

# Caveatron Rev B 3D Printed Parts Description

2021-08-02

## Introduction

This document includes a description of the 3D printed Caveatron parts, alternate versions and notes on how to print them. Also included is information on how the 3D printed parts go together. Information on how to assemble all the other components is found in the Caveatron Assembly Instructions document.

## Scaling

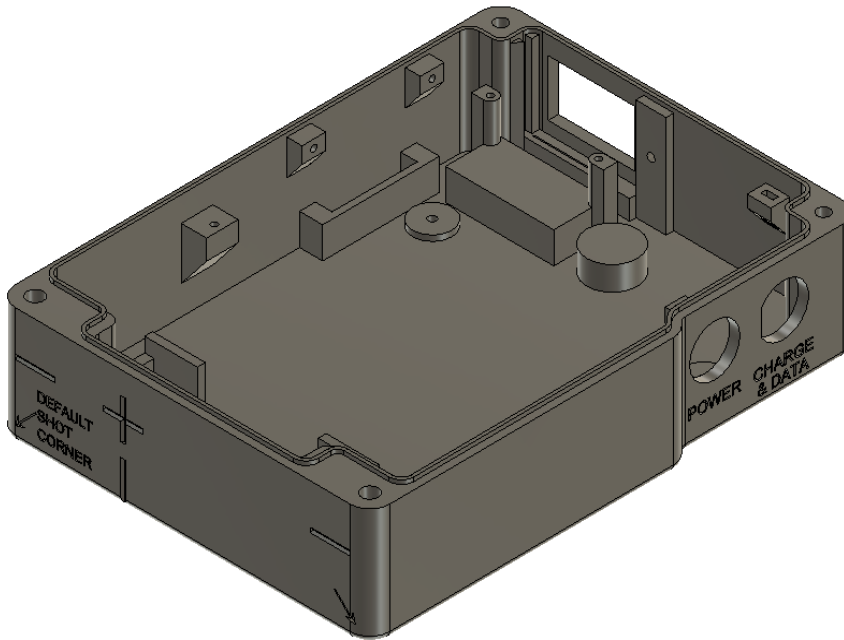
To print properly, these files must be scaled by 2540% in your slicer software.

## General Printing Notes

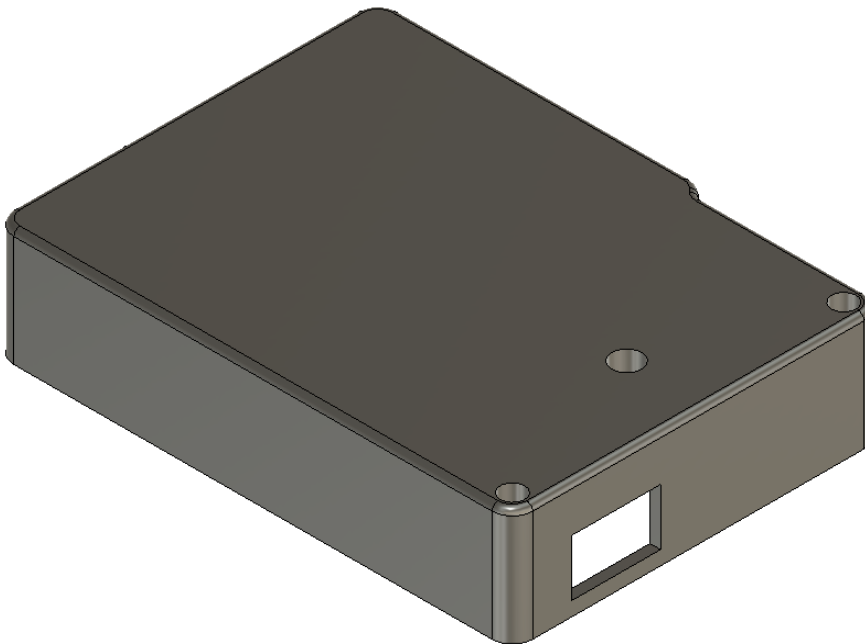
The recommended material for these parts is PETG. Print settings were 0.2 mm resolution and 20% infill. PLA is not recommended as it is not as durable. ABS may work but is more rigid and brittle so screws and inserts may not work as well. Many parts can be printed without support material. There are a few parts where support material is recommended in a few spots and if you have the ability to insert supports only in selected locations, you do not need supports everywhere.

## Main Enclosure Base

The main portion of the enclosure containing the bulk of the components. Support material should be used across the LRF window and the center portion of the USB and power button holes on the right side. This version is designed for the UT390B LRF and will not work with other LRF modules.

