

AMARU - Step-by-step Assembly Instructions

Overview

This documentation refers to assembly of the Amazon Multichannel Autonomous Recording Unit (AMARU): developed for James Skinner's master's project.


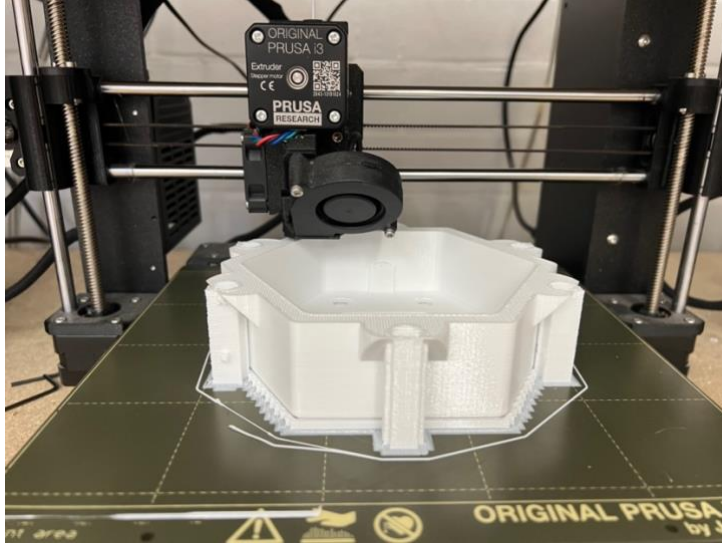
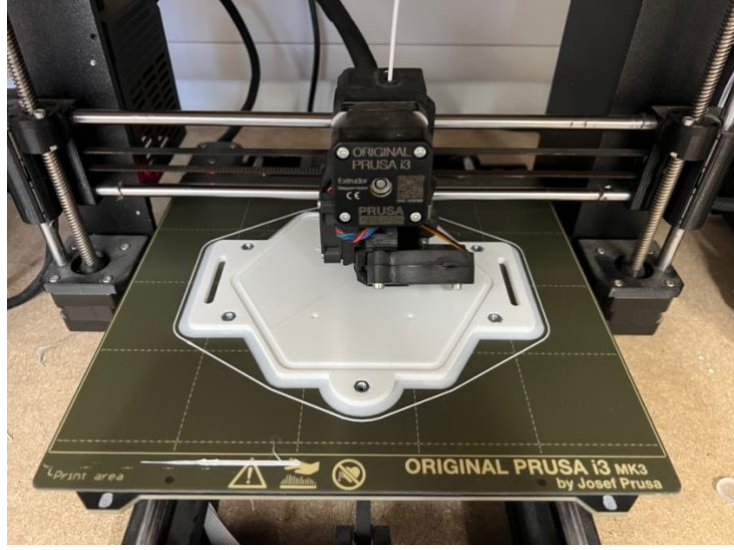


