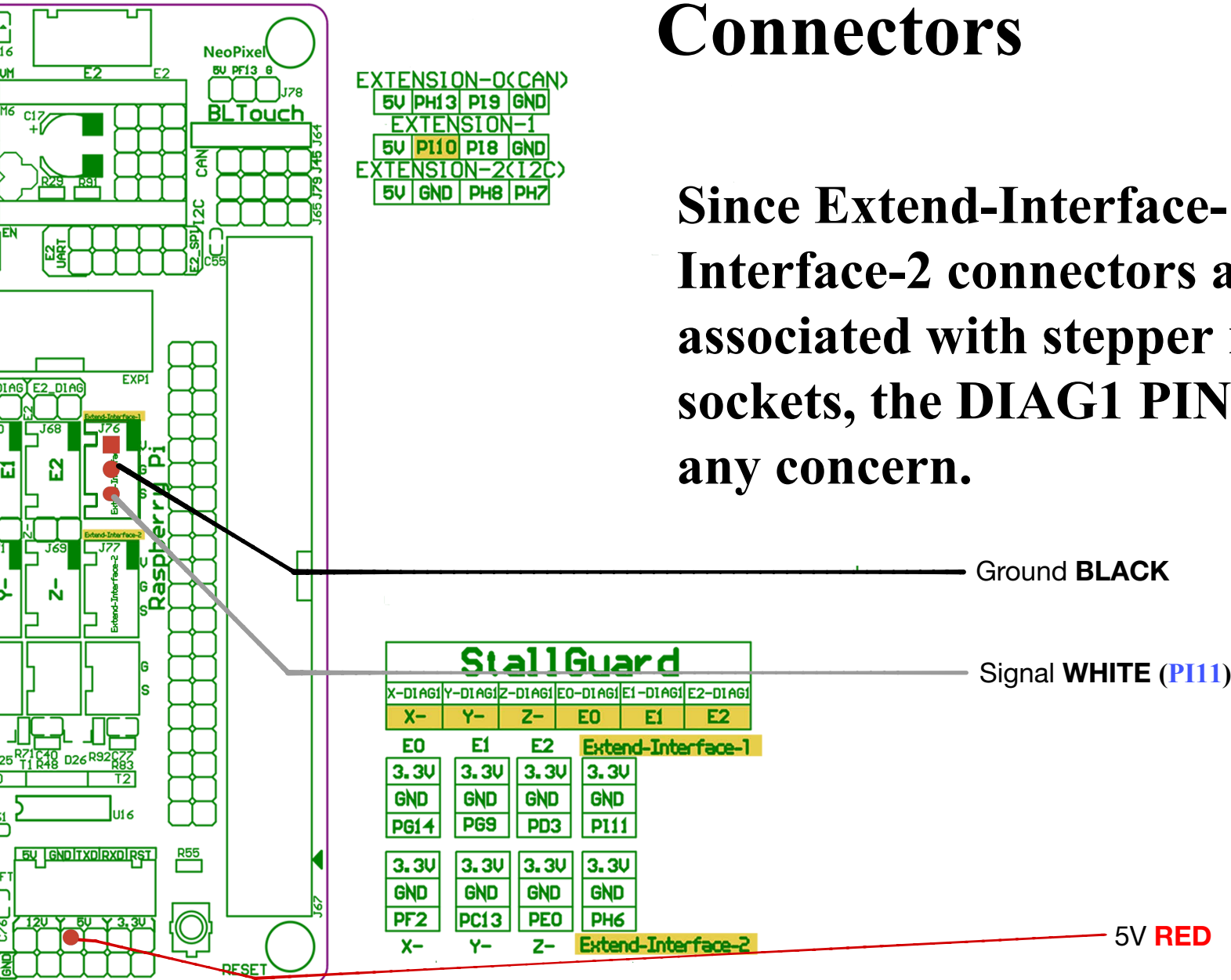


# **Filament Runout Sensor Guide for GTR V1.0 Board**

**If you want to wire the Filament Runout Sensor to Extend-Interface-1 Connector or Extend-Interface-2 Connector go to page 2.**

