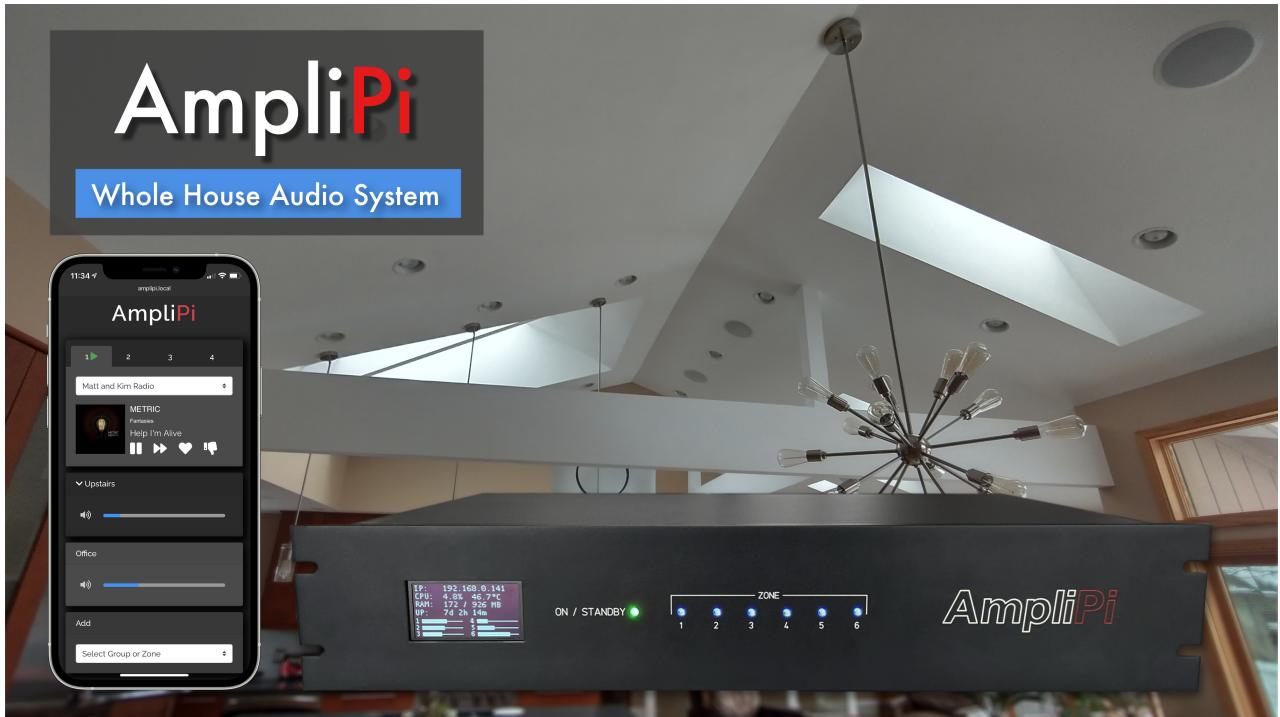


AmpliPro Home Audio Controller - User Manual

MicroNova

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0.1 Safety

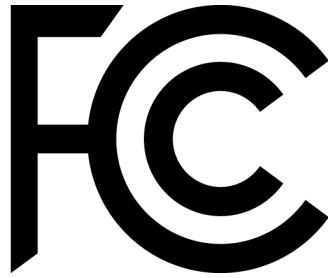


- **WARNING!** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.
- **CAUTION!** TO REDUCE THE RISK OF ELECTRIC SHOCK, KEEP COVER ON AT ALL TIMES.