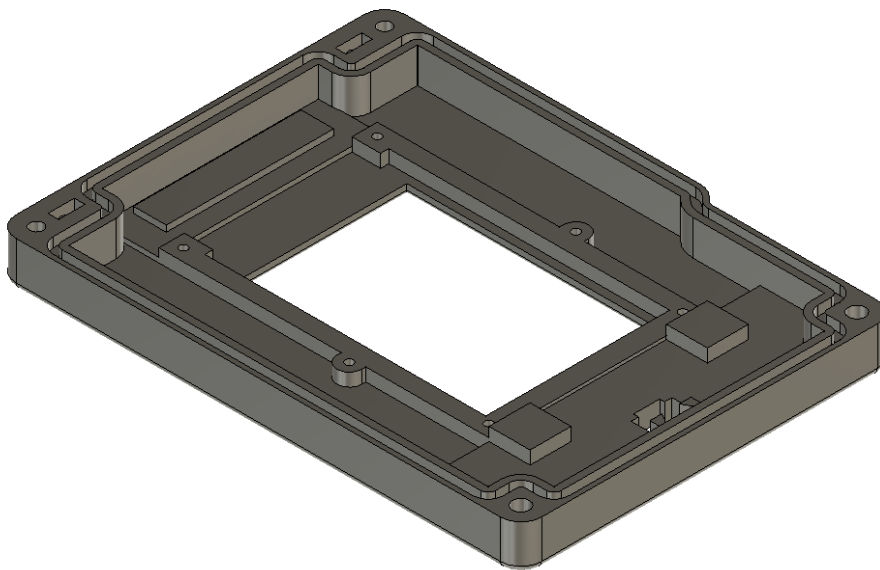
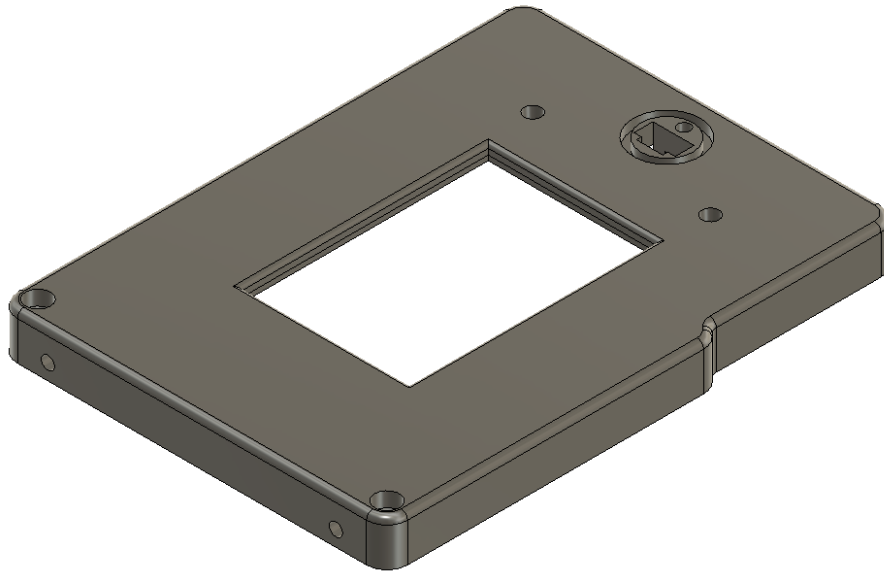


Print in this orientation



## Main Enclosure Lid

The lid supports the LCD touchscreen, the D-rings for the neck strap and provides mounting points for the LIDAR enclosure as well as a sealed feedthrough for the electrical connections. Two versions of this lid exist – one for the CTE35IPS touchscreen and one for the BuyDisplay 3.5" touchscreen.

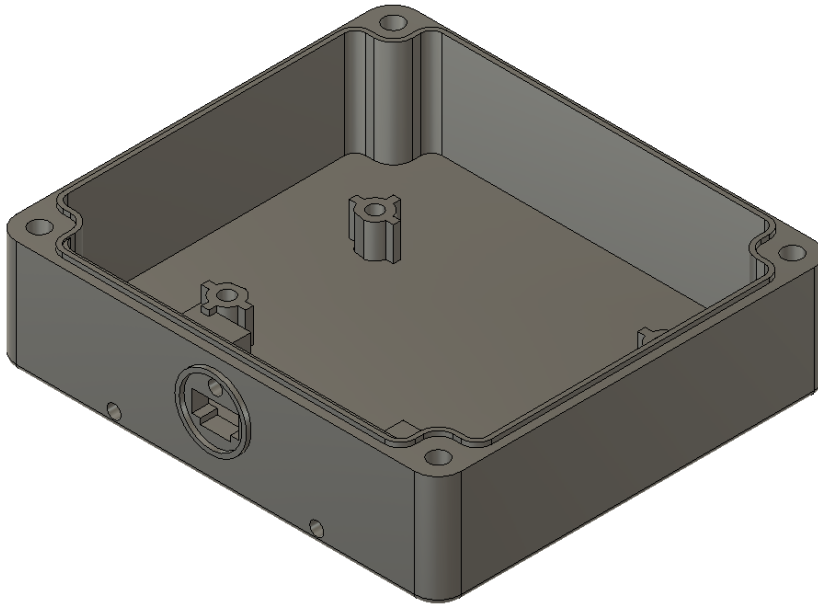


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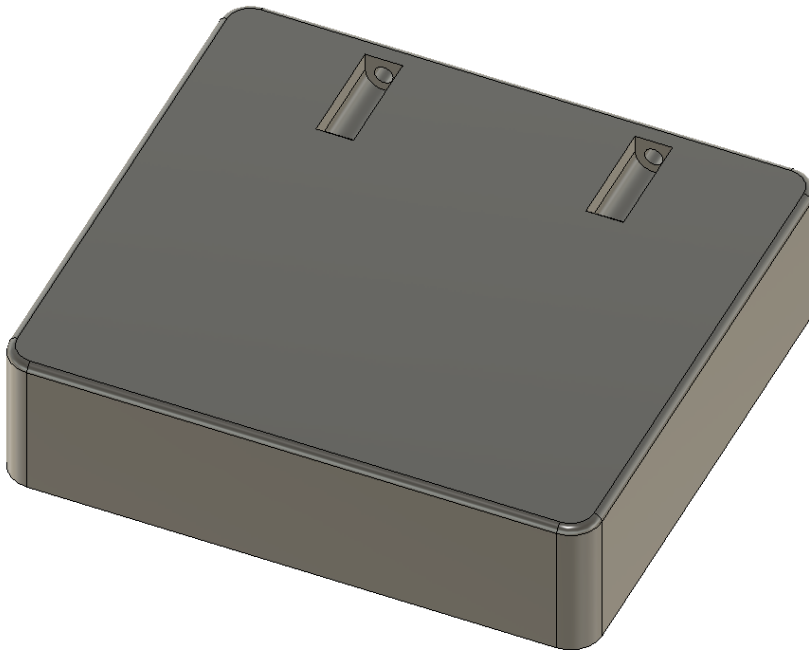
It attaches to the main enclosure base by four 6-32 flathead machine screws into brass inserts. Two screws are inserted from the top of the lid in the rear and the two in front are inserted up through the main enclosure base into the lid from below.