**If you want to wire the Filament Runout Sensor to an Endstop Connector {X-, Y-, Z-, E0, E1, or E2} then go to page 5.**

# Filament Runout Sensor Wired to Extend-Interface-1/Extend-Interface-2 Connectors



Since Extend-Interface-1 and Extend-Interface-2 connectors are not associated with stepper motor driver sockets, the DIAG1 PIN will not be of any concern.

In this example the Filament Runout Sensor is wired to Extend-Interface-1

# Marlin 2.0.x Setup for Filament Runout Sensor Connected to Extend-Interface-1 Connector

- Define the **FIL\_RUNOUT\_PIN** in pins\_BTT\_GTR\_V1\_0.h file. The pins file for GTR V1.0 board is located in "...\\Marlin\\src\\pins\\stm32f4\\ subdirectory.
- Enter the following lines into the pins\_BTT\_GTR\_V1\_0.h file:

```
#ifndef FIL_RUNOUT_PIN
#define FIL_RUNOUT_PIN          PI11
#endif
```

The screenshot shows the Visual Studio Code interface with the file `pins_BTT_GTR_V1_0.h` open. The Explorer panel on the left shows the project structure, including the `MARLIN-2.0.X` folder and various pin configuration files. The main editor displays the content of `pins_BTT_GTR_V1_0.h`, which includes definitions for various pins and sensors. A green rectangular box highlights the following code block:

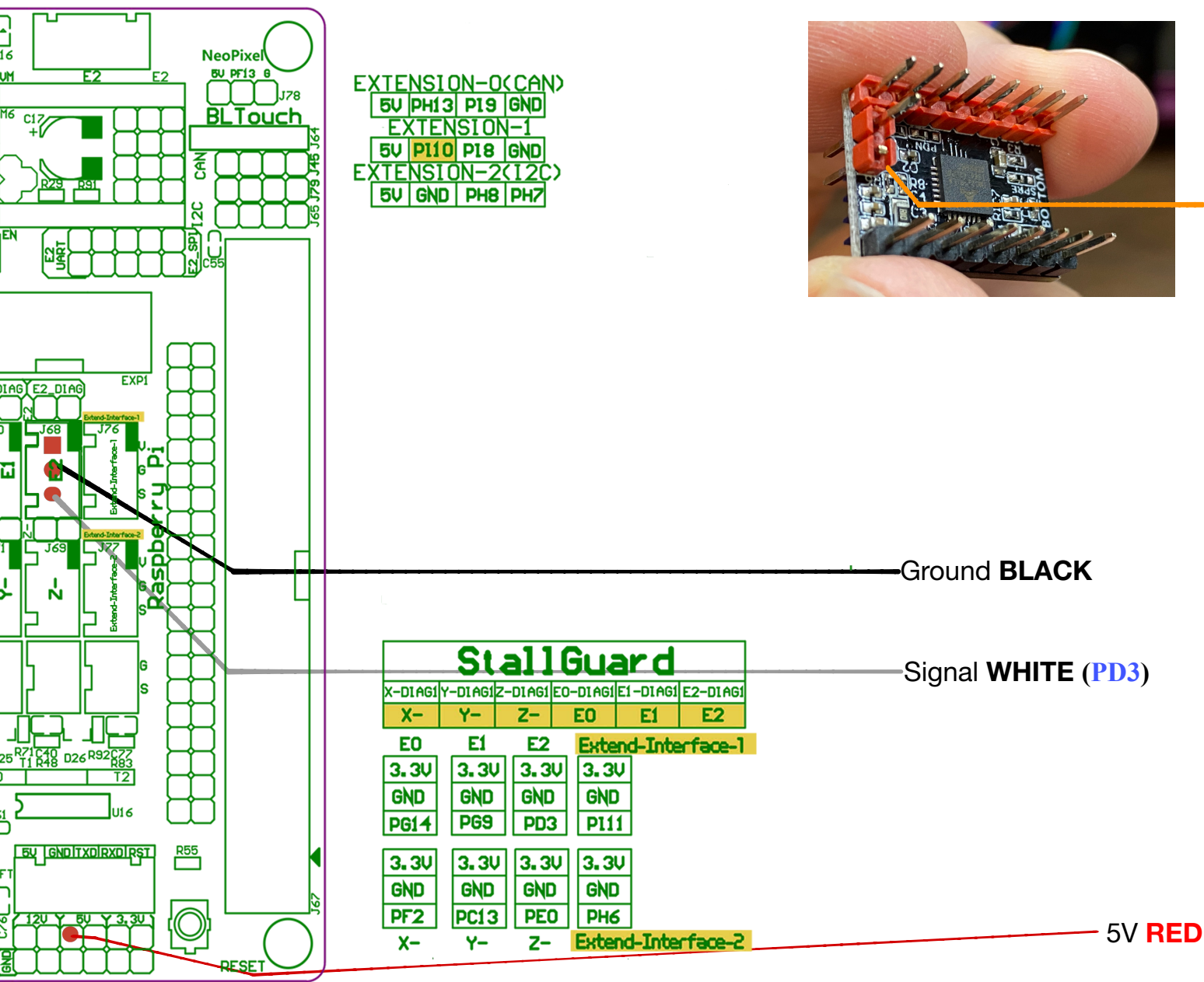
```
#ifndef FIL_RUNOUT_PIN
#define FIL_RUNOUT_PIN          PI11
#endif
```