0.1.1 IMPORTANT SAFETY INSTRUCTIONS

- Read and keep these instructions.
- Heed all warnings and follow all instructions contained within this manual.
- Do not use this unit near water.
- Clean only with dry cloth.
- When cleaning, clean exterior only
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the unit.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this unit during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the unit has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled, or objects have fallen into the unit, the unit has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Operate the unit only with the voltage specified on the rear. Fire and/or electric shock may result if a higher voltage is used.
- Do not modify, kink, or cut the power cord. Do not place the power cord in close proximity to heaters and do not place heavy objects on the power cord and/or the unit itself, doing so may result in fire or electrical shock.
- Do not touch the speaker terminals as electric shock may result.
- Ensure that the safety ground terminal is connected to a proper ground. Never connect the ground to a gas pipe, as a severe explosion and/or fire may result.
- Be sure the installation of this product is stable, avoid unlevel surfaces as the product may fall and cause injury, property damage, electrocution and/or fire.
- Note that when the unit is turned off, it is not completely disconnected from the AC power outlet. Do not remove the cover.

0.2 FCC Statement



1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - This device may not cause harmful interference.
 - This device must accept any interference received, including interference that may cause undesired operation.
2. FCC Radiation Exposure Statement: Mobile device. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1 Overview

AmpliPi™ is a multi room/zone home audio controller and amplifier made for whole house audio systems with many zones. It can play up to 4 simultaneous audio streams (Pandora, Spotify, AirPlay, etc) or sources (RCA inputs), each routed to one or many zones, all of which are configurable in real-time using the self-hosted AmpliPi Web App or its underlying REST API. It is expandable up to 36 zones using AmpliPi Expanders. Your AmpliPi controller includes the following components:

- 1 x AmpliPi Controller
- 1 x This User Manual
- 6 x Phoenix connectors for speaker connections

The following optional accessories are available and can be purchased separately:

- **AmpliPi Wall Panel:** Wall mountable touch panel that can control volume and playback for a zone or group of zones. Also includes two physical switches for light control, intended to replace the light switch in the room it's installed in.
- **AmpliPi Zone Expander:** Expansion unit to add more controllable zones. Up to 5 can be added to an AmpliPi controller for a total of 36 zones.

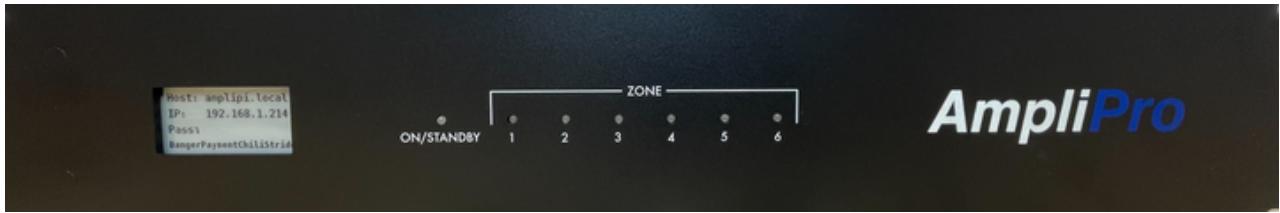
1.1 App



AmpliPi hosts a mobile-friendly web app that can control the system from any PC or mobile phone on the local network. Its design was based on the idea that each of the four audio sources could be controlled separately by different people in the house. Each audio source's controls are in their own tab at the top of the app.

1.2 Main Controller

1.2.1 Front Panel



- **DISPLAY:** Show IP Address, Hostname, and SSH Password.
- **ON/STANDBY:** Show state of the audio controller:
 - Green: Unit is on
 - Red: Unit is in Standby
 - Blinking Red: Unit is waiting to be configured
- **ZONE:** Show powered state of each zone
 - Blue: Zone is on (not muted)
 - None: Zone is off (muted)

1.2.2 Rear Panel



- **POWER:** 115V, or optionally 230V connection. See installation page for more detail.
- **CONTROLLER:** Connections to the embedded Raspberry Pi Controller.
- **SERVICE:** USB mini connection for re-imaging the Pi's EMMC.
- **USB:** USB A ports for connecting peripherals such as additional storage devices. Do not power an input using the USBs, see installation page for more info.
- **OPTICAL IN:** SPDIF audio input, planned to be used for extra inputs.
- **AUX IN:** Additional stereo input, planned to be used for announcements.
- **HDMI OUT:** The Pi's HDMI output, can be used for visualizations or development.
- **ETHERNET:** Network connection.
- **INPUTS:** 4 Stereo RCA inputs.
- **PREOUT:** Unamplified zone audio outputs, intended for powered speakers/subwoofers.
- **ZONE X:** Amplified stereo outputs for Zone X, using 4-pin Phoenix connectors.
- **EXPANSION:**
 - **CHAIN OUT:** Connection to the next expansion unit (if one or more expanders are needed).