### RPLIDAR Enclosure Base

Base of the LIDAR enclosure which mounts onto the Main Enclosure Lid and into which mounts the RPLIDAR module. Support material should be used around the feedthrough hole/sealing ring.



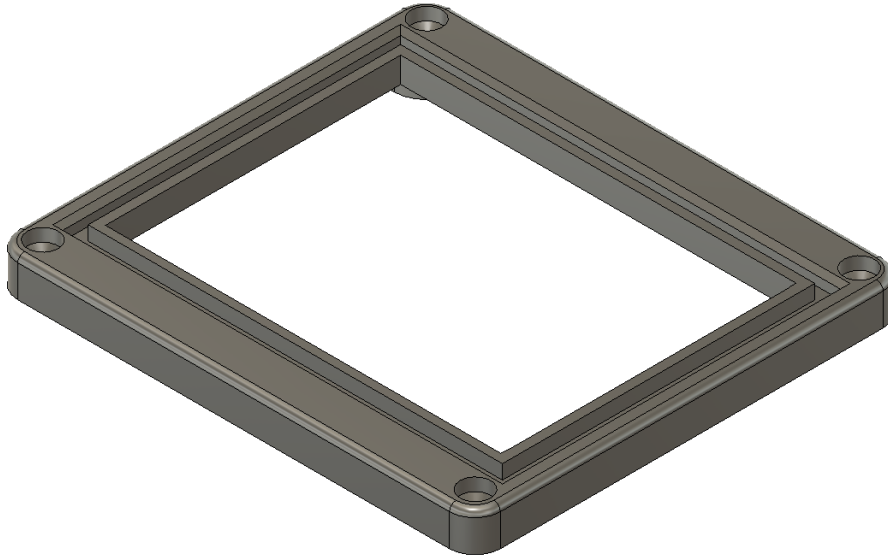
Print in this orientation



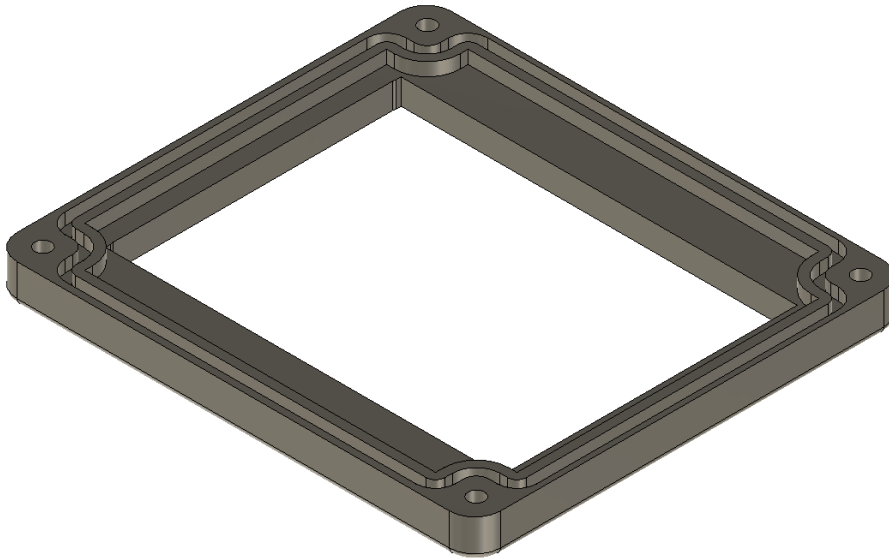
This part mounts to the Main Enclosure Lid via two 6-32 pan head machine screw through holes in the rear of the module into brass inserts in the Main Enclosure Lid and with an additional 6-32 pan head machine screw through the hole inside the sealing ring in the base (next to the cable feedthrough) and into a captive nut in the Main Enclosure Lid.

### RPLIDAR Enclosure Lid - Bottom (window version)

The bottom half of the LIDAR module lid with windows. Cut acrylic windows are epoxied into slots at the top of this part to support the top half of the lid. Support material needs to be used everywhere across the underside of the lip.



