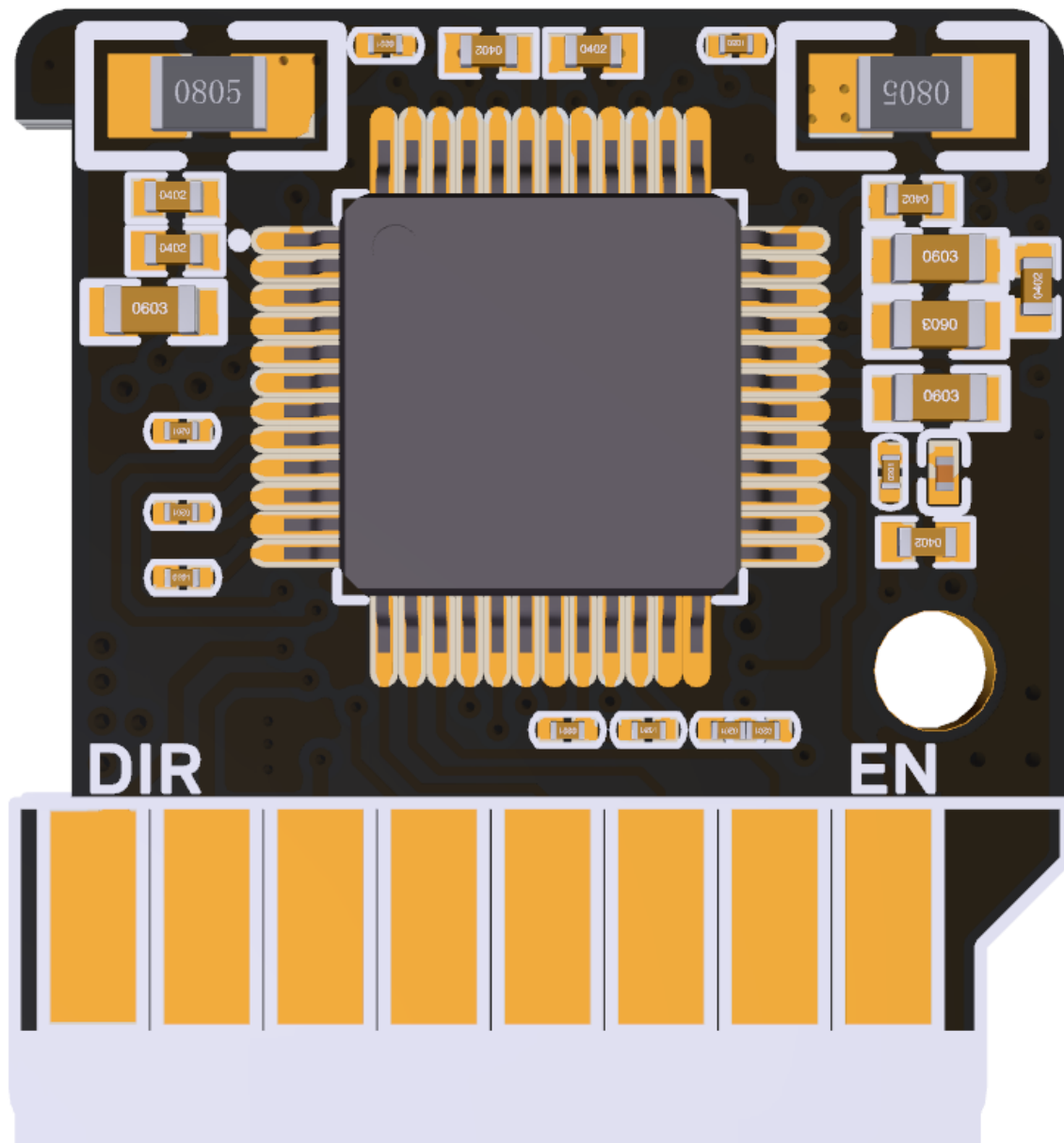


BIGTREETECH

EZ5160 V1.0

User Manual



Contents

Revision History	3
1. Product Introduction	4
1.1 Product Features	4
1.2 Product Parameters	4
1.3 Peripheral Interface	5
1.3.1 Product Dimensions	5
1.3.2 Interface Diagram	6
2. Interface Introduction	7
2.1 Installation Method and Interface	7
3. Firmware Settings	8
3.1 Marlin Firmware Settings	8
4. Precautions	122

