Caveatron Rev C 3D Printed Parts Description

2023-01-12

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

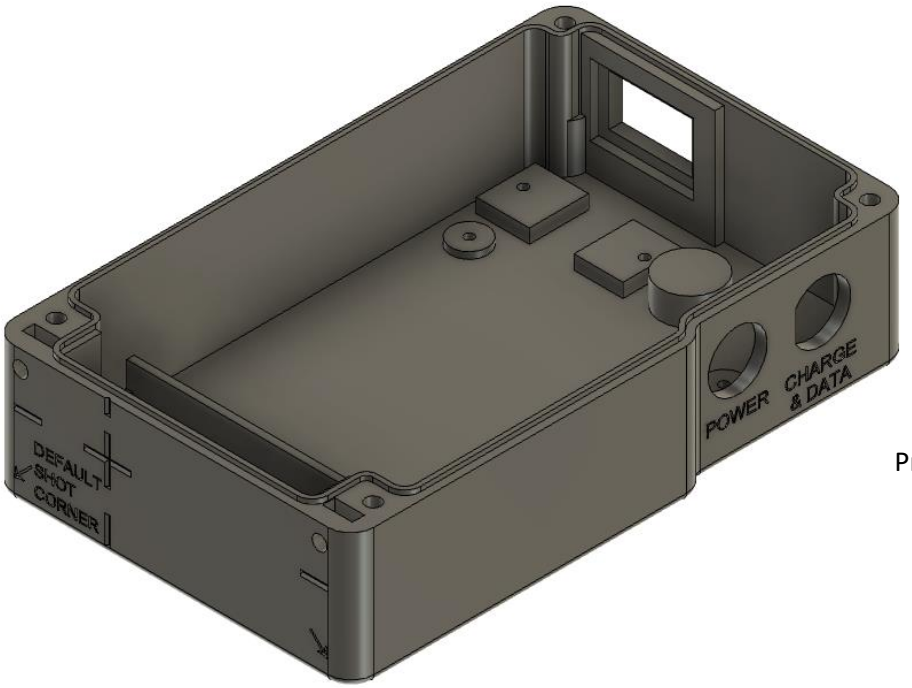
In some Slicer software, these files must be scaled by 2540% though in others, they import correctly.

General Printing Notes

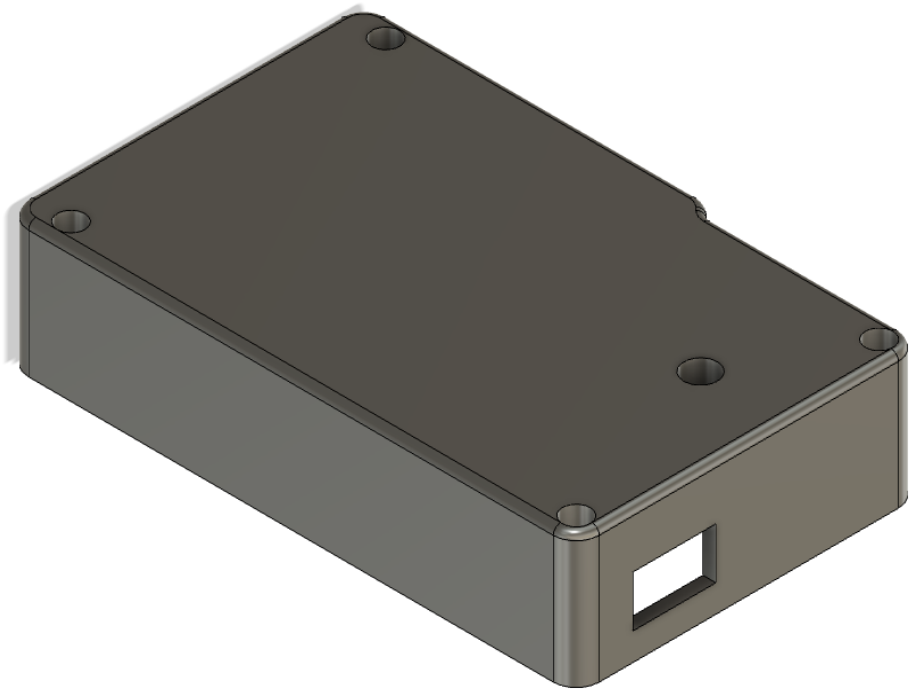
The recommended material for these parts is PETG. Print settings were 0.2 mm resolution and 20% infill. PLA is not recommended as it is not as durable. ABS may work but is more rigid and brittle so screws and inserts may not work as well. Many parts can be printed without support material. There are 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 part has the acrylic LRF window glued inside the front, supports the D-rings for the neck strap on the rear, and has an optional ¼-20 heat-set threaded insert location on the underside. This version is designed for the small JRT LRF modules (both ASCII or HEX variants use the same form factor) and will not work with other LRF modules.

