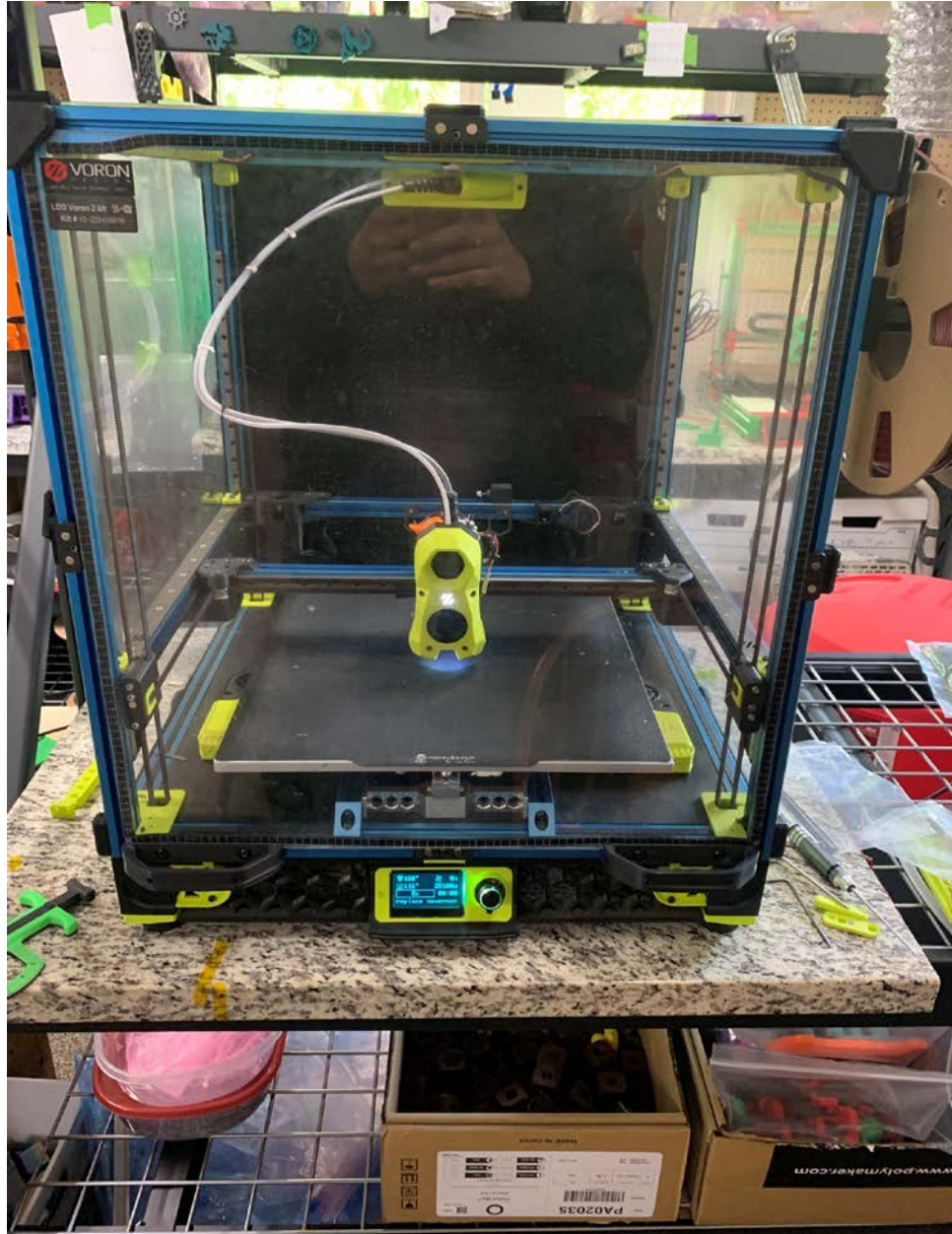


# Shaketune vs. Klipper

Comparison between the input shapers

# Voron V2.4 350 - 3812



# Printer Mods

- Stealth Burner
- Mellow Fly SB-2040 toolhead board
- Rapido v1
- 0.4 CHT
- Umbilical – using igus cable (prefer 3do cable)
- Rama Idlers
- Pin Mod (xy joints and AB motor mounts)
- Hartk umbilical pass through
- Nevermore x2 on left and right side of build plate
- Mandala Rose Works build plate with magnets
- Mandala Rose Works Kinematic Kit
- TI backers (x and y)
- FlexTap (AndrewMcGr)

# What is the difference

- Klipper uses a default damping ratio of 0.1 in the calculation of the shapers.
- Shaketune uses the damping ratio calculated from the measured graphs in the calculation of shapers.
- Both use the built-in TEST\_RESONANCE macro to run.
- Thus, the major difference is how the shaper values are calculated

# Belt Shaper

- Shaketune

- Click “Belt Shaper Calibration” in mainsail
- Files in mainsail in config files

