SAVANT

Savant® IP Video

PAV-VIM8S, PAV-VIM4S, PAV-VIMVP1F, PAV-VIMVP1C, PAV-VIM1C
PAV-VOMVP1F, PAV-VOMVP1C, PAV-VOM1C

Deployment Guide

Document Number:	009-1551-03
Document Date:	October 2018
Document Supports:	da Vinci 8.8

Contents

To access the link to the topics in this document, click the topic page

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

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

Safety Statements

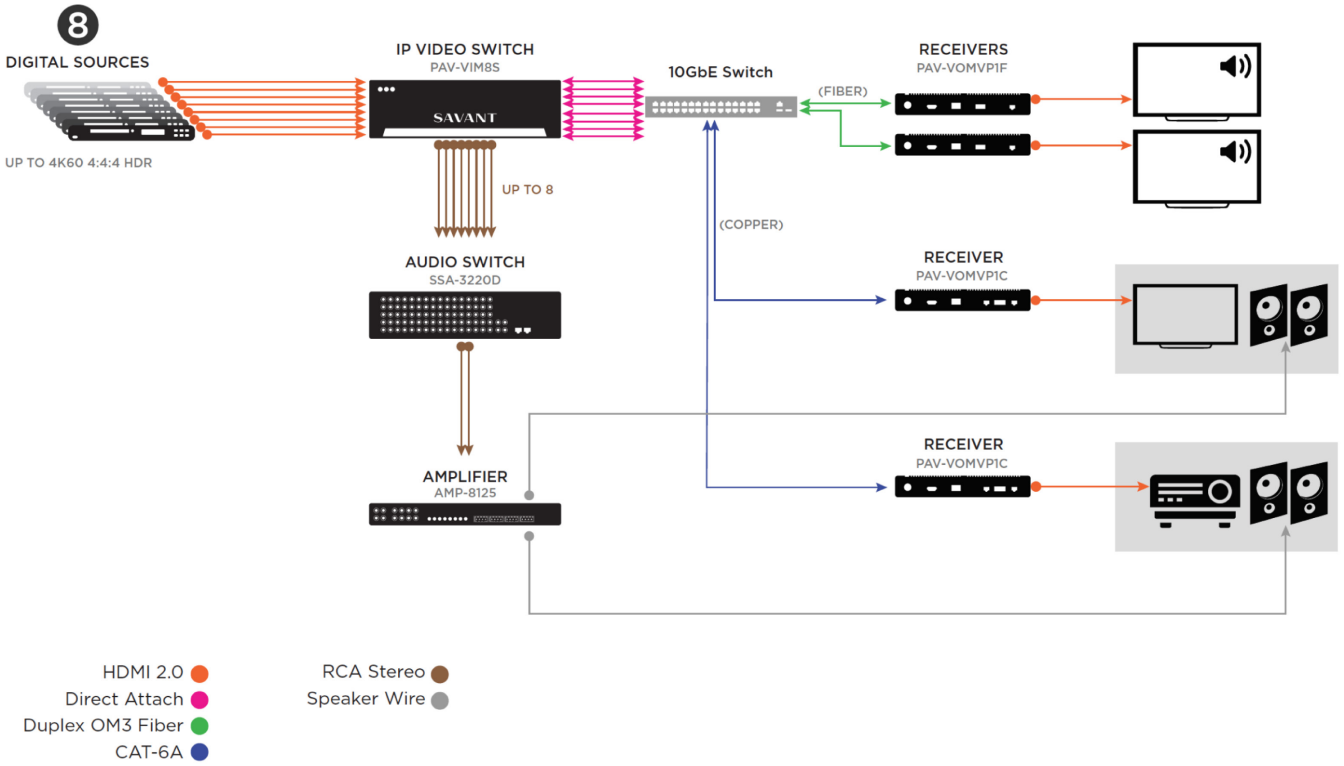
Follow all of the safety instructions listed below and apply where applicable. Additional safety information will be included where applicable.

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

The Savant IP Video is a scalable UHD (4K) Video Matrix using a Savant verified 10G network switch. This document will guide the installer through the process of installing, configuring, and adding Savant IP Video devices to a RacePoint Blueprint® configuration.