Revision History

Version	Revision Description	Date
01.00	First Draft	2022/03/17

1. Product Introduction

TMC5160 is a high-power stepper motor drive control chip, with an external MOSFET, its maximum voltage can reach 48V, thus the supported stepper motor range is wider, and the adaptability is higher.

1.1 Product Features

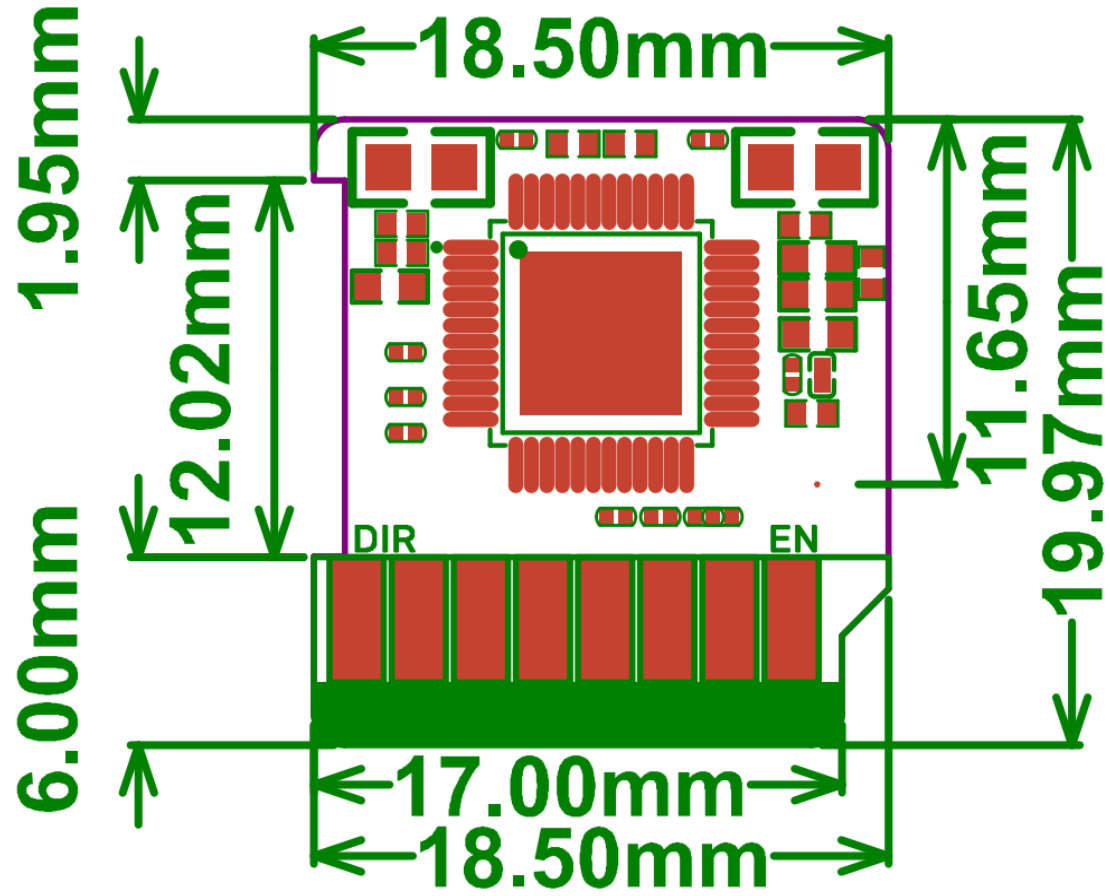
1. With the external MOSFET, it can support higher voltage and larger current, and the maximum current can reach 8A (because the module is limited by size and connector, the current cannot exceed 3A);
2. Ultra-quiet mode;
3. Low heat generation, which is far lower than that of 2100, 2130, and other drivers;
4. It can prevent the motor from shaking;
5. Not easy to lose steps;
6. Can drive 57 stepper motors;
7. The newly developed board frame is used to match the new connector so that customers can experience the aesthetic feeling and avoid the accident of the old driving pin stabbing the hand;
8. Using a new type of specially made heat sink to enhance the heat dissipation as well as protect the driver chip from external damage;
9. Using the environmentally friendly packaging to improve the cost-effectiveness.