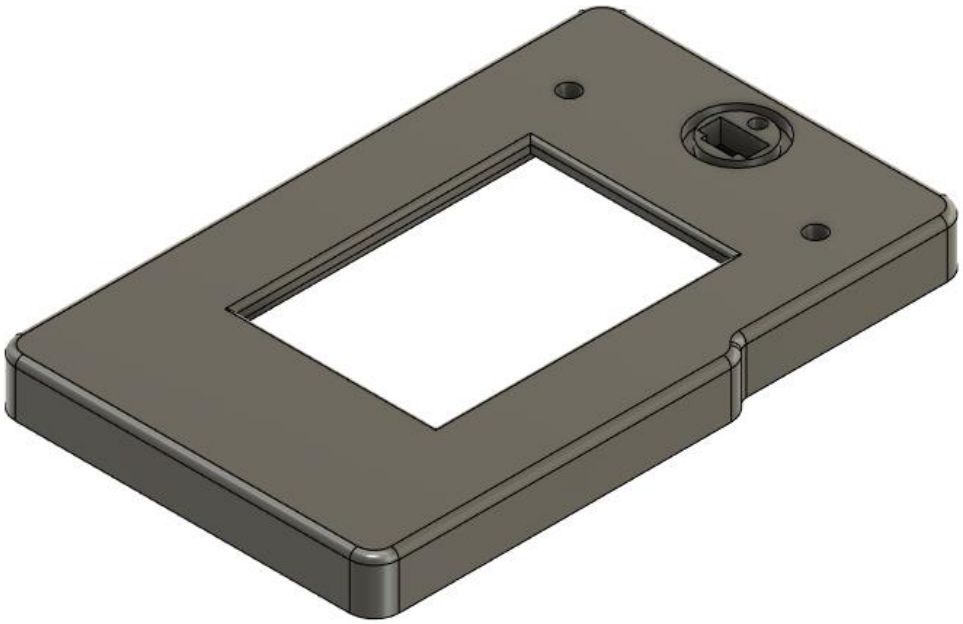


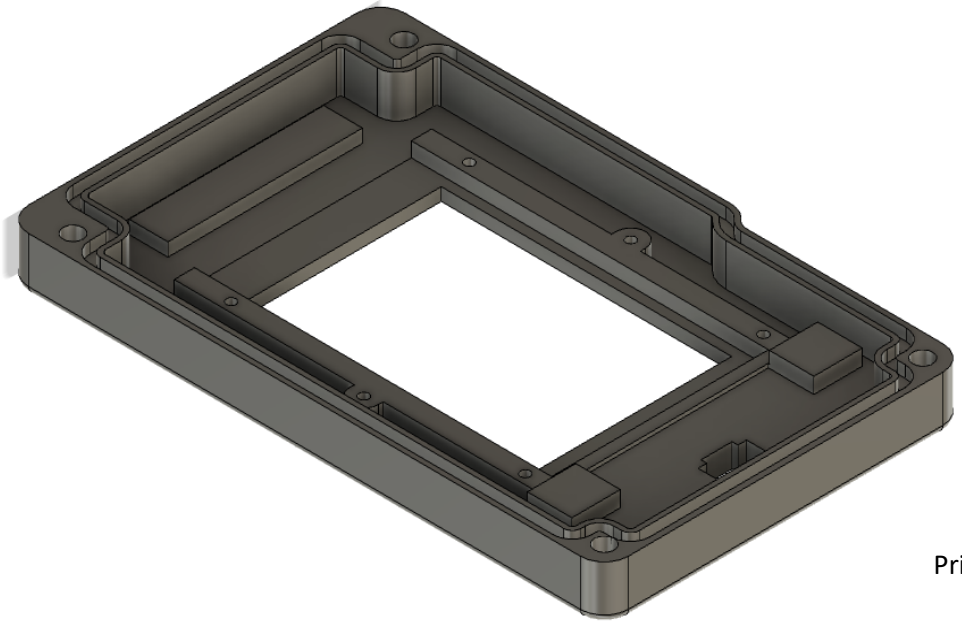
Print in this orientation



Main Enclosure Lid

The lid supports the LCD touchscreen and provides mounting points for the LIDAR enclosure as well as a sealed feedthrough for the electrical connection. Six heat-set threaded inserts (6-32) are added to this part – four on the inside in the corners to attach to the base, and two on the top for the LIDAR module.



