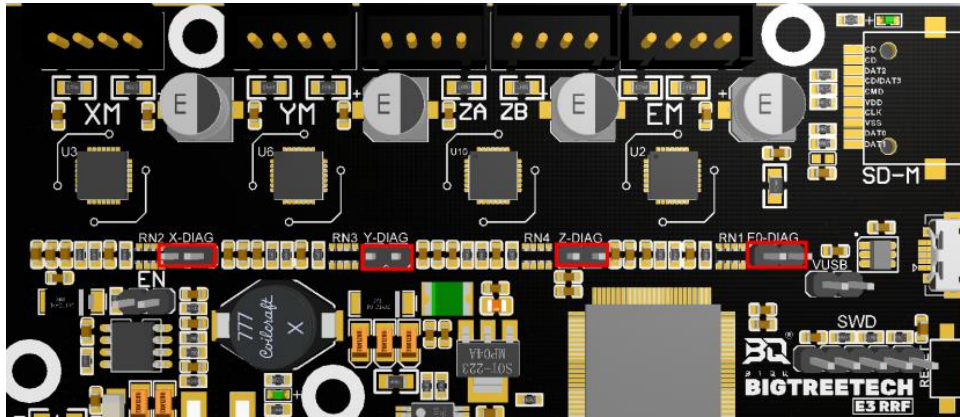


前言

只有您需要 DIY 升级功能您才需要查看此文档，如果您是基础版的机器，直接更新我们 github 中预编译的 firmware.bin 文件即可正常使用。

一、板载 TMC2209 Sensorless homing

1. 接线图



将要使用 Sensorless homing 的轴对应的限位开关从主板上拔出，对应的 DIAG 用跳帽短接起来(挤出机不支持此功能)。

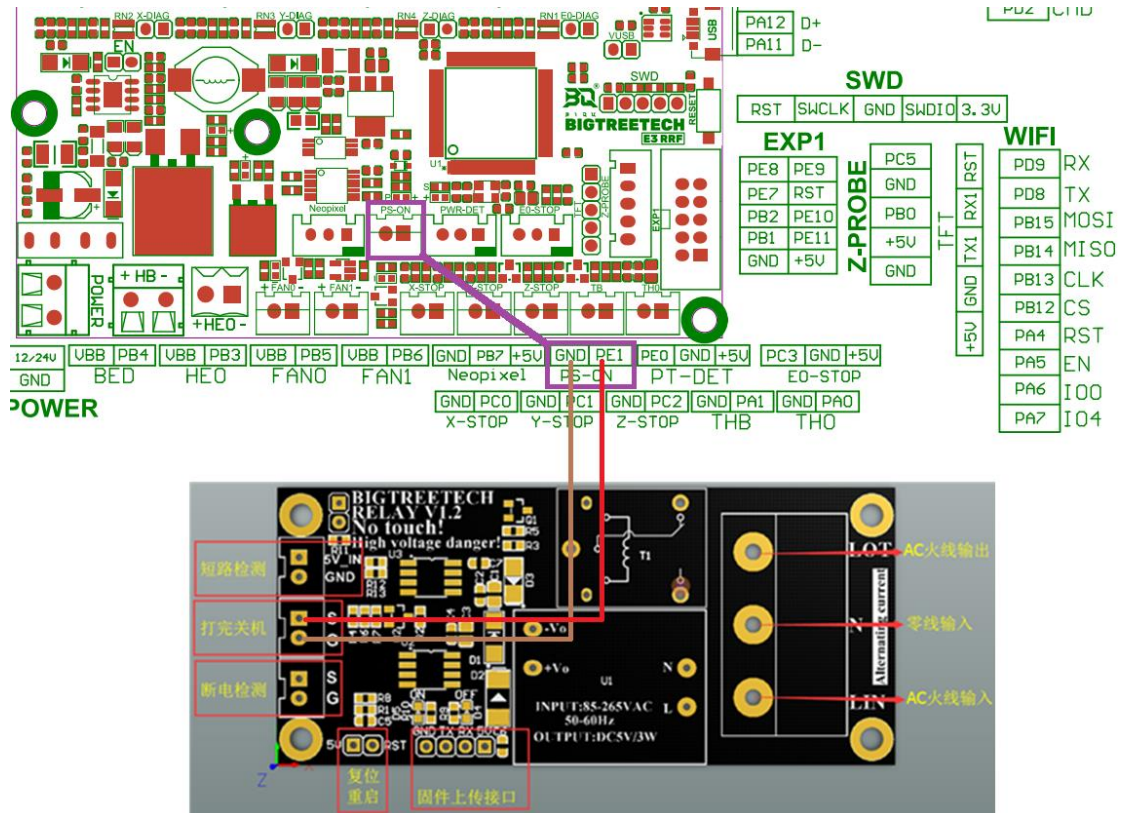
2. 固件设置

```
C Configuration.h C Configuration_adv.h X
Marlin > C Configuration_adv.h > SENSORLESS_HOMING
2686 | #define SENSORLESS_HOMING // StallGuard capable drivers only
2687
2688 | #if EITHER(SENSORLESS_HOMING, SENSORLESS_PROBING)
2689 | // TMC2209: 0...255. TMC2130: -64...63
2690 | #define X_STALL_SENSITIVITY 80
2691 | #define X2_STALL_SENSITIVITY X_STALL_SENSITIVITY
2692 | #define Y_STALL_SENSITIVITY 70
2693 | #define Y2_STALL_SENSITIVITY Y_STALL_SENSITIVITY
2694 | #define Z_STALL_SENSITIVITY 60
2695 | // #define Z2_STALL_SENSITIVITY Z_STALL_SENSITIVITY
2696 | // #define Z3_STALL_SENSITIVITY Z_STALL_SENSITIVITY
2697 | // #define Z4_STALL_SENSITIVITY Z_STALL_SENSITIVITY
2698 | // #define SPI_ENDSTOPS // TMC2130 only
2699 | #define IMPROVE_HOMING_RELIABILITY
2700 | #endif
2701
```

#define SENSORLESS_HOMING // 打开驱动堵转检测作为归零限位开关的功能
#define xxx_STALL_SENSITIVITY 80 // 设置堵转检测的灵敏度，对于 TMC2209 来说，数值越大越灵敏容易误触发，现象为归零的时候轴还没有回到原点就停下来了，数值越小越不灵敏容易不触发，现象为归零时一直撞轴发出“噎噎噎”的声音。我们在 Ender3 上测试的效果，X = 80、Y = 70、Z = 60 比较合适
#define IMPROVE_HOMING_RELIABILITY // 可以在上面单独设置归零时的电流参数 (X_CURRENT_HOME)，以便得到最好的归零效果

二、打完关机模块(Relay V1.2)