This code block is located at the bottom of the file, below the definition for `PS_ON_PIN` and above the definitions for `X_MIN_PIN`, `X_MAX_PIN`, `Y_MIN_PIN`, and `Y_MAX_PIN`.

**To Finish the Marlin 2.0.x  
Setup, go to page 7.**

# Filament Runout Sensor Wired to Limit Switch

## {X-, Y-, Z-, E0, E1, or E2}



The filament sensor won't work with the diagnostic pin (DIAG1) of the extruded stepper (or other Limit switches/ Endstops) so you must cut it or use a soldering iron to heat up the pin and slide it up out of the way.

# Marlin 2.0.x Setup for Filament Runout Sensor Connected to E2 Endstop Connector

- Define the **FIL\_RUNOUT\_PIN** in pins\_BTT\_GTR\_V1\_0.h file. The pins file for GTR V1.0 board is located in "...\\Marlin\\src\\pins\\stm32f4\\ subdirectory.
- Enter the following lines into the pins\_BTT\_GTR\_V1\_0.h file:

```
#ifndef FIL_RUNOUT_PIN
#define FIL_RUNOUT_PIN      PD3
#endif
```

```

30  #endif
31
32  #define BOARD_INFO_NAME "BIGTREE GTR 1.0"
33
34  // Use one of these or SDCard-based Emulation will be used
35  // #define I2C_EEPROM
36  // #define SRAM_EEPROM_EMULATION // Use BackSRAM-based EEPROM emulation
37  // #define FLASH_EEPROM_EMULATION // Use Flash-based EEPROM emulation
38
39  #define TP // Enable to define servo and probe pins
40
41  //
42  // Servos
43  //
44  #if ENABLED(TP)
45  | #define SERV00_PIN      PB11
46  #endif
47
48  //
49  // Filament Runout Sensor
50  //
51  // PIN for X- is PF2
52  // PIN for Y- is PC13
53  // PIN for Z- is PE0
54  // PIN for E0 is PG14
55  // PIN for E1 is PG9
56  // PIN for E2 is PD3
57  // PIN for Extend-Interface-1 is PI11
58  // PIN for Extend-Interface-2 is PH6
59  //
60  #ifndef FIL_RUNOUT_PIN
61  | #define FIL_RUNOUT_PIN      PD3
62  #endif
63
64  #define PS_ON_PIN      PH6
65
66  //
67  //
68  //
69  #define X_MIN_PIN      PF2
70  #define X_MAX_PIN      PG14
71  #define Y_MIN_PIN      PC13
72  #define Y_MAX_PIN      PG9

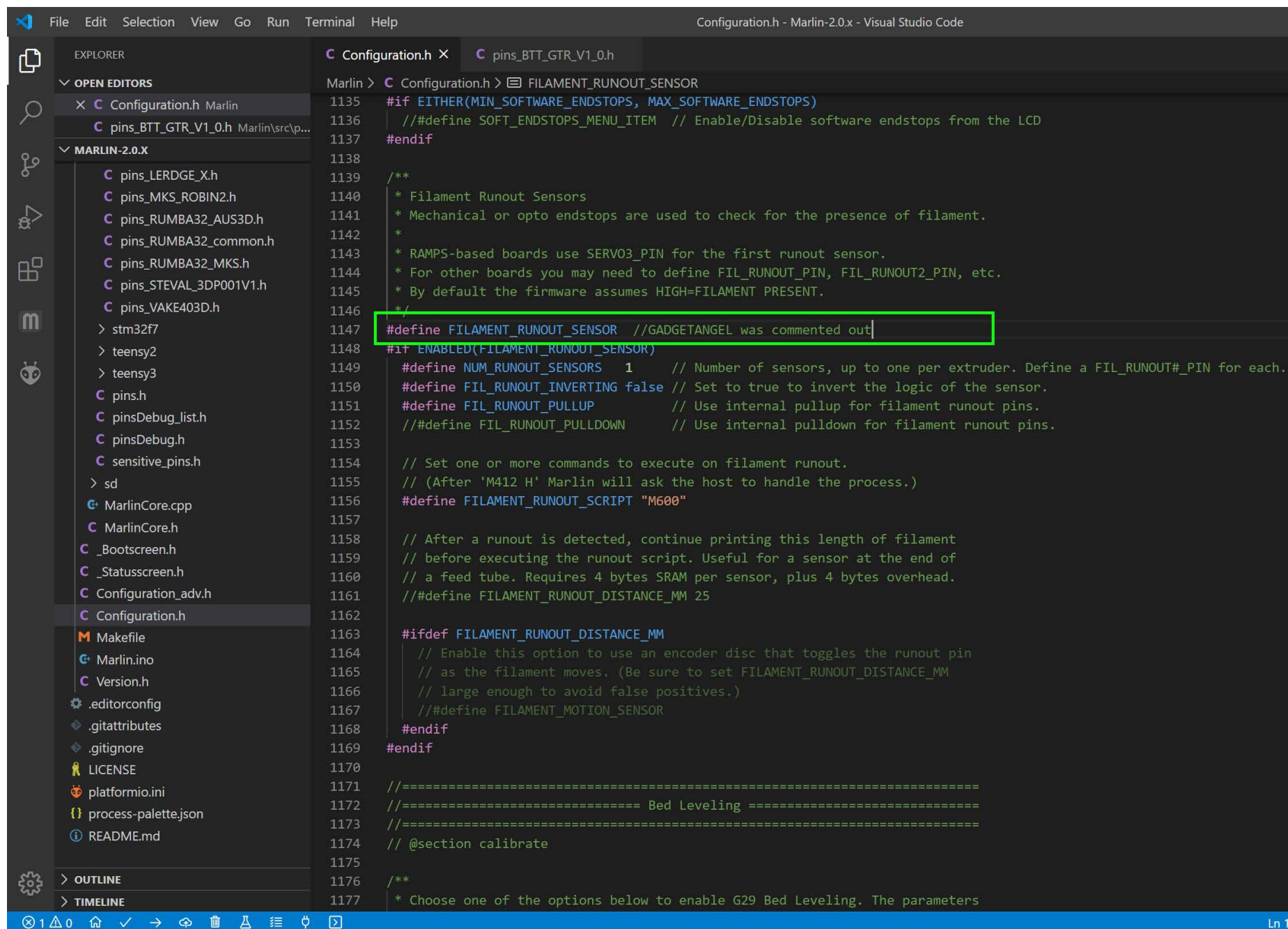
```