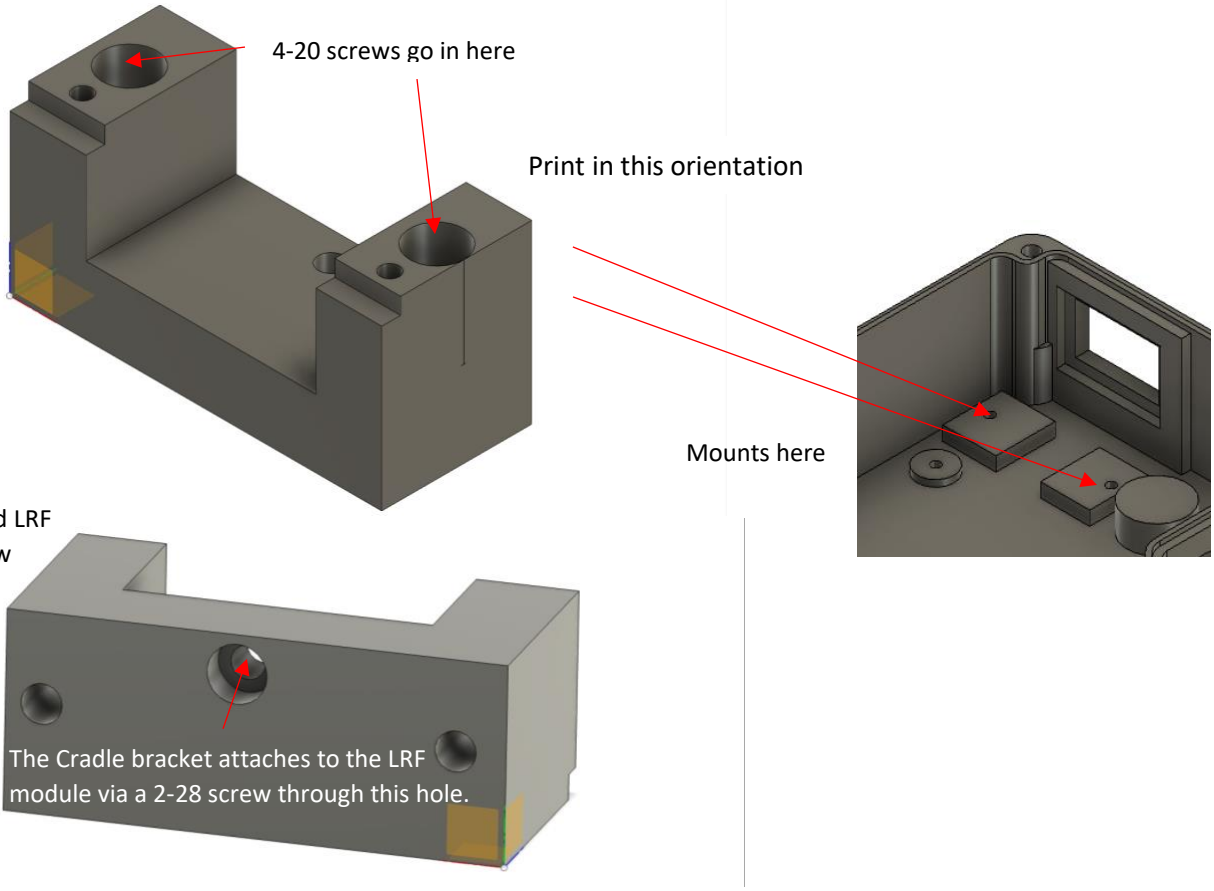


Print in this orientation

It attaches to the main enclosure base by four 6-32 flathead machine screws that are inserted from the bottom of the main enclosure base up into the lid.

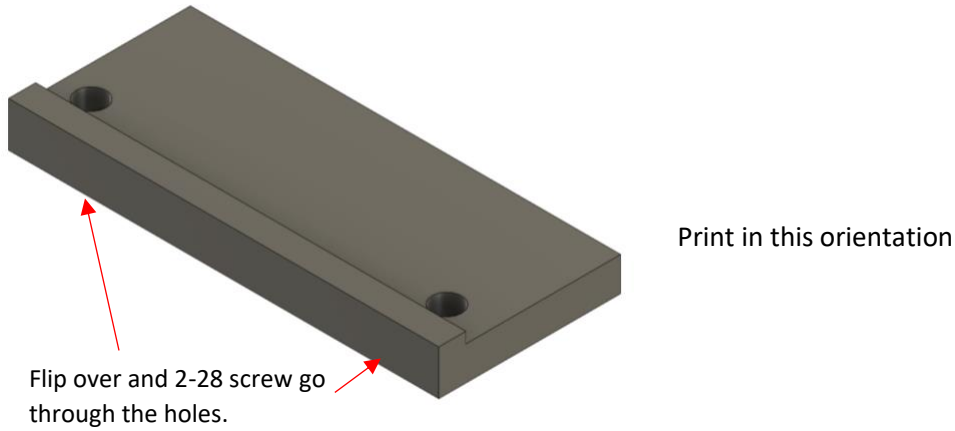
LRF Cradle Bracket

The LRF module is supported by this bracket which in turn mounts to the inside of the Main Enclosure Base. A single 2-28 thread rolling screw inserted into the countersunk bottom center hole threads into the hole on the underside of the LRF module. The part is then mounted to the Main Enclosure base with two 4-20 thread rolling screws that are inserted into the countersunk holes on either side.



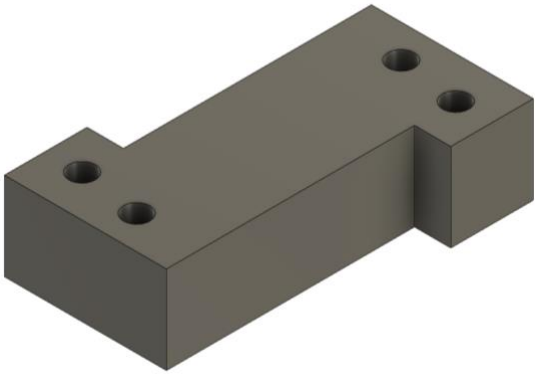
LRF Clamp

Attaches to the top of the LRF bracket to fully secure the LRF module. Two 2-28 screws through the holes on either side attach to the top of the LRF bracket. The protrusion goes downward.



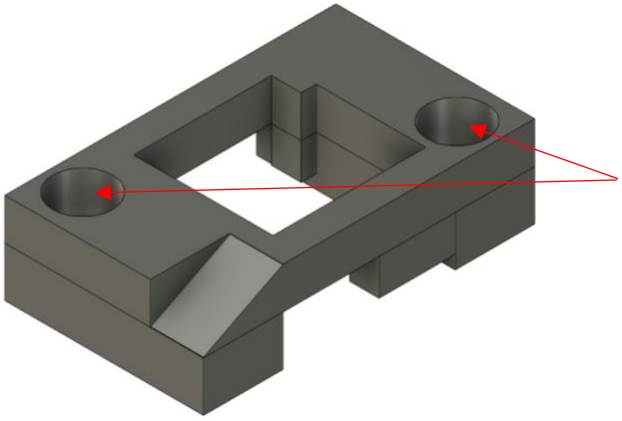
RM3100 Bracket

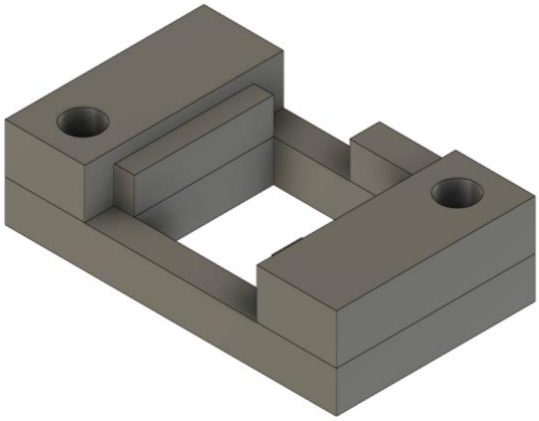
Provides support to the RM3100 magnetometer. 2-28 screws from the underside the main PCB screw into the two centermost holes in this part.



