REPRAPWORLD

In this newsletter...

RepRapWorld's Meet the maker

The first Thursday of the month we always host the Beer & Pizza party. Attending are always a lot of makers, enthusiasts, people with questions, etc, etc.
From this forum we always get a lot of idea's and views on our products. There is a lot of knowledge in this group and we want to share this knowledge with the community.

Since not all our fans can attend the Beer & Pizza party, we would like to encourage to share your experiences, thoughts, build logs, etc. through email.

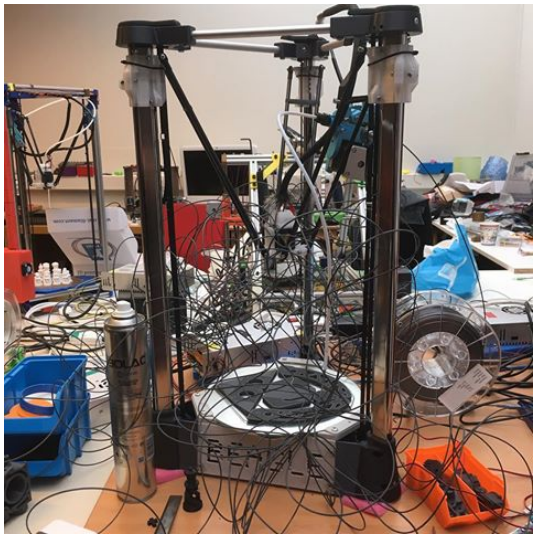
Every month we will feature a new article about a maker and we would like to activate the online community. So if you have an idea about printing something amazing. Let us know and we will see how we can sponsor this.

Next Beer & Pizza party the 11th May

Meet the maker: Diede van Abs

by: Diede van Abs

Beagle's are still being build all over Europe. One of our regulars to the Beer & Pizza party (next one is May 11th) ; Diede made an amazing build log of the Beagle. We really appreciate him creating the build log. It really visualizes the whole process of building your own Beagle.



Russell's Printing Tips

Hello, my name is Russell and I'm RepRapWorld's 3D Prints Production manager. As the in-house subject matter expert on DIY printing, customers will often ask me a variety of technical questions about printers, slicer settings and filament. RepRapWorld has given me this little corner of their monthly newsletter to share with a larger audience some of the useful tips I've learned in this line of work over the past few years.

Q: How can I make my (FDM) printer faster?

A: Different 3D printing technologies have different speed constraints, but in the case of FDM, the main limits are typically either the mechanical stability of the structure (and linear motion components), or some part of the extrusion system (extruder, hotend and interface).*

- Mechanical: A rigid, high inertia structure is essential to maintaining good print quality during rapid accelerations and direction changes. Some amount of shake is acceptable as long as the entire frame remains in sync, but in general, undamped vibration will reduce layer-on-layer positional accuracy.

These same shocks can also magnify backlash in the linear motion system or even cause underpowered XY motors to skip steps.

- Extrusion: The extrusion system consists of the hotend, the extruder itself, and (in Bowden systems) a PTFE tube + pneufit connection between them. All else in the slicer settings being equal, the faster you drive your printer, the faster the extrusion system has to push out filament. This means your extruder motor is running faster, the filament is cooling the heater block faster, and there is an increase in back pressure that the extruder must be able to overcome. This is where a well designed geared extruder can be handy, since it provides more power as long as the resulting maximum stepper motor speed is kept within its optimal performance range

Everyone at some point wants their prints to finish faster... and continue to look good... with low failure rates. Fortunately, you have some degree of control over this, but as you push your printer to its extremes you will eventually hit one of the limits described above. Below are a few tips to increase machine performance and reduce print time without sacrificing too much in quality, machine wear and failure risk:

a) Total print time is a function of the time for each layer and layer thickness. Layer time is driven primarily by the XY speeds (mechanical) and layer thickness is driven primarily by extrusion rate. These two variables can be traded off. If you hit mechanical limits before the extrusion limit, then decrease XY print speed and increase layer thickness. On the other hand, if you are constrained by extrusion speed, reduce layer thickness instead and increase the XY print speed.

b) If your printer has a case of the "shakes" or occasionally skipped XY steps, reduce the XY "jerk" (ie shock) value in the firmware until the structure or linear motion system becomes more stable. This usually allows an increase in the firmware's acceleration settings.

c) If your filament is experiencing grind-through at higher speeds, try reducing back pressure by increasing the nozzle temperatures or upgrading to an e3D volcano. Don't exceed the max specified temperature for the filament material type.

d) If your extruder motor begins "clicking" (missing steps), incrementally increase power to the step sticks and/or look at a more powerful extruder design.

