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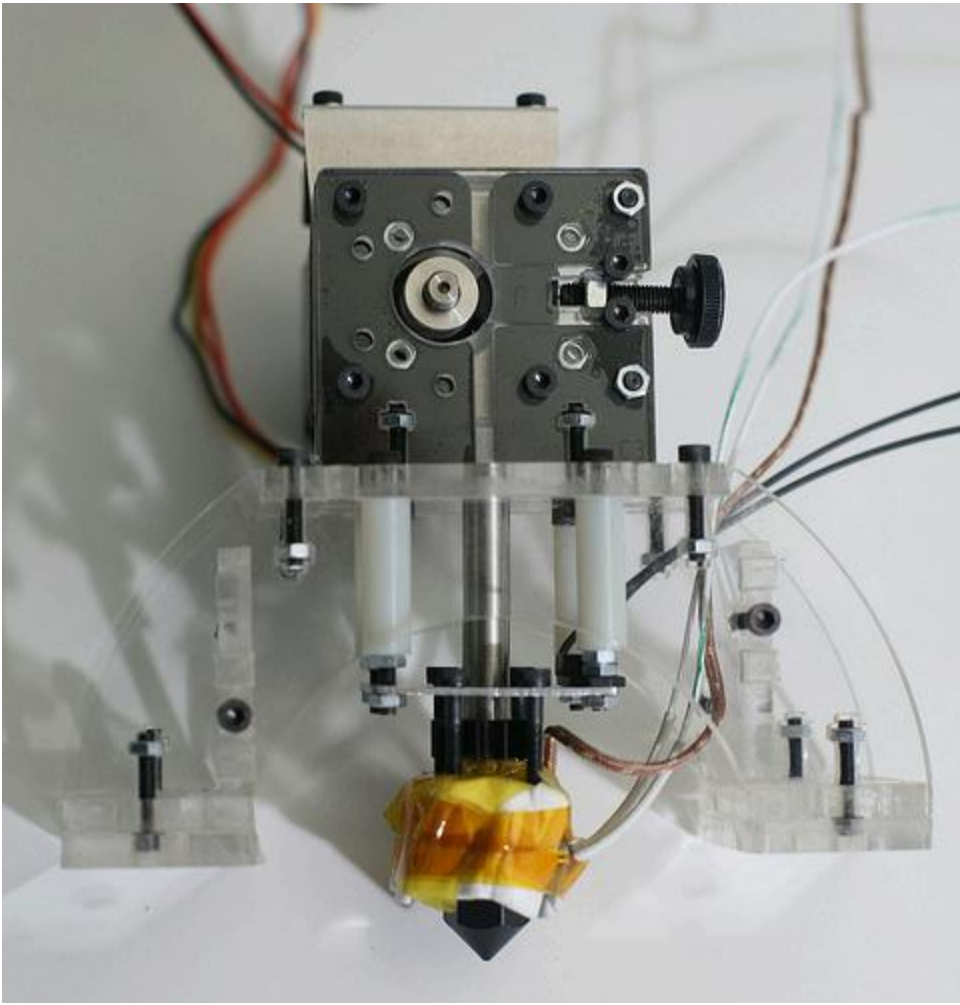
## Stepstruder Mk6 Plus

### Warning



The MakerBot [StepStruder™ MK6](#) contains certain parts that can be dangerous if used in an improper manner. The extruder tip can become hot (>250 celsius). There is also a powerful motor that can pinch fingers. Make sure you always run the extruder fully assembled and that you never touch the hot metal end. Always keep the extruder away from flammable objects and never leave it unattended while heated up.

### Overview



The MakerBot [StepStruder™ MK6](#) is the ‘print head’ for your MakerBot 3D printer. You can think of it as a souped-up, robotic hot glue gun. Its main purpose in life is to heat up the plastic you feed it, and then extrude it out in a fine stream that you can build with. It has two main parts: the filament drive mechanism, and the heater barrel assembly. The filament drive mechanism is the part that grips the plastic and pushes it into the heater for extrusion. The heater barrel assembly is the hot part of the extruder that melts the filament. It also has a small diameter nozzle where the hot plastic is forced out.

