



Keyblade 3D Kit

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<https://learn.adafruit.com/kingdom-key-keyblade>

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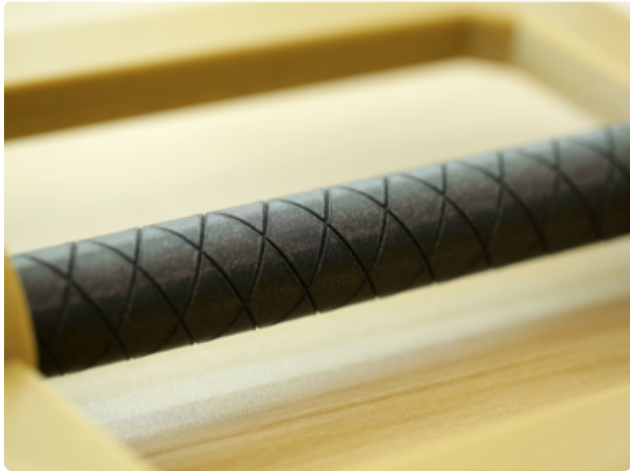
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Overview



3D Cosplay Prop Kit

This easy-to-build kit features parts with screw-threaded ends. It's also easy to take apart and break down, making it great for transport. Each part is printed in a specific color. Parts are designed to 3D print without any support material. Best suited for large printers with **minimum build volume of 250mm x 210mm x 210mm**. Download the files and 3D print your own keyblade!



3D Printed Parts

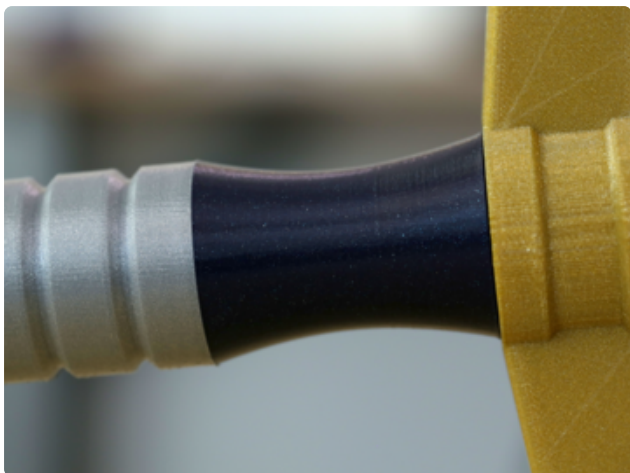
These parts were 3D printed using a special blend of PLA filament. The [PLA Extrafill from Fillamentum \(https://adafru.it/EuT\)](https://adafru.it/EuT) appear to be infused with glitter giving parts a semi-glossy surface finish. These weren't any post-processing done – These parts are straight off the printer. These filaments give parts a texture makes layer lines appear less visible at a distance.



This prop is separated into parts that are designed to be modular. The assembly is easy to build and the parts snap fit together. The build uses hardware fasteners for a ridge frame that is sturdy and durable.



The design source files are open source and available for remixing. This guide will provide a parts list, slice settings and assembly instructions.



Keyblade Lore

The **Kingdom Key** is the iconic weapon featured in the Kingdom Hearts video game series. They're known to be mysterious weapons that are used to battle between darkness and light. It has the ability to lock/unlock a world's keyhole to seal or open the barriers between worlds, as well as lock/unlock any room, gate or treasure chest. Although there's not much of a cutting edge, they are shown to be effective combat weapons.



