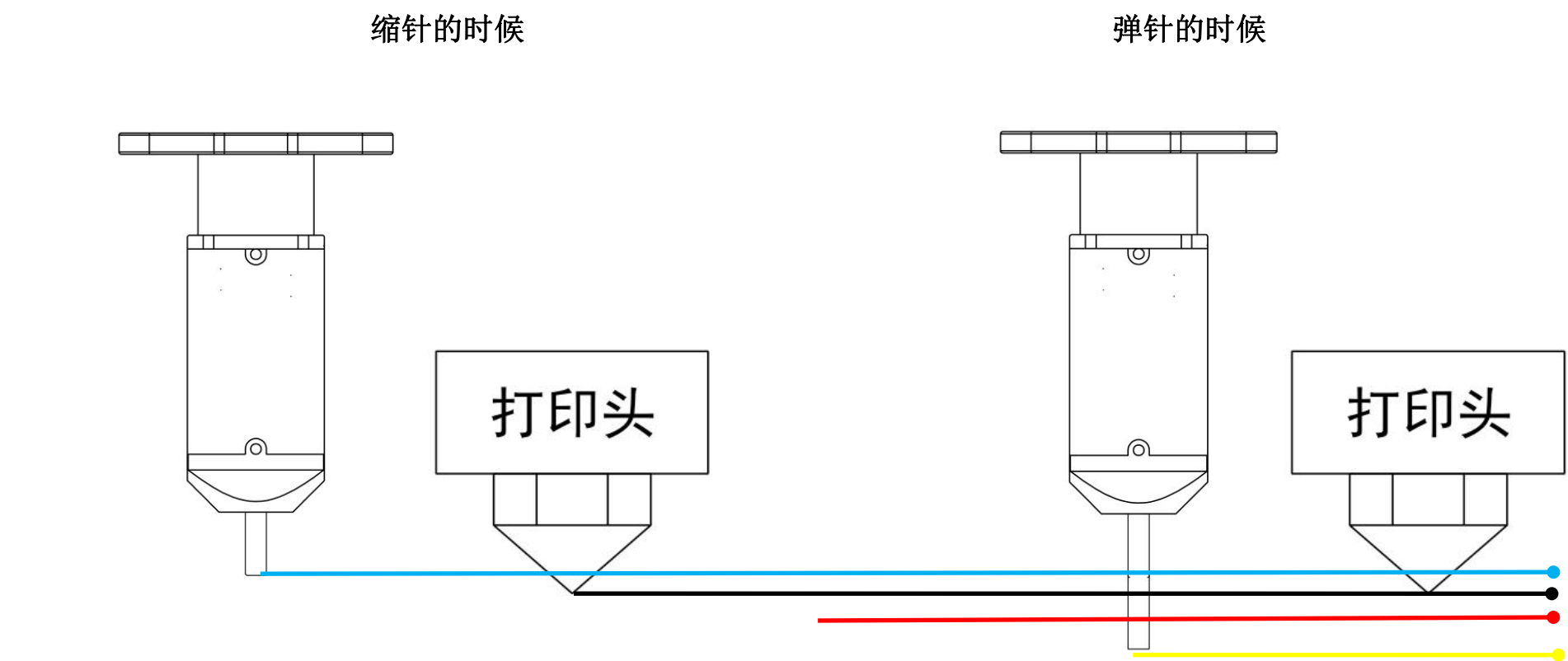


3D Touch 调平培训

一. 装机



- 代表 3d touch 缩针时，探针底部所处的位置，一定要比喷嘴要高。否则打印模型时，探针会碰到模型，造成损坏。
- 代表喷嘴所处的位置
- 代表 3d touch 的触发点，这个触发点一定要比喷嘴要低，否则触发不了 3D touch，就已经被喷嘴顶住了，这个可以微调调到适合的位置
- 代表 3d touch 弹针时，弹针底部所处的位置

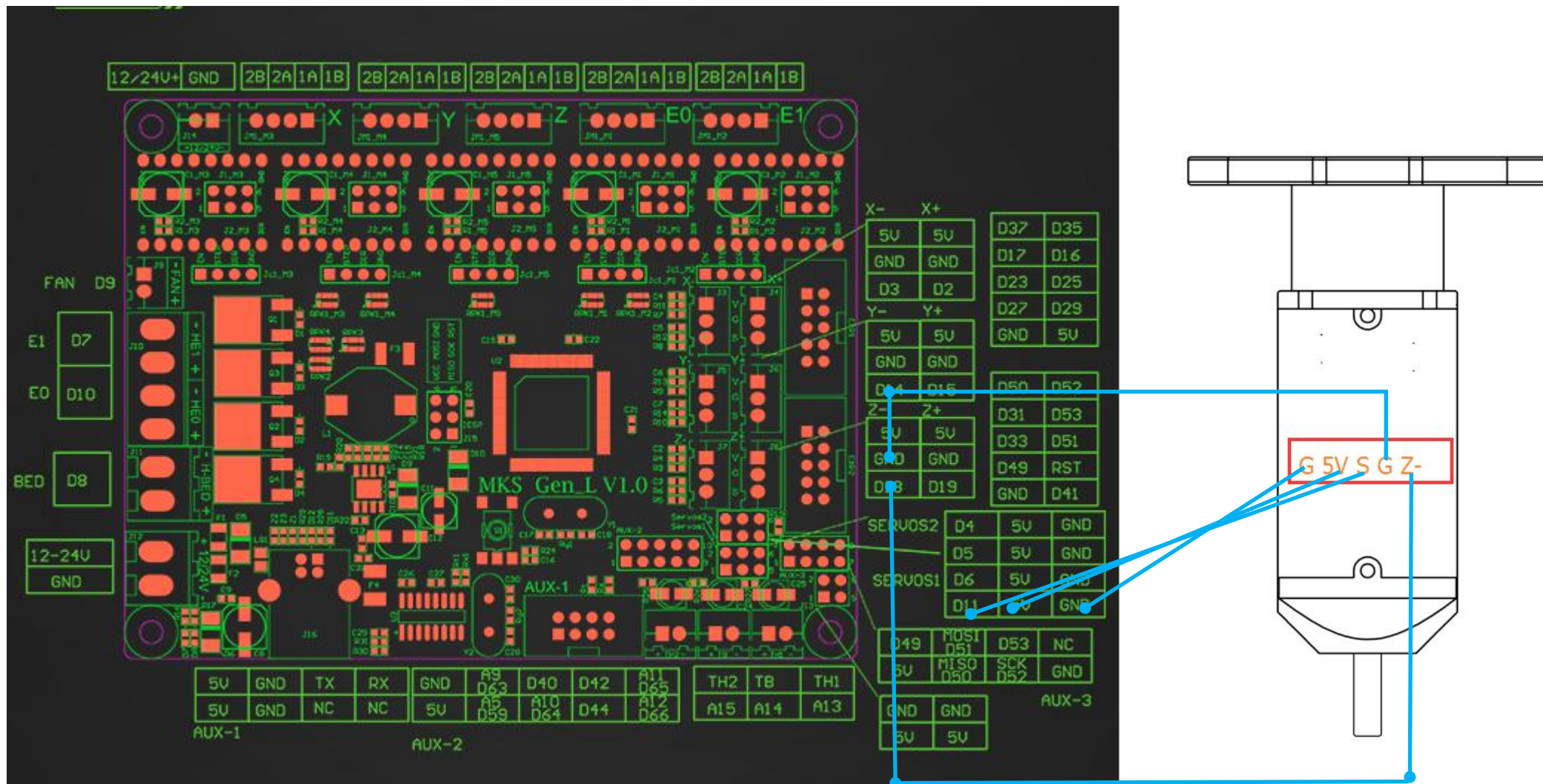
黑线和红色之间的距离代表 Z offset 的值

```
+-- BACK --+
|
L | (+) P | R <-- probe (20,20)
E |      | I
F | (-) N (+) | G <-- nozzle (10,10)
T |      | H
|      | T
|      |
O-- FRONT --+
(0,0)
```

二. Marlin 固件修改

1. Delta 结构

(以 GEN-L 主板, Marlin 1.1.X 版本固件为例) (3pin 的线接 D11 (注意正负)), 2PIN 的线接 Zmin)



