Savant IP Audio
SMA-5000, PAV-SIPA125, PAV-AIM7C, PAV-AOM8C

Deployment Guide
Document Number: 009-1571-00
Document Date: November 2017
Document Supports: da Vinci 8.7
Important Safety Information - Read First

Before installing, configuring, and operating Savant equipment and other vendor equipment, Savant recommends that each dealer, integrator, installer, etc. access and read all the required 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

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE:</td>
<td>Provides special information for installing, configuring, and operating the equipment.</td>
</tr>
<tr>
<td>IMPORTANT!</td>
<td>Provides special information that is critical to installing, configuring, and operating the equipment.</td>
</tr>
<tr>
<td>CAUTION!</td>
<td>Provides special information for avoiding situations that may cause damage to equipment.</td>
</tr>
<tr>
<td>WARNING!</td>
<td>Provides special information for avoiding situations that may cause physical danger to the installer, end user, etc.</td>
</tr>
</tbody>
</table>

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 of the Savant equipment requires two installers to ensure safe handling during installation. Failure to use two installers may result in injury.

Safety Statements

Follow all of the safety instructions listed below and apply where applicable. Additional safety information will be included where applicable.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. 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 is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. To completely disconnect this equipment from the AC mains, disconnect the power supply cord plug from the AC receptacle.
1. Introduction

This document will guide the installer through the process of installing, configuring, and adding Savant IP Audio devices to a RacePoint Blueprint® configuration.

1.1. Before You Begin

Read through this document in its entirety 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 (Smart or Pro) licensed and running da Vinci software
- SMA-5000 require da Vinci 8.2 or higher
- PAV-SIPA125, PAV-AIM7C, PAVAOM8C require da Vinci 8.7 or higher
- Savant Development Environment (SDE/MacBook)
- Ethernet network meeting Savant’s requirements
- See Appendix A: Network requirements
2. Deployment Steps

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

1. Review product specifications and connection details .................................................................
   See Savant IP Audio Equipment Overview

2. Install the Savant IP Audio devices ..............................................................................................
   See Savant IP Audio Equipment Overview

3. Install Savant qualified AVB/TSN Network Switch (Optional)......................................................
   See Adding an AVB/TSN Switch

4. Add the Savant IP Audio devices into a RacePoint Blueprint® configuration............................... 
   See Adding a Savant IP Audio to a Configuration
3. Savant IP Audio Equipment Overview

3.1. Box Contents and Specifications

Refer to the Quick Reference Guide for these products located on the Savant Customer Community for Box Contents and Specifications.

3.2. SMA-5000

**Front Panel**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Power LED</strong>&lt;br&gt;Green: System has power and is operating normally. Red: System is in standby mode. In standby mode, most of the controller circuitry is powered down. Off: System is not receiving power.</td>
</tr>
<tr>
<td>B</td>
<td><strong>Status LED</strong>&lt;br&gt;Green Blinking: Embedded system is ready, but no communication has been established with the host. Green: Host has established communications with the embedded system. Red Blinking: Embedded firmware is running, but has not received a DHCP IP Address. Red: Host has determined the firmware needs to be updated, but a problem occurred during the process that will initiate a reset. Amber Blinking: Embedded system has a valid link-local IP Address and is connecting to the host. Amber: Host is updating the embedded firmware. Off: Embedded processor is resetting, or is powered up, and is booting the embedded firmware. Hardware Failure: If a hardware failure occurs, the status LED indication will be interrupted every three seconds with a solid red indication. For example, if the LED is blinking green when a hardware failure occurs, the LED will alternate between blinking green and solid red at three-second intervals.</td>
</tr>
<tr>
<td>D</td>
<td><strong>IR LED</strong>&lt;br&gt;Green: IR port signal activity. Off: No IR port activity.</td>
</tr>
<tr>
<td>E</td>
<td><strong>On/Off button</strong>&lt;br&gt;On: Fully enables all internal power rails and processor. Off: Disables most internal power rails and processor, but not internal AC/DC power supply. Hold On/Off button for about 5 seconds to place into standby mode. The Power LED turns red. Hold On/Off button for about 1 second to take system out of standby mode. The I/O power switch on the back of unit must be On (I) to enable this function. To turn the power off for the entire system, press the I/O power switch on the rear panel to Off (O).</td>
</tr>
<tr>
<td>F</td>
<td><strong>Reset button</strong>&lt;br&gt;Resets the network. Hold Reset Button for 5 seconds while powered On to clear network settings. Status LED will blink Red rapidly when reset is complete.</td>
</tr>
<tr>
<td>G</td>
<td><strong>Zone Protection</strong>&lt;br&gt;Red: Protection mode has been enabled to protect a zone / channel; Typically indicates thermal protection, clipping or over current. Off: Protection mode has not been enabled.</td>
</tr>
</tbody>
</table>
**Rear Panel**

