

SHENZHEN BIQU TECHNOLOGY LIMITED COMPANY  
BIGTREETECH

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# **BIGTREETECH**

# **MAX31865 V2.0**

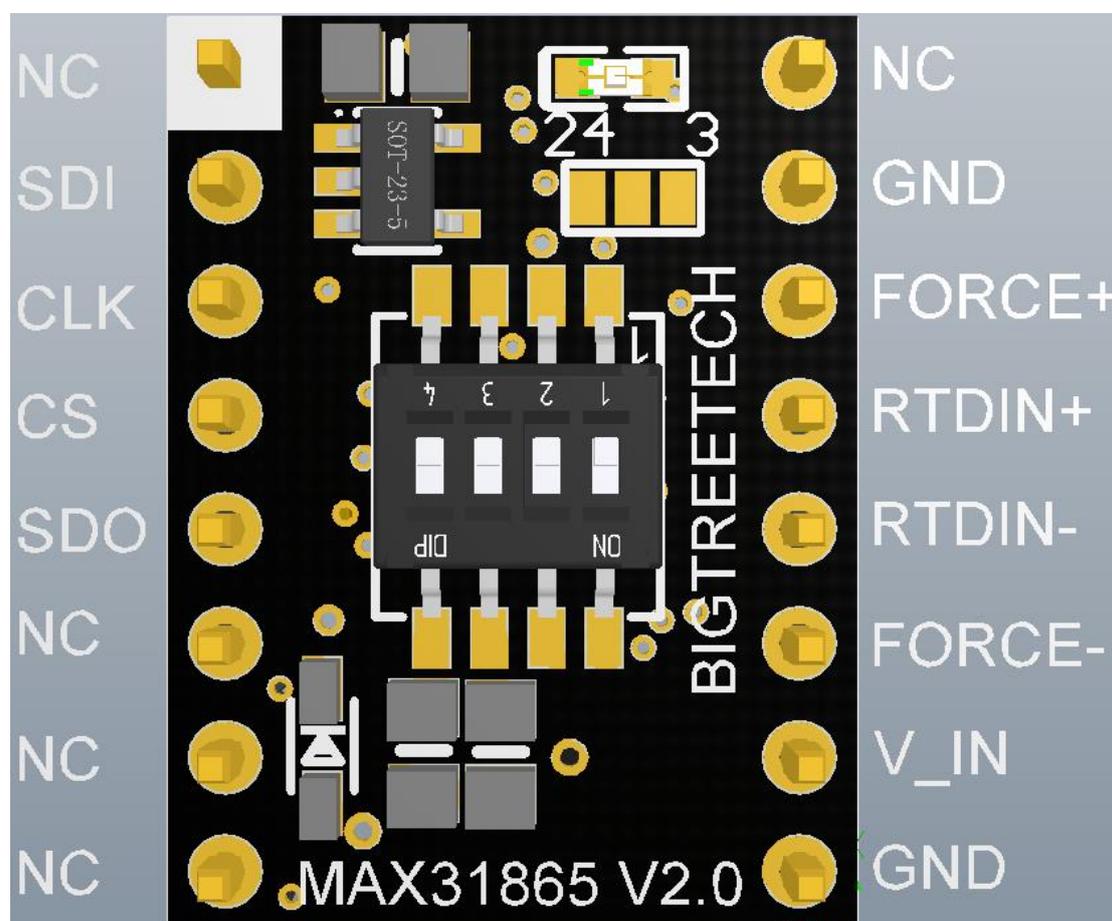
# **USER MANUAL**

**【Please read this manual carefully before use】**

## 一、BIGTREETECH MAX31865 V2.0 Module Introduction

This module uses MAX31865 chip, supports two-wire, three-wire, four-wire PT1000 and PT100 temperature sensors, adopts the same package of motor drive module, easy to install, and uses VCCIO part of the power supply. Support 3.3V-5V power input.