*For older Cartesian machines, microprocessor power and bus speeds from the controller boards could also constrain data throughput and gcode processing for higher resolution microsteps; and this is still a common issue for the reference frame conversion necessary for Delta printers.

Did you print something for one of our products? Let us know and we will put it in our next newsletter

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Titan Aero: What do you get if you cross a Titan with a V6?

Since smashing into the world of extruders with Titan back in March 2016 the next logical step for E3D was to integrate a Hot End into it, compress it as much as possible and make an ultra-compact all-in-one extruder and hotend. As with the original Titan, we came up with some design objectives before cracking on with prototyping. This helped us to work out exactly what we wanted to achieve with our new hot-end-extruder-thing.

Objectives

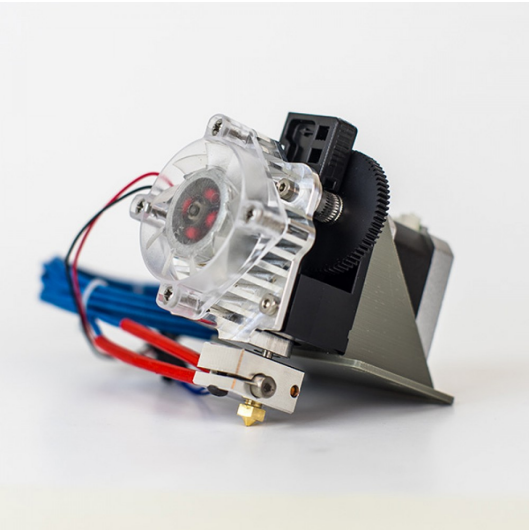
1. Make it as small as possible, particularly in the Z direction in order to squeeze out as much extra build height as possible.
2. Be compatible with the current Titan design, so that those with a Titan can simply upgrade their Hot End. We really didn't want to force customers to buy a whole new product when the original is a perfectly good piece of kit! We don't want to be one of those companies that launches a product and then makes you buy an upgrade which shares a large amount of components 6 months later.
3. Be compatible with the V6 and Volcano ecosystem of nozzles, sensors and heaters, maintaining all the customisation options that are available.
4. Be all metal in design, with comparable performance to a V6 HotEnd. Anything less than accurate, reliable extrusion of any thermoplastic would have been a compromise we weren't willing to make.
5. Keep the filament path as short and constained as possible. This leads to a more responsive extruder with cleaner starts and stops and, by extension, better print quality. Reducing the driven length of filament in the system reduces lag induced by the flexing and compressing of the filament. This is especially beneficial for flexible filaments due to their compressibility.

Titan Aero

The Result

This is the Titan Aero. An aluminium heatsink that replaces the lid of the Titan, giving you all the performance of a V6 (and then some!). It also takes a standard V6 threaded heatbreak, so retains full membership to the V6 ecosystem.

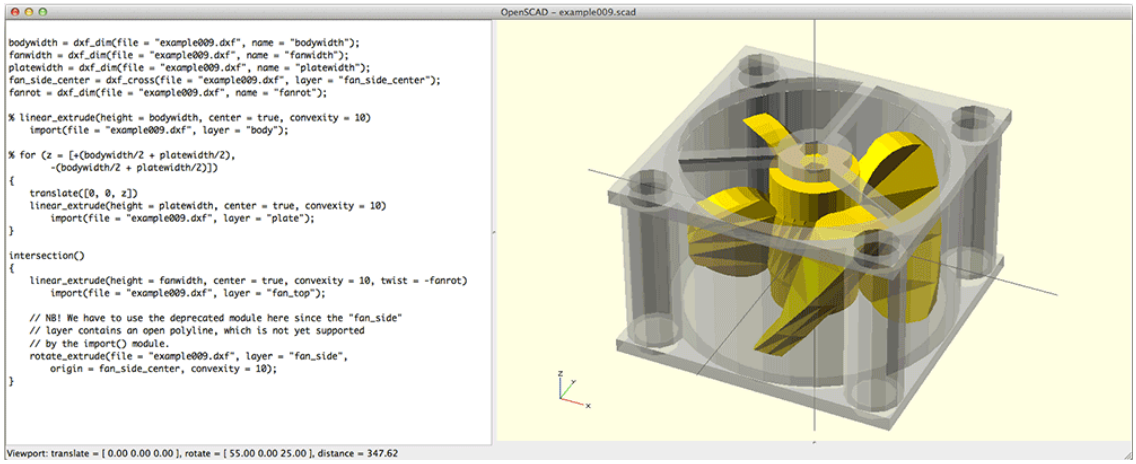
The first thing to note is how compact Aero is. At 25mm shorter than a Titan and V6, it allows you to squeeze out every last bit of build volume from your printer.



