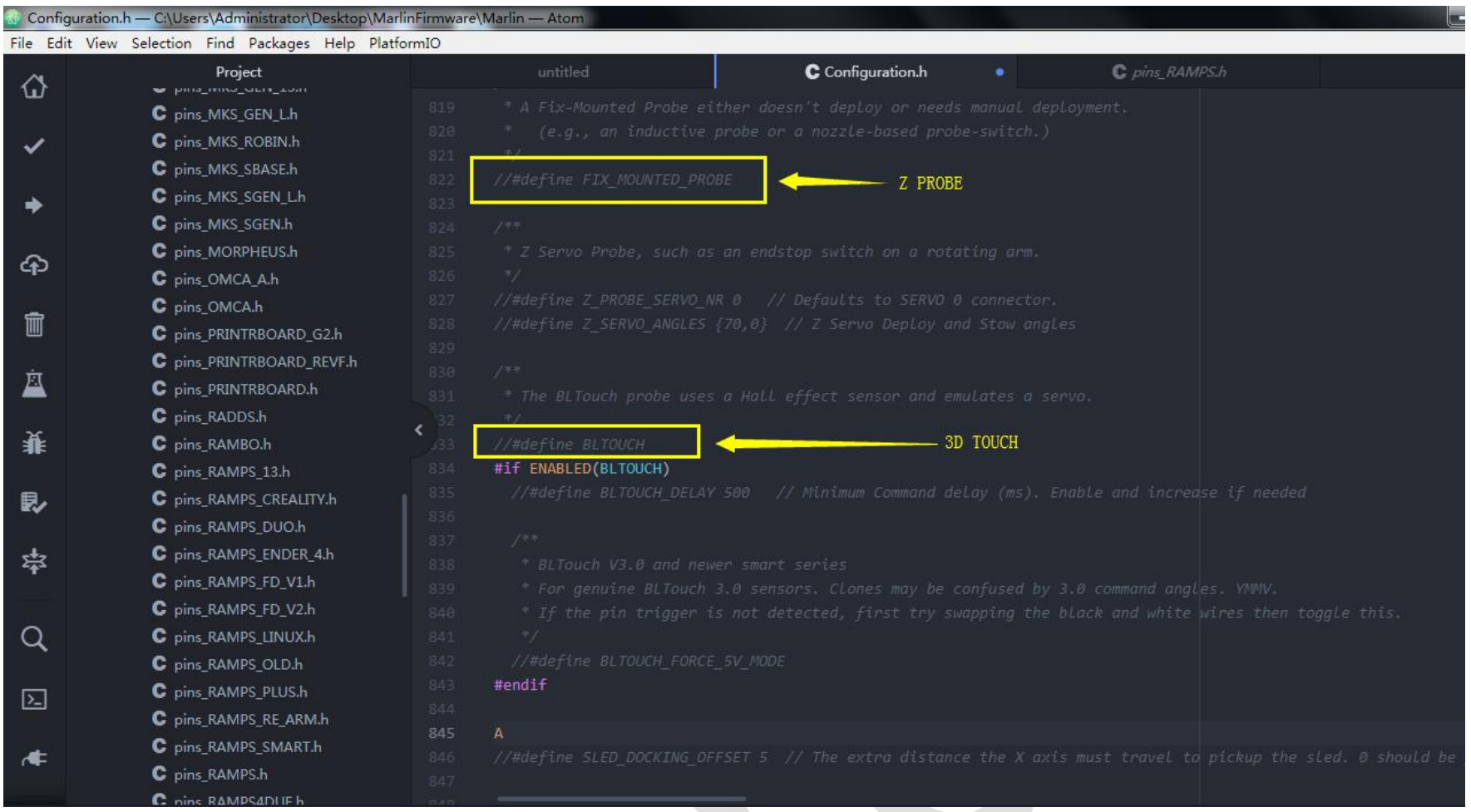


If you want to enable on other endstop's pin, you can enable the following item and modify the pin of the corresponding limit.

#define Z_MIN_PROBE_PIN 32

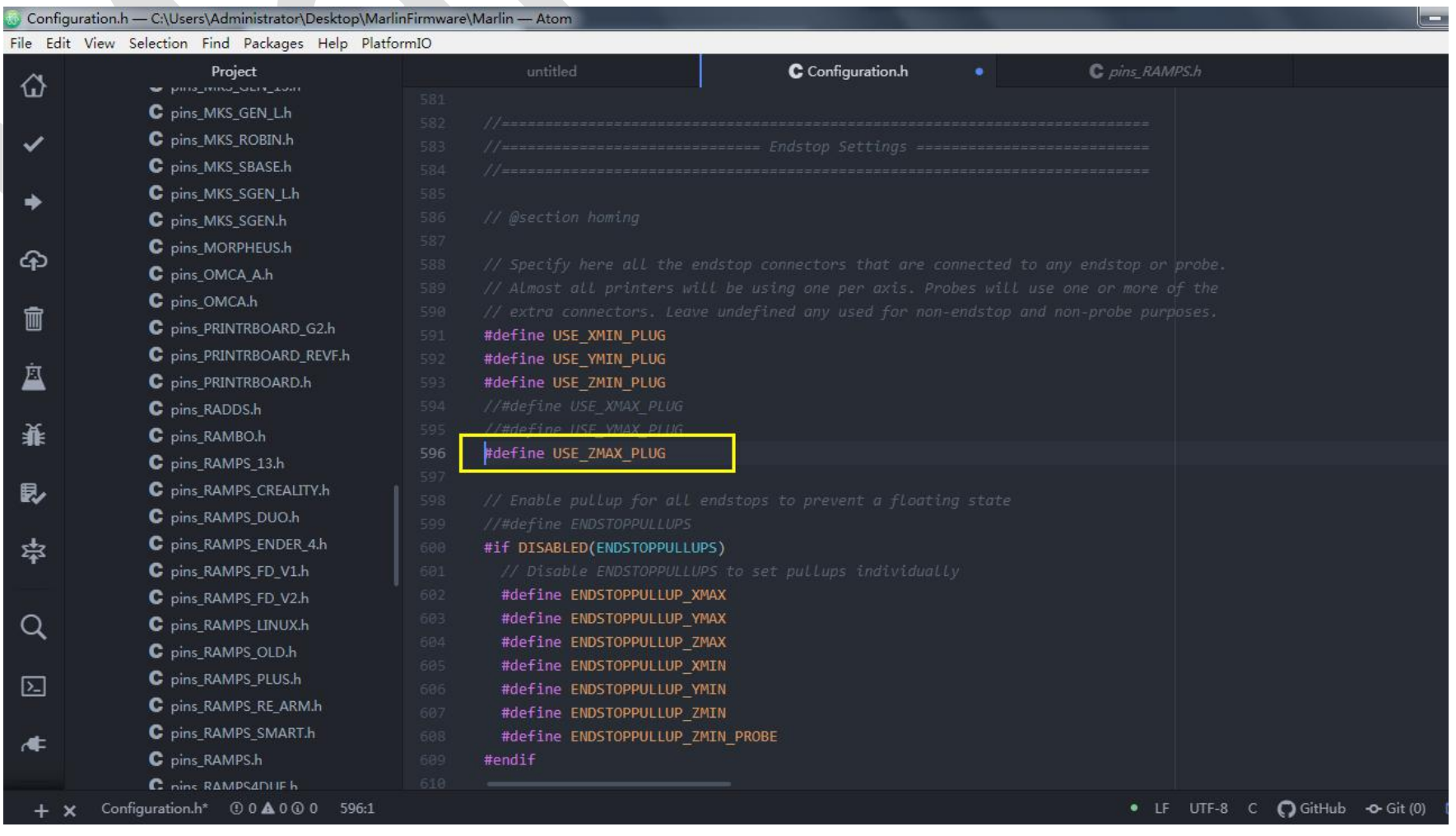


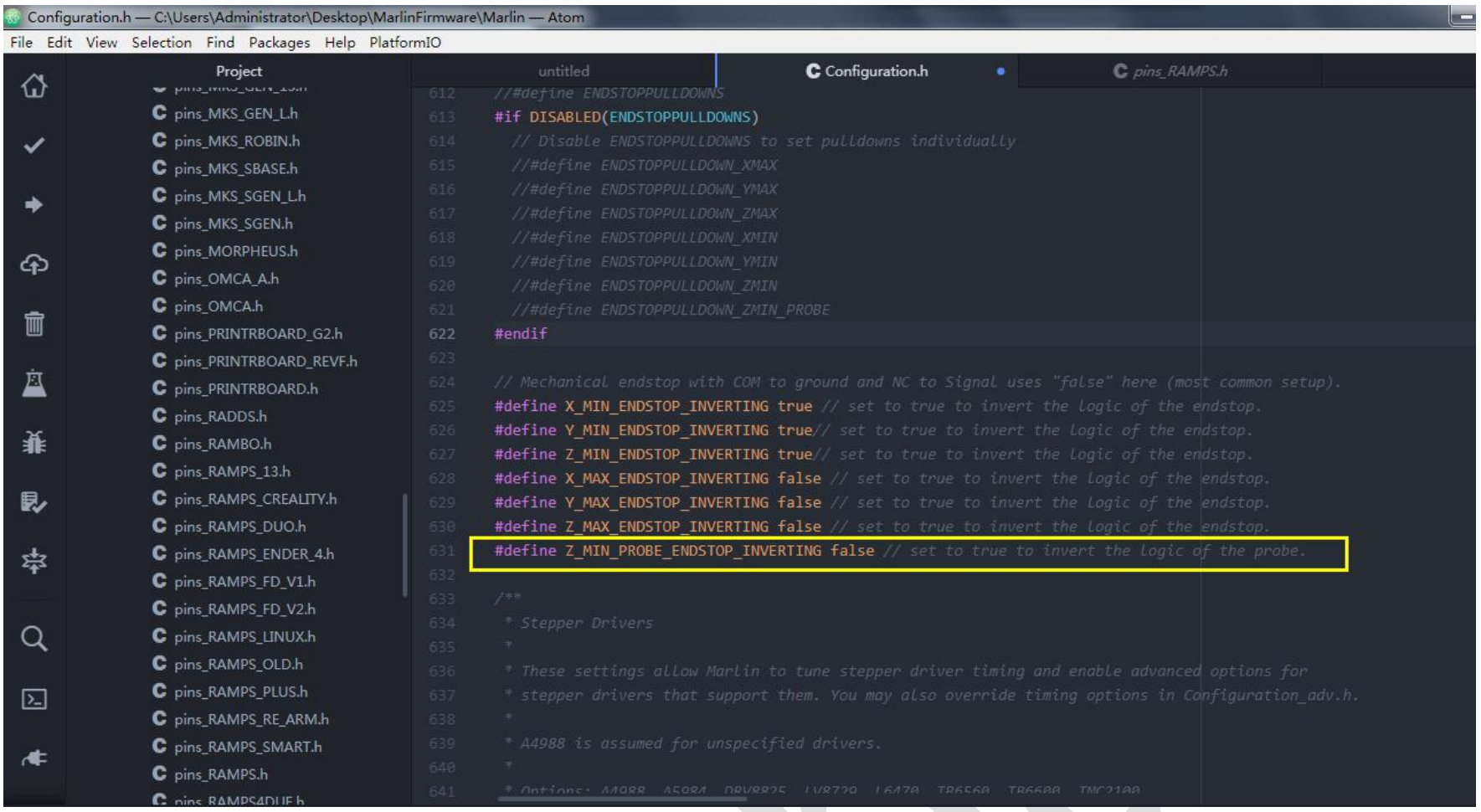
Look at the following figure, If you use Z-probe, enable the first item. If you use 3dtouch, enable the second one. Cannot enable multiple items at the same time, because it will cause errors. If you enable one item, you need to shield another one.