### 1,Pin Introduction



V\_IN—Positive power supply (3.3V-5V)

GND—Power negative

SDI--data input

SDO--Data output

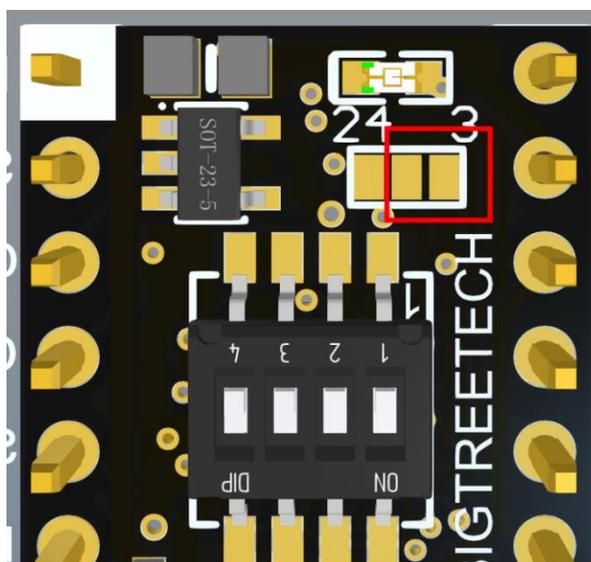
CLK--Clock line

CS--Chip Select

## 2,DIP Switch Configuration

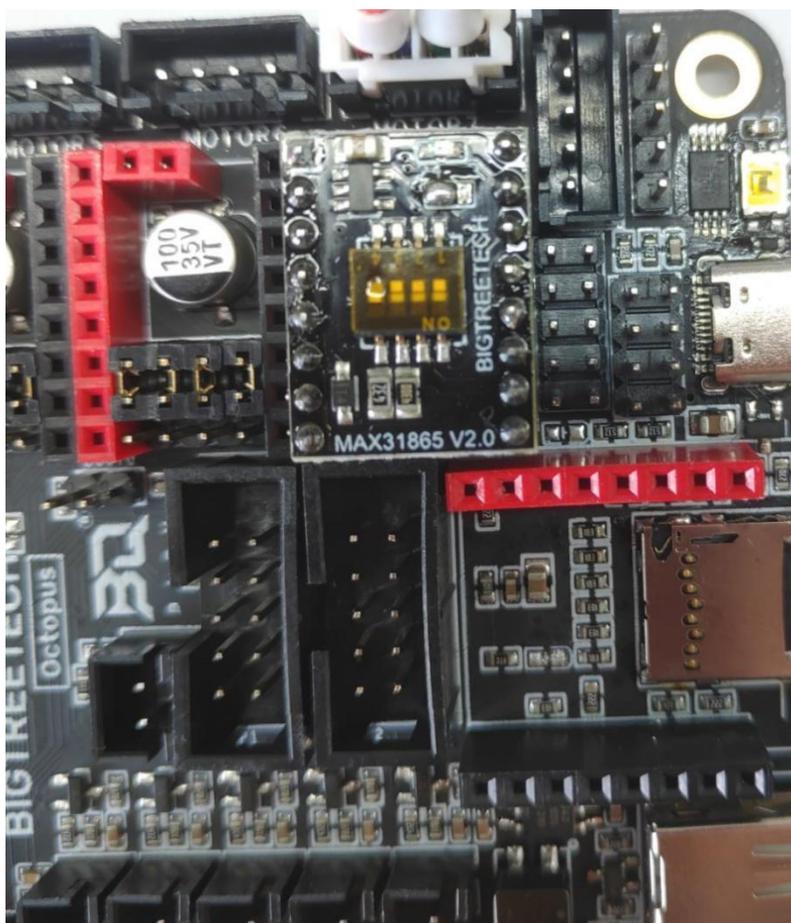
1	2	3	4	Sensor Model
ON	ON	ON	OFF	Two lines PT100
ON	ON	OFF	ON	Two linesPT1000
OFF	ON	ON	OFF	Three lines PT100
OFF	ON	OFF	ON	Three lines PT1000
OFF	OFF	ON	OFF	Four-wire PT100
OFF	OFF	OFF	ON	Four-wire PT1000