# **Marlin 2.0.x Setup Continued for Filament Runout Sensor Wired by Extend-Interface-1 Connector or E2 Endstop Connector.**



# Marlin 2.0.x Setup for Filament Runout Sensor

- In Configuration.h file remove the forward slashes in front of **#define FILAMENT\_RUNOUT\_SENSOR** line



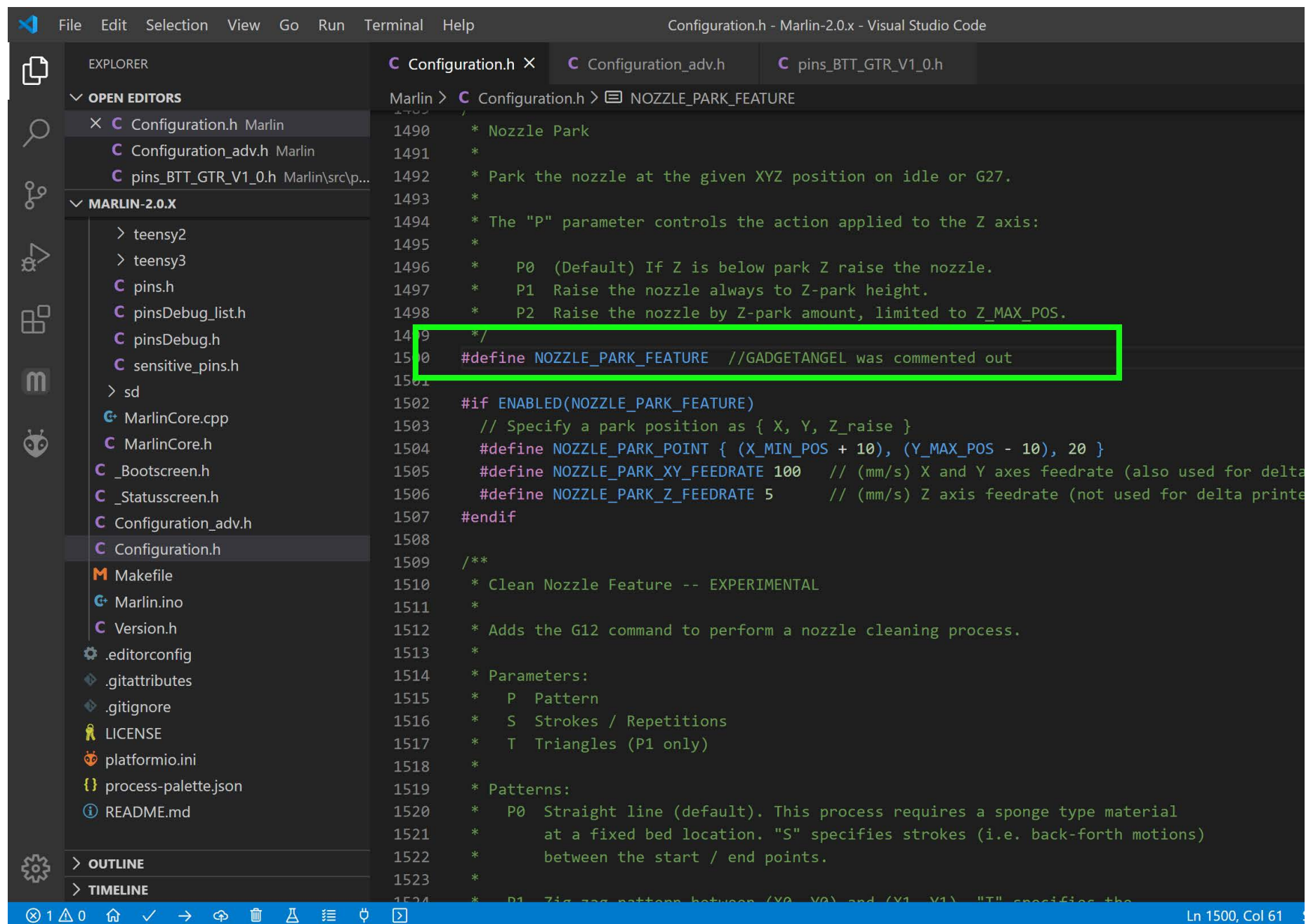
```
Configuration.h - Marlin-2.0.x - Visual Studio Code

Marlin > Configuration.h > FILAMENT_RUNOUT_SENSOR
1135 #if EITHER(MIN_SOFTWARE_ENDSTOPS, MAX_SOFTWARE_ENDSTOPS)
1136 | // #define SOFT_ENDSTOPS_MENU_ITEM // Enable/Disable software endstops from the LCD
1137 #endif
1138
1139 /**
1140  * Filament Runout Sensors
1141  * Mechanical or opto endstops are used to check for the presence of filament.
1142  *
1143  * RAMPS-based boards use SERVO3_PIN for the first runout sensor.
1144  * For other boards you may need to define FIL_RUNOUT_PIN, FIL_RUNOUT2_PIN, etc.
1145  * By default the firmware assumes HIGH=FILAMENT PRESENT.
1146  */
1147 #define FILAMENT_RUNOUT_SENSOR //GADGETANGEL was commented out
1148 #if ENABLED(FILAMENT_RUNOUT_SENSOR)
1149   #define NUM_RUNOUT_SENSORS 1 // Number of sensors, up to one per extruder. Define a FIL_RUNOUT#_PIN for each.