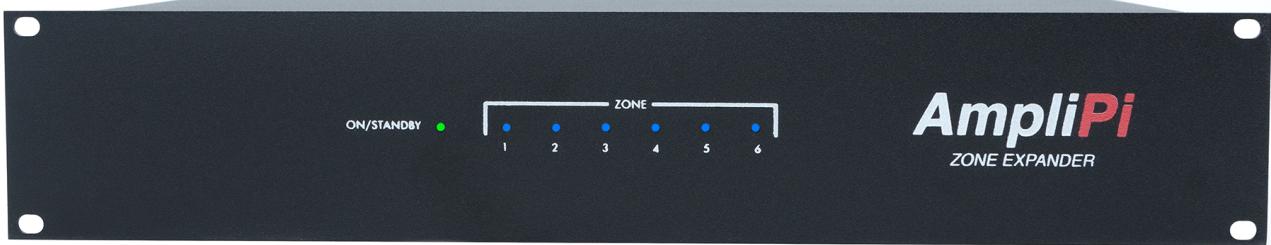
1.2.3 Specifications

Feature	
Streaming Sources	Airplay, Pandora, Spotify Connect, DLNA
Control Interfaces	Web App, REST API
Dimensions	2U 19" rackmount unit with 300mm depth
Connectivity	100Mbps Ethernet HDMI 1.4 output 2x USB 2.0 External 1x USB 2.0 Internal
Power Input	90-132VAC or 180-264VAC
Power Consumption	6.7W Idle 391W Continuous 782W Peak
Peak Current Consumption	6.8A @ 115VAC or 3.4A @230VAC
Speaker Power	79 WPC @ 4 Ω 57 WPC @ 4 Ω 44 WPC @ 4 Ω
Speaker Impedance	4 - 8 Ω
Stereo Zones	6
Audio Input	4 RCA Line In
Digital Audio Sources	32-bit 384KHz (source 1), 16-bit 48KHz (sources 2-4)

1.3 Zone Expander

Adds 6 output zones to an AmpliPro Controller (often referred to as "AmpliPro Main Unit") and can be daisy chained to create a massive whole house audio system with up to 36 stereo zone outputs!

1.3.1 Front Panel



- **ON/STANDBY:** Show state of the audio controller:
 - Green: Unit is on
 - Red: Unit is in Standby
 - Blinking Red: Unit is waiting to be configured
- **ZONE:** Show powered state of each zone
 - Blue: Zone is on (not muted)
 - None: Zone is off (muted)

1.3.2 Rear Panel



- **PREOUT:** Unamplified zone audio outputs, intended for powered speakers/subwoofers.
- **ZONE X:** Amplified stereo outputs for Zone X, using 4-pin Phoenix connectors.
- **EXPANSION:**
 - **CHAIN OUT:** Connection from previous expansion or main unit.
 - **CHAIN OUT:** Connection to the next expansion unit (if needed).

1.3.3 Specifications

Feature	
Dimensions	2U 19" rackmount unit with 300mm depth
Power Input	90-132VAC or 180-264VAC
Power Consumption	1W Idle 391W Continuous 782W Peak
Peak Current Consumption	6.8A @ 115VAC or 3.4A @230VAC
Speaker Power	79 WPC @ 4 Ω 57 WPC @ 4 Ω 44 WPC @ 4 Ω
Speaker Impedance	4 -8 Ω
Stereo Zones	6
Audio Input	From Controller

1.4 Wall Panel



See the included Sonoff manual for specifications and installation. Also accessible via QR code below:



2 Installation

2.1 Overview

We understand you will probably be excited to power on your AmpliPro and try it out. To avoid damaging the unit, please read through this guide before installing and powering your AmpliPro unit!

WARNING!! VERIFY THAT THE VOLTAGE OF YOUR WALL OUTLET MATCHES THE VOLTAGE LISTED NEAR THE POWER INLET BEFORE PLUGGING IN.