Pre-order starts soon! Titan Aero

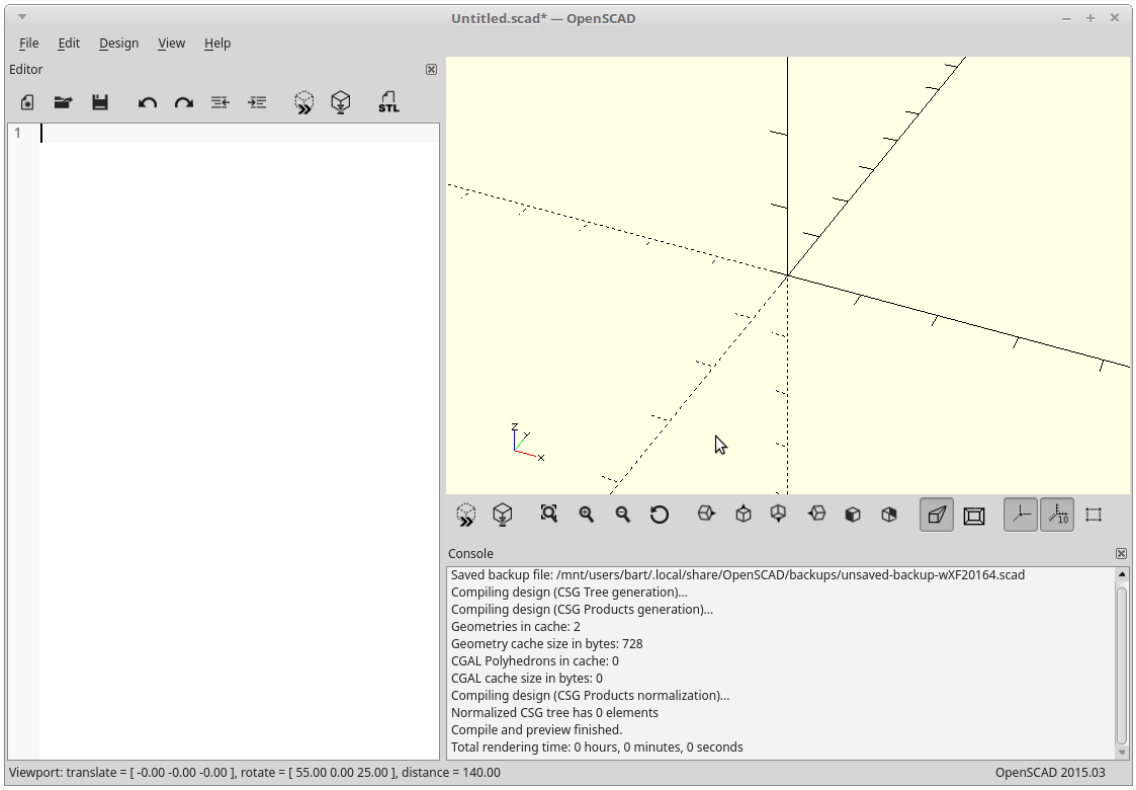
Meet OpenSCAD: 3D modeling for programmers