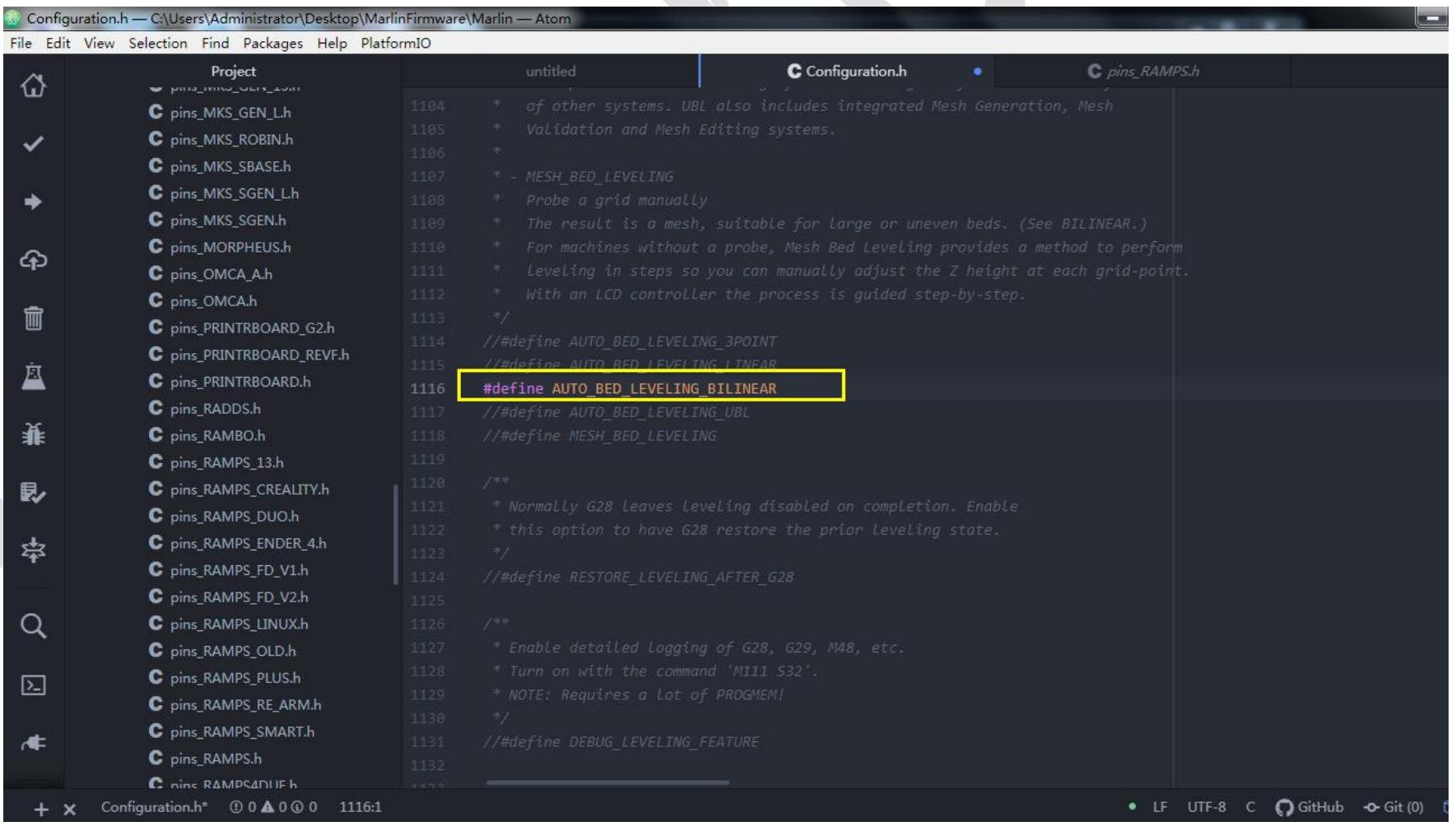
If the leveling switch is used with the relevant endstop, it must be enabled.

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

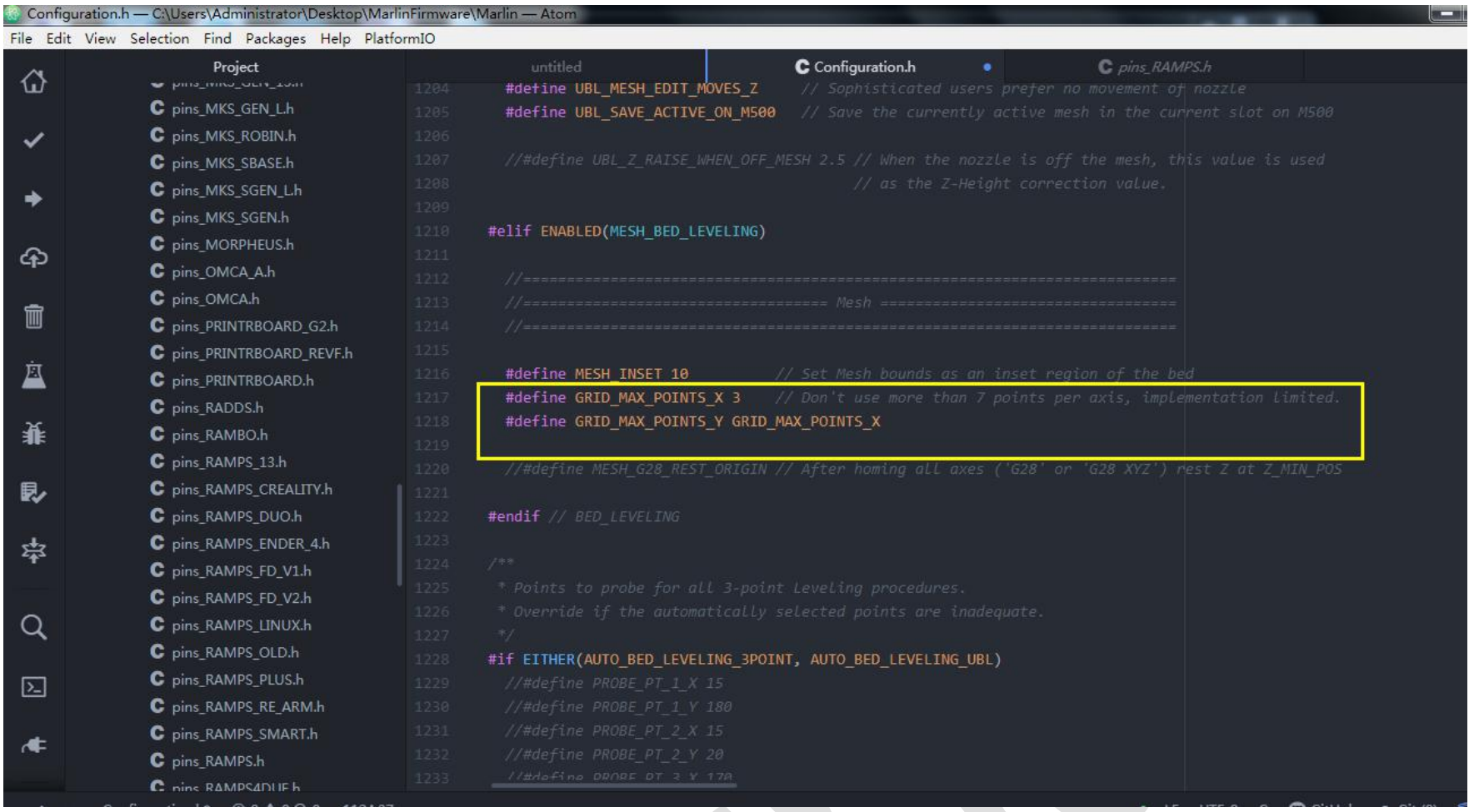




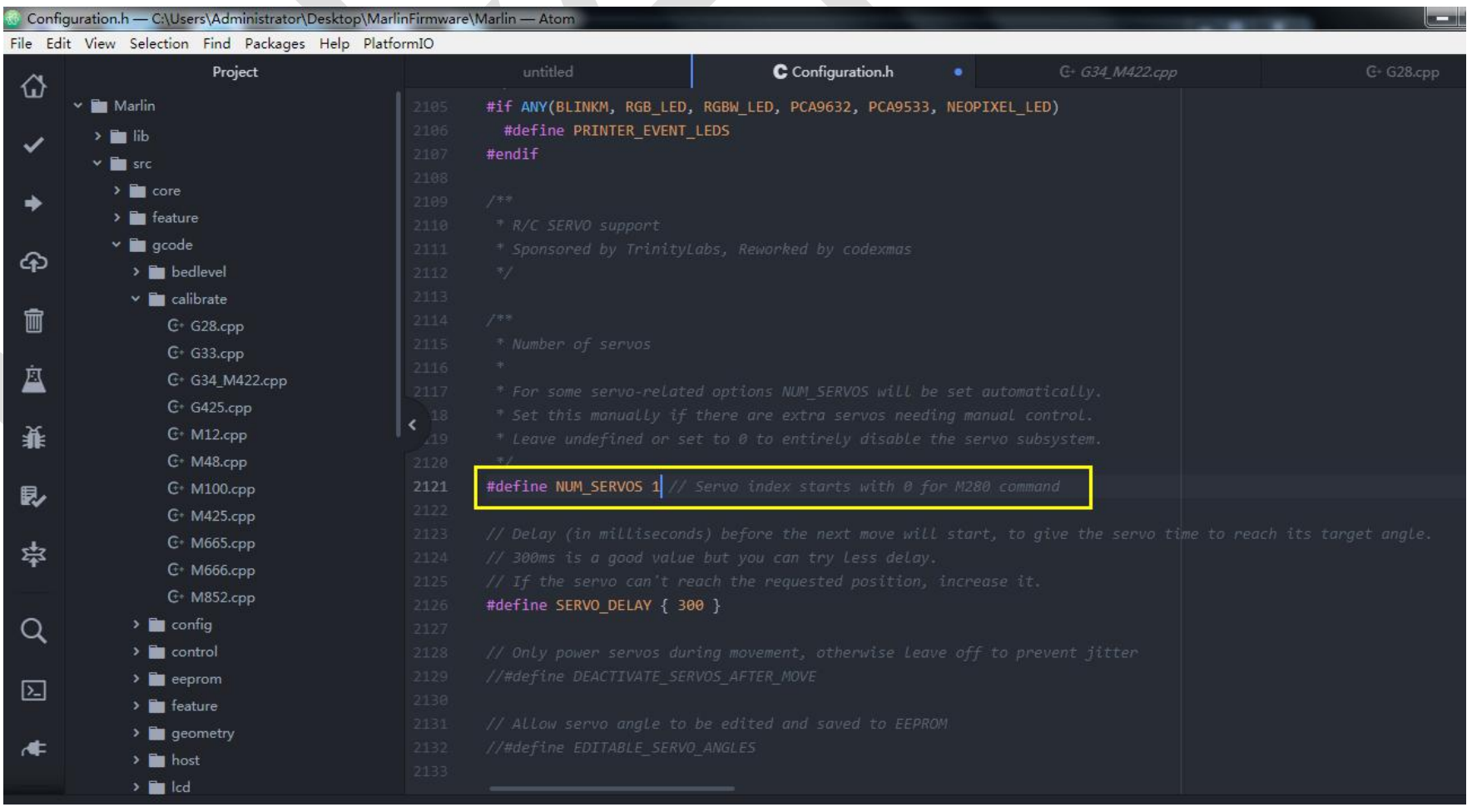
Select leveling mode, enable: #define AUTO_BED_LEVELING_BILINEAR