(1) 设置调平口 (Z+或者 Z-), 但是不能和限位公用一个 pin 口。Delta 结构调平可以使用 Zmin 做为 3D touch 的接口, Zmax 做为机器限位开关的接口。

```
Marlin Conditionalsh Conditionals_LCD.h Conditionals_post.h Configurationh Configuration_a
// #define DELTA_DIAGONAL_ROD_TRIM_TOWER {0, 0, 0}

#endif

// ===== Endstop Settings =====

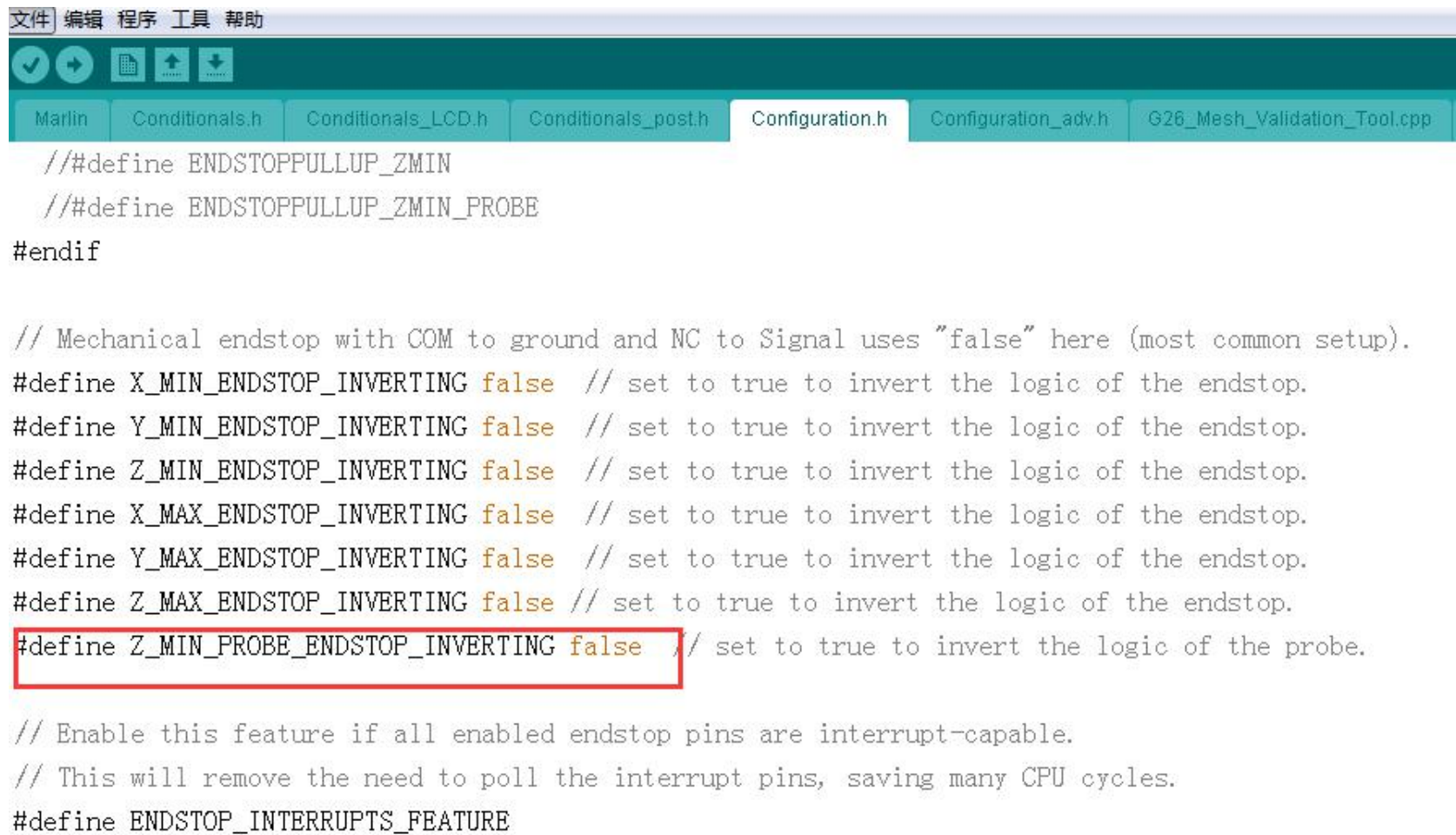
// @section homing

// Specify here all the endstop connectors that are connected to any ends
// Almost all printers will be using one per axis. Probes will use one or
// extra connectors. Leave undefined any used for non-endstop and non-probe

// #define USE_XMIN_PLUG
// #define USE_YMIN_PLUG
#define USE_ZMIN_PLUG // a Z probe
#define USE_XMAX_PLUG
#define USE_YMAX_PLUG
#define USE_ZMAX_PLUG
```

使用哪些限位口就要对其使能

(2) 设置调平接口类型

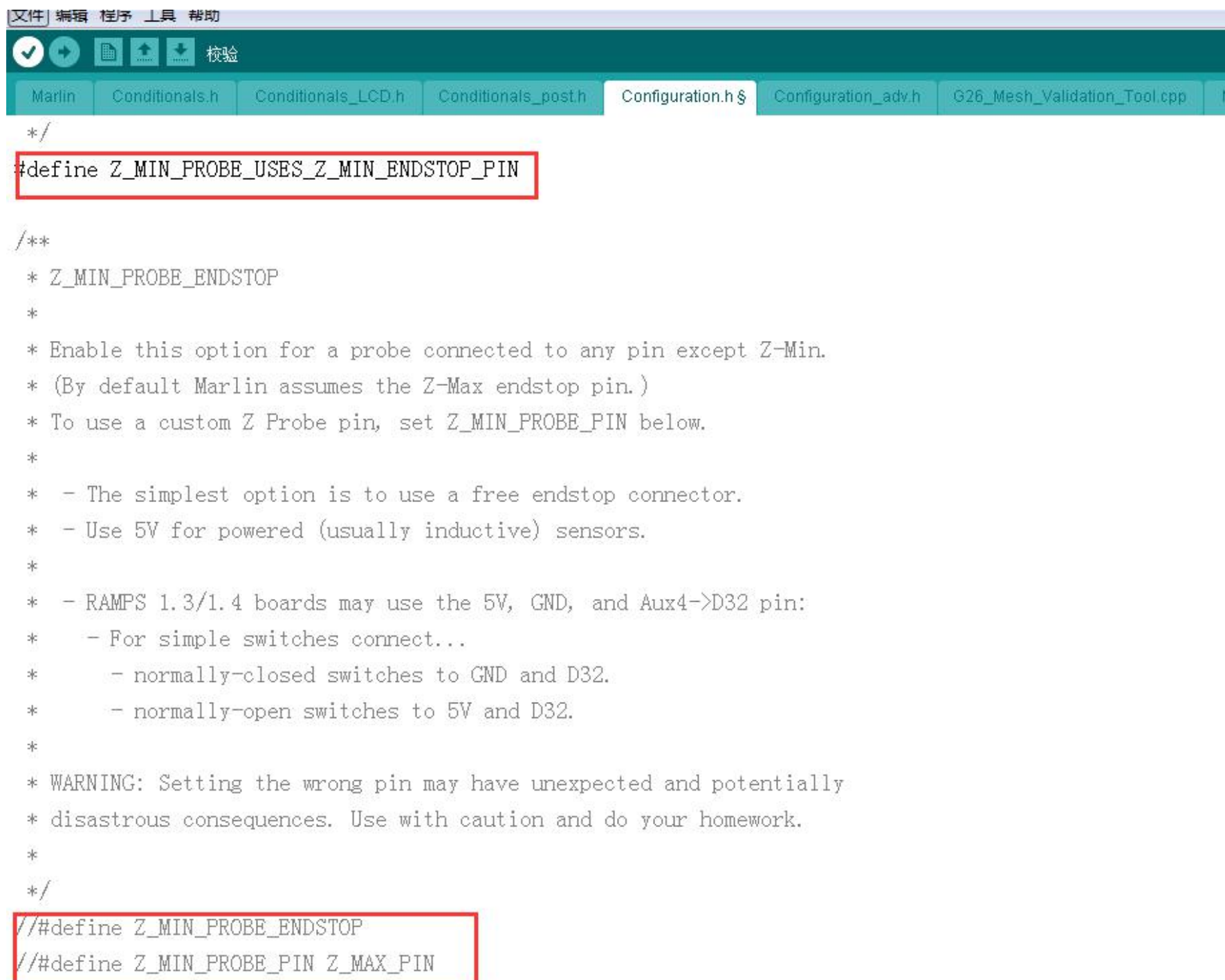


```
文件 编辑 程序 工具 帮助
Configuration.h
// #define ENDSTOPPULLUP_ZMIN
// #define ENDSTOPPULLUP_ZMIN_PROBE
#endif

// Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).
#define X_MIN_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Y_MIN_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Z_MIN_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define X_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Y_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Z_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Z_MIN_PROBE_ENDSTOP_INVERTING false // set to true to invert the logic of the probe.

// Enable this feature if all enabled endstop pins are interrupt-capable.
// This will remove the need to poll the interrupt pins, saving many CPU cycles.
#define ENDSTOP_INTERRUPTS_FEATURE
```

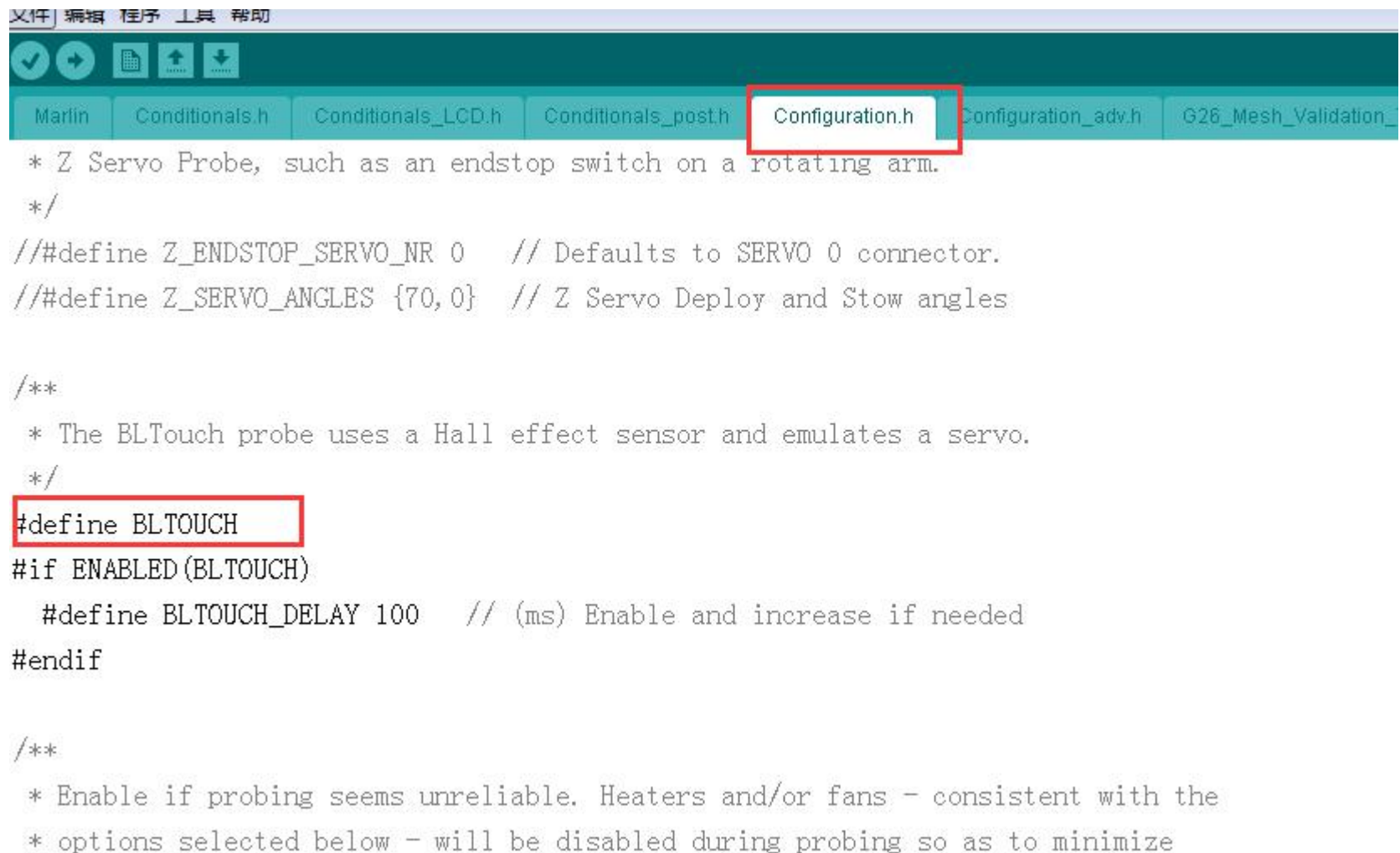
(3) 使能 Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN



```
文件 编辑 程序 工具 帮助
Configuration.h $
*/
#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN

/**
 * Z_MIN_PROBE_ENDSTOP
 *
 * Enable this option for a probe connected to any pin except Z-Min.
 * (By default Marlin assumes the Z-Max endstop pin.)
 * To use a custom Z Probe pin, set Z_MIN_PROBE_PIN below.
 *
 * - The simplest option is to use a free endstop connector.
 * - Use 5V for powered (usually inductive) sensors.
 *
 * - RAMPS 1.3/1.4 boards may use the 5V, GND, and Aux4->D32 pin:
 *   - For simple switches connect...
 *     - normally-closed switches to GND and D32.
 *     - normally-open switches to 5V and D32.
 *
 * WARNING: Setting the wrong pin may have unexpected and potentially
 * disastrous consequences. Use with caution and do your homework.
 */
// #define Z_MIN_PROBE_ENDSTOP
// #define Z_MIN_PROBE_PIN Z_MAX_PIN
```