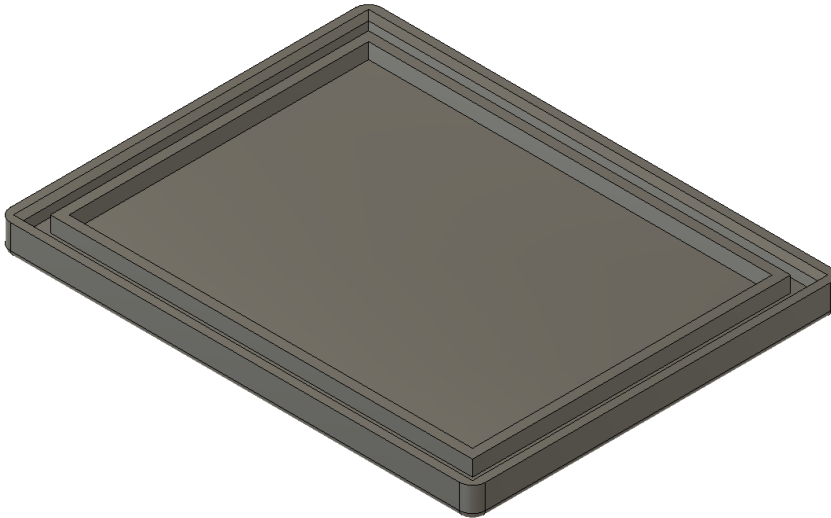
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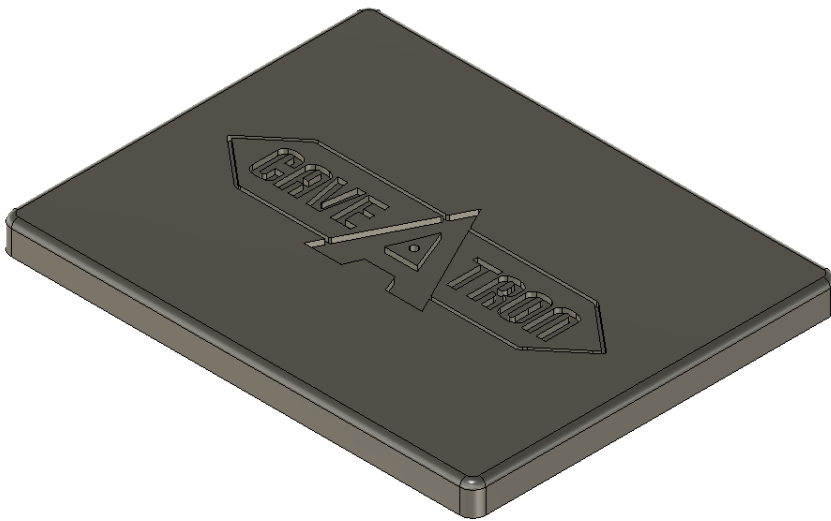
This part mounts to the RPLIDAR Enclosure Base via four 6-32 flat head machine screw through holes in the top of this part into brass inserts in the RPLIDAR Enclosure Base.

### RPLIDAR Enclosure Lid – Top (Window version)

The top half of the LIDAR module lid with windows which is supported by the cut acrylic windows epoxied into the RPLIDAR Enclosure Lid bottom half.



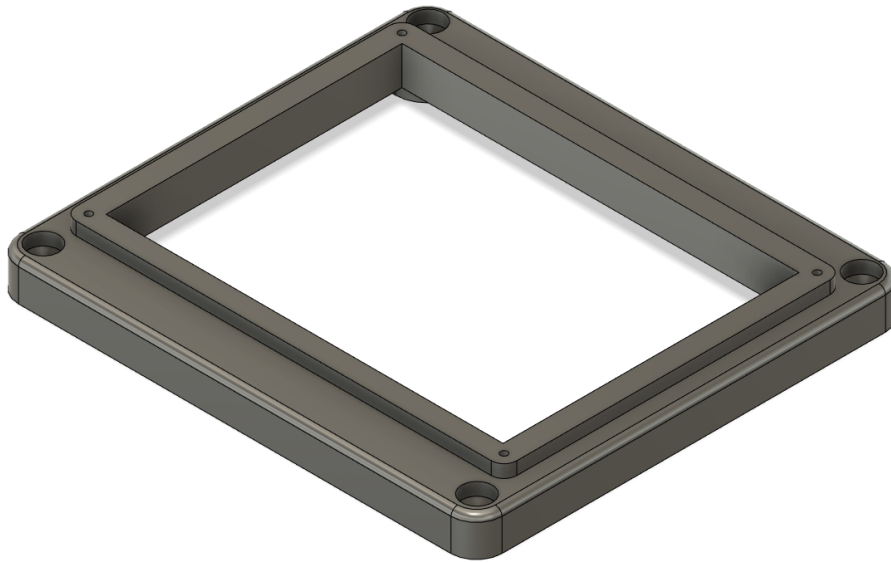
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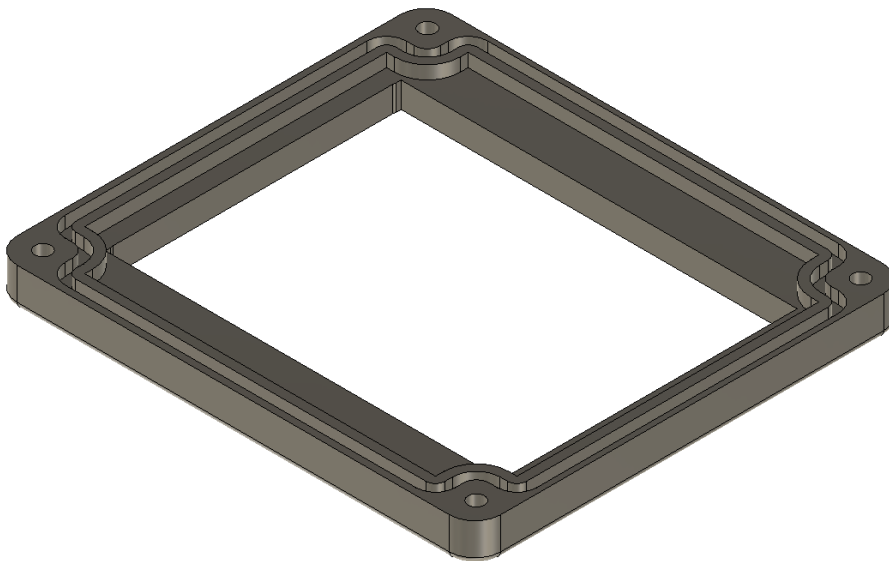
This part is epoxied to the acrylic windows that project from the RPLIDAR Enclosure Lid (Bottom) that are inserted into slots around the underside of the lid and becomes permanently attached to the RPLIDAR Enclosure Lid (Bottom).