RM3100 Clamp

Hold the RM3100 magnetometer securely to the bracket to prevent movement.



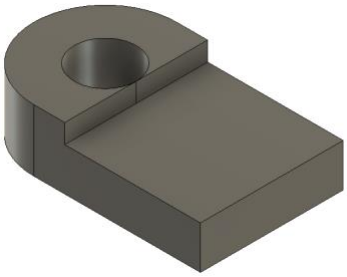


Print in this orientation

Be sure to get the orientation correct and adjust it so that it does not press on any components on the RM3100 board. The sloped corner goes toward the 40 pin connector for the touchscreen display.

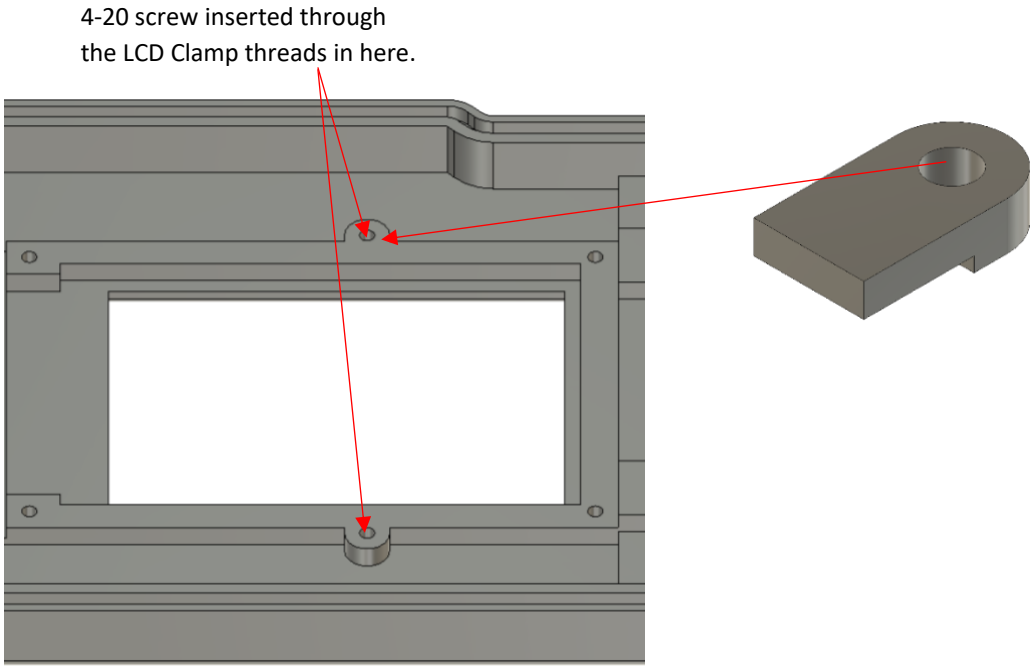
LCD Clamp

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



Print in this orientation

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.

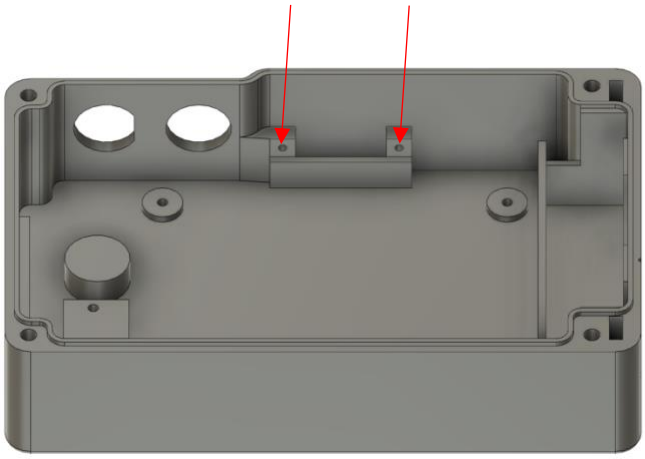


Buzzer Clamp

Provides additional support for the piezo buzzer.

Print in this orientation

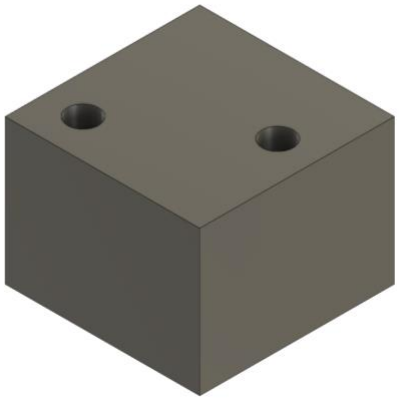
2-28 screws thread into the two indicated holes



Presses against backside of piezo buzzer (which is inserted into a slot at the side 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 as shown below.

MinIMU/AltIMU Bracket

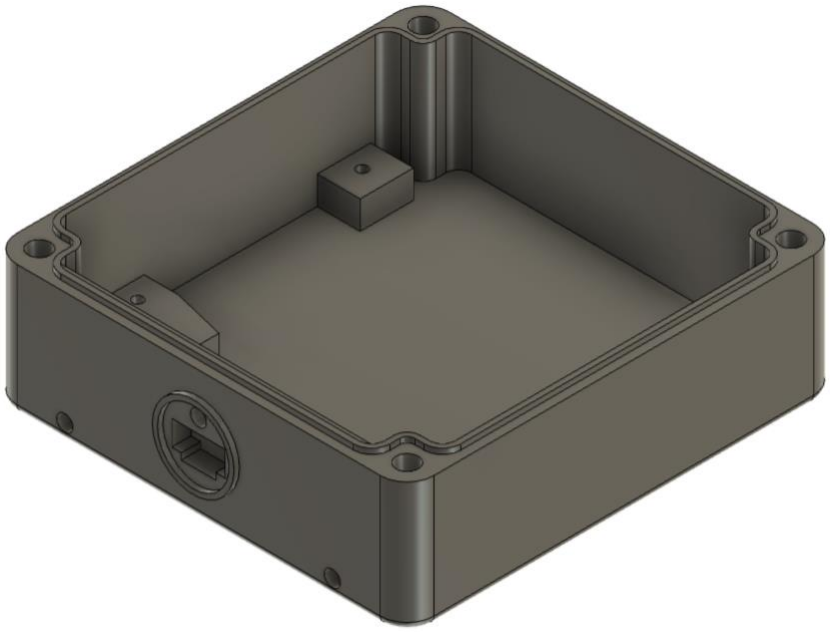
Secures the MinIMU or AltIMU module to the PCB.