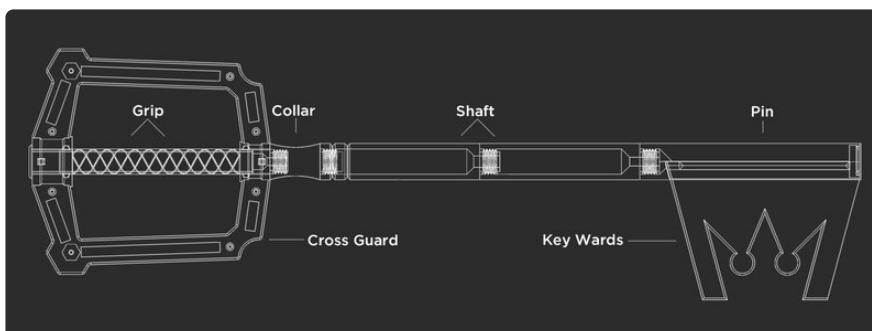
From [Kingdom Hearts Fandom Wiki \(https://adafru.it/EB1\)](https://adafru.it/EB1)

Keyblades can only be wielded by chosen individuals who are strong of heart.

Shaped like keys, they operate any lock in existence and are imbued with magic and other unique capabilities.

Sword & Key Anatomy

The Keyblade design is based off keys used with warded locks. A warded lock uses wards to stop the lock from opening. Key have corresponding notches to the wards in the lock. The different shapes in the wards can be quite intricate. These old style lock designs are iconic and can be found as far back as ancient China and Rome.





- Total Weight: **1lb, 3.6oz (554g)**
- Total Length: **40in (101cm)**
- Number of parts: **14 pcs**



Parts



Filament for 3D Printers in Various Colors and Types

Having a 3D printer without filament is sort of like having a regular printer without paper or ink. And while a lot of printers come with some filament there's a good chance...

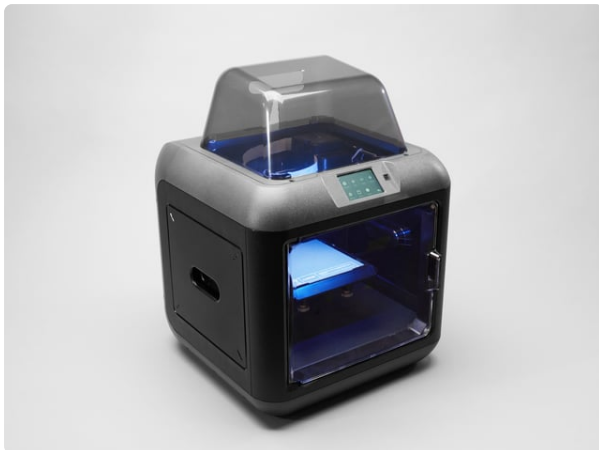
<https://www.adafruit.com/product/2080>



Heat-Set Insert For Soldering Irons - #4-40 / M3 Inserts

Wanna improve the connection strength between your project's 3D-printed parts, and also have nice clean surfaces? Instead of gluing bits together, or screwing plastic screws...

<https://www.adafruit.com/product/4239>



Monoprice Inventor II 3D Printer with Touchscreen and WiFi

The Monoprice Inventor II 3D Printer Touchscreen with WiFi is a perfect entry-level 3D printer with small footprint and reliable performance. It comes equipped with...

<https://www.adafruit.com/product/3897>



Ultimaker 2+ 3D Printer

The Ultimaker 2+ is one of our favorite 3D printers on the market. It's a well-built open-source compact machine with an excellent UX. Every inch of the...