| A | Speaker Connections | (4) Speaker output zones Uses 4-pin Speaker Connectors  
| **NOTE:** Compatible with 8 ohm or 4 ohm speakers. |
| B | Analog Preamp Output | (1) Analog stereo line output (Left & Right). Direct Line Level 2.1-V<sub>rms</sub> Output. |
| C | Analog Inputs | (2) Analog stereo inputs, RCA line-level inputs; 22 kΩ input impedance. |
| D | Digital Audio Out | (1) Digital optical preamp output, line-level 96kHz/24-bit output, fixed volume. |
| E | Digital Audio In | (2) Digital optical audio inputs. Supports up to 96kHz/24-bit digital audio in; PCM stereo format only. |
| F | IR | (4) IR Ports  
Uses 4-pin IR Connectors to send IR signals to control devices with an IR input or IR receiver via an IR flasher (5V tolerant only). See IR Wiring section for important precautions regarding IR functionality before making any connections. |
| G | RS-232 | (2) RS-232 Ports  
8-pin RJ-45 port used to transmit and receive serial binary data to and from serial controllable devices. CTS/RTS handshaking availability based on component profile. See RS-232 Connections section for pin-outs. |
| H | Ethernet | 8-pin RJ-45 female.  
10/100/1000 Base-T auto-negotiating port with Link/Activity LEDs  
Supports Audio Video Bridging (AVB) |
| I | Ethernet Activity LED | **Green Blinking:** Activity (Rx/Tx)  
**Off:** No Activity |
| J | Ethernet Link LED | **Green Solid:** Ethernet Link is established  
**Off:** Ethernet link is not established |
| K | USB | USB 2.0 Type A  
(Reserved for future Use) |
| L | Fuse | 250V 3A Slow Blow fuse field replaceable. |
| M | Power Input | 100/240V 50/60 Hz 2.7A |
| N | I/O (power switch) | I (On): Powers On the controller.  
O (Off): Powers Off the controller. |
3.3. PAV-SIPA125

**Front Panel**

- **A** Reset: Resets the network. Hold Reset Button for 5 seconds while powered On to clear network settings. Status LED will rapidly blink red when reset is complete.

- **B** On/Off:
  - **On**: Fully enables all internal power rails and processor.
  - **Off**: Disables most internal power rails and processor, but not internal AC/DC power supply. Hold On/Off button for about 5 seconds to place into standby mode. The Power LED turns red. Hold On/Off button for about 1 second to take system out of standby mode. The I/O power switch on the back of unit must be On (I) to enable this function. To turn the power off for the entire system, press the I/O power switch on the rear panel to Off (O).

- **C** Power LED:
  - **Green**: System has power and is operating normally.
  - **Red**: System is in standby mode and most of the controller circuitry is powered down.
  - **Off**: System is not receiving power.

- **D** Status LED:
  - **Green Blinking**: Embedded system is ready, but no communication has been established with the host.
  - **Green**: Host has established communications with the embedded system.
  - **Red Blinking**: Embedded firmware is running, but has not received a DHCP IP Address.
  - **Red**: Host has determined the firmware needs to be updated, but a problem occurred during the process that will initiate a reset.
  - **Amber Blinking**: Embedded system has a valid link local IP Address and is connecting to the host.
  - **Amber**: Host is updating the embedded firmware.
  - **Off**: Embedded processor is resetting, or is powered up, and is booting the embedded firmware.