See the power section for more details on how to change input voltage.

2.2 Mounting and unit placement

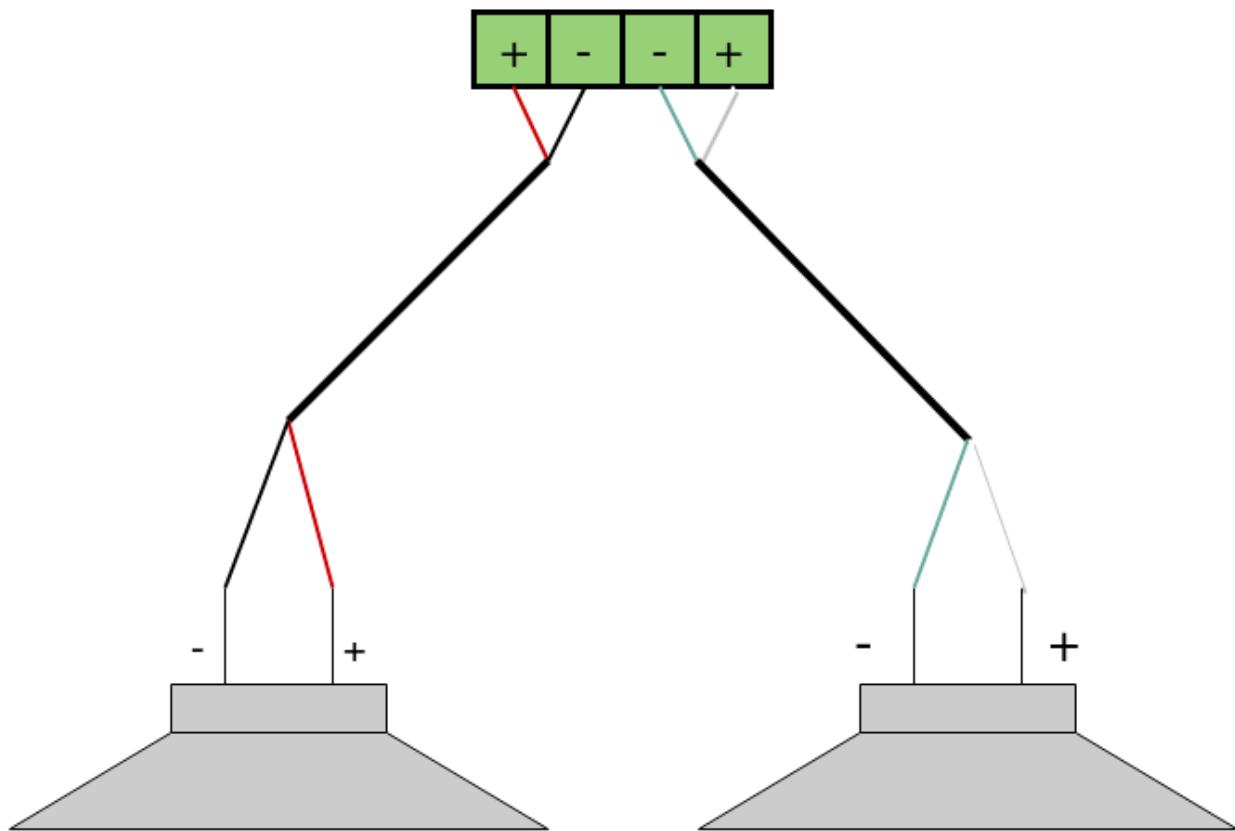
Main Controllers and Zone Expanders both ship with built in 19" rackmount ears, so that they can be easily installed into a server rack with mounting screws (not provided).