1150   #define FIL_RUNOUT_INVERTING false // Set to true to invert the logic of the sensor.
1151   #define FIL_RUNOUT_PULLUP // Use internal pullup for filament runout pins.
1152   // #define FIL_RUNOUT_PULLDOWN // Use internal pulldown for filament runout pins.
1153
1154   // Set one or more commands to execute on filament runout.
1155   // (After 'M412 H' Marlin will ask the host to handle the process.)
1156   #define FILAMENT_RUNOUT_SCRIPT "M600"
1157
1158   // After a runout is detected, continue printing this length of filament
1159   // before executing the runout script. Useful for a sensor at the end of
1160   // a feed tube. Requires 4 bytes SRAM per sensor, plus 4 bytes overhead.
1161   // #define FILAMENT_RUNOUT_DISTANCE_MM 25
1162
1163   #ifdef FILAMENT_RUNOUT_DISTANCE_MM
1164     // Enable this option to use an encoder disc that toggles the runout pin
1165     // as the filament moves. (Be sure to set FILAMENT_RUNOUT_DISTANCE_MM
1166     // large enough to avoid false positives.)
1167     // #define FILAMENT_MOTION_SENSOR
1168   #endif
1169 #endif
1170
1171 //=====
1172 //===== Bed Leveling =====
1173 //=====
1174 // @section calibrate
1175
1176 /**
1177  * Choose one of the options below to enable G29 Bed Leveling. The parameters
```