The figure below shows the basic application. The audio path can either come from the PAV-VIM8S as shown below, or it can be a separate output (Not HDMI) into an audio switch like the SSA-3220. If a source was only going to be used with a TV and you are using the TV Speakers, then we will also support HDMI audio through that entire path.



Before You Begin

Read through this document in its entirety and ensure that the following required items are available:

1. Savant IP Video Transmitter 4K UHD with Control ☐
   (PAV-VIM8S, PAV-VIM4S, PAV-VIMVP1F, PAV-VIMVP1C, or PAV-VIM1C)
2. Savant IP Video Single Port 4K UHD Video Output IP Receiver ☐
   (PAV-VOMVP1F, PAV-VOMVP1C, PAV-VOM1C)
3. 10G Network Switch that meets Savant requirements ☐
   (see 10G Network Requirements)
4. Unique IDs (UID) of the IP Video devices ☐
   (located on the back or bottom of the units)
5. Savant Pro Host licensed and running da Vinci 8.7 or higher ☐
   (Mac based Pro Host only)
6. Savant Development Environment (SDE/MacBook®) ☐
   RacePoint Blueprint da Vinci 8.7 or higher
7. Source equipment that will be used in the system ☐
8. Displays that will be used in the system ☐

2 Deployment Steps

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

1. Review product specifications and connection details ☐
   See IP Video Equipment Overview

2. Install the Savant IP Video devices ☐
   See Installation

3. Install Savant qualified 10G Network Switch ☐
   See the Savant IP Video Network Configuration Guide

4. Add the Savant IP Video devices into a RacePoint Blueprint® configuration ☐
   See Blueprint Configuration

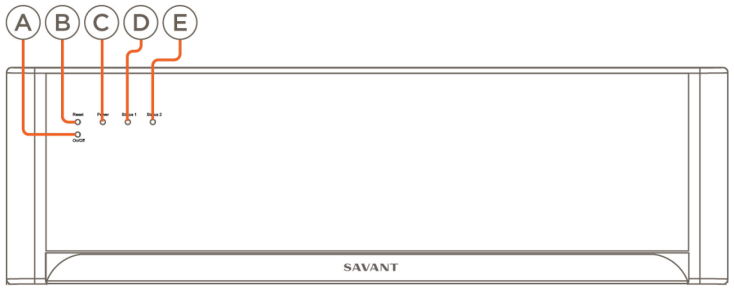
3 IP Video Equipment Overview

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.

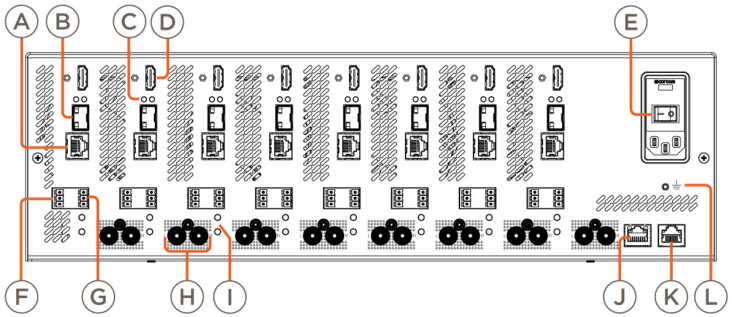
3.2 PAV-VIM8S or PAV-VIM4S

Front Panel



Ⓐ	On / Off Button	Reboots the main board (mcu) and power cycles the IP Video transmit (Tx) cards
Ⓑ	Reset Button	**Press and Release** - Resets the IP Video transmit (Tx) cards. **Press and hold** – Clears the network settings. Press and hold button for 5 seconds until Status LED blinks red rapidly; then release.
Ⓒ	Power LED	**Off** – Device is off. No power applied. **Green** – Main board is powered
Ⓓ	Status 1 LED	**Blinks Twice** – Provisioned to the local network and is currently connecting to the Host **Rapid Blink (green)** – The reset button was pressed and held for five seconds and the A/V over IP unit is performing a factory reset. All network settings are cleared. **Short Off Blink** – Firmware is updating
Ⓔ	Status 2 LED	Reserved for future use.