1. 接线图



将模块的控制信号线插到主板的 PS-ON 端口中

2. 固件设置

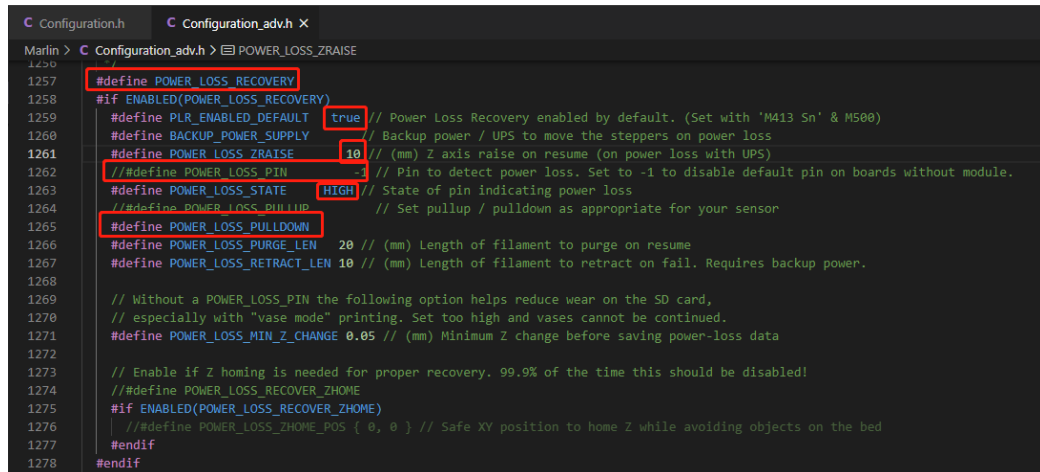
```
Configuration.h Configuration_adv.h
Marlin > Configuration.h > PSU_CONTROL
314 #define PSU_CONTROL
315 #define PSU_NAME "Power Supply"
316
317 #if ENABLED(PSU_CONTROL)
318   #define PSU_ACTIVE_STATE HIGH // Set 'LOW' for ATX, 'HIGH' for X-Box
319
320   // #define PSU_DEFAULT_OFF // Keep power off until enabled directly with M80
321   // #define PSU_POWERUP_DELAY 250 // (ms) Delay for the PSU to warm up to full power
322
323   // #define PSU_POWERUP_GCODE "M355 S1" // G-code to run after power-on (e.g., case light on)
324   // #define PSU_POWEROFF_GCODE "M355 S0" // G-code to run before power-off (e.g., case light off)
325
326   // #define AUTO_POWER_CONTROL // Enable automatic control of the PS_ON pin
327   #if ENABLED(AUTO_POWER_CONTROL)
328     #define AUTO_POWER_FANS // Turn on PSU if fans need power
329     #define AUTO_POWER_E_FANS
330     #define AUTO_POWER_CONTROLLERFAN
331     #define AUTO_POWER_CHAMBER_FAN
332     // #define AUTO_POWER_E_TEMP 50 // (°C) Turn on PSU if any extruder is over this temperature
333     // #define AUTO_POWER_CHAMBER_TEMP 30 // (°C) Turn on PSU if the chamber is over this temperature
334     #define POWER_TIMEOUT 30 // (s) Turn off power if the machine is idle for this duration
335     // #define POWER_OFF_DELAY 60 // (s) Delay of poweroff after M81 command. Useful to let fans run for extra time.
336   #endif
337 #endif
```

#define PSU_CONTROL // 打开控制电源功能，可以通过 M80 开机、M81 关机
#define PSU_ACTIVE_STATE HIGH // 设置开机的电平，我们的 Relay V1.2 模块是高电平开机
低电平关机，所以需要设置为 HIGH，其他的打完关机模块可能逻辑相反，需要根据模块
的说明书设置为正常的逻辑电平

```
#define POWER_LOSS_PIN    -1 // 设置断电检测的信号线，因为我们没有外接检测模块，所以要设置为 -1，意味着没有 POWER_LOSS_PIN
```

我们 github 上的 firmware.bin 已经打开了此种方式,但是由于影响 SD 卡的使用寿命,所以默认是 OFF 关闭的状态,你可以在 12864 屏幕的"Configuration->Power Outage"中开启,"Configuration->Store Settings"保存设置,也可以发送 "M413 S1" gcode 开启,"M500"保存设置。

- 2) 外加类似于 BTT UPS 24V 的模块,断电时给主板提供电源并给主板发送信号,提醒主板保存打印状态,这方式只会在断电时向 SD 卡写入数据,对 SD 卡的使用寿命几乎没有影响。

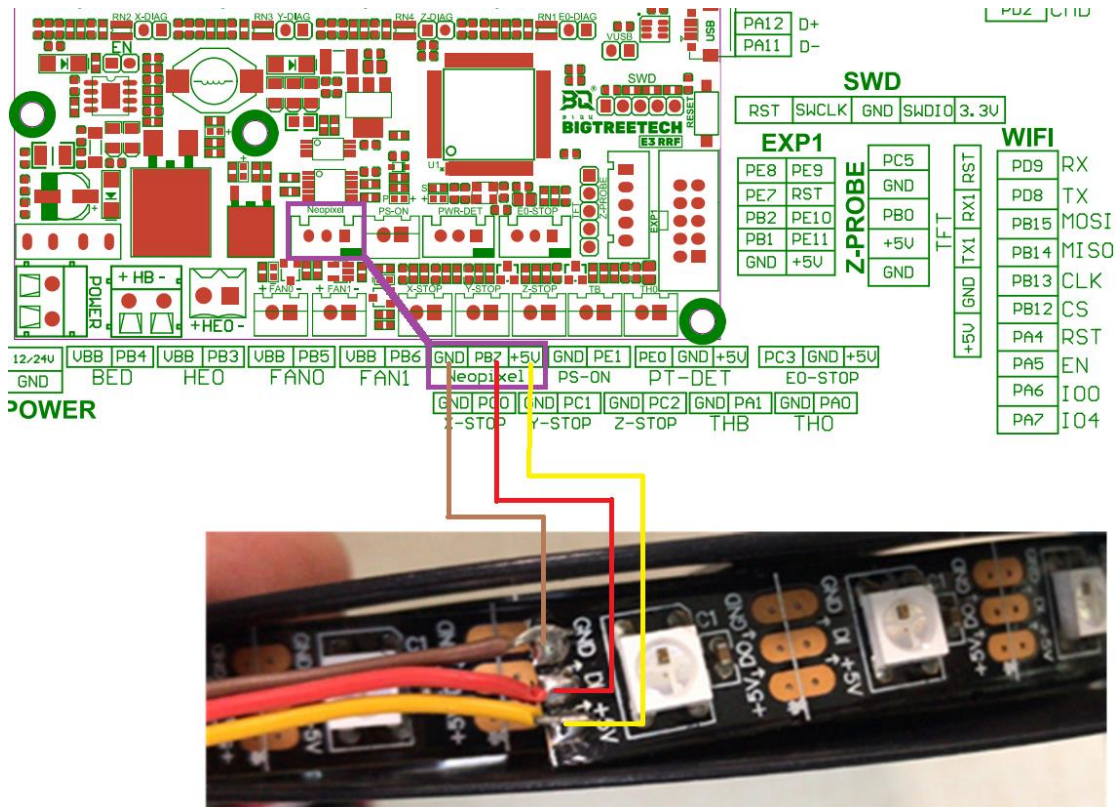


```
C Configuration.h C Configuration_adv.h X
Marlin > C Configuration_adv.h > POWER_LOSS_ZRAISE
1250
1257 #define POWER_LOSS_RECOVERY
1258 #if ENABLED(POWER_LOSS_RECOVERY)
1259 #define PLR_ENABLED_DEFAULT true // Power Loss Recovery enabled by default. (Set with 'M413 Sn' & M500)
1260 #define BACKUP_POWER_SUPPLY // Backup power / UPS to move the steppers on power loss
1261 #define POWER_LOSS_ZRAISE 10 // (mm) Z axis raise on resume (on power loss with UPS)
1262 // #define POWER_LOSS_PIN -1 // Pin to detect power loss. Set to -1 to disable default pin on boards without module.
1263 #define POWER_LOSS_STATE HIGH // State of pin indicating power loss
1264 // #define POWER_LOSS_PULLUP // Set pullup / pulldown as appropriate for your sensor
1265 #define POWER_LOSS_PULLDOWN
1266 #define POWER_LOSS_PURGE_LEN 20 // (mm) Length of filament to purge on resume
1267 #define POWER_LOSS_RETRACT_LEN 10 // (mm) Length of filament to retract on fail. Requires backup power.
1268
1269 // Without a POWER_LOSS_PIN the following option helps reduce wear on the SD card,
1270 // especially with "vase mode" printing. Set too high and vases cannot be continued.
1271 #define POWER_LOSS_MIN_Z_CHANGE 0.05 // (mm) Minimum Z change before saving power-loss data
1272
1273 // Enable if Z homing is needed for proper recovery. 99.9% of the time this should be disabled!
1274 // #define POWER_LOSS_RECOVER_ZHOME
1275 #if ENABLED(POWER_LOSS_RECOVER_ZHOME)
1276 // #define POWER_LOSS_ZHOME_POS { 0, 0 } // Safe XY position to home Z while avoiding objects on the bed
1277 #endif
1278 #endif
```

