Klipper Tuning

1. Tune the heat points:
   1. PID\_CALIBRATE heater=extruder target=210
   2. SAVE\_CONFIG
   3. PID\_CALIBRATE heater=heater\_bed target=65
   4. SAVE\_CONFIG
2. Extruder E-steps Calibration:
   1. Disassembly the Bowden tube from the extruder
   2. Check extisting esteps:
      1. M92
      2. M503 \* Look for M92
      3. Heat bed to normal printing temperature
      4. M83
      5. Mark the filament at 120mm
      6. G1 E100 F50
      7. Measure remaining
      8. Enter information here: [Teaching Tech 3D Printer Calibration (teachingtechyt.github.io)](https://teachingtechyt.github.io/calibration.html#esteps)

Oriole: 22.895

Raven: 23.108

1. Setting offset for BLTouch (Bed leveling)
   1. BLTOUCH\_DEBUG COMMAND=pin\_down
   2. BLTOUCH\_DEBUG COMMAND=pin\_up
   3. BLTOUCH\_DEBUG COMMAND=pin\_down
   4. BLTOUCH\_DEBUG COMMAND=touch\_mode
   5. QUERY\_PROBE (probe: open RETURNED)
   6. *touch the pin*
   7. QUERY\_PROBE (probe: triggered RETURNED)
   8. *adjust the x and y offsets with a dot on a post-it under the pin*
   9. subtract ending position from the beginning (-46.5 for x axis and -6.3 for the y axis for both printers)
   10. PROBE\_CALIBRATE
   11. *paper test when complete (3.799 for Oriole and 4.325 for Raven)*
   12. ACCEPT
   13. SAVE\_CONFIG

*\*NOTE: Before doing the next 2 steps, unscrew the bed screws all the way and turn them back 1 full turn.*

1. Bed Tramming
   1. Find the four points where the BLTouch is exactly over the bed screws

Oriole:

screw1: 75.9, 37.8

screw1\_name: front left screw

screw2: 249, 37.8

screw2\_name: front right screw

screw3: 249, 207.9

screw3\_name: rear right screw

screw4: 75.9, 207.9

screw4\_name: rear left screw

Raven:

screw1: 75.9, 39.8

screw1\_name: front left screw

screw2: 246, 39.8

screw2\_name: front right screw

screw3: 246, 208

screw3\_name: rear right screw

screw4: 75.9, 208

screw4\_name: rear left screw

1. Input shaping #Reference: https://mellow.klipper.cn/?spm=a2g0o.detail.1000023.1.35244c56Ho6O5M#/advanced/usb\_adxl
   1. Install on Pi
      1. *Press and hold the BOOT button of the USB accelerometer and connect the USB to the host computer*
      2. *Connect through SSH*
      3. *Build firmware for ADXL:*
         1. cd ~/klipper/
         2. ENTER
         3. make menuconfig
         4. ENTER

*\*the setup for Mellow's ADXL345 accelerometer module (mine)*

[\*] Enable extra low-level configuration options Micro-controller Architecture (STMicroelectronics STM32) Processor model (STM32F103)

Micro-controller Architecture (Raspberry Pi RP2040) --->

Bootloader offset (No bootloader) --->

Flash chip (W25Q080 with CLKDIV 2) --->

Communication interface (USB) --->

USB ids --->

() GPIO pins to set at micro-controller startup

* 1. *Identify the address of the ADXL:*

lsusb

* 1. Look for \* ID 2e8a:0003 Raspberry Pi RP2 Boot \* **make note of 6th column** \*

Bus 007 Device 002: ID **2e8a:0003** Raspberry Pi RP2 Boot

* 1. Flash firmware:
     1. cd ~/klipper/
     2. make flash FLASH\_DEVICE=**2e8a:0003**
  2. Configure host device for auto input shaping:
     1. sudo apt update
     2. *ENTER*
     3. sudo apt install python3-numpy python3-matplotlib libatlas-base-dev
     4. *ENTER*
     5. ~/klippy-env/bin/pip install matplotlib numpy
     6. *ENTER*
  3. Create config file
     1. Go to MACHINE of Mainsail
     2. Create input\_shaper.cfg
     3. EDIT

Add:

[mcu adxl]

serial: /dev/serial/by-id/usb-Klipper\_rp2040\_E6626005A76C4F34-if00

[adxl345]

cs\_pin: adxl:gpio9

spi\_software\_sclk\_pin: adxl:gpio10

spi\_software\_mosi\_pin: adxl:gpio11

spi\_software\_miso\_pin: adxl:gpio12

[resonance\_tester]

accel\_chip: adxl345

probe\_points: 100, 100, 20 # This coordinate is the position you need to measure, usually in the middle of the heating bed

* 1. Check Accelerometer:
     1. ACCELEROMETER\_QUERY
     2. MEASURE\_AXES\_NOISE
  2. Run Tests(Manual computation): #This is for when you want to determine the values
     1. TEST\_RESONANCES AXIS=X
     2. TEST\_RESONANCES AXIS=Y

*Raven:*

*Resonances data written to /tmp/resonances\_x\_20240901\_213638.csv file*

*Resonances data written to /tmp/resonances\_y\_20240901\_214155.csv file*

*Oriole:*

*Resonances data written to /tmp/resonances\_x\_20240902\_130826.csv file*

*Resonances data written to /tmp/resonances\_y\_20240902\_130346.csv file*

* 1. Compile Test info:
     1. ~/klipper/scripts/calibrate\_shaper.py /tmp/resonances\_x\_\*.csv -o /tmp/shaper\_calibrate\_x.png
     2. ~/klipper/scripts/calibrate\_shaper.py /tmp/resonances\_y\_\*.csv -o /tmp/shaper\_calibrate\_y.png
  2. Run Test ALT (auto computation and addition): #This is where Klipper determines the values
  3. SHAPER\_CALIBRATE AXIS=X
  4. SHAPER\_CALIBRATE AXIS=Y
  5. SAVE\_CONFIG

Input Shaper template for input\_shaper.cfg file: # Must add and comment out the rest if you are manually determining the codes

[input\_shaper]

shaper\_freq\_x:

shaper\_type\_x:

shaper\_freq\_y:

shaper\_type\_y:

1. Baseline Print
2. Slicer flow
   1. Checked flow rate through G-code created on [Teaching Tech 3D Printer Calibration (teachingtechyt.github.io)](https://teachingtechyt.github.io/calibration.html#flow)
   2. Oriole: 86.96
   3. Raven: 92.31
3. Temperature tuning
   1. Checked flow rate through G-code created on [Teaching Tech 3D Printer Calibration (teachingtechyt.github.io)](https://teachingtechyt.github.io/calibration.html#temp)
   2. Oriole:
   3. Raven:
4. Pressure Advance

References https://www.klipper3d.org/Pressure\_Advance.html # Klipper documentation

https://realdeuce.github.io/Voron/PA/pressure\_advance.html # Generates the gcode needed for .stl files

1. Check the Start G-code:

Should be:

M190 S60 \* Set for bed temp

M109 S210 \* Set for hotend temp

START\_PRINT

1. Check Retraction Distance: \* From slicer software (Cura)

Should be: 6.5

1. Check Layer Height: \* From slicer software (Cura)

Should be: 0.8

1. Check Print Bed:

Should be:

Bed Size X: 220

Bed Size Y: 220

1. Check Speed section: \* From slicer software (Cura)

Should be:

Use mm/s: Checked

Slow Printing speed: 5 \* Leave

Fast Printing speed: 60 \* Outer Wall Speed

Movement Speed: 200

Retract Speed: 25

Unretract Speed: 25

Acceleration: 3000