- **E** Relay LED:
  - **Green**: Relay port activity.
  - **Off**: No Relay port activity.

- **F** GPIO LED:
  - **Green**: GPIO port activity.
  - **Off**: No GPIO port activity.

- **G** Zone Status:
  - **Green**: Zone in use.
  - **Red**: Protection mode has been enabled to protect a zone/channel; typically indicates thermal protection, clipping or over current.
  - **Off**: Zone is off and protection mode has not been enabled.
### Rear Panel

![Diagram of Rear Panel](image)

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Speaker Connections</td>
<td>(4) Speaker output zones. Uses 4-pin Speaker Connectors. <strong>NOTE:</strong> Compatible with 8 ohm or 4 ohm speakers.</td>
</tr>
<tr>
<td><strong>B</strong> Digital Audio Out</td>
<td>(1) Digital optical preamp output, line-level 96kHz/24-bit output, fixed volume.</td>
</tr>
<tr>
<td><strong>C</strong> Digital Audio In</td>
<td>(2) Digital optical audio inputs. Supports up to 96kHz/24-bit digital audio in; PCM stereo format only.</td>
</tr>
<tr>
<td><strong>D</strong> Analog Preamp Output</td>
<td>(1) Analog stereo line output (Left &amp; Right). Direct Line Level 2.1-V&lt;sub&gt;rms&lt;/sub&gt; Output.</td>
</tr>
<tr>
<td><strong>E</strong> Analog Input</td>
<td>(2) Analog stereo inputs (Left &amp; Right). RCA line-level inputs; 22 kΩ input impedance.</td>
</tr>
<tr>
<td><strong>F</strong> Ethernet</td>
<td>8-pin RJ-45 port. 10/100/1000 Base-T auto-negotiating port. Supports Audio Video Bridging (AVB). <strong>Activity LED:</strong> Green Blinking: Activity (Rx/Tx) Off: No Activity <strong>Link LED:</strong> Green Solid: Ethernet Link is established (any speed). Off: Ethernet link is not established.</td>
</tr>
<tr>
<td><strong>G</strong> IR</td>
<td>(6) IR Ports. Uses 6-pin IR Connectors to send IR signals to control devices with an IR input or IR receiver via an IR flasher (5V tolerant only). See IR Wiring section for important precautions regarding IR functionality before making any connections.</td>
</tr>
<tr>
<td><strong>H</strong> Relay</td>
<td>3-pin Control Connector. See Relay Wiring for pinouts. Normally Open (NO) Normally Closed (NC) to control devices requiring basic on/off operation. DC Voltage Max: 30V DC 1A.</td>
</tr>
<tr>
<td><strong>I</strong> GPIO</td>
<td>3-pin Control Connector. See GPIO Wiring for pinouts. <strong>GPIO Input:</strong> When configured as an input the processor will look for a low (&lt;0.8V DC) or a high (&gt;2.4V DC) state. Minimum 0V DC / Maximum 12V DC. <strong>GPIO Output:</strong> When configured as an output, the port provides a binary output of 0-12V DC 150mA max.</td>
</tr>
<tr>
<td><strong>J</strong> RS-232</td>
<td>8-pin RJ-45 port used to transmit and receive serial binary data to and from serial controllable devices. CTS/RTS handshaking availability based on component profile. See RS-232 Connections section for pin-outs.</td>
</tr>
<tr>
<td><strong>K</strong> USB</td>
<td>USB 2.0 Type A (reserved for future use)</td>
</tr>
<tr>
<td><strong>L</strong> Power Input</td>
<td>100/240V AC (50/60 Hz) 5.7A <strong>Fuse:</strong> 250V 10A slow blow fuse; field replaceable <strong>I/O (power switch):</strong> I (On): Powers On the chassis. O (Off): Powers Off the chassis.</td>
</tr>
</tbody>
</table>
### 3.4. PAV-AIM7C

**Front Panel**

<table>
<thead>
<tr>
<th>Power LED</th>
<th>Power Status LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green: System has power and is operating normally.</td>
<td>Off: Embedded processor is resetting, or is powered up, and is booting the embedded firmware.</td>
</tr>
<tr>
<td>Off: System is not receiving power.</td>
<td><strong>Green Blinking</strong>: Embedded system is ready; no communication has been established with the host.</td>
</tr>
<tr>
<td><strong>Red</strong>: Host has determined the firmware needs to be updated, but a problem occurred during the process that will initiate a reset.</td>
<td><strong>Green</strong>: Host has established communications with the embedded system.</td>
</tr>
<tr>
<td><strong>Red Blinking</strong>: Embedded firmware is running, but has not received a DHCP IP Address.</td>
<td><strong>Amber</strong>: Host is updating the embedded firmware.</td>
</tr>
<tr>
<td><strong>Amber Blinking</strong>: Embedded system has a valid link-local IP Address and is connecting to the host.</td>
<td></td>
</tr>
</tbody>
</table>

**Rear Panel**

<table>
<thead>
<tr>
<th>Reset</th>
<th>RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resets the network settings of the device. Hold Reset Button for 5 seconds while powered on to clear network settings. Status LED will rapidly blink red when reset is complete.</td>
<td>8-pin RJ-45 port used to transmit and receive serial binary data to and from serial controllable devices. CTS/RTS handshaking availability based on component profile. See RS-232 Connections section for pin-outs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IR Ports</th>
<th>(6) IR Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses 6-pin Control Connectors to send IR signals to control devices with an IR input or IR receiver via an IR flasher (5V tolerant only). See IR Wiring section for important precautions regarding IR functionality before making any connections.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital Audio In (Optical)</th>
<th>(2) Digital optical audio inputs. Supports up to 96kHz/24-bit digital audio in; PCM stereo format only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Audio In (Coaxial)</td>
<td>(2) Digital coaxial audio inputs. Supports up to 96kHz/24-bit digital audio in; PCM stereo format only.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analog Inputs</th>
<th>(3) Analog stereo inputs, RCA line-level inputs; 22 kΩ input impedance</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ethernet</th>
<th>8-pin RJ-45 port</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/100/1000 Base-T auto-negotiating port with Link/Activity LEDs. Supports Audio Video Bridging (AVB).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet Activity LED</th>
<th>Ethernet Link LED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green Blinking</strong>: Activity (Rx/Tx).</td>
<td><strong>Green Solid</strong>: Ethernet Link is established.</td>
</tr>
<tr>
<td><strong>Off</strong>: No Activity.</td>
<td><strong>Off</strong>: Ethernet link is not established.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Input</th>
<th>5V DC 3A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.5. PAV-AOM8C

Front Panel

**Power LED**
- **Green**: System has power and is operating normally.
- **Off**: System is not receiving power.

**Status LED**
- **Off**: Embedded processor is resetting, or is powered up, and is booting the embedded firmware.
- **Green**: Host has established communications with the embedded system.
- **Green Blinking**: Embedded system is ready, but no communication has been established with the host.
- **Red**: Host has determined the firmware needs to be updated, but a problem occurred during the process that will initiate a reset.
- **Red Blinking**: Embedded firmware is running, but has not received a DHCP IP Address.
- **Amber**: Host is updating the embedded firmware.
- **Amber Blinking**: Embedded system has a valid link-local IP Address and is connecting to the host.

Rear Panel

**Reset**
- Resets the network settings of the device. Hold Reset Button for 5 seconds while powered on to clear network settings. Status LED will rapidly blink red when reset is complete.

**USB**
- USB 2.0 Type A (reserved for future use).

**GPIO**
- 3-pin Control Connector
- See GPIO Wiring for pinouts
- **GPIO Input**: When configured as an input the processor will look for a low (<0.8V DC) or a high (>2.4V DC) state. Minimum 0V DC / Maximum 12V DC.
- **GPIO Output**: When configured as an output, the port provides a binary output of 0-12V DC 150mA max.

**RCA Output**
- (8) Analog stereo line output (Left & Right)
- Direct Line Level 2.1-Vrms Output

**Ethernet**
- 8-pin RJ-45 port
- 10/100/1000 Base-T auto-negotiating port with Link/Activity LEDs.
- Supports Audio Video Bridging (AVB).

**Ethernet Activity LED**
- **Green Blinking**: Activity (Rx/Tx).
- **Off**: No Activity.

**Ethernet Link LED**
- **Green Solid**: Ethernet Link is established.
- **Off**: Ethernet link is not established.

**Power Input**
- 5V DC 3A
4. 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.

4.1. RS-232 Wiring

SMA-5000, PAV-SIPA125, PAV-AIM7C all use the same RS-232 wiring.

**TIPS:**
- 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.

RS-232 Pinout

<table>
<thead>
<tr>
<th>PIN 1</th>
<th>PIN 2</th>
<th>PIN 3</th>
<th>PIN 4</th>
<th>PIN 5</th>
<th>PIN 6</th>
<th>PIN 7</th>
<th>PIN 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND (RS-232)</td>
<td>RXD (RS-232)</td>
<td>TXD (RS-232)</td>
<td>CTS (RS-232)</td>
<td>RTS (RS-232)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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

**IMPORTANT!**

If you are 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.
4.2. IR Wiring

**SMA-5000**
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.

**IMPORTANT! IR Wiring Precautions**
- Ensure that all IR emitters are within 15 feet (4.6 meters) from 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 that can degrade IR performance.

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

**PAV-SIPA125/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.

**IMPORTANT! IR Wiring Precautions**
- Ensure that all IR emitters are within 15 feet (4.6 meters) from 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 that can degrade IR performance.

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

4.3. Speaker Wiring

The SMA-5000 and the PAV-SIPA125 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.
4.4. GPIO

The PAV-SIPA125 and PAV-AOM8C have a GPIO that use the same wiring. General Purpose Input/Outputs (GPIO) are binary I/O ports used on Savant controllers to trigger an action within the system. Events can control a device, such as turning on an amplifier (output) or detecting a state change for a device (input) to perform a workflow. Pin 2 is used for input or output depending on configuration.

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.

4.5. Relay

Relay ports are used when a device is controlled via a normally open (NO) or normally closed (NC) relay.

4.6. Network Connection

The 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). Up to sixteen IP Audio devices can be connected using AVB/TSN compliant switching. For more information on this, see the Expansion section.

4.7. AC Power Connection

⚠️ 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 E for more information.
4.8. Checking and Replacing the Fuse

**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.

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 during seating the cartridge, DO NOT apply more pressure. Stop pressing on the cartridge, remove it, verify the orientation, and repeat step.
5. Installation
The SMA-5000 and PAV-SIPA125 can be installed in a National Electrical Manufacturers Association (NEMA) rack.

5.1. SMA-5000

Rack Installation
The SMA-5000 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 SMA-5000 device can be mounted in a structured media panel. The enclosure brackets needs to be attached prior to mounting. Savant recommends using vented (louvered) enclosure doors.
5.2. PAV-SIPA125

Rack Installation
The PAV-SIPA125 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.

5.3. PAV-AIM7C/PAV-AOM8C

The PAV-AIM7C/PAV-AOM8C can be placed on a solid flat surface such as a table or shelf. Also, the PAV-AIM7C/PAV-AOM8C can be placed on any generic 1U NEMA rack shelf.
6. Blueprint Configuration

6.1. Basic Blueprint Layout
6.2. Adding a Savant IP Audio to a Configuration

This example shows adding a PAV-SIPA125, the basic process is the same no matter with IP Audio devices is being added to the configuration. In an open Blueprint configuration.

1. Click Show Library.
2. Search for IP Audio.
   
   **NOTE:** If in this search the device is not found search by model number.
3. Select the PAV-SIPA125 and drag into a Shared Equipment zone.

**HELPFUL INFO:**

It is recommended to place any type of A/V switch in a Shared Equipment zone. If placed in a User zone the outputs cannot leave that zone.

4. Name the Device.

5. Place PAV-SIPA125 in the layout window.
6. Select the **PAV-SIPA125**.
7. Open Inspector.
8. Enter the UID.

**NOTE:**

The Ethernet connection is implied in Blueprint. No data connection is needed for a single unit deployment.

This device supports expansion of up to 16 IP Audio devices to be used as a single switch. The second and up to the sixteenth device will need to be added to the configuration in the same way as the first one was. For more information, see the **Expansion Section**.
6.3. Assigning Inputs and Outputs (I/Os)

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.

**NOTE:** The Digital Audio Output (TOSLINK) cannot be assigned this way

To assign outputs on the Pro Audio 4 do the following steps:

1. Select the Pro Audio 4 device.
2. Open Inspector
3. Click the Show drop-down
4. Select Assigned I/Os
5. Move the outputs that need to be combined into the same Audio Output.

For more information on the use of this feature please refer to [Support for Multiple Audio Outputs Active Simultaneously in a Zone Application Note](#) on the [Savant Customer Community](#).
7. 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.

7.1. Accessing the Web UI
In order to access the Web UI, the IP Address of the IP Audio device is needed. To retrieve the IP Address of the switch, follow the steps in Appendix C.

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

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

7.2. Status Tab
This tab is available on all IP Audio devices.

<table>
<thead>
<tr>
<th>A</th>
<th>Savant ID</th>
<th>UID of the device.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>IP Address</td>
<td>Current assigned IP Address.</td>
</tr>
<tr>
<td>C</td>
<td>Firmware Version</td>
<td>Current Firmware Version number.</td>
</tr>
<tr>
<td>D</td>
<td>Uptime</td>
<td>Amount of time the unit has been powered without a restart.</td>
</tr>
<tr>
<td>E</td>
<td>Restart</td>
<td>Restarts the software of the unit.</td>
</tr>
</tbody>
</table>
### 7.3. Network Tab

This tab is available on all IP Audio devices.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>IP Address Configuration</td>
<td>DHCP or Static.</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>IP Address</td>
<td>Displays the current IP Address and allows for entry. This is automatically assigned when item A is set to DHCP.</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Subnet Mask</td>
<td>Subnet mask of the network. This is automatically assigned when item A is set to DHCP.</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Router</td>
<td>IP Address of the network router. This is also known as Gateway or Default Gateway.</td>
<td></td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Revert</td>
<td>Select to erase entered settings and revert back to saved settings.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Apply and Restart</td>
<td>Select to apply entered settings, and restart the device.</td>
<td></td>
</tr>
</tbody>
</table>
7.4. Inputs & Outputs Tab

This tab is available on SMA-5000 and PAV-SIPA125.

A. Connector Type  
Analog Inputs: Stereo RCA, Digital inputs (TosLink), Media Server.

B. Channel Trim  
Adjusts the gain of the input from -10 dB to +10 dB.

C. Input List  
List of the inputs on the device.

D. I/O Connection Indicator  
When an input is connected to an output, a line will appear between them showing that there is a connection. Inputs with no connection will have a black dot with no line. The dots can also be used to connect an input to an output. Simply click & hold the mouse on the dot next to the desired input and drag the line to desired output dot and release.

E. Output List  
List of the outputs on the device.

F. Output Channels  
Stereo or Mono  
Clicking this field will toggle between the Stereo and Mono. Mono Summing: combines the left and right input signal into a single speaker channel output.

G. Process/Pass-Through  
This toggle button changes between the two settings Process and Pass-Through. The only function of this on pass-through mute function is disabled. This is only possible on the Analog Out of these devices.

H. Delay  
Adjustable delay per channel from 0 - 160 ms.

I. 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. No volume control is available for the Digital Out. Muting is available on all amplified speaker outputs and analog preamp output, independent from volume setting.

NOTE: There is no volume control in the Digital output. Any service from this output will require volume control on a different component.
8. Expansion
Up to sixteen Savant IP Audio devices can be connected using a MOTU AVB switch or a compatible switch certified for AVB/TSN switching.

8.1. Blueprint Layout 5 IP Audio devices
This image shows just the IP Audio devices and the AVB/TSN switch to illustrate how to have these devices work as a “single switch”.
8.2. Adding an AVB/TSN Switch

1. From Blueprint Click Show Library
2. Search for MOTU.
3. Drag into a Shared Equipment zone.
4. Name the Device.
5. Place the MOTU switch in the layout window and make AVB connections.

The Savant IP Audio devices Ethernet port must be connected to the MOTU AVB switch.
9. Savant Music

The SMA-5000 and PAV-SIPA125 both have a single stream of Savant Music. This allows the use of popular music streaming services such as Pandora or Spotify (streaming music service fee may apply). For a full list of supported services, see Savant Media Server/Savant Music Supported Streaming Services on the Savant Customer Community.

The service is generated in Blueprint. The streaming services are managed in the Savant Pro App. Streaming services can be enabled/disabled from System Monitor.
10. System Monitor

10.1. AVB Info

Connections that output from the same device that they originate from will not display.

Examples:
- Audio from device A that outputs from device B will display.
- Audio from device A and outputting the same device will not display.

| 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 | All active AVB/TSN connections that originate on the selected device |
10.2. Savant Music

**Savant Music Devices** – List of devices in the configuration that have an enabled Savant Music stream.

**Firmware** – Displays the current installed firmware version.

**Licensing** – Displays the Autonomic license serial number.

**Airplay** – Airplay settings, there is a limit of 32 characters for the Airplay name.

**HELPFUL INFO**: Savant recommends changing the Airplay Name. If more than one device is in use it can get confusing for the end-user.

**Music Services** – List of Music services, they can be disabled from this list.

The **More** button on the Tunein Radio line allows the entry of Latitude and Longitude for more precise information for finding local radio stations.
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 or packet shaping in your network topology for the Savant devices as this may interfere with performance.

AVB Requirements
Savant requires an AVB/TSN Compliant Switch. The AVB/TSN switch should be an extension of the current network.

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, static IP Addresses for all devices can be managed from a single UI avoiding the need to access devices individually.

Setting a Static IP Address
Refer to the Appendix C.

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 Pro Audio 4 from the power source.
  - Wait 15 seconds and then reconnect.

- Hot Plug the Ethernet (LAN) Connection
  - Disconnect the Ethernet (LAN) connection from the controller.
  - Wait 15 seconds and then reconnect.
## Appendix B: Document Revision History

<table>
<thead>
<tr>
<th>Section</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Initial releases of this Deployment Guide</td>
</tr>
</tbody>
</table>
Appendix C: Retrieving and Setting IP Address

The SDE must be connected to the same network as the Savant system in order to the devices to appear in rpmEmbScanner.

**NOTE:**
The UID is needed to verify that the correct IP Address is being checked. Record the UID from the sticker located on the rear of the unit.

Have Savant Application Manager active.

1. Active da Vinci 8.2 or higher.
2. Go to Launch > rpmEmbScanner
3. Select the device to edit in the list, and click Edit
4. Click the Configure drop-down, Select Manually
5. Enter IP Address
   **NOTE:**
   Subnet Mask and Router will populate automatically.
6. Click Save & Reboot
Appendix D: DNS (Add, Remove, Query)

Setting a DNS is only relevant to devices with a built in Savant Music stream. Follow the instructions below to, add, remove, or query the DNS servers configured on the 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@10.0.200.45
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 add a DNS server:
   ```
   setDNSServer -add -address x.x.x.x <enter>
   ```

   To remove a DNS server:
   ```
   setDNSServer -remove -address x.x.x.x <enter>
   ```

   To query the DNS servers configured:
   ```
   setDNSServer <enter>
   ```
   Terminal window will respond with the list of DNS servers as displayed below:
   ```
   nameserver 8.8.8.8
   nameserver 8.8.4.4
   ```
Appendix E: Uninterruptible Power Supply (UPS)

Savant does not recommend any particular 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 if 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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