Leveling point setting



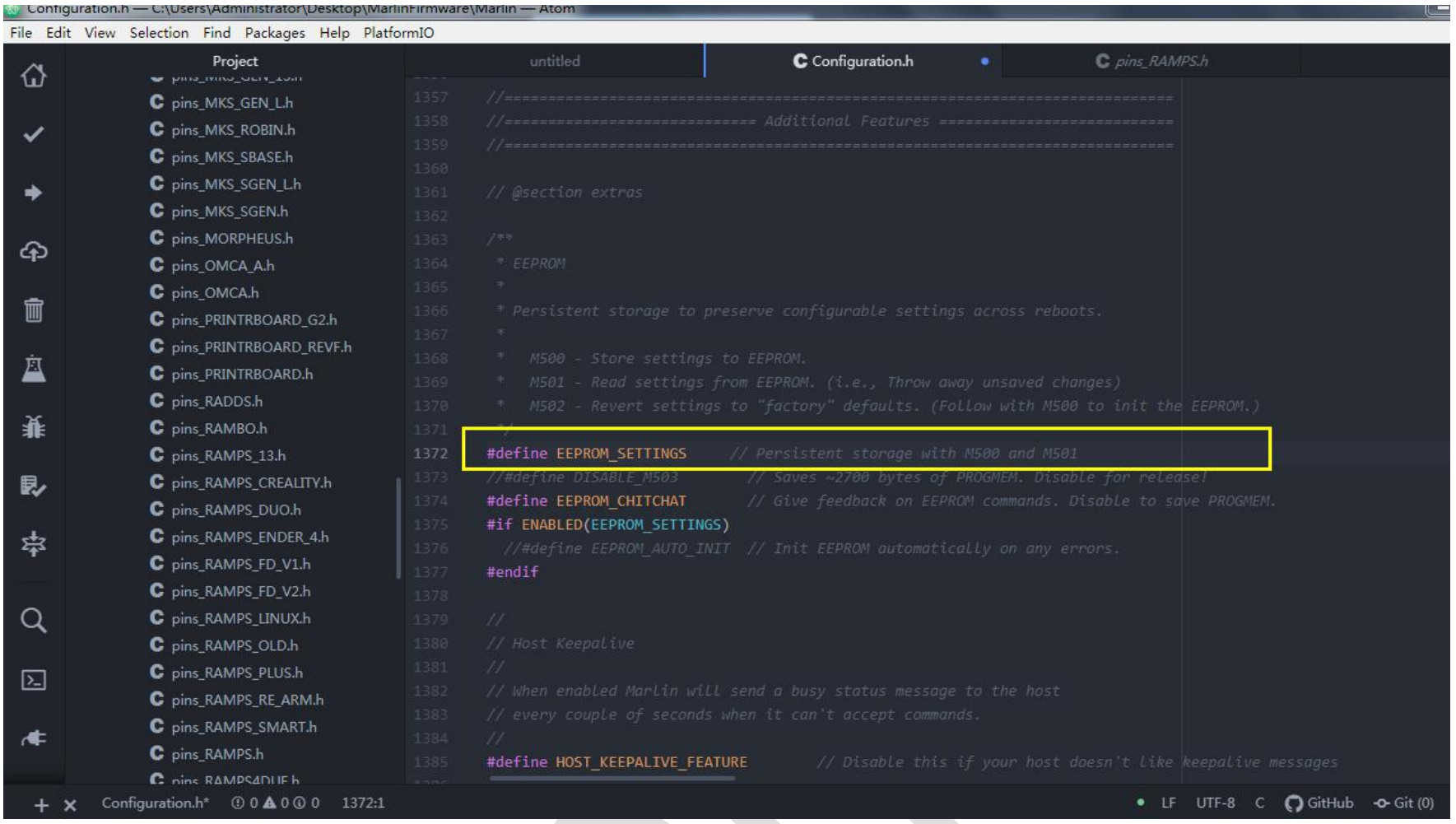
Change the number to “1”

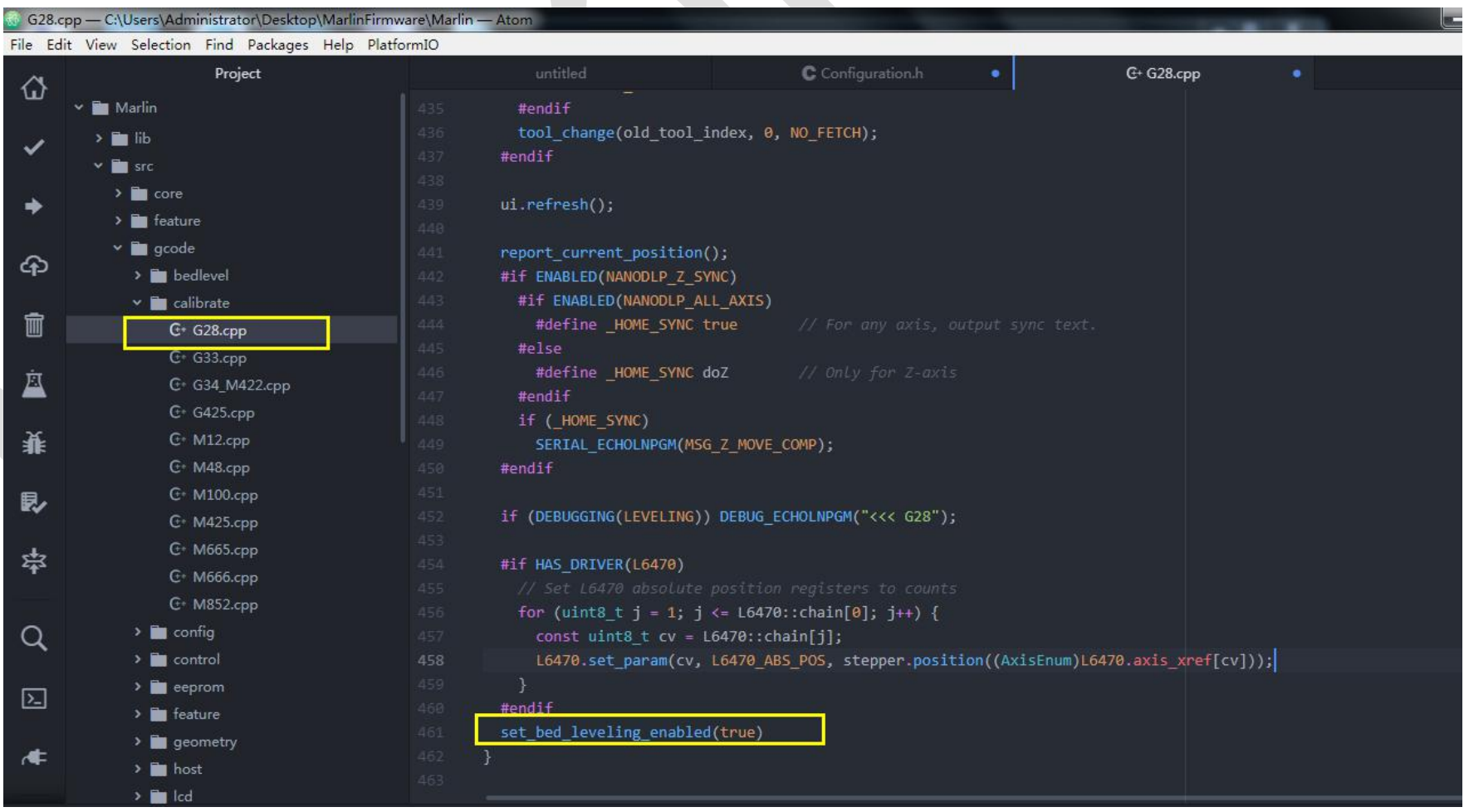


Leveling data saving settings

Need to enable first: #define EEPROM_SETTINGS first

“Add set_bed_leveling_enabled(true) ”to the “gocde- calibrate-G28.cpp ”file, as the following figure shows.





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.

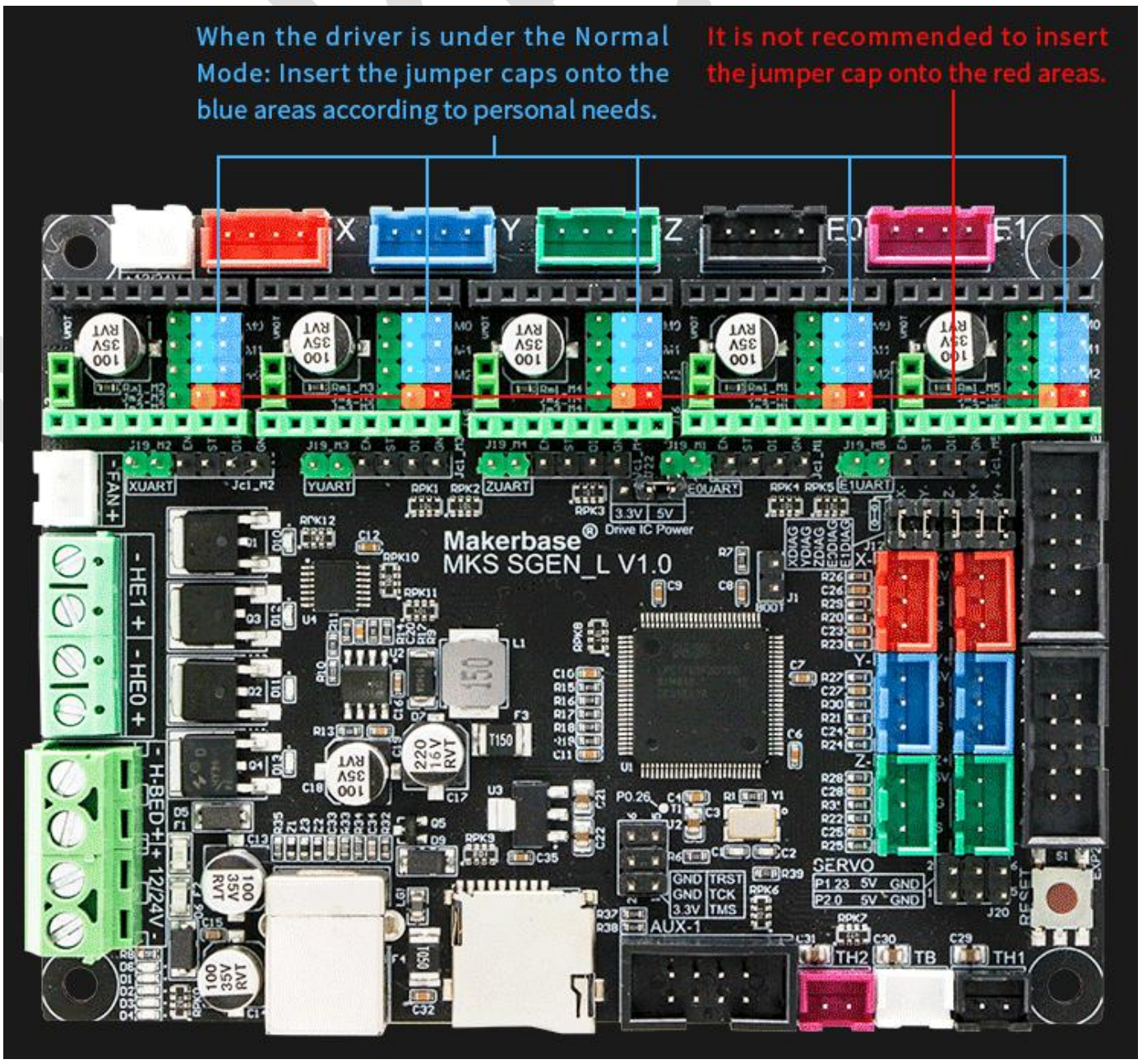
Normal mode (step/dir mode)

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)