### RPLIDAR Enclosure Lid - Bottom (Non-window version)

The bottom half of the alternate LIDAR module lid that does not include windows in the event you want to obtain a scan without obscurations and are willing to expose the LIDAR to the cave environment. Four 1.5 mm diameter stainless steel posts are cut to 0.8 inches in length and epoxied into the small holes in each corner. Support material needs to be used everywhere across the underside of the lip.



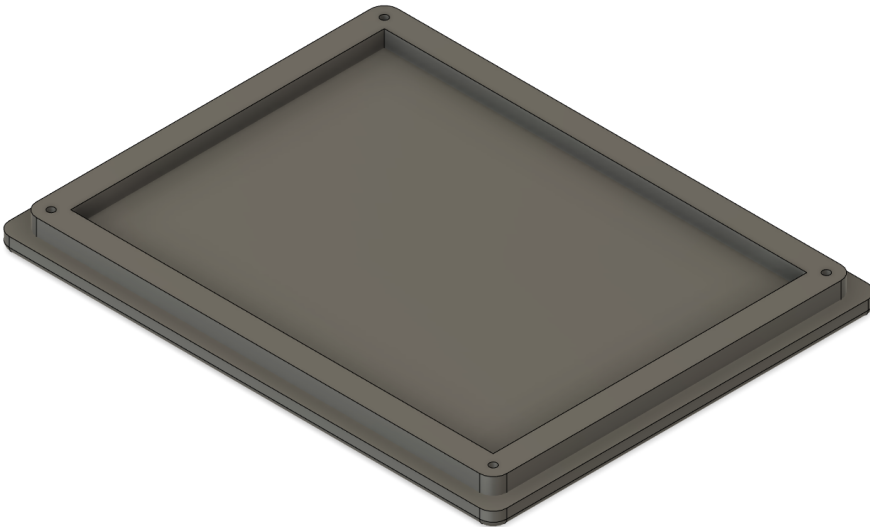
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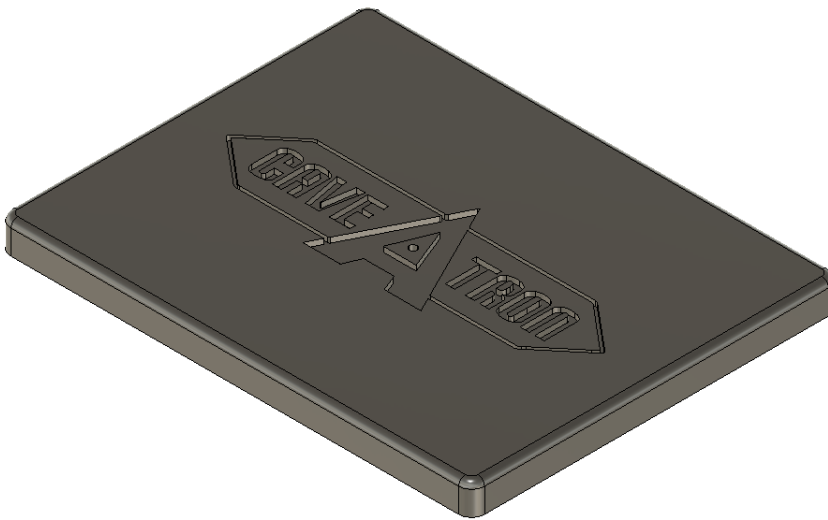
This part mounts to the RPLIDAR Enclosure Base via four 6-32 flat head machine screw through holes in the top of this part into brass inserts in the RPLIDAR Enclosure Base.

### RPLIDAR Enclosure Lid – Top (Non-window version)

The top half of the LIDAR module lid with windows which is supported by 1.5 mm diameter stainless steel posts epoxied into the holes in each corner.



Print in this orientation

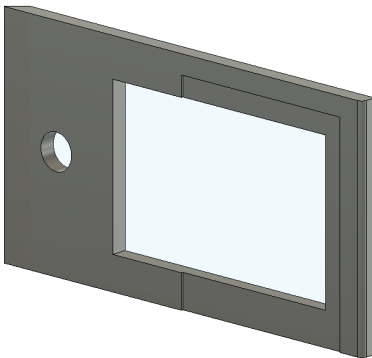
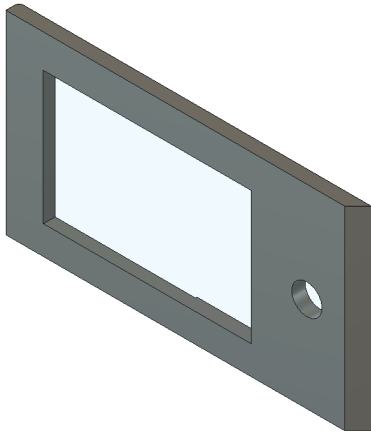


This part becomes permanently attached to the RPLIDAR Enclosure Lid – Bottom (Non-window version).



