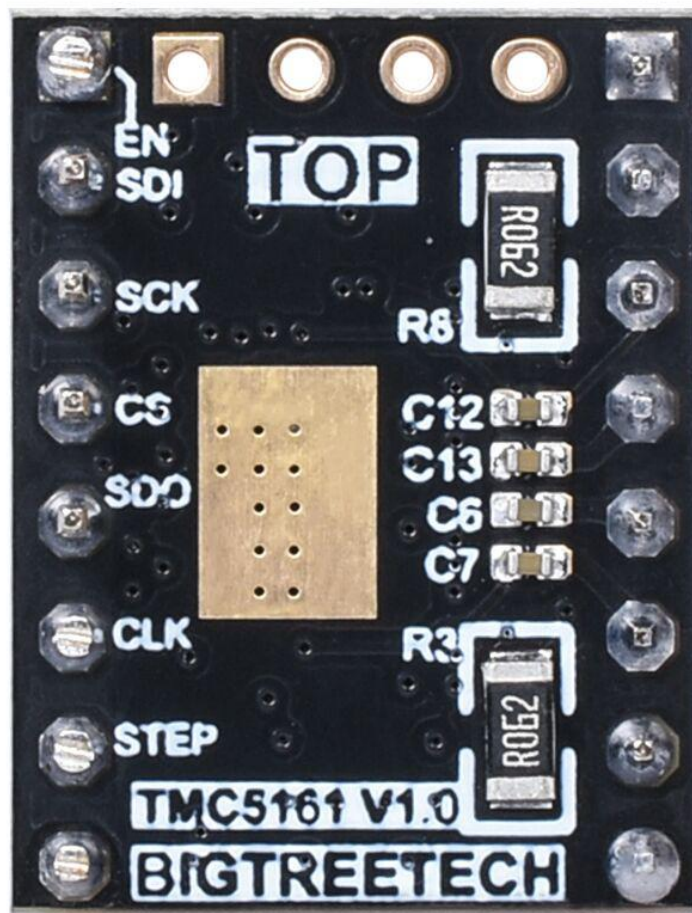


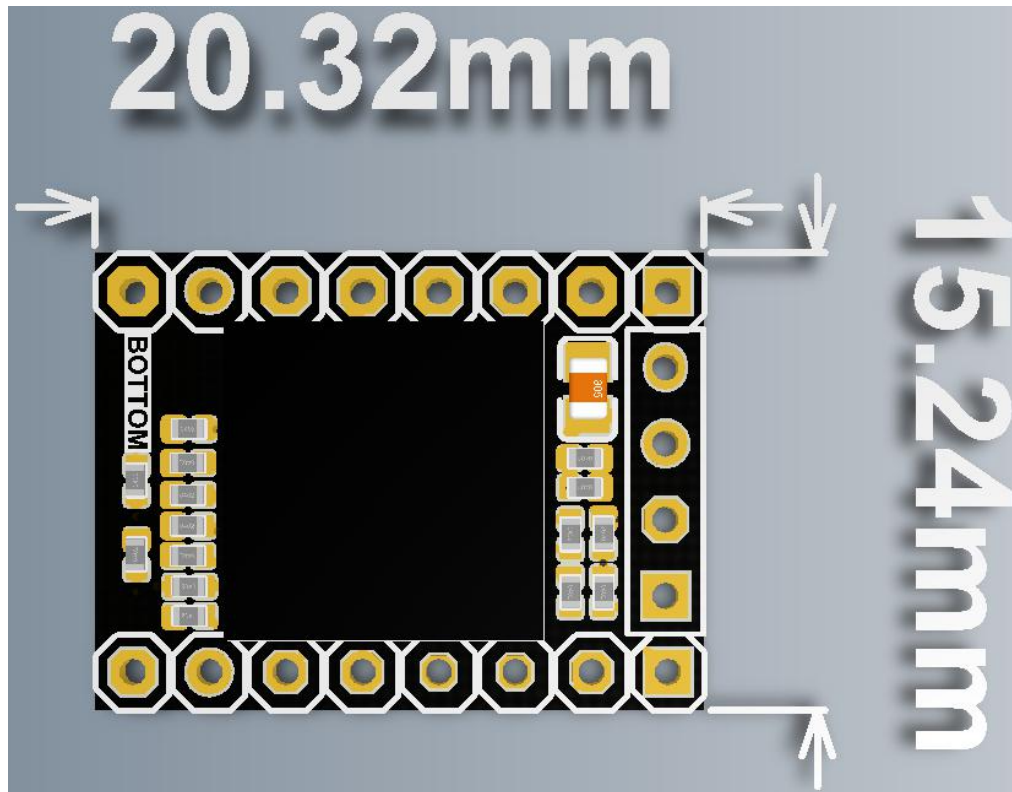
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TMC5161 V1.0