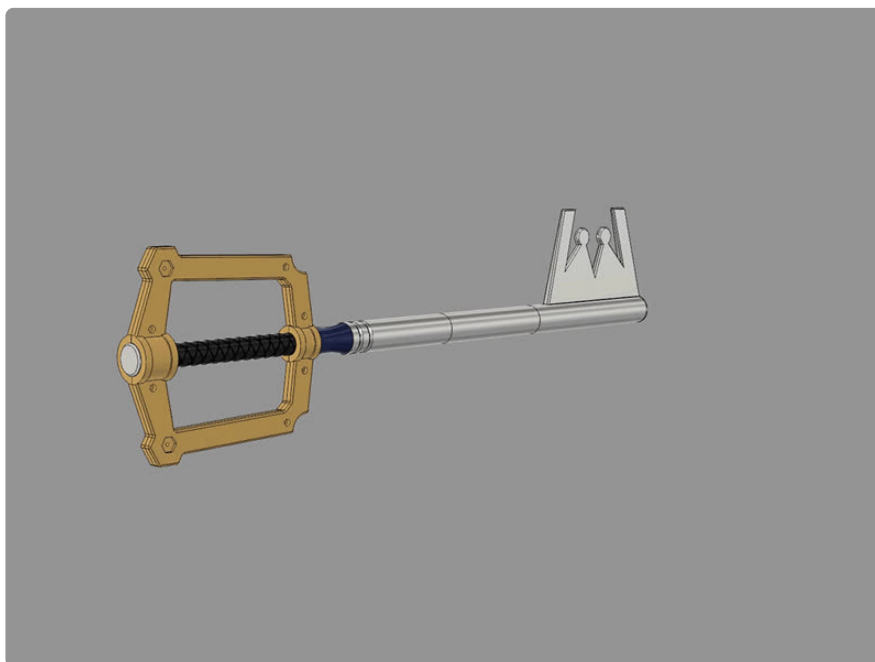
<https://www.adafruit.com/product/2673>

Required Hardware

- 8x M3 [button head machine screws](https://adafru.it/EB2) (<https://adafru.it/EB2>)
- 8x M3 [heat set inserts](https://adafru.it/EB3) (<https://adafru.it/EB3>)

Author Notes:

There's a lot of different methods of constructing cosplay props, foam smithing, metal working and wood working. Search on YouTube to see different ways makers build props – There's a few different Keyblade build videos worth checking out. I think the Kingdom Key has a nice simple form with geometric shapes that translate nicely across different mediums and materials. I think the story behind this weapon is both interesting and very creative.



3D Printing



3D Printed Parts

The parts in this kit are designed to be 3D printed with FDM based machines. STL files are oriented to print "as is". Parts require tight tolerances that might need adjustment of slice settings. Reference the suggested settings below.

Download CAD files from Github

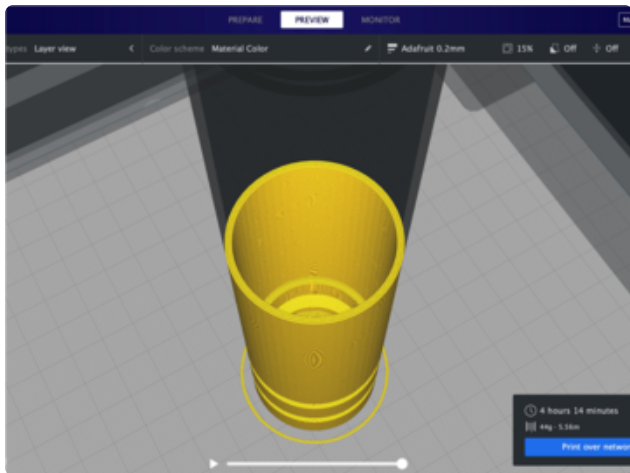
<https://adafru.it/ECt>

Alternate Download Links:

- Cults 3D – <https://cults3d.com/en/3d-model/game/yet-another-keyblade> (<https://adafru.it/ECu>)
- Thingiverse – <https://www.thingiverse.com/thing:3582947> (<https://adafru.it/ECv>)
- MyMiniFactory – <https://www.myminifactory.com/object/3d-print-92038> (<https://adafru.it/ECw>)
- Github Repo – https://github.com/adafruit/Adafruit_Learning_System_Guides/tree/master/Keyblade_3DKit (<https://adafru.it/ECt>)

CURA Slicing

Parts were sliced using Ultimaker's CURA 4.x software and tested with an Ultimaker S5, Ultimaker 3 and Flashforge Inventor II. The kit requires a minimum build volume of 250mm x 210mm x 210mm. The tallest tubing part requires a z-height of 210mm. No support material is necessary for any of the parts. Double check parts are positioned in the center of the build plate.