When using a three-wire PT100 or PT1000 sensor, you need to short-circuit the two solder joints in the red box: (the factory default is a short-circuit between the middle and 24, and the use of a 3-wire requires a short-circuit between the middle and 3 and a short-circuit between 24)



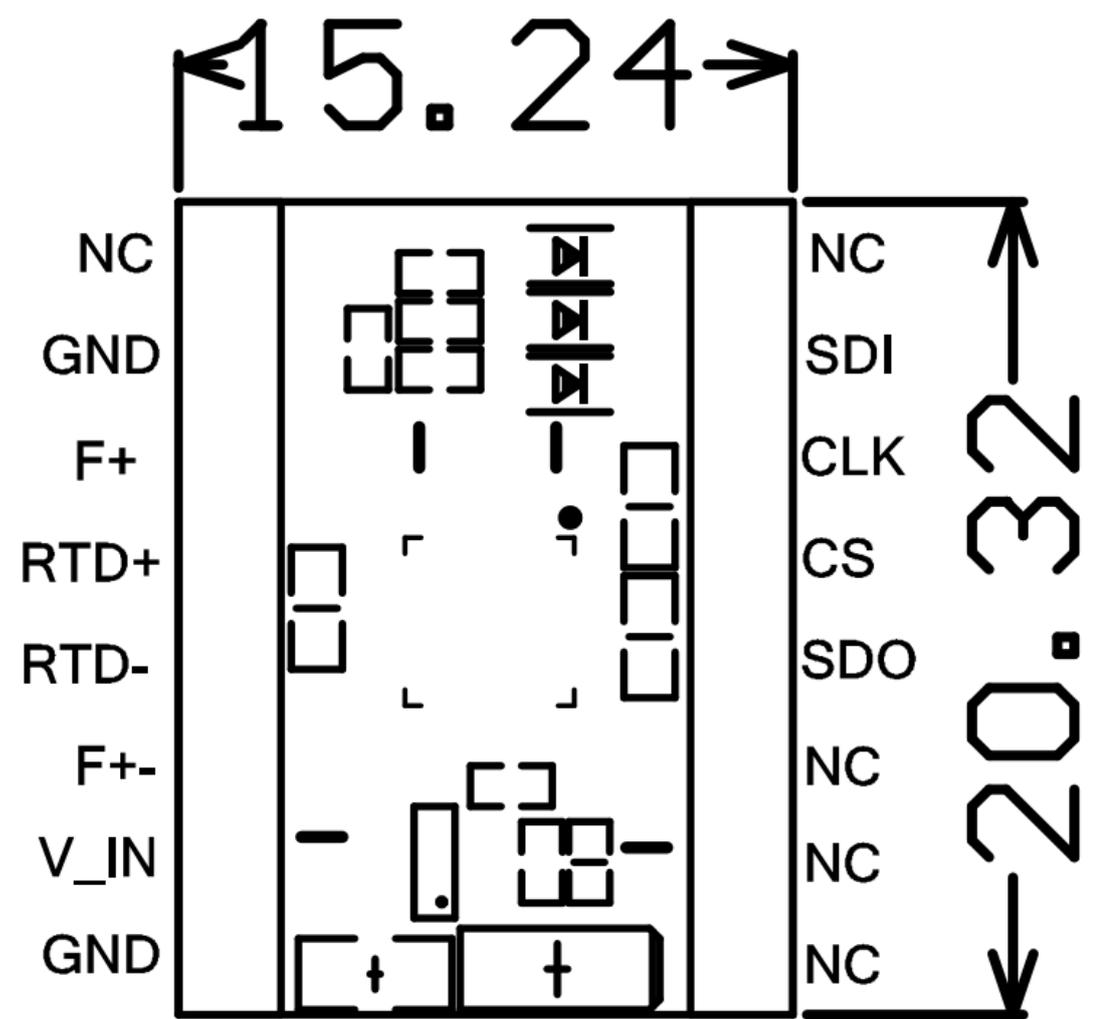
Among them, the two-wire or 4-wire PT100/PT1000 is used to short the middle pad and the two sides close to the terminal block, and the 3-wire PT100/PT1000 is used to short the middle pad and the edge of the board. The factory default is 2/4 wires. 3 wires can also use 2 wires, but the accuracy is slightly reduced (same as 2 wires).