- Klipper

- [https://www.klipper3d.org/Measuring\\_Resonances.html#testing-custom-axes](https://www.klipper3d.org/Measuring_Resonances.html#testing-custom-axes)
- Commands (run individually in this order)
  - TEST\_RESONANCES AXIS=1,1 OUTPUT=raw\_data
  - TEST\_RESONANCES AXIS=1,-1 OUTPUT=raw\_data
  - ~/klipper/scripts/graph\_accelerometer.py -c /tmp/raw\_data\_axis\*.csv -o /tmp/resonances.png (ssh)
- Files in /tmp

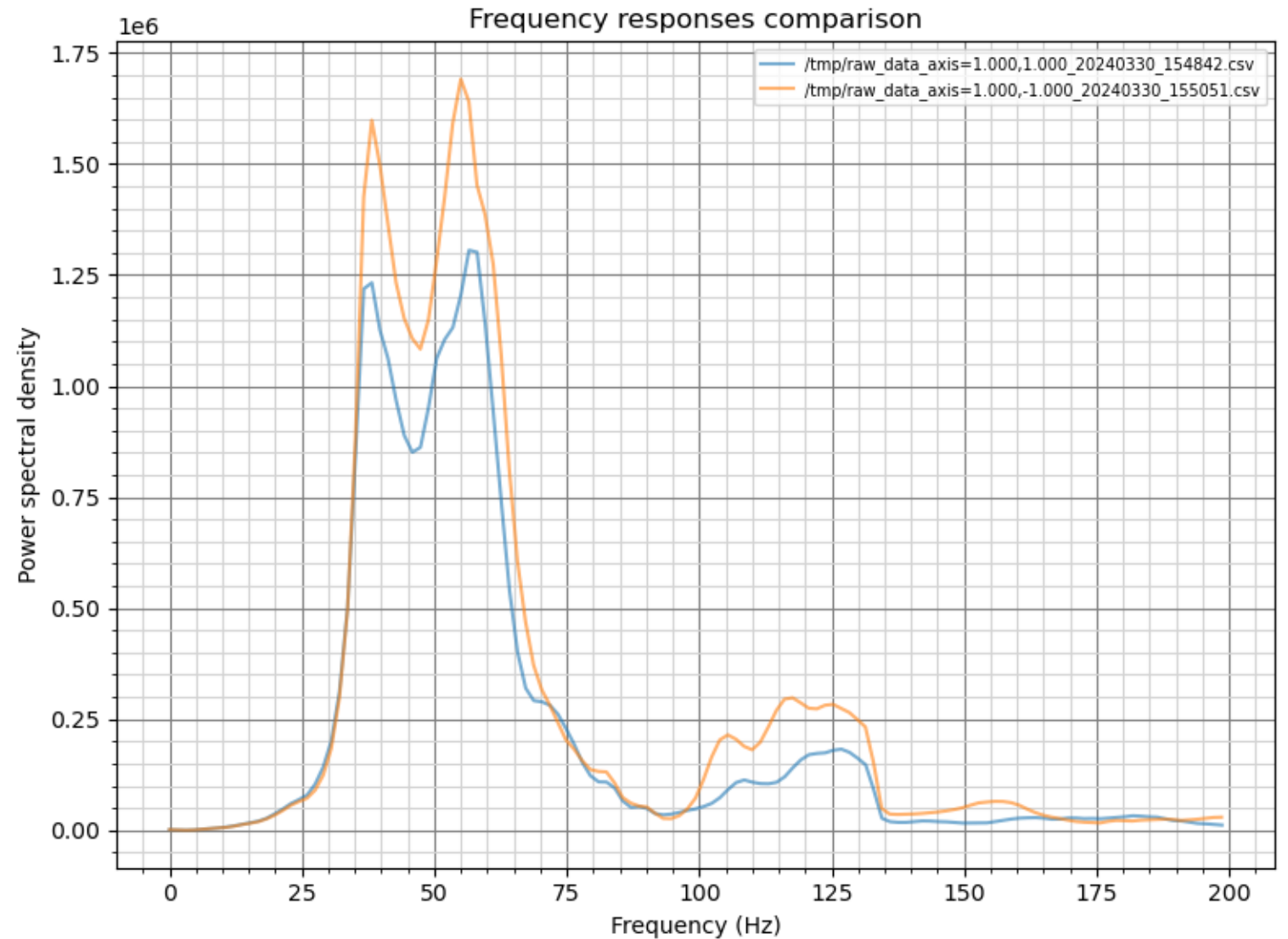
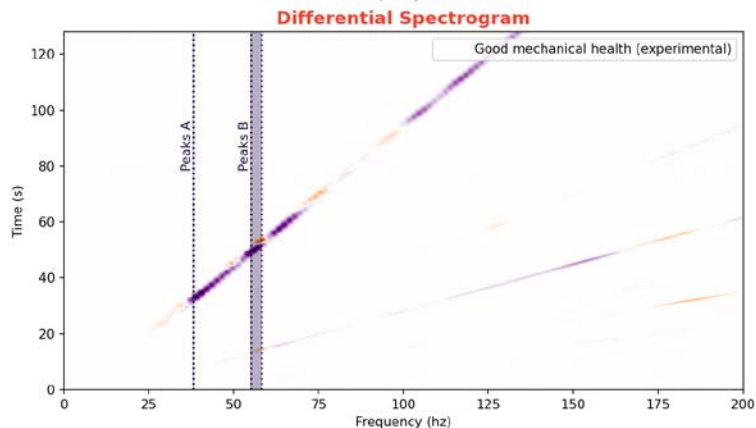
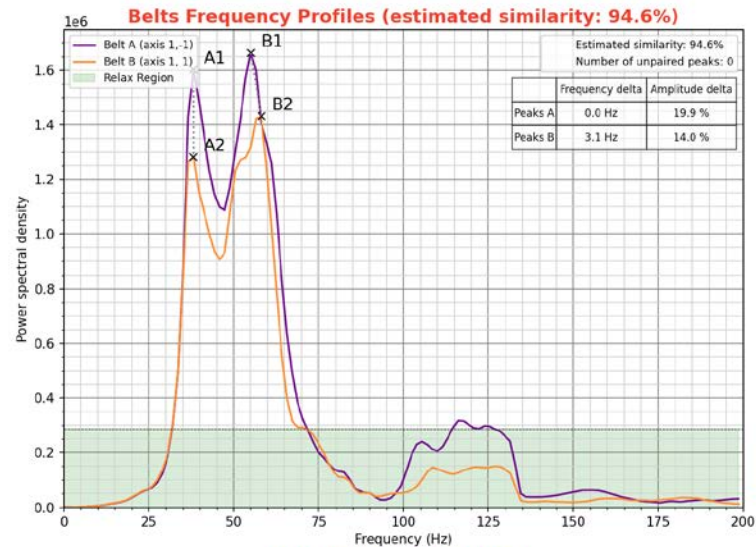
# BeltShaper with FlexTap



