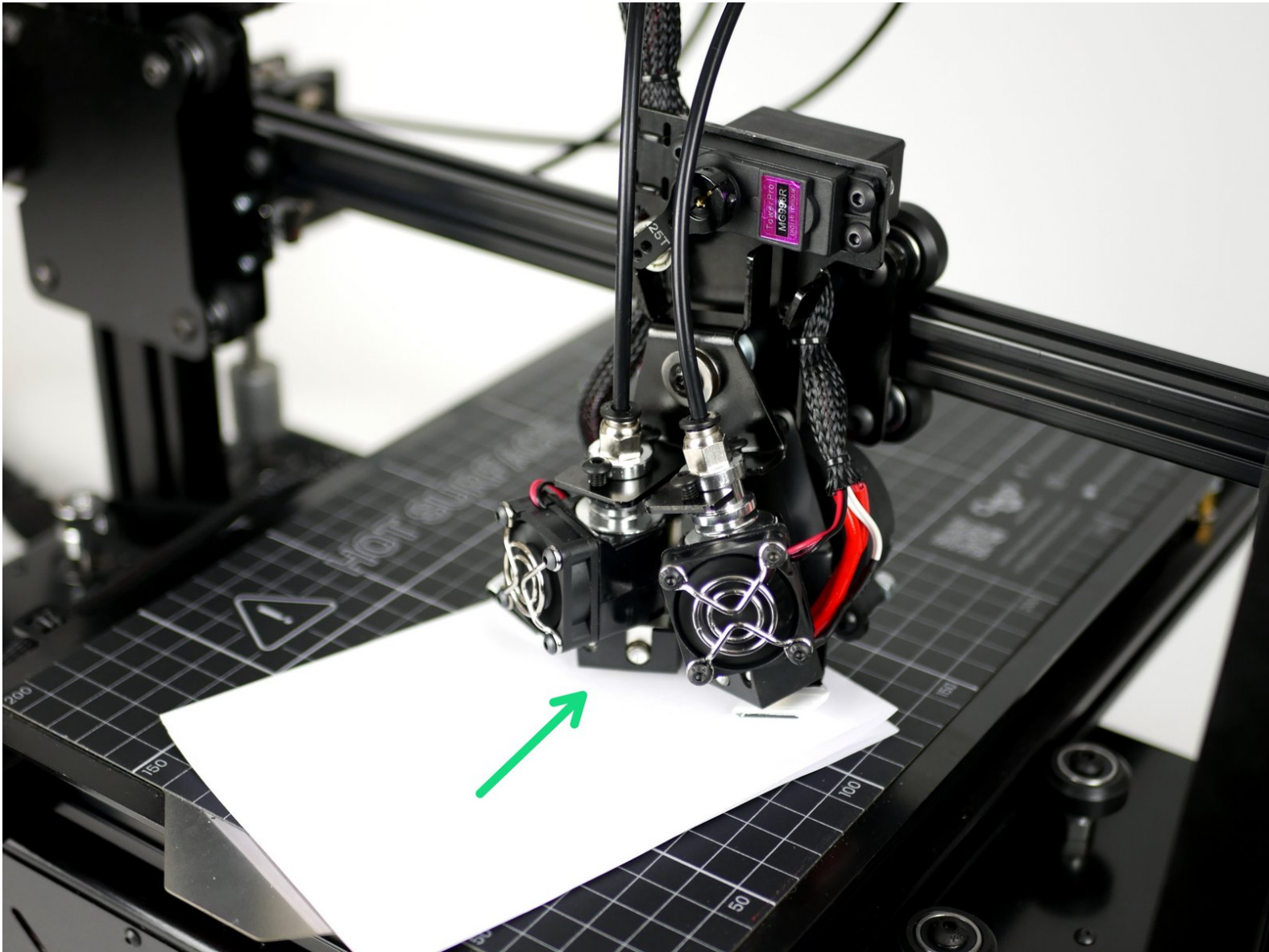


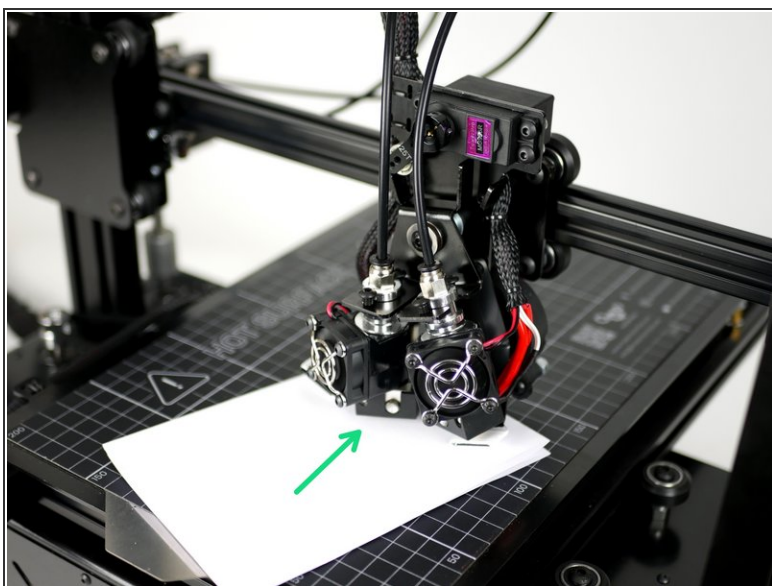
# Makertech

## DSE Only - Stage 10: Hotend #1/#2 Offset

Written By: Makertech



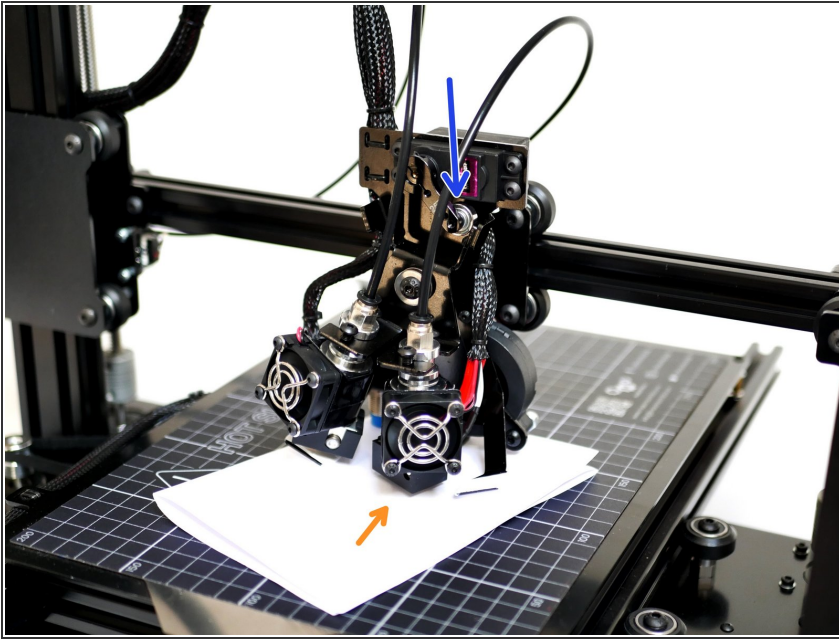
## Step 1 — Prepare Hotend #1



 This step is the same as the [last step](#) from the previous stage.

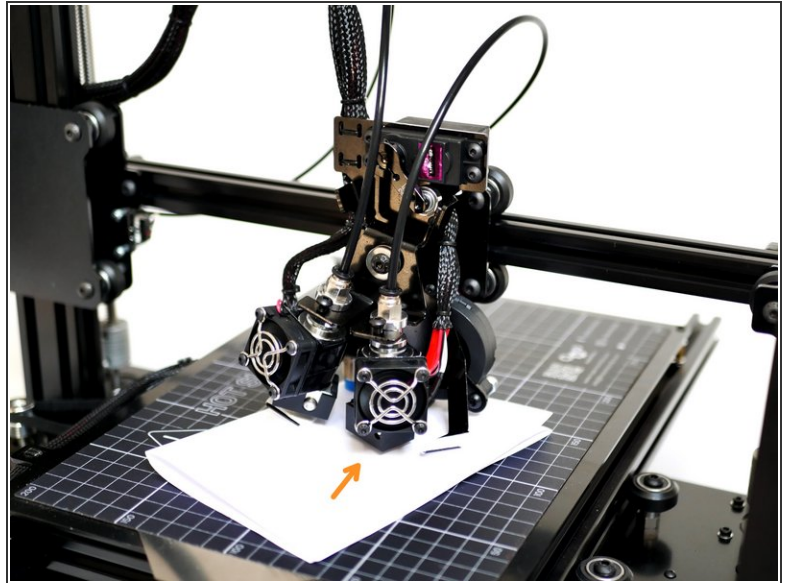
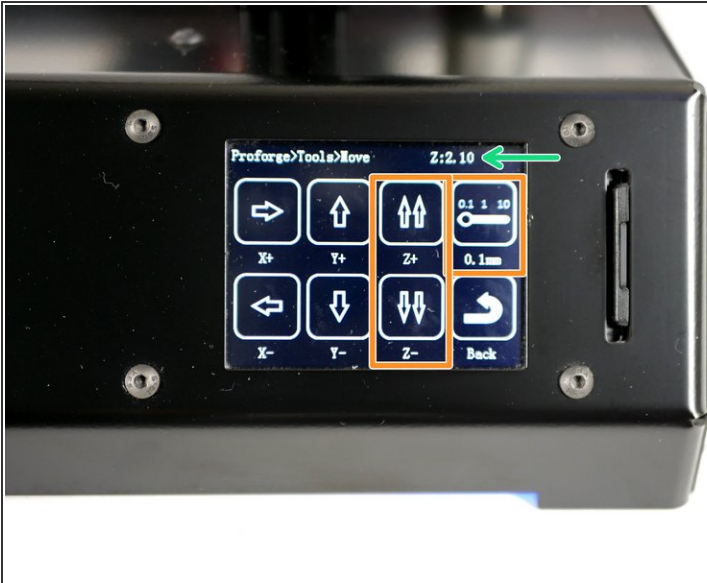
- After homing all of the axes place a folded piece of paper between the print surface and the nozzle of Hotend #1.
- Lower the Hotend in 0.1mm increments until the paper begins to be gripped by the nozzle.
- Make a note of the Z height displayed on the top right of the touch screen when the paper begins to be gripped. (This value will be 3.00mm to begin with, this is normal.)
- ☑ In this case it ended up being 1.90mm when the paper began to be gripped, but this value will likely be different for everyone.