## 3,Connection of Module Installation Method



As shown in the figure above, modify the program of the motherboard, select the SPI mode of the motherboard driver jumper, and directly connect BIGTREETECH MAX31865V2.0 to the idle motor driver of the motherboard, and then connect the PT100/PT1000 thermistor to the corresponding original motor line On the interface (need to pay attention to the line sequence, subject to the actual motherboard, only support the motherboard that supports the SPI mode pluggable drive).

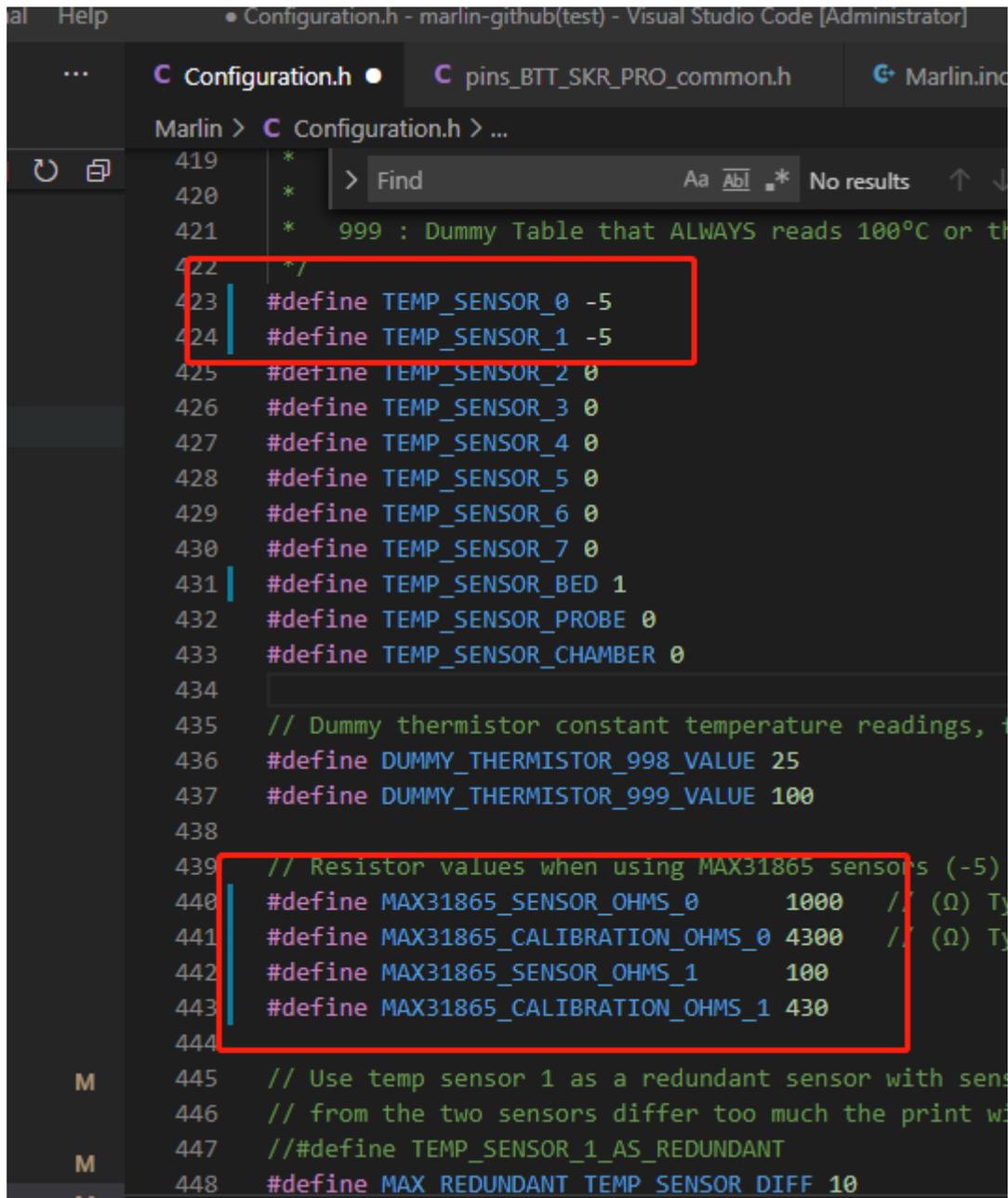
## 二、 Installation Size:



### 三、Marlin firmware configuration:

Marlin firmware supports the connection of up to two BTT PT1000&PT100 modules. The default is two-wire and four-wire common, through the configuration of Configuration.h and Configuration\_adv.h files. The BTT PT1000&PT100 module can be a PT100 or PT1000 sensor, and different parameters need to be configured.

1, Configuration in Configuration.h:



```
419 *
420 *
421 * 999 : Dummy Table that ALWAYS reads 100°C or th
422 */
423 #define TEMP_SENSOR_0 -5
424 #define TEMP_SENSOR_1 -5
425 #define TEMP_SENSOR_2 0
426 #define TEMP_SENSOR_3 0
427 #define TEMP_SENSOR_4 0
428 #define TEMP_SENSOR_5 0
429 #define TEMP_SENSOR_6 0
430 #define TEMP_SENSOR_7 0
431 #define TEMP_SENSOR_BED 1
432 #define TEMP_SENSOR_PROBE 0
433 #define TEMP_SENSOR_CHAMBER 0
434
435 // Dummy thermistor constant temperature readings, t
436 #define DUMMY_THERMISTOR_998_VALUE 25
437 #define DUMMY_THERMISTOR_999_VALUE 100
438
439 // Resistor values when using MAX31865 sensors (-5)
440 #define MAX31865_SENSOR_OHMS_0 1000 // (Ω) Ty
441 #define MAX31865_CALIBRATION_OHMS_0 4300 // (Ω) Ty
442 #define MAX31865_SENSOR_OHMS_1 100
443 #define MAX31865_CALIBRATION_OHMS_1 430
444
M 445 // Use temp sensor 1 as a redundant sensor with sens
446 // from the two sensors differ too much the print w
M 447 //#define TEMP_SENSOR_1_AS_REDUNDANT
M 448 #define MAX_REDUNDANT_TEMP_SENSOR_DIFF 10
```

**TEMP\_SENSOR\_0** Set to -5: Use MAX31865 module on heater 0

**TEMP\_SENSOR\_1** Set to -5: Use MAX31865 module on heater 1

Currently, only sensors 0 and 1 are configured as MAX31865 modules, others are not supported

If using **PT100**:

**MAX31865\_SENSOR\_OHMS** Set to 100

**MAX31865\_CALIBRATION\_OHMS** Set to 430

If using **PT1000**:

**MAX31865\_SENSOR\_OHMS** Set to 1000

**MAX31865\_CALIBRATION\_OHMS** Set to 4300

In the picture above: Temperature sensor 0 is configured as a PT1000 MAX31865 module

Temperature sensor 1 is configured as a PT100 MAX31865 module

The number of heating rods is 2 (#define EXTRUDERS 2)