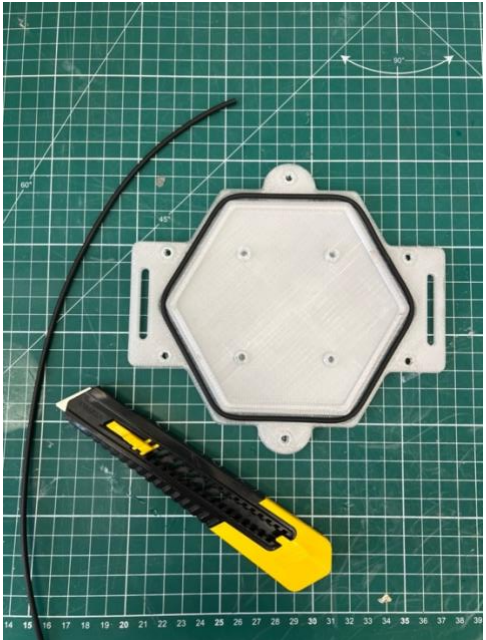

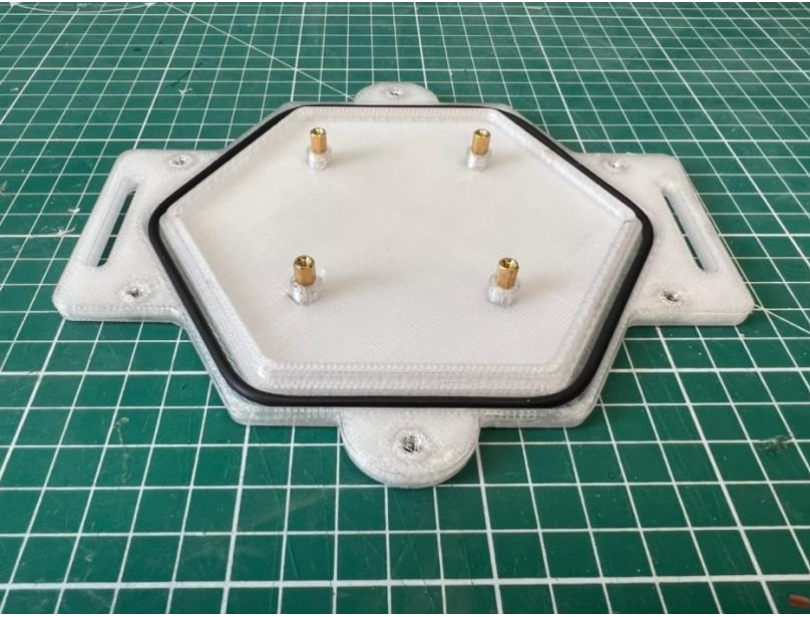
For a list of required components and links to purchase them, refer to [this spreadsheet](#).

Tools required to perform this assembly:

- 3D Printer (I used a Prusa MK3S)
- Pliers
- Deburring Tool
- Paintbrush
- Gloves
- Plastic Cups
- Mixing Sticks
- Cutting Mat
- Stanley Knife
- Soldering Iron
- Small Screwdriver
- Tweezers
- Duct Tape



Assembly

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<p>Download the AMARU casing STL files from the following link: STL Files</p>	<p>Use a 3D printer to print the casing, using <u>PETG</u>. The following settings should be used: 3-layer wall thickness, 0.2 mm layer height, 40% infill density.</p>	<p>Add a print pause before printing the base plate, at the layer before hex-nut holes are covered. Once paused, insert the 6 hexnuts into their respective positions.</p>	<p>Once the parts are printed, remove any support material. A small pair of pliers and a deburring tool are useful, here.</p>
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<p>Apply two coats of XTC-3D epoxy resin to both parts of the casing. Make sure to wear gloves and a ventilation mask. Allow to dry between coats for at least 24 hours.</p>	<p>Measure out an appropriate length of O-ring tubing. This should fit within the gland: slightly loose. Cut to the correct length. Then, use a small amount of super glue to attach the ends together. Place the O-ring within the gland.</p>	<p>Use tweezers and a soldering iron to carefully melt the threaded inserts into place. The inserts heat up very quickly, so ensure they are properly aligned with the holes before applying the soldering iron.</p>	<p>Screw the 4 M2.5*6+6 metal standoff screws into the threaded inserts.</p>

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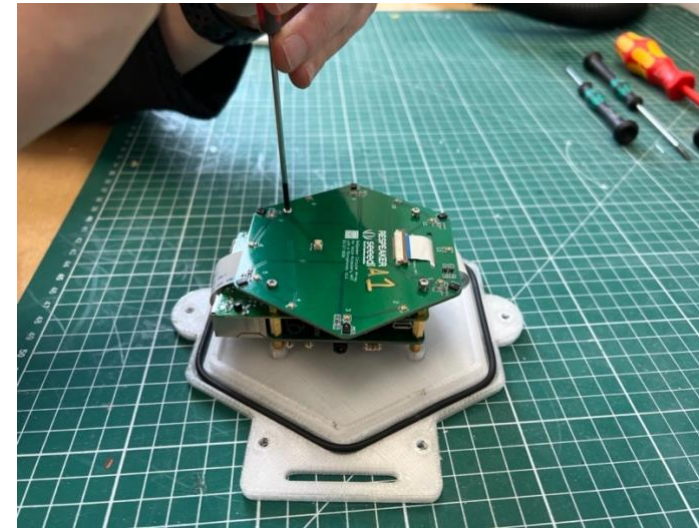
Place the Respeaker sound card upside down, on top of the standoff screws. Then, fix it in place by screwing in 4 M2.5*12+6 standoff screws.

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Place the Raspberry Pi upside down, on top of the standoff screws and sound card. Fix it in place by screwing in another 4 M2.5*12+6 standoff screws.

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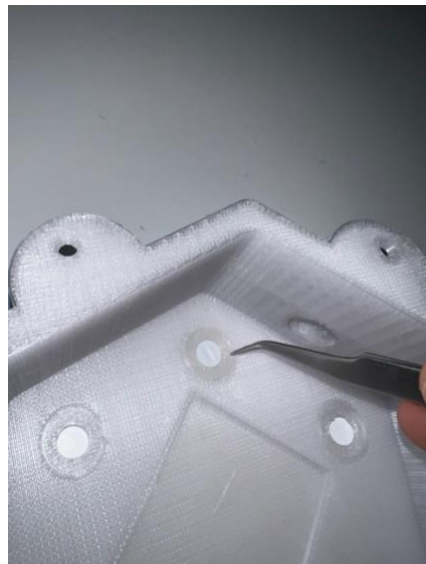
Pass the ribbon cable from the sound card through the slot in the microphone array, and plug it in. Then, position the mic array on top of the standoff screws, and fix in place using the 4 M2.5*6 screws.