This part does not directly attach to any other 3D part but instead attaches between MinIMU/AltIMU module and holes in the main PCB. Two 2-28 thread-rolling screws are inserted through the main PCB into the underside. If the MinIMU is used, it attached using one screw from the top. If the AltIMU is used then both top screw holes are used.

RPLIDAR S2 Enclosure Base

Base of the LIDAR enclosure which mounts onto the Main Enclosure Lid and into which mounts the RPLIDAR S2 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) that is inserted from inside the Main Enclosure Lid and into a captive nut in this part.

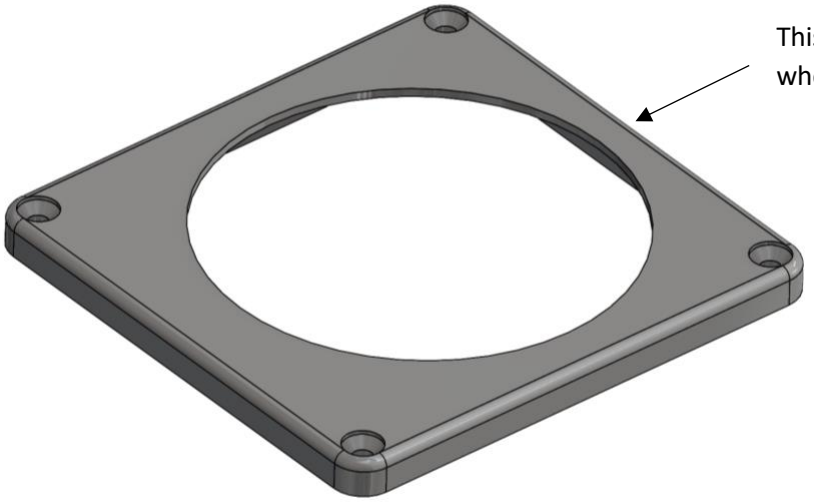
RPLIDAR S2 Mounting Plate

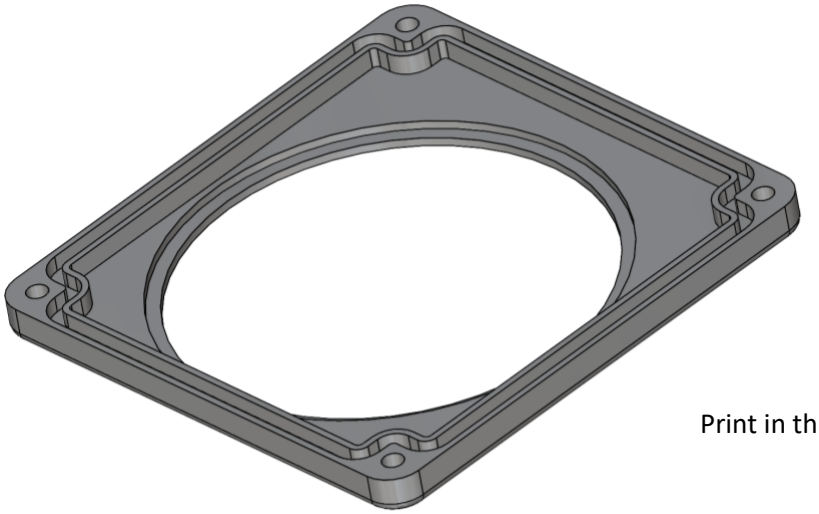
This plate connects directly to the RPLIDAR S2 and then mounts inside the LIDAR enclosure base. Note the orienation printed on the backside.

Print in this orientation

RPLIDAR S2 Enclosure Lid – Dome Version

An acrylic dome is epoxied through the opening and sits in the recess around the opening.