## 2, Configuration in Configuration\_adv.h:

```
#define THERMOCOUPLE_MAX_ERRORS 20
#define MAX_CONSECUTIVE_LOW_TEMPERATURE_ERROR_ALLOWED 10
#define SHOW_TEMP_ADC_VALUES
#define M115_GEOMETRY_REPORT
```

```
*/
#define THERMOCOUPLE_MAX_ERRORS 20
```

```
*
* If you want to enable this feature for your hotend thermis
* uncomment and set values > 0 in the constants below
*/
// The number of consecutive low temperature errors that can
// before a min_temp_error is triggered. (Shouldn't be more t
#define MAX_CONSECUTIVE_LOW_TEMPERATURE_ERROR_ALLOWED 10
// The number of milliseconds a hotend will preheat before st
```

```
// Show Temperature ADC value
// Enable for M105 to include ADC values read from temperatur
#define SHOW_TEMP_ADC_VALUES
```

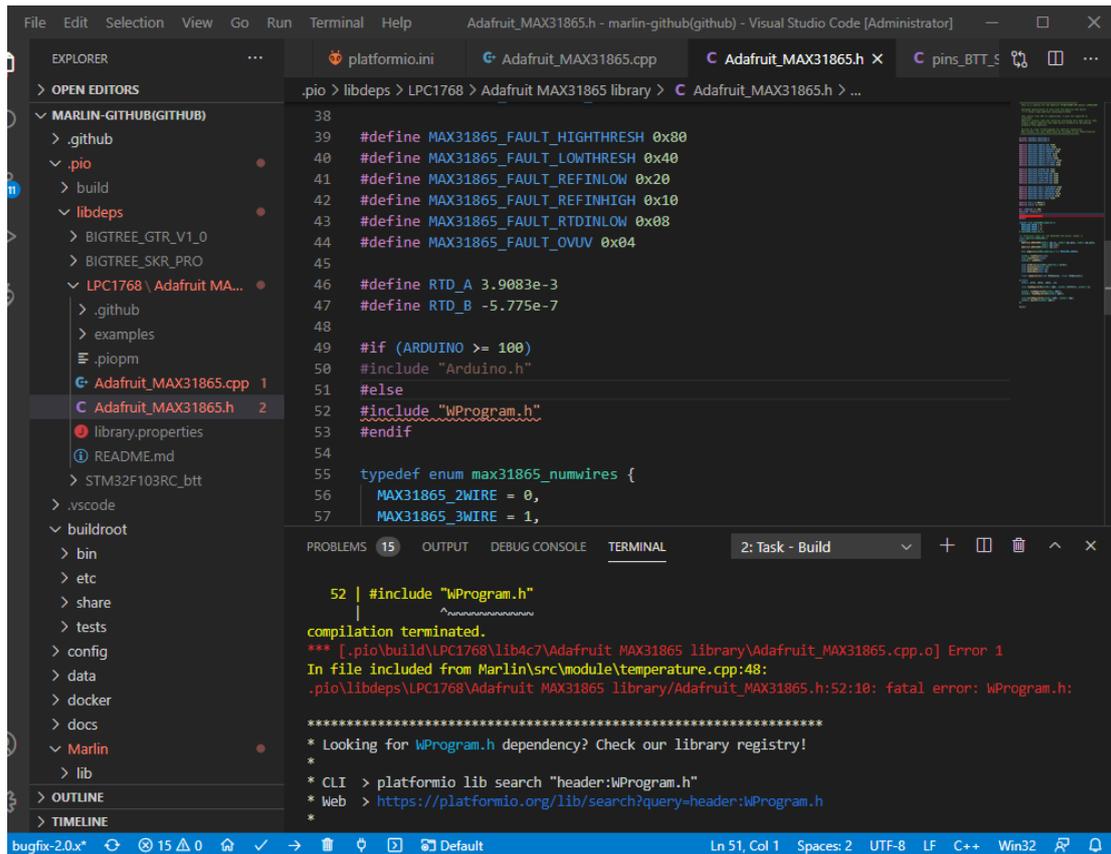
```
*/
#define EXTENDED_CAPABILITIES_REPORT
#if ENABLED(EXTENDED_CAPABILITIES_REPORT)
  #define M115_GEOMETRY_REPORT
#endif
```

```
/**
 * Expected Printer Check
```