1.2 Product Parameters

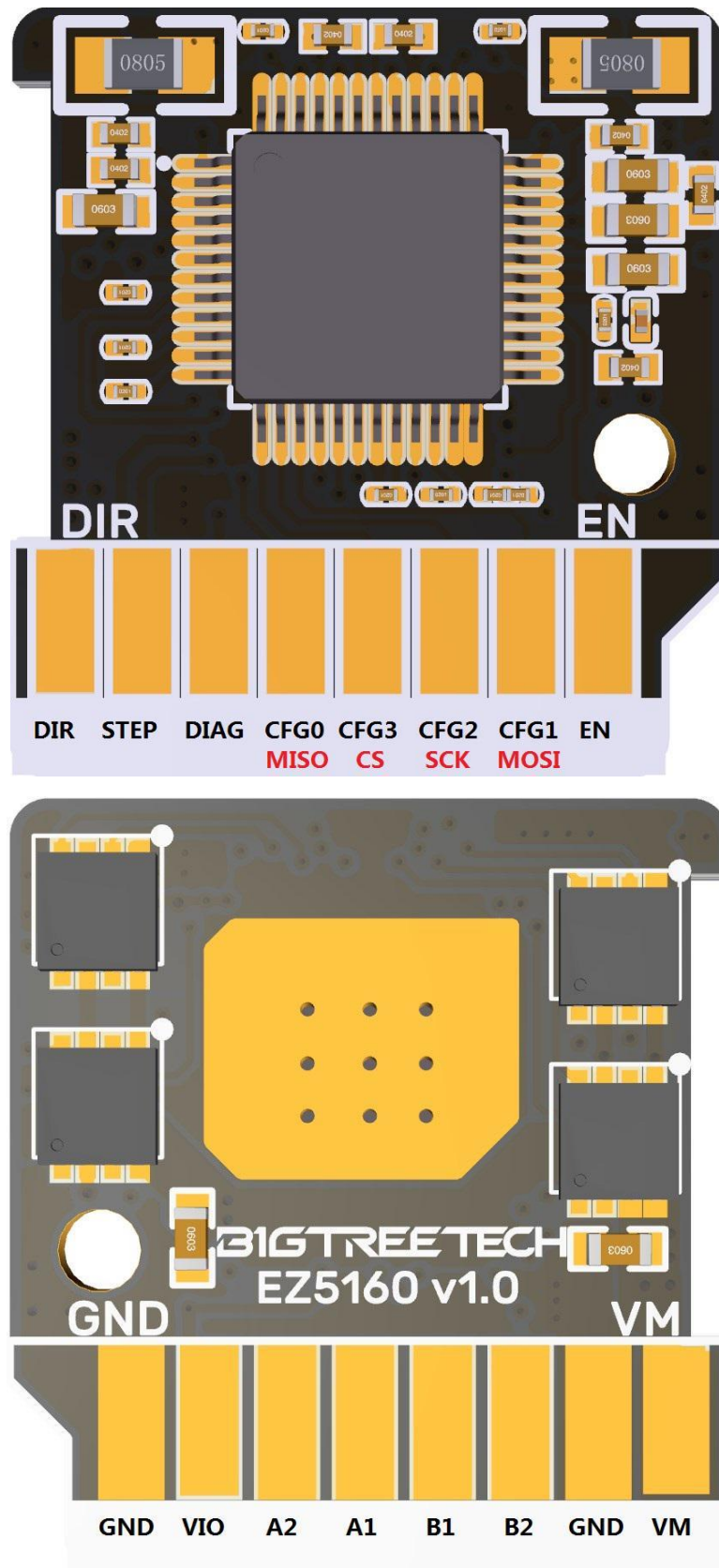
1. Product Size: 18.5 x 20mm
2. Driver Chip: TMC5160-TA
3. Input Voltage (VM): 8V-48V
4. Maximum Current: 2.5A, Peak Value: 3A (the maximum current that the header can withstand.)
5. Maximum Subdivision: 256
6. Working Mode: SPI