(4) 使能 BLtouch 调平



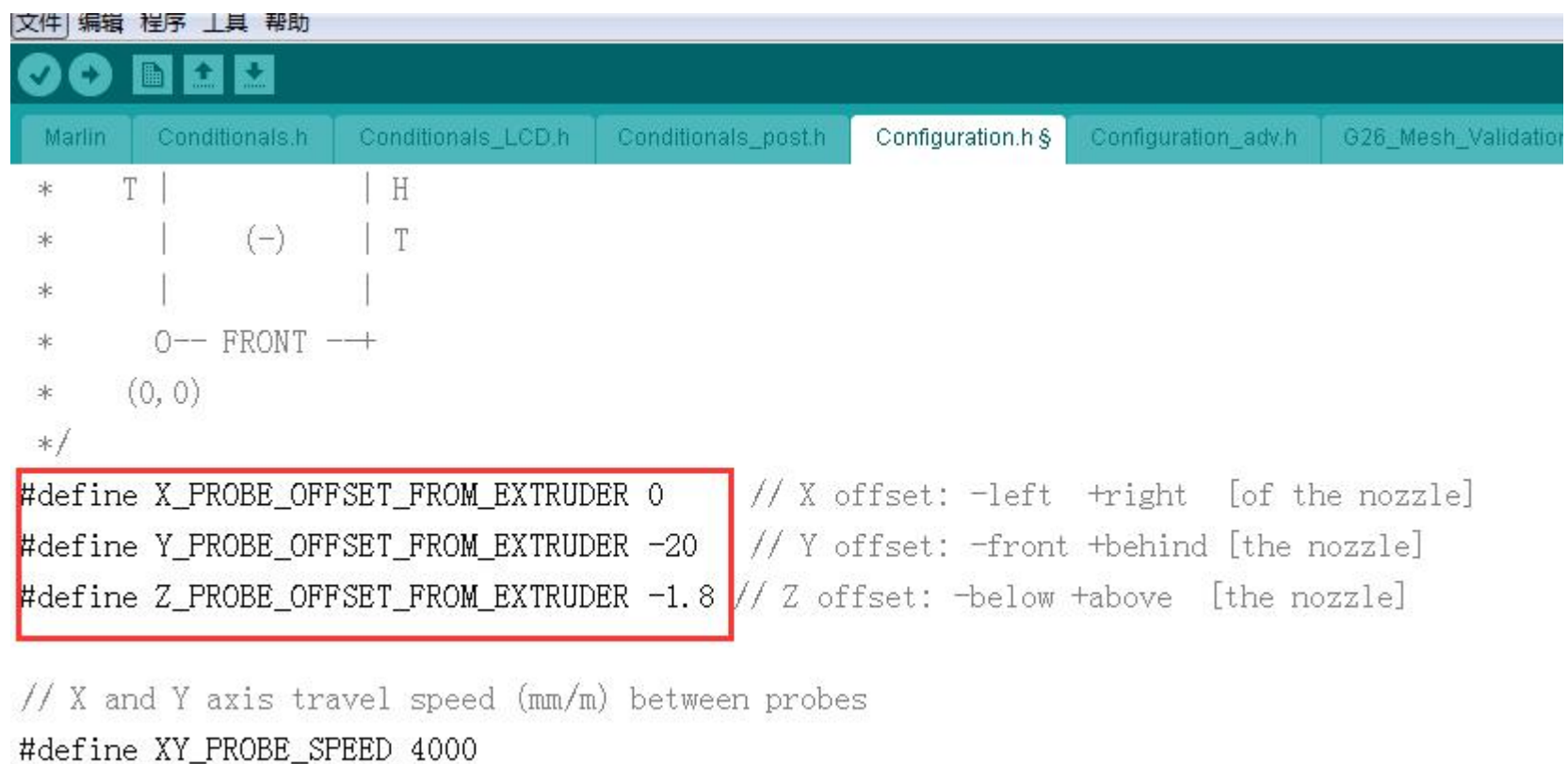
```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h Configuration_adv.h G26_Mesh_Validation_

* Z Servo Probe, such as an endstop switch on a rotating arm.
*/
// #define Z_ENDSTOP_SERVO_NR 0 // Defaults to SERVO 0 connector.
// #define Z_SERVO_ANGLES {70,0} // Z Servo Deploy and Stow angles

/**
 * The BLTouch probe uses a Hall effect sensor and emulates a servo.
 */
#define BLTOUCH
#if ENABLED(BLTOUCH)
  #define BLTOUCH_DELAY 100 // (ms) Enable and increase if needed
#endif

/**
 * Enable if probing seems unreliable. Heaters and/or fans - consistent with the
 * options selected below - will be disabled during probing so as to minimize
```

(5) 设置调平开关探针离喷嘴在 XYZ 方向上的偏差值

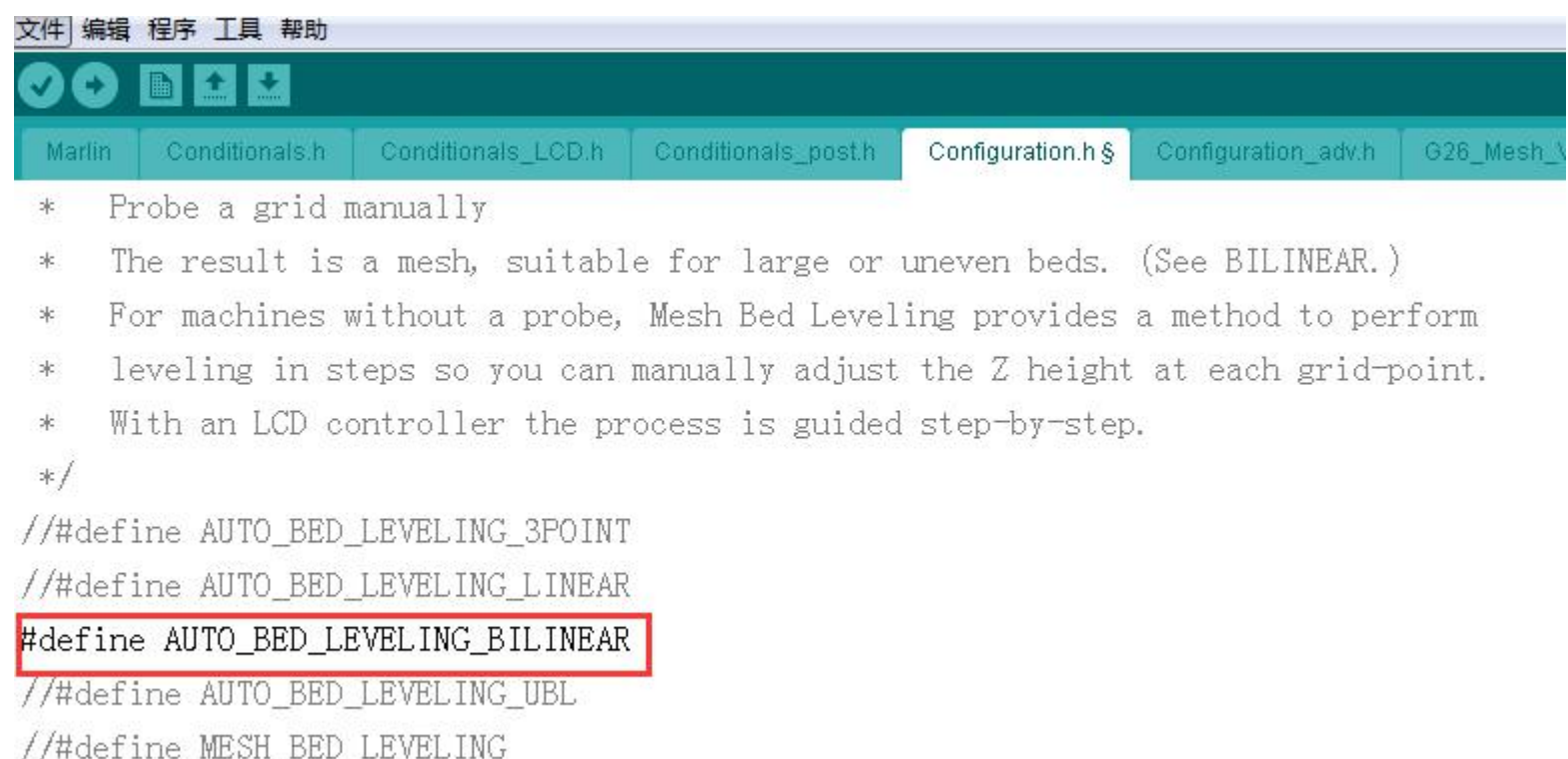


```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h $ Configuration_adv.h G26_Mesh_Validation_

* T | H
* | (-) | T
* | 
* O-- FRONT --+
* (0,0)
*/
#define X_PROBE_OFFSET_FROM_EXTRUDER 0 // X offset: -left +right [of the nozzle]
#define Y_PROBE_OFFSET_FROM_EXTRUDER -20 // Y offset: -front +behind [the nozzle]
#define Z_PROBE_OFFSET_FROM_EXTRUDER -1.8 // Z offset: -below +above [the nozzle]

// X and Y axis travel speed (mm/m) between probes
#define XY_PROBE_SPEED 4000
```