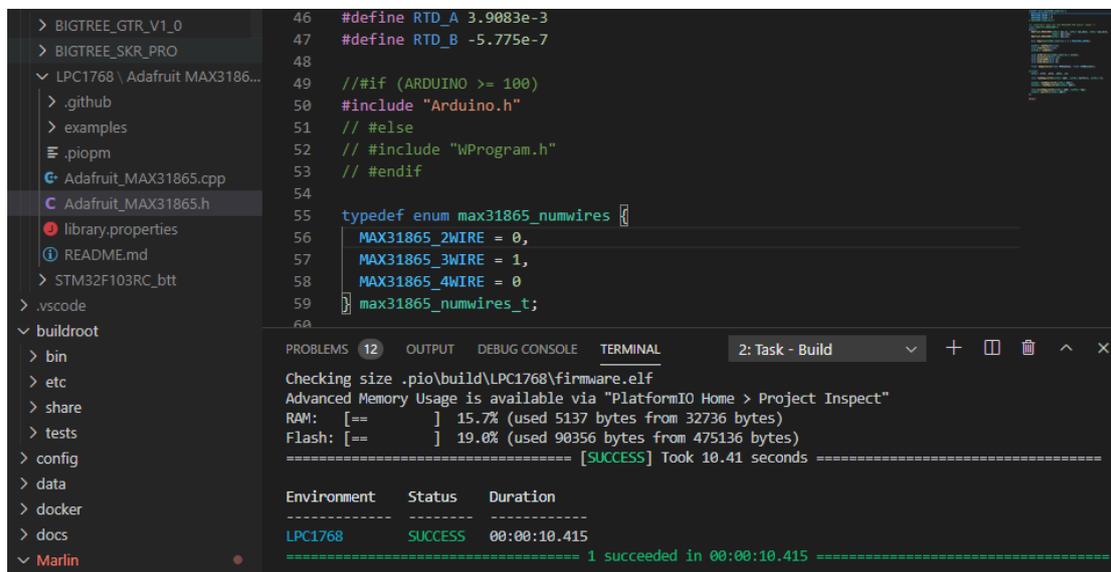
## 3, Use BTT-SKR motherboard V1.1 V1.3 V1.4      BTT-SKR V1.4 turbo

BTT-SKR E3 Turbo      When connecting the max31865 motherboard, the firmware needs additional modification

Note: After steps 1, 2 are completed, compile the program, and the program will report an error as shown below



Make the following modifications in the file Adafruit\_MAX31865.h Comment out (ARDUINO >= 100) to determine