1.3 Peripheral Interface

1.3.1 Product Dimensions



1.3.2 Interface Diagram



2. Interface Introduction

2.1 Installation Method and Interface

The direction of installing the EZ version driver to the new header is shown in the image below:



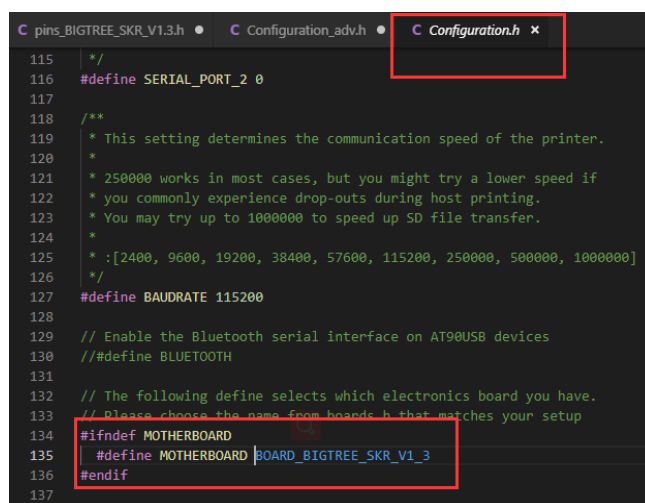
J1	Function	J2	Function
1	(EN) Enable	1	(VM) Motor Supply Voltage
2	(SDI/CFG1) Data	2	(GND) GND
3	(SCK/CFG2) Clock	3	(B2) B Phase
4	(CSN/CFG3) Chip Select	4	(B1) B Phase
5	(SDO/CFG0) Data	5	(A1) A Phase
6	(DIAG) Locked-Rotor Detection	6	(A2) A Phase
7	(STEP) Pulse Input	7	(VIO) Logic Voltage
8	(DIR) Direction Input	8	(GND) GND

3. Firmware Settings

3.1 Marlin Firmware Settings

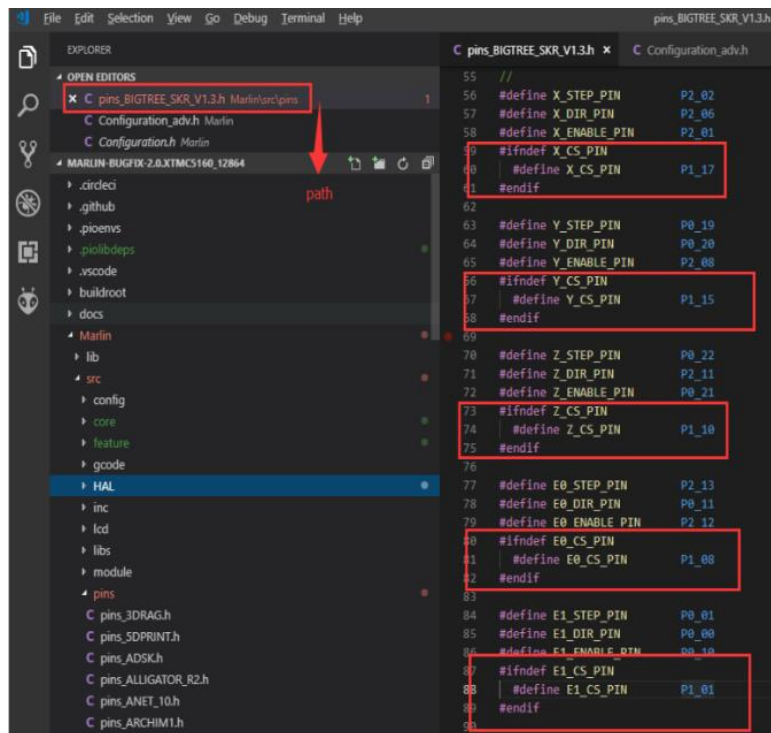
Note*: Currently only the firmware of Marlin 2.0 and later supports the SPI mode of TMC5160.