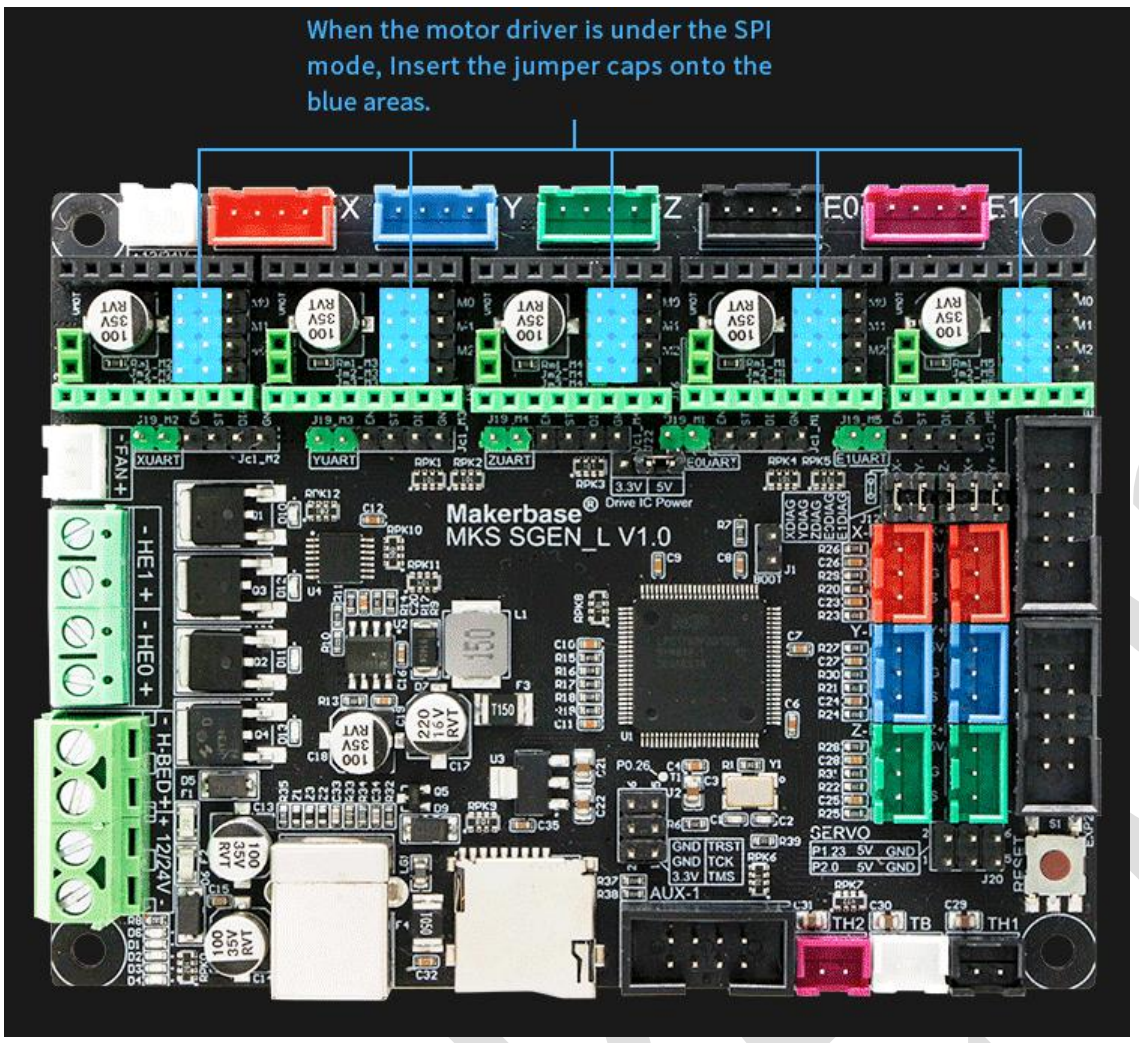


TMC2130 SPI mode setting

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

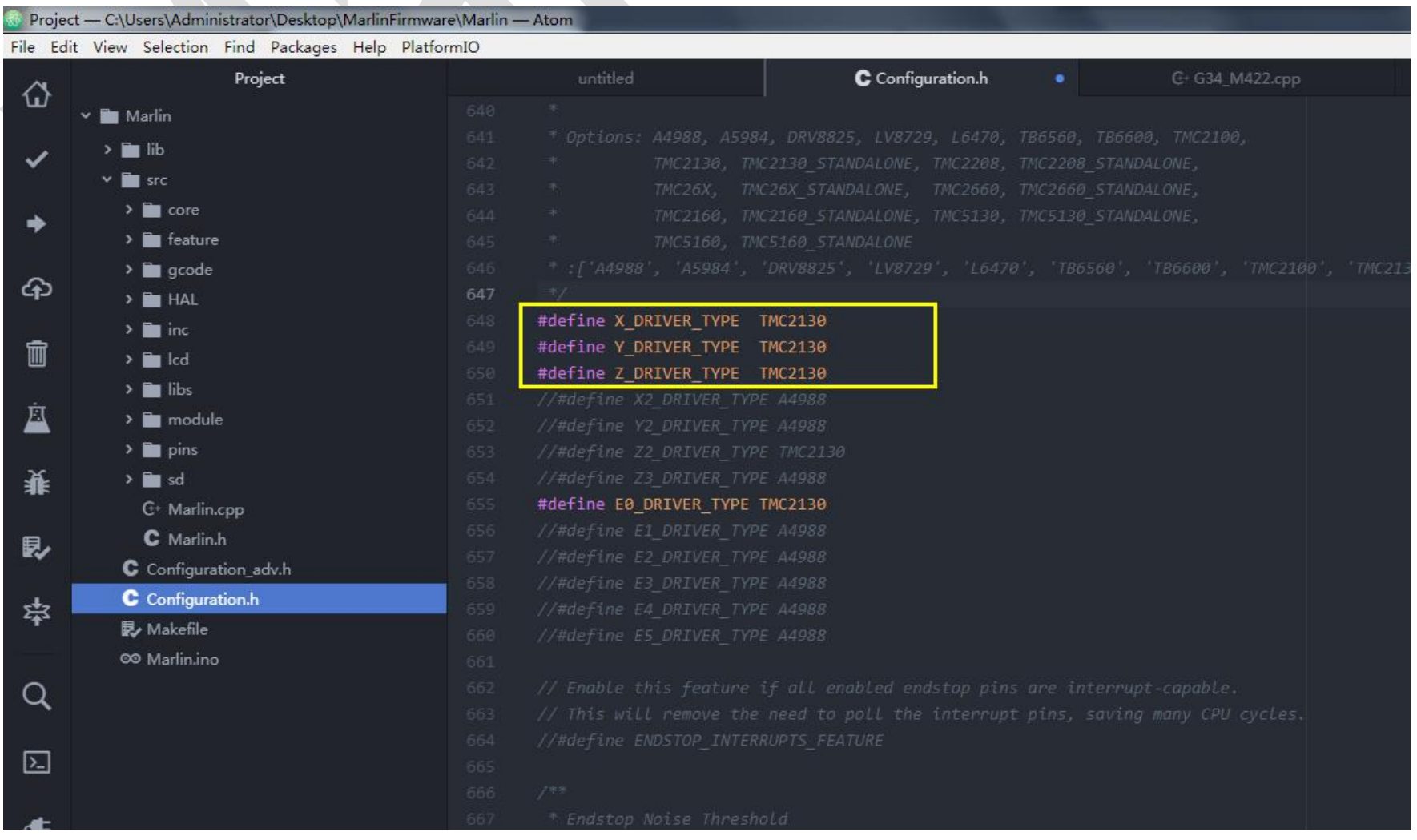
Hardware setting: The motherboard jumper cap setting, only need to insert the jumper cap according to the requirements, no need jumper. as the picture shows

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

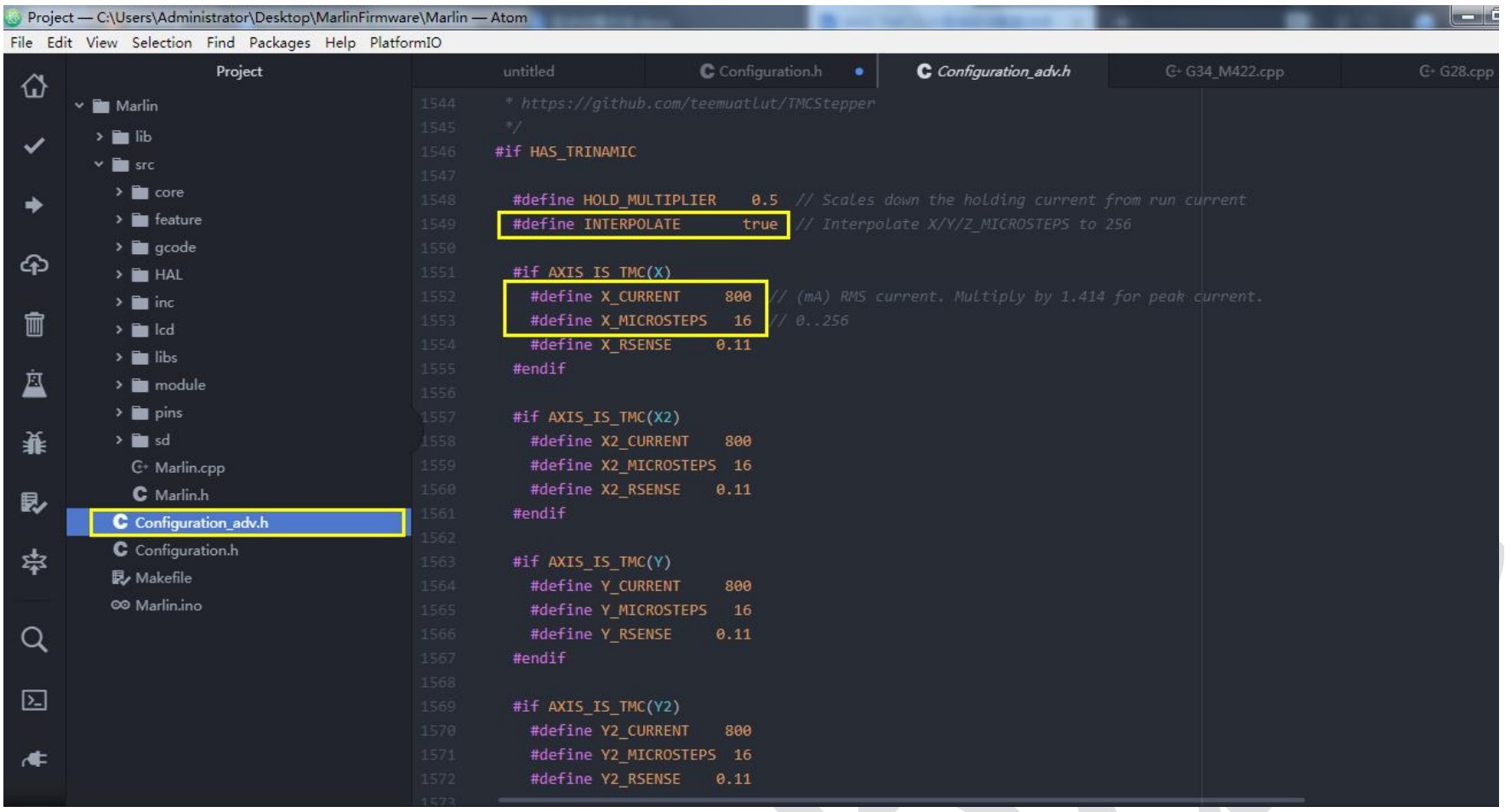


Software setting: configure SPI parameter in marlin firmware2.0, specific setting steps are as follow：

1. Driver type is set: TMC2130



2.Configure microstep and current in “Configuration_adv.h”



Microstep setting: X_MICROSTEPS, default setting is16 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.