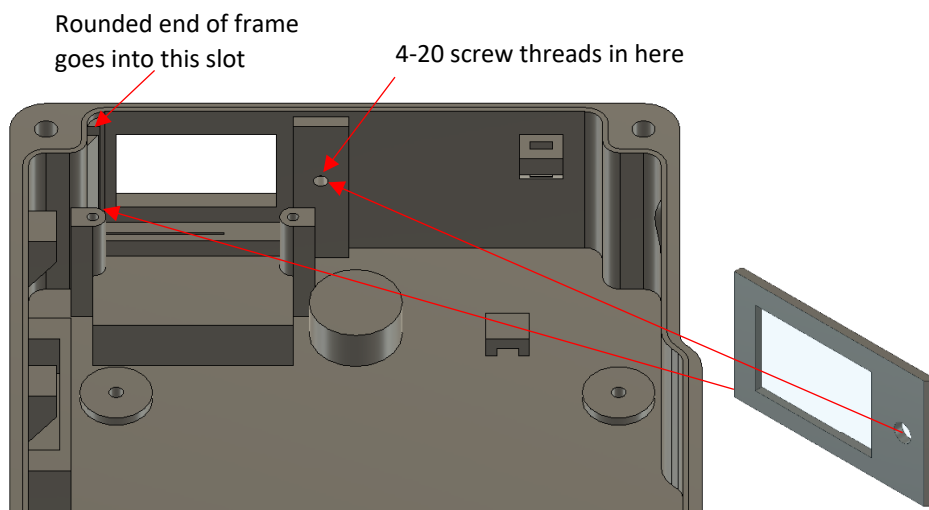
## LRF Window Frame

Provides extra backing support for the acrylic LRF window (which is attached with epoxy) and also holds the neutral density filter in the cutout on the front.



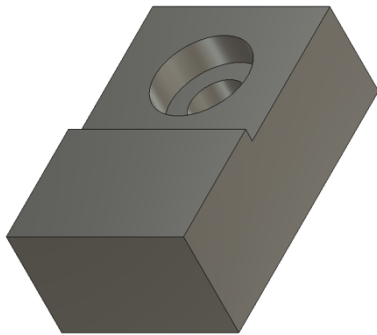
Print this side up

This part attaches to the Main Enclosure Base by inserting it into a slot on one side and then affixing it with a 4-20 thread rolling screw through the hole into a mounting point in the front of the Main Enclosure Base as indicated in the drawing below.

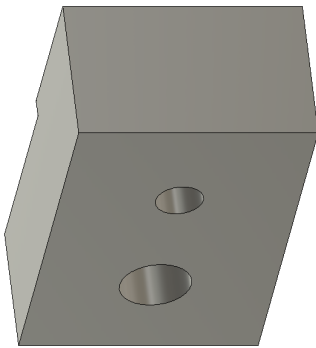


## LRF Support Bracket

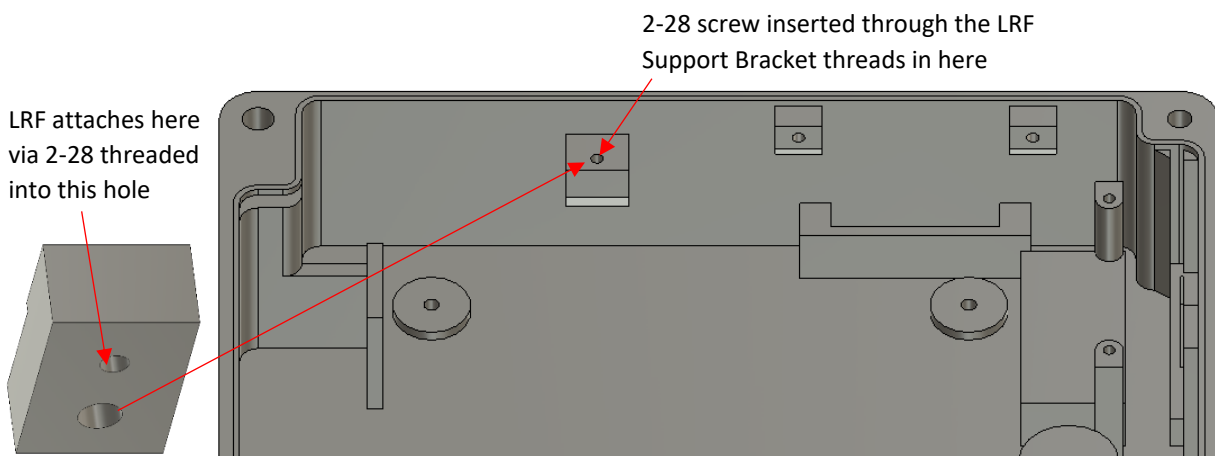
Provides support to the UT390B LRF module.