Step 1: Find and open the "Configuration.h" file in the Marlin 2.0 firmware, then find "#define MOTHERBOARD XXXXXX", "XXXXXX" represents the model of the board used. Check the motherboard you are using.

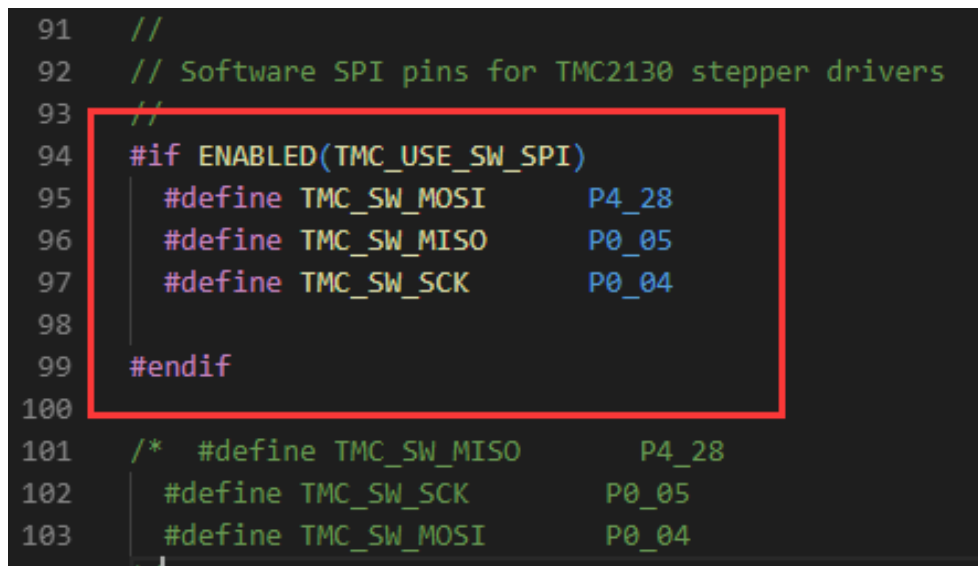


```
115  */
116  #define SERIAL_PORT_2 0
117
118  /**
119   * This setting determines the communication speed of the printer.
120   *
121   * 250000 works in most cases, but you might try a lower speed if
122   * you commonly experience drop-outs during host printing.
123   * You may try up to 1000000 to speed up SD file transfer.
124   *
125   * :[2400, 9600, 19200, 38400, 57600, 115200, 250000, 500000, 1000000]
126   */
127  #define BAUDRATE 115200
128
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_BIGTREE_SKR_V1_3
136  #endif
137
```

Step 2: Find the "pins_XXXXXX.h" file corresponding to your board in Marlin\src\pins (XXXX represents the board model), and then find "X_CS_PIN", "Y_CS_PIN", "Z_CS_PIN", "EO_CS_PIN" etc., in the file, and modify the pin name to the pin you use.