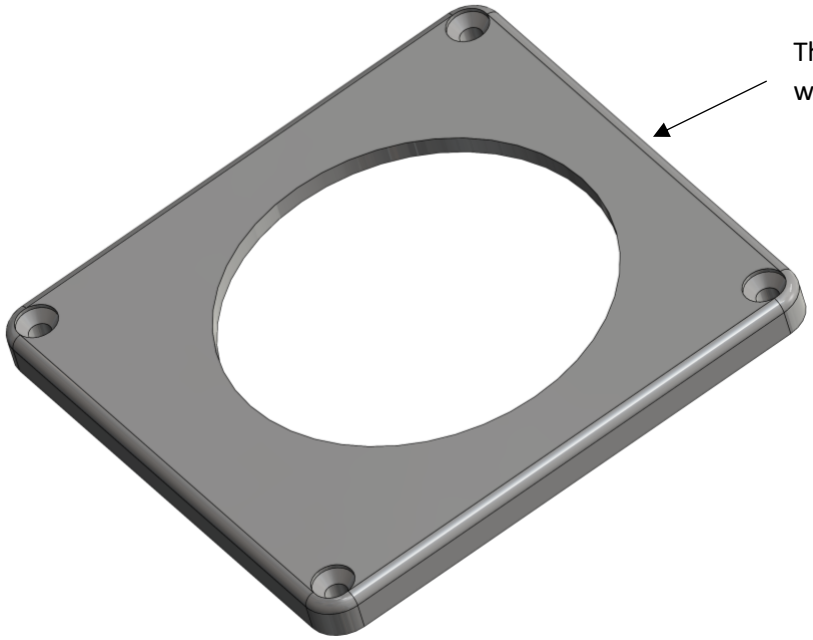


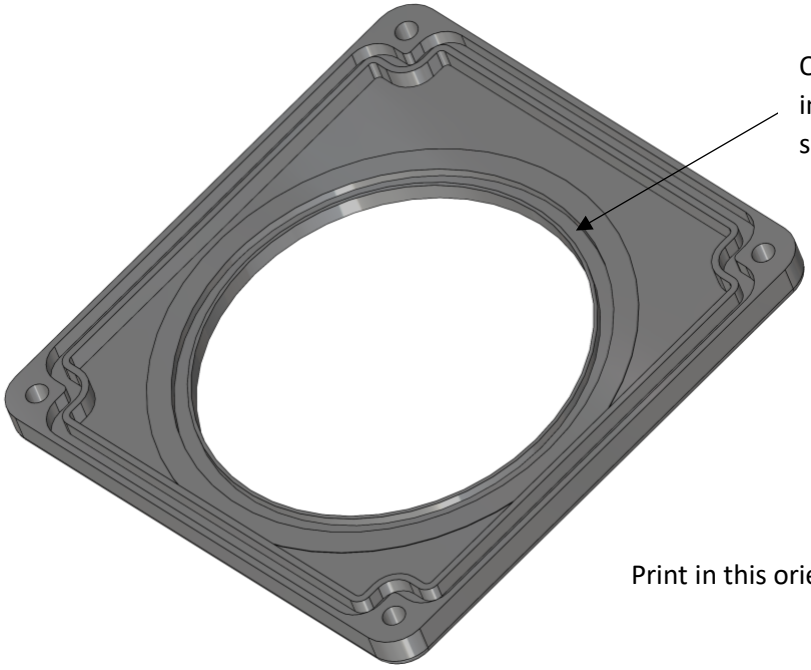
Print in this orientation

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

RPLIDAR S2 Enclosure Lid – Open Version

This version allows the LIDAR lens to be exposed to avoid an losses through the dome. It provides some sealing to the LIDAR via an O-ring inserted into the groove right around the LIDAR opening as shown below.



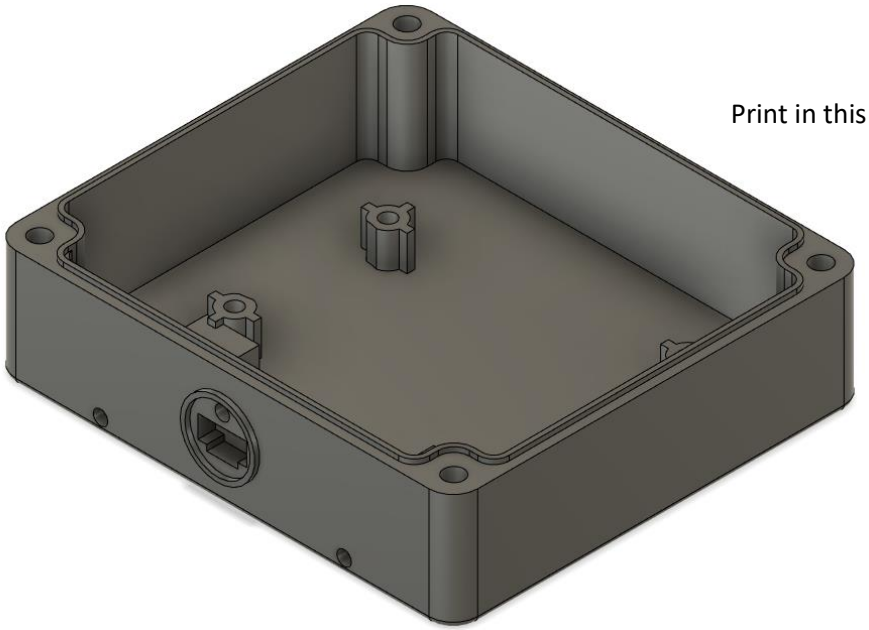


Print in this orientation

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

RPLIDAR A1 Enclosure Base

Base of the LIDAR enclosure which mounts onto the Main Enclosure Lid and into which mounts the RPLIDAR A1 module. Support material should be used around the feedthrough hole/sealing ring.