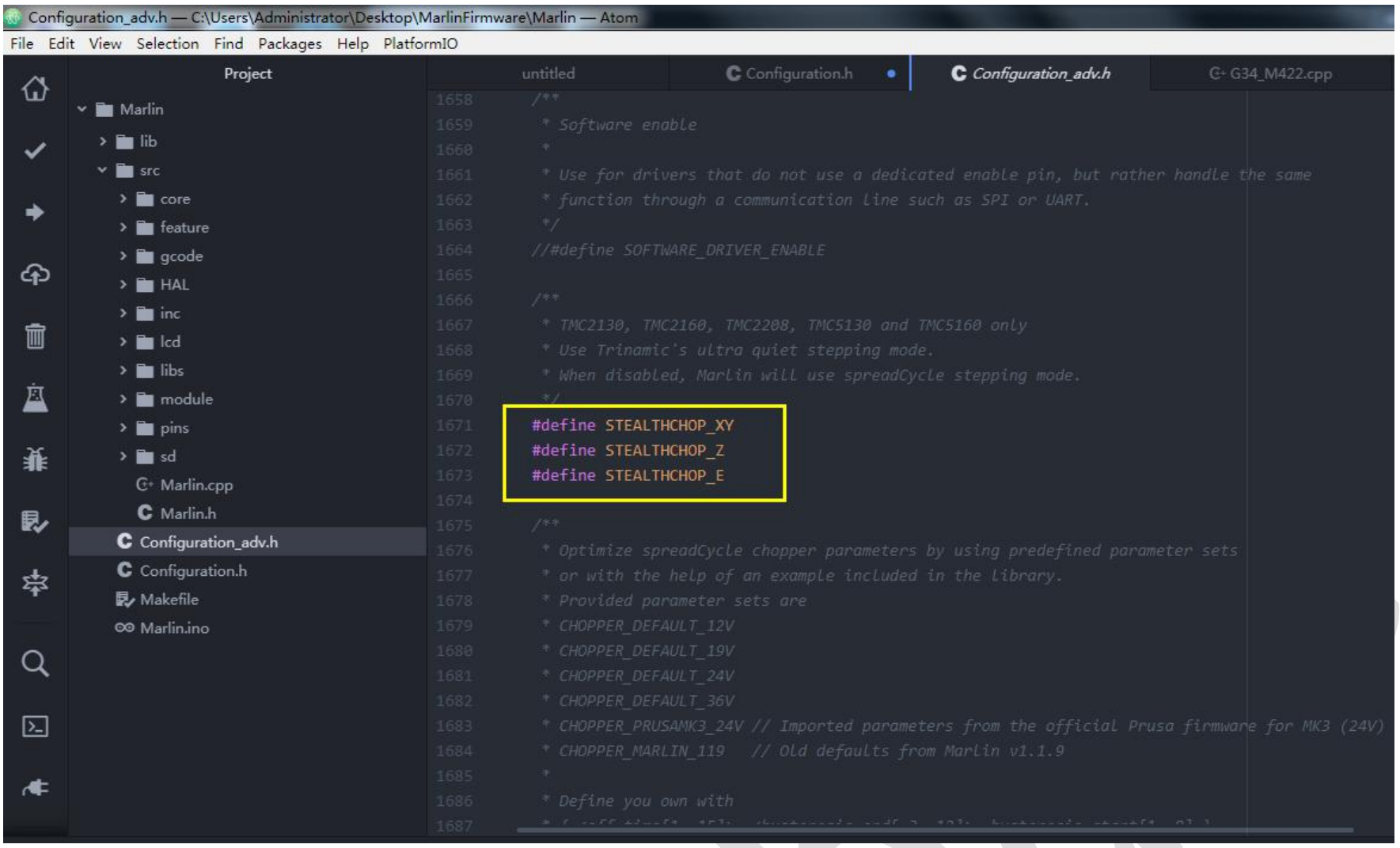
For example: the picture shows that the current is 800mA, but the actual running current I=1.414*800mA.

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.

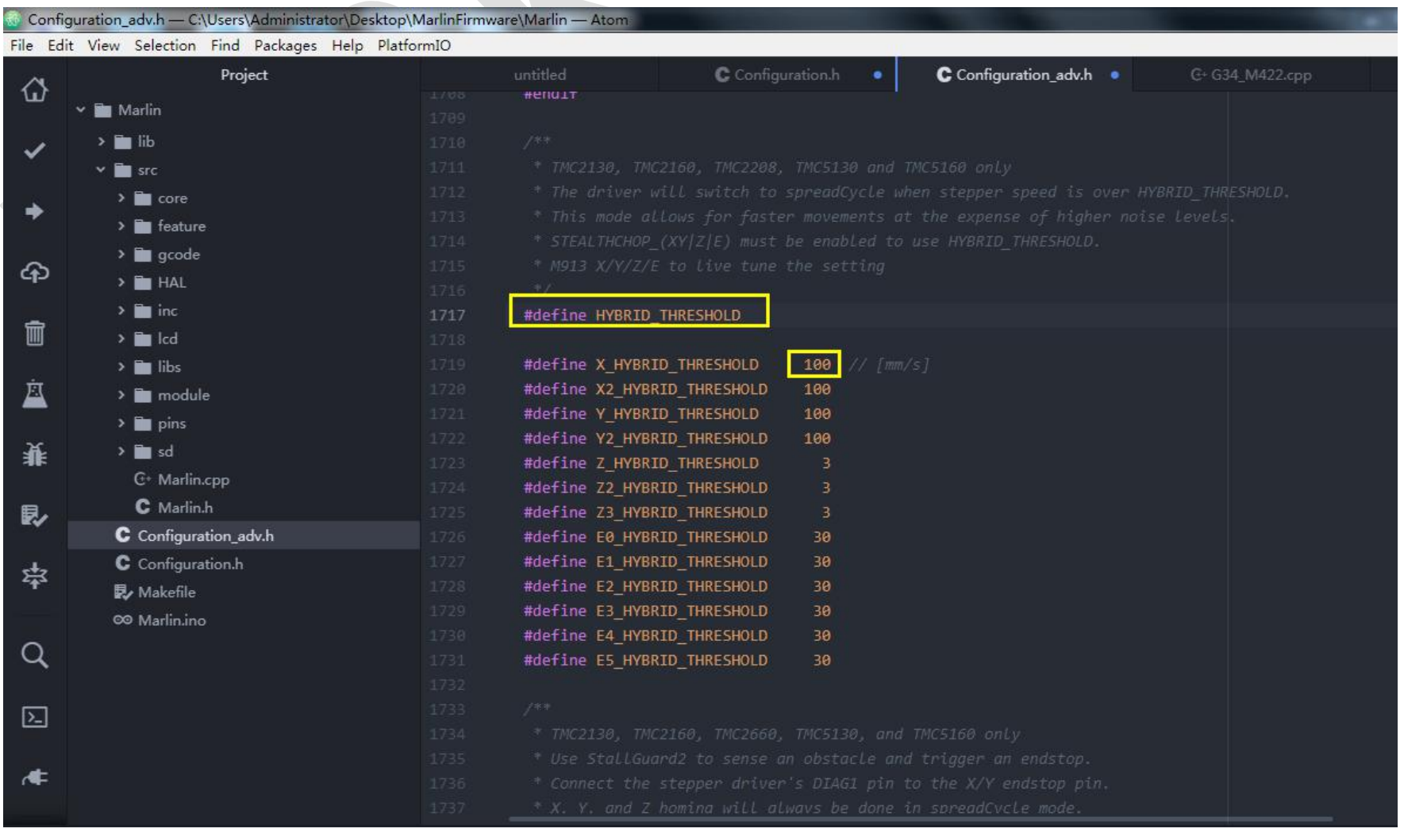


If you want to configure the Hybrid mode, you must first enable the STEALTHCHOP (silent mode)

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



4.CS pin setting

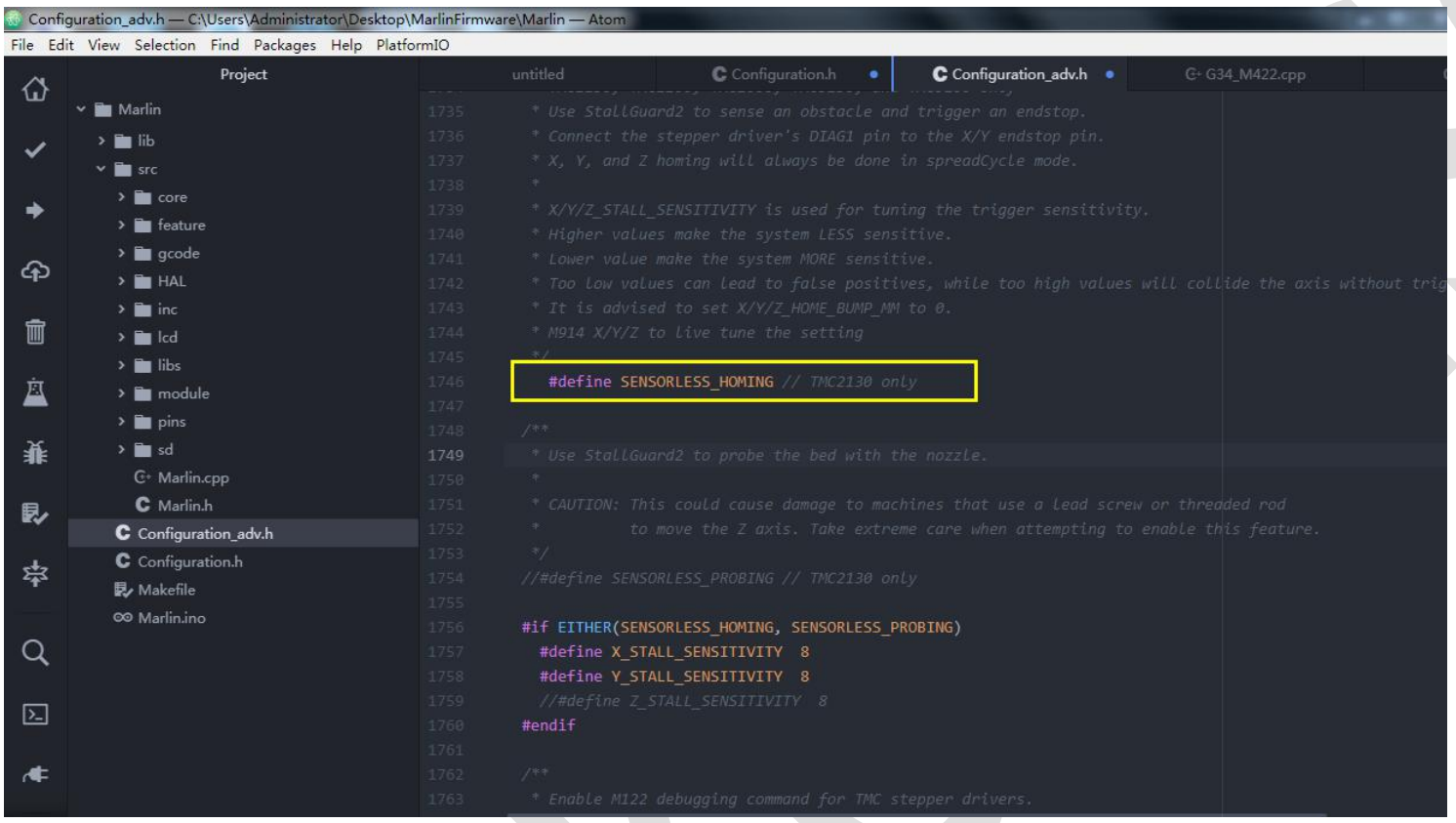
Because the wires are integrated internally to SGEN_L, and the pin file has been set, which doesn't need to modified.

