

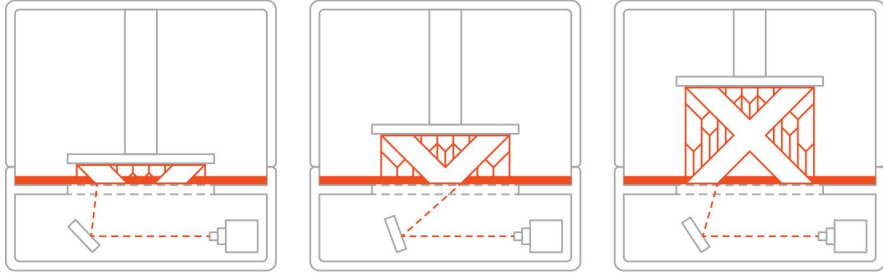
3D Printing for the Amateur Radio Operator

John Thurmond - K5JBT

What / Why / How / How much?

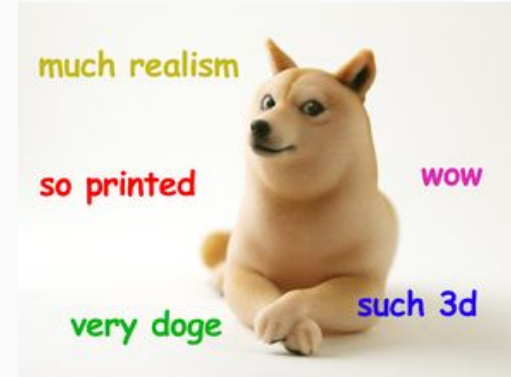
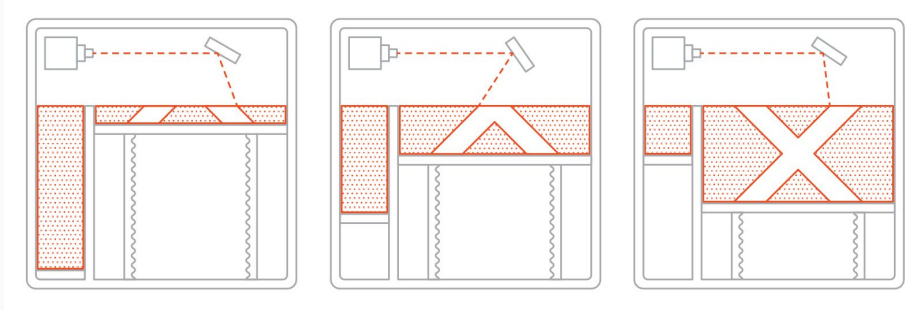
Other types of 3D printing (SLA)

SLA (Stereolithography)

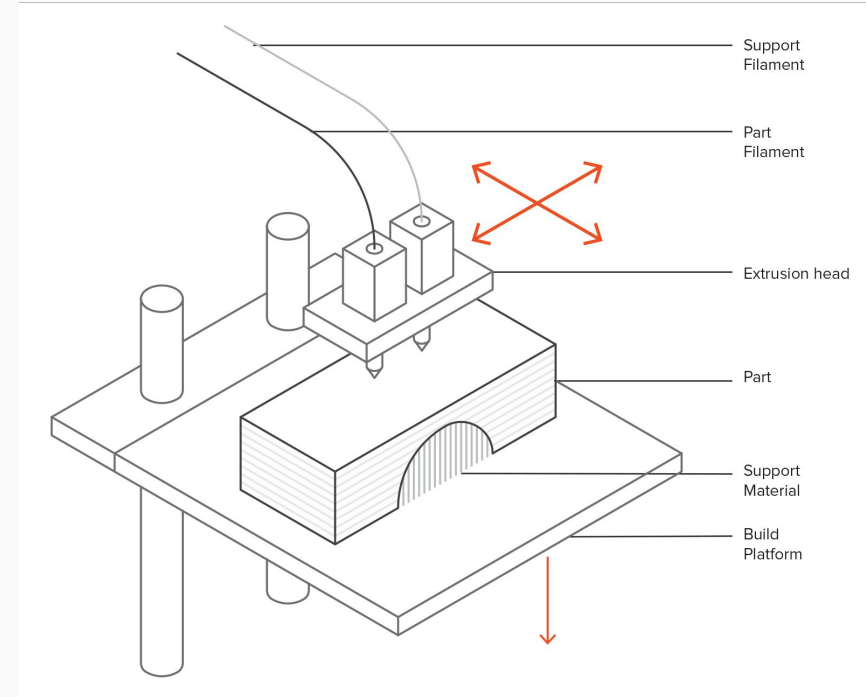


Other types of 3D printing (SLS/MJF)

SLS (Selective Laser Sintering) & MJF (Multi-Jet Fusion)



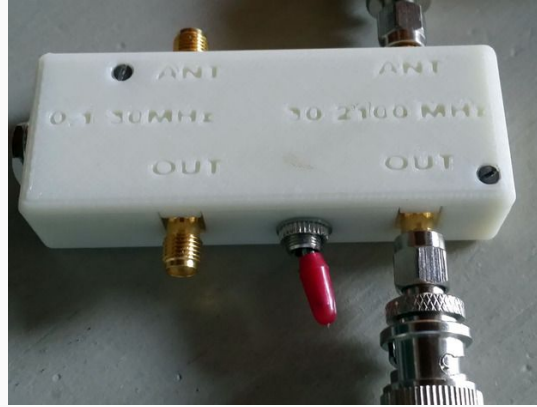
What is 3D Printing (FDM - Fused Deposition Modeling)?