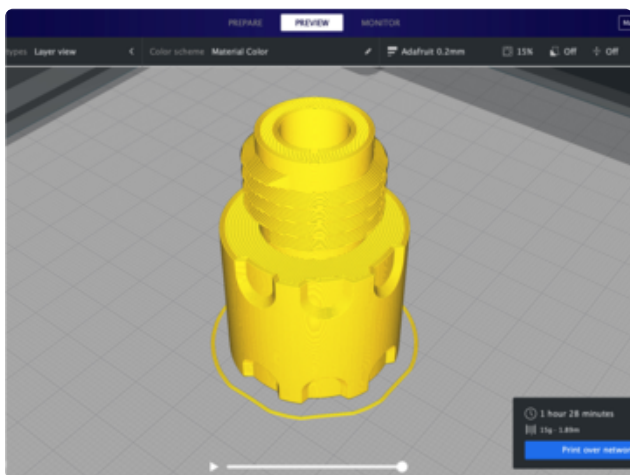
Wall Line Width

The blade is comprised of hollow tubing that prints with minimal infill. The pipe is made from four pieces that feature screw-threaded ends. With a shell thickness of 1.5mm, the walls of the cylinder is made from just the inner and outer perimeters. Adjust the "wall line width" to generated a similar tool path in your slicing software.

Settings

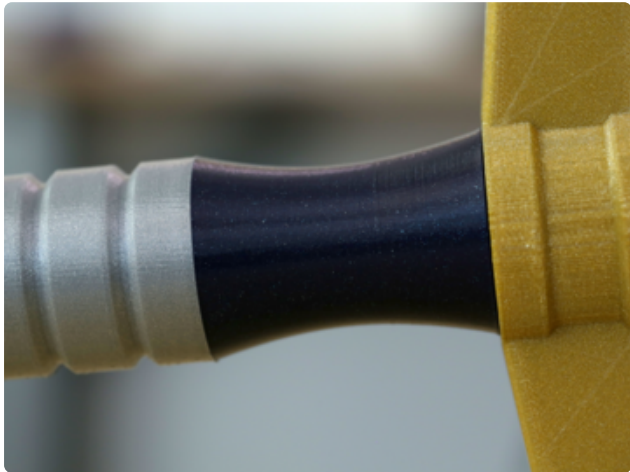
Use these settings as reference. Values listed were used in [Ultimaker's CURA 3.X \(https://adafru.it/C26\)](https://adafru.it/C26) slicing software.

- 0.2mm Layer Height / 0.4mm nozzle
- 0.38mm Line Width (inner & outer widths)
- 40mm/s printing speed
- 20% infill
- Supports: No



Tolerance Testing

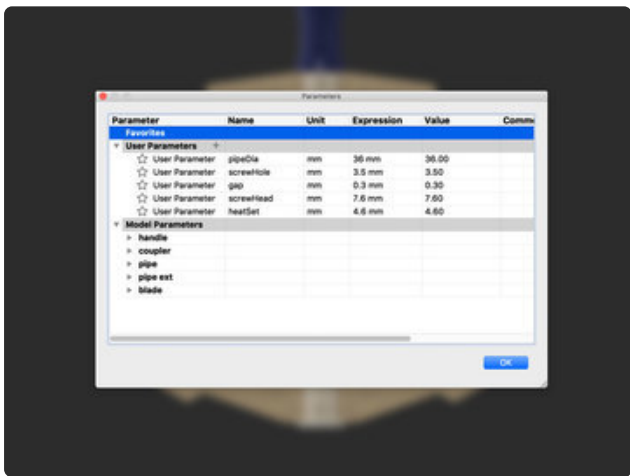
An extra part is included with the kit, **tube-tester.stl** – This part is meant to test your printers slice settings. Print two and see how well they screw together. The outer pattern should line up properly. These parts use the same tolerances in the screw-threaded ends. There's a small gap between the mating threads to accommodate for expansion during the printing process. This also gives the surfaces some room so that the parts don't grind together when twisting them.