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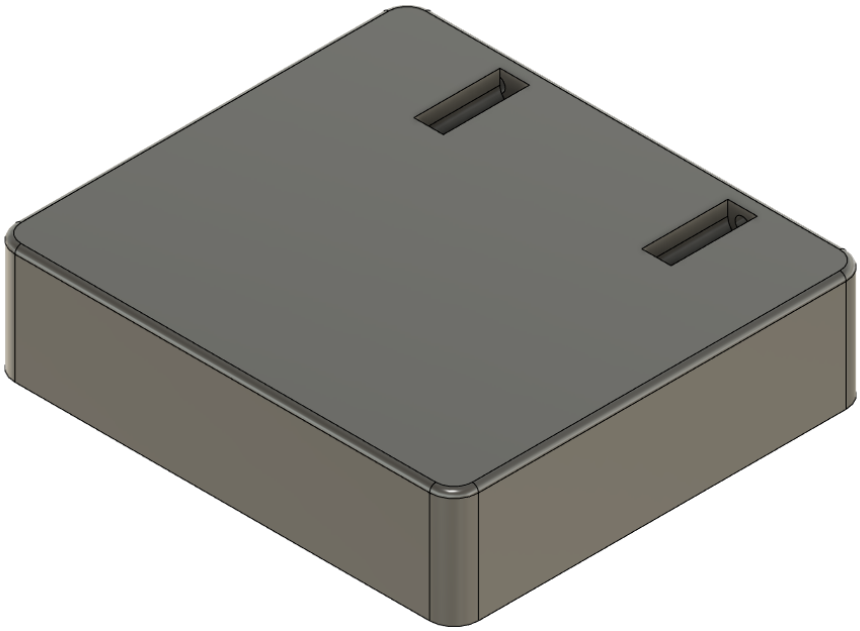
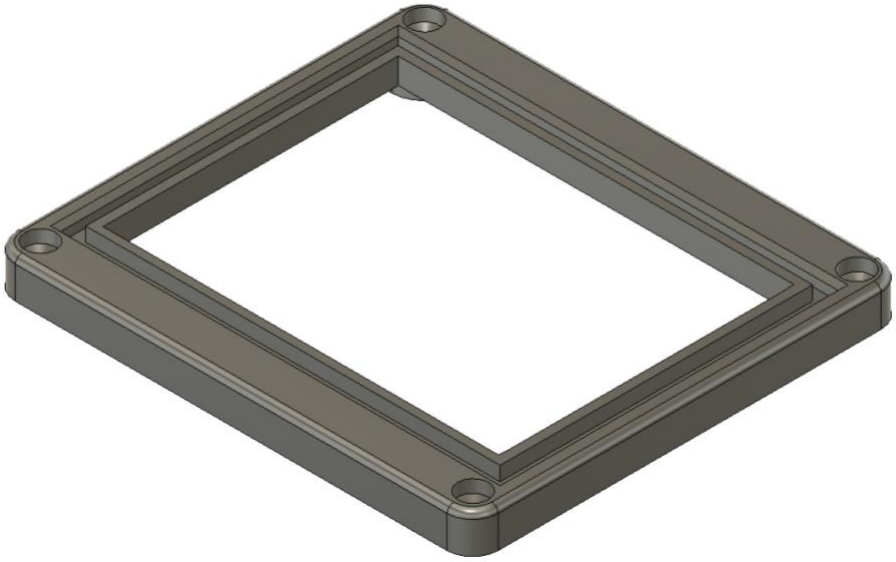


This part mounts to the Main Enclosure Lid via two 6-32 pan head machine screw through holes in the rear of the module into brass inserts in the Main Enclosure Lid and with an additional 6-32 pan head machine screw through the hole inside the sealing ring in the base (next to the cable feedthrough) that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

RPLIDAR A1 Enclosure Lid - Bottom (window version)

The bottom half of the A1 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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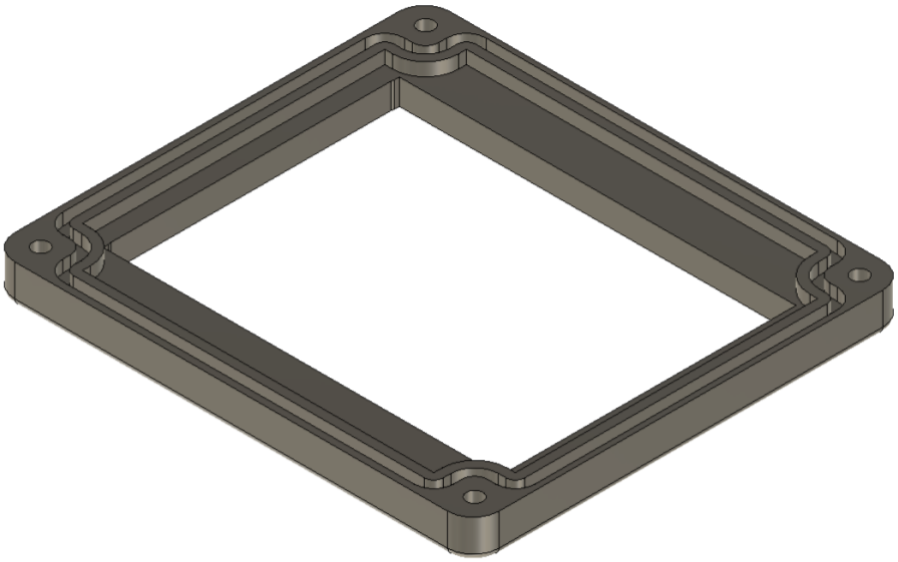
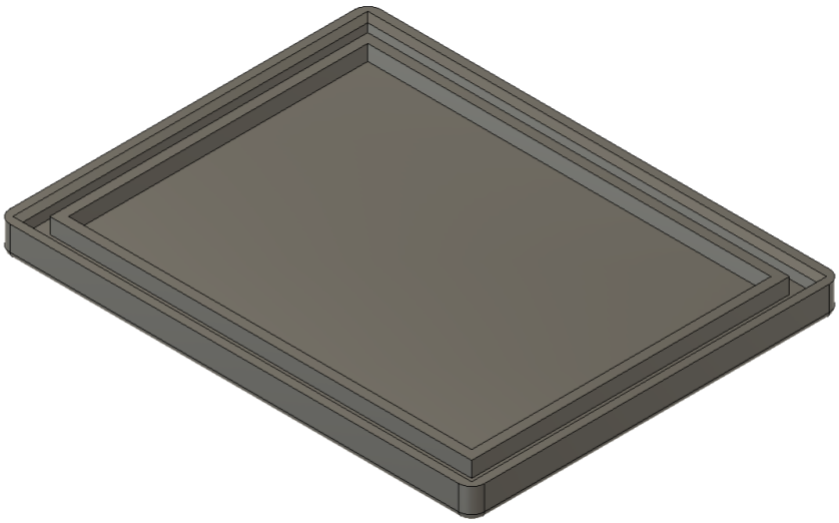


This part mounts to the RPLIDAR Enclosure Base via four 6-32 flat head machine screw through holes in the top of this part into brass inserts in the RPLIDAR A1 Enclosure Base.