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Plug in the micro-USB to USB-C right angled connector and pass through the device as shown.

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Use a pair of tweezers to lay the ePTFE acoustic vents into the insets of the microphone holes.

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Pass the power cable through the hole in the top casing, and plug it into the USB-C adapter. Close the casing and ensure that there is sufficient cable length inside the device. Mark the position where the cable protrudes from the hole. Then, unplug the cable from the adapter, and glue it into place using Silicon Sealant. Allow to set for at least 24 hours.

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Setup

Pre setup image:

We have made a new disk image for this fork. If using this image, clone the image to an SD card then skip ahead to the "RPI Configuration" steps below to customise your ecosystem monitoring protocol and finish install. This image can be found [here](#). If you'd like to set the Raspberry Pi up manually follow the manual setup below and then the Configuration procedure.

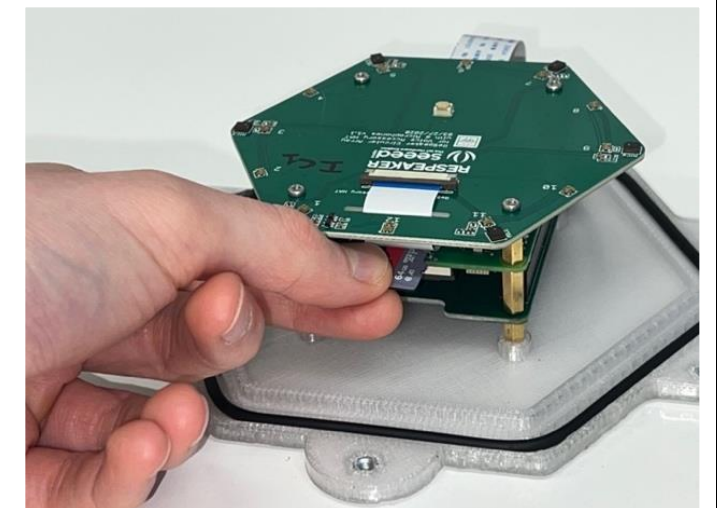
Manual Setup

If you would rather start using a stock Raspbian image, there's an extra couple of steps before you start the setup process. The seed soundcard only works on older versions of Raspbian Buster. The following instructions are modified from Becky Heath's Repository...




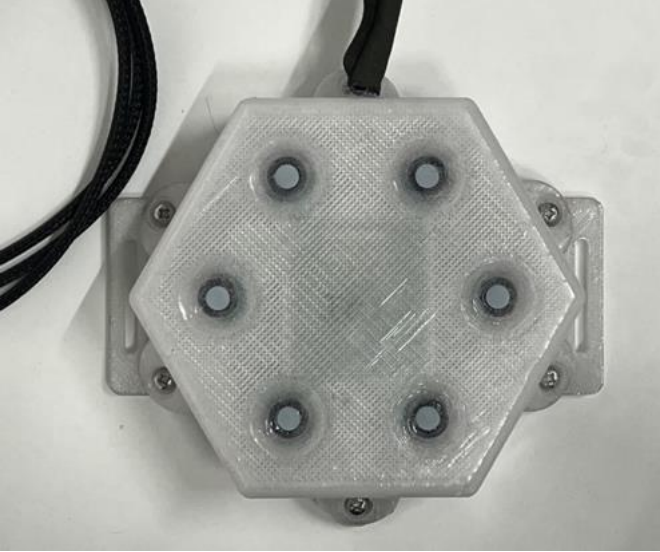

Install the disk image onto an SD card by following [these instructions](#).

This SD card should be at least 64 GB, with a minimum of 150 MB/s write speeds.

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Plug the SD card into the Raspberry Pi.

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<p>Connect the USB to USB-C power cable with the Micro-USB to USB-C adapter. Apply duct tape to secure the connection.</p>	<p>Place a new silica gel packet into the position shown (and repeat on the other side of the Pi, for a total of 2 packets).</p>	<p>Place the top casing on top of the device. Make sure to align the screw holes, and tuck in the internal cabling.</p>	<p>One by one, insert the M4 bolts into the holes, and use a screwdriver to screw until tight.</p>
<p>21</p> 			
<p>The device should now be ready for deployment! For deployment instructions, see this document.</p>			