#define POWER_LOSS_RECOVERY // 在固件中包含断电续打功能
#define PLR_ENABLED_DEFAULT true // true 意味着默认使用此功能
#define POWER_LOSS_ZRAISE 10 // 断电时喷头抬升 10mm 避免喷头烫坏模型
// #define POWER_LOSS_PIN -1 // 在这里屏蔽 POWER_LOSS_PIN 的设置会使用主板 pin 文件中设置正确的信号线
#define POWER_LOSS_STATE HIGH // 断电时模块反馈信号的电平, BTT UPS 24V 正常工作反馈低电平, 断电时反馈高电平, 所以设置为 HIGH

四、RGB 彩灯(WS2812 等)

1. 接线图



将彩灯插到主板的 Neopixel 端口，注意端口的线序为 GND 地线、信号线、+5V 电源线

2. 固件设置

```
C Configuration.h x C Configuration_adv.h
Marlin > C Configuration.h > NEOPIXEL_LED
2638 #define NEOPIXEL_LED
2639 #if ENABLED(NEOPIXEL_LED)
2640 #define NEOPIXEL_TYPE NEO_GRB // NEO_GRB / NEO_RGB - four/three channel driver type (defined in Adafruit_NeoPixel.h)
2641 // #define NEOPIXEL_PIN 4 // LED driving pin
2642 // #define NEOPIXEL2_TYPE NEOPIXEL_TYPE
2643 // #define NEOPIXEL2_PIN 5
2644 #define NEOPIXEL_PIXELS 30 // Number of LEDs in the strip. (Longest strip when NEOPIXEL2_SEPARATE is disabled.)
2645 #define NEOPIXEL_IS_SEQUENTIAL // Sequential display for temperature change - LED by LED. Disable to change all LEDs at once.
2646 #define NEOPIXEL_BRIGHTNESS 127 // Initial brightness (0-255)
2647 #define NEOPIXEL_STARTUP_TEST // Cycle through colors at startup
2648
2649 // Support for second Adafruit NeoPixel LED driver controlled with M150 S1 ...
2650 // #define NEOPIXEL2_SEPARATE
2651 #if ENABLED(NEOPIXEL2_SEPARATE)
2652 #define NEOPIXEL2_PIXELS 15 // Number of LEDs in the second strip
2653 #define NEOPIXEL2_BRIGHTNESS 127 // Initial brightness (0-255)
2654 #define NEOPIXEL2_STARTUP_TEST // Cycle through colors at startup
2655 #else
2656 // #define NEOPIXEL2_INSERIES // Default behavior is NeoPixel 2 in parallel
2657 #endif
2658
2659 // Use a single NeoPixel LED for static (background) lighting
2660 // #define NEOPIXEL_BKGD_LED_INDEX 0 // Index of the LED to use
2661 // #define NEOPIXEL_BKGD_COLOR { 255, 255, 255, 0 } // R, G, B, W
2662 // #define NEOPIXEL_BKGD_ALWAYS_ON // Keep the backlight on when other NeoPixels are off
2663 #endif
```

#define NEOPIXEL_LED //打开 Neopixel 功能

#define NEOPIXEL_TYPE NEO_GRB // 设置彩灯的类型

// #define NEOPIXEL_PIN 4 //在这里屏蔽 PIN 的设置会使用主板 pin 文件中正确的信号线

#define NEOPIXEL_PIXELS 30 // 彩灯的数量

#define NEOPIXEL_STARTUP_TEST // 开机时会依次显示红绿蓝三种颜色便于测试

```

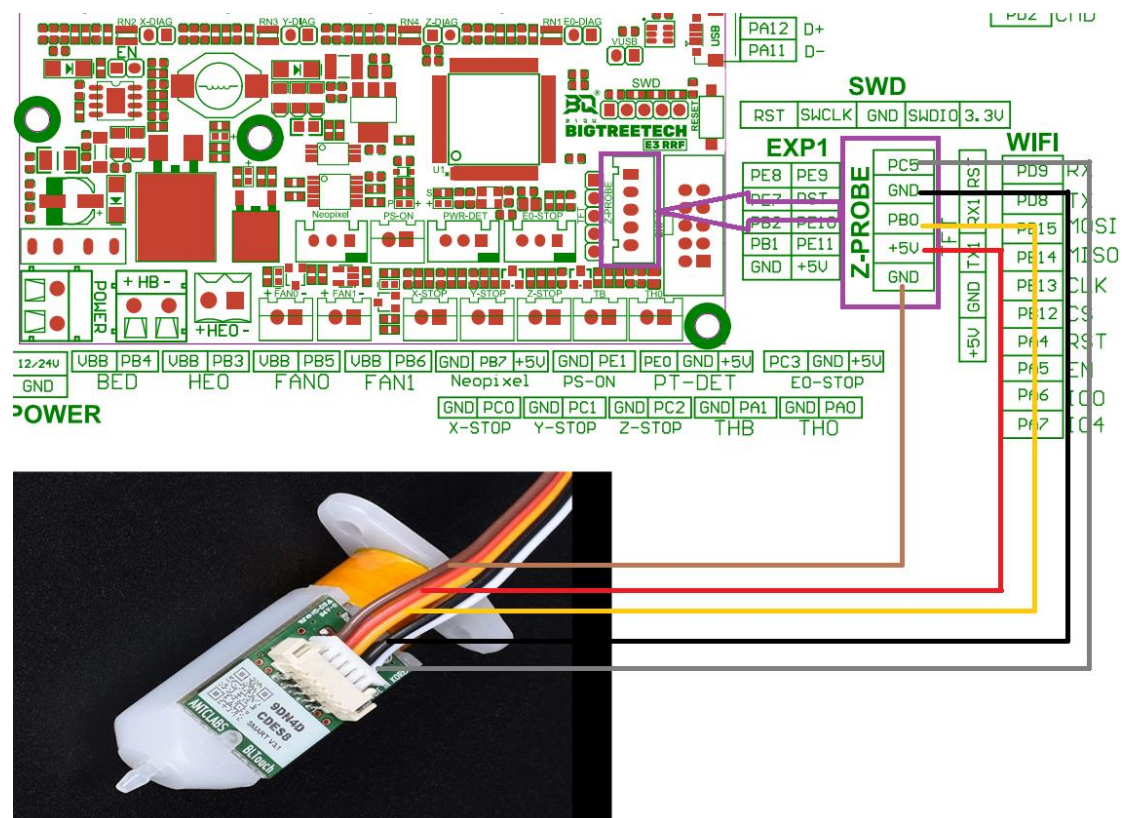
C Configuration.h  C Configuration_adv.h X
Marlin > C Configuration_adv.h > LED_CONTROL_MENU
1128  /**
1129   * LED Control Menu
1130   * Add LED Control to the LCD menu
1131   */
1132  #define LED_CONTROL_MENU
1133  #if ENABLED(LED_CONTROL_MENU)
1134    #define LED_COLOR_PRESETS           // Enable the Preset Color menu option
1135    //#define NEO2_COLOR_PRESETS        // Enable a second NeoPixel Preset Color menu option
1136    #if ENABLED(LED_COLOR_PRESETS)
1137      #define LED_USER_PRESET_RED       255 // User defined RED value
1138      #define LED_USER_PRESET_GREEN     128 // User defined GREEN value
1139      #define LED_USER_PRESET_BLUE      0    // User defined BLUE value
1140      #define LED_USER_PRESET_WHITE     255 // User defined WHITE value
1141      #define LED_USER_PRESET_BRIGHTNESS 255 // User defined intensity
1142      //#define LED_USER_PRESET_STARTUP   // Have the printer display the user preset color on startup
1143    #endif
1144    #if ENABLED(NEO2_COLOR_PRESETS)
1145      #define NEO2_USER_PRESET_RED       255 // User defined RED value
1146      #define NEO2_USER_PRESET_GREEN     128 // User defined GREEN value
1147      #define NEO2_USER_PRESET_BLUE      0    // User defined BLUE value
1148      #define NEO2_USER_PRESET_WHITE     255 // User defined WHITE value
1149      #define NEO2_USER_PRESET_BRIGHTNESS 255 // User defined intensity
1150      //#define NEO2_USER_PRESET_STARTUP   // Have the printer display the user preset color on startup for the second strip
1151    #endif
1152  #endif