RPLIDAR A1 Enclosure Lid – Top (Window version)

The top half of the A1 LIDAR module lid with windows which is supported by the cut acrylic windows epoxied into the RPLIDAR Enclosure Lid bottom half.

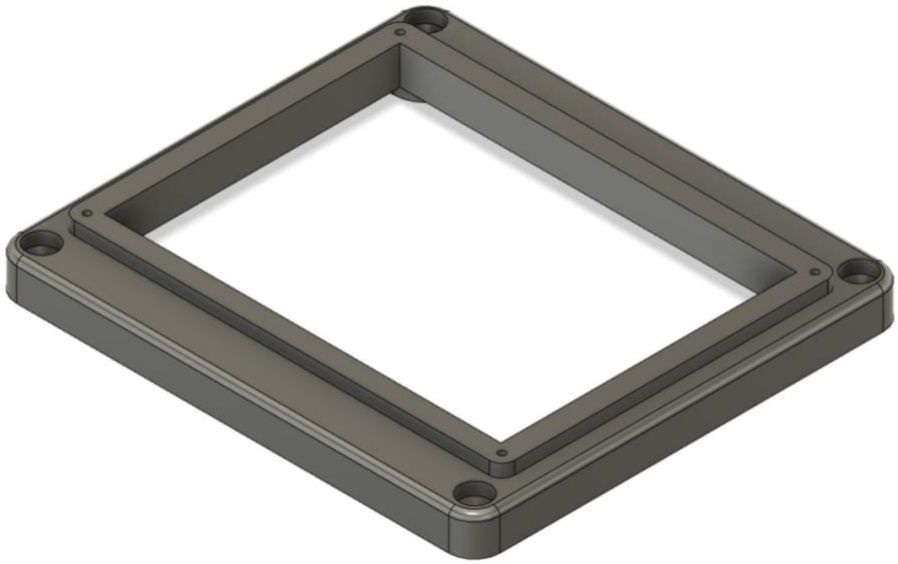


Print in this orientation

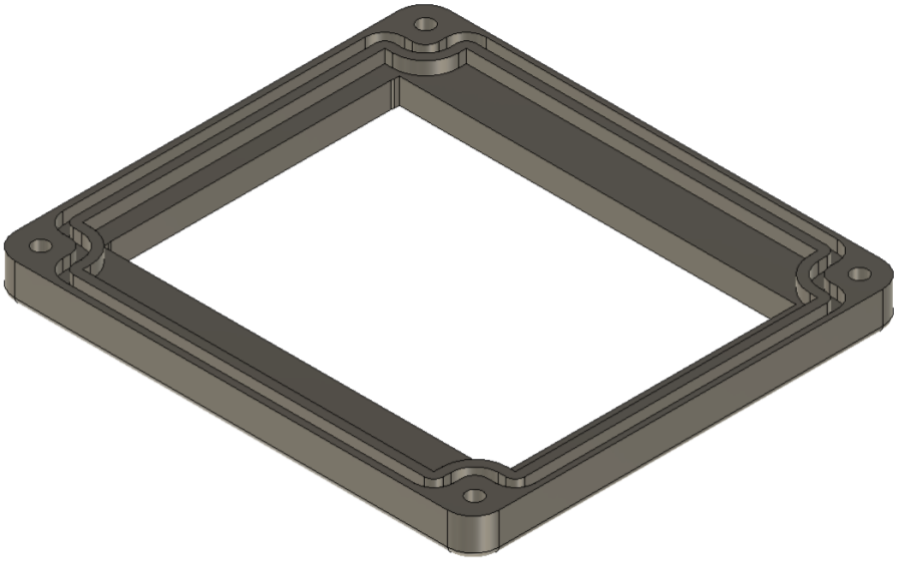
This part is epoxied to the acrylic windows that project from the RPLIDAR A1 Enclosure Lid (Bottom) that are inserted into slots around the underside of the lid and becomes permanently attached to the RPLIDAR Enclosure Lid (Bottom).

RPLIDAR A1 Enclosure Lid - Bottom (Non-window version)

The bottom half of the alternate A1 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.



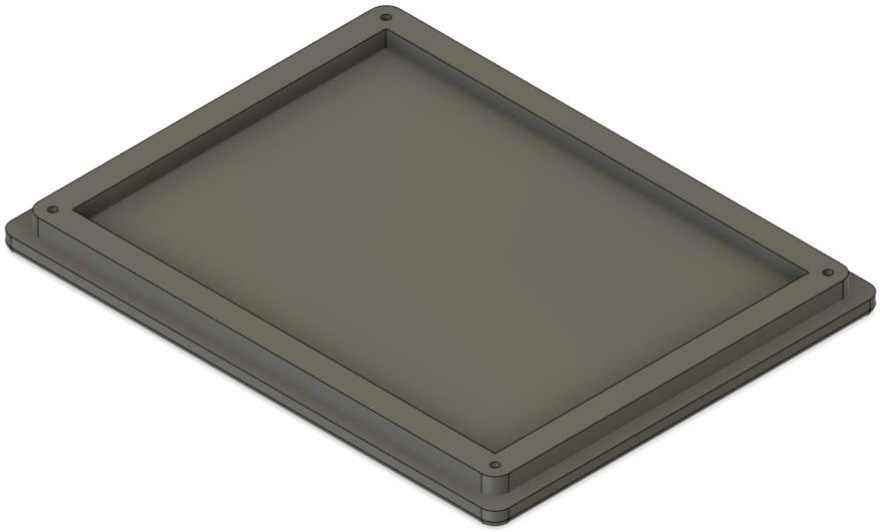
Print in this orientation



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 A1 Enclosure Base.

RPLIDAR A1 Enclosure Lid – Top (Non-window version)

The top half of the alternate A1 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 A1 Enclosure Lid – Bottom (Non-window version).