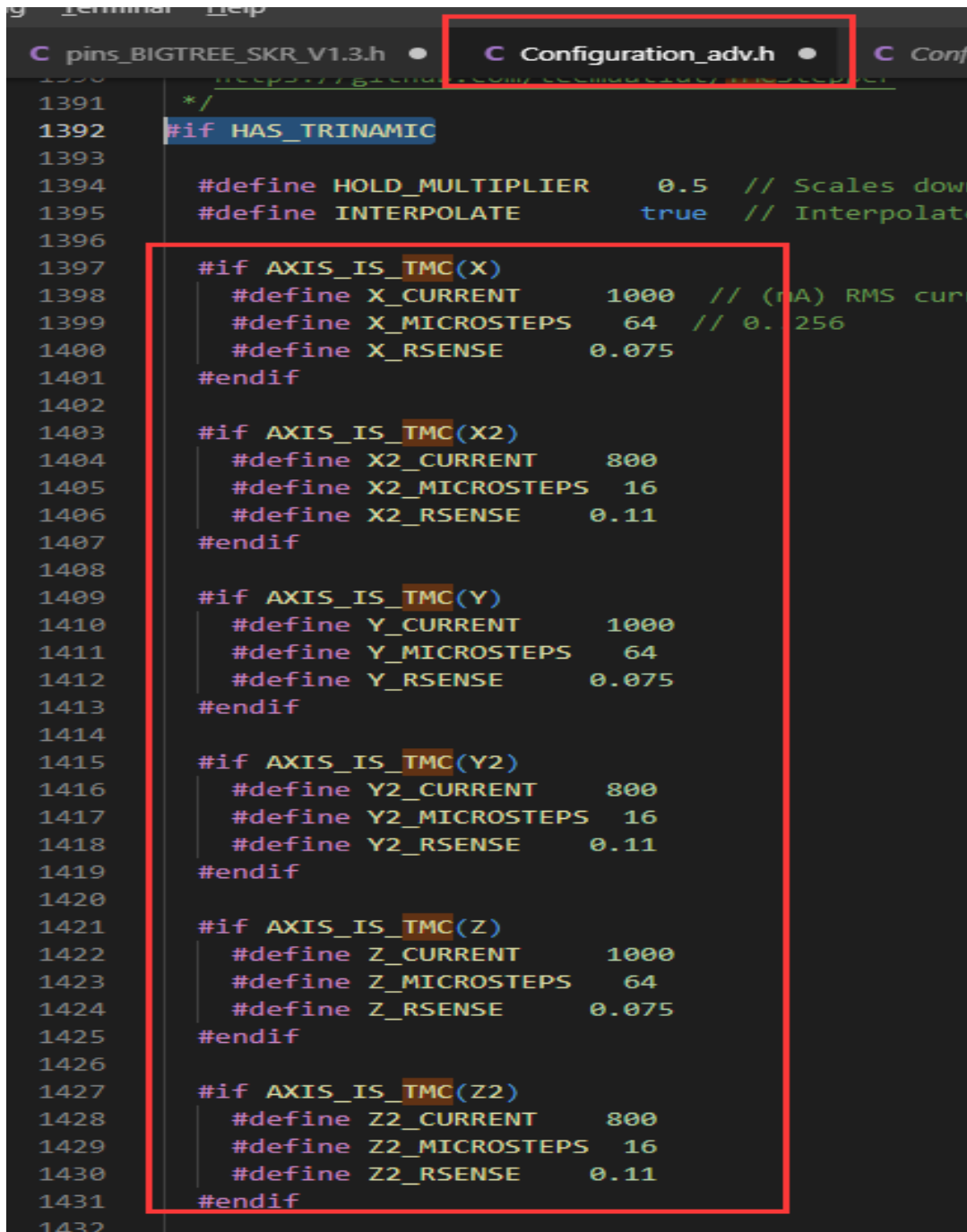


Step 3: Find "#define TMC_SW_MOSI XXX", "#define TMC_SW_MISO XXX", "#define TMC_SW_SCK XXX" under the file in Step 2 and modify "XXX" to the pin you are going to use.



```
C pins_BIGTREE_SKR_V1.3.h • C Configuration_adv.h • C Configuration.h
1486 // #define E0_CS_PIN -1
1487 // #define E1_CS_PIN -1
1488 // #define E2_CS_PIN -1
1489 // #define E3_CS_PIN -1
1490 // #define E4_CS_PIN -1
1491 // #define E5_CS_PIN -1
1492
1493 /**
1494  * Use software SPI for TMC2130.
1495  * Software option for SPI driven drivers (TMC2130, TMC21
1496  * The default SW SPI pins are defined the respective pin
1497  * but you can override or define them here.
1498  */
1499 #define TMC_USE_SW_SPI
```