Why 3D Printing?



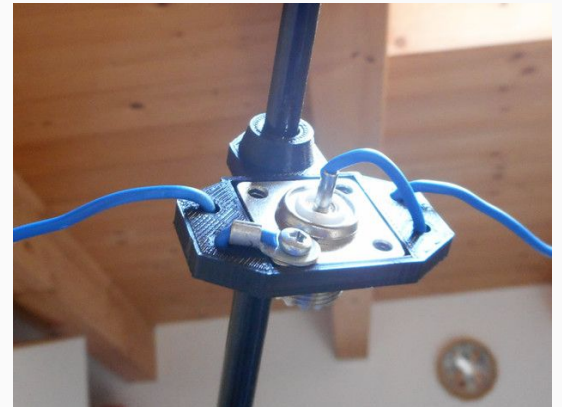
Keys



Enclosures



Antennas



Why 3D Printing?



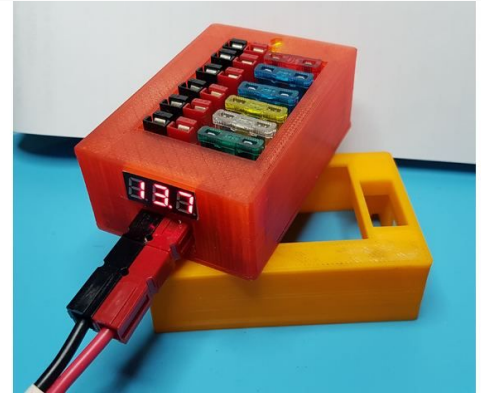
Custom Mounts



Knobs



Accessories



How: Step 1 - Download

Thingiverse

DASHBOARD

EXPLORE

EDUCATION

CREATE

Enter a search term



SEARCH RESULTS

71 results matching baofeng

Relevant



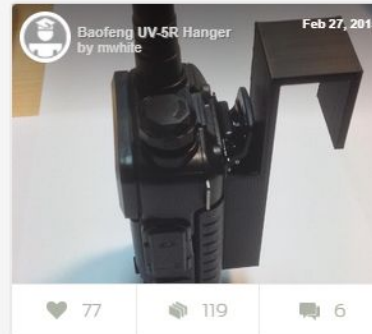
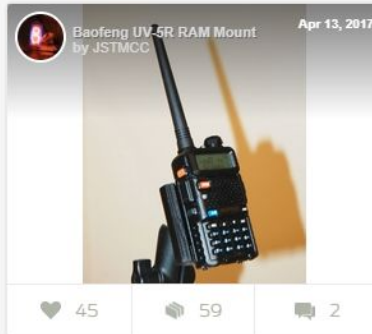
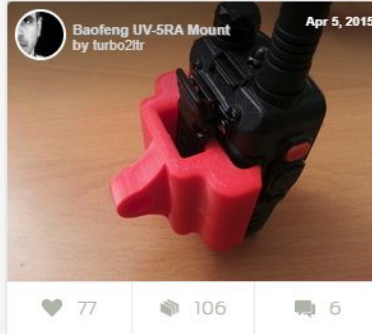
baofeng

