

3D Printing for the Amateur Radio Enthusiast

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3D printing is in the news a lot. Daily we read about new developments in medical research, building houses, boats and even spacecraft.

As 3D printing becomes more accessible to the average person, there are also applications for the Amateur Radio enthusiast.

A quick search on the Web quickly finds many sorts of Amateur Radio printable files. Some examples are provided in Figures 1 to Figure 3.

From Antennas to cable supports – the list goes on! You can print new pieces for your device and also customize items to the exact size and colour that you need.

For those who are unfamiliar with 3D printing, it is a process where melted material (usually some type of plastic) is extruded in fine layers to build an object.

I like to refer to it as a hot glue gun controlled by a computer with more precise results than the human hand ever could. Layer by layer you can watch your object grow right before your eyes.

Don, VE3BSR, holding a tape measure antenna built for foxhunting. The yellow handle with the HT mount and the cross pieces are all made on his 3D printer. Hopefully, we can all get back to foxhunts when this pandemic is over.

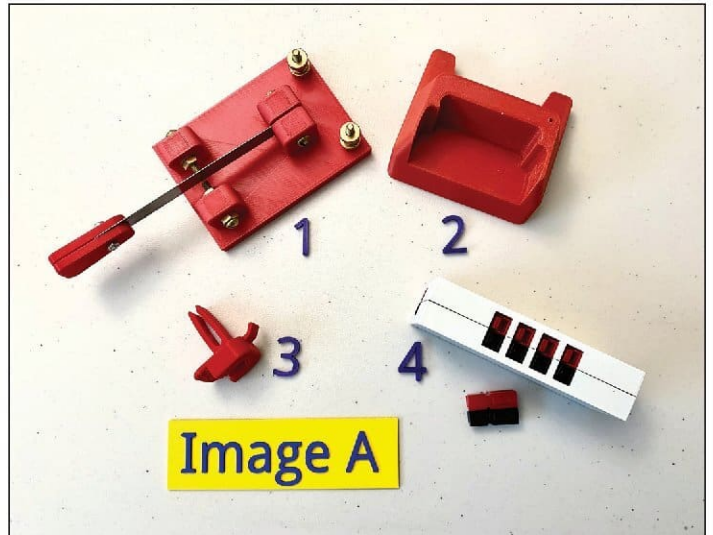
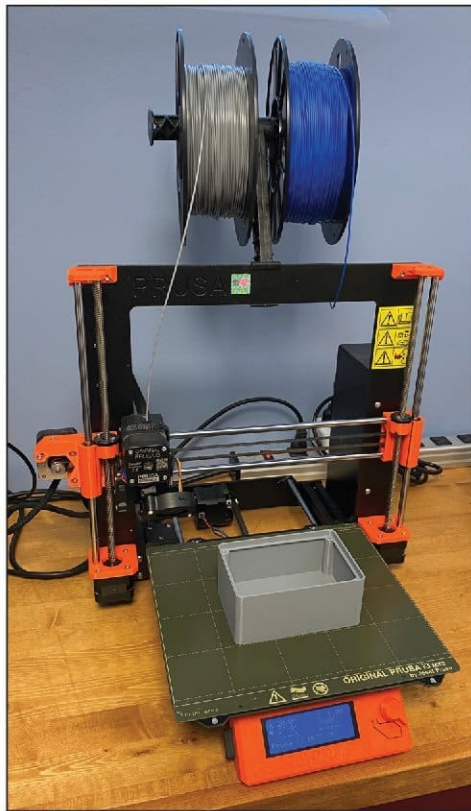


Figure 1: 1) CW Key; 2) Handy Talkie Base; 3) Mic holder for car vent; 4) Anderson Power Block.

This all started in the early 1980s with research into making a machine that could duplicate itself. It is what is

known as an additive process where things are built up, not cut out of solid material.

There is even an old joke about buying a 3D printer, printing a 3D printer for yourself and returning the original.