# Marlin 2.0.x Setup for Filament Runout Sensor

- In Configuration.h file remove the forward slashes in front of **#define NOZZLE\_PARK\_FEATURE** line



```
Configuration.h - Marlin-2.0.x - Visual Studio Code

Configuration.h x Configuration_adv.h pins_BTT_GTR_V1_0.h

Marlin > Configuration.h > NOZZLE_PARK_FEATURE

1490 * Nozzle Park
1491 *
1492 * Park the nozzle at the given XYZ position on idle or G27.
1493 *
1494 * The "P" parameter controls the action applied to the Z axis:
1495 *
1496 * P0 (Default) If Z is below park Z raise the nozzle.
1497 * P1 Raise the nozzle always to Z-park height.
1498 * P2 Raise the nozzle by Z-park amount, limited to Z_MAX_POS.
1499 */
1500 #define NOZZLE_PARK_FEATURE //GADGETANGEL was commented out
1501
1502 #if ENABLED(NOZZLE_PARK_FEATURE)
1503   // Specify a park position as { X, Y, Z_raise }
1504   #define NOZZLE_PARK_POINT { (X_MIN_POS + 10), (Y_MAX_POS - 10), 20 }
1505   #define NOZZLE_PARK_XY_FEEDRATE 100 // (mm/s) X and Y axes feedrate (also used for delta
1506   #define NOZZLE_PARK_Z_FEEDRATE 5 // (mm/s) Z axis feedrate (not used for delta printers)
1507 #endif
1508
1509 /**
1510  * Clean Nozzle Feature -- EXPERIMENTAL
1511  *
1512  * Adds the G12 command to perform a nozzle cleaning process.
1513  *
1514  * Parameters:
1515  *   P Pattern
1516  *   S Strokes / Repetitions
1517  *   T Triangles (P1 only)
1518  *
1519  * Patterns:
1520  *   P0 Straight line (default). This process requires a sponge type material
1521  *   at a fixed bed location. "S" specifies strokes (i.e. back-forth motions)
1522  *   between the start / end points.
1523  *
1524  *   P1 Zig-zag pattern between (X0, Y0) and (X1, Y1). "T" specifies the
```