SEARCH

FILTER BY

- ☒ Things
- ☐ Makes
- ☐ Users
- ☐ Collections
- ☐ Groups
- ☐ Apps

FOR EDUCATION



www.thingiverse.com

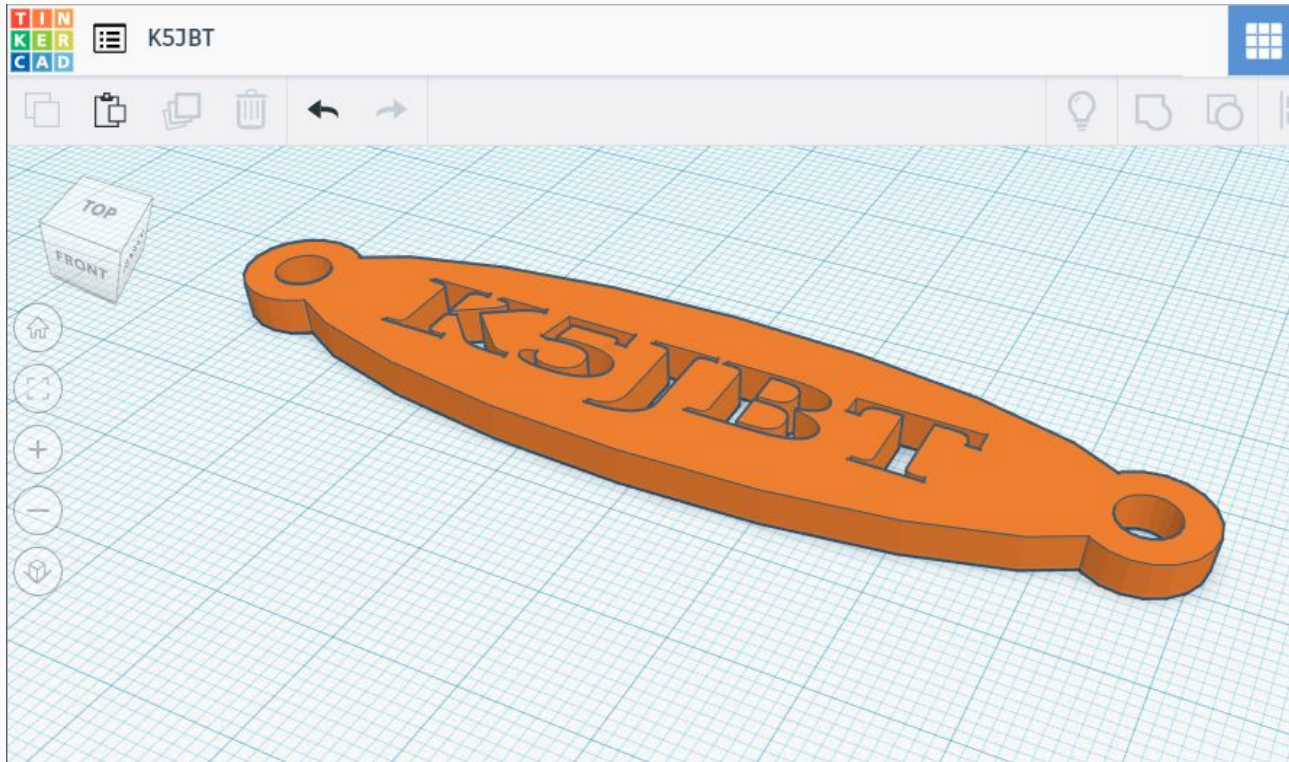
Pretty much anything you're looking for, you can find and download *for free* here