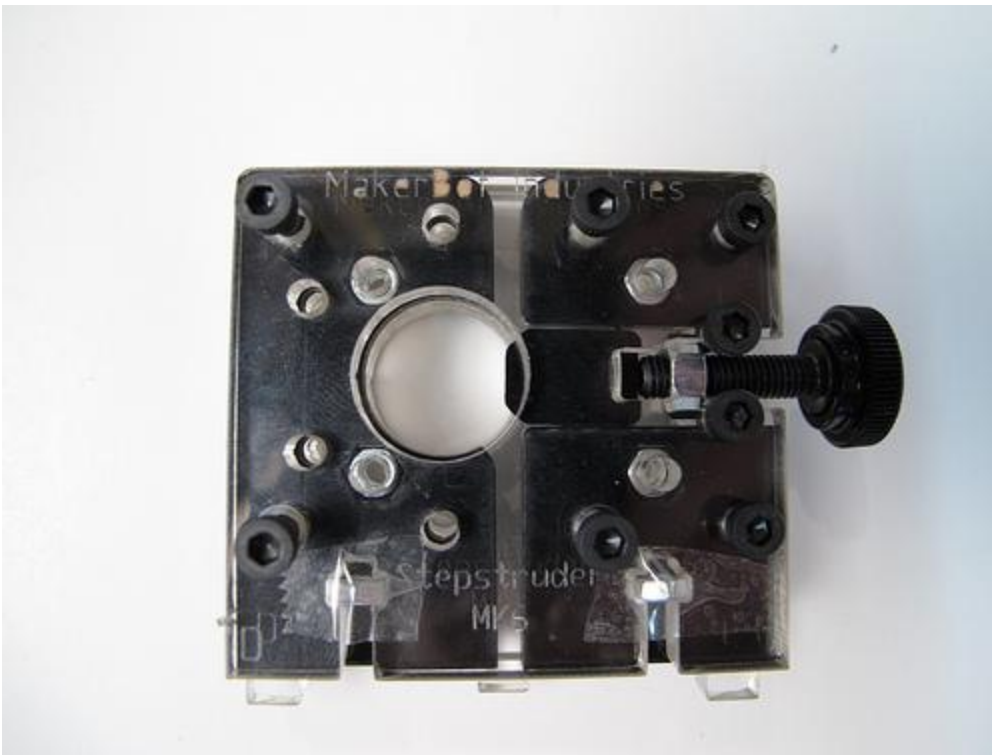
## **Direct Stepper Driving**



The MakerBot [StepStruder™ MK6](#) is a major upgrade featuring a high-torque, direct-drive NEMA17 stepper motor. This stepper motor is strong enough to directly drive 3 mm filament, avoiding the problems associated with geared stepper motors. Using a stepper motor to drive extrusion brings a number of advantages. Unreliable DC gear motors are history: stepper motors will last effectively forever and they do not have brushes to wear out. Stepper motors are much more precise the rotational speed can be set exactly, increasing the uniformity between MakerBots and providing a better out-of-the-box experience. Less calibration, more printing! Stepper motors allow rapid reversal and an end to oozing, stringing, and other problems.

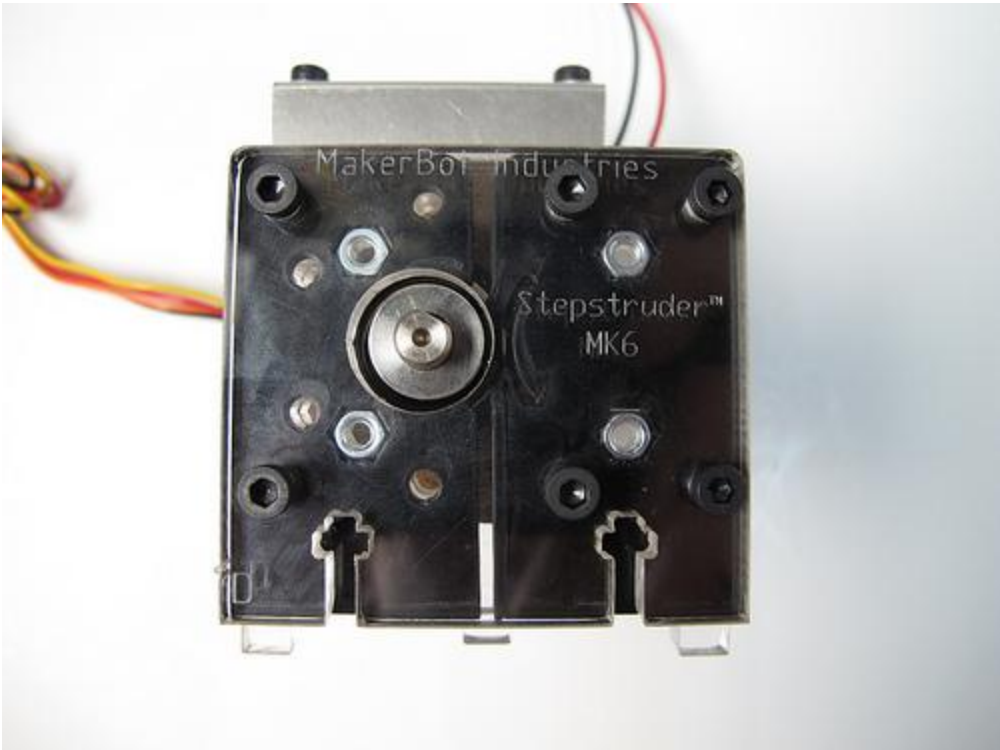
## **Filament Drive System**

### **3 mm Filament Configuration**



The MakerBot StepStruder™ MK6 drive system uses a fixed motor with a drive gear on the shaft. The plastic is pressed against the drive gear by a smooth Delrin plunger. A thumb screw adjusts the plunger’s depth. This system for filament extrusion is robust and simple to use. Changing filament is fast, requiring no tools. To remove the filament, loosen the thumb screw and pull the filament out. To load new filament, insert the filament and tighten the thumb screw. You can even change the filament mid-print to change colors.

### 1.75 mm Filament Configuration



The MakerBot [StepStruder™ MK6](#) has experimental support for 1.75 mm filament. This should give finer control of the filament and yield better prints. The small-filament drive system uses an engineered piece of

Delrin designed to behave like a spring bearing to provide simple, adjustment free printing.

## Hot End



The hot end on the original MK6 was the same hot end from the MK5 — pretty darn good. But this is where the “plus” comes in for the MK6+ — we’ve redesigned the hot end with a cartridge heater and a new aluminum block that is much faster to heat and just as durable. Not only is the new “Plus” hot end much easier to assemble, it’ll also be more reliable.

## Get One!

Gathering all the parts for building one of these can be pretty time-consuming. For some parts, you have to buy a large amount of something (like machined parts) when all you need is small amount. Not only that, but buying a kit from the creators supports us so we can make it better. That’s why we offer a kit that contains everything you need to build one yourself.

You can buy a [complete kit](#) or [upgrade kit](#) from the MakerBot Store.

## Assembly

Building the extruder takes about 2 hours. It’s a pretty straight-forward process where you bolt together parts, cut and solder wires, and other fairly simple tasks. We’ve simplified the extruder design so that assembly requires only common tools.

- [Assembly instructions](#)

## Usage



Your finished extruder is a robust, solid device for extrusion. If you treat it properly, it will extrude for a long time. There are certain things you should know about your extruder in order to avoid damaging it.

1. Never run the motor without extruder being hot.
2. Never feed in a second strand of filament.
3. Always turn off extruder when you are done printing.
4. Double check the target temperature before extruding.
5. Never let your filament run all the way into the extruder.

[Usage instructions](#)

## Source Code

 filament-drive-and-stand\_display\_small.jpg

The design of this extruder is 100% open source. What this means is that we've released all the CAD files used for parts and the documentation under free licenses. The majority of the files are DXF files created by QCad. There are a few different ways you can access the files:

\* [Thingiverse](#) – download the source, talk about it, etc.

\* [Google Code](#) – download the release.

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