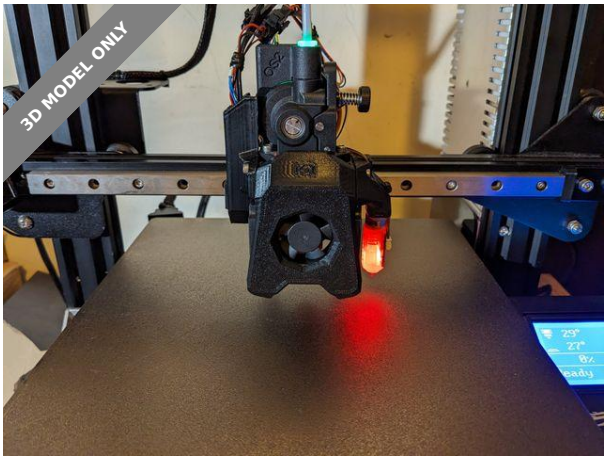

Ender 3 Speed Upgrade

o orestes

VIEW IN BROWSER

updated 10. 10. 2023 | published 10. 10. 2023

Summary

A list of upgrades that mainly aim to increase the printer's printing speed on a budget, w/o sacrificing print quality.

3D Printers > Other Printer Parts & Upgrades

Tags: creality ender3 crealityender3 linearrail apogee canbus orbiter2 chcpro

WIP - TBA (as of 10/10/2023):

- Full specs (will be updated once I am done testing everything out)
- Y-axis upgades
- Z-axis upgrades

Outline

A series of upgrades for an Ender 3 that aim to transform a stock printer into a fast and reliable machine, able to produce excellent quality 3D prints.

This whole series of upgrades obviously might not make sense for everyone, considering that you can get a e.g. a Voron 0.x kit or an A-1 for a similar amount of money.

Most of the parts listed in their respective categories can be had from Aliexpress. Waiting for sales or "spend and save" promotions will save you a good chunk of money.

Specs:

- **Build Size:** 210 x 210 x 210 mm (=210 mm^3)
- **Max. Motion System Speed (stock motors, aluminum bed carriage):** ~250 mm/s (limited by the stock Y-axis motor)
- **Max Printing Speed:** TBA mm/s
- **Max. Printing Speed (Quality):** TBA mm/s (estimated at least 300 mm/s)
- **Acceleration (as set in printer.cfg file):** 8000 mm/s^2
- **Input Shaper Settings (tested many times over multiple different probe points):**
  - X-Axis: ZV w/ ~20k mm/s^2 Acceleration, ~0.03 Dampening Ratio
  - Y-Axis: TBA
- **Max. Volumetric Flow Rate (OrcaSlicer max flowrate test):** ~50 mm^3/s (PLA @ 260 °C, 0.6 mm CHT Clone Nozzle)*

this is the result from an initial max flow rate test I just did, as I thought the limit of the extrusion system would be sitting someplace around the 50 mm^3/s mark, but I am not sure if I have hit its limit yet... there are hints of die swell on two out of the 3 bends in the test print, but I'd say it's not conclusive. Maybe there's a handful of mm^3/s to be squeezed out of it yet, will test further and update you when I do.

Visit the links below for a detailed breakdown of each upgrade:

X-Axis Upgrades (+ Toolhead)

Y-Axis Upgrades

Coming Soon :)

Z-Axis Upgrades

Coming Soon :)

Electronics (Total Cost: incl. mainboard: ~110€ - w/o mainboard: ~80€):

- SKR MINI E3 V3.0
- MKS Pi + eMMC Memory Module + USB WiFi Dongle: https://www.aliexpress.com/item/1005004417871231.html (obviously, any Pi or Pi alternative will work).

- BTT U2C v2.1: https://www.aliexpress.com/item/1005004243206192.html
- 0.5 m Type A to Type C USB Cable (angled): https://www.aliexpress.com/item/1005001626467639.html

Maybe it'd be cheaper if one would use the BTT Manta E3EZ V1.0 + a CM + a CAN hat instead of all that, but since I already had the mainboard in place along with the Pi when that released, it wouldn't make sense for me to shell out the extra cash for the board - however, someone attempting this build that hasn't already invested in a motherboard upgrade should probably consider this.

Various QoL Upgrades (optional):

- X/Y Axis Belt Tensioners: https://www.aliexpress.com/item/1005004392680334.html
- Angle Brackets (to stiffen the printer's frame): https://www.aliexpress.com/item/32870543302.html
- SKR MINI E3 V2.0/V3.0 DCDC5V V1.0 Power Module (for powering your Neopixel strip through the mainboard header): https://www.aliexpress.com/item/4000474224890.html
- Neopixel LED Strip: https://www.aliexpress.com/item/1005004289391906.html

This remix is based on

Apogee Ender 3 V2 Tool-head – ORBITER PROJECTS

Model files

F3D Files 1 file

apogee.f3z

License

This work is licensed under a
Creative Commons (4.0 International License)

Attribution—Noncommercial—Share Alike

✖ | Sharing without ATTRIBUTION
✔ | Remix Culture allowed
✖ | Commercial Use
✖ | Free Cultural Works
✖ | Meets Open Definition