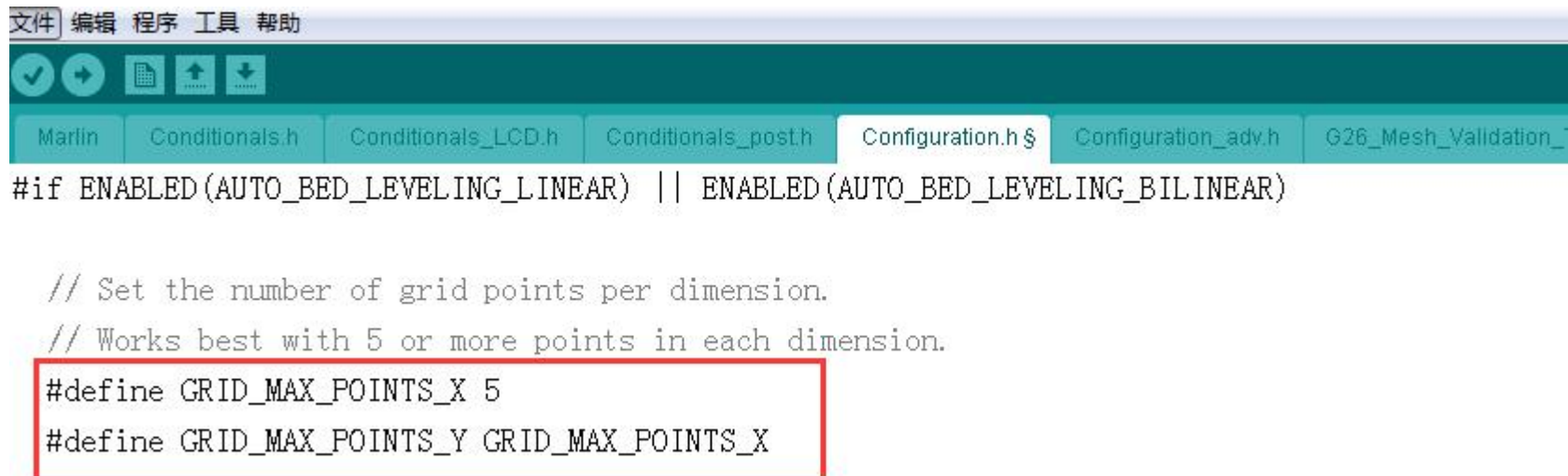
(6) 设置调平方式



```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h $ Configuration_adv.h G26_Mesh_V

* Probe a grid manually
* The result is a mesh, suitable for large or uneven beds. (See BILINEAR.)
* For machines without a probe, Mesh Bed Leveling provides a method to perform
* leveling in steps so you can manually adjust the Z height at each grid-point.
* With an LCD controller the process is guided step-by-step.
*/
// #define AUTO_BED_LEVELING_3POINT
// #define AUTO_BED_LEVELING_LINEAR
#define AUTO_BED_LEVELING_BILINEAR
// #define AUTO_BED_LEVELING_UBL
// #define MESH_BED_LEVELING
```


(7) 设置调平点数 (例如 5*5=25 个点)



```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h $ Configuration_adv.h G26_Mesh_Validation_
#if ENABLED(AUTO_BED_LEVELING_LINEAR) || ENABLED(AUTO_BED_LEVELING_BILINEAR)

  // Set the number of grid points per dimension.
  // Works best with 5 or more points in each dimension.
  #define GRID_MAX_POINTS_X 5
  #define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X
```

(8) 设置调平后保存数据

1) 去掉#define EEPROM_SETTINGS 前面的//, 开启 M500 保存数据

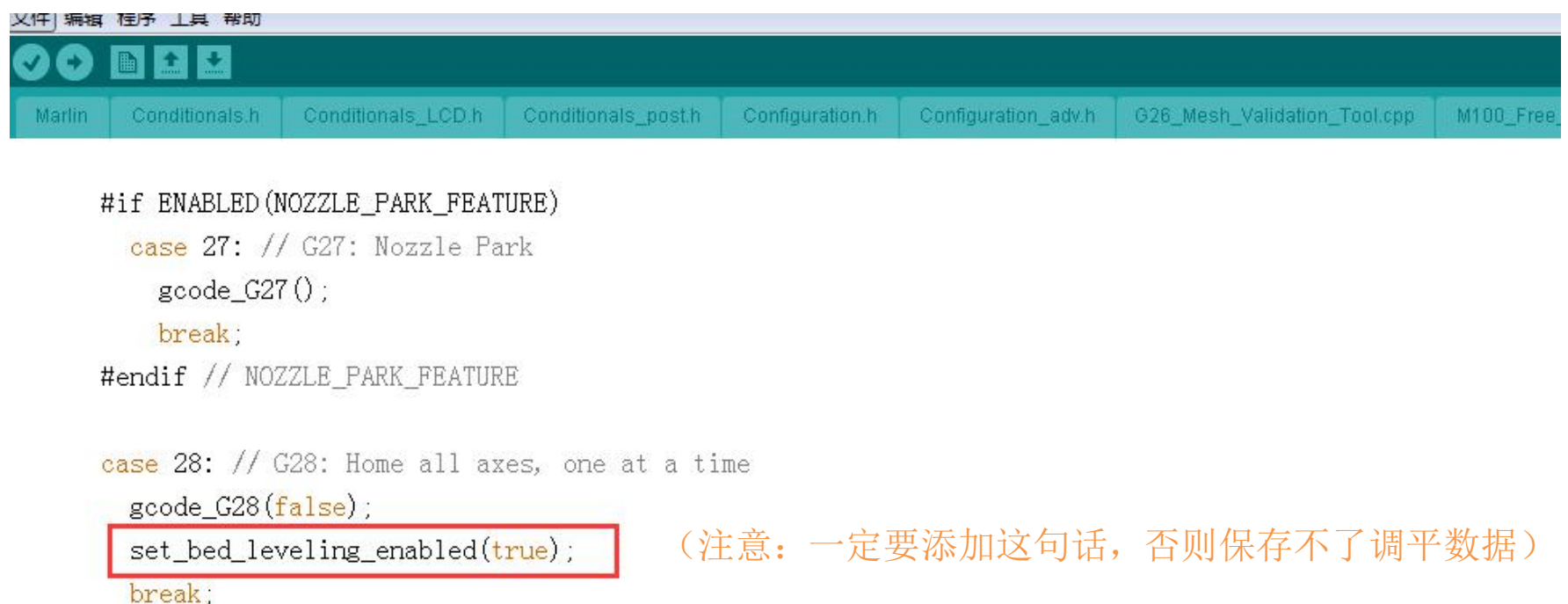


```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h $ Configuration_adv.h G26_Mesh_
//
// The microcontroller can store settings in the EEPROM, e.g. max velocity...
// M500 - stores parameters in EEPROM
// M501 - reads parameters from EEPROM (if you need reset them after you changed them)
// M502 - reverts to the default "factory settings". You still need to store them in EEPROM!
//define this to enable EEPROM support
#define EEPROM_SETTINGS

#if ENABLED(EEPROM_SETTINGS)
  // To disable EEPROM Serial responses and decrease program space by ~1700 bytes: comment this out
  #define EEPROM_CHITCHAT // Please keep turned on if you can.
#endif
```

2) 打开 Marlin_main.cpp 中, 找到: 添加 set_bed_leveling_enabled(true); 如下:

```
case 28: // G28: Home all axes, one at a time
  gcode_G28(false);
  set_bed_leveling_enabled(true);
  break;
```

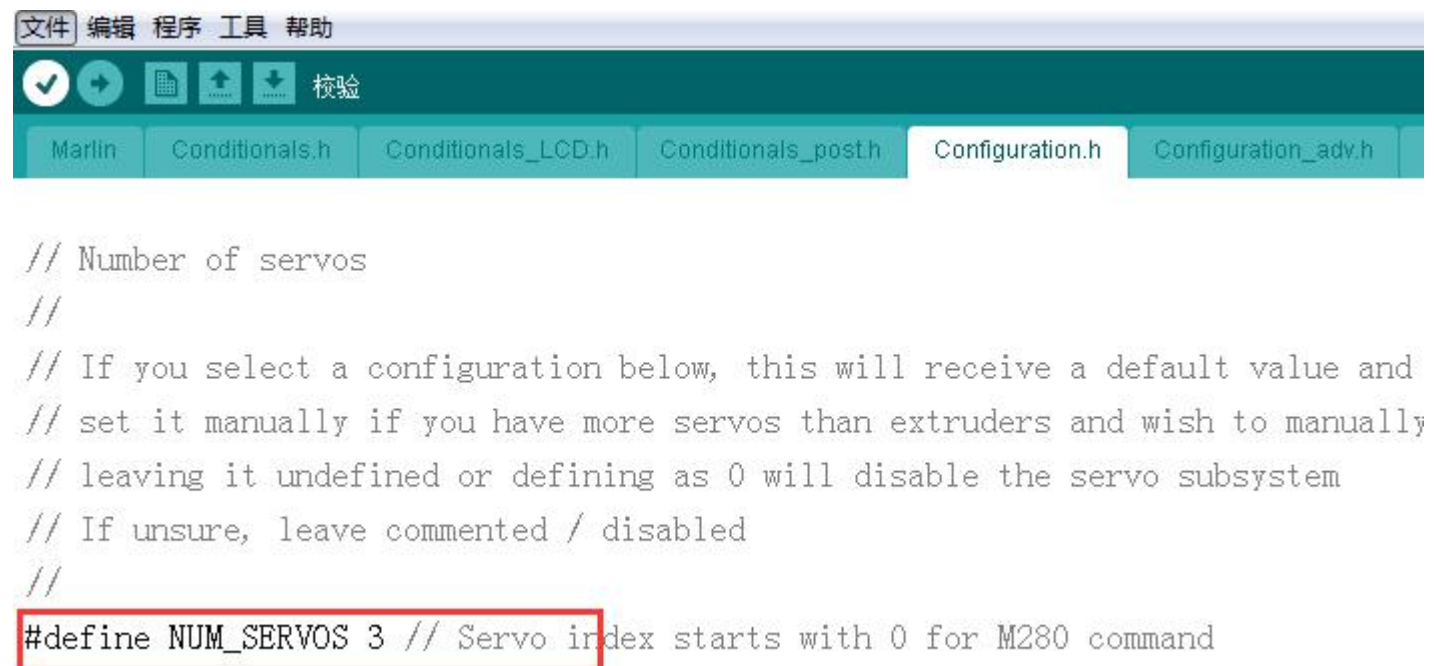


```
文件 编辑 程序 工具 帮助
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h Configuration_adv.h G26_Mesh_Validation_Tool.cpp M100_Free_
#if ENABLED(NOZZLE_PARK_FEATURE)
  case 27: // G27: Nozzle Park
    gcode_G27();
    break;
#endif // NOZZLE_PARK_FEATURE

case 28: // G28: Home all axes, one at a time
  gcode_G28(false);
  set_bed_leveling_enabled(true);
  break;
```