How: Alternate Step 1 - Design

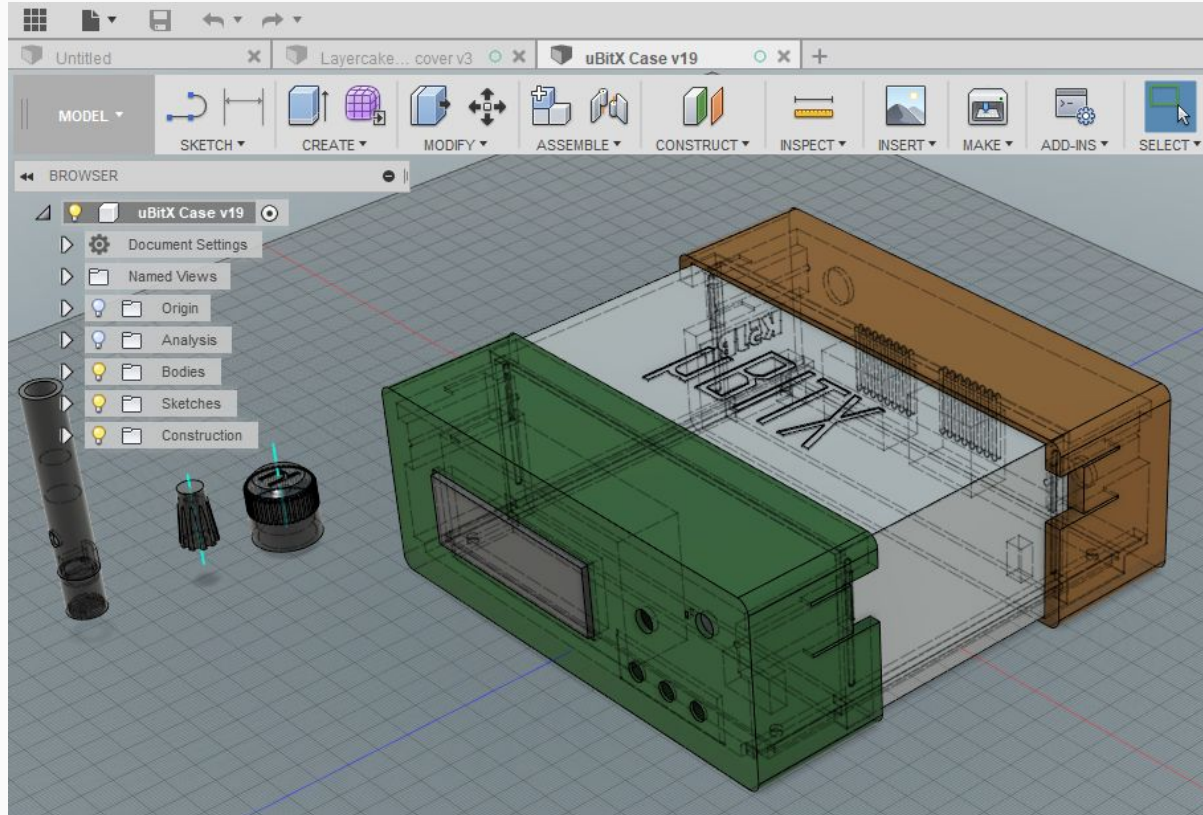
TinkerCAD

Simple, *free*, browser-based
3D CAD program.

Deceptively powerful!



How: Alternate Step 1 - Design

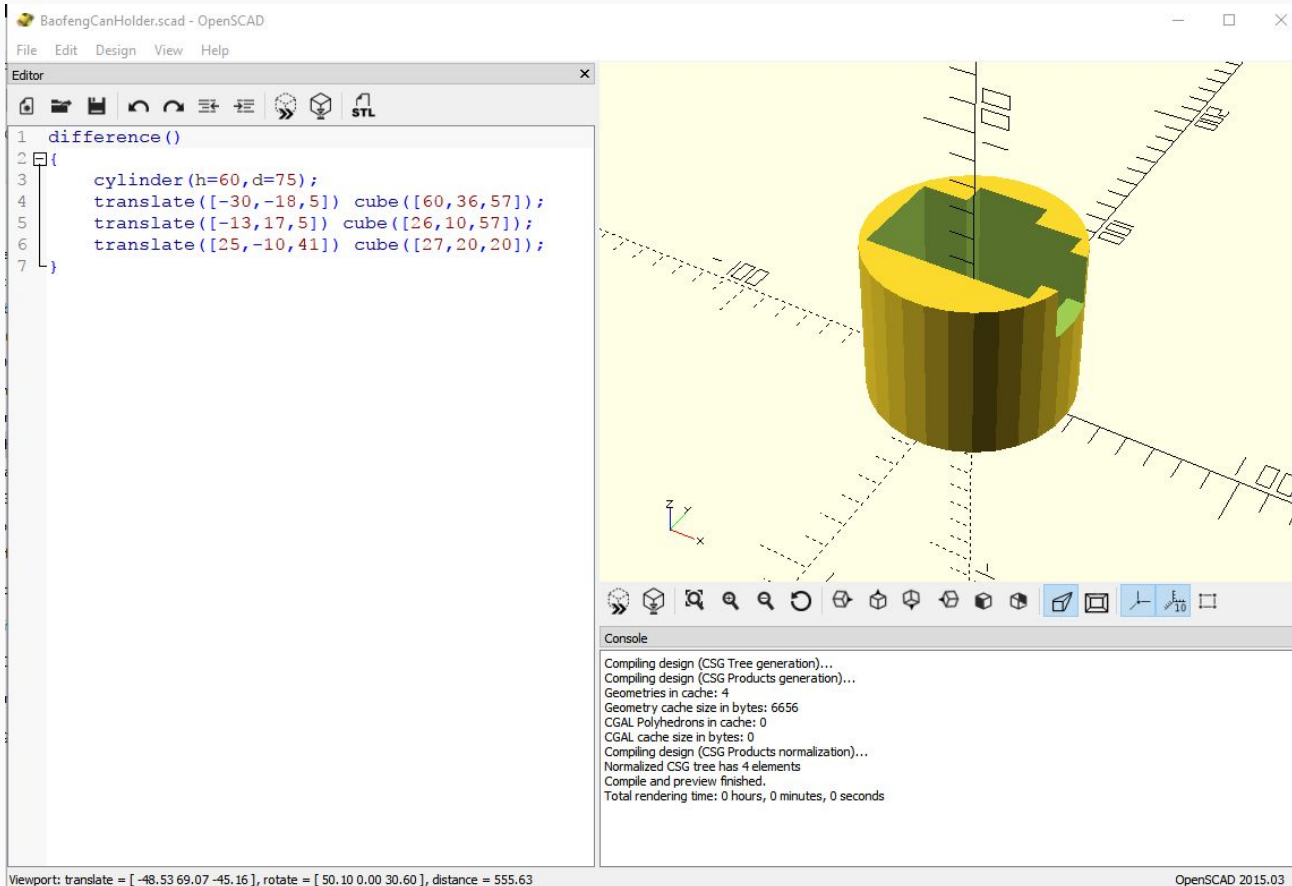


Fusion360

Free (for hobbyists) powerful cloud-based CAD/CAM

Can even control 3D printer directly

How: Alternate Step 1 - Design



OpenSCAD

Free parameterized 3D CAD

Create solid objects with
simple code

Example: Baofeng cup holder
is seven lines of code!