by Bart Meijer

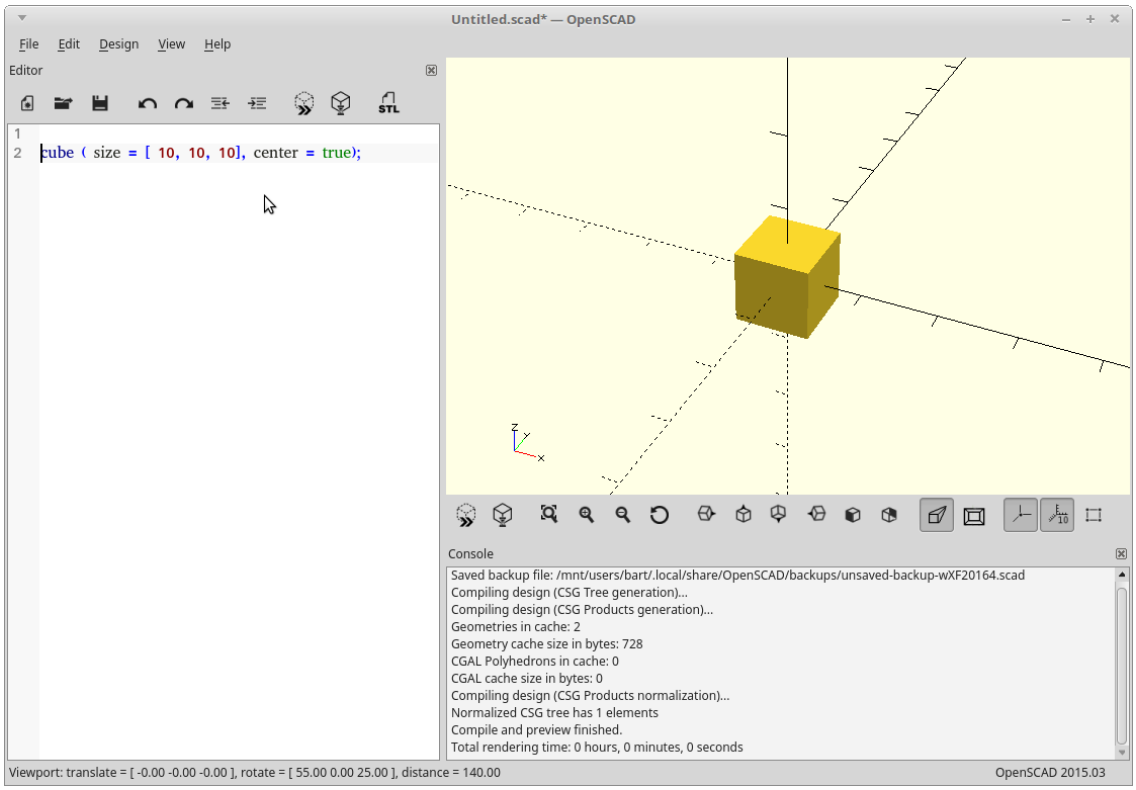


There are quite a few good options available for 3D modeling: Blender, SketchUp, SolidWorks etc. Every option has it's own (dis)advantages for getting a great 3D print, but they generally work by defining objects in 3D space and applying modifiers to them. OpenSCAD is a bit different in this regard as it allows you to define a 3D model with code. This is especially great for programmers, like me, but as non-coder you may find that for certain applications OpenSCAD may even be for you. Today we will walk through some of the compelling features of OpenSCAD, so you will get an idea of what it is about.

If we take a look at the interface you will see a pane on the left where you can write code. On the right side there is a 3D view where the result is rendered and a pane where the results of rendering, including any error, are shown. There is a quite an extensive documentation available, but I find that the cheat sheet is enough most of the time.



If you are a programmer, you should find it very easy to understand the way the expressions are written, but I will show how to draw a 10x10x10mm cube first. In the cheat sheet we can find the following definition for a cube:




```
cube(size = [x,y,z], center = true/false);
```

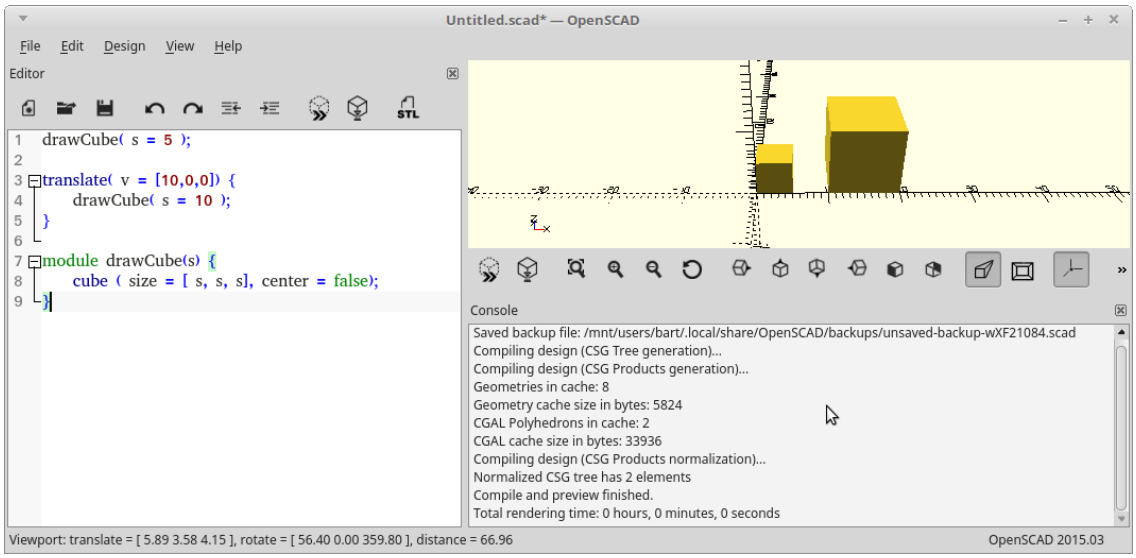
So for a simple 10x10x10 cube we will write the following statement. Just enter the code in the left pane and press F5 to quick-render the result. To export it to a STL file, press F6 first to build the file first. The you can use the STL button.

```
cube ( size = [ 10, 10, 10], center = true);
```