## Step 2 — Switching to Hotend #2



- After sending a T1 command Hotend #2 should now be selected.
- The folded piece of paper should now also be between the nozzle of Hotend #2 and the print surface.

## Step 3 — Hotend #2 Z-Height



- Raise or lower the Hotend in 0.1mm increments until the friction between the paper and nozzle is the same as what the friction between the paper and the nozzle of Hotend #1 was.
- ☒ To compare again you can send a T0 command to switch back then move the gantry to the Z value from step 1 (in our case 1.9mm).
- Once happy, make a note of the Z position of Hotend #2.
- In our case this was 2.10mm when the paper began to be gripped, but this value will likely be different for everyone.



## Step 4 — Hotend #1/#2 Offset Calculation



- To find the offset value we need to do:
  - (Step 1 Z value) - (Step 3 Z value)
- So in this example:
  - Offset = 1.9 - 2.1 = **-0.2**

## Step 5 — Entering the Offset into the Firmware

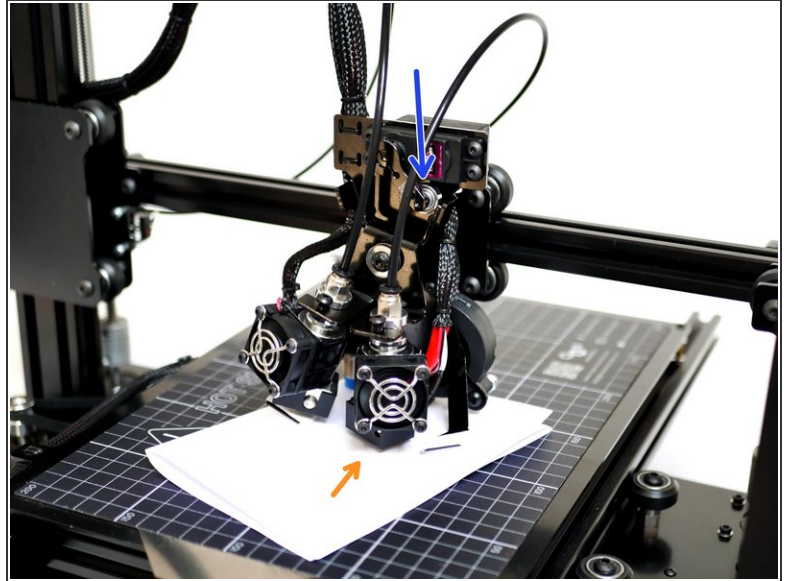
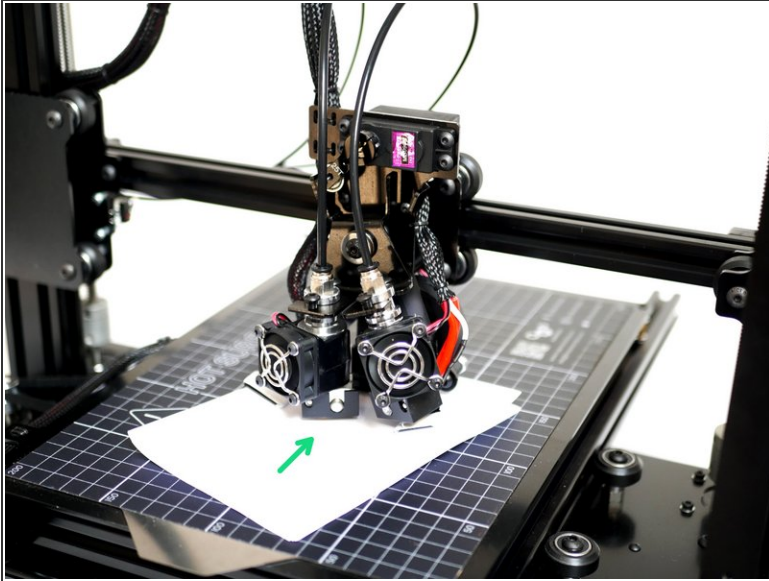
```

190 #define SWITCHING_NOZZLE_SERVO_ANGLES { 0, 100 } // Angles for E0, E1
191 #define HOTEND_OFFSET_Z { 0.0, -0.2 }
192 #endif
193
194 /**
195  * Two separate X-carriages with extruders that connect to a moving part
196  * via a magnetic docking mechanism. Requires SOL1_PIN and SOL2_PIN.
197  */
198 //
199 // #define PARKING_EXTRUDER
200 #if ENABLED(PARKING_EXTRUDER)
201 #define PARKING_EXTRUDER_SOLENOIDS_INVERT // If enabled, the solenoid is NOT magnetized with applied voltage
202 #define PARKING_EXTRUDER_SOLENOIDS_PINS_ACTIVE LOW // LOW or HIGH pin signal energizes the coil
203 #define PARKING_EXTRUDER_SOLENOIDS_DELAY 250 // Delay (ms) for magnetic field. No delay if 0 or not defined.
204 #define PARKING_EXTRUDER_PARKING_X { -75, 154 } // X positions for parking the extruders
205 #define PARKING_EXTRUDER_COAST_DISTANCE 1 // mm to move beyond the parking point to grab the extruder
206 #define PARKING_EXTRUDER_SECURITY_RAISE 5 // Z-raise before parking
207 #define HOTEND_OFFSET_Z { 0.0, 1.3 } // Z-offsets of the two hotends. The first must be 0.