# Marlin 2.0.x Setup for Filament Runout Sensor

- In Configuration\_adv.h file remove the forward slashes before **#define ADVANCED\_PAUSE\_FEATURE**

```

1851 // #define TOOLCHANGE_PARK
1852 #if ENABLED(TOOLCHANGE_PARK)
1853   #define TOOLCHANGE_PARK_XY    { X_MIN_POS + 10, Y_MIN_POS + 10 }
1854   #define TOOLCHANGE_PARK_XY_FEEDRATE 6000 // (mm/m)
1855 #endif
1856 #endif
1857
1858 /**
1859  * Advanced Pause
1860  * Experimental feature for filament change support and for parking the nozzle when paused.
1861  * Adds the GCode M600 for initiating filament change.
1862  * If PARK_HEAD_ON_PAUSE enabled, adds the GCode M125 to pause printing and park the nozzle.
1863  *
1864  * Requires an LCD display.
1865  * Requires NOZZLE_PARK_FEATURE.
1866  * This feature is required for the default FILAMENT_RUNOUT_SCRIPT.
1867  */
1868 #define ADVANCED_PAUSE_FEATURE //GADGETANGEL was commented out
1869 #if ENABLED(ADVANCED_PAUSE_FEATURE)
1870   #define PAUSE_PARK_RETRACT_FEEDRATE    60 // (mm/s) Initial retract feedrate.
1871   #define PAUSE_PARK_RETRACT_LENGTH      2 // (mm) Initial retract.
1872   // This short retract is done immediately, before parking the nozzle.
1873   #define FILAMENT_CHANGE_UNLOAD_FEEDRATE 10 // (mm/s) Unload filament feedrate. This can be pretty fast.
1874   #define FILAMENT_CHANGE_UNLOAD_ACCEL   25 // (mm/s^2) Lower acceleration may allow a faster feedrate.
1875   #define FILAMENT_CHANGE_UNLOAD_LENGTH  100 // (mm) The length of filament for a complete unload.
1876   // For Bowden, the full length of the tube and nozzle.
1877   // For direct drive, the full length of the nozzle.
1878   // Set to 0 for manual unloading.
1879   #define FILAMENT_CHANGE_SLOW_LOAD_FEEDRATE 6 // (mm/s) Slow move when starting load.
1880   #define FILAMENT_CHANGE_SLOW_LOAD_LENGTH  0 // (mm) Slow length, to allow time to insert material.
1881   // 0 to disable start loading and skip to fast load only
1882   #define FILAMENT_CHANGE_FAST_LOAD_FEEDRATE 6 // (mm/s) Load filament feedrate. This can be pretty fast.
1883   #define FILAMENT_CHANGE_FAST_LOAD_ACCEL   25 // (mm/s^2) Lower acceleration may allow a faster feedrate.
1884   #define FILAMENT_CHANGE_FAST_LOAD_LENGTH  0 // (mm) Load length of filament, from extruder gear to nozzle.
1885   // For Bowden, the full length of the tube and nozzle.
1886   // For direct drive, the full length of the nozzle.
1887   // #define ADVANCED_PAUSE_CONTINUOUS_PURGE // Purge continuously up to the purge length until interrupted.
1888   #define ADVANCED_PAUSE_PURGE_FEEDRATE    3 // (mm/s) Extrude feedrate (after loading). Should be slower than load feedrate.
1889   #define ADVANCED_PAUSE_PURGE_LENGTH      50 // (mm) Length to extrude after loading.
1890   // Set to 0 for manual extrusion.
1891   // Filament can be extruded repeatedly from the Filament Change menu
1892   // until extrusion is consistent, and to purge old filament.
1893   #define ADVANCED_PAUSE_RESUME_PRIME      0 // (mm) Extra distance to prime nozzle after returning from park.
1894   // #define ADVANCED_PAUSE_FANS_PAUSE // Turn off print-cooling fans while the machine is paused.
1895
1896   // Filament Unload does a Retract, Delay, and Purge first:
1897   #define FILAMENT_UNLOAD_PURGE_RETRACT    13 // (mm) Unload initial retract length.
1898   #define FILAMENT_UNLOAD_PURGE_DELAY      5000 // (ms) Delay for the filament to cool after retract.
1899   #define FILAMENT_UNLOAD_PURGE_LENGTH      8 // (mm) An unretract is done, then this length is purged.
1900   #define FILAMENT_UNLOAD_PURGE_FEEDRATE   25 // (mm/s) feedrate to purge before unload
1901
1902   #define PAUSE_PARK_NOZZLE_TIMEOUT        45 // (seconds) Time limit before the nozzle is turned off for safety.
1903   #define FILAMENT_CHANGE_ALERT_BEEPS     10 // Number of alert beeps to play when a response is needed.
1904   #define PAUSE_PARK_NO_STEPPER_TIMEOUT   // Enable for XYZ steppers to stay powered on during filament change.
1905
1906   // #define PARK_HEAD_ON_PAUSE // Park the nozzle during pause and filament change.
1907   // #define HOME_BEFORE_FILAMENT_CHANGE // Ensure homing has been completed prior to parking for filament change
1908
1909   // #define FILAMENT_LOAD_UNLOAD_GCODES // Add M701/M702 Load/Unload G-codes, plus Load/Unload in the LCD Prepare menu.
1910   // #define FILAMENT_UNLOAD_ALL_EXTRUDERS // Allow M702 to unload all extruders above a minimum target temp (as set by M302)
1911 #endif
1912
1913 // @section tmc
1914

```

## **Marlin 2.0.x Setup for Filament Runout Sensor**

- **keep the settings to the same as above until the filament sensor is working. Afterwards you are free to tweak away.**
- **All Finished with setting up the filament runout sensor!!**
- **Use a spare strip of filament and feed it through the filament runout sensor. Start a print, and then pull the filament strip out of the filament runout sensor.**
- **If filament runout sensor is working, the printer will have paused and if this was not a test, you would then load in new filament.**