Thing-O-Matic Specs and Schematics

Technical Specifications

- Interface: Serial over USB or print from SD card.
- Size: 12" W x 12" D x 16" H (roughly 300mm x 300mm x 400mm)
- Usable Build Area:
  - With Automated Build Platform: 100mm x 100mm x 100mm
  - With Acrylic Build Platform: 110mm x 110mm x 120mm
- Generation 4 Electronics
- Supports up to five stepper drivers (XYZ + A/B)
- Connect over USB
- Optional LCD interface support
- Full endstop support
- High current mosfets to drive heated build platform and extruder heater
- Thermocouple support for accurate temperature sensing
- Power Usage: 500 watts, standard ATX power supply.
- Works with both 110v and 220v power.
- XY Positioning resolution of 0.02mm (20 microns or 0.0008")
- XY Maximum Feedrate of up to 5000mm/minute (roughly 200 IPM)
- Z Positioning resolution of 0.005mm (5 microns / or 0.0002")
- Z Positioning Feedrate of up to 1000mm/minutes (roughly 40 IPM)
- Accepts 3mm polymer filament
- Capable of printing with ABS and PLA

Plug and Play
With integrated USB, connection is a breeze. Both the motherboard and extruder controller now natively support serial over USB, so you can connect to them with any standard USB cable. This makes connecting to them much easier and eliminates the need for a custom cable. This also makes uploading firmware a breeze as the USB allows for automatic reset of the board. Additionally, it has an SD card slot which you can use to run builds from, eliminating the need for a computer. It also has a piezo buzzer which can give you feedback on print status simply by listening.

More Power

Beefier MOSFETs to handle bigger loads. We’ve searched high and low to find the best MOSFETs for the extruder controller. The result is an extruder controller that can drive a heated build platform and a MK5 heater block without breaking a sweat. This eliminates the need for a relay, and allows plenty of room for experimenting with driving other things that draw large currents. We've also added a molex power connector to the extruder controller so that it can safely draw all that power without sending it through the RS485 cable. This has a nice side effect of reducing noise in the comms system. Of course we didn't forget the stepper drivers — they can now handle up to 2.8A steppers.
Better Hackability

Arduino MEGA brings more memory, more pins. By using the Arduino MEGA as our base, we have almost doubled the amount of pins available. This has allowed us to do some pretty awesome stuff, with room to spare for you to modify and hack to your hearts content. The motherboard has built in support for up to five stepper drivers. You could control an XYZ platform and two stepper driven extruders. Or you could make a five-axis CNC. The sky is the limit. We've also added an interface header with 18 I/O pins that can be used to drive an LCD screen and buttons, or to hook up custom electronics that you've designed yourself. Of course the increased FLASH and RAM mean you can write bigger, more complex programs to drive your machine.

Improved Quality

Microstepping and thermocouple support up the ante. We've upgraded the stepper drivers to handle 1/8-step microstepping. This brings much quieter operation, and improved resolution. Your machine will sound better, and your prints will look nicer. We've also switched from thermistors to thermocouples for temperature measurement on the extruder. Thermocouples are much more standard, and provide a higher quality reading of temperature. You can be confident that the temperature displayed is actually the temperature of your extruder. They also bring the side benefit of coming pre-assembled and you can simply bolt them right onto the side of your extruder.
Source

The MakerBot Industries Thing-O-Matic is Open Source Hardware and is licensed under the GNU GPLv3.

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