It's not far from the truth as many units are made up of mostly 3D printed parts. A lot of materials can be used in printers from a basic plastic PLA (Polylactic Acid, or Polylactide), a corn-based material. Other less common materials, such as ABS (Acrylonitrile butadiene styrene), and others which include carbon fibres, can make very strong parts needed for more strenuous use.

The International Space Station (NAISS) has a 3D printer on board so if a part is needed they can print it themselves!

There are many printers available for purchase ranging from \$300 to \$1,300 for a home unit. As shown in the first photo, I use a PRUSA model i3 MK3 for its reliability and tech support. They are user friendly and there are many videos on YouTube to help you learn how to effectively use your 3D printer. You can resize items as well as print in various colours and materials.

The cost to operate a printer is fairly low. A 2 kilogram roll of PLA filament costs about \$30 to \$50 and can create many items from antenna accessories to control knobs for a fraction of the cost to buy it elsewhere.

There is a short learning curve with these machines. There are often a few adjustments. It is not quite "click and print", but it's not that difficult to learn. If you can set up a Hamshack, you can operate one of these printers.



One advantage of 3D printing is you can design and make all sorts of things on your own. Project boxes built to size with custom openings for switches or connectors or knobs to replace a lost or broken one. You can start by downloading items from various online sites such as MakerBot's Thingiverse (www.thingiverse.com) which describes itself as a "thriving design community for discovering, making, and sharing 3D printable things. As the world's largest 3D printing community, we believe that everyone should be encouraged to create and remix 3D things, no matter their technical expertise or previous experience. In the spirit of maintaining an open platform, all designs are encouraged to be licensed under a Creative Commons license, meaning that anyone can use or alter any design."

Designing items for yourself is another great advantage to having a 3D printer. There are a lot of free 3D design software programs available, from the very basic (but still very useful) Tinkercad (www.tinkercad.com) to the advanced AutoCAD's "Fusion 360".

There are an enormous number of resources to help you. YouTube has literally thousands of videos. The printing manufacturers have online help and videos available. There is actually a Facebook group totally devoted to 3D printing for Amateur Radio enthusiasts! Other 3D enthusiasts are also very willing to help you.

But what exactly can you make for your shack? What can't you make? There are hundreds of items to choose from or design yourself. The photos provided in this article show only a few examples of the variety of items you can enjoy making.

I'm certain you will enjoy the discovery process of learning what 3D printing is all about!

Don, VE3BSR, is a retired school board support technician. He has always had an interest in making things even as a young child and 3D printing was a natural progression. He has had a printer for three years and enjoys designing and printing various items. Other hobbies include Geocaching, stained glass, and travelling. Don lives in Peterborough and became a new Amateur in 2020.