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"



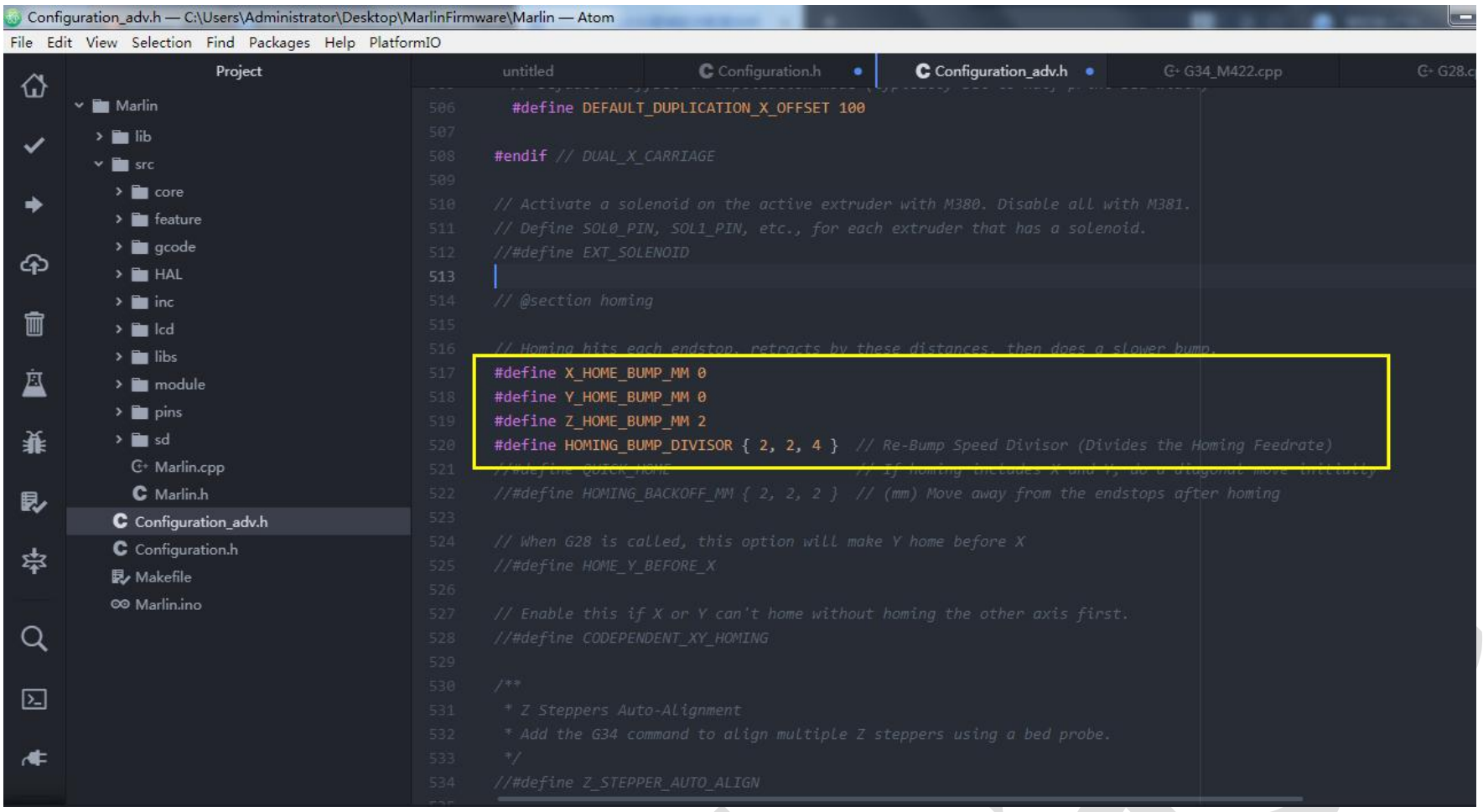
Note: The wire of the driver DIAG1 pin needs to be connected to the X / Y limit pin. (Z axis is temporarily not supported)

using the TMC2130 SGL version doesn't need jumper.

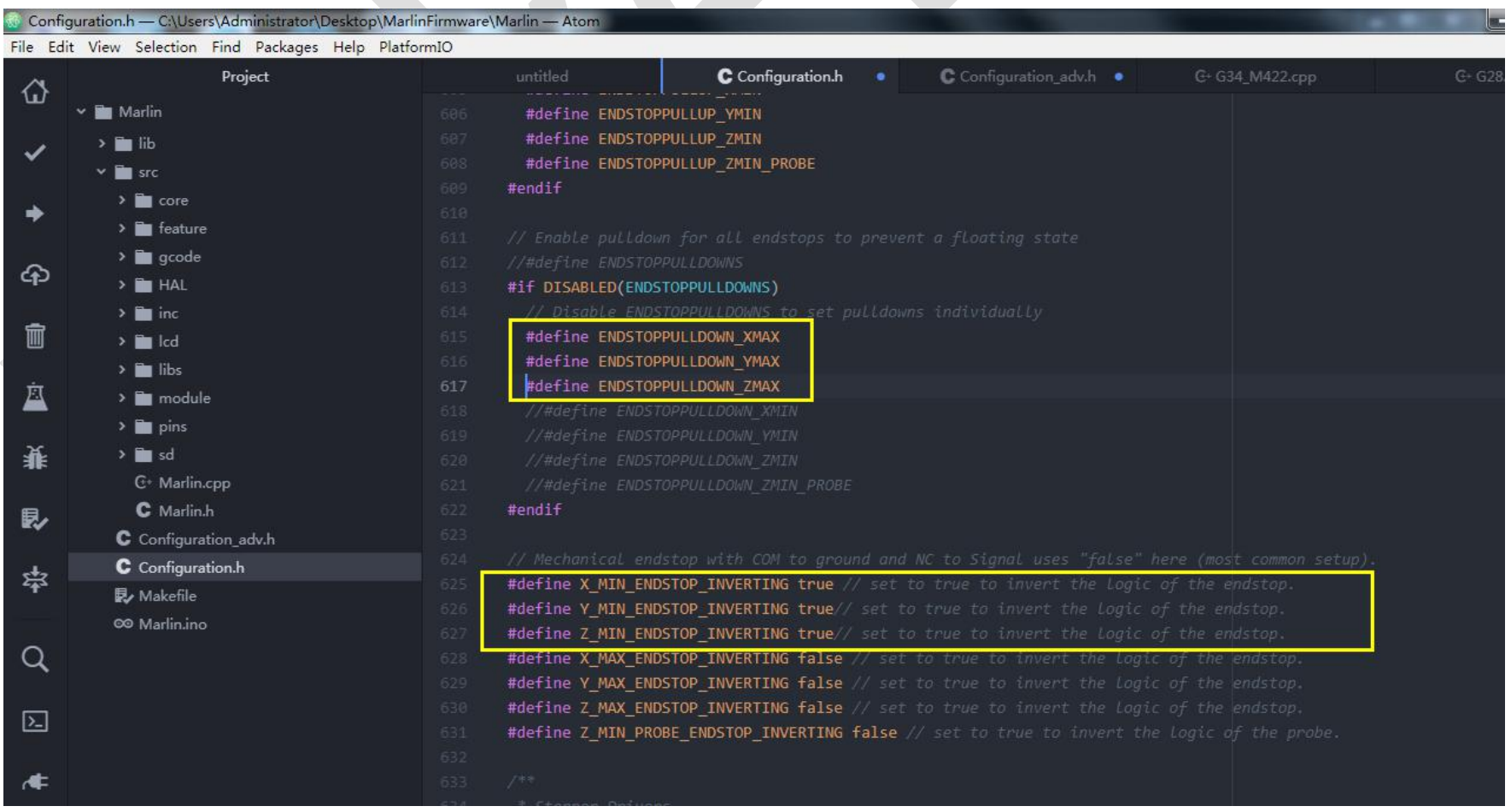
X, Y and Z homing will only be done in spreadCycle mode.

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.



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 Marin 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.