Filament Colors

List of filament colors used in this project. PLA is by [Fillamentum.com](https://fillamentum.com) (<https://adafru.it/EuT>) these are from their premium filament line of material.

Vertigo Galaxy PLA
 Vertigo Gray PLA
 Vertigo Starlight PLA
 Gold Happens
 Rapunzel Silver



Parametric Customization

Need to change the diameter of the screw? How about using different heat set inserts? The parts are setup with user parameters, so it's easy to change a value and automatically update the features in CAD. Tolerances use a "gap" to give clearance between mating surfaces – slight adjustments make big differences.



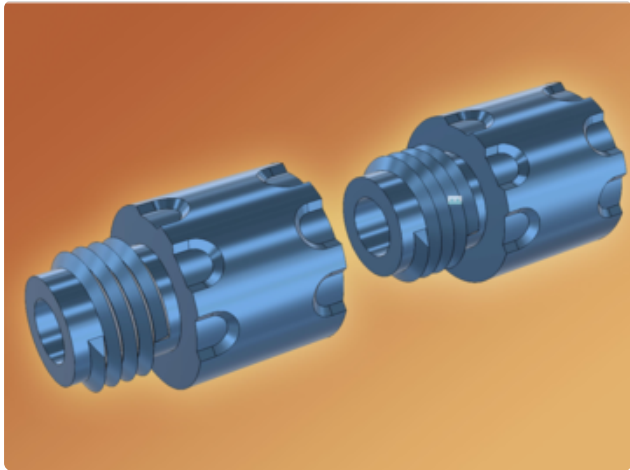
3D Parts

Here's the full parts list segmented for better readability.

- Handle Assembly
 - handle-collar.stl
 - handle-connector.stl
 - handle-endcap.stl
 - handle-grip.stl
 - handle-guard-a.stl
 - handle-guard-b.stl
 - handle-guard-a-smaller.stl
 - handle-guard-b-smaller.stl
 - handle-ring.stl
- Blade Assembly
 - pipe-base.stl
 - pipe-extension.stl
 - pipe-key.stl
 - pipe-key-smaller.stl
 - pipe-top-cap.stl
 - key-wards.stl
 - key-wards-smaller.stl
- Accessories
 - charm-adafruit.stl
 - charm-mickey.stl

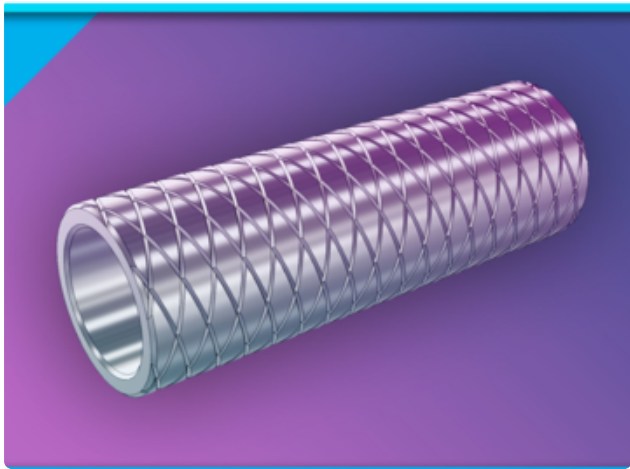
Designing Things

The fusion 360 source file is included and features original sketches and feature timeline along with easily editable user parameters. The parts can further be separated into small pieces for fitting on printers with smaller build volumes. Note: STEP file is included for other 3D surface modeling programs such as Onshape, Solidworks and Rhino.



Screw-Threaded Parts

Most of the tubing pieces feature screw-threaded ends allowing the parts to simply screw together. This uses the coil feature from Fusion 360 to create threads with custom size, pitch and height. Watch my Layer by Layer tutorial below for a deep dive on how to design parts with these features.