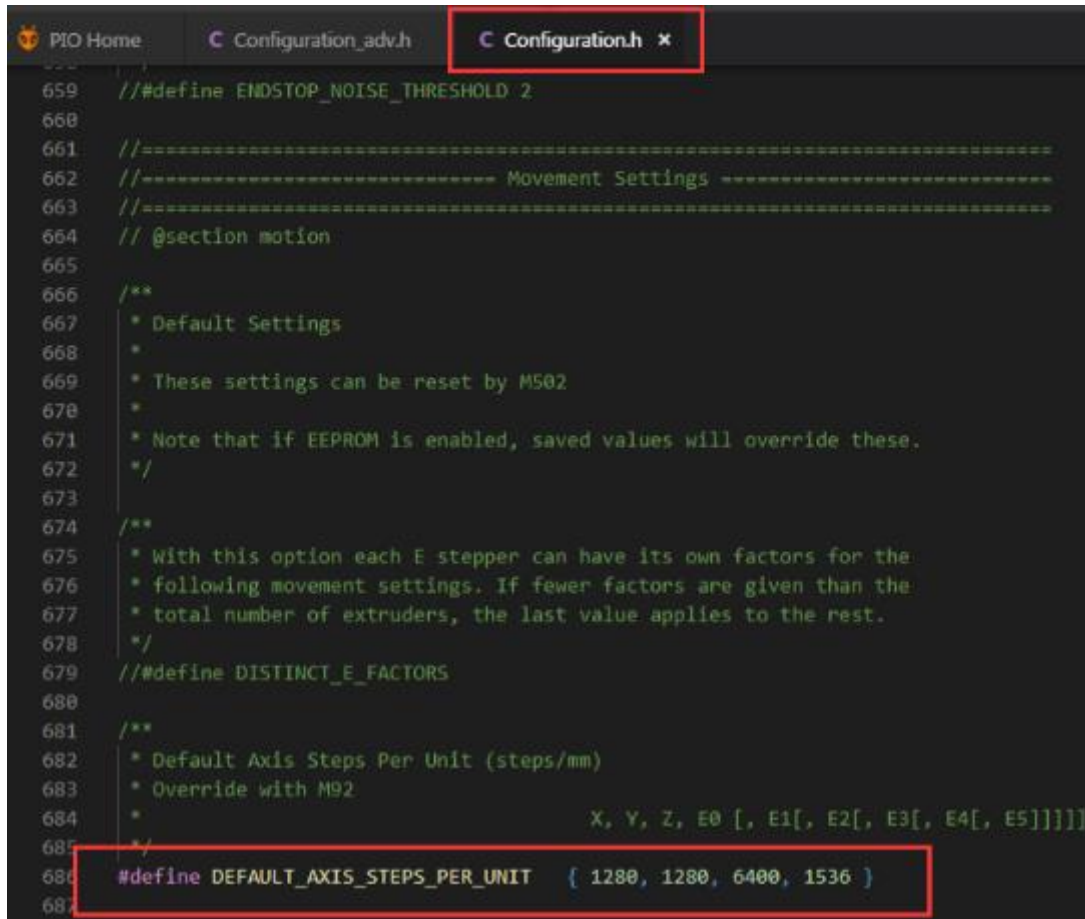
Step 5: In the "Configuration_adv.h" file, find "#define X_CURRENT", "#define X_MICROSTEPS", "#define X_RSENSE" and modify the following parameters, (all axes used need to be modified) **the RSENSE of the axes used should be modified as "0.075"**.



```
1391  */
1392  #if HAS_TRINAMIC
1393
1394      #define HOLD_MULTIPLIER    0.5  // Scales down
1395      #define INTERPOLATE      true  // Interpolate
1396
1397      #if AXIS_IS_TMC(X)
1398          #define X_CURRENT      1000  // (mA) RMS cur
1399          #define X_MICROSTEPS    64  // 0.256
1400          #define X_RSENSE      0.075
1401      #endif
1402
1403      #if AXIS_IS_TMC(X2)
1404          #define X2_CURRENT      800
1405          #define X2_MICROSTEPS    16
1406          #define X2_RSENSE      0.11
1407      #endif
1408
1409      #if AXIS_IS_TMC(Y)
1410          #define Y_CURRENT      1000
1411          #define Y_MICROSTEPS    64
1412          #define Y_RSENSE      0.075
1413      #endif
1414
1415      #if AXIS_IS_TMC(Y2)
1416          #define Y2_CURRENT      800
1417          #define Y2_MICROSTEPS    16
1418          #define Y2_RSENSE      0.11
1419      #endif
1420
1421      #if AXIS_IS_TMC(Z)
1422          #define Z_CURRENT      1000
1423          #define Z_MICROSTEPS    64
1424          #define Z_RSENSE      0.075
1425      #endif
1426
1427      #if AXIS_IS_TMC(Z2)
1428          #define Z2_CURRENT      800
1429          #define Z2_MICROSTEPS    16
1430          #define Z2_RSENSE      0.11
1431      #endif
1432
```