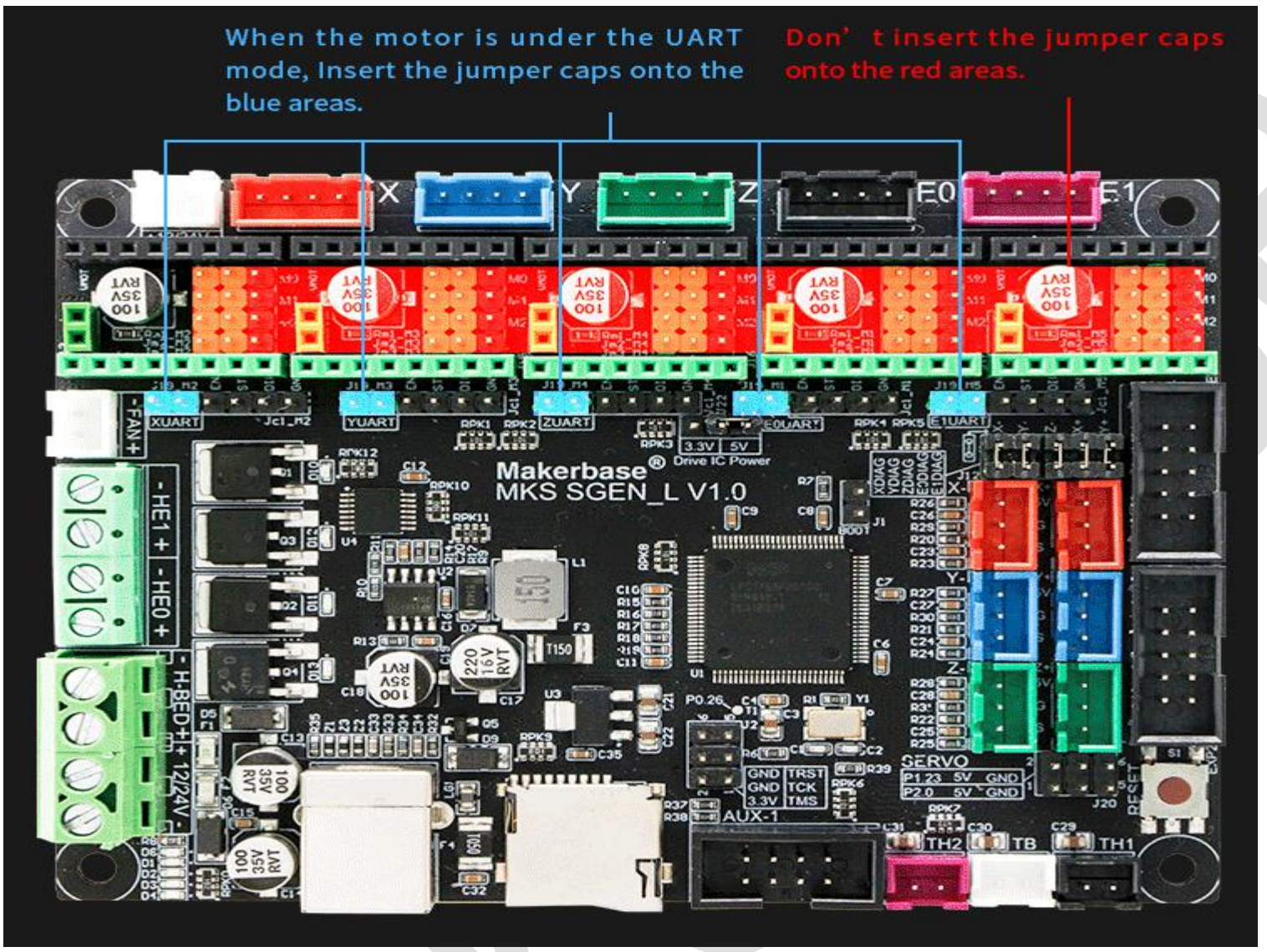


Descriptions above are TMC2130 SPI mode setting

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

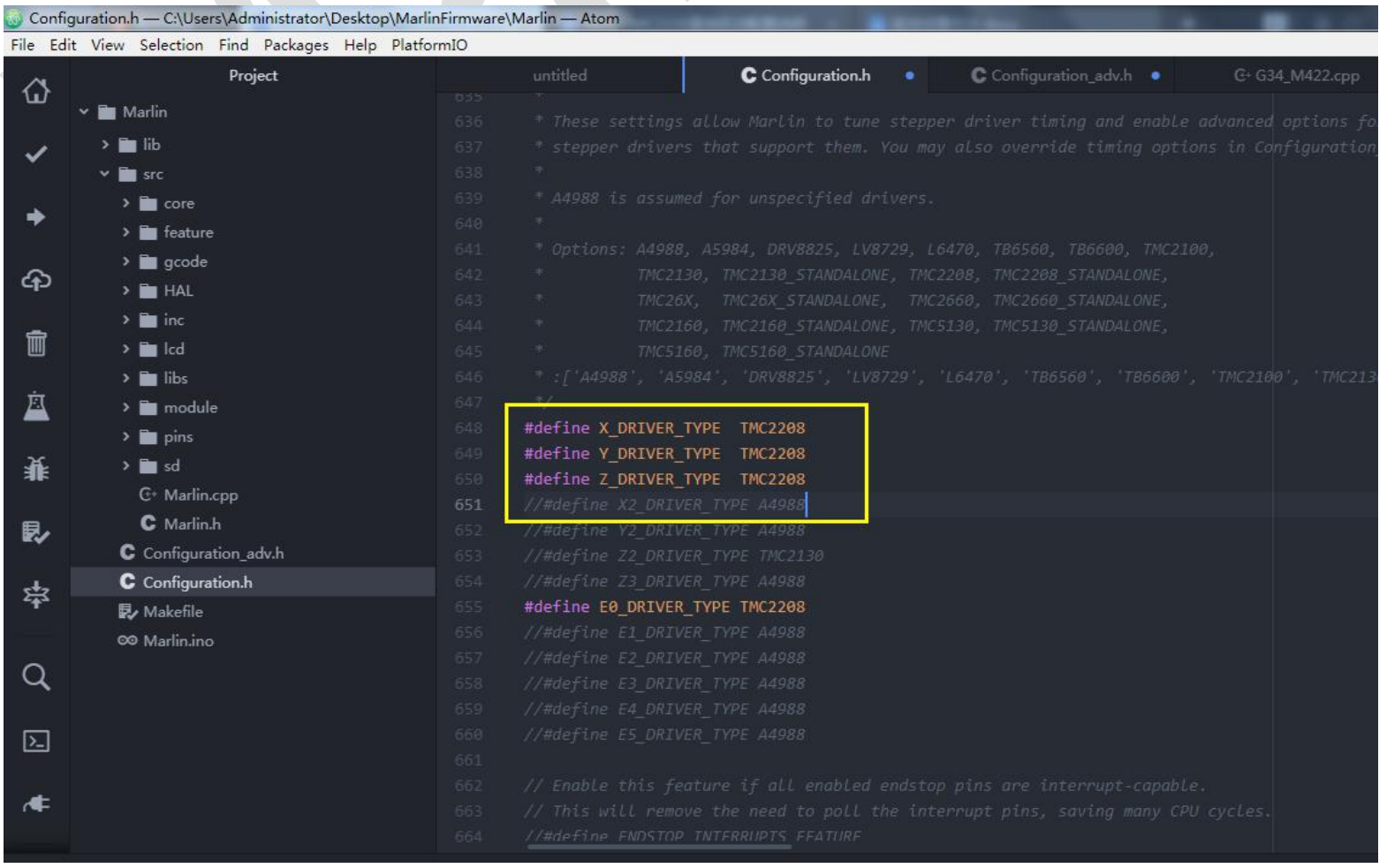
SGEN-L motherboard used with TMC2208V2.0 or TMC2209, requires hardware and software configuration.

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



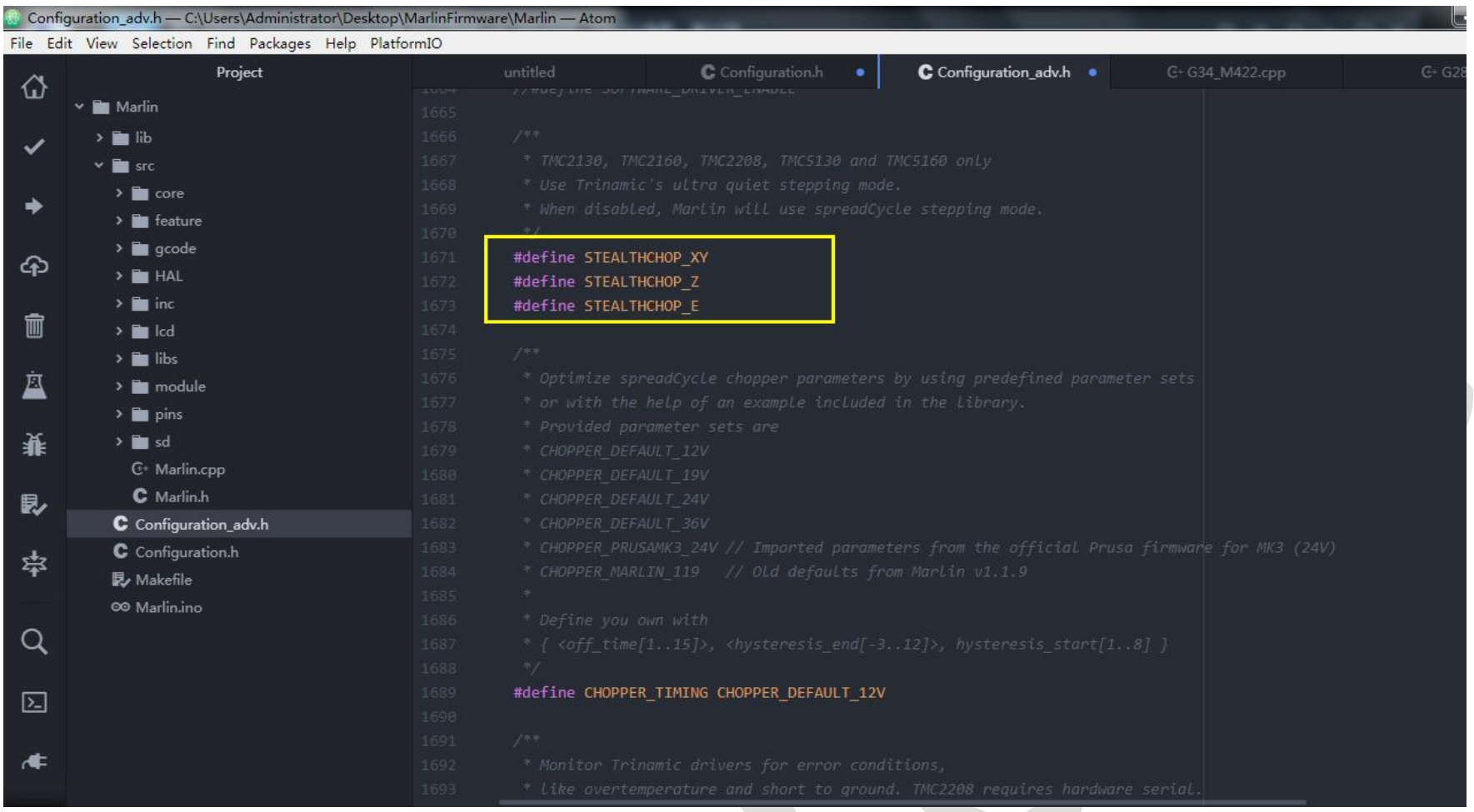
Software Configuration: The configuration method of UART Marlin 2.0 is similar to the 2130.

1. Driver type setting



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.

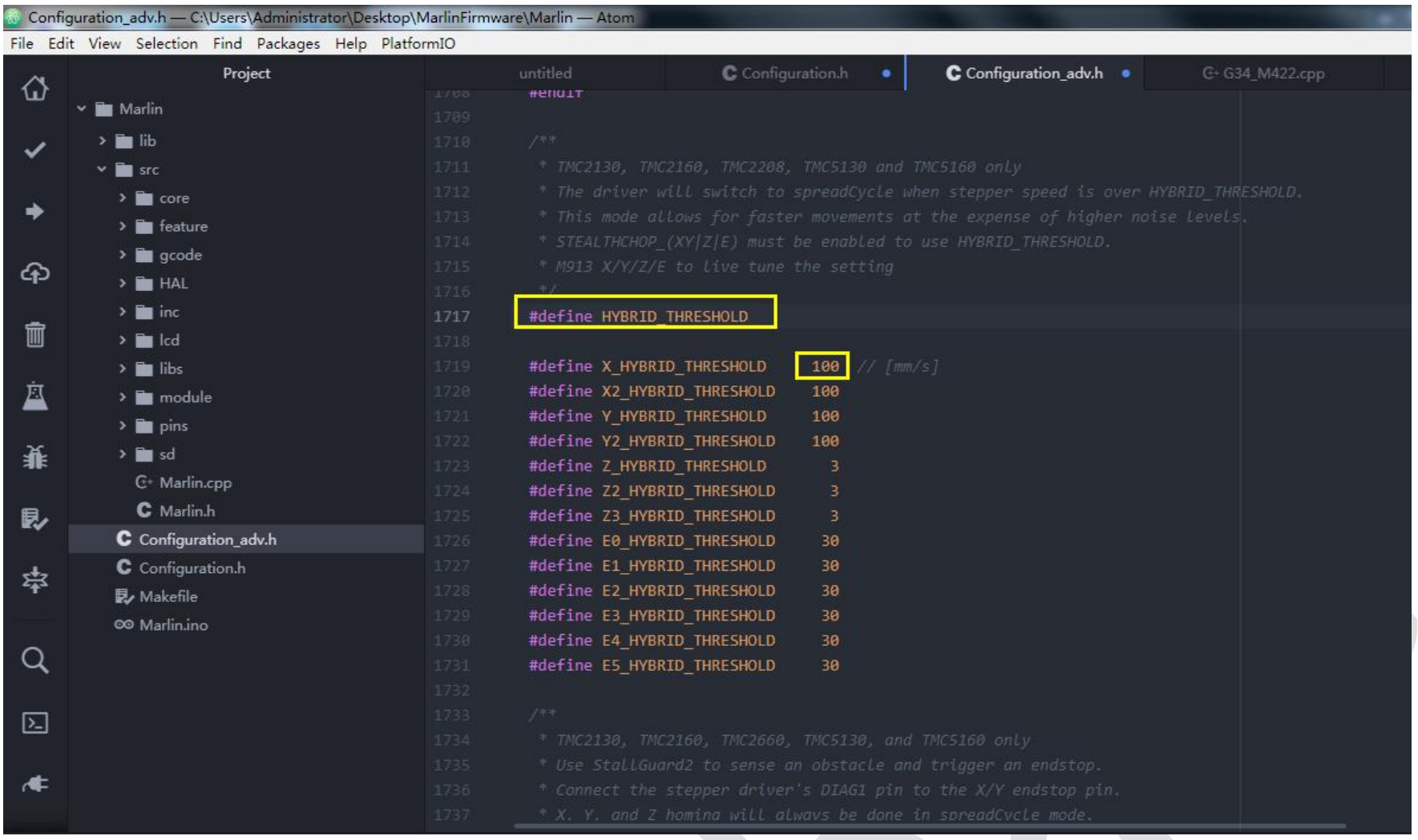


If you want to configure the hybrid mode, you must first enable the STEALTHCHOP mode.