```

- ❗ Power off the printer.
- ❗ Open up the *marlin.ino* firmware file in the Arduino IDE, go to the Configuration.h tab.
  - Scroll down to line #191
  - Enter in your calculated Z-offset value.
    - 📌 In our case this was -0.2
- ❗ Connect your computer to the printer and upload the firmware.

## Step 6 — Checking Hotend Offset



- i* Home all of the Axes.
  - Place the folded piece of paper onto the print surface under Hotend #1
- i* Lower the Z-Axis to your Z-offset height from Step 1. In our case it was 1.9mm.
- i* You should now be able to feel some friction between the paper and nozzle.
  - Send a T1 command to select the second Hotend.
  - You should now also be able to feel the same friction between the paper and Hotend #2's nozzle.

## Step 7 — Further Adjustment



### *i* Less friction with Nozzle #2:

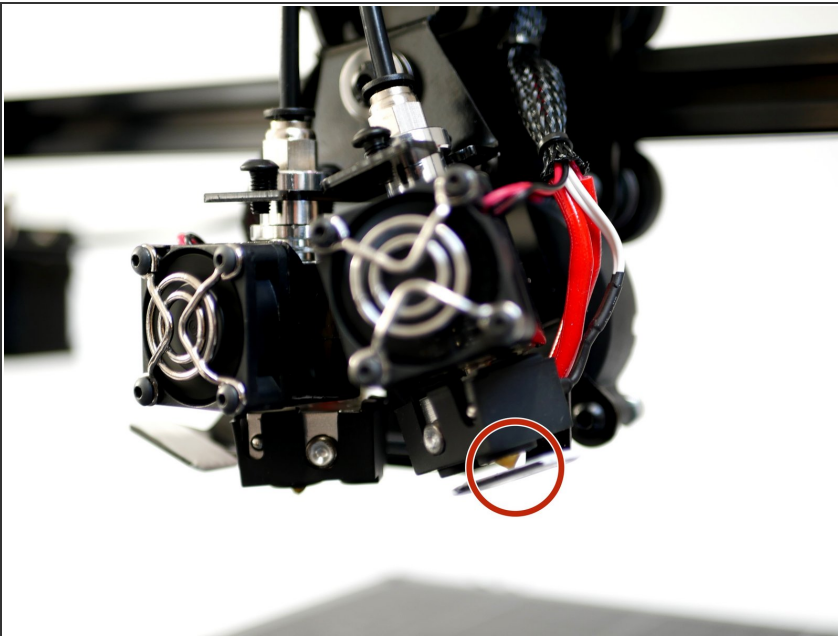
- Increase the offset by 0.05, so new offset would become in our case -0.15

### *i* More friction with Nozzle #2:

- Decrease the offset, so new offset would become in our case -0.25.

### *i* Re-upload the firmware and check again as outlined in the previous step until you are happy with the offset.

## Step 8 — Ooze Shields



- Check that when one Hotend is selected the other has its nozzle against the ooze shield.

### *i* You can correct the ooze shield by carefully bending it to adjust the position of a sled.