```

#define LED_CONTROL_MENU // 在屏幕上增加控制 LED 颜色的菜单

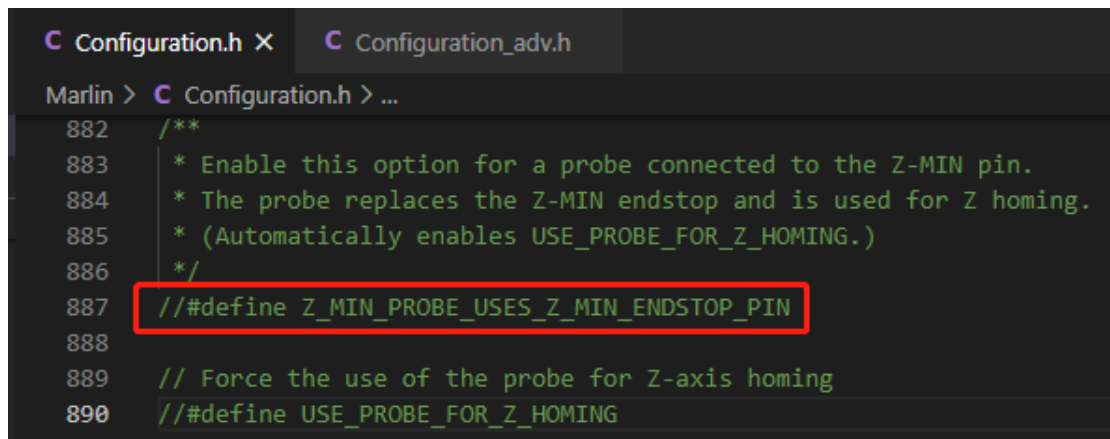
五、Bltouch

1. 接线图



将 Bltouch 的一根 3pin 一根 2pin 的信号线，分别插到主板的 5pin Z-PROBE 端口

2. 固件设置

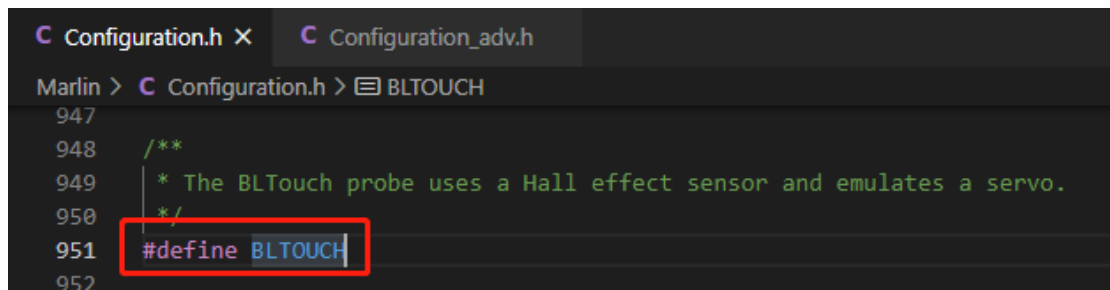


The screenshot shows the Marlin Configuration.h file in a code editor. The file is open at line 882. The code is as follows:

```
882  /**
883   * Enable this option for a probe connected to the Z-MIN pin.
884   * The probe replaces the Z-MIN endstop and is used for Z homing.
885   * (Automatically enables USE_PROBE_FOR_Z_HOMING.)
886   */
887  // #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
888
889  // Force the use of the probe for Z-axis homing
890  // #define USE_PROBE_FOR_Z_HOMING
```

The line `// #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN` is highlighted with a red box.

`// #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN` 屏蔽把 Z_PROBE_PIN 重映射到 Z_MIN 端口上



The screenshot shows the Marlin Configuration.h file in a code editor. The file is open at line 947. The code is as follows:

```
947
948  /**
949   * The BLTouch probe uses a Hall effect sensor and emulates a servo.
950   */
951  #define BLTOUCH
952
```

The line `#define BLTOUCH` is highlighted with a red box.

`#define BLTOUCH` // 打开 BLTOUCH 功能

```
Configuration.h X Configuration_adv.h
Marlin > Configuration.h > ...
1025 * - Probe in FRONT of the Nozzle has a Negative Y offset
1026 *
1027 * Some examples:
1028 * #define NOZZLE_TO_PROBE_OFFSET { 10, 10, -1 } // Example "1"
1029 * #define NOZZLE_TO_PROBE_OFFSET { -10, 5, -1 } // Example "2"
1030 * #define NOZZLE_TO_PROBE_OFFSET { 5, -5, -1 } // Example "3"
1031 * #define NOZZLE_TO_PROBE_OFFSET { -15, -10, -1 } // Example "4"
1032 *
1033 * +-- BACK ---+
1034 * |      [+]      |
1035 * L |          1 | R <-- Example "1" (right+, back+)
1036 * E | 2          | I <-- Example "2" ( left-, back+)
1037 * F | [-] N [+] | G <-- Nozzle
1038 * T |          3 | H <-- Example "3" (right+, front-)
1039 * | 4          | T <-- Example "4" ( left-, front-)
1040 * |      [-]      |
1041 * O-- FRONT ---+
1042 */
1043 #define NOZZLE_TO_PROBE_OFFSET { -40, -10, -1.85 }
1044
1045 // Most probes should stay away from the edges of the bed, but
1046 // with NOZZLE_AS_PROBE this can be negative for a wider probing area.
1047 #define PROBING_MARGIN 10
1048
1049 // X and Y axis travel speed (mm/min) between probes
1050 #define XY_PROBE_FEEDRATE (133*60)
1051
1052 // Feedrate (mm/min) for the first approach when double-probing (MULTIPLE_PROBING == 2)
1053 #define Z_PROBE_FEEDRATE_FAST (4*60)
1054
1055 // Feedrate (mm/min) for the "accurate" probe of each point
1056 #define Z_PROBE_FEEDRATE_SLOW (Z_PROBE_FEEDRATE_FAST / 2)
1057
```

#define NOZZLE_TO_PROBE_OFFSET { -40, -10, -1.85 } // 设置 Bltoch 探针相对于喷嘴的偏移量
#define PROBING_MARGIN 10 // 设置调平探测的范围，例如 Ender3 的平台范围为 0 - 235，
PROBING_MARGIN = 10 意味着调平探测的范围为 10 - 225

```
Configuration.h X Configuration_adv.h
Marlin > Configuration.h > ...
1372 */
1373 // #define AUTO_BED_LEVELING_3POINT
1374 // #define AUTO_BED_LEVELING_LINEAR
1375 #define AUTO_BED_LEVELING_BILINEAR
1376 // #define AUTO_BED_LEVELING_UBL
1377 // #define MESH_BED_LEVELING
1378
1379 /**
1380 * Normally G28 leaves leveling disabled on completion. Enable one of
1381 * these options to restore the prior leveling state or to always enable
1382 * leveling immediately after G28.
1383 */
1384 #define RESTORE_LEVELING_AFTER_G28
1385 // #define ENABLE_LEVELING_AFTER_G28
1386
```

#define AUTO_BED_LEVELING_BILINEAR // 设置调平策略
#define RESTORE_LEVELING_AFTER_G28 // 归零之后自动重新加载调平补偿


```
C Configuration.h X C Configuration_adv.h
Marlin > C Configuration.h > AUTO_BED_LEVELING_BILINEAR
1430 #endif
1431
1432 #endif
1433
1434 #if EITHER(AUTO_BED_LEVELING_LINEAR, AUTO_BED_LEVELING_BILINEAR)
1435
1436 // Set the number of grid points per dimension.
1437 #define GRID_MAX_POINTS_X 5
1438 #define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X
1439
1440 // Probe along the Y axis, advancing X after each column
1441 //#define PROBE_Y_FIRST
1442
1443 #if ENABLED(AUTO_BED_LEVELING_BILINEAR)
1444
1445 // Beyond the probed grid, continue the implied tilt?
1446 // Default is to maintain the height of the nearest edge.
1447 #define EXTRAPOLATE_BEYOND_GRID
1448
1449 //
1450 // Experimental Subdivision of the grid by Catmull-Rom method.
1451 // Synthesizes intermediate points to produce a more detailed mesh.
1452 //
1453 //#define ABL_BILINEAR_SUBDIVISION
1454 #if ENABLED(ABL_BILINEAR_SUBDIVISION)
1455 // Number of subdivisions between probe points
1456 #define BILINEAR_SUBDIVISIONS 3
1457 #endif
1458
1459 #endif
```

