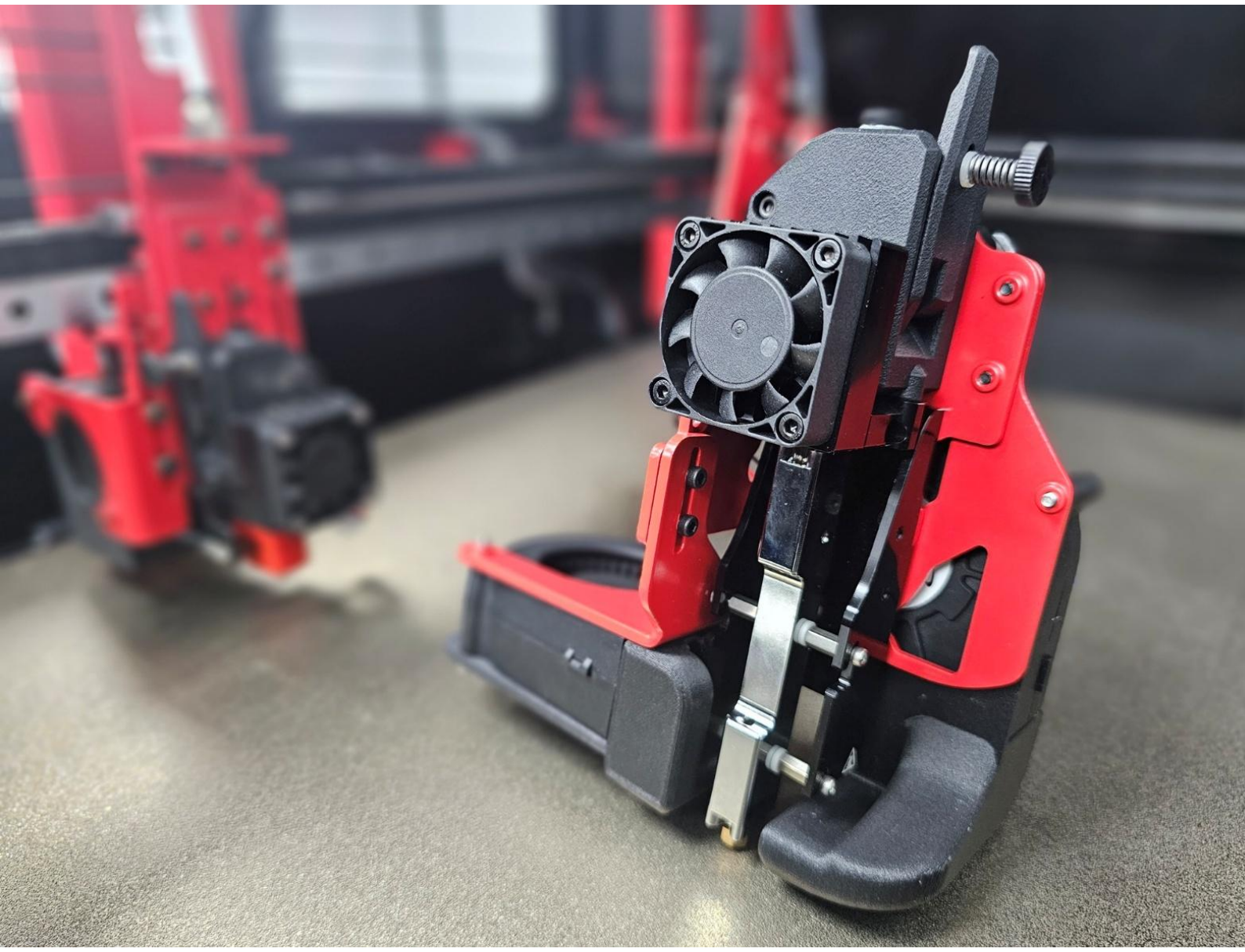
Modix
Large Scale 3D Printers

Print Faster with Griffin Ultra



Why Flowrate wins

When Volume Matters, Flow Wins

Modern "fast" 3D printers are often defined by their high movement speeds, but when printing large objects**, flow rate & tool path length** is what truly determines total print time.

Modix unique capability to print **large parts in hours instead of days** is a game changer for prototyping, end use big parts, tooling, molds, and sculpting. In many of these applications, surface finish and fine details are less critical, or the parts undergo manual finishing like coating and painting.

Modix offers **four different print head configurations**, ranging from high-resolution 50-micron layer heights for highly detailed prints to the Griffin Ultra, featuring a 1.6mm nozzle capable of 1.2mm layer heights and an extreme high-flow rate of 0.5 kg per hour. With thicker layers, the total number of layers decreases, significantly shortening the overall toolpath length and reducing print time.