Stepping motor driving module



I. Dimensional parameters



Product Advantages

Support 2-Phase stepping motor

Rated current: 3.5A rms

Voltage input: 12/24V DC

Low $R_{DS(ON)}$: Integrated 45m Ω MOSFET, not easy to heat up

SPI working mode

Encoder expansion port

Support 256 microsteps

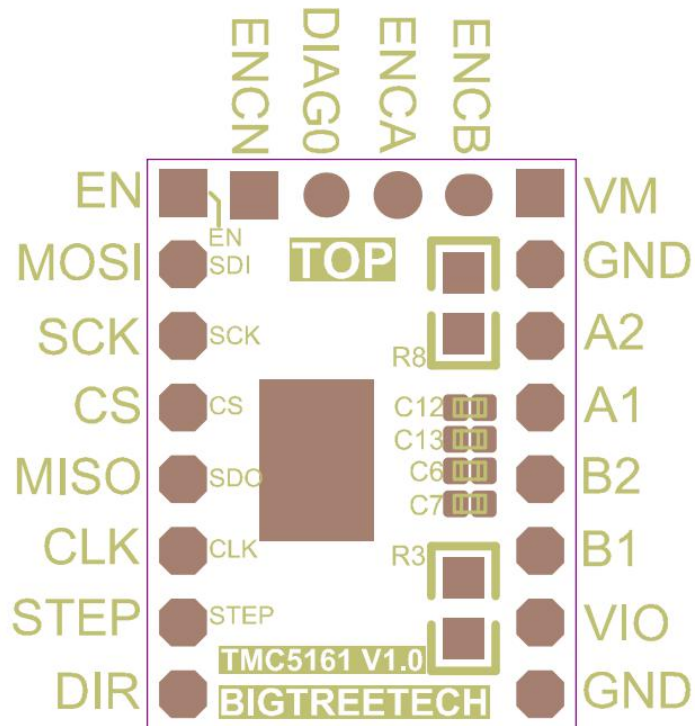
SpreadCycle (highly dynamic motor control chopper)

StealthChop (ultra-quiet technology)

CoolStep (current dynamic control)

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Pin diagram

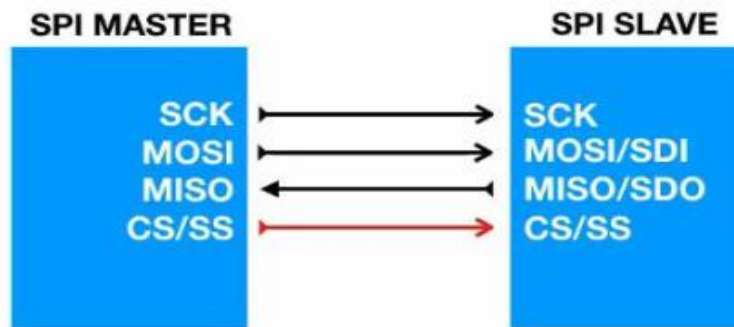


Grade	Function	Grade	Function
EN	Enabled	VM	Motor operating voltage input
SDI	SPI-MOSI	GND	power ground
SCK	SPI-SCK	A2	Phase A
CS	SPI-CS	A1	Phase A
SDO	SPI-MISO	B2	Phase B
CLK	clock input	B1	Phase B
STEP	impulse input	VIO	Logical voltage input
DIR	impulse input	GND	digital ground

II. Description of SPI working mode

The wiring information

SPI Basics



Three lines common to all the devices:

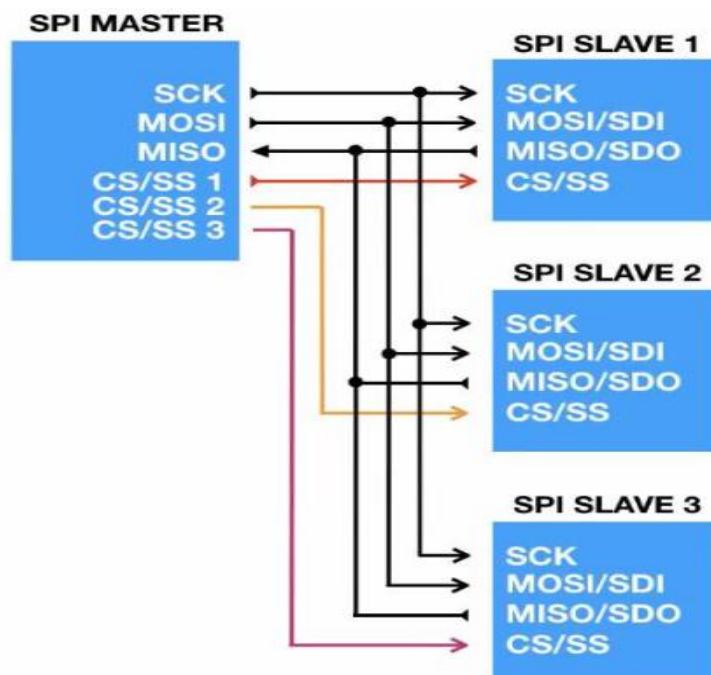
MOSI (Master Out Slave In)

MISO (Master In Slave Out)

SCK (Serial Clock)

One line specific for every device:

SS (Slave Select) / CS (Chip Select)



III. Firmware editing instructions

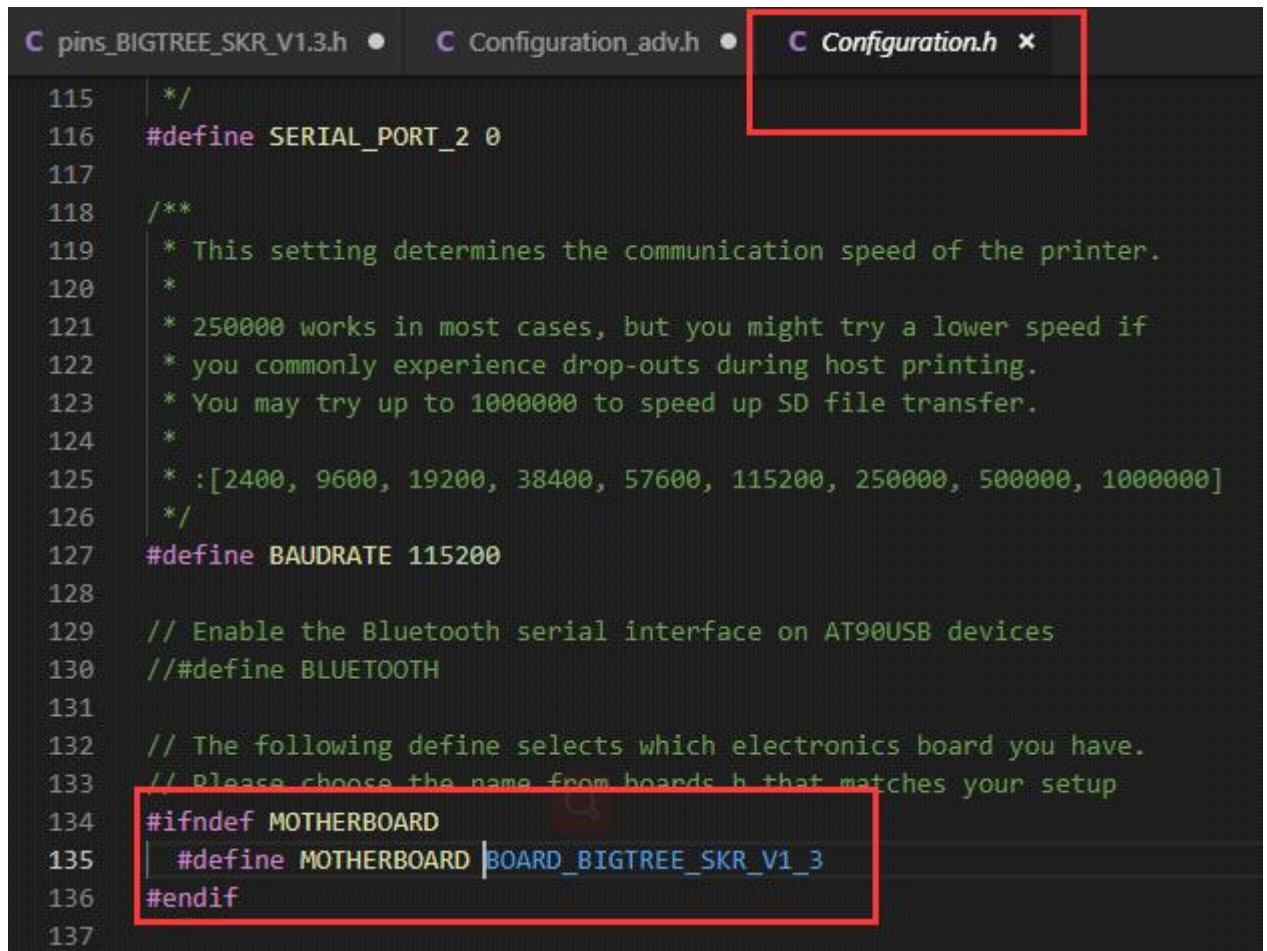
Product files download:

<https://github.com/bigtreetech>

Firmware: Marlin-2.0

BIGTREETECH SKR V1.3 as example: (same as TMC5160)

1、 Find and open the "Configuration.h" file in the marlin 2.0 firmware, then find "#define MOTHERBOARD XXXXXX", "XXXXXX" is the model of the board you are using.

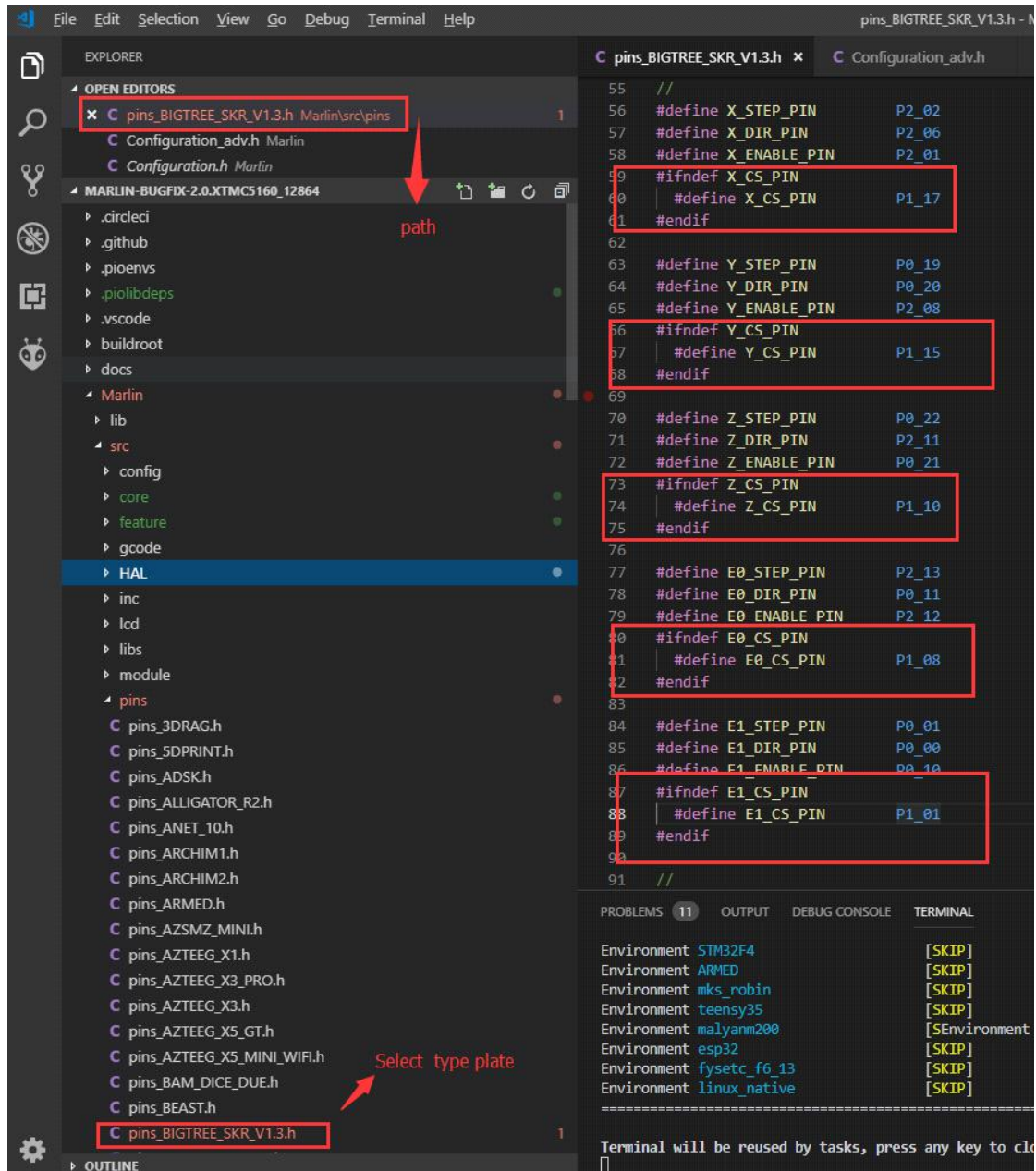


```
115  */
116  #define SERIAL_PORT_2 0
117
118  /**
119   * This setting determines the communication speed of the printer.
120   *
121   * 250000 works in most cases, but you might try a lower speed if
122   * you commonly experience drop-outs during host printing.
123   * You may try up to 1000000 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
```