(注意: 一定要添加这句话, 否则保存不了调平数据)

(9) 去掉#define NUM_SERVOS 3 前面的//

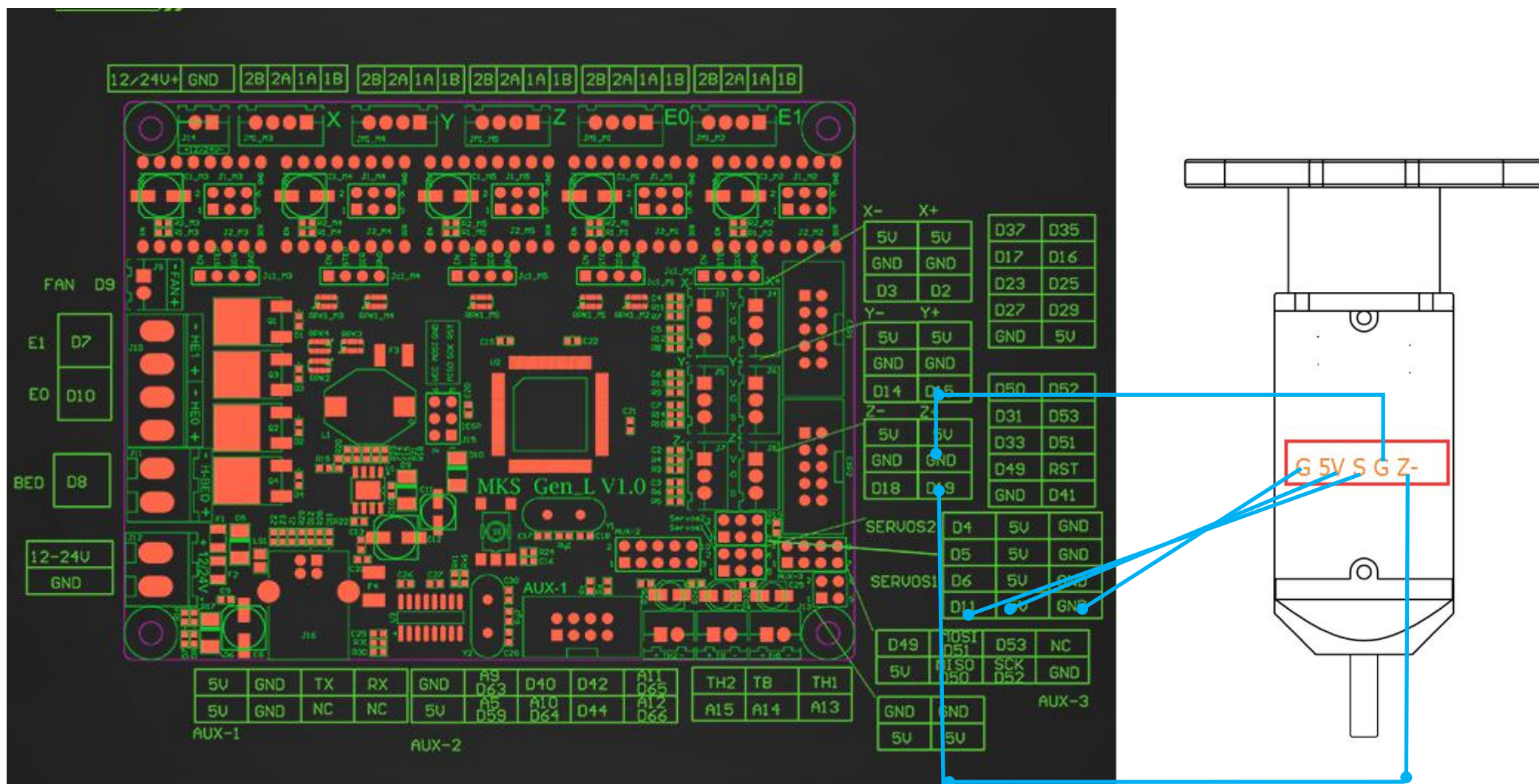


```
文件 编辑 程序 工具 帮助
[Icons] 校验
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h Configuration_adv.h

// Number of servos
//
// If you select a configuration below, this will receive a default value and
// set it manually if you have more servos than extruders and wish to manually
// leaving it undefined or defining as 0 will disable the servo subsystem
// If unsure, leave commented / disabled
//
#define NUM_SERVOS 3 // Servo index starts with 0 for M280 command
```

2. Cartesian 结构

(以 GEN-L 主板, Marlin 1.1.X 版本固件为例) (3pin 的线接 D11 (注意正负)), 2PIN 的线接 Zmax)



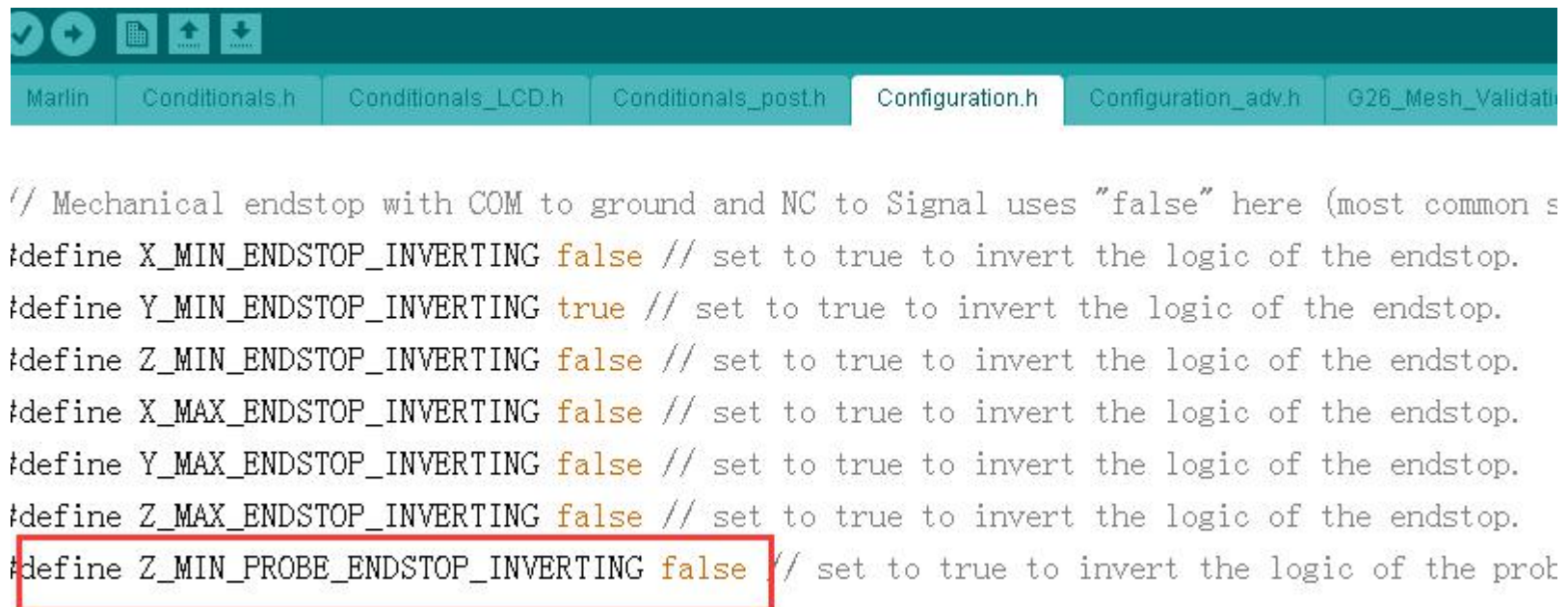
(1) 设置调平口 (Z+或者 Z-), 但是不能和限位公用一个 pin 口。Cartesian 结构调平可以使用 Zmax 做为 3D touch 的接口。

```
✓ ➡ 📄 ⬆ ⬇ 校验
Marlin Conditionals.h Conditionals_LCD.h Conditionals_post.h Configuration.h Configuration_adv.h G26_Me:

// Specify here all the endstop connectors that are connected to any endstop or pro
// Almost all printers will be using one per axis. Probes will use one or more of t
// extra connectors. Leave undefined any used for non-endstop and non-probe purpose

#define USE_XMIN_PLUG
#define USE_YMIN_PLUG
#define USE_ZMIN_PLUG
// #define USE_XMAX_PLUG
// #define USE_YMAX_PLUG
#define USE_ZMAX_PLUG
```


(2) 设置调平接口类型



```
// Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common)
#define X_MIN_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Y_MIN_ENDSTOP_INVERTING true // set to true to invert the logic of the endstop.
#define Z_MIN_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define X_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Y_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Z_MAX_ENDSTOP_INVERTING false // set to true to invert the logic of the endstop.
#define Z_MIN_PROBE_ENDSTOP_INVERTING false // set to true to invert the logic of the probe
```