How: Step 2 - Select Material

Materials Chart

Many different filaments are available - careful that choice is possible for your printer!

New (and exotic) materials!



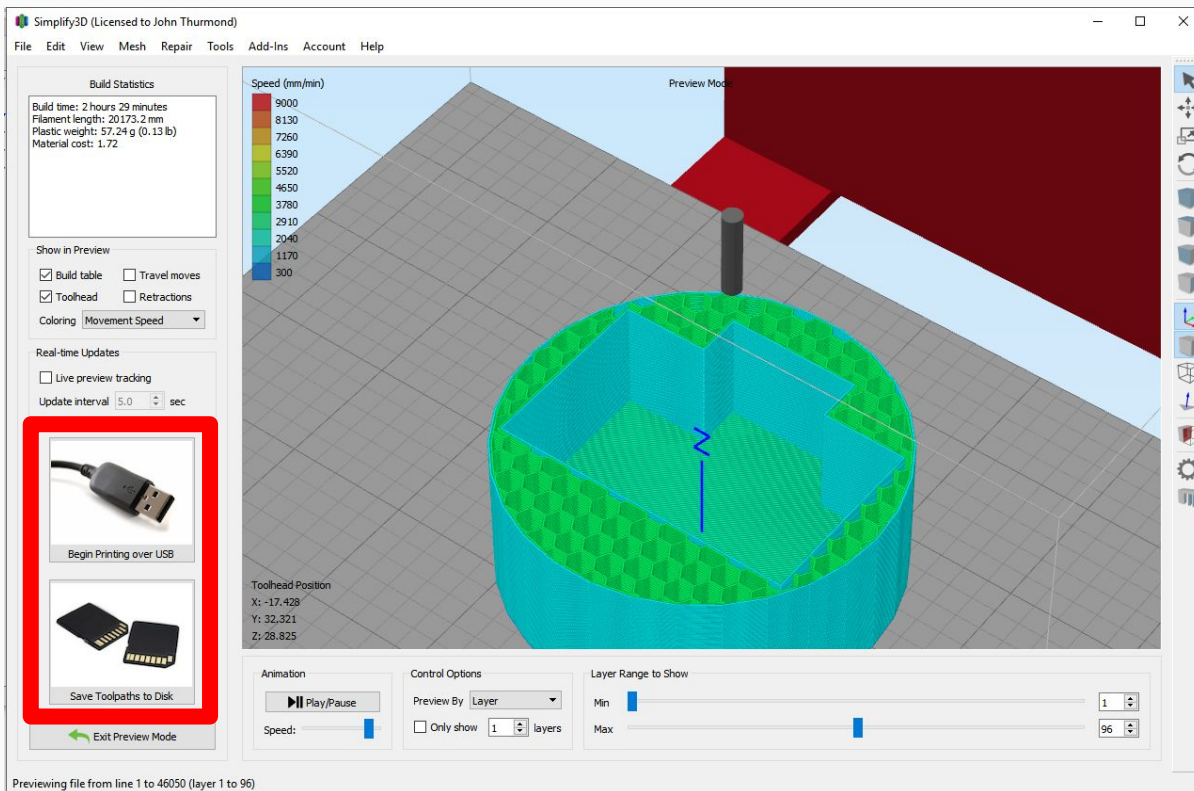
Materials Guide				
Material	Features	Printing Temperature	Heated Bed Temperature	Print Speed
rPLA	Easy to print, low warp and stronger than normal PLA	190-220°C	0-60°C	Medium-High
rPETg	Highly durable, flexible and food contact acceptable	195-235°C	50-70°C	Medium
rABS	High impact strength and little/no warping	240-260°C	75-100°C	Medium
Carbon Fibre	Stiff, low warping and matte finish	220-260°C	0-60°C	Medium-High
Polycarbonate	Tough, heat resistant to 140°C and BPA-free	270-300°C	100-120°C	Low-Medium
ASA	Strength, low warp and UV resistance	230-260°C	80-100°C	Medium
Wood	Authentic wood finish, smell and feel	205-235°C	0-60°C	Medium-High
FLEX	Flexible, oil-resistant and 400-450% elongation at break	220-250°C	0-60°C	Medium

How: Step 3 - Slice

Simplify3D
Cura (free)

Needed to turn a 3D model into printer commands - controls all settings:

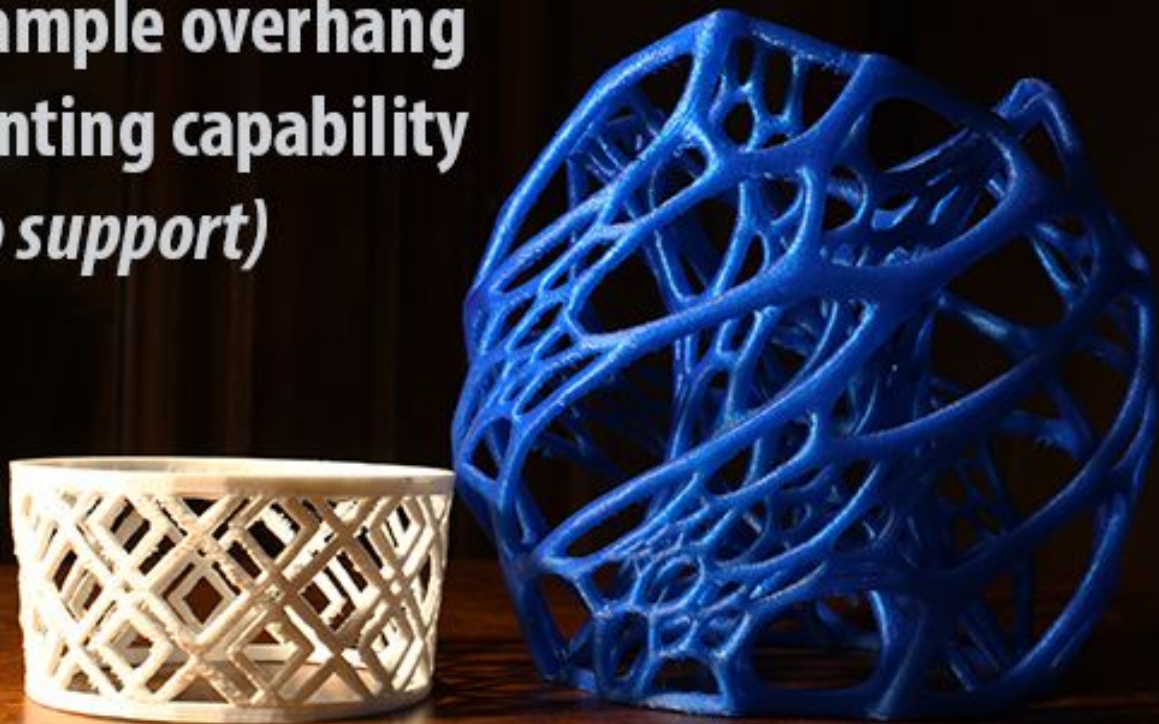
- Resolution
- Speed
- Temperature
- Infill
- Support
- Rafts