2. In the folder Marlin\src\pins , find the "pins_XXXXXX.h" file for your board (XXXXXX stands for board model), then find

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"X_CS_PIN", "Y_CS_PIN", "Z_CS_PIN", "EO_CS_PIN", etc. in the file, modify the following pins to the pins you use on your board.



3. Find "#define TMC_SW_MOSI XXX" "#define TMC_SW_MISO XXX" "#define TMC_SW_SCK XXX" in the file in step 2 then change "XXX" to the pin you use.

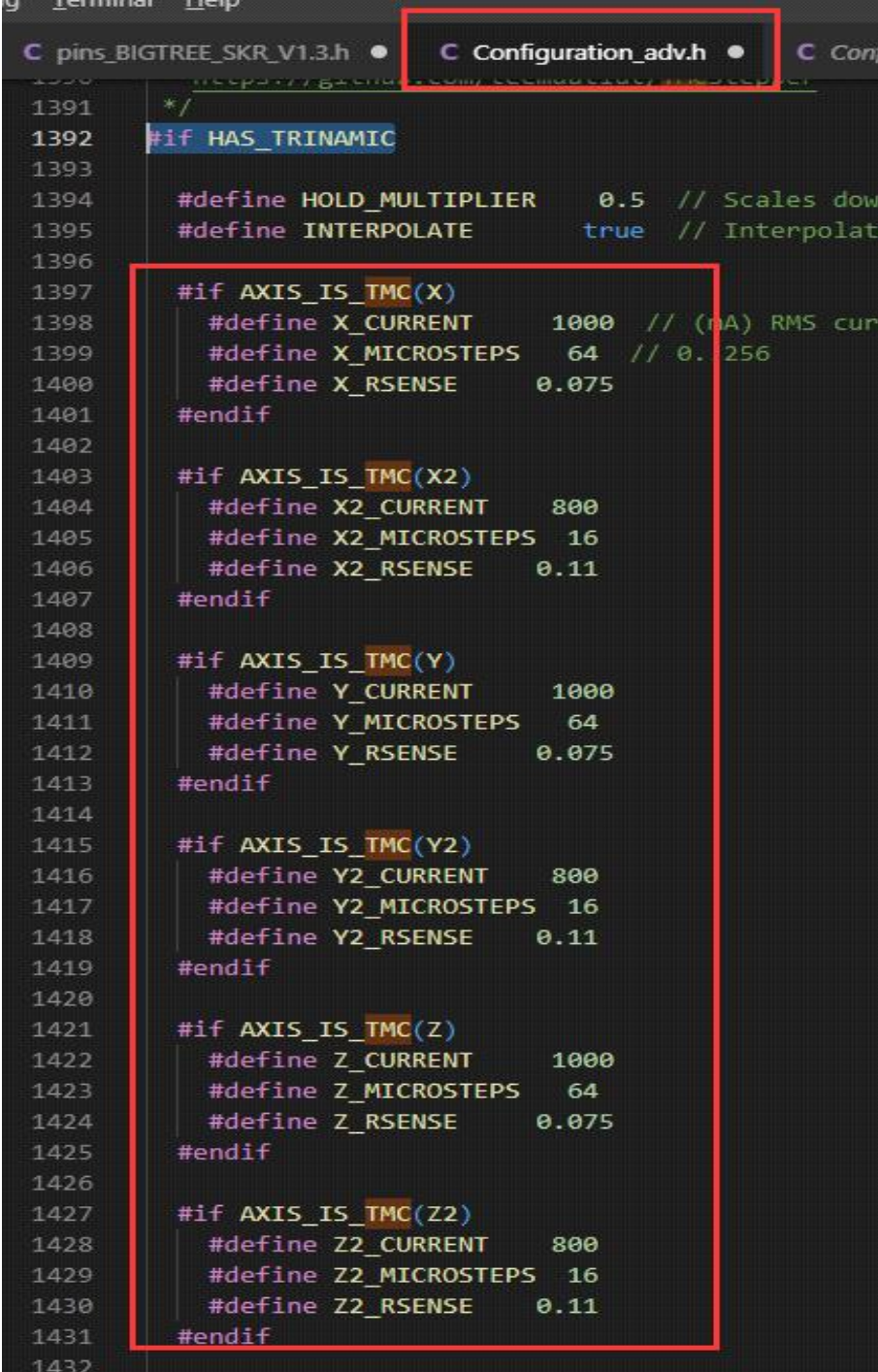
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```
C pins_BIGTREE_SKR_V1.3.h • C Configuration_adv.h • C Configuration.h
73 #ifndef Z_CS_PIN
74 #define Z_CS_PIN P1_10
75 #endif
76
77 #define E0_STEP_PIN P2_13
78 #define E0_DIR_PIN P0_11
79 #define E0_ENABLE_PIN P2_12
80 #ifndef E0_CS_PIN
81 #define E0_CS_PIN P1_08
82 #endif
83
84 #define E1_STEP_PIN P0_01
85 #define E1_DIR_PIN P0_00
86 #define E1_ENABLE_PIN P0_10
87 #ifndef E1_CS_PIN
88 #define E1_CS_PIN P1_01
89 #endif
90
91 //
92 // Software SPI pins for TMC2130 stepper drivers
93 //
94 #if ENABLED(TMC_USE_SW_SPI)
95 #define TMC_SW_MOSI P4_28
96 #define TMC_SW_MISO P0_05
97 #define TMC_SW_SCK P0_04
98 #endif
99
100
101 /* #define TMC_SW_MISO P4_28
102 #define TMC_SW_SCK P0_05
103 #define TMC_SW_MOSI P0_04
104 */
```

4. Find and open "Configuration_adv.h", then find "#define TMC_USE_SW_SPI", remove the mask "/*"