(3) 用 Zmax 来做调平开关

屏蔽: #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN

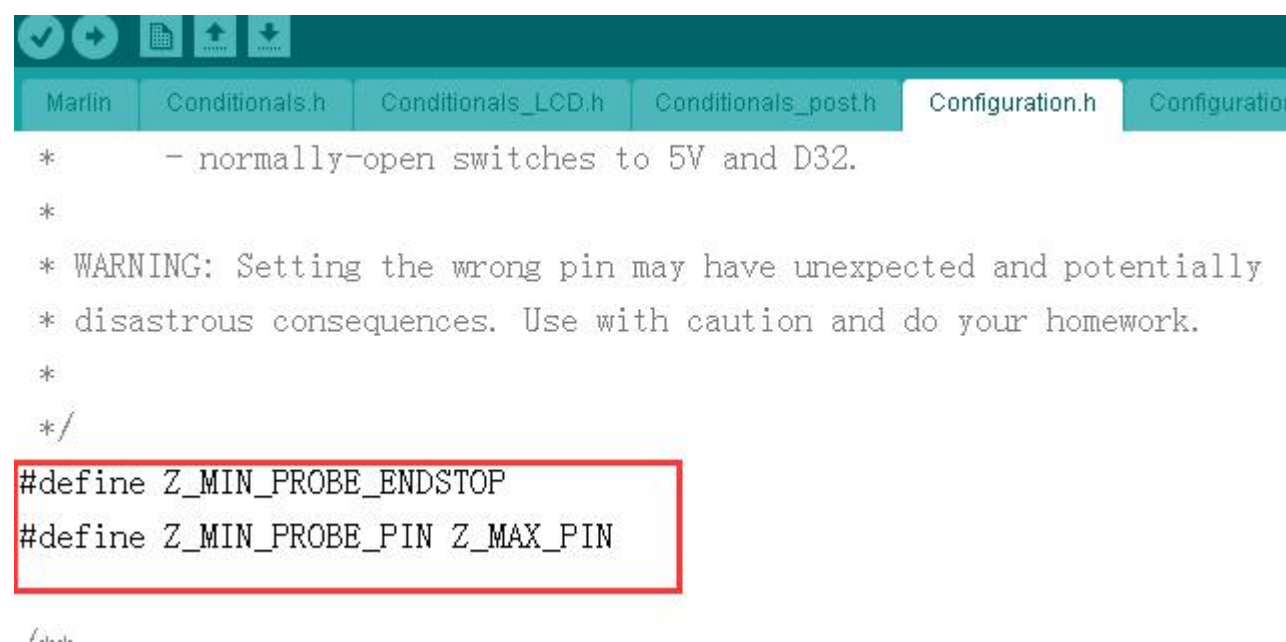
开启: #define Z_MIN_PROBE_ENDSTOP

开启: #define Z_MIN_PROBE_PIN Z_MAX_PIN



```
*
* Enable this option for a probe connected to the Z Min endstop pin.
*/
// #define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN

/**
 * Z_MIN_PROBE_ENDSTOP
```



```
* - normally-open switches to 5V and D32.
*
* WARNING: Setting the wrong pin may have unexpected and potentially
* disastrous consequences. Use with caution and do your homework.
*
*/
#define Z_MIN_PROBE_ENDSTOP
#define Z_MIN_PROBE_PIN Z_MAX_PIN

// ...
```


(4) 使能 BLtouch

```
Marlin Conditional.h Conditional_LCD.h Conditional_post.h Configuration.h Configuration_adv.h
// #define Z_SERVO_ANGLES {70,0} // Z Servo Deploy and Stow angles

/**
 * The BLTouch probe uses a Hall effect sensor and emulates a servo.
 */
#define BLTOUCH
#if ENABLED(BLTOUCH)
  // #define BLTOUCH_DELAY 375 // (ms) Enable and increase if needed
#endif
```

(5) 设置调平开关探针离喷嘴在 xyz 轴上的偏差值

```
Marlin Conditional.h Conditional_LCD.h Conditional_post.h Configuration.h$ Configuration_adv.h G26_Mesh
* | (-) | T
* | |
* 0-- FRONT --+
* (0,0)
*/
#define X_PROBE_OFFSET_FROM_EXTRUDER 0 // X offset: -left +right [of the nozzle]
#define Y_PROBE_OFFSET_FROM_EXTRUDER 10 // Y offset: -front +behind [the nozzle]
#define Z_PROBE_OFFSET_FROM_EXTRUDER -0.8 // Z offset: -below +above [the nozzle]
```

(6) 设置调平方式

```
✓ ↻ 📄 ⬆️ ⬇️ 校验
Marlin Conditional.h Conditional_LCD.h Conditional_post.h Configuration.h$ Configuration_
* leveling in steps so you can manually adjust the Z height at each g
* With an LCD controller the process is guided step-by-step.
*/
// #define AUTO_BED_LEVELING_3POINT
// #define AUTO_BED_LEVELING_LINEAR
#define AUTO_BED_LEVELING_BILINEAR
// #define AUTO_BED_LEVELING_UBL
// #define MESH_BED_LEVELING
```

(7) 设置调平点数

```
Marlin | Conditionals.h | Conditionals_LCD.h | Conditionals_post.h | Configuration.h$ | Configuration
```

```
// Set the number of grid points per dimension.  
#define GRID_MAX_POINTS_X 5  
#define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X
```

(8) 设置调平范围

```
Marlin | Conditionals.h | Conditionals_LCD.h | Conditionals_post.h | Configuration.h | Configuration_adv.h | G26_Mesh_Validation_To
```

```
// Set the number of grid points per dimension.  
#define GRID_MAX_POINTS_X 5  
#define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X  
  
// Set the boundaries for probing (where the probe can reach).  
#define LEFT_PROBE_BED_POSITION 15  
#define RIGHT_PROBE_BED_POSITION 170  
#define FRONT_PROBE_BED_POSITION 20  
#define BACK_PROBE_BED_POSITION 170  
  
// The Z probe minimum outer margin (to validate G29 parameters).
```

(9) 设置回零中心（可以不设置，i3 结构的机器如果使用 3D TOUCH 作为机器的 z 限位开关时，而且回零时，3D touch 在热床外进行 z 轴回零时，就要开启这个，避免 3D touch 传感器碰不到热床，导致机器或者传感器损坏。开启之后，机器会移动到热床中间进行 z 轴回零）（如果使用 3D touch 同时作为调平开关和 z 轴限位开关，固件配置跟 Delta 修改的一样）

```
文件 | 编辑 | 程序 | 工具 | 帮助
```


```
✓ | ↗ | 📄 | ⬆ | ⬇ | 校验
```

```
Marlin | Conditionals.h | Conditionals_LCD.h | Conditionals_post.h | Configuration.h | Configuration_adv.h | G26_Mesh_Validation_
```

```
// - Allow Z homing only after X and Y homing AND stepper drivers still enabled.  
// - If stepper drivers time out, it will need X and Y homing again before Z homing.  
// - Move the Z probe (or nozzle) to a defined XY point before Z Homing when homing all axes  
// - Prevent Z homing when the Z probe is outside bed area.  
//  
#define Z_SAFE_HOMING
```


(10) 设置调平后保存数据

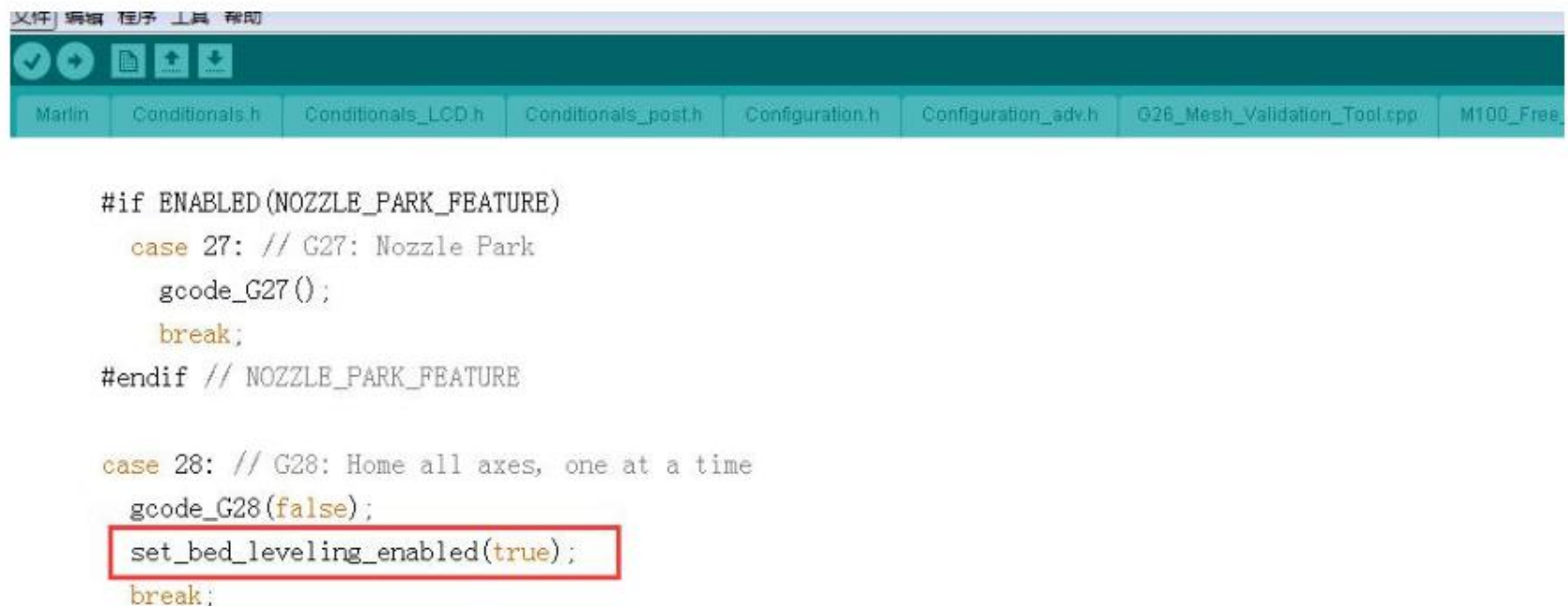
1) 去掉#define EEPROM_SETTINGS 前面的//, 开启 M500 保存数据



```
//  
// The microcontroller can store settings in the EEPROM, e.g. max velocity...  
// M500 - stores parameters in EEPROM  
// M501 - reads parameters from EEPROM (if you need reset them after you changed them)  
// M502 - reverts to the default "factory settings". You still need to store them in EEPROM!  
//define this to enable EEPROM support  
#define EEPROM_SETTINGS  
  
#if ENABLED(EEPROM_SETTINGS)  
  // To disable EEPROM Serial responses and decrease program space by ~1700 bytes: comment  
  #define EEPROM_CHITCHAT // Please keep turned on if you can.  
#endif
```

2) 打开 Marlin_main.cpp 中, 找到: 添加 set_bed_leveling_enabled(true);
如下:

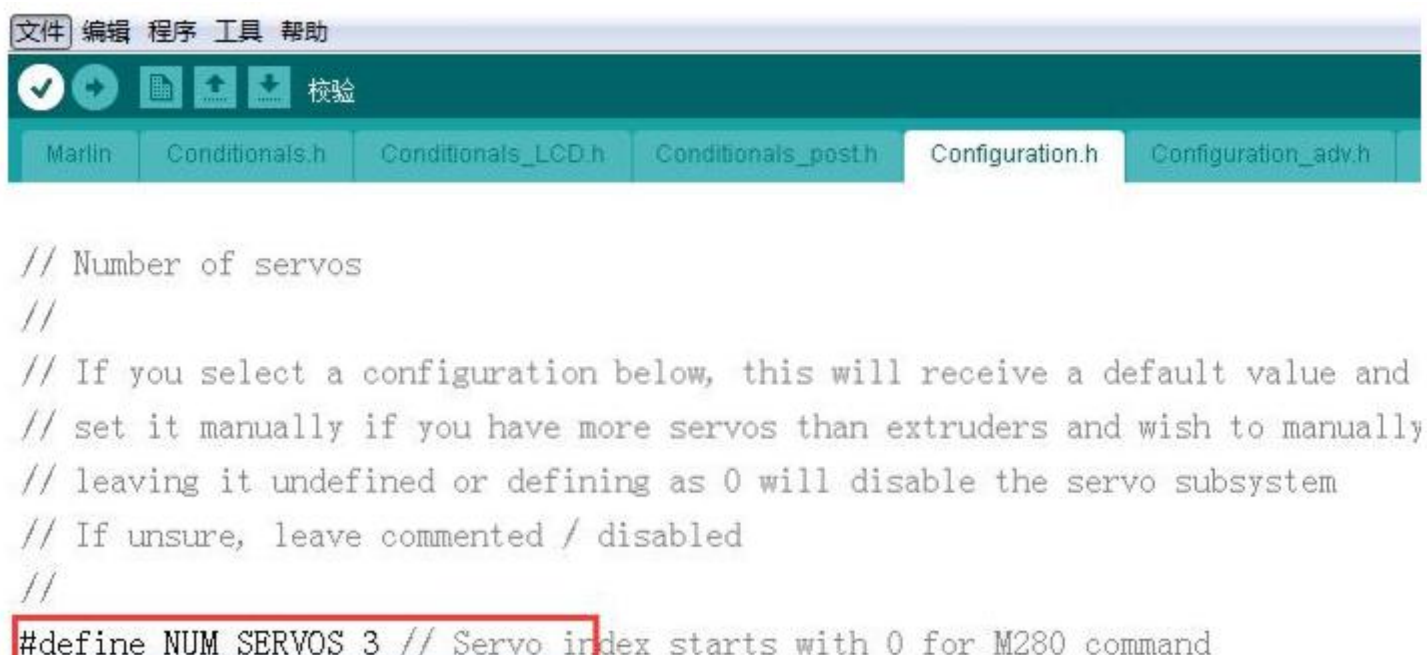
```
case 28: // G28: Home all axes, one at a time  
  gcode_G28(false);  
  set_bed_leveling_enabled(true);  
  break;
```



```
#if ENABLED(NOZZLE_PARK_FEATURE)  
  case 27: // G27: Nozzle Park  
    gcode_G27();  
    break;  
#endif // NOZZLE_PARK_FEATURE  
  
case 28: // G28: Home all axes, one at a time  
  gcode_G28(false);  
  set_bed_leveling_enabled(true);  
  break;
```

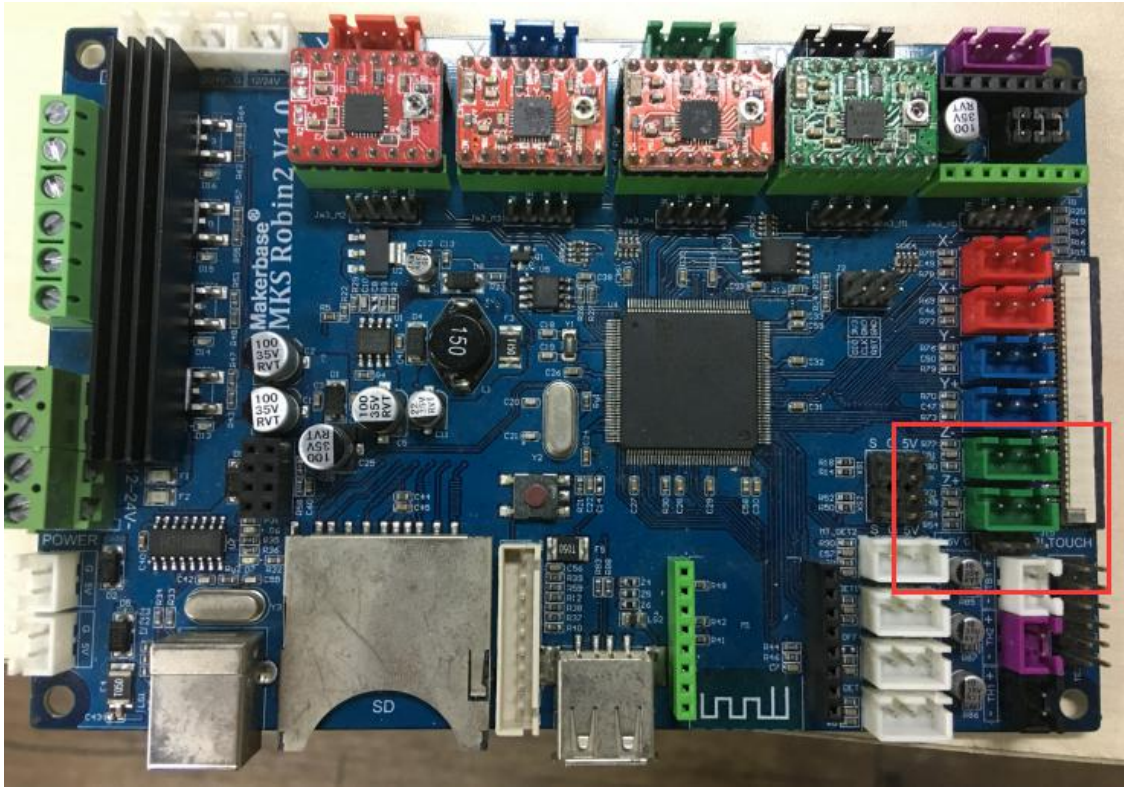
(注意: 一定要添加这句话, 否则保存不了调平数据)

(11) 去掉#define NUM_SERVOS 3 前面的//



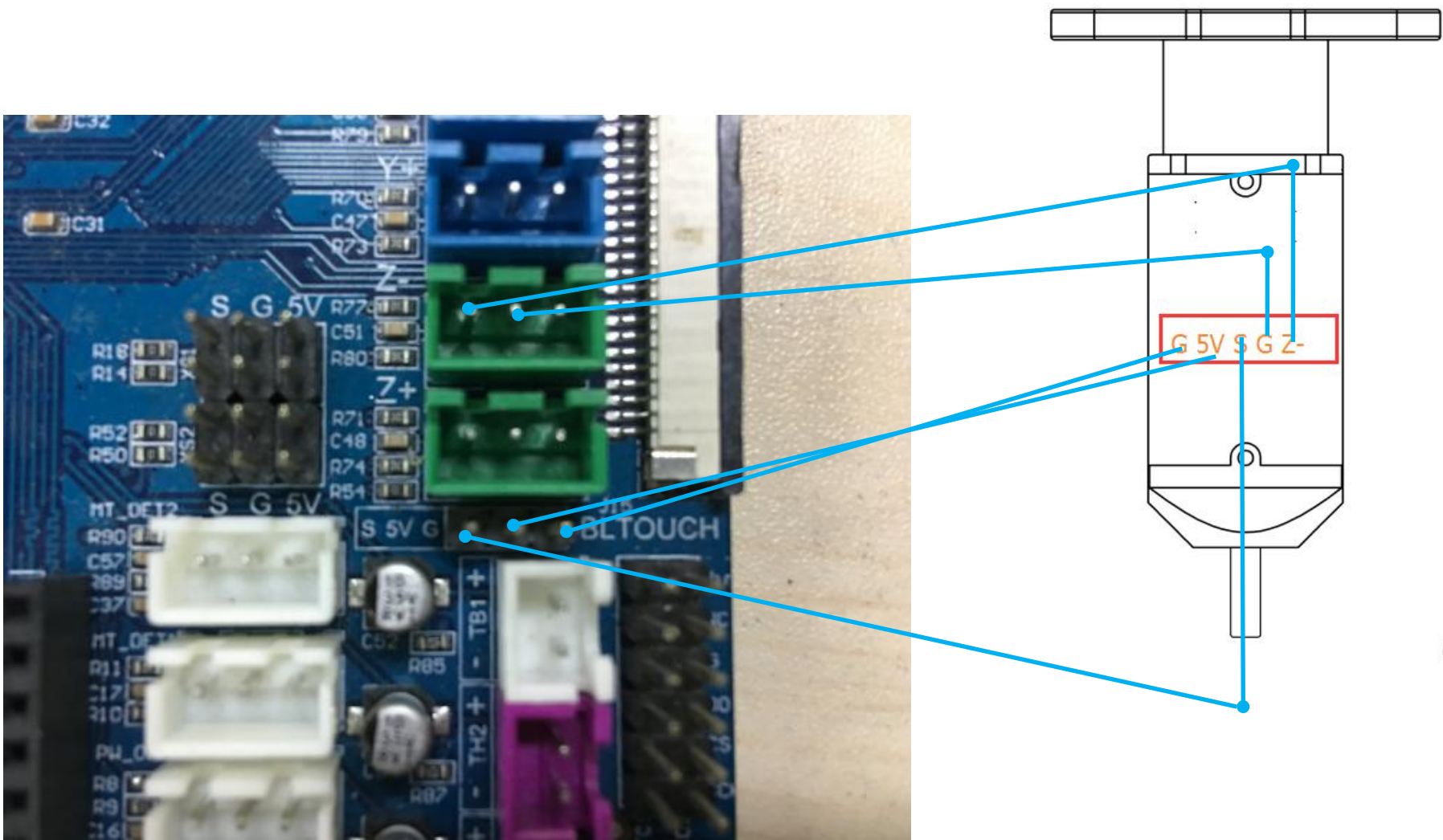
```
// Number of servos  
//  
// If you select a configuration below, this will receive a default value and  
// set it manually if you have more servos than extruders and wish to manually  
// leaving it undefined or defining as 0 will disable the servo subsystem  
// If unsure, leave commented / disabled  
//  
#define NUM_SERVOS 3 // Servo index starts with 0 for M280 command
```

三. robin 固件修改（目前只有 robin2 可以使用 3D touch）



1. Delta 结构

接线如下：



(1) 调平模式设置

```
#===== 调平按钮配置 =====  
>cfg_leveling_mode 1 #调平模式配置《1:自动调平；0:手动调平》  
..
```