Step 6: After the modification of Step 5, find and open "Configuration.h" and then find "#define DEFAULT_AXIS_STEPS_PER_UNIT" and modify the following parameters to set the subdivision, the subdivision of this part must correspond to that of Step 5.

Subdivision Calculation Method: "80, 80, 400, 96" means 16 subdivision, if modified to 32 subdivision, that will be "80*(32/16), 80*(32/16) , 400*(32/16) , 96*(32/16) ".



```
659 // #define ENDSTOP_NOISE_THRESHOLD 2
660
661 // =====
662 // ===== Movement Settings =====
663 // =====
664 // @section motion
665
666 /**
667  * Default Settings
668  *
669  * These settings can be reset by M502
670  *
671  * Note that if EEPROM is enabled, saved values will override these.
672  */
673
674 /**
675  * With this option each E stepper can have its own factors for the
676  * following movement settings. If fewer factors are given than the
677  * total number of extruders, the last value applies to the rest.
678  */
679 // #define DISTINCT_E_FACTORS
680
681 /**
682  * Default Axis Steps Per Unit (steps/mm)
683  * Override with M92
684  *
685  *                                     X, Y, Z, E0 [, E1[, E2[, E3[, E4[, E5]]]]
686  */
687 #define DEFAULT_AXIS_STEPS_PER_UNIT { 1280, 1280, 6400, 1536 }
```

The sampling resistance used in this product is 0.075R, so the effective value of the driving current of this product is 3A.

4. Precautions

1. Be sure to disconnect the power supply before installing the driver to prevent it from burning;
2. Before installing the driver, be sure to confirm the direction of the driver to prevent the driver from not working due to reverse connection;
3. Please do not plug and unplug the drive module with power on to avoid damage;

4. The product has installed the heat sink before leaving the factory, please don't remove it. If there is no thermal conductive material, the heat dissipation effect will be reduced;
5. Note: when using high voltage (more than 36V) or high current (more than 1.5A), active heat dissipation shall be taken to ensure that the drive can work normally.

For more information about this product, please visit <https://github.com/bigtreotech/>. If you cannot find the information you need, you can contact our after-sales support.

Please do not hesitate to contact us if you encounter other problems during use, we will answer your question carefully; Any suggestions/feedback on our products are welcome, and we will consider them carefully. Thanks for choosing BIGTREETECH.