Knurling Textures

The grip in the handle features knurling texture that wraps around the cylinder. This design technique is achieved using the coil and circular pattern features in Fusion 360. Watch my Layer by Layer tutorial below for a deep dive on how to apply knurling to your parts.

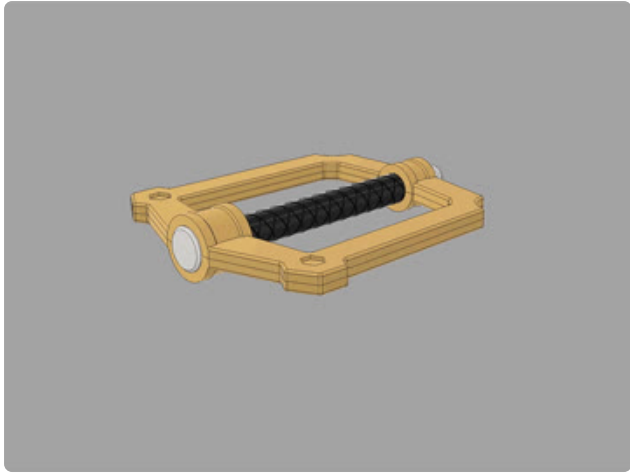
Layer by Layer

Want more CAD tutorials? Check out my [playlist on YouTube \(https://adafru.it/Ddm\)](https://adafru.it/Ddm) – There's over 100 of them! My personal favorite is the snap fit tutorial for cases and enclosures.

CAD Tutorials – YouTube Playlist

<https://adafru.it/Ddm>

Assembly



Handle Assembly

The handle is comprised of six individual pieces. The cross guard requires M3 screws and heat set inserts. The end cap and connector parts are keyed and snap fit into registrations in the cross guard.

Required Hardware

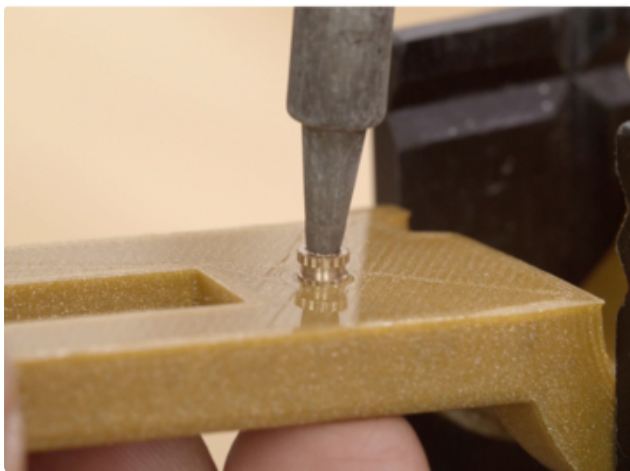
8x M3 [button head machine screws](https://adafru.it/EB2) (<https://adafru.it/EB2>)

8x M3 [heat set inserts](https://adafru.it/EB3) (<https://adafru.it/EB3>)



Blade Assembly

The blade is comprised of seven parts. The collar joins the tubing to the handle. The pipe extension is printed twice to lengthen the tubing. The key wards slide into the v-slot on the **pipe-key.stl** part. The **pipe-top-cap.stl** part is designed to snap fit and locks on top.



Installing Heat Set Inserts

The handle requires threaded inserts for joining the halves together with screws. The term "heat set" is named after the installation process. Place an insert on top of the mounting hole. Use the tip of a soldering iron to heat up the insert and slowly press down to install. I suggest using a vise to help keep parts in place. I used a long screw to test the straightness so you can go back and reheat if you need to.

[Heat-Set Solder Iron Tip](https://adafru.it/EB4) (<https://adafru.it/EB4>)



Install Grip

The grip features registration keys on both ends. The cylinder is symmetrical so it can fit either orientation. Line up the notches on the handle halves and press to snap fit into place.