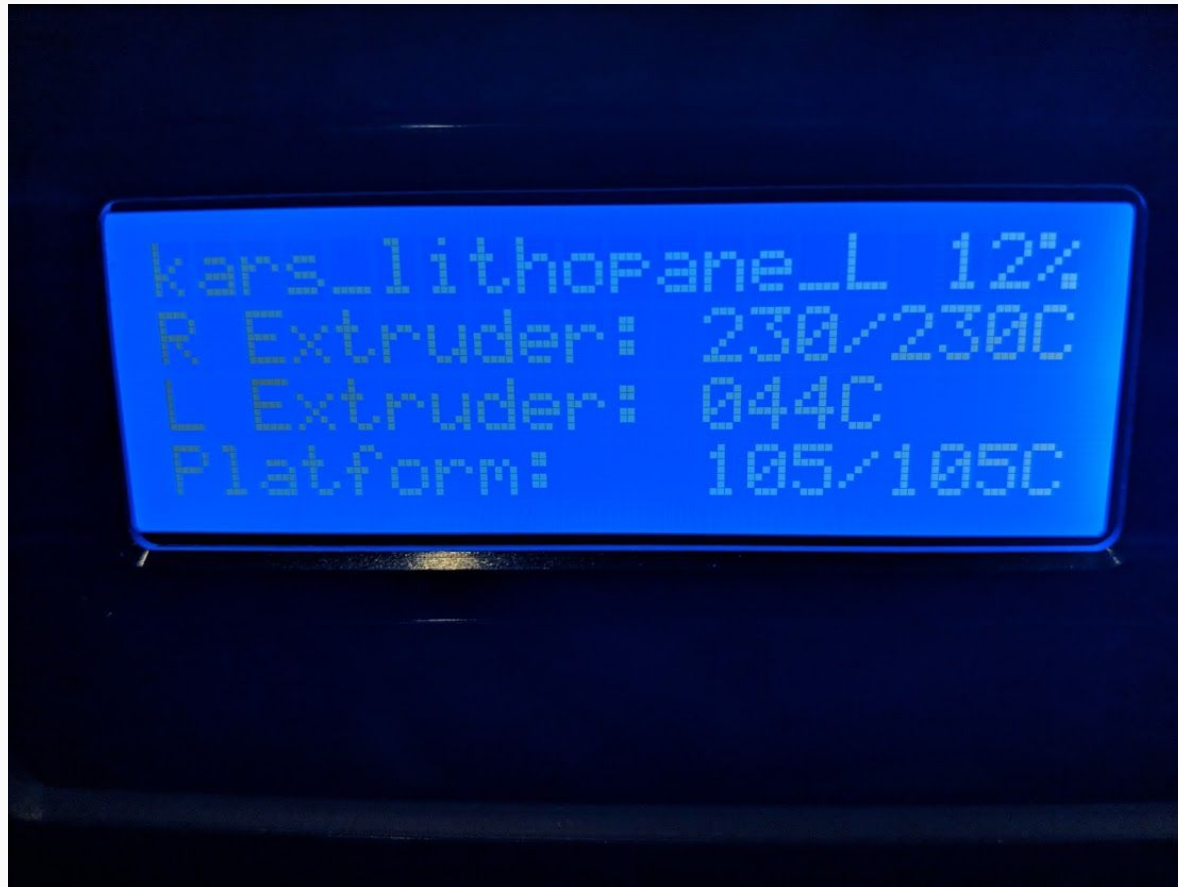
How: Step 3 - Slice



**Example overhang
printing capability
(no support)**



How: Step 4 - Print!



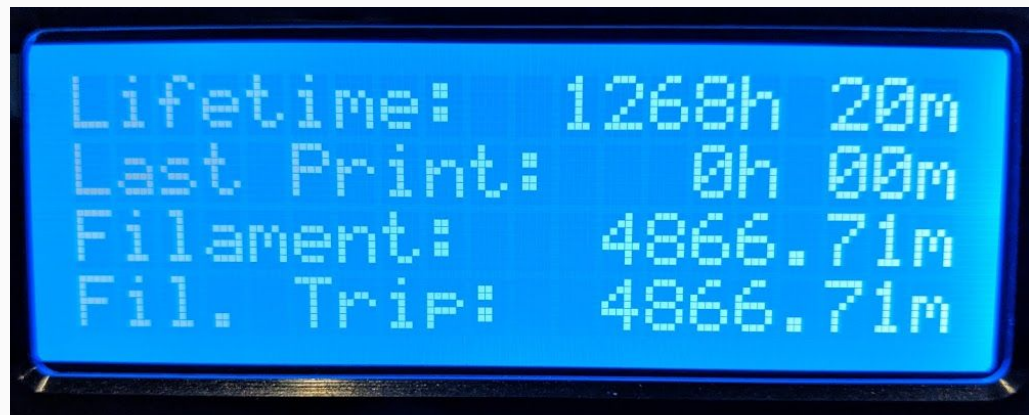
How Much?

Printers are way too expensive! NO!

Material is expensive, right? NO!

Printers are huge, right? NO!

Lifetime?



How Much? Printers

M MONOPRICE

Find Amazing Products

Help

Business

Shop

Featured Products

My Account

Quick Order

My Cart

HOME / Ink & Toner / 3D Printer / 3D Printer



Share Facebook Twitter

MP Select Mini 3D Printer V2, Black (Open Box)

★★★★★ 7 Reviews | 7 Questions, 11 Answers

Product # 29417

\$159.99

Qty: 1

ADD TO CART

ADD TO WISHLIST

In Stock This item should ship tomorrow (3/5/2018) if ordered **within 20 hours 18 minutes**

Volume Pricing

[\(Log In to see Member Pricing\)](#)

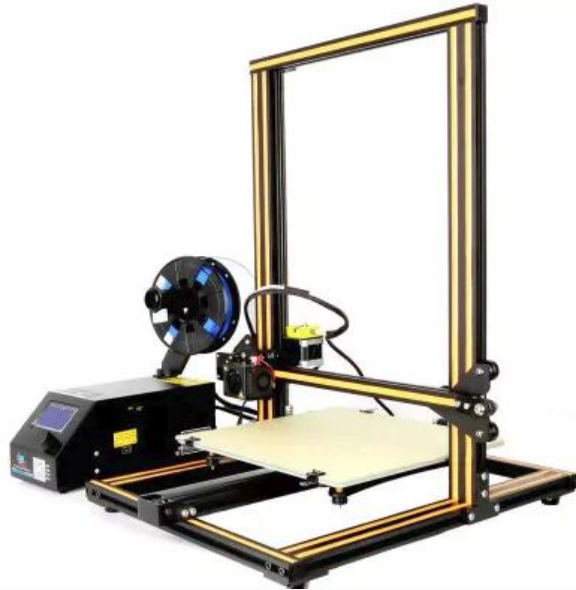
Qty: 1	Qty: 2-9	Qty: 10-19	Qty: 20-49	Qty: 50+
\$159.99	\$159.99	\$159.99	\$159.99	\$159.99

To see and take advantage of our member pricing **sign up for a business account** or **contact** our sales team.