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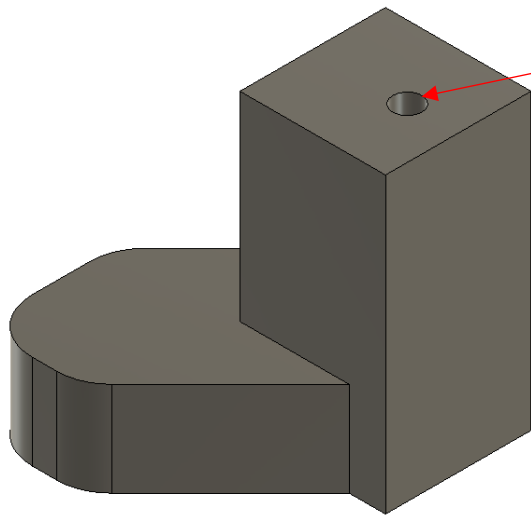


Attaches to left rear mounting hole of the LRF module via a 2-28 thread rolling screw inserted up through the hole in the LRF module and is threaded into smaller hole in the LRF Support Bracket. The LRF Support Bracket is affixed to the Main Enclosure Base via a support point on the left side of the enclosure using a 2-28 thread rolling screw inserted through the LRF Mounting Bracket and threaded into the hole in the Main Enclosure Base support as indicated below.



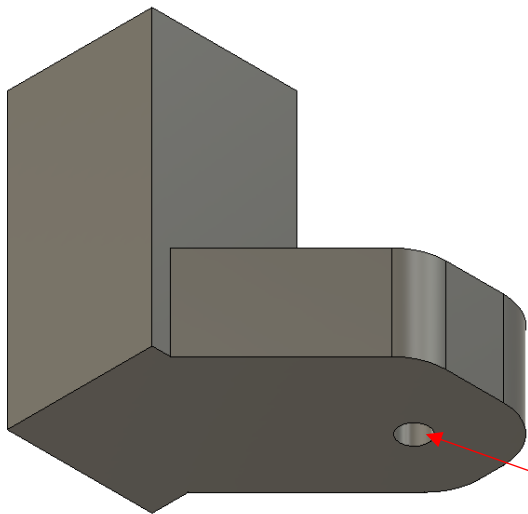
## LRF Mounting Post

Provides support to the UT390B LRF module.



2-28 screw inserted through the LRF module right rear hole threads in here.

Print this side up

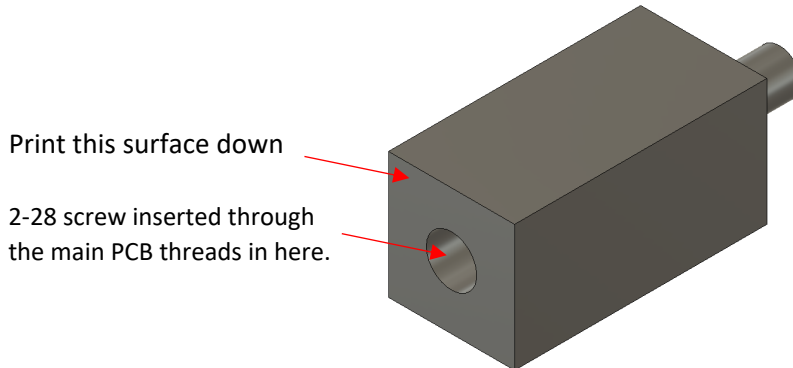


2-28 screw inserted through the main PCB LSM303D hole threads in here.

This part does not directly attach to any other 3D part but instead attaches between the right rear side of the UT390B LRF and a mounting hole on the main PCB. 2-28 thread rolling screws are inserted through both boards and threaded into this part.

### Battery Charging Board Support Post

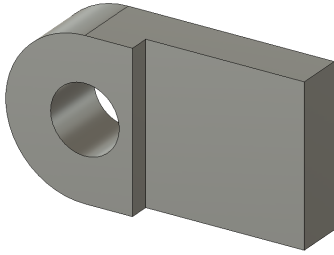
Supports the Adafruit Li-Ion Charging Module. Since this module is only held in a couple spots with header pins, this post is needed to give additional support. Either one or two may be used on the left sides of the Charging Module.



This part does not directly attach to any other 3D part but instead attaches between one of the holes on the left side of the Adafruit Li-Ion Charging Module and provided mounting hole on the main PCB. 2-28 thread rolling screws are inserted through the main PCB and threaded into this part. The thin post on top inserts into the hole in the Charging Module and can be mashed down to secure it.

## LCD Clamp

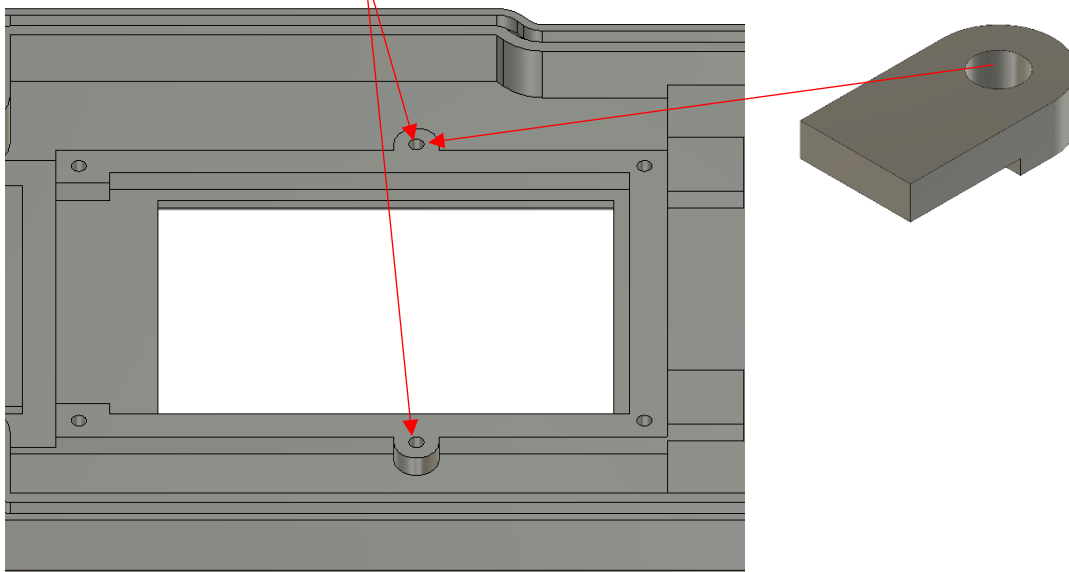
Provides additional support to the long side of the LCD modules. Two of these need to be printed.