Some things to keep in mind avoid overheating the unit:

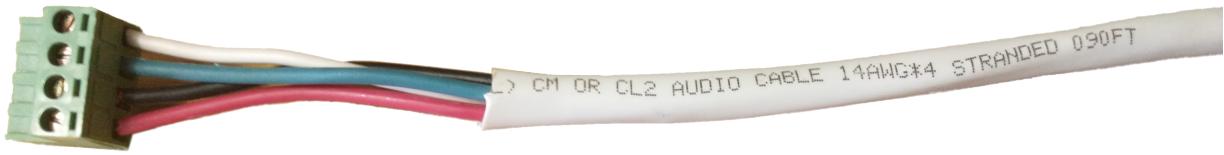
- Don't block the vent holes on the side
- Don't allow dust to build up inside the unit to avoid overheating the unit. See cleaning instructions page for more detail.

2.3 Speakers

Each of AmpliPro's zone outputs can drive a 4-8 Ohm speaker pair, using the provided Phoenix connectors. Here is what the basic wiring diagram for a zone looks like:



AmpliPro's amplifiers are capable of driving 4-8 Ohm speaker loads in a stereo configuration. Here is what a typical stereo speaker connection, using CL2 rated 14-AWG speaker wire and the Phoenix connectors, looks like:



To connect a stereo speaker pair, using speaker wire:

1. Strip 3-4 inches of the cable jacket, then strip 1/4 inch of insulation from the end of each wire.
2. Twist the frayed end of each wire to keep things nice and neat.
3. Unscrew each set screw to open the contacts, then insert and tighten down each wire one by one. Note that set screws loosen, but should not come out.
4. To avoid any shorts, make sure that there aren't any stray wire strands.
5. The speaker set can now be connected to one of the 6 zones.

2.3.1 Connections

- Improper connection of speakers can damage the unit
- Never connect multiple speakers in parallel such that it brings the total impedance below 4 ohms (max 2x 8ohm speakers in parallel).
- Amplified speaker outputs **CAN NOT** be bridged, attempting to do so will damage the amplifier and void the warranty

2.3.2 Running wire in walls and ceilings

- Most electric codes require the use of CL2 rated speaker wire for in-wall installations. Please refer to local building codes for more details.
- Avoid running speaker wire next to AC power wires as much as possible to reduce noise.
- When necessary, cross AC wires at 90 degree angles to avoid introducing any noise into the speakers.

2.3.3 More Info

Much more information on speaker selection and installation can be found in AmpliPro's online documentation and question forums found at the end of this section.

2.4 Preamp Outputs

Each of AmpliPro's zone outputs have a corresponding line-level preout output pair. These outputs can be used to connect powered subwoofers and other active/power speakers.

The volume output of a preout is controlled by the corresponding speaker output. This allows a connected subwoofer to be controlled proportionally to the speakers output in the same zone.

2.5 Audio Inputs

Each of the stereo RCA inputs can be connected to a different audio source, such as the output of a TV or a record player. Expansion Units To increase the number of zones you can add expansion units to your system. You can add up to 5 additional zone expander units to a single AmpliPro main unit. Each expansion unit adds 6 zones or pairs of speakers. Zones attach to main units using the CHAIN IN/OUT connectors on the rear panel. These are included with each Zone Expander.

2.6 Network connection

Connect an RJ45 cable to the Ethernet port on the main unit. Connect the other end to a port on your main network (likely on your router). The unit's IP address is configured by DHCP by default.

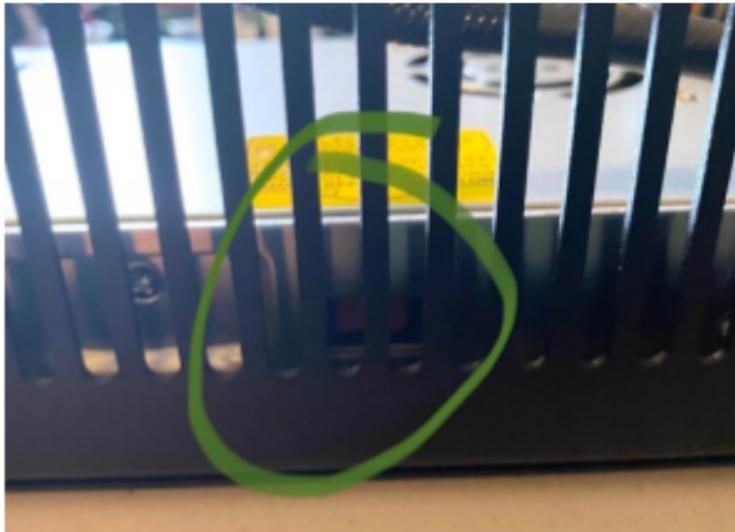
2.7 Power

WARNING!! VERIFY THAT THE VOLTAGE OF YOUR WALL OUTLET MATCHES THE VOLTAGE LISTED NEAR THE POWER INLET.