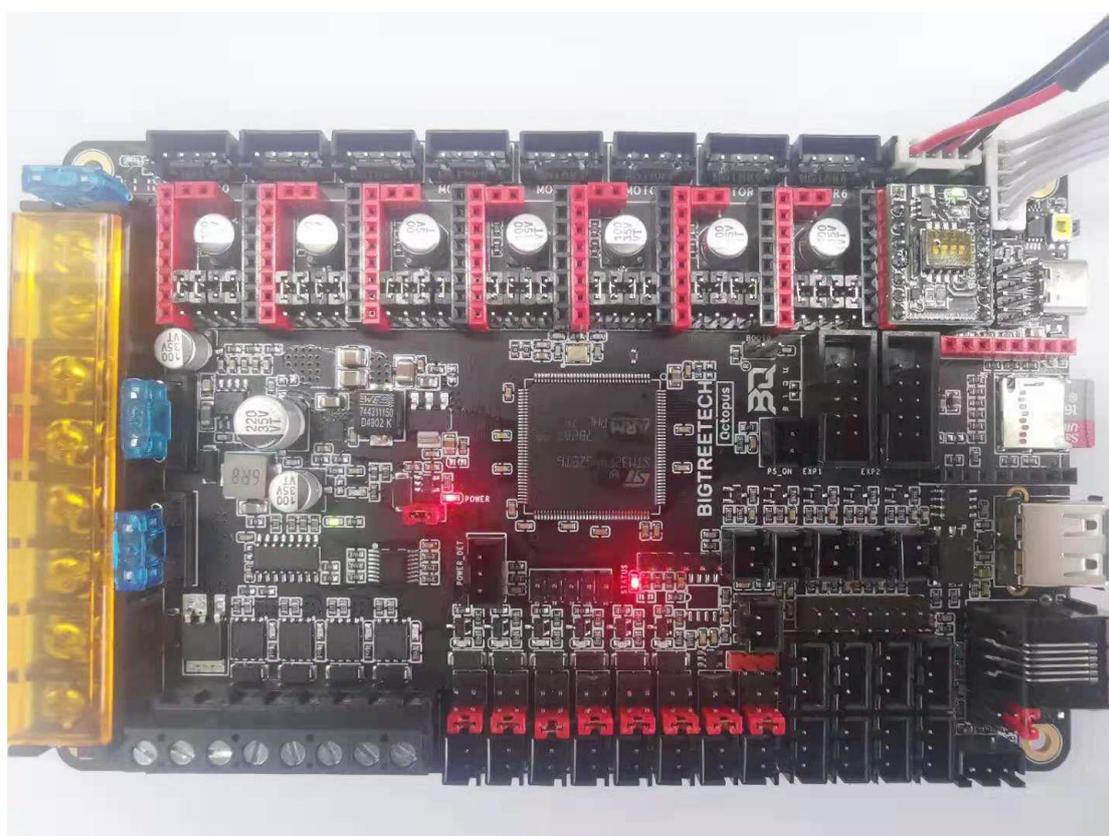


BTT-SKR E3 TurboChange the Adafruit\_MAX31865.h file under the LPC1769 file

#### 四、BIGTREETECH motherboard and BTT PT1000&PT100V module connection configuration:

The following is a tutorial for using the module on the BTT OCTOPUS V1.0 motherboard (marlin firmware)

1,Use a 4-wire PT1000 sensor, E3 driver interface, select the SPI mode of the driver to connect to MAX31865. The connection is shown in the figure



## 2, Add pins in the pin file

```

198 #define E2_DIR_PIN PE3
199 #define E2_ENABLE_PIN PD4
200 #ifndef E2_CS_PIN
201
202 #define E2_CS_PIN PE1
203 #endif
204
205 // #define E3_STEP_PIN PE6 // MOTOR 7
206 // #define E3_DIR_PIN PA14
207 // #define E3_ENABLE_PIN PE0
208 // #ifndef E3_CS_PIN
209 // #define E3_CS_PIN PD3
210 // #endif
211
212 //Max31865
213 //Thermocouple sensor
214 //If the TEMP_SENSOR value of - 5 is enabled in the configuration file, it will work
215 #ifndef MAX31865_CS_PIN
216 #define MAX31865_MISO_PIN PA6
217 #define MAX31865_SCK_PIN PA5
218 #define MAX31865_MOSI_PIN PA7
219 #define MAX6675_SS_PIN PD3
220 // #define MAX31865_CS_PIN PD3
221 #endif
222
223 //
224 // Temperature Sensors
225 //
226 #define TEMP_BED_PIN PF3 // TB
227 #if TEMP_SENSOR_0 == 20
228 #define TEMP_0_PIN PF8 // PT100 Connector
229 #else
230 #define TEMP_0_PIN PF4 // TH0
231 #endif
232 #define TEMP_1_PIN PF5 // TH1

```

```

#ifndef MAX31865_CS_PIN
#define MAX31865_MISO_PIN PA6
#define MAX31865_SCK_PIN PA5
#define MAX31865_MOSI_PIN PA7
#define MAX6675_SS_PIN PD3
// #define MAX31865_CS_PIN PD3
#endif

```

At present, to use this module on marlin, you need to define the MAX31865 chip select as MAX6675\_SS\_PIN, compile the bin file, and you can use it after updating

## 五、Precautions:

Please ensure that the power supply is disconnected when wiring or dialing the DIP switch

Because this module uses SPI communication, motherboards that do not support SPI mode pluggable drivers cannot be used directly.