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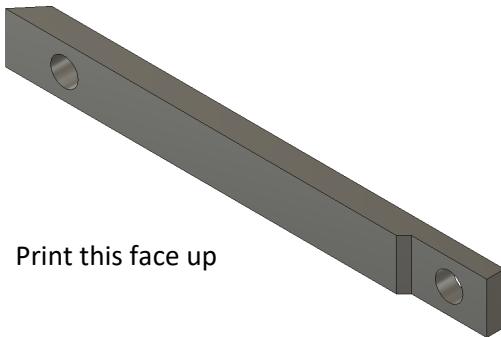
A 4-20 thread rolling screw inserts through the LCD Clamp into threads into the hole indicated. The clamp is oriented so that the recessed part is down facing the LCD.

4-20 screw inserted through  
the LCD Clamp threads in here.



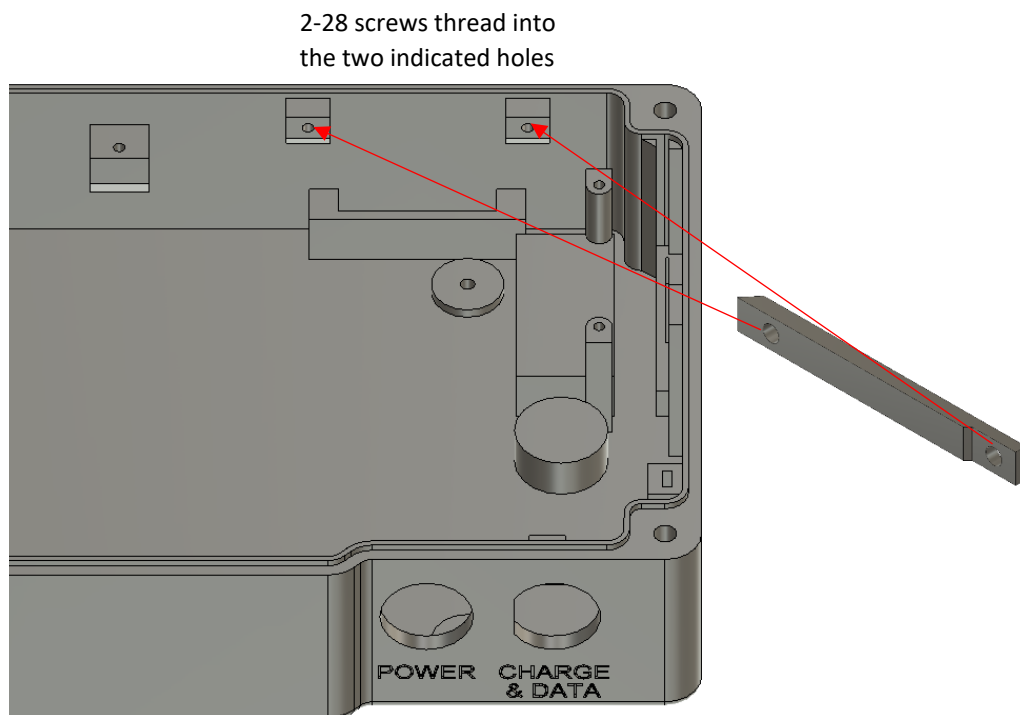
## Buzzer Clamp

Provides additional support for the piezo buzzer.



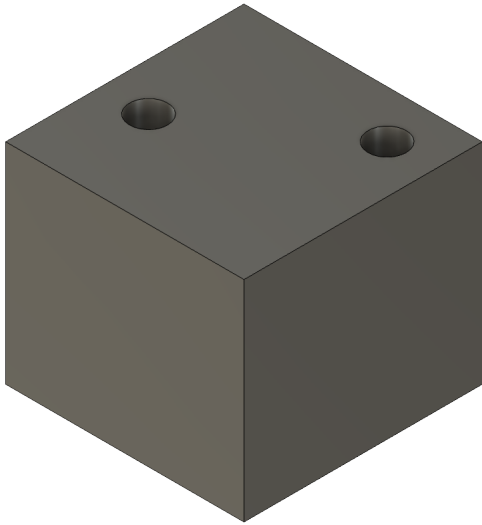
Print this face up

Presses against backside of piezo buzzer (which is inserted into a slot at the bottom of the Main Enclosure Base). The Buzzer Clamp attaches to the Main Enclosure Base via two 2-28 thread rolling screws threaded into mounting points on the left side of the enclosure as shown below.



### AltIMU Bracket

Secures the AltIMU module to the PCB.



This part does not directly attach to any other 3D part but instead attaches between AltIMU module and holes in the main PCB. Two 2-28 thread-rolling screws are inserted through the AltIMU module and two through the main PCB and are threaded into the AltIMU Bracket's top and bottom holes, respectively.