Install End Cap

The pommel, or "bow" of the keyblade is made from two pieces that are glued together – **handle-ring.stl** and **handle-endcap.stl**. The endcap part features registration keys that slot into the bottom of the cross guard halves.



Install Collar Connector

The **handle-connector.stl** part is fitted on the opposite end of the cross guard. It also features registration keys that slot and snap fit onto the cross guard halves.



Clamp & Secure

Place the other half of the cross guard and clamp it onto the assembly. Hold the parts together while installing machine screws. Insert and fasten 8x M3 x 6mm long machine screws until fully tightened.



Install Key Wards

The key wards feature an edge that slides into the v-slot on the **pipe-key.stl** part. Install the key ward with the drafted angle going in first – Reference photo for correct placement. If tolerances are too slight to fully slide in, use a mini rubber mallet to hammer it in. Place the **pipe-top-cap.stl** part over the tubing with the notches lined up. Use the edge of the table to apply firm pressure to snap fit and lock it in place.



Install Pipes

Connect the two **pipe-extension.stl** parts together. Then, install the **pipe-base.stl** part onto the bottom of the pipe extension. Proceed to install the **pipe-key.stl** part onto the top of the pipe extension.



Install Collar

Screw the **handle-collar.stl** part onto connector on the handle assembly. This piece joints the handle assembly to the blade assembly.



Install Handle to Blade

Twist the collar onto the tubing of the blade assembly. Firmly twist to tighten until the cross guard and key wards line up properly. Take a moment to disassemble a few times to get the threads to smoothly screw together. The blade and handle can be removed for storage or putting in a bag for traveling to an event.



More Project Ideas

Check out the following tutorials for more ideas and inspiration. Make something cool you want to share with us? Please post, share and join our [LIVE Show & Tell show](https://adafru.it/ExB) (<https://adafru.it/ExB>), every Wednesday @ 7:30PM ET.

- [Prop-Maker Keyblade](https://adafru.it/EB5) (<https://adafru.it/EB5>)
- [Prop-Maker Lightsaber](https://adafru.it/EB6) (<https://adafru.it/EB6>)
- [Zelda BOTW: Guardian Sword](https://adafru.it/EB7) (<https://adafru.it/EB7>)
- [Zelda BOTW: Guard Shield](https://adafru.it/EB8) (<https://adafru.it/EB8>)
- [Zelda BOTW: Bladesaw](https://adafru.it/EB9) (<https://adafru.it/EB9>)
- [Gunblade](https://adafru.it/EBa) (<https://adafru.it/EBa>)
- [NeoPixel Gas Mask](https://adafru.it/EBb) (<https://adafru.it/EBb>)
- [Lie Rien's Stormflower](https://adafru.it/EBc) (<https://adafru.it/EBc>)
- [Link's Wooden Sword](https://adafru.it/CfC) (<https://adafru.it/CfC>)
- [Raygun blaster](https://adafru.it/EBd) (<https://adafru.it/EBd>)
- [Bioshock Little Sister Syringe](https://adafru.it/EBe) (<https://adafru.it/EBe>)
- [Ultrasonic Ruler](https://adafru.it/eOD) (<https://adafru.it/eOD>)
- [Halo Energy Sword](https://adafru.it/EBf) (<https://adafru.it/EBf>) (3D printed)
- [Halo Energy Sword](https://adafru.it/EBg) (<https://adafru.it/EBg>) (modd)
- [Overwatch Lucio Blaster](https://adafru.it/yrB) (<https://adafru.it/yrB>)
- [Sword & Wand Prop](https://adafru.it/sez) (<https://adafru.it/sez>)
- [D20 Glowing Mace](https://adafru.it/EBh) (<https://adafru.it/EBh>)
- [Fix It Felix Hammer](https://adafru.it/EBi) (<https://adafru.it/EBi>)
- [Magic Wand](https://adafru.it/EBj) (<https://adafru.it/EBj>)