(2) 调平开关类型设置

```
#===== Endstop Settings =====  
>MIN_SOFTWARE_ENDSTOPS 1 # 0:axes can move below MIN_POS; 1:axes won't move below MIN_POS.  
>MAX_SOFTWARE_ENDSTOPS 1 # 0:axes can move below MAX_POS; 1:axes won't move below MIN_POS.  
  
# Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).  
>X_MIN_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>Y_MIN_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>Z_MIN_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>X_MAX_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>Y_MAX_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>Z_MAX_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>Z_MIN_PROBE_ENDSTOP_INVERTING 0 # set to true to invert the logic of the probe.  
>FIL_RUNOUT_INVERTING 0 # set to true to invert the logic of the Filament Runout Sensor.  
..
```

```
# Specify here all the endstop connectors that are connected to any endstop or probe.  
>USE_XMIN_PLUG 0 # 1:used; 0:noused  
>USE_YMIN_PLUG 0 # 1:used; 0:noused  
>USE_ZMIN_PLUG 1 # 1:used; 0:noused  
>USE_XMAX_PLUG 1 # 1:used; 0:noused  
>USE_YMAX_PLUG 1 # 1:used; 0:noused  
>USE_ZMAX_PLUG 1 # 1:used; 0:noused
```

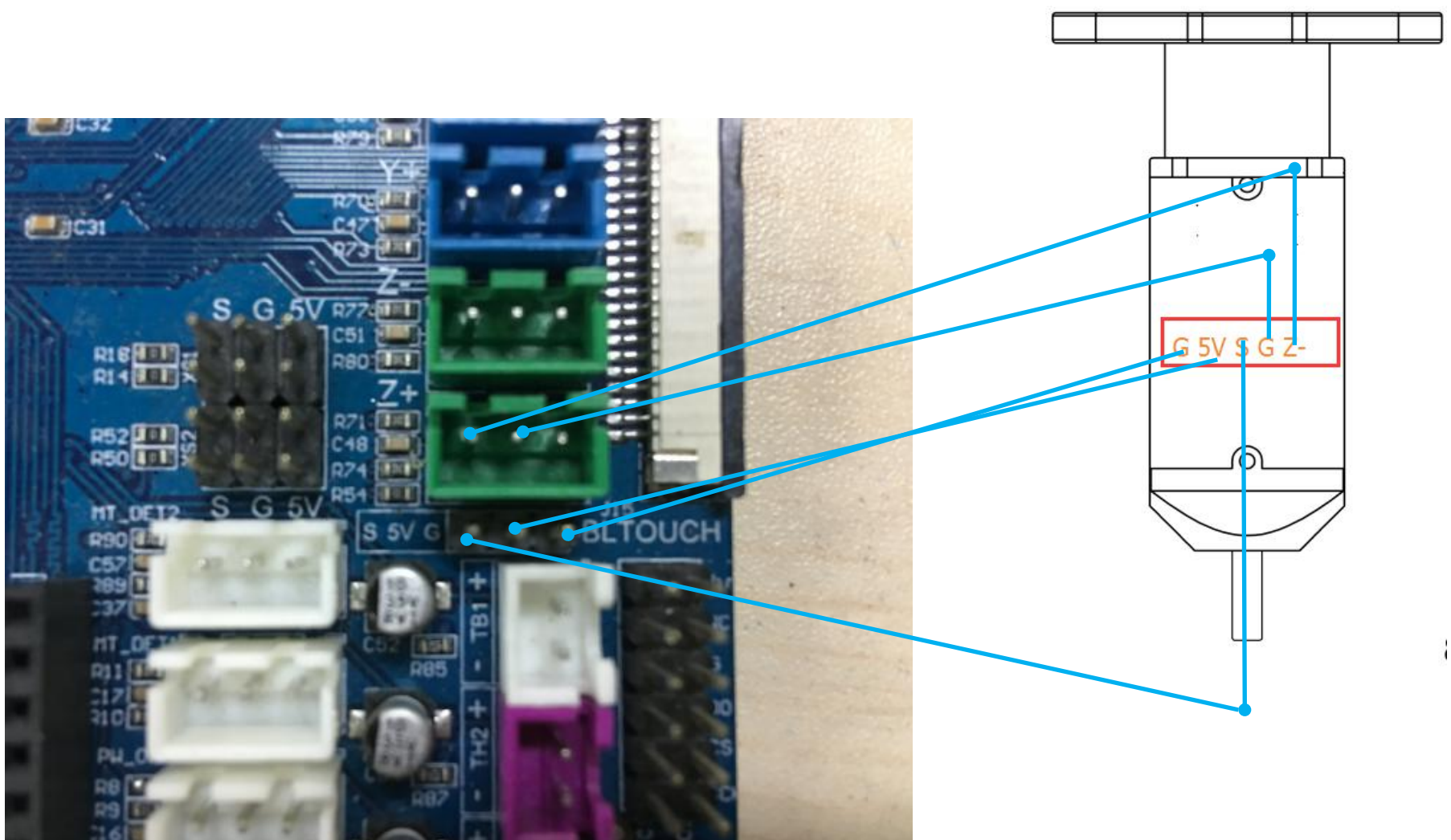
(3) z-probe 设置

```
#===== Z Probe Options =====  
>BLTOUCH 1 # 0:disable BLTOUCH; 1:enable BLTOUCH  
#Select for a probe connected to Z-Min or Z-Max.  
>Z_MIN_PROBE_PIN_MODE 1 # 0 : NULL; 1: ZMIN; 2: ZMAX  
  
>Z_PROBE_OFFSET_FROM_EXTRUDER -0.8 # Z offset: -below +above [the nozzle]  
>X_PROBE_OFFSET_FROM_EXTRUDER 10 # X offset: -left +right [of the nozzle]  
>Y_PROBE_OFFSET_FROM_EXTRUDER 0 # Y offset: -front +behind [the nozzle]  
>XY_PROBE_SPEED 4000 # X and Y axis travel speed (mm/m) between probes  
>Z_PROBE_SPEED_FAST 600 # Speed for the first approach when double-probing (with PROBE_DOUBLE_TOUCH)  
>Z_PROBE_SPEED_SLOW 300 # Speed for the "accurate" probe of each point
```

(4) 调平类型，调平点数，调平范围设置

```
#===== Bed Leveling =====  
  
>BED_LEVELING_METHOD 3 # 0:NULL_BED_LEVELING; 3:AUTO_BED_LEVELING_BILINEAR; 5:MESH_BED_LEVELING  
  
>GRID_MAX_POINTS_X 2 # the number of grid points per dimension. <= 15  
>GRID_MAX_POINTS_Y 2 # the number of grid points per dimension. <= 15  
>Z_CLEARANCE_DEPLOY_PROBE 20 # Z Clearance for Deploy/Stow > 0  
>Z_CLEARANCE_BETWEEN_PROBES 20 # Z Clearance between probe points > 0  
  
# Set the boundaries for probing (where the probe can reach).  
>LEFT_PROBE_BED_POSITION 30  
>RIGHT_PROBE_BED_POSITION 180  
>FRONT_PROBE_BED_POSITION 30  
>BACK_PROBE_BED_POSITION 180
```


2. Cartesian 结构



(1) 调平模式设置

```
#===== 调平按钮配置 =====  
>cfg_leveling_mode 1 #调平模式配置《1:自动调平；0:手动调平》
```

(2) 调平开关类型设置

```
#===== Endstop Settings =====  
  
>MIN_SOFTWARE_ENDSTOPS 1 # 0:axes can move below MIN_POS; 1:axes won't move below MIN_POS.  
>MAX_SOFTWARE_ENDSTOPS 1 # 0:axes can move below MAX_POS; 1:axes won't move below MIN_POS.  
  
# Mechanical endstop with COM to ground and NC to Signal uses "false" here (most common setup).  
>X_MIN_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>Y_MIN_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>Z_MIN_ENDSTOP_INVERTING 1 # set to true to invert the logic of the endstop.  
>X_MAX_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>Y_MAX_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>Z_MAX_ENDSTOP_INVERTING 0 # set to true to invert the logic of the endstop.  
>Z_MIN_PROBE_ENDSTOP_INVERTING 0 # set to true to invert the logic of the probe.  
>FIL_RUNOUT_INVERTING 0 # set to true to invert the logic of the Filament Runout Sensor.  
  
# Specify here all the endstop connectors that are connected to any endstop or probe.  
>USE_XMIN_PLUG 1 # 1:used; 0:noused  
>USE_YMIN_PLUG 1 # 1:used; 0:noused  
>USE_ZMIN_PLUG 1 # 1:used; 0:noused  
>USE_XMAX_PLUG 0 # 1:used; 0:noused  
>USE_YMAX_PLUG 0 # 1:used; 0:noused  
>USE_ZMAX_PLUG 1 # 1:used; 0:noused
```


(5) z-probe 设置

```
#===== Z Probe Options =====
>BLTOUCH      1 # 0:disable BLTOUCH; 1:enable BLTOUCH
#Select for a probe connected to Z-Min or Z-Max.
>Z_MIN_PROBE_PIN_MODE    2 # 0 : NULL; 1: ZMIN; 2: ZMAX

>Z_PROBE_OFFSET_FROM_EXTRUDER  -0.8 # Z offset: -below +above [the nozzle]
>X_PROBE_OFFSET_FROM_EXTRUDER  10  # X offset: -left +right [of the nozzle]
>Y_PROBE_OFFSET_FROM_EXTRUDER   0 # Y offset: -front +behind [the nozzle]
>XY_PROBE_SPEED    4000 # X and Y axis travel speed (mm/m) between probes
>Z_PROBE_SPEED_FAST    600 # Speed for the first approach when double-probing (with PROBE_DOUBLE_TOUCH)
>Z_PROBE_SPEED_SLOW    300 # Speed for the "accurate" probe of each point
```

(6) 调平类型，调平点数，调平范围设置

```
#===== Bed Leveling =====

>BED_LEVELING_METHOD    3 # 0:NULL_BED_LEVELING; 3:AUTO_BED_LEVELING_BILINEAR; 5:MESH_BED_LEVELING

>GRID_MAX_POINTS_X    2 # the number of grid points per dimension. <= 15
>GRID_MAX_POINTS_Y    2 # the number of grid points per dimension. <= 15
>Z_CLEARANCE_DEPLOY_PROBE  20 # Z Clearance for Deploy/Stow    > 0
>Z_CLEARANCE_BETWEEN_PROBES  20 # Z Clearance between probe points > 0

# Set the boundaries for probing (where the probe can reach).
>LEFT_PROBE_BED_POSITION  30
>RIGHT_PROBE_BED_POSITION 180
>FRONT_PROBE_BED_POSITION  30
>BACK_PROBE_BED_POSITION  180
```