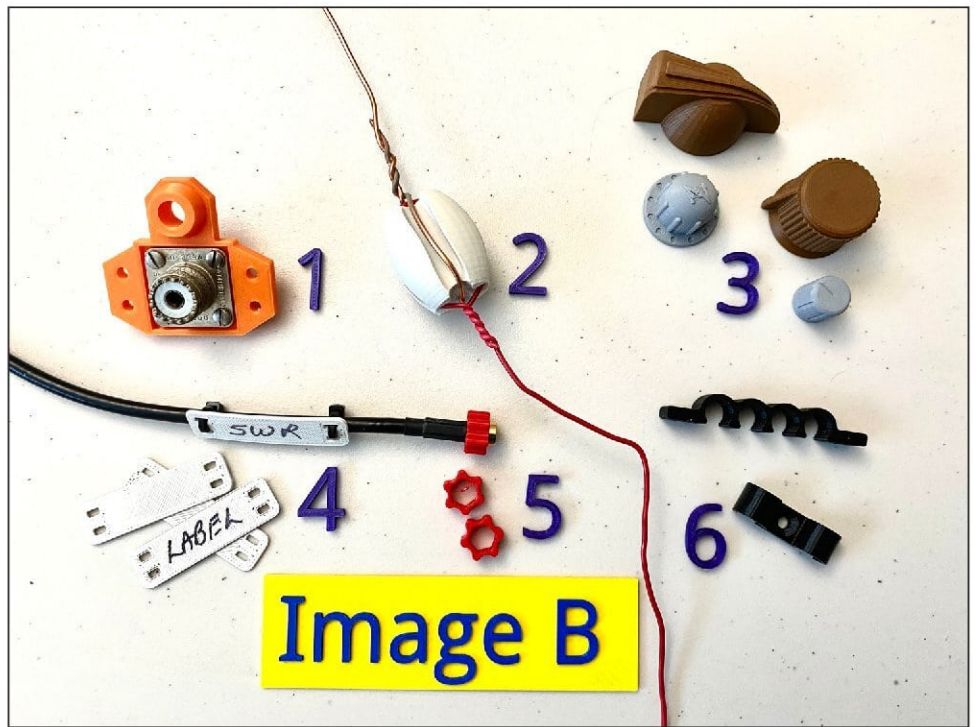


Figure 2: 1) Dipole antenna centre insulator; 2) Wire dipole insulator; 3) Knobs; 4) Cable label; 5) SMA nut grips; 6) Cable tie downs.

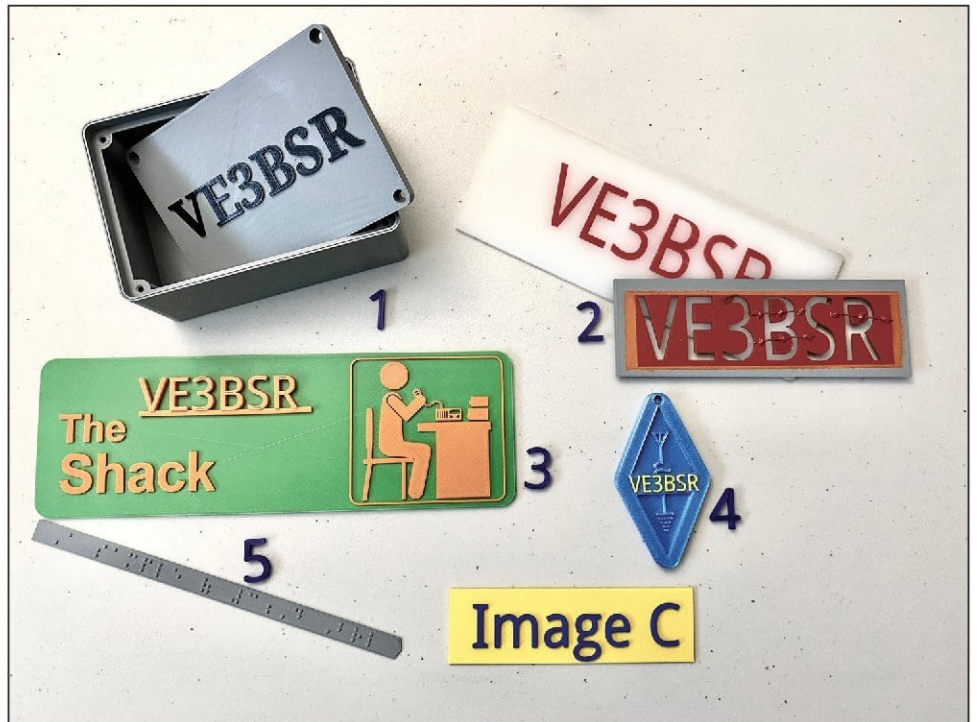


Figure 3: 1) Hobby box; 2) Stencils; 3) Door sign; 4) Key tag; 5) Braille tag.

Links:

MakerBot's Thingiverse: www.thingiverse.com

Tinkercad: www.tinkercad.com

PC Mag: <https://www.pcmag.com/news/3d-printing-what-you-need-to-know>