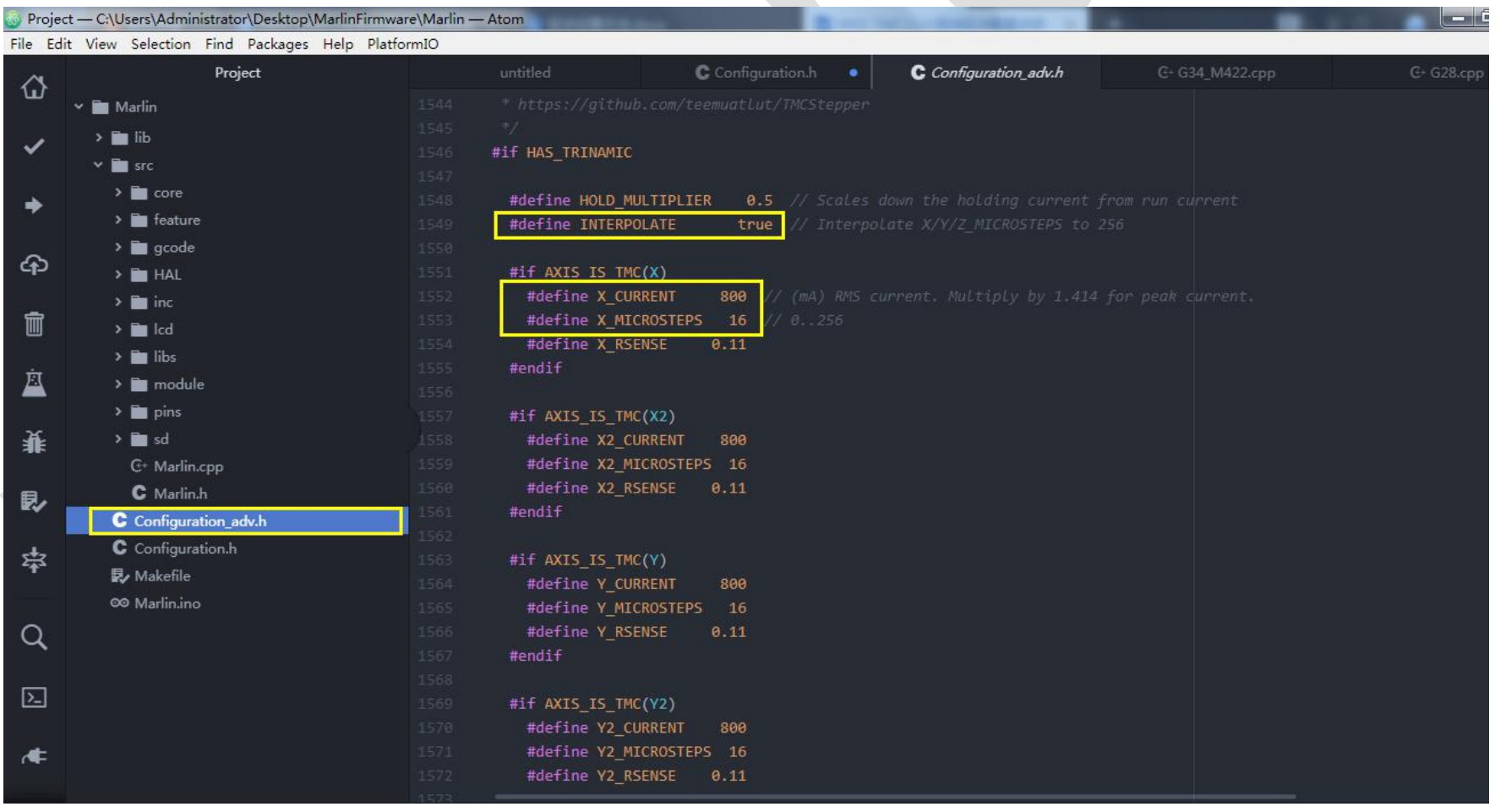
Enable #define HYBRID_THRESHOLD

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



1. Driver current setting



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.

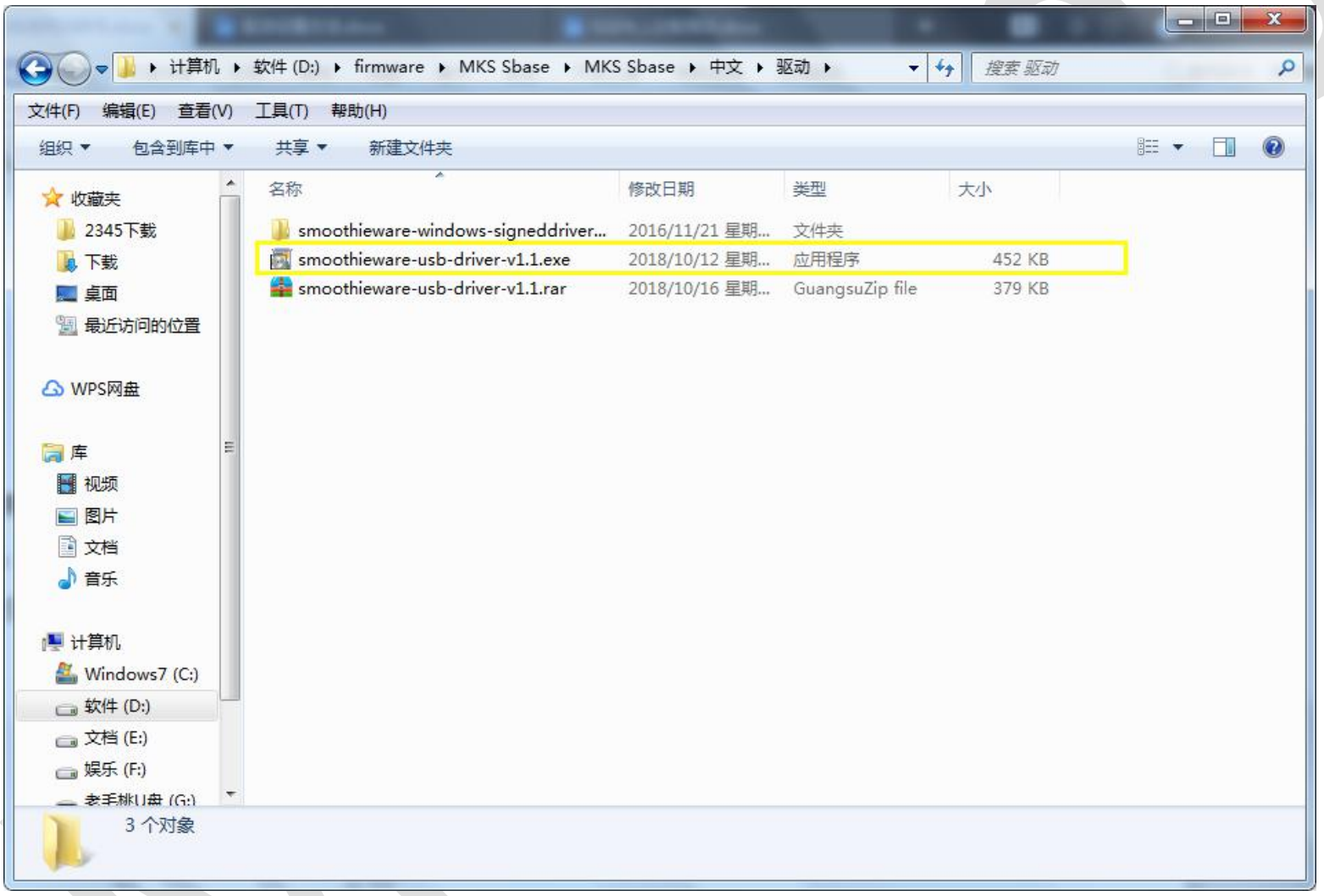
Makerbase

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.

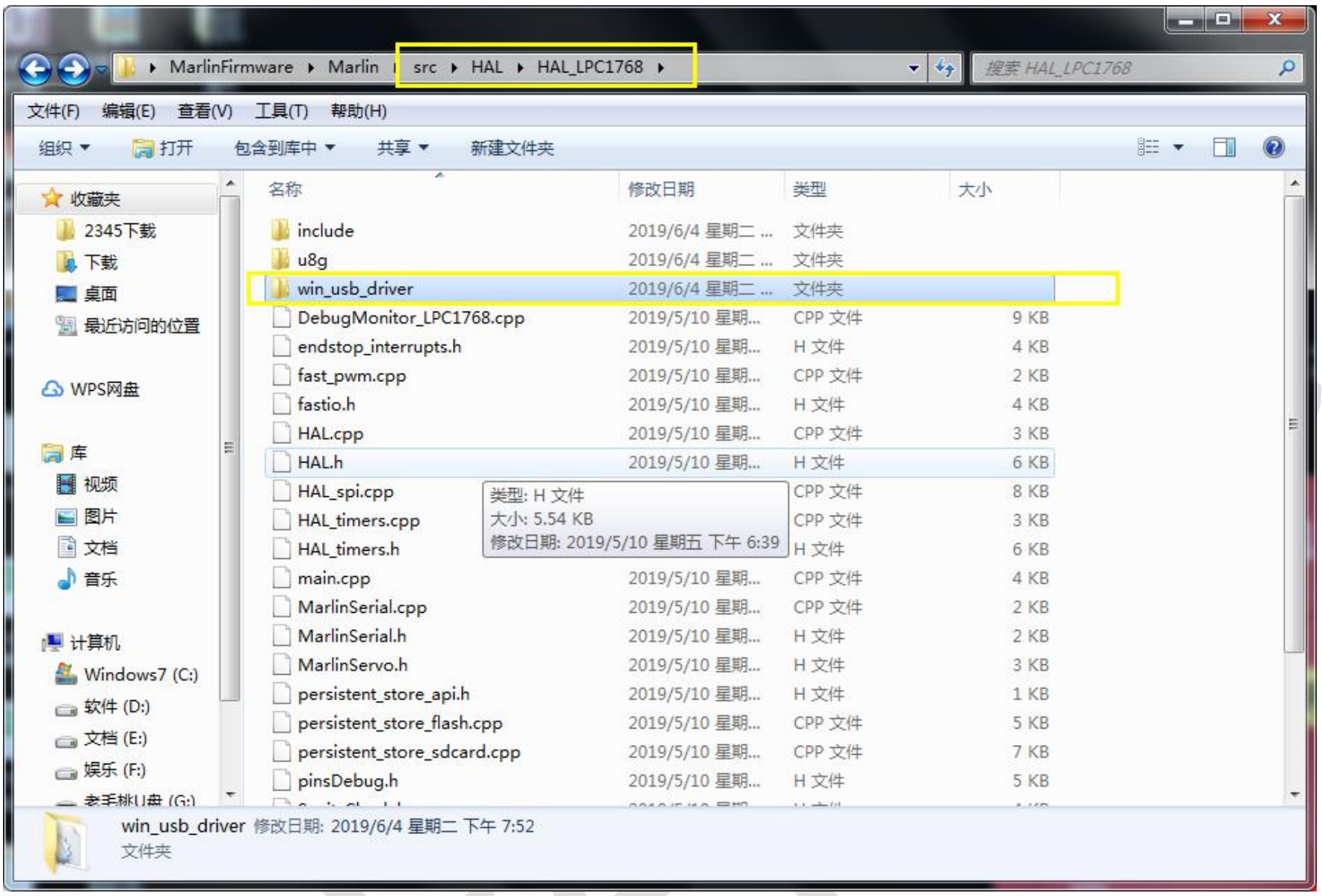
Note: only update the motherboard firmware, can motherboard COM port be recognized by computer.

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.



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