[Learn more about Monoprice Business](#)

- Small build volume
- (4.7" x 4.7" x 4.7")
- Limited filaments
- + Tiny!
- + Good starter

How Much? Printers



Creality3D CR - 10 3D Desktop DIY Printer - US
PLUG COFFEE AND BLACK

LCD Screen Display with SD Card Off-line Printing Function

(134 Customer Reviews) | [Ask a question](#)

Warehouse Options: ☒ US-CN

Dispatch: Mar 5 - Mar 7

\$491.38

QTY:

Size:

Color:

Shipping Cost: **FREE SHIPPING** to [United States Via Priority Line](#) ▼

- Kit form (+?)
- Large
- + Most filaments
- + Huge build volume (11.8"x11.8"x15.7")

How much? Printers



Flashforge Creator Pro:

- \$1100 three years ago
- Most Materials
- Medium build volume
- Dual Extruders

How much? Filament



Inland

Inland 1.75mm Black PLA 3D Printer Filament - 1kg Spool (2.2 lbs)



177 customer reviews | 6 answered questions

Price: **\$14.99** ✓prime

In Stock.

Want it Tuesday, March 6? Order within **19 hrs 40 mins** and choose **One-Day Shipping** at checkout. [Details](#)

Sold by [Micro Center](#) and [Fulfilled by Amazon](#). Gift-wrap available.

Eligible for [amazon smile](#) donation.

New (3) from \$14.99 ✓prime

GMASS Bismuth Metal ABS Natural Color Filament - 1.75mm (1kg)

[Home](#) / [Store](#) / [3D Printer Filament](#) / [GMASS Bismuth Metal ABS Natural Color Filament - 1.75mm \(1kg\)](#)



Start printing with real Bismuth today using GMASS, a unique hybrid made of ABS and Bismuth. GMASS is precisely formulated so that it can be printed on any desktop 3D printer that can handle ABS filament. GMASS gives your parts the weight, feel, and density of real metal.

GMASS is radiation shielding (but contains no lead) and is ideal for creating parts that will be used in medical environments.

Tagged: 3D Printer Filament

Product No. MAN6Z882

List Price: ~~180.00 USD~~

Price: **155.00 USD**

Availability: **In Stock**

Order Now: **Ships Tomorrow** Free U.S. Shipping

Typically \$20-30 / kg

Concept to Hands-on in Hours!

Other Alternatives


shapeways

Marketplace My Workshop

All Products Search

This is a preview of how others will view your product. [EDIT PRODUCT](#)

MARKETPLACE > TECH > MECHANICAL PARTS >



uBITX Encoder Knob

Made by [THI Design](#)

\$16.00

Black Premium Strong & Flexible

3D printed in black nylon plastic with a smooth and slightly sheen surface for a finished look.

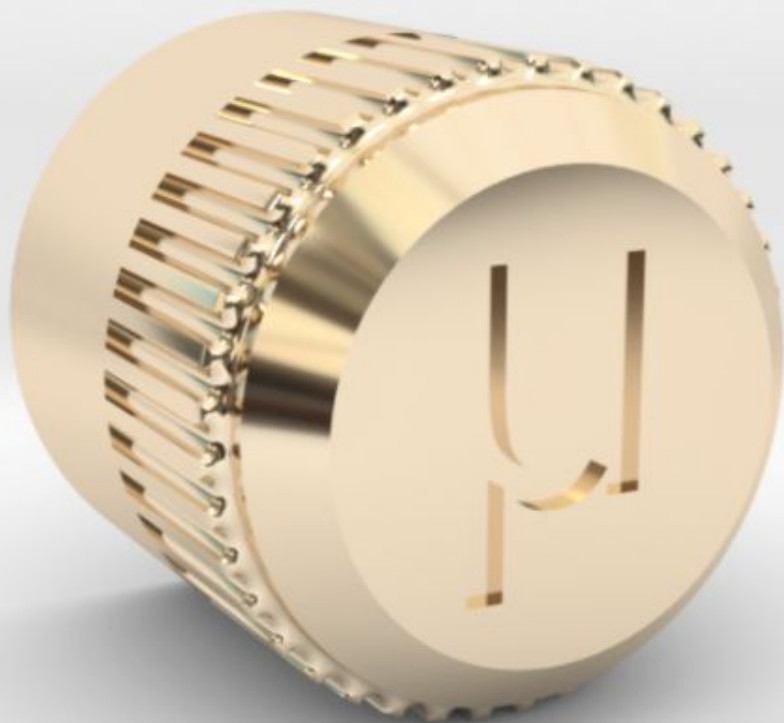
QTY 1 [BUY NOW](#)

All orders are backed by our Money Back Guarantee.

Design your part

Have a 3rd party print it

- Expensive!
- + Easy!



DIGITAL PREVIEW
Not a Photo

uBITX Encoder Knob

Made by
THI Design

\$3,500.00



14K Gold



3D printed in Solid 14k Gold polished to a beautiful smooth sheen.

QTY

1 ▼

BUY NOW



All orders are backed by our
Money Back Guarantee.

Conclusions

3D Printing...

- + ...is useful for hams (and other things)
- + ...is cheap(-ish)
- + ...is worth learning more about
- ...is limited in some ways
- ...takes some time
- ...still requires learning/knowledge

...is worth it!