Center = true means that the origin of the cube should be at the center, meaning the object will be drawn at position -5,-5,-5. You can easily modify the position of the cube by using the translate(v = [x, y, z]) function. So the following code will move the cube +10mm on the X axis.

```
translate ( v = [10, 0, 0]) {
  cube ( size = [ 10, 10, 10], center = false);
}
```

This is all great, but you can do this much quicker in blender for example. So where does OpenSCAD really get an edge? Well there are a few features that could really benefit you. Let’s take a look at them.

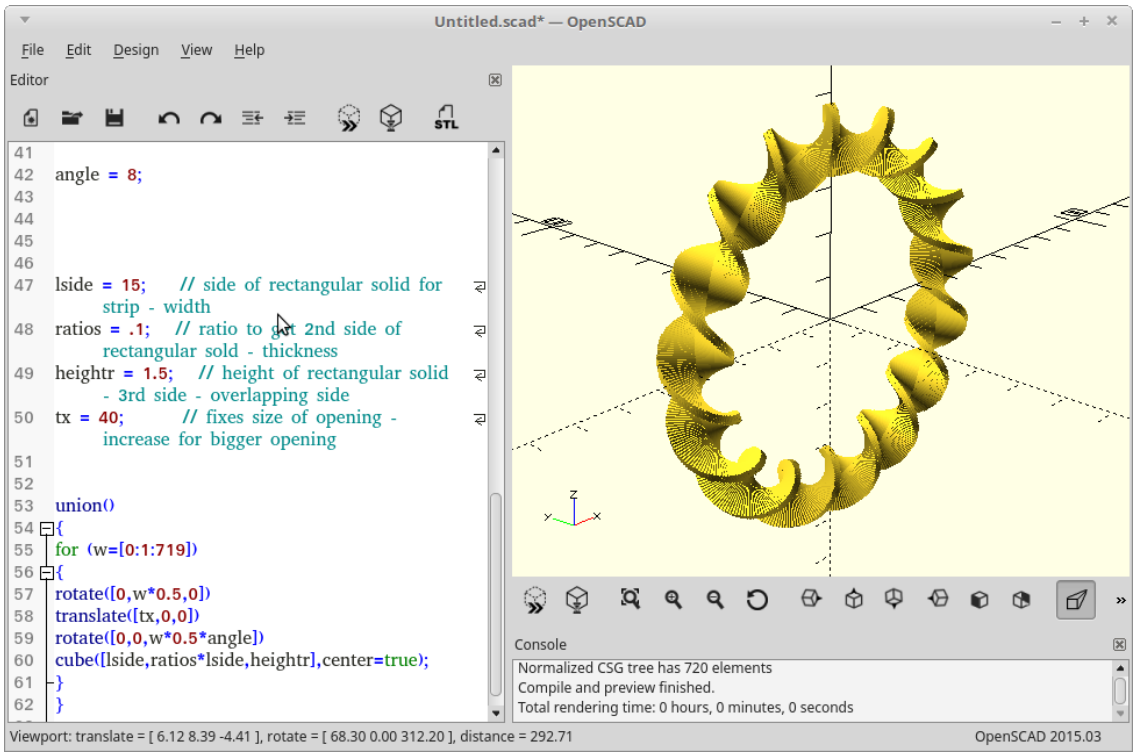


First one is variables. Instead of using fixed values, you should define everything as variable, making modifications easy and fast. So for example, when you design an extruder, you can easily modify it for either 1.75mm or 3mm. So, the following code will render a 20x20x20 cube.

```
d=20;

cube ( size = [ d, d, d], center = false);
```