## RELATIVE BELT CALIBRATION TOOL

30/03/24 15:42:11

v2.6.1-1-gb7a98d



# Input Shaper

- Shaketune
  - Click “Axes Shaper Calibration” in mainsail
  - Files in mainsail in config files
- Klipper
  - [https://www.klipper3d.org/Measuring\\_Resonances.html#testing-custom-axes](https://www.klipper3d.org/Measuring_Resonances.html#testing-custom-axes)
  - Commands (run individually in this order)
    - TEST\_RESONANCES AXIS=X
    - `~/klipper/scripts/calibrate_shaper.py /tmp/resonances_x_*.csv -o /tmp/shaper_calibrate_x.png`  
(ssh)
    - TEST\_RESONANCES AXIS=Y
    - `~/klipper/scripts/calibrate_shaper.py /tmp/resonances_y_*.csv -o /tmp/shaper_calibrate_y.png`  
(ssh)
  - Files in /tmp



# Input Shaper = x (FlexTap)

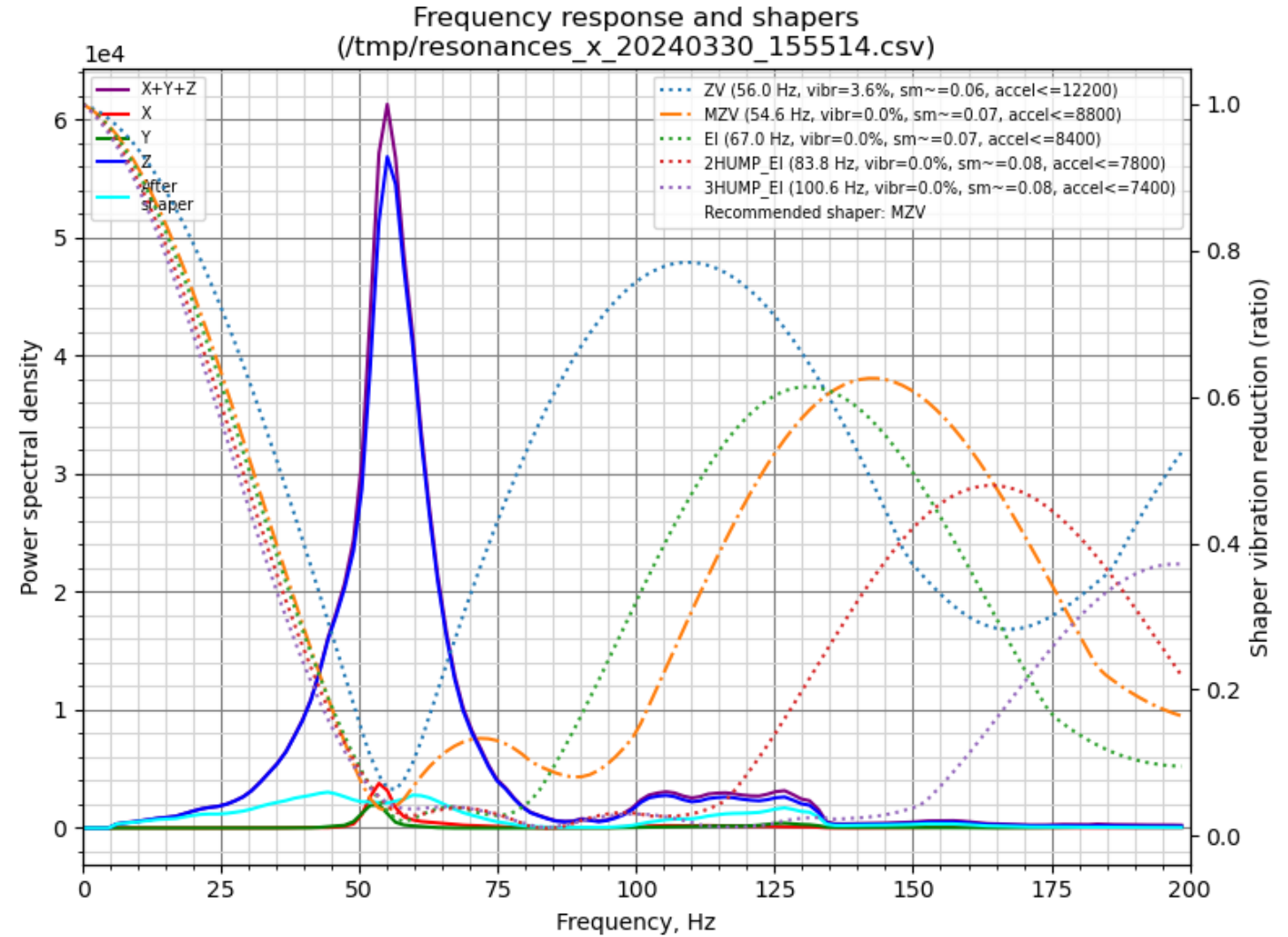
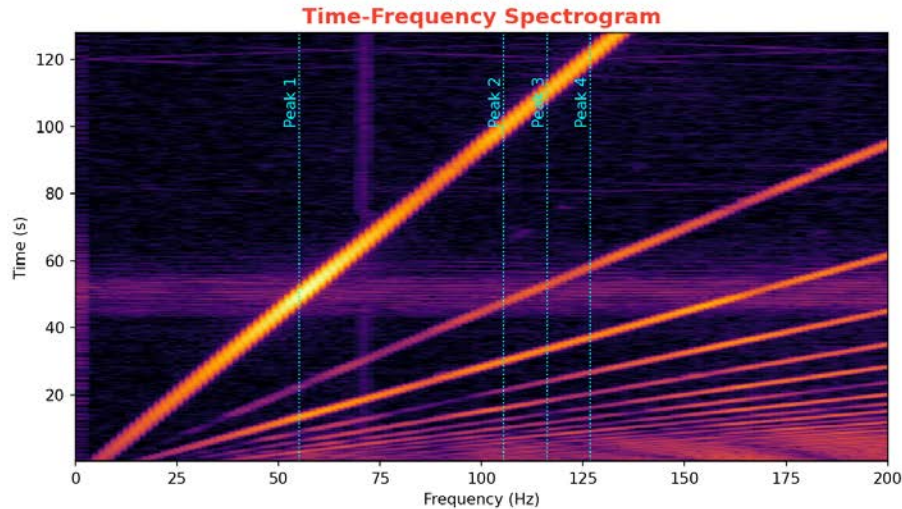
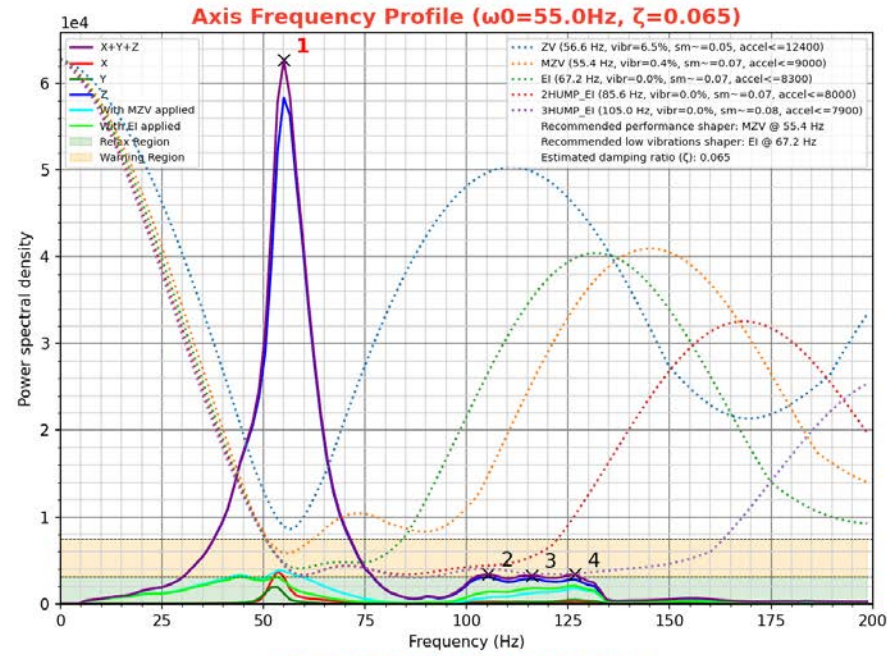


## INPUT SHAPER CALIBRATION TOOL

v2.6.1-1-gbf7a98d

30/03/24 15:44:35 -- X axis

Square corner velocity: 5.0mm/s  
Max allowed smoothing: None





# Input Shaper = y (FlexTap)

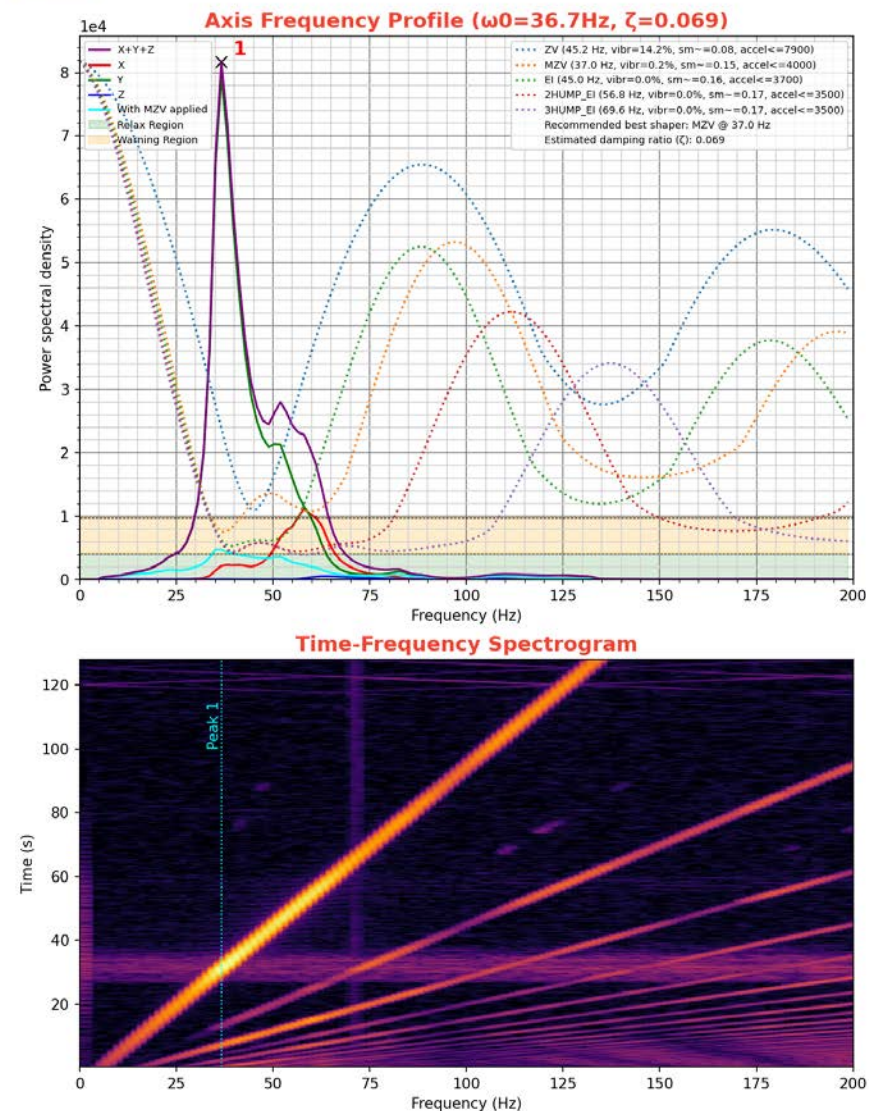


## INPUT SHAPER CALIBRATION TOOL

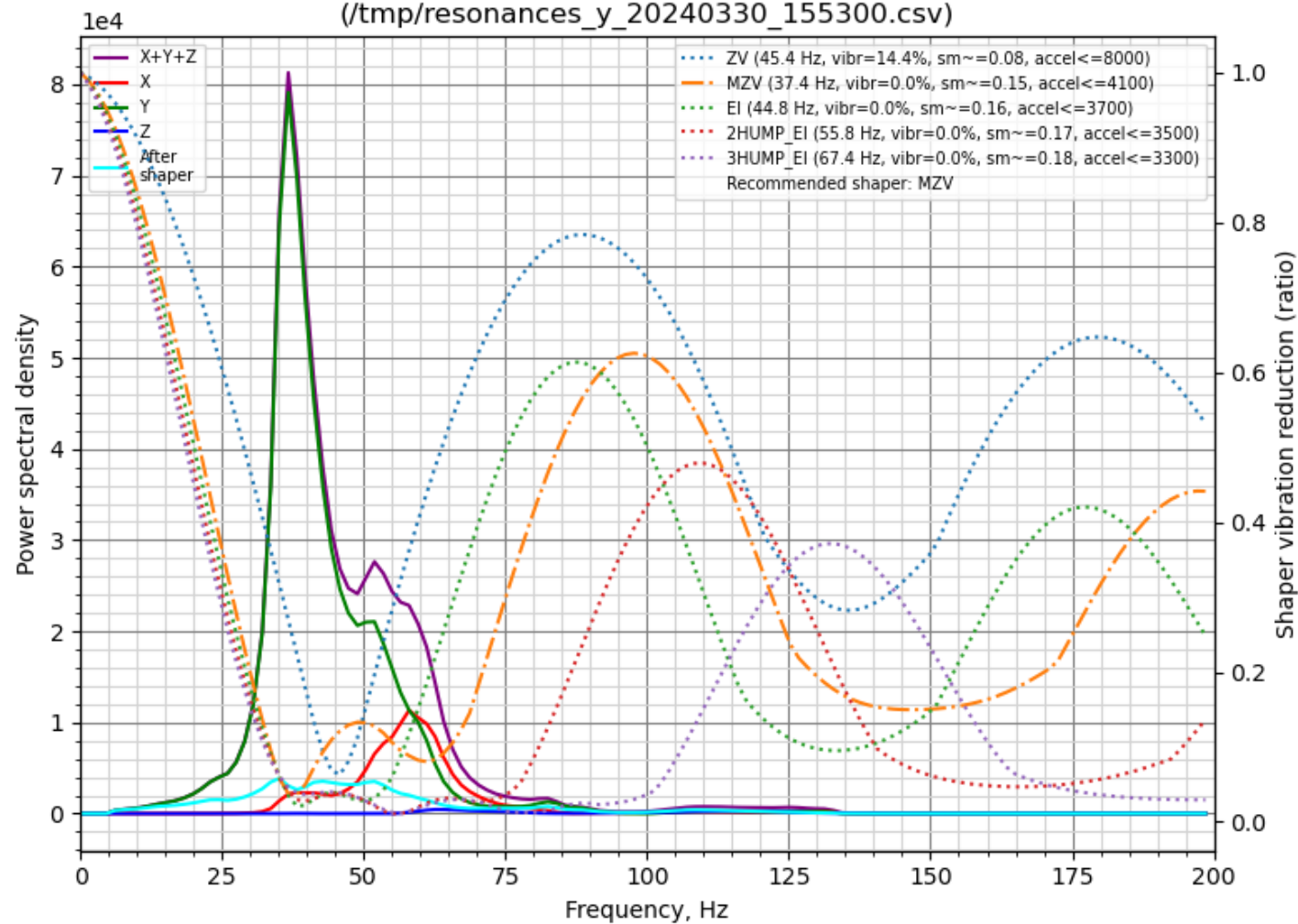
v2.6.1-1-gbf7a9f

30/03/24 15:46:58 -- Y axis

Square corner velocity: 5.0mm/s  
Max allowed smoothing: None



## Frequency response and shapers (/tmp/resonances\_y\_20240330\_155300.csv)



# Prusa Slicer 2.7.2 setting

note: ext/int perimeter accel changes between prints

Speed for print moves			
Perimeters:		<input type="text" value="125"/>	mm/s
Small perimeters:		<input type="text" value="35"/>	mm/s or %
External perimeters:		<input type="text" value="125"/>	mm/s or %
Infill:		<input type="text" value="100"/>	mm/s
Solid infill:		<input type="text" value="150"/>	mm/s or %
Top solid infill:		<input type="text" value="70"/>	mm/s or %
Support material:		<input type="text" value="120"/>	mm/s
Support material interface:		<input type="text" value="100%"/>	mm/s or %
Bridges:		<input type="text" value="140"/>	mm/s
Gap fill:		<input type="text" value="30"/>	mm/s
Ironing:		<input type="text" value="15"/>	mm/s

Dynamic overhang speed			
Enable dynamic overhang speeds:		<input type="checkbox"/>	
speed for 0% overlap (bridge):		<input type="text" value="75%"/>	mm/s or %
speed for 25% overlap:		<input type="text" value="80%"/>	mm/s or %
speed for 50% overlap:		<input type="text" value="90%"/>	mm/s or %
speed for 75% overlap:		<input type="text" value="100%"/>	mm/s or %

Speed for non-print moves			
Travel:		<input type="text" value="400"/>	mm/s
Z travel:		<input type="text" value="0"/>	mm/s

Modifiers			
First layer speed:		<input type="text" value="30"/>	mm/s or %
Speed of object first layer over raft interface:		<input type="text" value="30"/>	mm/s or %

Acceleration control (advanced)			
External perimeters:			<input type="text" value="4000"/> mm/s <sup>2</sup>
Perimeters:			<input type="text" value="4000"/> mm/s <sup>2</sup>
Top solid infill:			<input type="text" value="3000"/> mm/s <sup>2</sup>
Solid infill:			<input type="text" value="4500"/> mm/s <sup>2</sup>
Infill:			<input type="text" value="5000"/> mm/s <sup>2</sup>
Bridge:			<input type="text" value="4500"/> mm/s <sup>2</sup>
First layer:			<input type="text" value="2000"/> mm/s <sup>2</sup>
First object layer over raft interface:			<input type="text" value="0"/> mm/s <sup>2</sup>
Travel:			<input type="text" value="0"/> mm/s <sup>2</sup>
Default:			<input type="text" value="3000"/> mm/s <sup>2</sup>

Auto Speed (advanced)			
Max print speed:			<input type="text" value="300"/> mm/s
Max volumetric speed:			<input type="text" value="24"/> mm <sup>3</sup> /s

Pressure equalizer (experimental)			
Max volumetric slope positive:			<input type="text" value="0"/> mm <sup>3</sup> /s <sup>2</sup>
Max volumetric slope negative:			<input type="text" value="0"/> mm <sup>3</sup> /s <sup>2</sup>







SCV=5.0

# Filament Settings: KVP ABS





## Filament

- Color: 
- Diameter:  • 1.75 mm
- Extrusion multiplier:  • 0.94
- Density:  • 1.03 g/cm<sup>3</sup>
- Cost:  • 25 money/kg
- Spool weight:  • 0 g

## Temperature

-  Idle temperature:  • N/A °C
- Nozzle: First layer:  • 250 °C Other layers:  • 250 °C
- Bed: First layer:  • 115 °C Other layers:  • 110 °C

## Enable







- Keep fan always on:  • 
- Enable auto cooling:  • 

If estimated layer time is below ~10s, fan will run at 100% and print speed will be reduced so that no less than 10s are spent on that layer (however, speed will never be reduced below 10mm/s).  
If estimated layer time is greater, but still below ~60s, fan will run at a proportionally decreasing speed between 100% and 50%.  
During the other layers, fan will always run at 50%

## Fan settings

- Fan speed: Min:  • 50 % Max:  • 100 %
- Bridges fan speed:  • 0 %
- Disable fan for the first:  • 0 layers
- Full fan speed at layer:  • 0

## Dynamic fan speeds

- Enable dynamic fan speeds:  • 
- speed for 0% overlap (bridge):  • 0 %
- speed for 25% overlap:  • 0 %
- speed for 50% overlap:  • 0 %
- speed for 75% overlap:  • 0 %

## Cooling thresholds

- Enable fan if layer print time is below:  • 60 approximate seconds
- Slow down if layer print time is below:  • 10 approximate seconds
- Min print speed:  • 10 mm/s

# Line widths

Extrusion width			
Default extrusion width:		• 0.46	mm or %
First layer:		• 0.5	mm or %
Perimeters:		• 0.44	mm or %
External perimeters:		• 0.46	mm or %
Infill:		• 0.56	mm or %
Solid infill:		• 0.56	mm or %
Top solid infill:		• 0.4	mm or %
Support material:		• 0.46	mm or %

Overlap			
Infill/perimeters overlap:		• 40%	mm or %

Flow			
Bridge flow ratio:		• 0.85	

Slicing			
Slice gap closing radius:		• 0.049	mm
Slicing Mode:		• Regular	▼
Slice resolution:		• 0.0125	mm
G-code resolution:		• 0.0125	mm
Arc fitting:		• Enabled: G2/3 I J	▼
XY Size Compensation:		• 0	mm
Elephant foot compensation:		• 0.075	mm

- Note:
- Chamber preheated to 45 C (37 min)
- Chamber temp over total prints 57.5 C
- 0.2 layer height
- 0.44/0.46 int/ext perimeter width

# ADXL settings

## #Shaketune MZV

[input\_shaper]  
shaper\_freq\_x: 55.4  
shaper\_type\_x: mzv  
damping\_ratio\_x: 0.065  
shaper\_freq\_y: 37.0  
shaper\_type\_y: mzv  
damping\_ratio\_y: 0.069

## #Shaketune EI

[input\_shaper]  
shaper\_freq\_x: 67.2  
shaper\_type\_x: ei  
damping\_ratio\_x: 0.065  
shaper\_freq\_y: 45  
shaper\_type\_y: ei  
damping\_ratio\_y: 0.069

## #Klipper MZV

[input\_shaper]  
shaper\_freq\_x: 54.6  
shaper\_type\_x: mzv  
shaper\_freq\_y: 37.4  
shaper\_type\_y: mzv

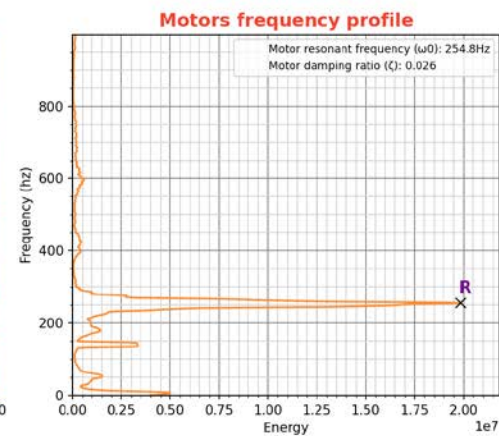
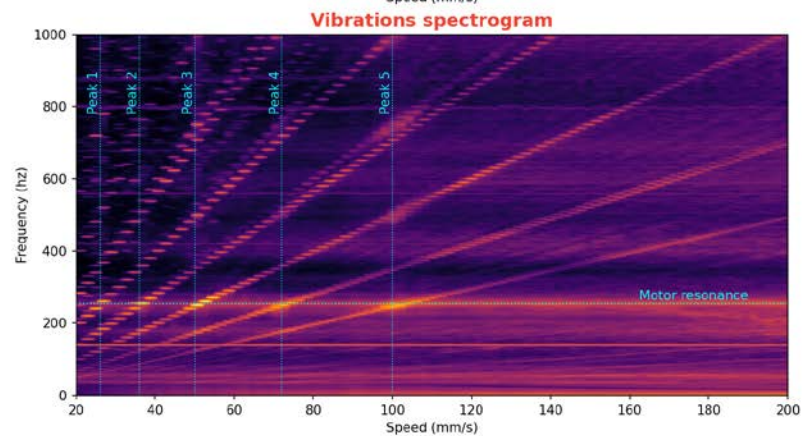
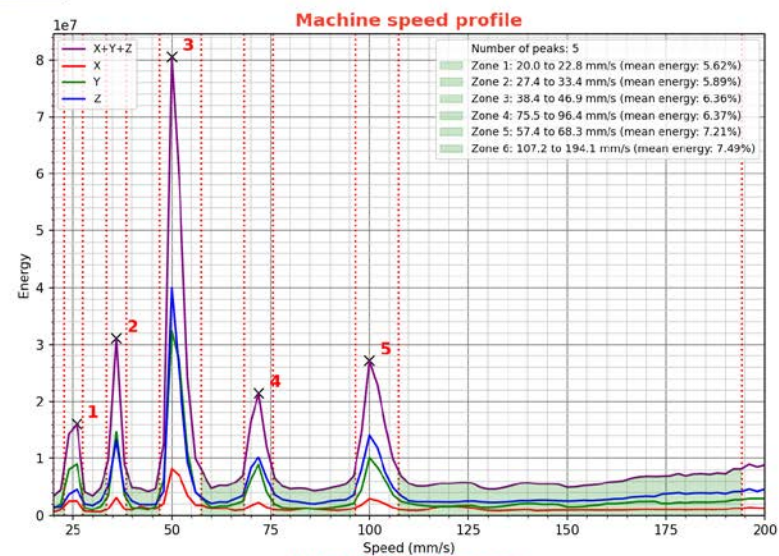




## VIBRATIONS MEASUREMENT TOOL

29/03/24 16:31:58 -- ABXY axis at 3000 mm/s<sup>2</sup>

v2.6.1-1-gbf7a98d





# Let's push it

1) Increased accel to 4k on shaketune  
MZV

2) internal/external perimeter speed=250  
Internal perimeter accel = 6000

3) Increased Max volumetric speed/flow  
from 24 to 30

external perimeter speed = 350

Internal perimeter speed = 325

Solid infill = 275

Solid infill accel = 6000

4) Increased max volumetric speed/flow  
from 30 to 35

External perimeter speed = 375

Internal perimeter speed = 390

Infill = 155

Top solid infill = 125

Gap fill = 125

internal perimeters accel = 6000

Top solid infill accel = 6000

Solid infill accel = 8000

Infill accel = 8000

5) increased max volumetric speed/flow from 35 to 40

External perimeter speed = 435

Internal perimeter speed = 450

Infill = 190

Solid infill = 350

External Perimeter accel = 7k

Top solid infill = 7k

Solid infill = 9k

Infill = 9k

Travel = 10k

Small perimeter = 70

# What I settled For...

6) Kept max volumetric speed/flow at 40

## **Speeds**

Internal perimeters = 250/125

External perimeters = 250/125

Small perimeters = 85

Infill = 190

Solid infill = 125

Top solid infill = 125

Travel = 300

Max print speed = 400

## **Accels**

External perimeter accel = 4000

Internal perimeter accel = 4000

Top solid infill = 4000

Solid infill = 4000

Infill = 6000

Travel = 8,000

## **Filament**

EM 0.94 to 1.05 to 0.95