AmpliPro ships preconfigured for the typical mains voltage in your region, either 120V mains power or 230V mains; you can see what mode it was set to before shipment based on which box is checked near the power inlet on the unit. If your unit is preconfigured incorrectly for your region, several changes need to be made to the unit to connect to alternative mains:

- Use an appropriate voltage power cable (AmpliPro only ships with the cable rated for the region)
- Change the internal power supply fuse located in the IEC socket (located just above the power inlet on the exterior of the AmpliPro)
- Switch the internal power supply as needed (See below)

Internally, there is a red switch on the side of the power supply that can be toggled for 230V. The easiest way to get at this switch is to take off the top cover. The power supply switch can potentially be accessed through the vent slots on the right side of the unit as well. Here are some pictures to help clarify the process:



Once the unit has the correct input voltage configured, plug the AmpliPro in to a wall outlet. The ON/STANDBY will start off blinking red then transition to solid red once the unit is fully powered on. Continue below to enjoy your unit!

2.8 Startup and Configuration

Now that the AmpliPro unit is powered on, it is time to play with it. Let's see what it can do:

1. Go to amplipi.local (Android and Windows 7 users will need to type the ip address found on the unit's display into their web browser to find the page).
2. You should now be connected to AmpliPro's mobile-friendly website. Please note that an https connection to the AmpliPro is not currently available since certificates have to be managed on a per-unit basis.
3. Android users can download the AmpliPi app in the Google Play Store.
4. Click the plus (+) icon and select a stream
 - The Groove Salad - InternetRadio stream comes preconfigured (needs an internet connection).
5. Change the volume on the zone you would like to output music on. Many of the zones will be hidden inside a group. Click on the different groups to see which zones belong to them.
6. You will probably want to change the default group and zone names and add different streaming sources. The gear icon () on the bottom right leads to the settings page where you can configure inputs, zones, and groups.

Since AmpliPro is constantly improving, our manual may have been updated. Go to amplipi.com/getting-started or scan the QR code below to view the latest version of our manual.



3 Troubleshooting

If you are having problems with your AmpliPi device, start here.

3.1 Audio

3.1.1 Noise

Audio noise can have a lot of causes, below are some common reasons:

- **Mixing grounds:** AmpliPi has two different grounded lines, analog and digital. The most common way to mix them is by plugging in an audio device and attempting to power it by the usb on the rear of the unit, all usb-powered devices must be powered from a wall outlet
- **Speaker setup:** Some speaker configurations can lead to excess noise being inducted into the output. This is unrelated to the system and has everything to do with how the speakers are wired and installed.
- **Hardware issues:** See the support page for more info.

3.1.2 No Audio

Lack of audio typically has one of a few causes:

- **No Source / Bad Source:** The source itself isn't outputting audio properly, try changing to a different source to confirm
- **Bad Output / Bad Zone:** Either the speaker, the speaker wires, or one of the ports on the back of the AmpliPro might be broken or hooked up incorrectly. Try a different speaker, length of wire, or port on the back of the AmpliPro to test each case

3.2 Updating

1. Go to the web app at <http://amplipi.local/>
2. Click the gear icon () in the bottom right corner to go to the configuration page
3. Select **Updates** and click the **Check for Updates** button

3.3 New Release

To update your AmpliPi to the latest version:

4. Click the **Update** button

3.4 Prereleases and using previous versions

4. Click the **Older Releases** tab and select the release you would like to use
5. Click the **Start Update** button

3.5 Reimaging AmpliPi

To bring AmpliPi's OS and install back to its original state see: <https://amplipi.discourse.group/t/re-imaging-the-raspberry-pi/46>

Or scan:

