SAVANT

Savant® IP Audio Deployment Guide

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Document Supports:	da Vinci 8.7 or higher

This document outlines the process for deploying Savant IP Audio products including physical installation, RacePoint Blueprint™ configuration, and web-based user interface setup.

Products supported by this guide include:

- IP Audio 1 with Savant Music 2.0 [PAV-SIPA1SM]
- IP Audio 50 with Savant Music 2.0 [PAV-SIPA50SM]
- IP Audio 125 with Savant Music 2.0 [PAV-SIPA125SM]
- ProAV 7 Source Audio Input IP Transmitter with Control [PAV-AIM7C]
- IP Audio Single In and Out [PAV-AIO1C]
- ProAV 16 Channel Audio Output IP Receiver with Control [PAV-AOM8C]
- IP Audio 16 Channel Balanced Audio Output IP Receiver with Control [PAV-AOMBAL8C]
- IP Audio Soundbars [IP-STUDIOxx-2CH]
- IP Audio Micro Aperture Speakers [EDG-4-AVB-x, EDG-4-SAT-x]
- IP Audio WiSA Bridge (Stereo) [PAV-AOMWS1C]

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Contents

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Important Safety Information - Read First

Before installing, configuring, or operating any equipment, Savant recommends that each dealer, integrator, installer, etc. access and read all relevant technical documentation. Savant technical documentation can be located by visiting Savant.com. Vendor documentation is supplied with the equipment.

Read and understand all safety instructions, cautions, and warnings in this document and the labels on the equipment.

Safety Classifications In this Document	
NOTE:	Provides special information for installing, configuring, and operating the equipment.
IMPORTANT!	Provides special information that is critical to installing, configuring, and operating the equipment.
CAUTION!	Provides special information for avoiding situations that may cause damage to equipment.
WARNING!	Provides special information for avoiding situations that may cause physical danger to the installer, end user, etc.

Electric Shock Prevention	
ELECTRIC SHOCK!	The source power poses an electric shock hazard that has the potential to cause serious injury to installers and end users.
ELECTRICAL DISCONNECT:	The source power outlet and power supply input power sockets should be easily accessible to disconnect power in the event of an electrical hazard or malfunction.

Weight Injury Prevention	
WEIGHT INJURY!	Installing some Savant equipment requires two installers to ensure safe handling during installation. Failure to use two installers may result in injury.

Safety Statements

All safety instructions below should be read, understood, and applied under all relevant circumstances when working with this equipment.

1. Follow all input power ratings marked on product near power input!
2. If fuse replacement is required, replacement fuse should match fuse rating marked on the product.
3. Do not use equipment near water.
4. Clean only with dry cloth.
5. Do not block any ventilation openings or install near any heat sources such as heat registers, stoves, radiators, amplifiers, etc.
6. Refer all servicing to qualified service personnel. Servicing is required when any part of the apparatus has been damaged in any way, or fails to operate normally for any reason.
7. Use only attachments/accessories specified by the manufacturer, following all relevant safety precautions for any such attachments/ accessories.
8. For applicable equipment, use the included power cord with the grounding prong intact to insure proper grounding of the device.
9. If the provided plug does not fit the desired outlet, contact a licensed electrician to replace the obsolete outlet.
10. Protect any power cord from being walked on, pinched, strained, or otherwise potentially damaged, especially at the outlet or device connections.
11. Disconnect any outlet powered apparatus from its power source during lightning storms or when unused for long periods of time.
12. To completely disconnect equipment from AC mains power, disconnect the power supply cord plug from the AC receptacle on the device.
13. For any hardwired or fixed in-wall apparatus, carefully follow all wiring diagrams and instructions. All electrical wiring and servicing should be performed by a properly licensed electrician.

1. Before You Begin

Read this document in its entirety before starting deployment of the product, and ensure that the following required items are available:

Savant IP Audio device(s) ☐

Unique ID (UID) of the Savant IP Audio device(s) ☐
Located on the back of the device.

Savant Host; licensed and running da Vinci software ☐

Savant Development Environment (SDE/MacBook) ☐
See the table below for minimum supported release.

Ethernet network meeting Savants requirements ☐
See Appendix A: Network Requirements

IMPORTANT! Device firmware updates require a valid Internet connection to be downloaded to the Host.

Supported Release

Device	Minimum Supported Release
PAV-AIM7C-10	da Vinci 8.10.2
PAV-AIO1C	da Vinci 8.10.1
PAV-AOM8C	da Vinci 8.7
PAV-AOMBAL8C	da Vinci 8.8
PAV-SIPA50SM	da Vinci 8.8
PAV-SIPA125SM-05	da Vinci 9.0.2
EDG-4-AVB-x	da Vinci 8.10
PAV-AOMWS1C	da Vinci 9.4

Feature	Minimum Supported Release
Maximum AVB Devices 16*	da Vinci 8.4
Maximum AVB Devices 45* + 200 listen only devices	da Vinci 9.0
Savant Music Trim (System Monitor)	da Vinci 9.2
Speaker Calibration (Web-UI)	da Vinci 9.2.2
Advanced Speaker Grouping	da Vinci 9.3

* Additional device restrictions may apply based on Host type. For further information, refer to the relevant da Vinci Release ReadMe for the runtime version in use, available on the Savant Customer Community.

HELPFUL INFO!
When installing IP Audio products with Integrated Hosts being used in subordinate mode refer to the IP Audio Products with Integrated Host Deployment Guide on the Savant Customer Community.

2. Deployment Steps

Follow these steps to successfully deploy a Savant IP Audio device. This page can be used as a checklist to record which steps have been completed.

Review product specifications and connection details ☐
See the device's Quick Reference Guide on the Savant Customer Community.

Install the Savant IP Audio devices ☐
See the Installation section below.

Add the Savant IP Audio devices into a RacePoint Blueprint configuration ☐
See the Blueprint Configuration section below.

3. Wiring and Connections

The Savant IP Audio control connections send data to control a device and receive data to display current status on the user interfaces or trigger a system action. Each port type may support multiple protocols that are determined by the logical connection within Blueprint.

3.1. Network Connection

Savant IP Audio devices use a standard RJ-45 port complying with IEEE 802.3 Ethernet standards. This port also supports Audio Video Bridging (AVB) or Time Sensitive Networking (TSN) over Ethernet (AVB/TSN, IEEE 802.1).

Power over Ethernet (PoE)

The products listed below can be powered using PoE. For details on supported PoE standard see the individual products Quick Reference Guide on the Savant Customer Community.

- PAV-AOMWS1C
- PAV-AIO1C
- PAV-SMS2001-10
- PAV-AIM7C-10
- PAV-AOM8C-10

3.2. AC Power Connection

Read and follow all warnings and instructions related to the AC power connection below.

SURGE PROTECTION! Use a surge-protected circuit for all components and power supplies requiring 100/240V (AC 50/60 Hz) source power.

ELECTRICAL DISCONNECT! The source power outlet and power supply input power sockets should be easily accessible to disconnect power in the event of an electrical hazard or malfunction.

Power Management Recommendations

Savant recommends a pure sine wave uninterruptible power supply (UPS) with the ability to shut down the Savant Host before the battery runs out of power. Never remove power from the Savant devices before shutting them down. See Appendix B for more information.

3.3. Checking and Replacing the Fuse

Carefully follow the instructions outlined below to remove, check, and replace the IP Audio device fuses.

ELECTRIC SHOCK HAZARD! Disconnect the unit from AC power by removing the power cord from the AC outlet and the unit before replacing the fuse.

IMPORTANT! The orientation of the cartridge within the unit and location of the fuse within the cartridge are crucial to proper operation. Make note of the orientation of the cartridge and the fuse location within the cartridge before removing.

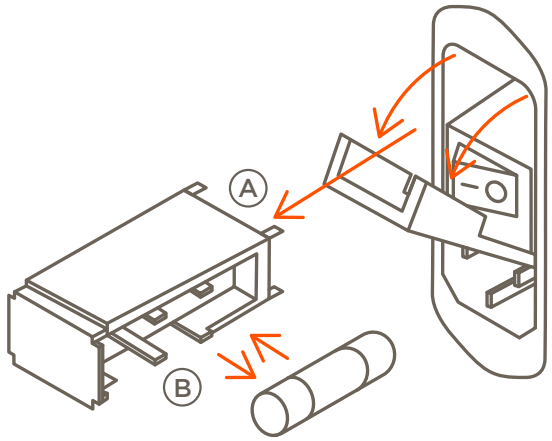
PAV-SIPA50SM/PAV-SIPA125SM

1. Disconnect the unit from AC power by removing the power cord.
2. Open the fuse cover on the AC power input using a flat head screwdriver or similar thin flat head tool. This will allow access to the fuse cartridge.
3. Using a flat head screwdriver or similar thin flat head tool, gently loosen the cartridge and pull the cartridge out of the unit slowly. As the cartridge is removed, make note of the orientation, as it is important to proper operation.

TIP: Mark the chassis and fuse holder with a marker in order to align when replacing.

4. Remove the old fuse from the cartridge and discard.
5. Gently place the new fuse in the cartridge and place the cartridge part way into the receptacle aligning it as defined in the diagram.
6. Gently press on the cartridge the rest of the way until it seats into the terminals at the rear of the slot.

NOTE: If any resistance is encountered while seating the cartridge, DO NOT apply more pressure. Stop pressing on the cartridge, remove it, verify the orientation, and repeat step.

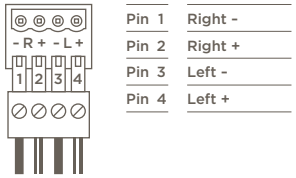


(A) Connection Pins Towards Unit

(B) Open Side of Cartridge Towards Power Switch

3.4. Speaker Wiring

The PAV-SIPA50SM, and PAV-SIPA125SM use the same Speaker wiring. Speaker wiring is made using 4-pin Speaker Connectors supplied with the IP Audio devices. The wire slips into the hole and locks with a screw located at the top of the connector. Speaker connectors accept up to 12AWG speaker cable.



NOTES:

- Wire order shown does not represent any wiring standard. It may be different than other models.
- While not shown in the diagram above, Zones 2 to 4 follow the same wiring as Zone 1.

3.5. IR Wiring

The PAV-SIPA50SM, PAV-SIPA125SM, and PAV-AIM7C all feature available ports for passing IR control to component devices. Follow the diagram and notes below for the model of IP Audio device being installed to wire any IR control connections to component devices.

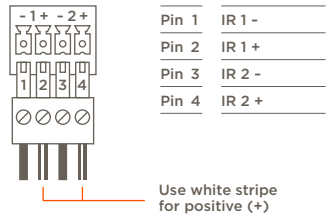
IMPORTANT! IR Wiring Precautions

- Ensure that all IR emitters are within 15 feet (4.6 meters) of the controller's location.
- Use of 3rd party flashing IR emitters with Talk Back is not recommended. These types of emitters can draw voltage away from the IR signal, which may degrade IR control performance.

PAV-SIPA50SM

IR connections are made using 4-pin IR connectors supplied with the device. The wire slips into the hole and locks with a screw located at the top of the connector.

IR Pinout

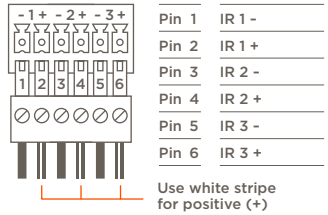


NOTE: While not shown in the diagram, IR connections 3 and 4 follow the same wiring as 1 and 2.

PAV-SIPA125SM /PAV-AIM7C

IR connections are made using 6-pin IR Connectors supplied with the device. The wire slips into the hole and locks with a screw located at the top of the connector.

IR Pinout



NOTE: While not shown in the diagram, IR connections 4 to 6 follow the same wiring as 1 to 3.

3.6. RS-232 Wiring

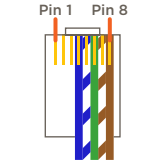
HELPFUL INFO:

- Savant recommends planning control connections and protocols to be used prior to building any cables and connecting equipment. This will ensure that devices will respond to commands and will not be damaged by an incorrect cable configuration.
- When installing wire in screw down terminals, strip a 1/4 inch of insulation from each wire and twist the strands together. This will allow for the exposed wire to be inserted into the terminal up to the insulation eliminating stray strands that may cause shorting.

PAV-SIPA50SM/PAV-SIPA125SM/PAV-AIM7C

The PAV-SIPA50SM, PAV-SIPA125SM, and PAV-AIM7C all use the same RS-232 wiring. Refer to the diagram and information below for pinout and wiring instructions.

RS-232 Pinout



RJ-45 Connector
(Gold pins facing up)

Pin 1	No Connection
Pin 2	No Connection
Pin 3	No Connection
Pin 4	GND (RS-232)
Pin 5	RXD (RS-232)
Pin 6	TXD (RS-232)
Pin 7	CTS (RS-232)
Pin 8	RTS (RS-232)

NOTES:

- CTS/RTS handshaking is supported for flow control based on the profile used in the configuration.
- IP Audio devices do not support RS-422/485

RJ-45 to DB9 Serial Control Adapters

Refer to the RS-232 Conversion to DB9 and RS-422/485 Pinout Application Note located on the Savant Customer Community for more information on RJ-45 to DB9 adapters.

IMPORTANT! If using RJ-45 to DB9 adapters not supplied by Savant:

- Ensure that any wires required for communication/control are terminated within the adapter.
- Ensure that all wires NOT required for communication/control are NOT terminated in the connector.
- Ensure that the unused wires in the connector are cut to prevent them from shorting out, as they are still terminated in the RJ-45 connector on the controller side.

3.7. GPIO Connections

The PAV-SIPA125SM, PAV-AOM8C, and PAV-AOMBAL8C have GPIO ports which share the same wiring. General Purpose Input/Output (GPIO) ports are binary I/O ports used by Savant controllers to trigger actions within the system. GPIO actions may be configured to control a device, such as turning on an amplifier (output), or detecting a device state change (input) to perform a triggered workflow. Pin 2 is used for input or output depending on configuration.

Pin 1	Ground
Pin 2	GPIO 1
Pin 3	Pull-Down Jumper 1

NOTE: While not shown this diagram, GPIO 2 follows the same wiring as GPIO 1.

GPIO Pull Down Resistor (PD) Usage

GPIO pins are configured as inputs and are pulled high to 12V while the host is booting up. To make the GPIO signal low during a host reboot and/or a power cycle, attach the GPIO 1 pin to the PD pin. The PD pin is a 1K ohm pull down resistor (to signal ground) which keeps the GPIO output below 0.8V during processor boot times.

HELPFUL INFO: GPIO functionality for Savant Controllers is defined by the associated Profile used within RacePoint Blueprint. All further programming (State Trigger configuration for example) must also be done within Blueprint. For further information on programming of GPIO and relay ports, refer to the Relay and General Purpose Input/Output Profiles - Application Note, available on the Savant Customer Community.

3.8. Relay Connections

The PAV-SIPA125SM features a relay port, used to control components via a normally open (NO) or normally closed (NC) relay.

Pin 1	Normally Closed (NC)
Pin 2	Common (C)
Pin 3	Normally Open (NO)

HELPFUL INFO: Relay functionality for Savant Controllers is defined by physical wiring (which should follow specifications for the controlled component), as well as the associated Profile used within RacePoint Blueprint. For further information on programming GPIO and/or relay ports, refer to the Relay and General Purpose Input/Output Profiles - Application Note, available on the Savant Customer Community.

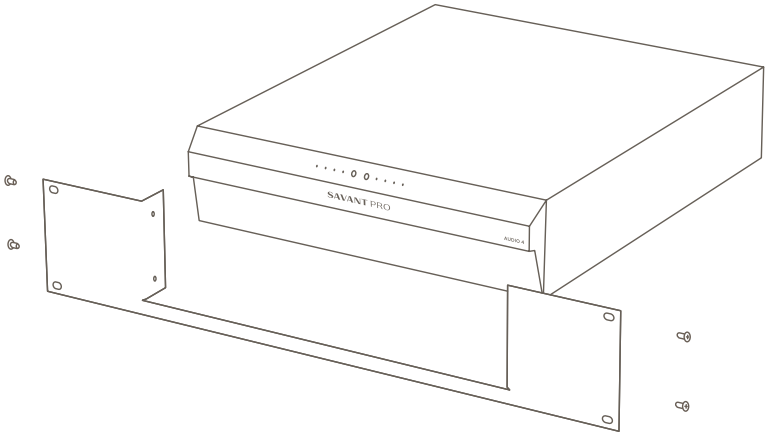
4. Installation

The all IP Audio devices can be installed in a National Electrical Manufacturers Association (NEMA) rack. Some of these devices require an optional rack bracket.

4.1. PAV-SIPA50SM

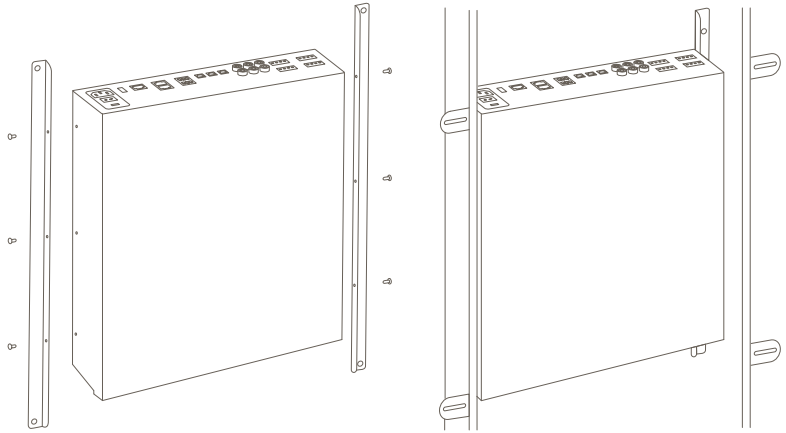
Rack Installation

The PAV-SIPA50SM can be mounted in a 2U rack style enclosure and is compatible with all standard 19-inch NEMA rack mounts. The rack bracket needs to be attached prior to placing in a rack.



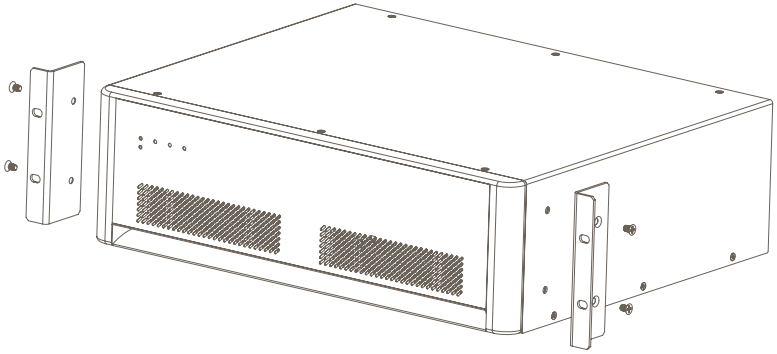
Enclosure Installation

The PAV-SIPA50SM device can be mounted in a structured media panel. The enclosure brackets need to be attached prior to mounting. Savant recommends using vented (louvered) enclosure doors.



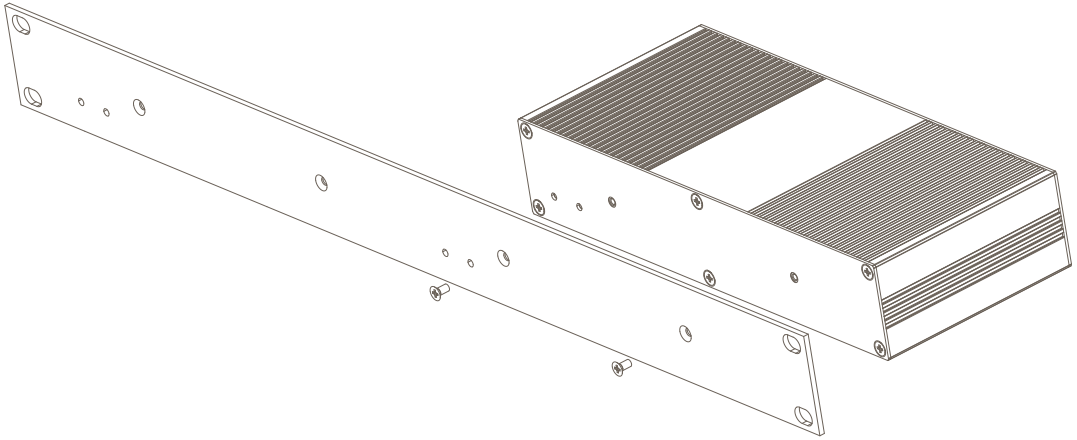
4.2. PAV-SIPA125SM

The PAV-SIPA125SM can be mounted in a 2U rack style enclosure and is compatible with all standard 19-inch NEMA rack mounts. The rack brackets need to be attached prior to placing in a rack.



4.3. PAV-AIM7C/PAV-AOM8C/PAV-AOMBAL8C

These devices can be placed on a solid flat surface such as a table or shelf. Or these devices can use the optional RMB-PAVAM2F-xx or RMB-PAVAM2-xx allows two devices to be mounted side by side. This rack is compatible with all standard 19-inch National Electrical Manufacturers Association (NEMA) rack mounts.



4.4. PAV-AIO1C

The PAV-AIO1C should be installed on a solid, flat, level surface, using the included hardware. The device will fit on a 1U rack shelf. The location should be dry, well ventilated, and out of direct sunlight.

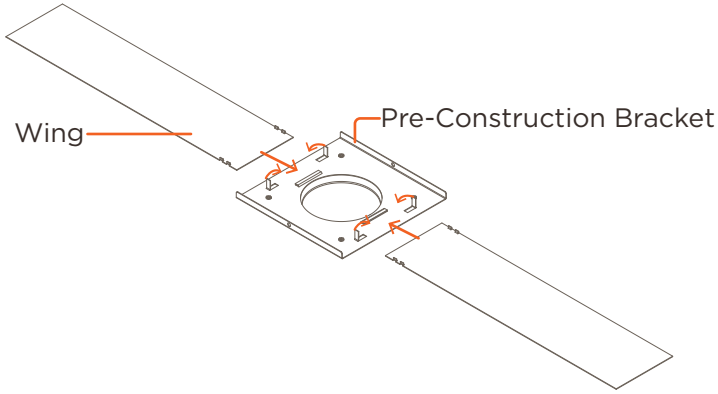
IMPORTANT! The PAV-AIO1C must to be connected to an AVB Switch.

4.5. IP Micro Aperture Speakers

MRS-4-PCB

Micro Aperture 4 Pre-Construction Bracket. This bracket is to be used when these speakers are being installed before the ceiling boards have been installed.

1. Push wings into place (x2).

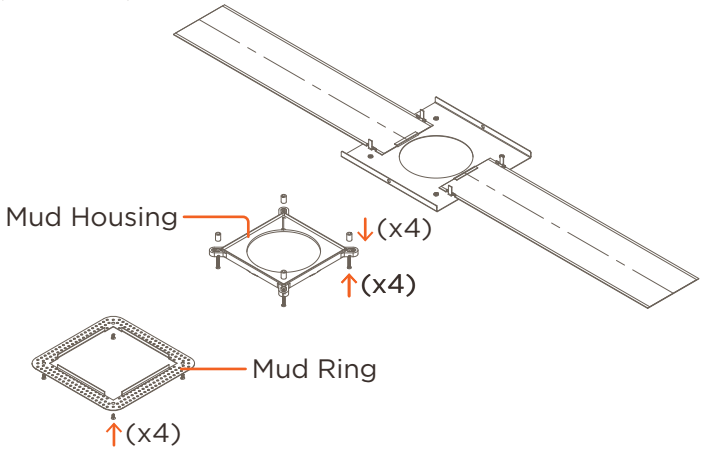


2. Once in place, fold tabs on pre-construction bracket down (x4).

MRS-4-FHK

Micro Aperture 4 Flush Mount Kit. Requires the Micro Aperture 4 Pre-Construction Bracket.

1. Before drywall, install the mud housing to the pre-construction bracket using the spacers (x4), and long (20 mm) screws (x4). (See Notes).



2. Install combined assembly same as above MRS-4-PCB install.
3. After drywall, attach the mud ring using the short (6 mm) screws to the mud housing.
4. Mud over mesh up to mud wall on the housing. Sand smooth.

NOTES:

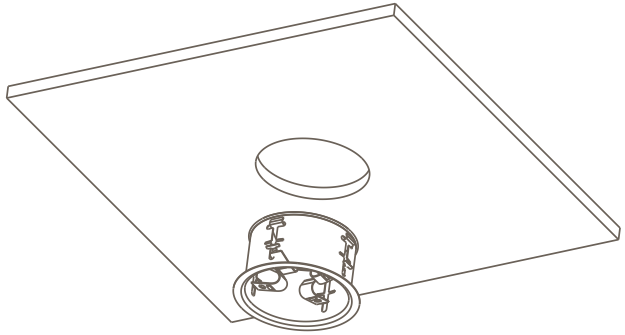
- The mud housing may be installed for the round or square speakers. Mount with the selected shape facing into the room.
- Select the proper spacer for your drywall finish.
  - 1/2" use 7 mm spacer.
  - 5/8" use 10 mm spacer

Micro Aperture Speakers

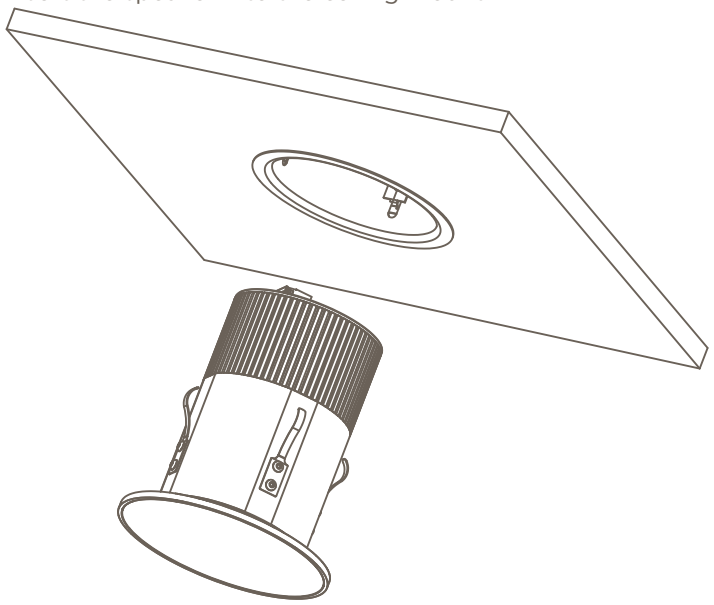
The IP Audio Micro Aperture 4 speakers and the Micro Aperture 4 speakers install the same way. The images below show IP Audio Micro Aperture 4 speaker.

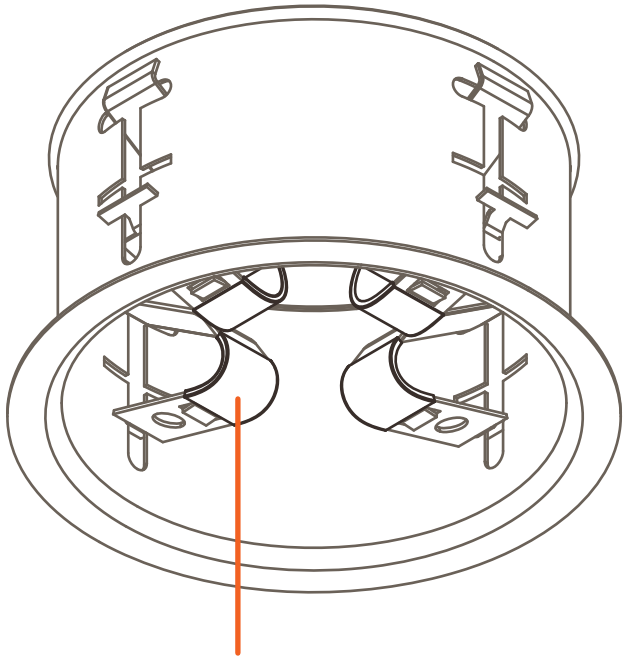
IMPORTANT! The AVB speaker must be the first Left channel. The AVB speaker can also drive up to two right channels and one additional left channel.

1. Use the cutout template to cut a hole in the ceiling.
2. Insert the Ceiling Mount in the hole.



3. Push springs into place.
4. Connect the speaker connection.
5. Insert the speaker into the ceiling mount.



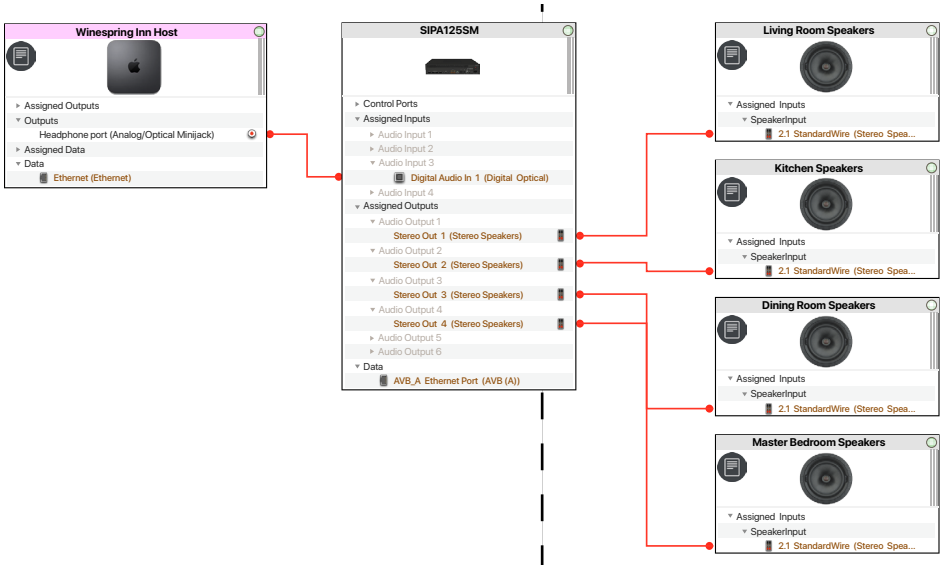


If the ceiling is 5/8" thick or greater remove the rubber friction bands from the springs.

5. Blueprint Configuration

5.1. Basic Blueprint Layout

The example image opposite shows a standard Blueprint configuration layout using a single PAV-SIPA125SM device.



5.2. Adding a Savant IP Audio Device to a Configuration

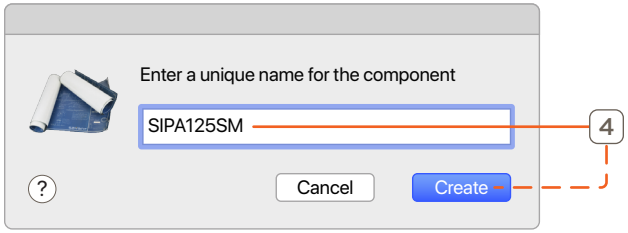
This example shows adding a PAV-SIPA125SM. The same process applies for all Savant IP Audio devices being added to a configuration.

In an open Blueprint configuration:

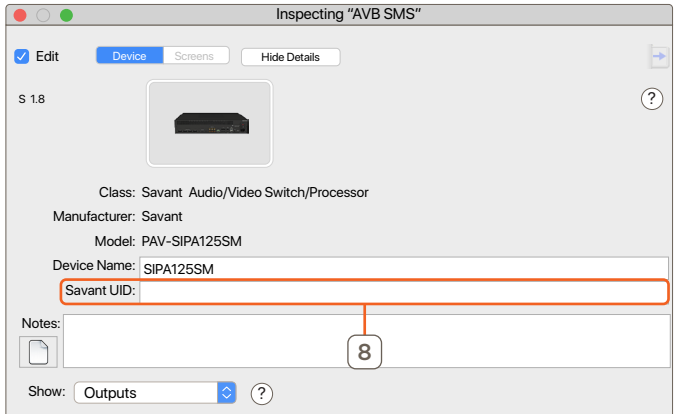
1. Select Show Library.
2. Search for IP Audio, or for the relevant product SKU/Model.
3. Select the PAV-SIPA125SM and drag into a Shared Equipment zone.

HELPFUL INFO: Savant recommends placing all A/V switch components in a Shared Equipment Zone, regardless of physical location on site. If placed in a User Zone, component outputs cannot leave that zone.

4. Name the device and select Create.
5. Place PAV-SIPA125SM in the layout window.
6. Select the PAV-SIPA125SM.
7. Open Inspector.



8. Enter the UID for the component in the Inspector field shown opposite: (the UID is printed on a label attached to the physical device, along with the unit serial number).



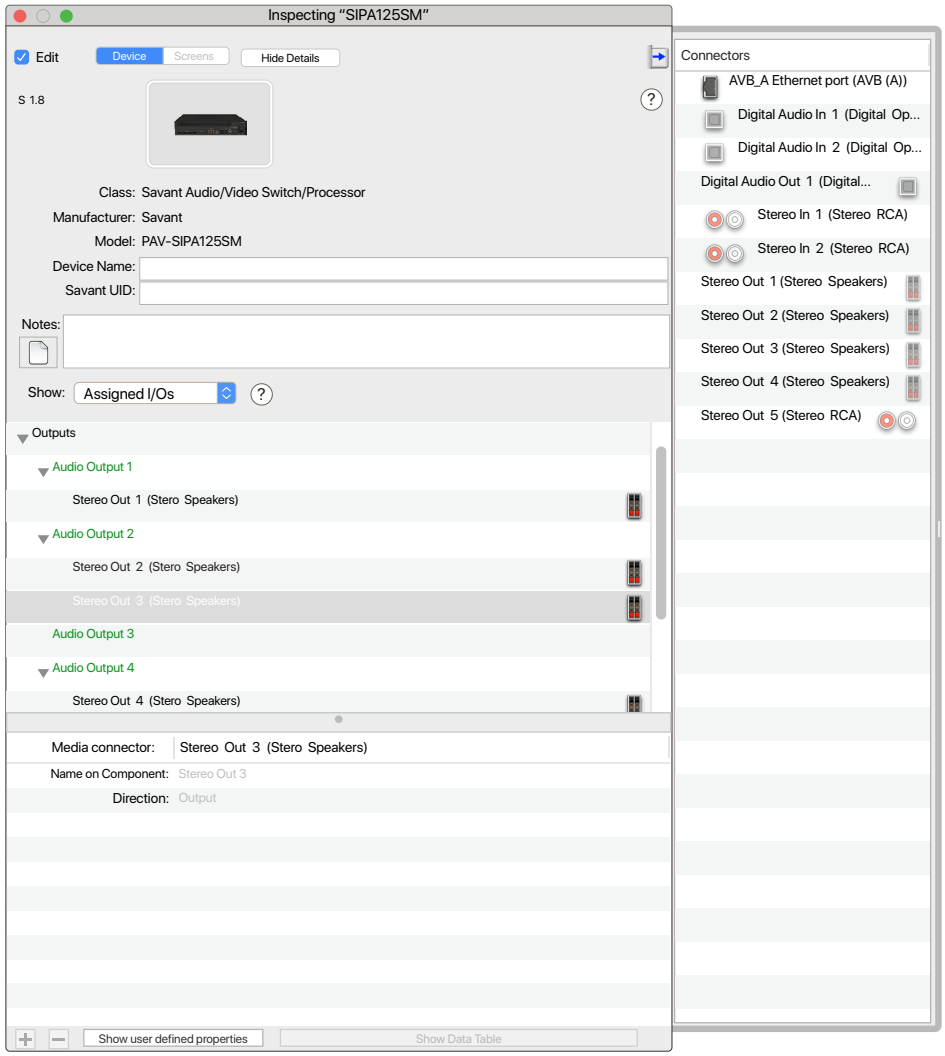
NOTES:

- The Ethernet connection is implied in Blueprint for Savant IP Audio components. There is no need to represent a data connection in Blueprint for a single unit deployment. Making an AVB connection in Blueprint when it is not going to be used may cause some stability issues.
- The IP Audio devices allows multiple units to function as a single switch. Additional devices will need to be added to the configuration in the same way as the first one was. For more information, see the Expansion Section.

5.3. Assigning Inputs and Outputs (I/Os)

The PAV-SIPA50SM, PAV-AOM8C, PAV-AOMBAL8C and PAV-SIPA125SM have this feature enabled. Assigned I/Os are Zone Groups (logical assignments). This allows the software to use two or more physical I/Os as a single logical output. To group audio outputs for IP Audio devices, follow the steps below:

1. Select the PAV-SIPA[x]SM device.
2. Open Inspector.
3. Click the Show drop-down.
4. Select Assigned I/Os.
5. Move the physical outputs to be combined into the same Audio Output group.

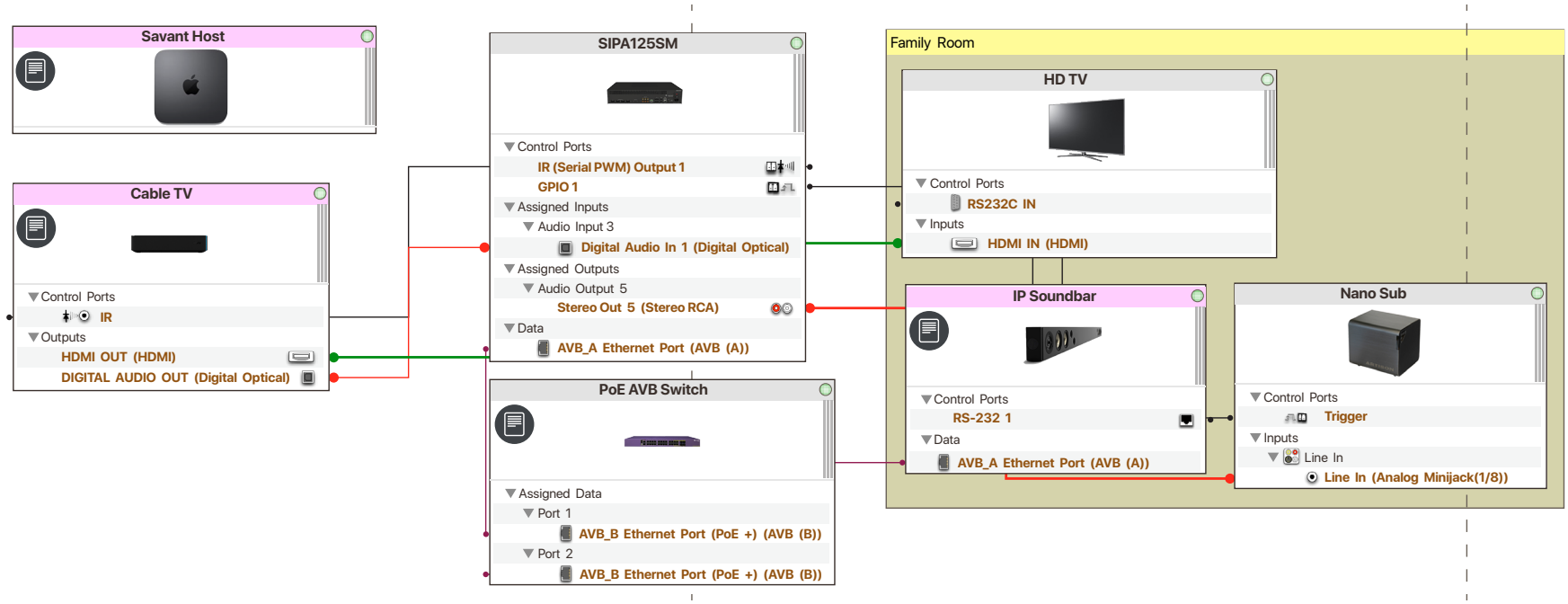


NOTE: The Digital Audio Output (TOSLINK) cannot be assigned to a group in this way.

For more information on the use of this feature, refer to the article on **Support for Multiple Audio Outputs Active Simultaneously in a Zone**, available on the Savant Customer Community.

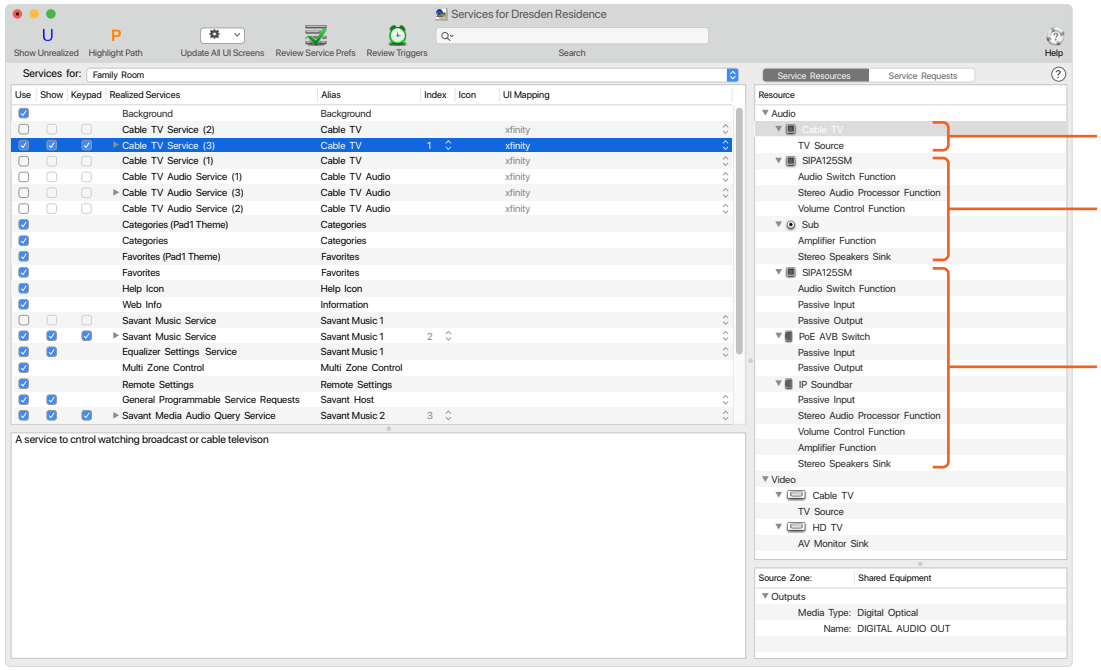
5.4. AVB Speaker Grouping

If there is more than one AVB Audio endpoints in the same User zone, Blueprint will generate service path options that group them and use them as a single audio service. Below is an example of an IP Audio Soundbar and a Sub-Woofer attached to the analog output of a PAV-SIPA125SM.

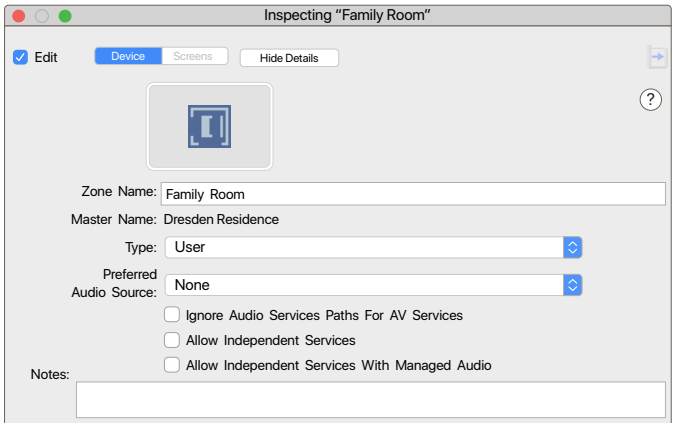


IMPORTANT! The above example shows the analog audio output of a PAV-SIPA125SM used in a speaker group. The analog output of a PAV-SIPA50SM cannot be used in AVB Speaker Grouping.

Below is an image of the Services window for the Cable TV service in the example shown above. It is included to highlight the service path of this service.



Allow Independent Services



Allow Independent Services - Allows more than one service to be active at once. When there is more than one audio endpoint in the zone they could be playing different audio at the same time.

Allow Independent Services with Managed Audio - Allows more than one service to be active at once. When there is more than one audio endpoint in a zone this will deactivate any other audio service in the zone. Leaving the last activated services audio playing.

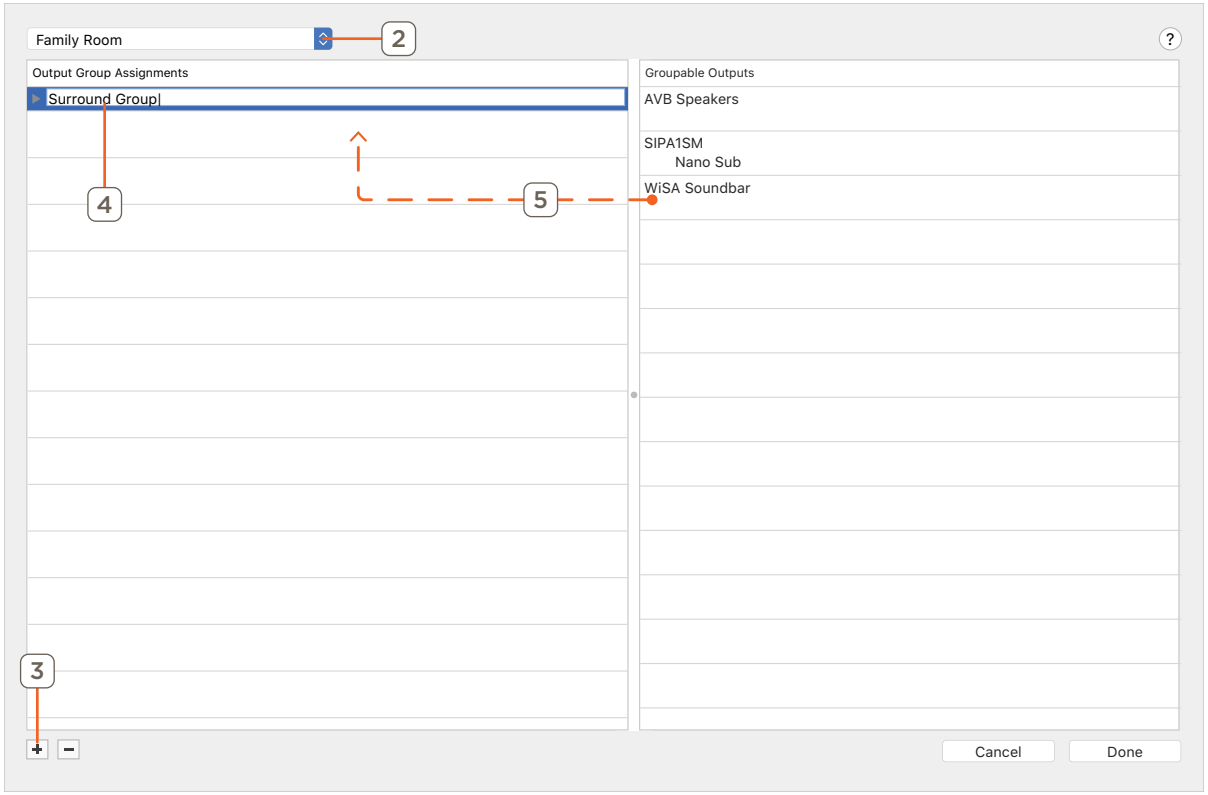
5.5. Advanced Speaker Grouping

Systems running da Vinci 9.3 and higher can access the Pro Audio Control table within Blueprint for configuration of AVB speaker grouping. This table allows speaker groups to be pre-defined on a zone by zone basis. Blueprint will then generate service paths tailored to each defined group, making them easier for the user to discern and select from the view services window.

Additionally, user zones that include STUDIO55WS soundbars can use the grouping defined within the Pro Audio Control table to create speaker groups for surround sound. STUDIO55WS soundbars are capable of decoding bitstream content routed through their local TOSlink input, enabling passive speakers and hardwired subwoofer endpoints driven by Savant AVB chassis and grouped with the STUDIO55WS soundbar to receive decoded surround channel and LFE content.

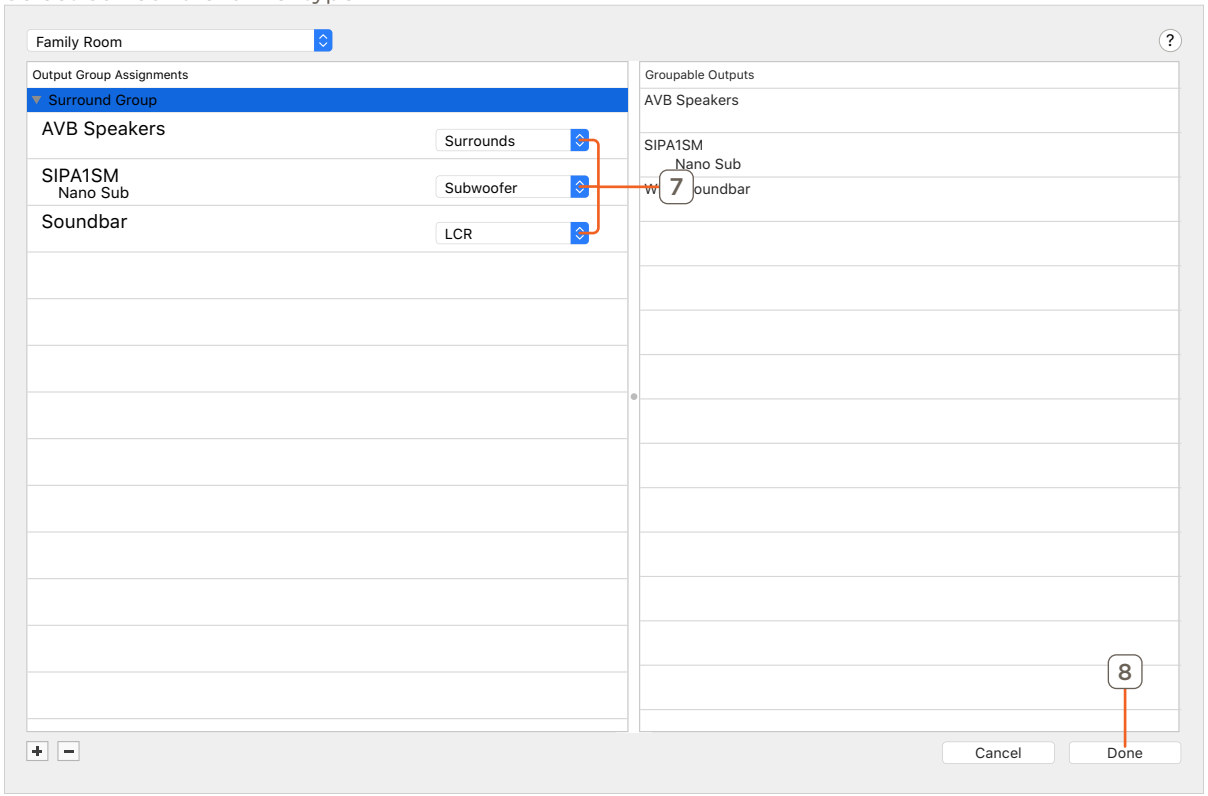
Surround Grouping Example:

1. Open the Pro Audio Control window.
   Tools > Settings > Pro Audio Control...
2. Select the zone to be programed.



3. Click the + button to create a new Group.
4. Name the Group.
   This group name will become a part of the service variant for service path selection in the view services window.
5. Click and drag the desired speaker(s) into the group.

6. Repeat step 5 for each speaker(s) in the group.
7. Select Surround channel type.

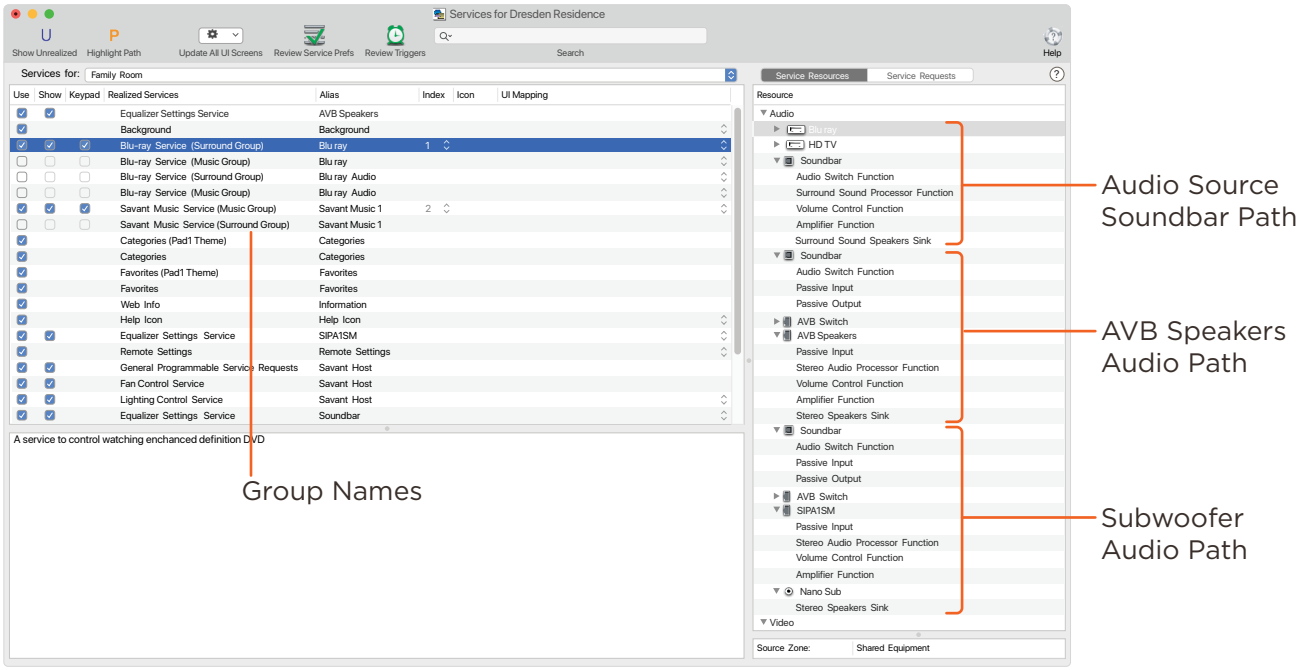


8. Click Done.
9. Generate Services.

IMPORTANT!

- The speaker type options are only available when the group contains a Smart Audio Soundbar (HST-STUDIO55WS or IP-STUDIO55WS).
- In this example, LFE (subwoofer) content is passed to the Right channel output port of the RCA stereo connection configured for the subwoofer.

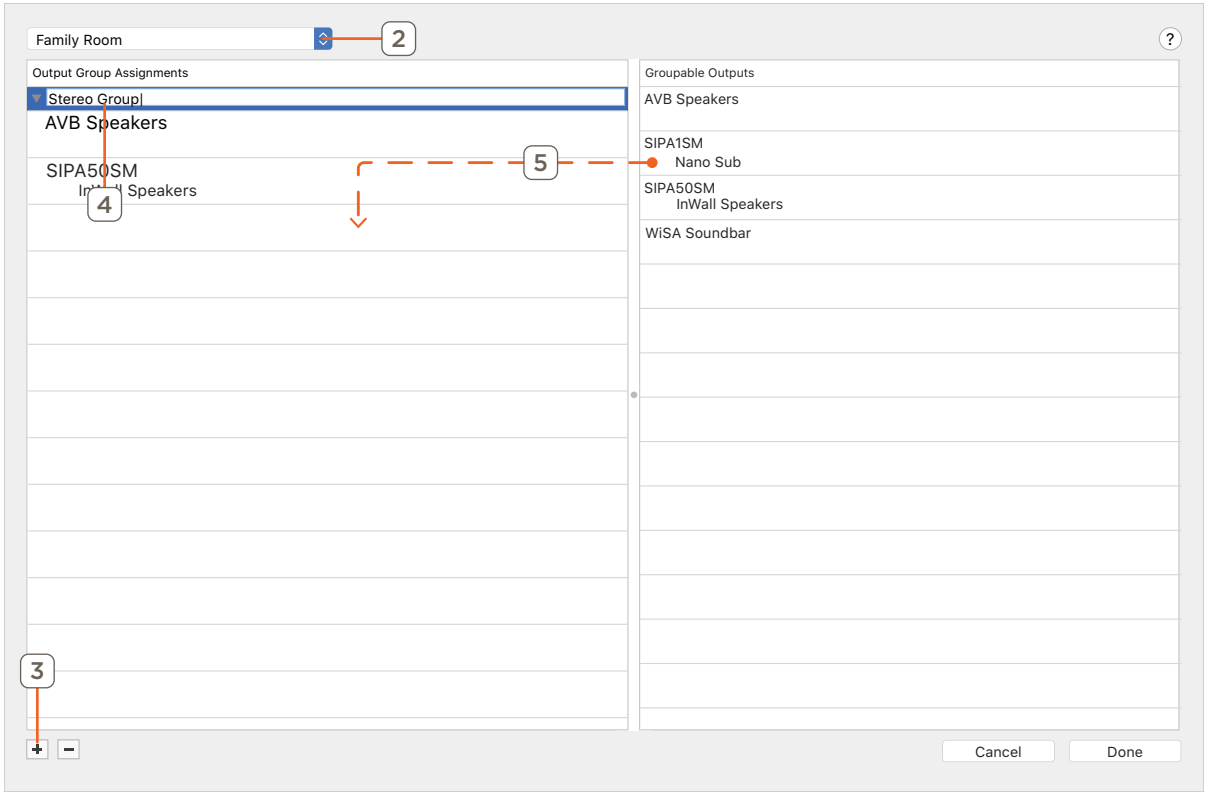
10. Open the View Services window.
11. Select a zone with defined AVB Speaker group(s).



12. Review the service paths and select the desired Speaker group for each service in the zone.

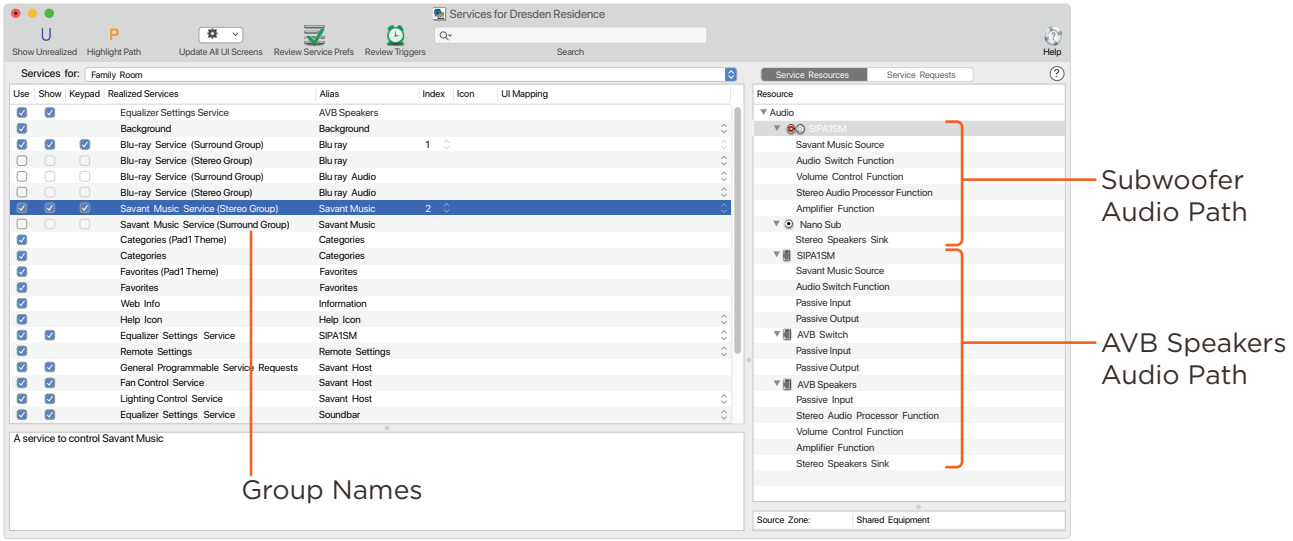
Stereo Grouping Example:

1. Open the Pro Audio Control window.
   Tools > Settings > Pro Audio Control...
2. Select the zone to be programed.



3. Click the + button to create a new Group.
4. Name the Group.
   This group name will become a part of the service variant for service path selection in the view services window.
5. Click and drag the desired speaker(s) into the group.

6. Repeat step 5 for each speaker(s) in the group.
7. Click Done.
8. Generate Services.
9. Open the View Services window.
10. Select a zone with defined AVB Speaker group(s).



11. Review the service paths and select the desired Speaker group for each service in the zone.

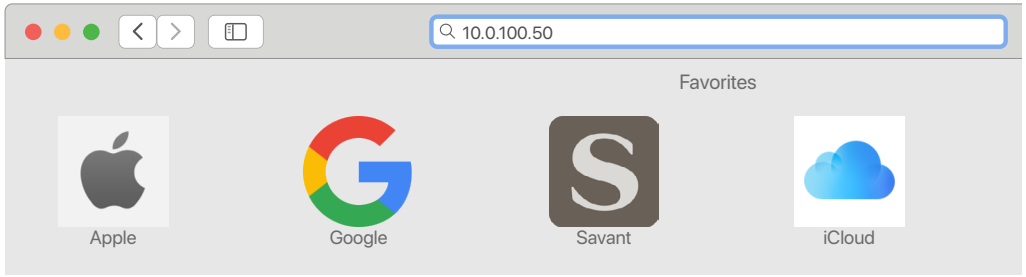
6. Web User Interface (Web UI)

In addition to Blueprint, the IP Audio devices have a Web UI. This allows control of setting and audio connections. It can be used in troubleshooting. Not all devices have all of the screens shown in this section.

6.1. Accessing the Web UI

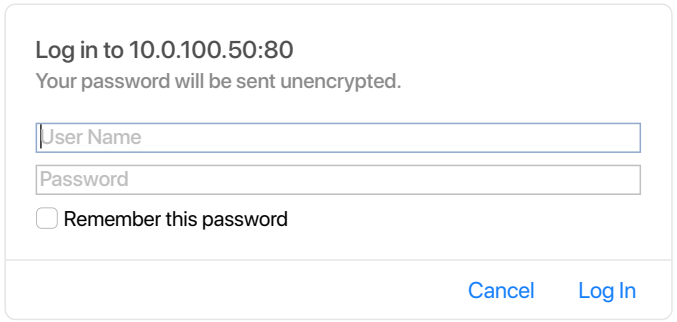
In order to access the Web UI, the IP Address of the IP Audio device is needed. This can be obtained from System Monitor, rpmEmpScanner, or any network scanning software.

1. On the SDE, open a Web Browser and enter the address of the device in the address bar:
   Syntax: http://[IP Address of Device]



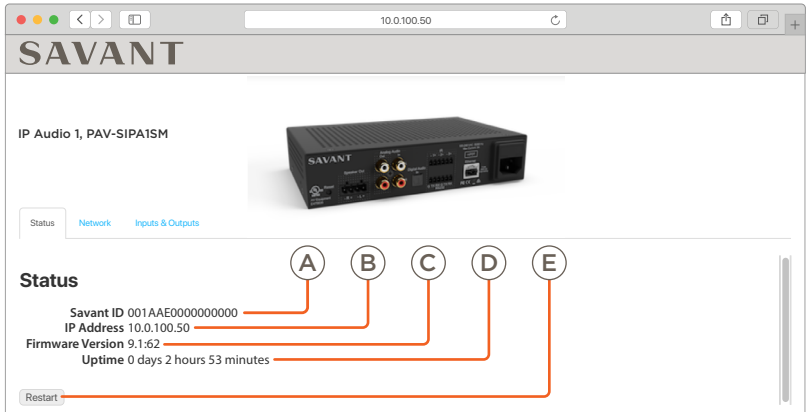
Also the Web UI can also be opened from System Monitor on the Controller Info tab. With the desired IP Audio device selected Click on the IP address listed, this will open the default web browser and connect to the device's web UI.

2. Once opened, login credentials will be required:
   Default User Name: RPM
   Default Password: RPM



6.2. Status Tab

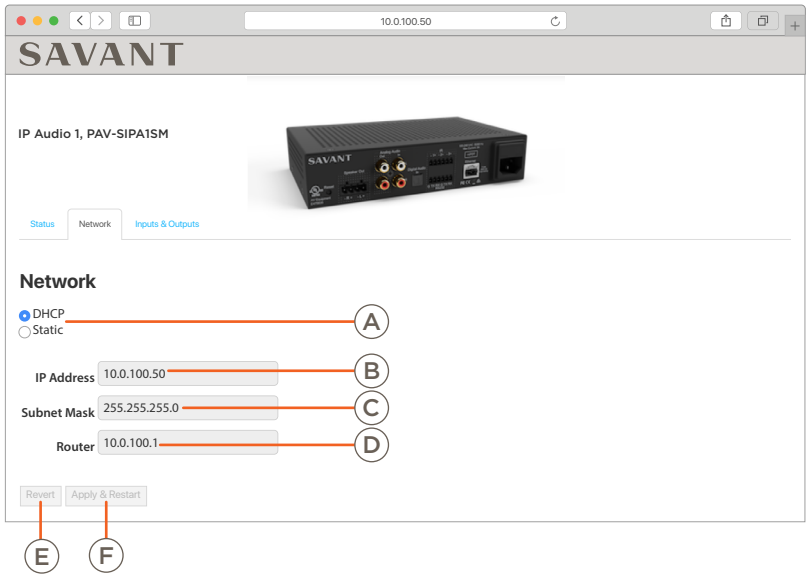
This tab is available on all IP Audio devices.



A	Savant ID	UID of the device.
B	IP Address	Currently assigned IP Address.
C	Firmware Version	Current Firmware Version number.
D	Uptime	Amount of time the unit has been powered without a restart.
E	Restart	Restarts the software of the unit.

6.3. Network Tab

This tab is available on all IP Audio devices.



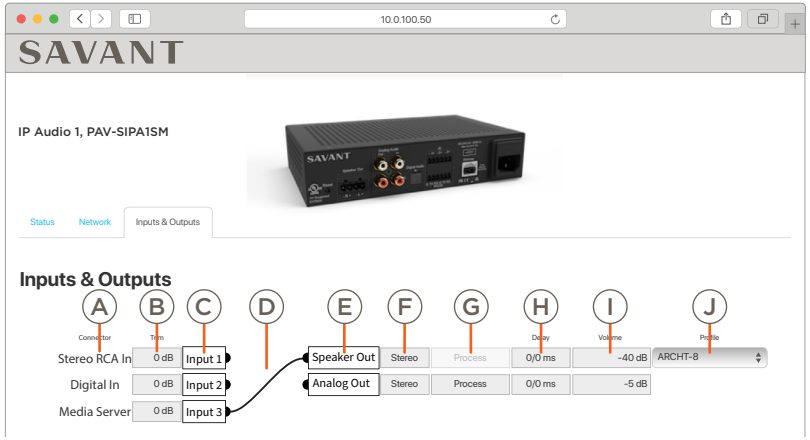
A	IP Address Configuration	DHCP (Dynamic Host Configuration Protocol) or Static.
B	IP Address	Displays the current IP Address and allows for entry. This is automatically assigned when item A is set to DHCP.
C	Subnet Mask	Subnet mask of the network. This is automatically assigned when item A is set to DHCP.
D	Router	IP Address of the network router. This is also known as Gateway or Default Gateway.
E	Revert	Select to erase entered settings and revert back to saved settings.
F	Apply & Restart	Select to apply entered settings, and restart the device.

NOTES:

- Setting the IP Address with a Static Address from the WebUI will automatically set the devices DNS to 8.8.8.8 and 8.8.4.4 (Google).
- A second method for setting these devices to a Static IP can be done with EMBScanner, for information on this method see Appendix B for more information.

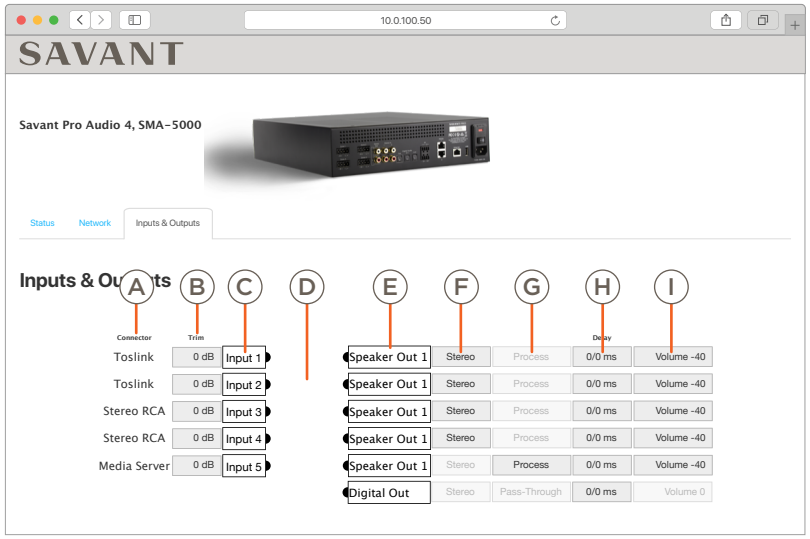
6.4. Inputs & Outputs Tab

PAV-SIPA1SM



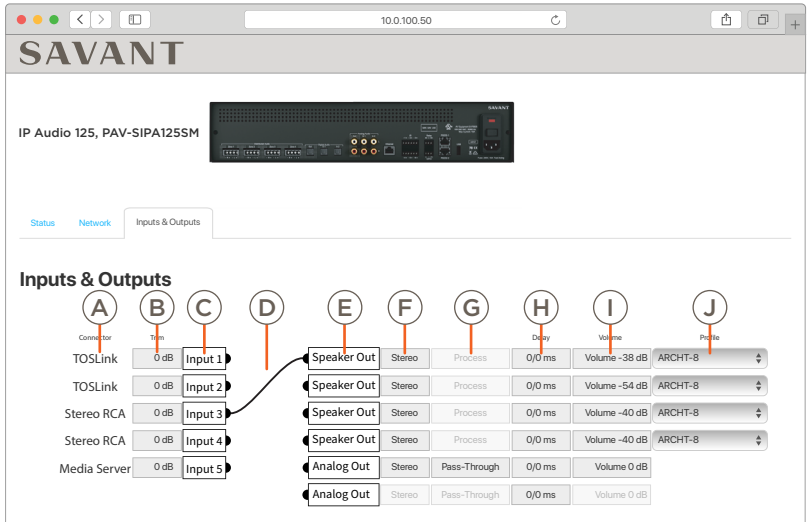
A	Connector Type	Stereo RCA, Digital Input (TosLink) or Media Server. **NOTE**: Audio paths that originate from a different AVB device do not show here.
B	Channel Trim	Adjusts the gain of the input from -10 dB to +10 dB. For testing or troubleshooting use. Changes made in the WebUI affect local outputs only, and are overwritten during system startup. To permanently adjust trim settings, apply the changes in System Monitor.
C	Input List	List of the inputs on the device.
D	I/O Connection Indicator	Active connections are represented by a black line between the input and output. To connect an input to an output manually from the WebUI, click and drag to draw the connection from the black dot on the input to the black dot on the output. **NOTE**: Audio paths that originate from a different AVB device will not display here.
E	Output List	List of the outputs on the device.
F	Output Channels	Toggle between Stereo and Mono by clicking in this field. Mono Summing combines the left and right stereo output channels into a single speaker channel output. Used for testing/troubleshooting only. This can be set through the Savant Pro App from the Settings > Audio Settings > Speaker Configuration menu.
G	Process	Toggle between Process or Pass-Through, this feature is disabled on the Speaker Out.
H	Delay	Adjustable delay per channel from 0 - 160ms.
I	Volume	Adjusts the volume level of the output channel. For speaker outputs, the possible adjustment range varies across different IP Audio devices. Changes are made in 1 dB increments.
J	Profile	Select from available Speaker Profiles to apply EQ presets for Savant/Artison speakers. This is an advanced feature for audio correction based on room acoustics.

PAV-SIPA50SM



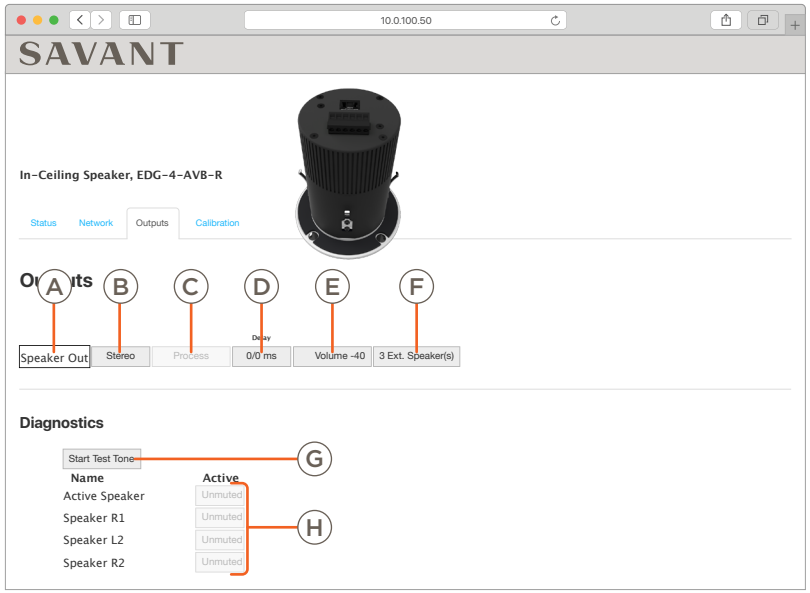
A	Connector Type	Stereo RCA, Digital Input (TosLink) or Media Server. **NOTE**: Audio paths that originate from a different AVB device do not show here.
B	Channel Trim	Adjusts the gain of the input from -10 dB to +10 dB. For testing or troubleshooting use. Changes made in the WebUI affect local outputs only, and are overwritten during system startup. To permanently adjust trim settings, apply the changes in System Monitor.
C	Input List	List of the inputs on the device.
D	I/O Connection Indicator	Active connections are represented by a black line between the input and output. To connect an input to an output manually from the WebUI, click and drag to draw the connection from the black dot on the input to the black dot on the output. **NOTE**: Audio paths that originate from a different AVB device will not display here.
E	Output List	List of the outputs on the device.
F	Output Channels	Toggle between Stereo and Mono by clicking in this field. Mono Summing combines the left and right stereo output channels into a single speaker channel output. Used for testing/troubleshooting only. This can be set through the Savant Pro App from the Settings > Audio Settings > Speaker Configuration menu.
G	Process	Toggle between Process or Pass-Through, this feature is disabled on the Speaker Outputs.
H	Delay	Adjustable delay per channel from 0 - 160ms.
I	Volume	Adjusts the volume level of the output channel. For speaker outputs, the possible adjustment range varies across different IP Audio devices. Changes are made in 1 dB increments.

PAV-SIPA125SM



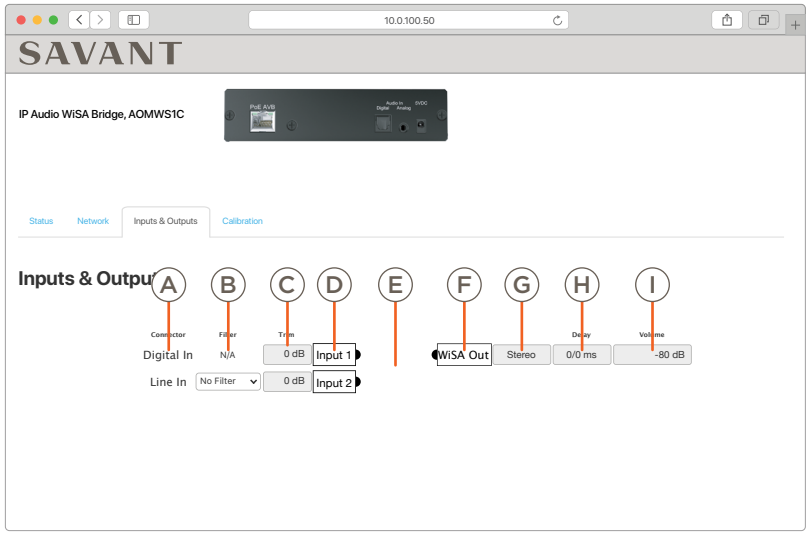
A	Connector Type	Stereo RCA, Digital Input (TosLink) or Media Server. **NOTE**: Audio paths that originate from a different AVB device do not show here.
B	Channel Trim	Adjusts the gain of the input from -10 dB to +10 dB. For testing or troubleshooting use. Changes made in the WebUI affect local outputs only, and are overwritten during system startup. To permanently adjust trim settings, apply the changes in System Monitor.
C	Input List	List of the inputs on the device.
D	I/O Connection Indicator	Active connections are represented by a black line between the input and output. To connect an input to an output manually from the WebUI, click and drag to draw the connection from the black dot on the input to the black dot on the output. **NOTE**: Audio paths that originate from a different AVB device will not display here.
E	Output List	List of the outputs on the device.
F	Output Channels	Toggle between Stereo and Mono by clicking in this field. Mono Summing combines the left and right stereo output channels into a single speaker channel output. Used for testing/troubleshooting only. This can be set through the Savant Pro App from the Settings > Audio Settings > Speaker Configuration menu.
G	Process	Toggle between Process or Pass-Through, this feature is disabled on the Speaker Outputs.
H	Delay	Adjustable delay per channel from 0 - 160ms.
I	Volume	Adjusts the volume level of the output channel. For speaker outputs, the possible adjustment range varies across different IP Audio devices. Changes are made in 1 dB increments.
J	Profile	Select from available Speaker Profiles to apply EQ presets for Savant/Artison speakers. This is an advanced feature for audio correction based on room acoustics. **NOTE**: This option does not appear in the PAV-SIPA125SM-00.

EDG-4-AVB-x



A	Output	Displays the output name.
B	Output Channels	Toggle between Stereo and Mono by clicking in this field. Mono Summing combines the left and right input signal into a single speaker channel output.
C	Process	This cannot be changed on the IP Audio Micro Aperture speakers.
D	Delay	Adjustable delay per channel from 0 - 160ms.
E	Volume	Adjusts the volume level of the output channel. For speaker outputs, the possible adjustment range is different on the various IP Audio devices these changes are made in 1dB increments.
F	Output Number Select	Allows the user to input the number of Add-On speakers that are connected.
G	Test Tone	Toggles a constant 1kHz tone through all un-muted channels
H	Channel Mute	Toggles Test Tone on or off for the selected channel.

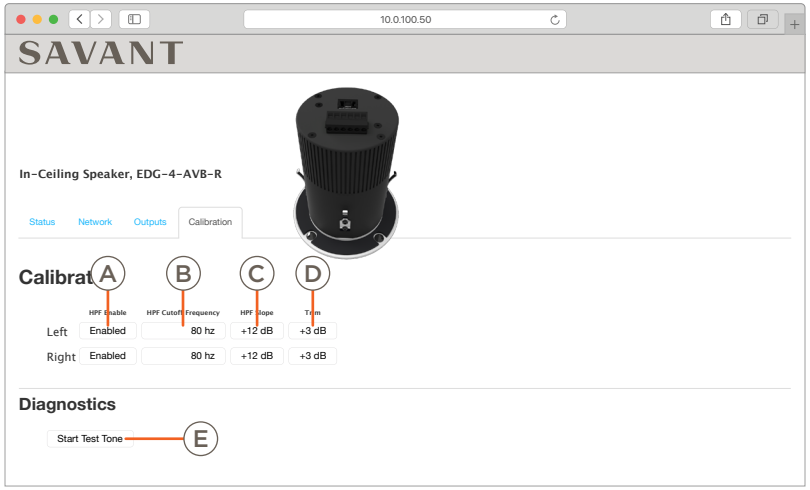
PAV-AOMWS1C



Ⓐ	Connector Type	Line In (3.5mm Analog Audio) or Digital Input (TosLink). **NOTE**: Audio paths that originate from a different AVB device do not show here.
Ⓑ	Filter	Drop down to select Phono filter. This is to be used with turntable with out a pre-amp filter.
Ⓒ	Channel Trim	Adjusts the gain of the input from -10 dB to +10 dB. For testing or troubleshooting use. Changes made in the WebUI affect local outputs only, and are overwritten during system startup. To permanently adjust trim settings, apply the changes in System Monitor.
Ⓓ	Input List	List of the inputs on the device.
Ⓔ	I/O Connection Indicator	Active connections are represented by a black line between the input and output. To connect an input to an output manually from the WebUI, click and drag to draw the connection from the black dot on the input to the black dot on the output. **NOTE**: Audio paths that originate from a different AVB device will not display here.
Ⓕ	Output List	List of the outputs on the device.
Ⓖ	Output Channels	Toggle between Stereo and Mono by clicking in this field. Mono Summing combines the left and right stereo output channels into a single speaker channel output. Used for testing/troubleshooting only. This can be set through the Savant Pro App from the Settings > Audio Settings > Speaker Configuration menu.
Ⓗ	Delay	Adjustable delay per channel from 0 - 160ms.
Ⓘ	Volume	Adjusts the volume level of the output channel. For speaker outputs, the possible adjustment range varies across different IP Audio devices. Changes are made in 1 dB increments.

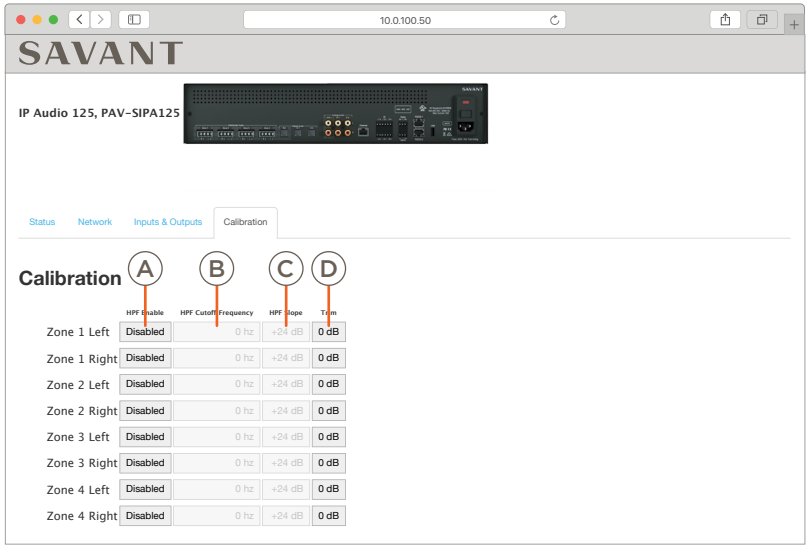
6.5. Calibration Tab

EDG-4-AVB-x



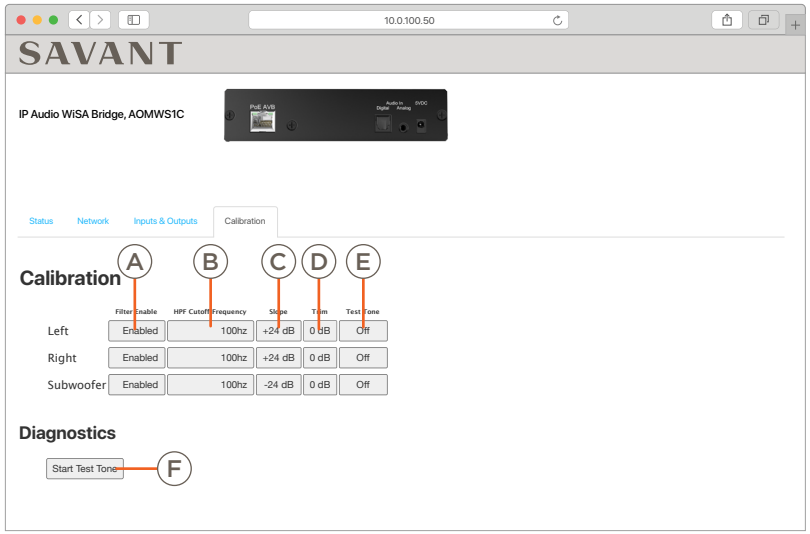
A	HPF Enable	Toggle to enable/disable High-Pass Filter (HPF)
B	Cutoff Frequency	The limit to which audio can be played back through the speaker. For example, a subwoofer will roll off audio above the crossover frequency, and a mid-level speaker will roll off audio below the crossover frequency.
C	Slope	In audio filters, slope refers to how quickly frequencies are attenuated by the filter once the cutoff frequency is passed.
D	Trim	Adjusts the gain of the input from -10 dB to +10 dB. Trim settings on the EDG-4-AVB persist though reboots and Host uploads
E	Test Tone	Toggles a constant 1kHz tone through all un-muted channels

PAV-SIPA125SM



A	HPF Enable	Toggle to enable/disable High-Pass Filter (HPF)
B	Cutoff Frequency	The limit to which audio can be played back through the speaker. For example, a subwoofer will roll off audio above the crossover frequency, and a mid-level speaker will roll off audio below the crossover frequency.
C	Slope	In audio filters, slope refers to how quickly frequencies are attenuated by the filter once the cutoff frequency is passed.
D	Trim	Adjusts the gain of the input from -10 dB to +10 dB. Trim settings on the PAV-SIPA125SM persist though reboots and Host uploads

PAV-AOMWS1C



A	Filter Enable	Toggle to enable/disable High-Pass Filter (HPF)
B	Cutoff Frequency	The limit to which audio can be played back through the speaker. For example, a subwoofer will roll off audio above the crossover frequency, and a mid-level speaker will roll off audio below the crossover frequency.
C	Slope	In audio filters, slope refers to how quickly frequencies are attenuated by the filter once the cutoff frequency is passed.
D	Trim	Adjusts the gain of the input from -10 dB to +10 dB. Trim settings for this device persist though reboots and Host uploads
E	Test Tone	Toggles Test Tone on or off for the selected channel.
F	Start Test Tone	Toggles a constant 1kHz tone through all un-muted channels

7. Expansion

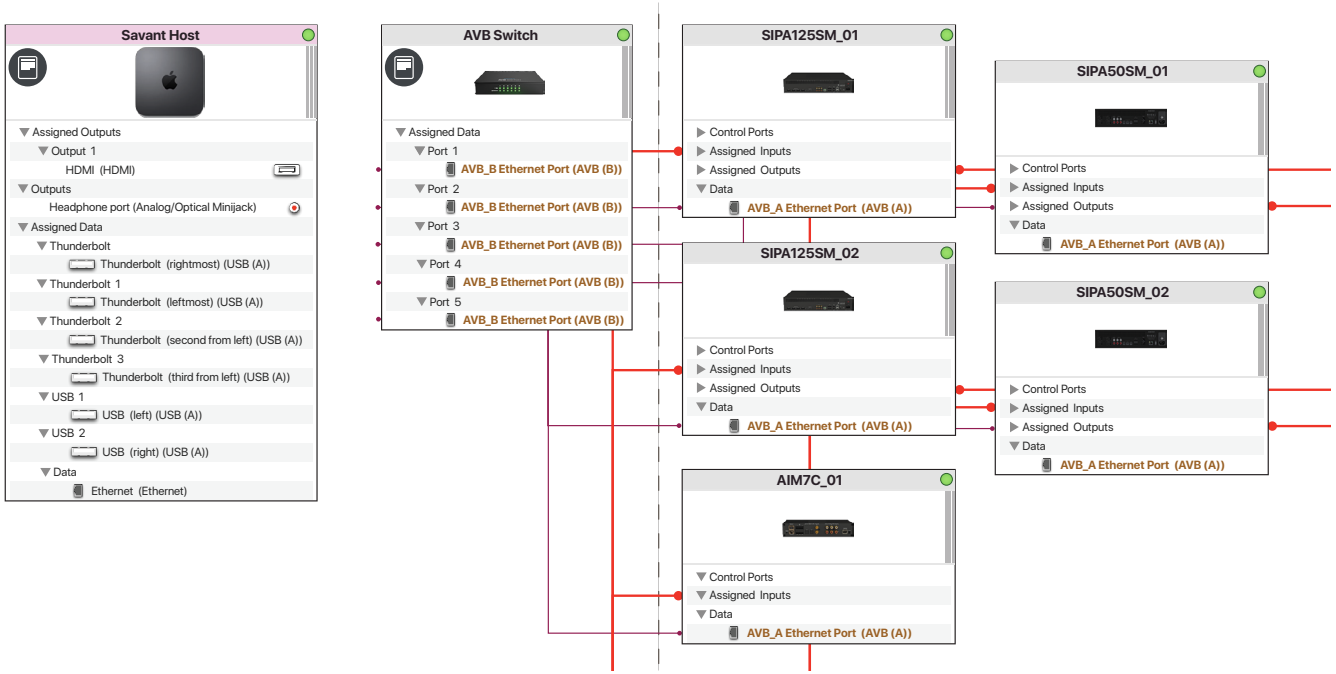
Savant IP Audio devices can be connected to a dedicated AVB network using a Savant certified AVB/TSN switch, or series of connected switches.

IMPORTANT NOTES:

- The number of IP Audio devices which can be supported in any given system is defined by the Savant Host type and da Vinci runtime version being used on site. For Host feature support limits, refer to the Release ReadMe or Host Licensing and Feature Support Matrix for the relevant da Vinci runtime version, available via the Savant Customer Community.
- Some Host support parameters for IP Audio devices may reference additional “Listen-Only devices”, which includes IP Audio Micro Aperture Speakers.

7.1. Blueprint Layout with 5 IP Audio devices

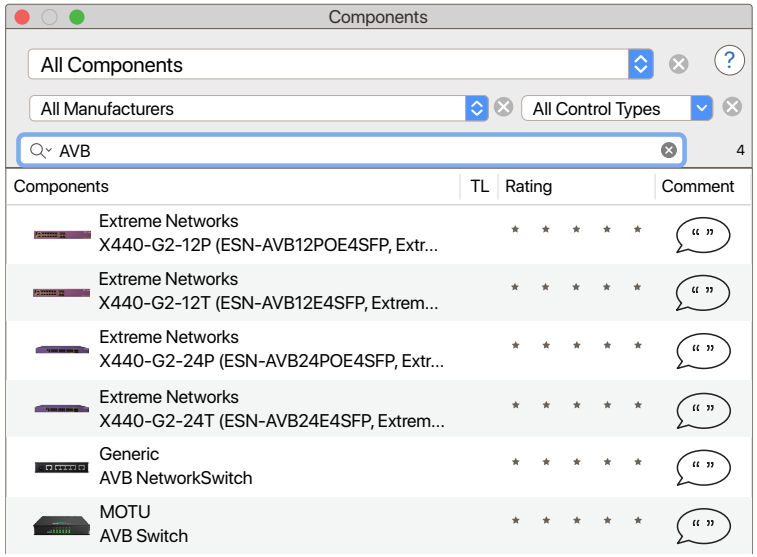
The example image below shows only the IP Audio devices and the AVB/TSN switch to illustrate how to have these devices work as a “single switch”. Each IP Audio component’s AVB_A Ethernet Port is connected to one of the AVB_B Ethernet Ports on the switch. The AVB Switch Uplink Port must be connected physically to the main networking switch on site, however this connection is assumed, and not represented in Blueprint.



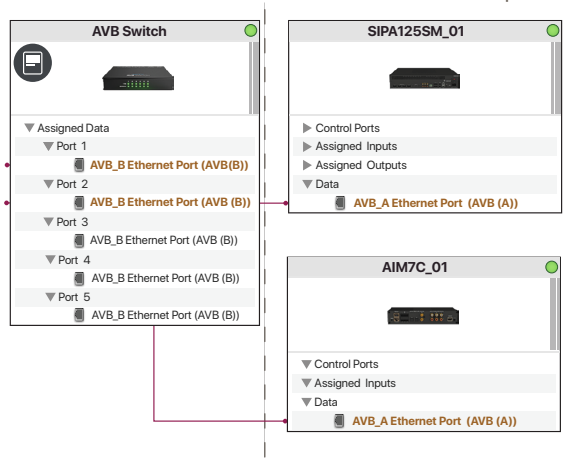
7.2. Adding an AVB/TSN Switch

An AVB/TSN switch is only required if more than one IP Audio device is being used.

1. Within RacePoint Blueprint, select Show Library.
2. Search for AVB, and select the model of the Savant supported switch matching the model used on site.



3. Drag the switch into a Shared Equipment zone.
4. Name the Device.
5. Place the AVB switch in the layout window
6. Make AVB connections to all IP Audio components.

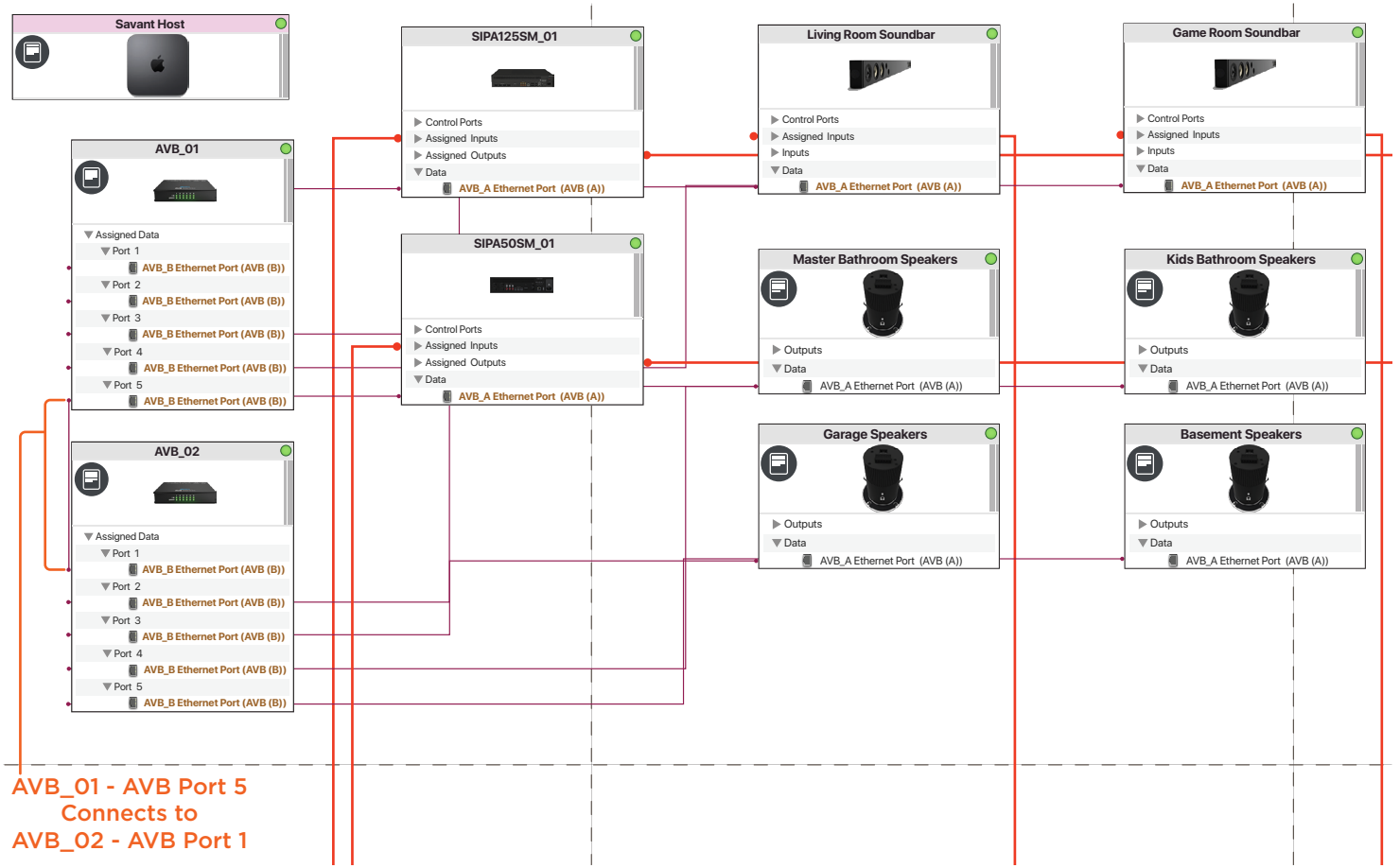


Savant IP Audio device Ethernet ports should be connected to ports on the AVB switch as shown in the example image.

7.3. Multi-Switch Blueprint Layout with 8 AVB devices

The example image below shows only the IP Audio/IP Video devices and the AVB/TSN switches to illustrate how to configure a multi-switch AVB deployment which will function as a “single switch”. AVB Switches can be “daisy-chained” as shown below in configurations where the number of IP Audio/IP Video devices exceeds the available number of ports on a single switch.

Note that while this example uses 5-port MOTU AVB switches, there are supported AVB switches with Component Profiles available in the RacePoint Blueprint Library with more than 5 available ports per switch.



IMPORTANT INFORMATION!

- The annotation shows AVB_01 connected to AVB_02, all AVB/ TSN switches are connected in this manner.
- Only one of the AVB/TSN switches should be physically connected to the rest of the network via its uplink port. As noted above, this connection is not represented within Blueprint.
- Savant IP Audio deployments are limited to three daisy-changed AVB switches. For more detailed information on supported AVB network design see the **Savant AVB Network Design Reference Guide** on the Savant Customer Community.

8. Savant Music

Many Savant IP Audio devices provide a stream of Savant Music 2.0. Refer to individual Product specifications and documentation for details on product-specific feature support guidelines. For further information on Savant Music 2.0, and a list of supported 3rd party streaming services, refer to the Savant Media Server/Savant Music Supported Streaming Services article, available via the Savant Customer Community.

The Savant Music 2.0 service is generated in Blueprint, and all streaming services are managed via the Savant Pro App.

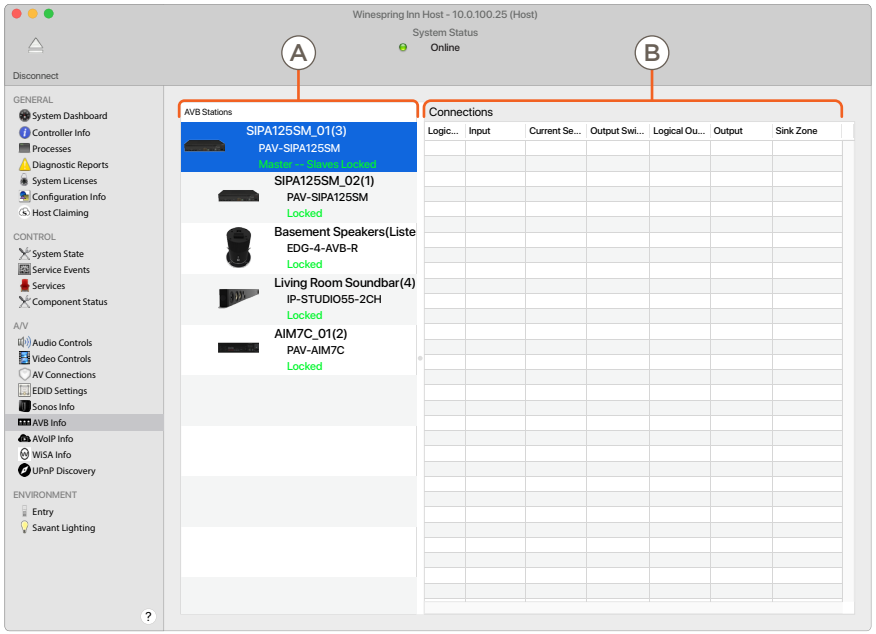
Each stream of Savant Music 2.0 is distributable to any other IP Audio device connected to the AVB network. The system scales sources as endpoints are added naturally.

9. System Monitor

This section covers select elements of System Monitor relating specifically to AVB and IP Audio components and settings. For further details on general system Monitor layout and functionality, refer to the **System Monitor Reference Guide**, available via the Savant Customer Community.

9.1. AVB Info

The AVB Info tab within System Monitor will display all active connections sending traffic across the AVB network. Connections that output from the same device they originate from are not displayed (for example: a Savant Music 2.0 stream originating from Device A and outputting only from speakers connected to Device A will not be displayed here, as there is no AVB traffic involved).

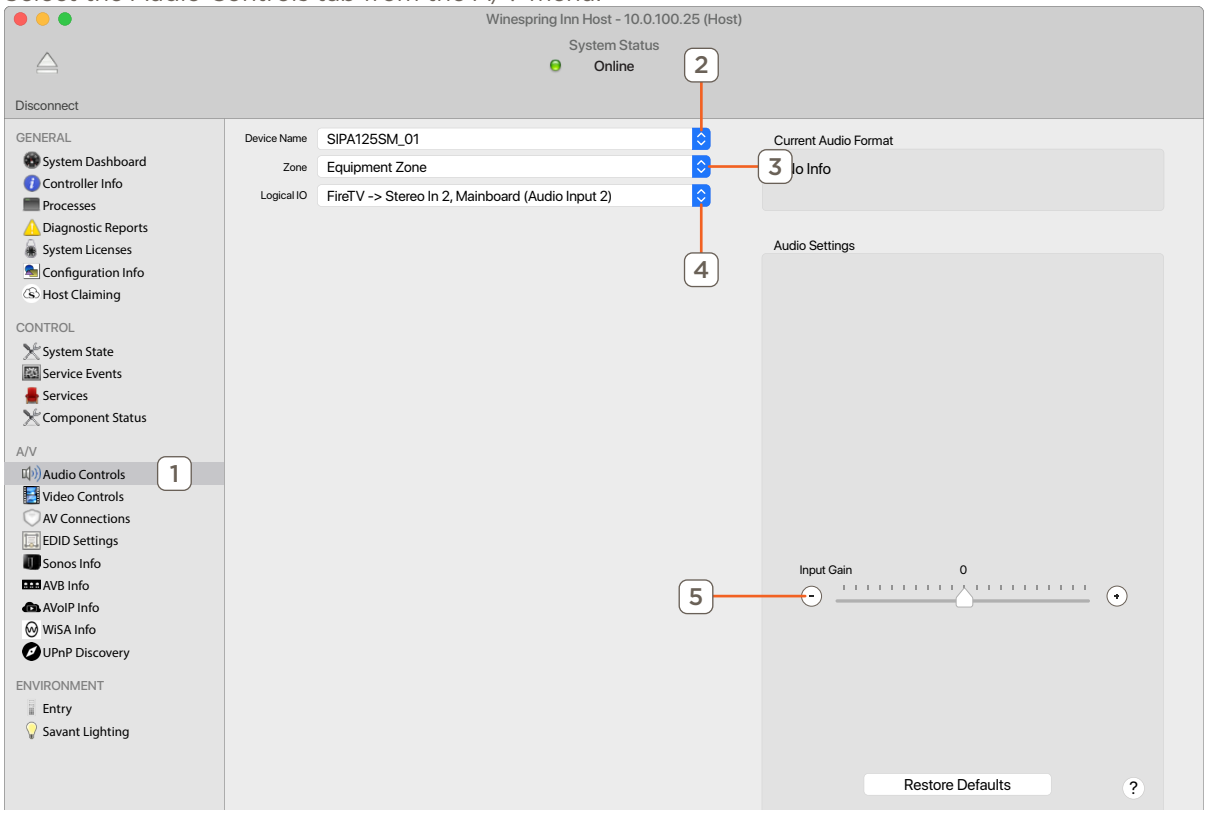


(A) AVB Stations	All AVB/TSN compliant Savant products will display. AVB/TSN Master/Slave notations display here. If “Freewheeling” displays AVB connections will not work.
(B) Connections	Displays all active AVB/TSN connections on the selected device.

9.2. Adjusting Input Gain

To adjust input gain from System Monitor, follow the steps outlined below.

1. Select the Audio Controls tab from the A/V menu.



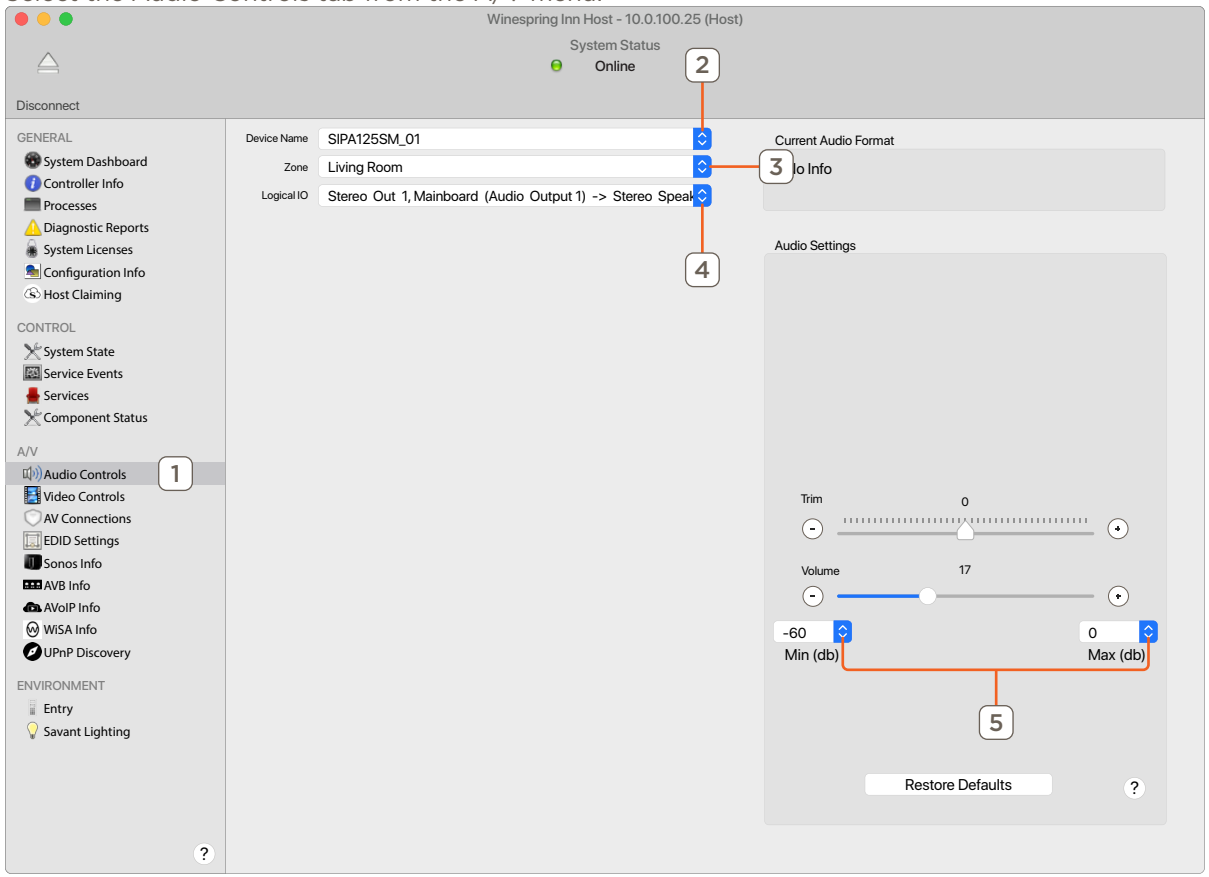
2. Select the target IP Audio device.
3. Select Zone.
4. Select the input device/port.
5. Adjust the Input Gain as desired.

NOTE: Input Gain can be set plus or minus 10 dB.

9.3. Adjusting Minimum / Maximum Volume

To adjust Minimum or Maximum Volume from System Monitor, follow the steps outlined below.

1. Select the Audio Controls tab from the A/V menu.

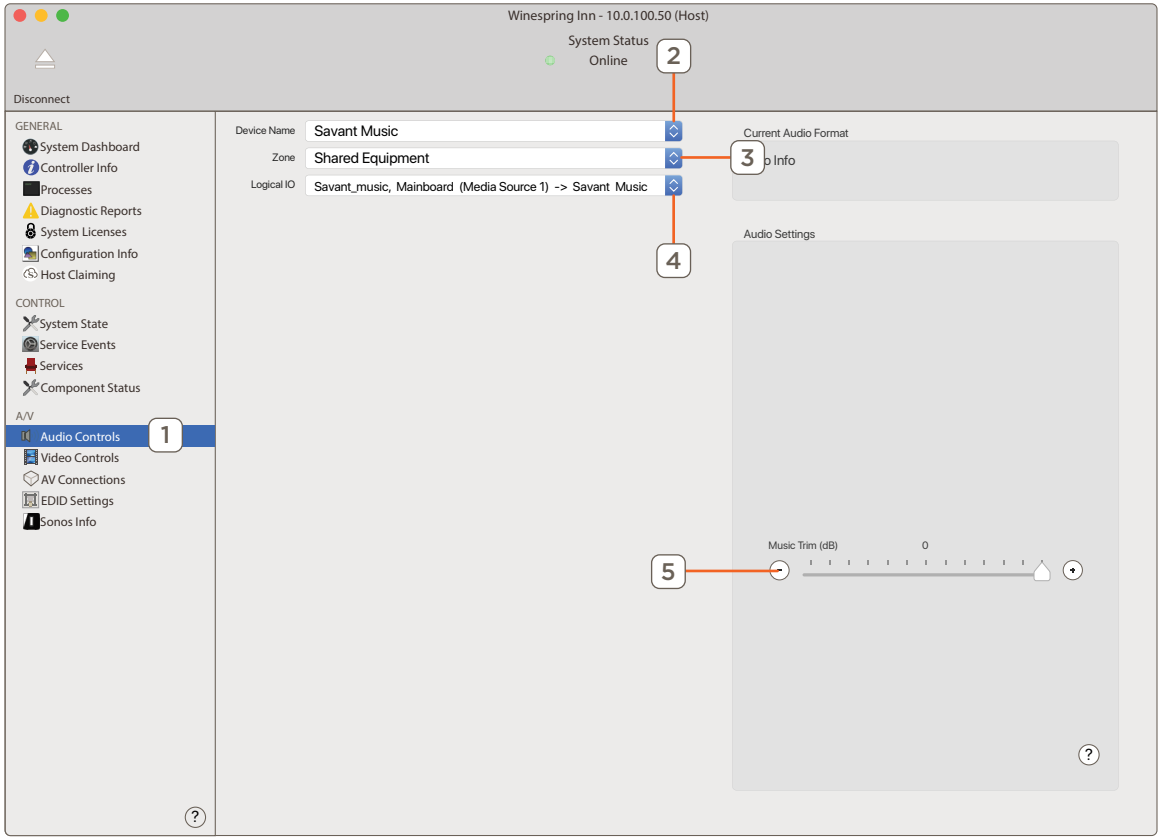


2. Select the target IP Audio device.
3. Select Zone.
4. Select the output device/port.
5. Adjust the Minimum/Maximum Volume as desired.

9.4. Savant Music Trim

Input trim of the Savant Music 2.0 service can be adjusted from within System Monitor. The trim adjustment is from 0 dB to -12 dB. Below is an image of the Music Service System Monitor screen.

1. Select the Audio Controls tab from the A/V menu.



2. Select the target IP Audio device.
3. Select Zone.
4. Select the output device/port.
5. Adjust the Music Trim as desired.

Appendix A: Network Requirements

Savant requires the use of business class/commercial grade network equipment throughout the network to ensure the reliability of communication between devices. These higher quality components also allow for more accurate troubleshooting when needed.

Device Network Connections

Connect all Savant devices to the same local area network (LAN) or subnet as the Host. Savant recommends not implementing any type of traffic management, packet shaping, band steering, QoS or similar features within the network topology for Savant devices, as this may interfere with performance.

AVB Requirements

Savant requires the use of an AVB/TSN compliant switch meeting IEEE standard 802.1BA+2011 for all IP Audio components utilizing AVB communication.

Managing IP Addresses

To ensure that the IP Address will not change due to a power outage, a static IP Address or DHCP reservation should be configured. Savant recommends using DHCP reservation within the router. By using this method, IP Addresses for all devices can be managed from a single UI avoiding the need to access devices individually.

Setting a Static IP Address

Setting a Static IP Address can be done in the Web UI on the Network Tab.

Setting DHCP Reservation

Setting DHCP reservation varies from router to router. Refer to the documentation for the router to configure DHCP reservation.

Network Changes

Savant recommends performing one of the following steps to refresh the IP connection after connecting to a new network, changing routers, or if the IP Address range is changed in the current router. This will reset any IP connection and ensure that the Host is communicating with the network correctly.

Cycle Power

- Disconnect the IP Audio device from the power source.
- Wait 15 seconds and then reconnect.

Hot Plug the Ethernet (LAN) Connection

- Disconnect the Ethernet (LAN) connection from the device.
- Wait 15 seconds and then reconnect.

DNS (Add, Remove, Query)

Setting DNS is only relevant for devices with a built in Savant Music stream. Follow the instructions below to add, remove, or query the DNS servers configured for IP Audio devices.

1. Open a terminal window on a MacBook/SDE.
2. Enter ssh RPM@<IP Address of IP Audio device>
   Example: `ssh RPM@10.0.100.50`
3. When prompted, enter the password
   Default: RPM
4. Once logged in, the commands below will add, remove, or query the DNS server(s) configured:

To query the DNS configuration:	`setDNSServer <enter>`
	Terminal will respond with the list of DNS servers as displayed below:
	`nameserver 8.8.8.8`
	`nameserver 8.8.4.4`

To add a DNS:	`setDNSServer –add –address x.x.x.x <enter>`
To remove a DNS:	`setDNSServer –remove –address x.x.x.x <enter>`

Appendix B: UPS Recommendations

Savant does not recommend any brand or model UPS, however there are a couple of factors that should be considered. It is important that the UPS does not only work during complete power loss but protects devices and their functionality during events like surges and brownouts. It is not uncommon for a residence or small business to see variations in power service that do not result in a complete black-out. These periods can be the most frustrating to end users as they do not realize what the cause of the operation disturbance may be.

Below are some specific design considerations when assembling your power management designs.

- Pure Sine Wave Inverter.
- Online/double-conversion power supply: This type of UPS always supplies power to the equipment this will eliminate any period where the power is interrupted. This will also address many issues if the site has regular “brown outs” or id the site has frequent under of over voltage situations.
- Max power output: The UPS needs to be properly sized for the equipment connected to it, and unnecessary loads should not be included on the UPS. For instance, putting an audio amplifier on the UPS will either drive up the cost of the UPS system to support the load or drastically shorten the period that the UPS can keep devices up and running.
  Remember to consider devices that you may not have directly installed, for instance modems, routers, switches, APs, PoE injectors, and the like. This is especially important if you are using software that relies on the network for communication. Power cycling segments of the network can cause network conflicts. It is important to consider this during your network design and configuration to ensure that there is the greatest likelihood of success.
- “Graceful” shut down: The UPS should communicate with the devices connected to it so that when necessary they are properly shut down. Many UPS manufacturers offer a software suite so that hard-drive based devices may go through a ‘graceful’ shut down procedure. This feature should be vetted in a test environment prior to implementation so that the integrator understands how the system will respond during shutdown and start-up periods.
- Power consumption monitoring.
  It is nice to have the ability to monitor the draw from each outlet to determine if an item is running through a remote console.
- Remote Access: The ability to remotely power cycle an outlet or a group of outlets.

⚠ **IMPORTANT!** Be VERY CAUTIOUS using with a UPS with the ability to cycle power an outlet remotely, devices with hard drives DO NOT like to be power cycled in this manner, and will be damaged by this action. Savant Hosts in particular need to be shut down correctly in order to restart correctly when power is restored.

- Generators: Generators are not a replacement for a UPS and should be considered as an augment to the UPS. Having a generator on site increases the need for a UPS because the equipment needs greater protection from power cycles when the generator comes online during testing. A generator is also likely to introduce electrical conditions like under and over voltage or frequency modulation while running. All of these circumstances stress power supplies and hard drives increasing the odds of premature failure.

Savant does have a variety of IP & Serial controlled UPS devices currently profiled (these can be found under Trigger Devices).

- The UPS profiles are designed to give the integrator a set of variables and triggers to perform actions with. The Savant User Interface has no default screen(s) that will auto populate for any of these devices.
- For feedback: All devices support a variety of different state information so make sure to put the device in an example configuration and check what states you can use as a trigger to make sure the profile supports the information you require. The easiest method to accomplish this is to add the desired device to a configuration, make the necessary control connection, generate services, create a new trigger (Tools->Review->State Triggers...), add a transition condition then select the UPS device under the component tab. This will show you all of the states that profile supports in the “State Name” table.
- For Control: Since many devices have different configurations as to what outlets shut off together etc. Savant recommends that you use a CPT kit and test the control commands prior to install to verify it is possible to accomplish the automation task which is proposed.

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