Print Speed Comparison

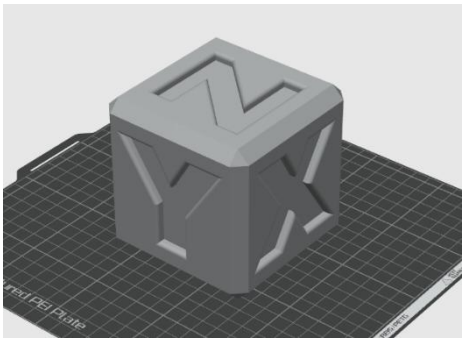
Bambu Lab printers are built for high-speed movement, often reaching 500 mm/s+ travel speeds with rapid acceleration. However, for large prints, flow rate and toolpath length determine total print time—not motion speed.

Benchmark: Draft Mode Print (200mm Cube, PLA, No Supports, 10% Infill, 2 Shells)

Printer	Nozzle	Layer Height	Print Speed	Print Weight	Total Time
Modix & Griffin Ultra	1.6mm	1.2mm	**60mm/s**	**2042g**	**5h 42m**
Bambu Lab (fast-draft)	0.4mm	0.28mm	**300mm/s**	**1112g**	**18h 12m**

The Winner: Modix—3× Faster Despite Bambu's 5× Faster Motion

- Modix completed the print in just 5 hours 42 minutes—three times faster than Bambu.
- Due to nozzle diameter Modix extruded **nearly double the material making the part stronger and denser.**
- Faster results are possible when wall is defined in actual width instead of passes.

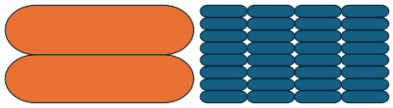


Bottom Line: Flow Rate Wins for Large Format Printing

In large-scale 3D printing, flow rate and toolpath length are the factors in print speed. Modix delivers the fastest large-format printing solutions, offering four interchangeable print heads to seamlessly balance speed and resolution—enabling rapid prototyping with the flexibility for fine-detail production in a single machine.

The Hidden benefit – Stronger parts

Beyond slashing print time, the Griffin Ultra's 1.6 mm nozzle measurably increases mechanical strength. In material-extrusion printing, each strand exits the nozzle as an oval—flatter on the top and bottom, curved on the sides. The wider the strand, the broader those flat faces become, and the more molten polymer is pressed directly onto the layer below. That bigger contact patch drives four reinforcing effects:



Layer Fusion Comparison Diagram

1.6 mm Nozzle, 1.2 mm thick VS. 0.4 Nozzle, 0.3 mm thick

1. **Greater Weld Area** – A 1.6 mm track offers roughly four times the bonded surface compared with a 0.4 mm track at the same layer height. More bonded area means higher tensile and flexural strength because the load is transmitted through polymer fusion rather than through air gaps. Source: pmc.ncbi.nlm.nih.govsetjournal.com
2. **Deeper Thermal Penetration** – A thick strand carries more heat energy; it stays above the glass-transition temperature longer, so molecular diffusion across the layer interface improves. Enhanced diffusion translates into fewer interlayer micro-cracks and higher impact resistance. Source: sciencedirect.com
3. **Reduced Void Fraction** – To cover a 1.6 mm wall with a 0.4 mm nozzle, four adjacent lines must be placed, leaving small triangular voids between them. A single 1.6 mm pass fills the width in one shot, eliminating those voids and the stress concentrators they create. Source: cnckitchen.com
4. **Stiffer Walls, Thicker Skins** – When you draw perimeters at their actual physical thickness rather than stacking multiple passes, the shell becomes a monolithic ribbon. Tests by independent reviewers show up to 30 % gains in bending strength when identical parts are re-printed with larger nozzles and proportionally higher layer heights. Source:cnckitchen.com

When Nozzle Size Meets Melt-Rate Limits

Most desktop "speed printers" can accept a larger aftermarket nozzle, yet the moment you swap the 0.4 mm tip for something like a 1 mm or 1.2 mm, you must **slow travel and extrusion speeds dramatically**. The reason is volumetric flow: a typical 40–60 W hot end and compact filament path can only melt and push about 12–20 mm^3 /s of PLA. Quadrupling the nozzle area demands roughly four times that melt rate. Unless you raise temperatures far beyond normal settings—risking jams and degraded polymer—you have to cut back on feed rate to stay within the heater's capacity. Users quickly discover that the real limiter isn't gantry acceleration but **how many cubic millimetres of plastic the hot end can liquefy per second**. In practice, large-nozzle profiles on small printers end up running at or below 60 mm/s and still struggle with under-extrusion, nullifying the headline motion specs that drew buyers in the first place

Conclusion

For prototypes, jigs, or molds that will be sanded, coated, or machined after printing, this "strength bonus" comes with zero cost to downstream finishing. Pair that with 0.5 kg/h flow and 1.2 mm layers, and Griffin Ultra delivers big, rugged parts in a single shift—combining throughput and durability no desktop-class speed printer can match.