```
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, TMC2160)
1496  * The default SW SPI pins are defined the respective pins
1497  * but you can override or define them here.
1498  */
1499 #define TMC_USE_SW_SPI
1500 // #define TMC_SW_MOSI -1
1501 // #define TMC_SW_MISO -1
1502 // #define TMC_SW_SCK -1
1503
1504 /**
```

5. In the "Configuration_adv.h" file, find "#define X_CURRENT", "#define X_MICROSTEPS" and "#define X_RSENSE" to modify the parameters (the axes used need to be modified), and the Rsense of the used axis should be changed into "0.060".



```
1391 */
1392 #if HAS_TRINAMIC
1393
1394 #define HOLD_MULTIPLIER    0.5 // Scales down the holding current from motor current
1395 #define INTERPOLATE        true // Interpolate LINERAM values between blocks
1396
1397 #if AXIS_IS_TMC(X)
1398 #define X_CURRENT          1000 // (mA) RMS current per motor (if applicable)
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
```


6. After firmware debugging, compile and flash on the motherboard, open the software Pronterface in computer, connect to the motherboard to view the TMC5161 driver running status of each SPI mode.

IV. Notes

1. Pay attention to the line sequence and I/O port when connecting, the wrong line will directly make the driver can not work, please carefully connect the driver according to the pin diagram;
2. When inserting the drive into the motherboard, pay attention to the driving direction, can not be plugged in reverse, to prevent the drive from burning down;
3. Before driving work, we must make sure that heat dissipation can work to prevent driving abnormal work;
4. Before installing the drive, make sure the power supply was disconnected to prevent the drive from burning down;
5. Do not plug and pull the module to avoid damage;
6. When installing the heat sink, please pay attention to the gap between the heat sink and pins to prevent short-circuited phenomenon.

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If you encounter problems in use, welcome to contact us, we will carefully answer for you; if you have any good comments or suggestions on our products, you are also welcome to give us back, we will also carefully consider your comments or suggestions, thank you for choosing BIGTREETECH products, thank you!