#define GRID_MAX_POINTS_X 5 // 设置调平探测的点数， X 轴探测 5 个点

#define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X // Y 轴探测 5 个点

如果你不想用 Z 轴机械开关做为限位开关，而是用 Bltouch 作为 Z 轴限位开关，不需要更改 Bltouch 的接线，只需要修改固件的设置即可

```
C Configuration.h X C Configuration_adv.h
Marlin > C Configuration.h > USE_PROBE_FOR_Z_HOMING
882 /**
883  * Enable this option for a probe connected to the Z-MIN pin.
884  * The probe replaces the Z-MIN endstop and is used for Z homing.
885  * (Automatically enables USE_PROBE_FOR_Z_HOMING.)
886  */
887 //#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN
888
889 // Force the use of the probe for Z-axis homing
890 #define USE_PROBE_FOR_Z_HOMING
891
```

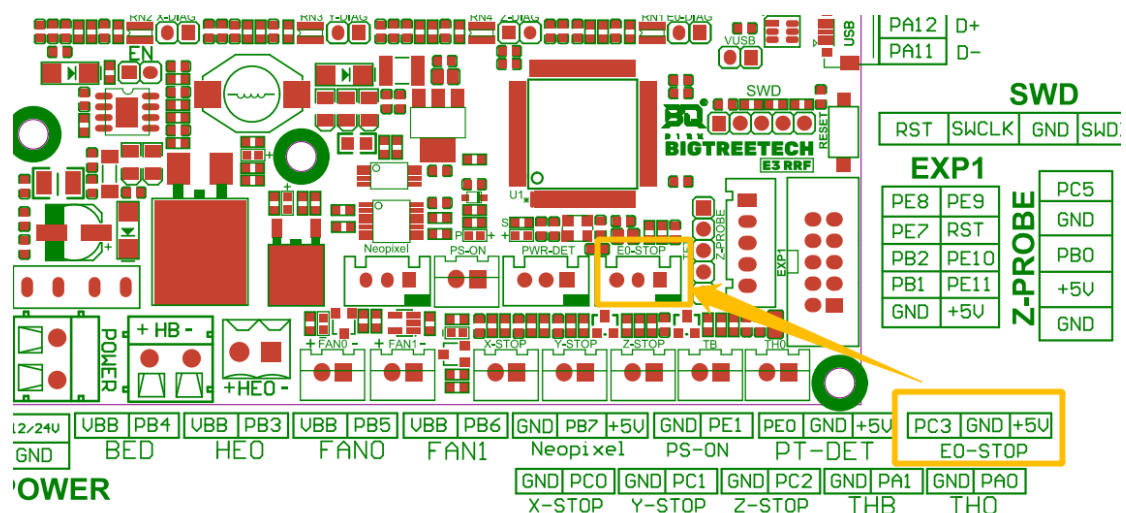
#define USE_PROBE_FOR_Z_HOMING // 使用 Z Probe(Bltouch) 作为 Z 轴归零限位开关

```
Configuration.h X Configuration_adv.h
Marlin > Configuration.h > Z_SAFE_HOMING
1556
1557 // Use "Z Safe Homing" to avoid homing with a Z probe outside the bed area.
1558 //
1559 // With this feature enabled:
1560 //
1561 // - Allow Z homing only after X and Y homing AND stepper drivers still enabled.
1562 // - If stepper drivers time out, it will need X and Y homing again before Z homing.
1563 // - Move the Z probe (or nozzle) to a defined XY point before Z Homing.
1564 // - Prevent Z homing when the Z probe is outside bed area.
1565 //
1566 #define Z_SAFE_HOMING
1567
1568 #if ENABLED(Z_SAFE_HOMING)
1569   #define Z_SAFE_HOMING_X_POINT X_CENTER // X point for Z homing
1570   #define Z_SAFE_HOMING_Y_POINT Y_CENTER // Y point for Z homing
1571 #endif
1572
```

#define Z_SAFE_HOMING // Z 轴归零时，将 X, Y 移动到指定的坐标(通常是平台中心)，保证 Z 轴归零的时候，Z Probe(Bltouch)的探针在平台的范围内。

六、耗材检测模块

1. 接线图



2. 固件设置

此主板目前支持两种耗材检测模块

- 1) 普通的断料检测模块，此类模块一般是由机械开关设计而成的，模块给主板一个恒定的高低电平代表耗材的状态

```
Configuration.h X Configuration_adv.h
Marlin > Configuration.h > FILAMENT_RUNOUT_SENSOR
1273
1274 #define FILAMENT_RUNOUT_SENSOR
1275 #if ENABLED(FILAMENT_RUNOUT_SENSOR)
1276   #define FIL_RUNOUT_ENABLED_DEFAULT true // Enable the sensor on startup. Override with M412 followed by M500.
1277   #define NUM_RUNOUT_SENSORS 1 // Number of sensors, up to one per extruder. Define a FIL_RUNOUT#_PIN for each.
1278   #define FIL_RUNOUT_STATE LOW // Pin state indicating that filament is NOT present.
1279   #define FIL_RUNOUT_PULLUP // Use internal pullup for filament runout pins.
1280   // #define FIL_RUNOUT_PULLDOWN // Use internal pulldown for filament runout pins.
1281   // #define WATCH_ALL_RUNOUT_SENSORS // Execute runout script on any triggering sensor, not only for the active extruder.
1282   // This is automatically enabled for MIXING_EXTRUDERS.

```

#define FILAMENT_RUNOUT_SENSOR // 在固件中包含耗材检测的功能

#define FIL_RUNOUT_ENABLED_DEFAULT true // 默认是 ON 打开的状态，你可以在

12864 屏幕的“Configuration->Runout Sensor”中关闭,“Configuration->Store Settings”保存设置,也可以发送“M412 S0” gcode 关闭,“M500”保存设置。

#define NUM_RUNOUT_SENSORS 1 // 耗材检测传感器的数量

#define FIL_RUNOUT_STATE LOW // 耗材异常时的电平状态,根据模块实际情况设置,如果耗材异常时模块发出低电平就设置为 LOW

- 2) 我司的智能耗材检测模块(Smart Filament Sensor/SFS),此模块在耗材正常通过时会不断的发出跳变的电平信号,当堵料/断料等异常情况出现,耗材无法正常的通过 SFS,模块就无法发出跳变的信号给主板,主板从而得知耗材异常。

```
C Configuration.h x C Configuration_adv.h
Marlin > C Configuration.h > FILAMENT_MOTION_SENSOR
1273 #define FILAMENT_RUNOUT_SENSOR
1274 #if ENABLED(FILAMENT_RUNOUT_SENSOR)
1275   #define FIL_RUNOUT_ENABLED_DEFAULT true // Enable the sensor on startup. Override with M412 followed by M500.
1276   #define NUM_RUNOUT_SENSORS 1 // Number of sensors, up to one per extruder. Define a FIL_RUNOUT#_PIN for each.
1277
1278   #define FIL_RUNOUT_STATE LOW // Pin state indicating that filament is NOT present.
1279   #define FIL_RUNOUT_PULLUP // Use internal pullup for filament runout pins...
1283
1284   // Override individually if the runout sensors vary...
1288
1289   // #define FIL_RUNOUT2_STATE LOW...
1292
1293   // #define FIL_RUNOUT3_STATE LOW...
1296
1297   // #define FIL_RUNOUT4_STATE LOW...
1300
1301   // #define FIL_RUNOUT5_STATE LOW...
1304
1305   // #define FIL_RUNOUT6_STATE LOW...
1308
1309   // #define FIL_RUNOUT7_STATE LOW...
1312
1313   // #define FIL_RUNOUT8_STATE LOW...
1316
1317   // Commands to execute on filament runout...
1320   #define FILAMENT_RUNOUT_SCRIPT "M600"
1321
1322   // After a runout is detected, continue printing this length of filament
1323   // before executing the runout script. Useful for a sensor at the end of
1324   // a feed tube. Requires 4 bytes SRAM per sensor, plus 4 bytes overhead.
1325   #define FILAMENT_RUNOUT_DISTANCE_MM 7
1326
1327   #ifdef FILAMENT_RUNOUT_DISTANCE_MM
1328     // Enable this option to use an encoder disc that toggles the runout pin
1329     // as the filament moves. (Be sure to set FILAMENT_RUNOUT_DISTANCE_MM
1330     // long enough to avoid false positives.)
1331     #define FILAMENT_MOTION_SENSOR
1332   #endif
1333 #endif
1334
```

#define FILAMENT_MOTION_SENSOR // 设置耗材传感器类型

#define FILAMENT_RUNOUT_DISTANCE_MM 7 // 设置检测灵敏度, SFS 推荐设置为 7mm, 耗材 7mm 内如果没有电平跳变就意味着耗材异常

耗材检测还需要通过以下两个地方来设置耗材异常暂停后的动作

```
Configuration.h X Configuration_adv.h
Marlin > C Configuration.h > NOZZLE_PARK_FEATURE
1696 /**
1697  * Nozzle Park
1698  *
1699  * Park the nozzle at the given XYZ position on idle or G27.
1700  *
1701  * The "P" parameter controls the action applied to the Z axis:
1702  *
1703  * P0 (Default) If Z is below park Z raise the nozzle.
1704  * P1 Raise the nozzle always to Z-park height.
1705  * P2 Raise the nozzle by Z-park amount, limited to Z_MAX_POS.
1706  */
1707 #define NOZZLE_PARK_FEATURE
1708
1709 #if ENABLED(NOZZLE_PARK_FEATURE)
1710 // Specify a park position as { X, Y, Z_raise }
1711 #define NOZZLE_PARK_POINT { (X_MIN_POS + 10), (Y_MAX_POS - 10), 20 }
1712 // #define NOZZLE_PARK_X_ONLY // X move only is required to park
1713 // #define NOZZLE_PARK_Y_ONLY // Y move only is required to park
1714 #define NOZZLE_PARK_Z_RAISE_MIN 2 // (mm) Always raise Z by at least this distance
1715 #define NOZZLE_PARK_XY_FEEDRATE 100 // (mm/s) X and Y axes feedrate (also used for delta Z axis)
1716 #define NOZZLE_PARK_Z_FEEDRATE 5 // (mm/s) Z axis feedrate (not used for delta printers)
1717 #endif
1718
```

#define NOZZLE_PARK_FEATURE // 喷头暂停功能

```
Configuration.h Configuration_adv.h X
Marlin > C Configuration_adv.h > ADVANCED_PAUSE_FEATURE
2180 /**
2181  * Advanced Pause
2182  * Experimental feature for filament change support and for parking the nozzle when paused.
2183  * Adds the GCode M600 for initiating filament change.
2184  * If PARK_HEAD_ON_PAUSE enabled, adds the GCode M125 to pause printing and park the nozzle.
2185  *
2186  * Requires an LCD display.
2187  * Requires NOZZLE_PARK_FEATURE.
2188  * This feature is required for the default FILAMENT_RUNOUT_SCRIPT.
2189  */
2190 #define ADVANCED_PAUSE_FEATURE
2191 #if ENABLED(ADVANCED_PAUSE_FEATURE)
2192 #define PAUSE_PARK_RETRACT_FEEDRATE 60 // (mm/s) Initial retract feedrate.
2193 #define PAUSE_PARK_RETRACT_LENGTH 2 // (mm) Initial retract.
2194 // This short retract is done immediately, before parking the nozzle.
2195 #define FILAMENT_CHANGE_UNLOAD_FEEDRATE 10 // (mm/s) Unload filament feedrate. This can be pretty fast.
2196 #define FILAMENT_CHANGE_UNLOAD_ACCEL 25 // (mm/s^2) Lower acceleration may allow a faster feedrate.
2197 #define FILAMENT_CHANGE_UNLOAD_LENGTH 400 // (mm) The length of filament for a complete unload.
2198 // For Bowden, the full length of the tube and nozzle.
2199 // For direct drive, the full length of the nozzle.
2200 // Set to 0 for manual unloading.
2201 #define FILAMENT_CHANGE_SLOW_LOAD_FEEDRATE 6 // (mm/s) Slow move when starting load.
2202 #define FILAMENT_CHANGE_SLOW_LOAD_LENGTH 0 // (mm) Slow length, to allow time to insert material.
2203 // 0 to disable start loading and skip to fast load only
2204 #define FILAMENT_CHANGE_FAST_LOAD_FEEDRATE 6 // (mm/s) Load filament feedrate. This can be pretty fast.
2205 #define FILAMENT_CHANGE_FAST_LOAD_ACCEL 25 // (mm/s^2) Lower acceleration may allow a faster feedrate.
2206 #define FILAMENT_CHANGE_FAST_LOAD_LENGTH 350 // (mm) Load length of filament, from extruder gear to nozzle.
2207 // For Bowden, the full length of the tube and nozzle.
2208 // For direct drive, the full length of the nozzle.
2209 // #define ADVANCED_PAUSE_CONTINUOUS_PURGE // Purge continuously up to the purge length until interrupted.
2210 #define ADVANCED_PAUSE_PURGE_FEEDRATE 3 // (mm/s) Extrude feedrate (after loading). Should be slower than load feedrate.
2211 #define ADVANCED_PAUSE_PURGE_LENGTH 50 // (mm) Length to extrude after loading.

```

#define NOZZLE_PARK_POINT { (X_MIN_POS + 10), (Y_MAX_POS - 10), 20 } //设置喷头暂停时的X、Y 的坐标以及 Z 轴抬升的高度

#define ADVANCED_PAUSE_FEATURE // 可以设置暂停时耗材回抽的长度及速度，继续打印后耗材挤出的长度和速度等参数

七、 风扇设置

Ender3 机器默认情况下，喷头喉管的散热风扇时常开的，直接接到 24V 电源上，主板上的 FAN1 端口时可控风扇，默认情况下将主板的散热风扇接到 FAN1 端口，通过固件将其设置为 CONTROLLER_FAN 电机工作或者热床加热时，此风扇就会打开给主板散热

```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > USE_CONTROLLER_FAN

482
483 /**
484  * Controller Fan
485  * To cool down the stepper drivers and MOSFETs.
486  *
487  * The fan turns on automatically whenever any driver is enabled and turns
488  * off (or reduces to idle speed) shortly after drivers are turned off.
489  */
490 #define USE_CONTROLLER_FAN
491 #if ENABLED(USE_CONTROLLER_FAN)
492   // #define CONTROLLER_FAN_PIN -1 // Set a custom pin for the controller fan
493   // #define CONTROLLER_FAN_USE_Z_ONLY // With this option only the Z axis is considered
494   // #define CONTROLLER_FAN_IGNORE_Z // Ignore Z stepper. Useful when stepper timeout is disabled.
495   #define CONTROLLERFAN_SPEED_MIN 0 // (0-255) Minimum speed. (If set below this value the fan is turned off.)
496   #define CONTROLLERFAN_SPEED_ACTIVE 255 // (0-255) Active speed, used when any motor is enabled
497   #define CONTROLLERFAN_SPEED_IDLE 0 // (0-255) Idle speed, used when motors are disabled
498   #define CONTROLLERFAN_IDLE_TIME 60 // (seconds) Extra time to keep the fan running after disabling motors
499   #define CONTROLLER_FAN_EDITABLE // Enable M710 configurable settings
500   #if ENABLED(CONTROLLER_FAN_EDITABLE)
501     #define CONTROLLER_FAN_MENU // Enable the Controller Fan submenu
502   #endif
503 #endif
504
```

如果您想要喷头喉管的散热风扇也变成受控的，可以将喉管散热风扇跟主板散热风扇接在一起，都插到 FAN1，将 #define USE_CONTROLLER_FAN 关闭，设置 E0_AUTO_FAN_PIN

```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > E0_AUTO_FAN_PIN

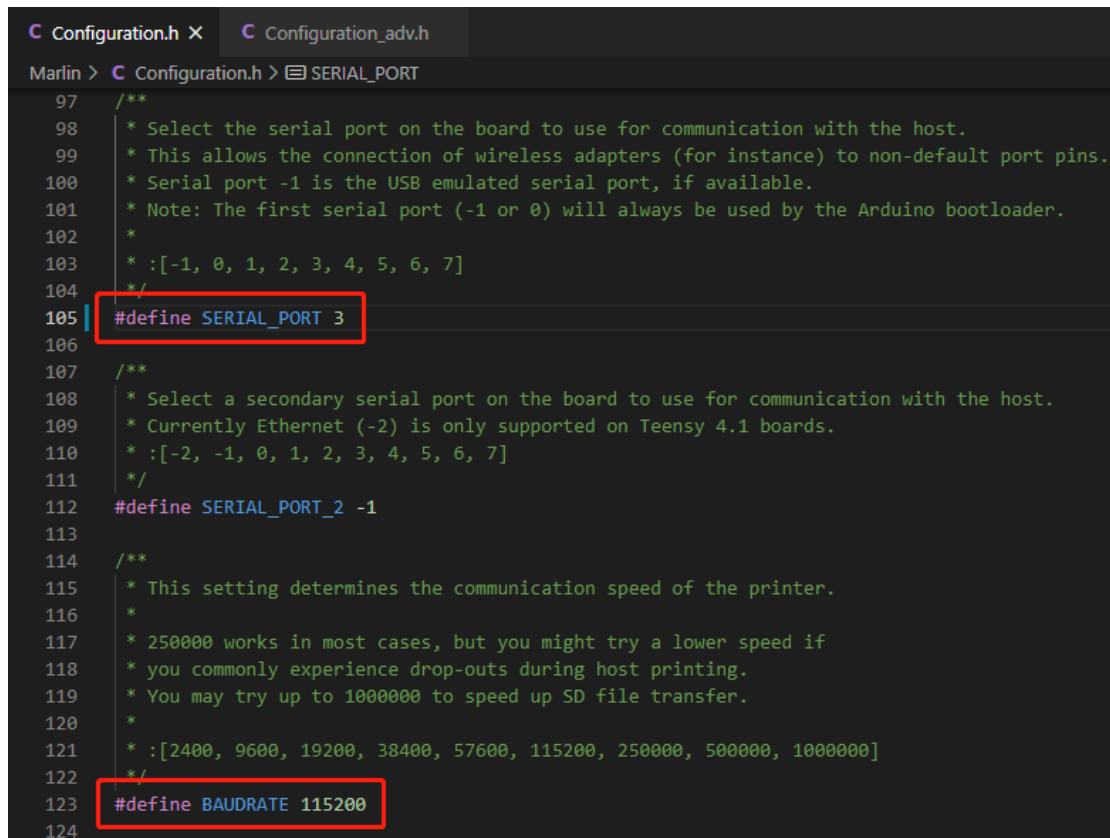
477 /**
478  * Extruder cooling fans
479  *
480  * Extruder auto fans automatically turn on when their extruders'
481  * temperatures go above EXTRUDER_AUTO_FAN_TEMPERATURE.
482  *
483  * Your board's pins file specifies the recommended pins. Override those here
484  * or set to -1 to disable completely.
485  *
486  * Multiple extruders can be assigned to the same pin in which case
487  * the fan will turn on when any selected extruder is above the threshold.
488  */
489 #define E0_AUTO_FAN_PIN PB6
490 #define E1_AUTO_FAN_PIN -1
491 #define E2_AUTO_FAN_PIN -1
492 #define E3_AUTO_FAN_PIN -1
493 #define E4_AUTO_FAN_PIN -1
494 #define E5_AUTO_FAN_PIN -1
495 #define E6_AUTO_FAN_PIN -1
496 #define E7_AUTO_FAN_PIN -1
497 #define CHAMBER_AUTO_FAN_PIN -1
498
499 #define EXTRUDER_AUTO_FAN_TEMPERATURE 50
500 #define EXTRUDER_AUTO_FAN_SPEED 255 // 255 == full speed
501 #define CHAMBER_AUTO_FAN_TEMPERATURE 30
502 #define CHAMBER_AUTO_FAN_SPEED 255
503
```

#define E0_AUTO_FAN_PIN PB6 // 将 PB6(FAN1) 设置为 E0 AUTO FAN

#define EXTRUDER_AUTO_FAN_TEMPERATURE 50 // 喷头温度超过 50 摄氏度，开启散热风扇

八、ESP3D

板载有 ESP8266 模组，所以无需额外的硬件既可使用 ESP3D 的 wifi 控制界面，Marlin 中只需设置正确的“SERIAL_PORT”和“BAUDRATE”即可。主板上 ESP8266 与 Marlin 通信的串口是 UART3，所以将 SERIAL_PORT 设置为 3。



```
Configuration.h X Configuration_adv.h
Marlin > Configuration.h > SERIAL_PORT
97  /**
98  * Select the serial port on the board to use for communication with the host.
99  * This allows the connection of wireless adapters (for instance) to non-default port pins.
100  * Serial port -1 is the USB emulated serial port, if available.
101  * Note: The first serial port (-1 or 0) will always be used by the Arduino bootloader.
102  *
103  * :[-1, 0, 1, 2, 3, 4, 5, 6, 7]
104  */
105  #define SERIAL_PORT 3
106
107  /**
108  * Select a secondary serial port on the board to use for communication with the host.
109  * Currently Ethernet (-2) is only supported on Teensy 4.1 boards.
110  * :[-2, -1, 0, 1, 2, 3, 4, 5, 6, 7]
111  */
112  #define SERIAL_PORT_2 -1
113
114  /**
115  * This setting determines the communication speed of the printer.
116  *
117  * 250000 works in most cases, but you might try a lower speed if
118  * you commonly experience drop-outs during host printing.
119  * You may try up to 1000000 to speed up SD file transfer.
120  *
121  * :[2400, 9600, 19200, 38400, 57600, 115200, 250000, 500000, 1000000]
122  */
123  #define BAUDRATE 115200
124
```

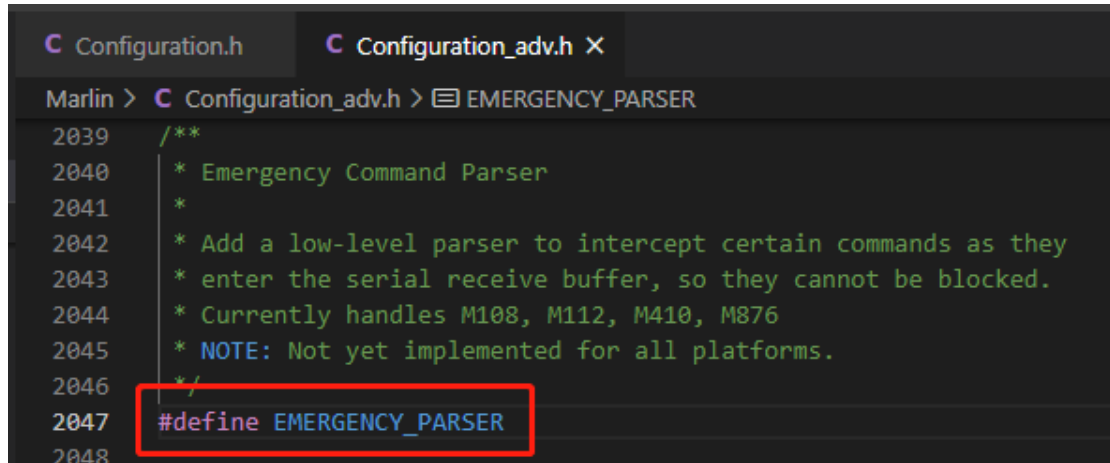
你可以在 <https://github.com/luc-github/ESP3D> 中获取最新的 ESP3D 固件，编译出您自己的二进制文件，将其重命名为“ESP3D.bin”然后复制到 microSD 卡的根目录中，插到主板上然后 Reset，主板中的引导程序会自动将 ESP3D.bin 更新到 ESP8266 中，更新完成后文件会被重命名为“ESP3D.CUR”

注意事项:

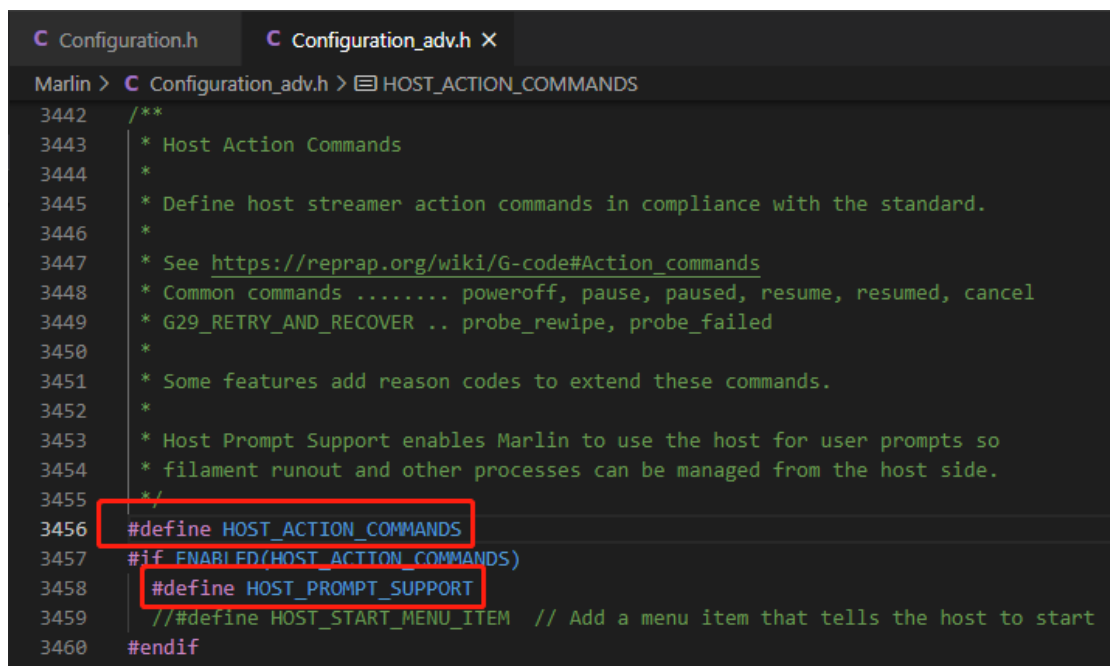
如果使用的是 BTT 的串口触控屏，并且将上述各种扩展模块接到了主板上，需要打开

#define EMERGENCY_PARSER

#define HOST_ACTION_COMMANDS



```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > EMERGENCY_PARSER
2039 /**
2040  * Emergency Command Parser
2041  *
2042  * Add a low-level parser to intercept certain commands as they
2043  * enter the serial receive buffer, so they cannot be blocked.
2044  * Currently handles M108, M112, M410, M876
2045  * NOTE: Not yet implemented for all platforms.
2046  */
2047 #define EMERGENCY_PARSER
2048
```



```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > HOST_ACTION_COMMANDS
3442 /**
3443  * Host Action Commands
3444  *
3445  * Define host streamer action commands in compliance with the standard.
3446  *
3447  * See https://reprap.org/wiki/G-code#Action\_commands
3448  * Common commands ..... poweroff, pause, paused, resume, resumed, cancel
3449  * G29_RETRY_AND_RECOVER .. probe_rewipe, probe_failed
3450  *
3451  * Some features add reason codes to extend these commands.
3452  *
3453  * Host Prompt Support enables Marlin to use the host for user prompts so
3454  * filament runout and other processes can be managed from the host side.
3455  */
3456 #define HOST_ACTION_COMMANDS
3457 #if ENABLED(HOST_ACTION_COMMANDS)
3458   #define HOST_PROMPT_SUPPORT
3459   // #define HOST_START_MENU_ITEM // Add a menu item that tells the host to start
3460 #endif
```

并且在触控屏的 config.ini 文件中设置

start_gcode_enabled:1

end_gcode_enabled:1

cancel_gcode_enabled:1

```
config.ini X
C: > Users > Administrator > Desktop > config.ini
606 ##### Default Start Gcode Status
607 # Options: [enable: 1, disable: 0]
608 start_gcode_enabled:1
609
610 ##### Default End Gcode Status
611 # Options: [enable: 1, disable: 0]
612 end_gcode_enabled:1
613
614 ##### Default Cancel Gcode Status
615 # Options: [enable: 1, disable: 0]
616 cancel_gcode_enabled:1
617
618 ##### Start Gcode
619 # This gcode will runs before starting a print if `start_gcode_enabled` is enabled.
620 # Value range: [max 75 characters]
621 start_gcode:G28 XY R20\nM75\n
622
623 ##### End Gcode
624 # This gcode will runs after a print is completed if `end_gcode_enabled` is enabled.
625 # Value range: [max 75 characters]
626 end_gcode:M77\nM104 S0\nM140 S0\nM107\nM18\n
627
628 ##### Cancel Gcode
629 # This gcode will runs when a print is canceled if `cancel_gcode_enabled` is enabled.
630 # Value range: [max 75 characters]
631 cancel_gcode:M77\nM104 S0\nM140 S0\nG28 XY R10\nM107\nM18\n
632
```

断电续打模块跟触控屏兼容，还需要屏幕上额外的设置

```
config.ini X
C: > Users > Administrator > Desktop > config.ini
486
487 ##### Default Power Loss Recovery Mode
488 # Enabled by default.
489 # Disable to reduce the loss of SD card or U disk.
490 # Options: [enable: 1, disable: 0]
491 pl_recovery_en:1
492
493 ##### Power Loss Recovery Homing
494 # Home before power loss recovery.
495 # Options: [enable: 1, disable: 0]
496 pl_recovery_home:0
497
498 ##### Power Loss Z Raise
499 # Raise Z axis on resume (on power loss with UPS).
500 # Unit: [height in mm]
501 pl_z_raise:10
502
503 ##### BTT UPS Support
504 # Enable BTT UPS.
505 # Options: [enable: 1, disable: 0]
506 btt_mini_ups:1
507
```

pl_z_raise 要跟 Marlin 中设置的#define POWER_LOSS_ZRAISE 一样高

如果智能耗材检测模块接到触控屏上，Marlin 中需要使能 “#define M114_DETAIL” 并且禁用 “#define LIN_ADVANCE” 功能，当前 Marlin 中的 LIN_ADVANCE 会导致 M114 E 反馈的数据不正常

```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > M114_DETAIL
3318
3319 // Extra options for the M114 "Current Position" report
3320 #define M114_DETAIL // Use 'M114' for details to check planner calculations
3321 // #define M114_REALTIME // Real current position based on forward kinematics
3322 // #define M114_LEGACY // M114 used to synchronize on every call. Enable if needed.
3323
3324 #define REPORT_FAN_CHANGE // Report the new fan speed when changed by M106 (and others)
3325
```

```
Configuration.h Configuration_adv.h X
Marlin > Configuration_adv.h > ...
1728 /**
1729  * Linear Pressure Control v1.5
1730  *
1731  * Assumption: advance [steps] = k * (delta velocity [steps/s])
1732  * K=0 means advance disabled.
1733  *
1734  * NOTE: K values for LIN_ADVANCE 1.5 differ from earlier versions!
1735  *
1736  * Set K around 0.22 for 3mm PLA Direct Drive with ~6.5cm between the drive gear and heatbreak.
1737  * Larger K values will be needed for flexible filament and greater distances.
1738  * If this algorithm produces a higher speed offset than the extruder can handle (compared to E jerk)
1739  * print acceleration will be reduced during the affected moves to keep within the limit.
1740  *
1741  * See https://marlinfw.org/docs/features/lin\_advance.html for full instructions.
1742  */
1743 // #define LIN_ADVANCE
1744 #if ENABLED(LIN_ADVANCE)
1745 // #define EXTRA_LIN_ADVANCE_K // Enable for second linear advance constants
1746 #define LIN_ADVANCE_K 0.0 // Unit: mm compression per 1mm/s extruder speed
1747 // #define LA_DEBUG // If enabled, this will generate debug information output over USB.
1748 #define EXPERIMENTAL_S_CURVE // Enable this option to permit S-Curve Acceleration
1749 #endif
```