Introduction

Lately, we've noticed that, to some, The Micro 3D Printer seems too good to be true.
We totally understand!

The following are some of the features that tend to surprise people. The Micro:

- Uses standard filament rolls
- Features auto-leveling and auto-calibration
- Prints in multiple materials including ABS, PLA and Nylon
- Open to any software
- Very affordable Kickstarter prices of $199-$299

Given that an equivalent printer on today's market would cost significantly more, the purpose of this article is to explain how -- and why -- we managed to do these things.

Our Vision

M3D founders David Jones and Michael Armani believe in ground-breaking innovation above incremental innovation. We also believe in business models which provide enormous value to customers. It is traditional for companies to limit their best technologies in order to make as much money as possible, but we at M3D don't see any good reason to do this. We want M3D to provide value as a technology leader, with The Micro as only the first technology we revolutionize.

From the very beginning, we knew it would be necessary to start from scratch -- an affordable printer couldn't come from existing technologies.

Starting with a seamless design, we created the Micro by preserving the best features of existing printers and redesigning everything else. Because we were uncompromising from the start, we were able to realize enormous improvements in the design of 3D printers. Is wasn't always easy, but after two years of relentless work, we are very proud to finally be sharing The Micro with the world.

Designed for Fast Assembly

Until now, 3D printers have been notoriously difficult to assemble. Dozens of screws and nuts meant assembly took hours.

The Micro has just one screw in its entire design! In fact, The Micro is designed to snap cleanly and quickly together in five minutes, with the majority of additional production time dedicated to quality assurance and testing.

Power Efficiency

A large portion of the last two years was spent researching electronics and motion technology. We wanted to find just the right solution to make our system power-efficient; light, yet strong; fast, yet accurate.

Here are a couple examples of how we improved The Micro, increasing the overall efficiency of our printer while drastically reducing costs:

- A standard 3D printer's nozzle heater uses between 30 and 80 watts, but The Micro uses only a tiny fraction of that. How did we do it? The key to an efficient 3D printer heater is a fast transition from hot to cold. Though standard extruders achieve this by using a large heat-sink and fan, this method is very wasteful. The Micro achieves the same quality results simply by isolating the heat to only where it's needed with a radial ceramic heater. As a result, The Micro uses a fraction of the material and power required by a normal printer nozzle.

- A standard heated print bed uses between 70 to 100 watts. It is a common belief that a heated bed is required to print ABS, when in fact a combination of auto-leveling and an ABS-based print bed allows printing ABS at sizes that rival a heated print bed. Our bed solution is similar to the way that support material is printed when using a single extruder. This saves a significant amount of power and cost.

Weight and Space Efficiency

By making The Micro space efficient, we were able to significantly reduce its weight. Weighing only 1kg (2.2lbs), it is a full magnitude lighter than other 3D printers on the market. This weight difference significantly reduces our shipping and material costs.

How giving away premium features at a low cost benefits M3D

We knew that making an affordable 3D printer would require making and selling them in high volume. By hitting a very affordable price point, we are able to sell our printers in higher volumes, lowering the cost per printer and allowing us to spread initial and overhead costs over a large number of units.

It was clear to us that in order to achieve our high volume goals, The Micro printer had to be both "plug-and-play" and extremely easy to use. This would make it possible for many more people to use our 3D printer enjoyably and effectively.

Auto Bed Leveling

With previous 3D printers, the number one problem has been bed leveling -- if the bed is not level, prints will not stay on it, resulting in a high print-failure rate. We realized that by including a motion sensor chip in the print head, we could auto-level the print bed without significantly impacting the cost of the printer. Chips are produced in large volumes, making them inexpensive. While we considered other non-solid-state solutions, using a microchip is the most elegant and reliable solution.

Designed for High Volume Manufacturing

The Micro is designed to be manufactured using high through-put techniques that cost less per part than most 3D printers that are designed for small production runs. Many of our parts are injection molded for high volume production and great consistency. This costs more in up-front tooling, but has low per-part costs.

Assembled in the USA

We believe assembling our product in the United States is the only way we can assure the highest possible quality. We verify each part going into The Micro to ensure that it is to spec. We can achieve this because of the careful preparation we did to make sure The Micro could be assembled quickly by a staff located in the U.S.A.

Parts Sourced Overseas

Some of our parts are made cost effectively overseas, and are carefully inspected and verified before shipment by our staff on the ground.

Materials Science

Due to our founder's extensive background in materials science, we were able to apply exotic new material techniques to our innovations. For example, we used carbon fiber because it is very strong yet light (reducing shipping costs), self-lubricating, and very straight with low friction when combined with the right plastic sliders.

Replacement Parts

We will provide replacement parts at a reasonable price, as is consistent with our company philosophy to provide customers with the upmost value. We will also offer extended warranties for any system repair. Although The Micro was designed to last many thousands of hours, we know that every machine eventually needs maintenance. If replacement parts or repairs are ever needed, the customer can take comfort in the fact that The Micro's simple design means repairs are a literal snap.

Auto Recalibration

All machines settle slightly over time, and a benefit of including the motion sensor chip is that we are able to auto-calibrate your 3D printer even as it changes over time. Most 3D printers do not take this into consideration, and their print quality deteriorates over time as the bearings dig into their hardened steel guide rails. The Micro is designed to use the microchip motion sensor to recalibrate and eliminate errors that could not be accounted for in the factory.

Why don't we lock down filaments and charge more?

Some 3D printers use a "cartridge system" such as the inkjet ink, or “razor and blades” strategy that locks the user down as a way of making money. We feel this strategy is both inconsiderate and outdated. We wanted to share with you M3D's philosophy on why we can keep things open, and how it is a good decision for everyone involved:

First, giving people what they want is good for long term business and community growth. That's why our printer will be open to standard filaments and software. By keeping things open, people will refer our printer and filaments to other prospective customers.

Second, companies which do not provide sufficient value resort to trapping their customers. At M3D, we believe in constant and never-ending innovation. By creating new filaments, such as our Chameleon color-change, or Metal-filled lines, we inspire people, even those who do not yet use our printer, to try a plethora of new products.

We will offer a half-pound filament roll at a cost of $10-$12 -- the most affordable filament roll on the market. The cost is proportionately similar to the cost of standard 1kg rolls (approximately $40-$50). We did this so people can afford to explore their creativity and try new materials or colors.

The Micro 3D Printer gives you two filament options. The first is to use our 1.75 mm 1/2-pound filament rolls that fit inside the printer base. The second is to use any supplier’s 1.75 mm filament and feed it through a slot in the extruder head. Our rolls are just a tiny 120 mm diameter spool -- it is easier for the average user to reload. This wide and open compatibility is what everyone wants and deserves.