Do note that you cannot change the value of a variable, only the last value assigned is used to render the entire result. Another great feature will allow you to get past this: modules. By defining a module you can reuse a part of the code.. The following code will render two cubes of different sizes:

```
drawCube( s = 5 );


translate( v = [10,0,0]) {
  drawCube( s = 10 );
}


module drawCube(s) {
  cube ( size = [ s, s, s], center = false);
}
```



These features make it easy to generate complex models, which can be easily modified afterwards. This makes OpenSCAD especially qualified for designing open-source models as other people can reuse and improve the design. So give OpenSCAD a try, let us know what you think.

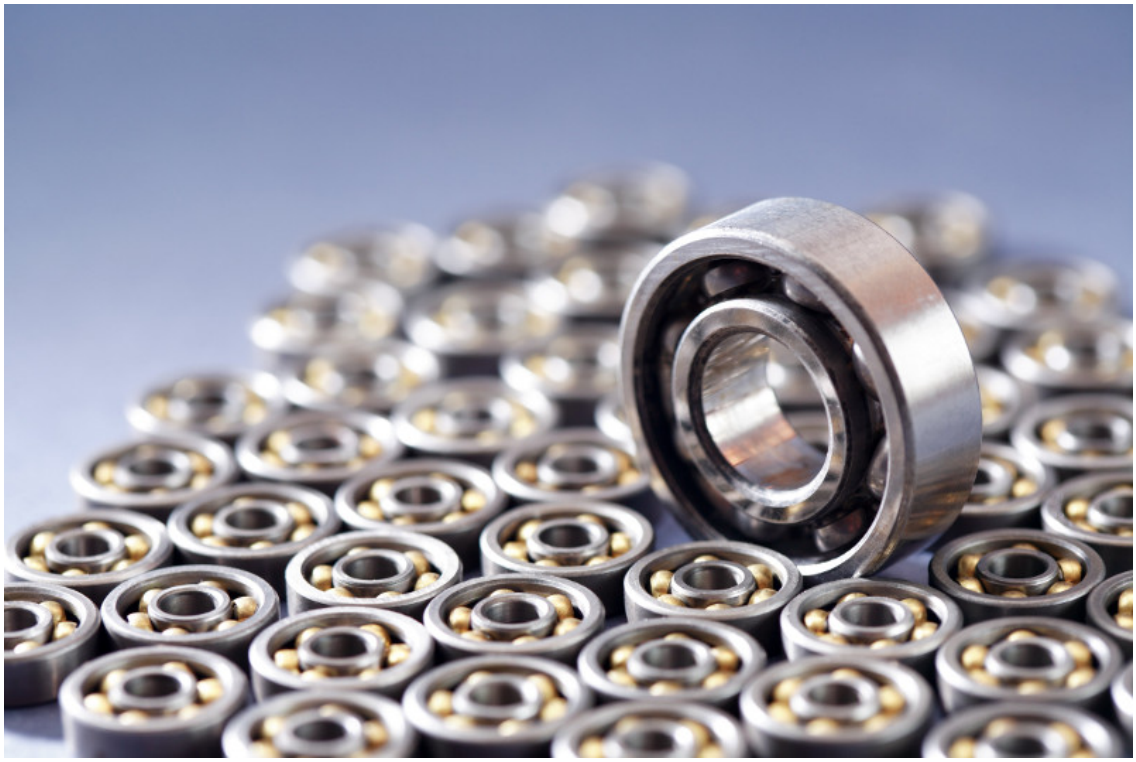
Thingiverse updates

Thingiverse

On Thingiverse you can find a lot of cool stuff to print. From guitar picks to Pokemon. You can also find handy stuff to cover up electronics.

Fidget Spinner
The next craze, easy to design and print. The fidget spinners are so popular they are even being banned in schools.

You can find a lot of fidget spinner idea's here.



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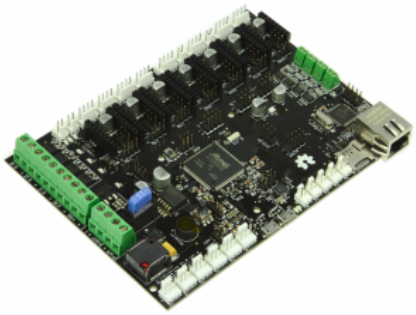

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