Rear Panel

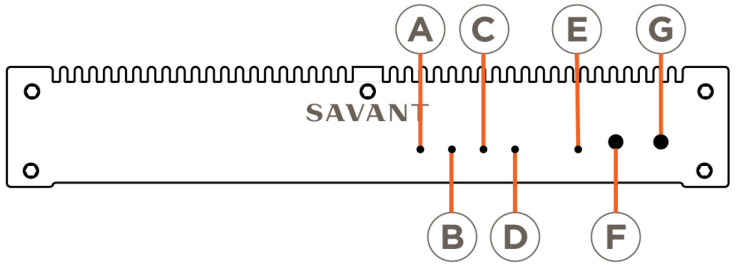


A	1 Gigabit Ethernet	1G of reserved network data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. 8-Pin RJ-45 female connection. This is a courtesy port. It will not work for all network functions. Example: Spanning tree devices are not supported by this port. **IMPORTANT!** Do not connect these ports to a network switch.
B	10 Gigabit Ethernet	SFP+ Housing; Used for connectivity to the 10G Ethernet Network Switch **IMPORTANT!** For all 10G connections, use only Savant certified SFP+ Direct-Attach Copper (DAC) cables, or Savant certified fiber and fiber connectors along with Savant certified SFP+ modules.

C	Rx/Tx LEDs (10 GbE)	Rx – Link Activity LED indicator for all data received on the 10G connection Tx – Link Activity LED indicator for all data transmitted from the 10G connection
D	HDMI In	19-Pin Type A HDMI female digital audio/video input. Supports HDMI 2.0a HDMI 2.0 compliant cable is required for 4K content.
E	Power Input Module	100-240V AC 5A 50/60Hz power input module with On/Off switch. I – Applies power to the device. O – Removes power to the device. **NOTE**: Includes a field replaceable 5A 250V Fast acting fuse.
F	RS-232 Control Port	3-pin Screw down plug-in connection. Transmits and receives serial data to and from serial controllable devices. For pin-out information, refer to the RS-232 Wiring section below.
G	IR Control Port	3-pin Screw down plug-in connection. Transmits IR signals via an IR Flasher (5V tolerant) to devices with an IR input or IR receiver. For pin-out information, refer to the IR Wiring section below.
H	Analog Audio Out	RCA Analog Audio Output. Requires HDMI input PCM audio format. Direct Line Level 2.1 V_{RMS} Output.
I	Push Buttons	Reserved for future use.
J	Ethernet	8-Pin RJ-45 female connection. Used to communicate with the Savant System Host.
K	Reserved	8-Pin RJ-45 female connection; Reserved for future use.
L	Grounding	Chassis Ground (optional)

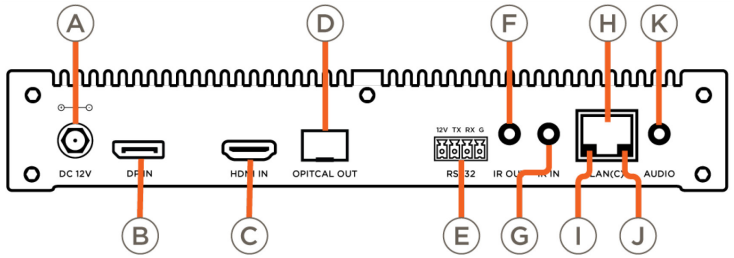
3.3 PAV-VIMVP1F or PAV-VIMVP1C

Front Panel



Ⓐ	RSVD LED	Reserved for future use. **Blue** - LED on by default.
Ⓑ	Link TX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Sending Ethernet Data.
Ⓒ	Link RX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Receiving Ethernet.
Ⓓ	Video LED	**Off** - No video signal detected. **Blue** - Video signal detected.
Ⓔ	Power LED	**Off** - Device is off. No power applied. **Red** - Main board is powered.
Ⓕ	P1	Reserved for future use.
Ⓖ	RSVD	Reserved for future use.

Rear Panel

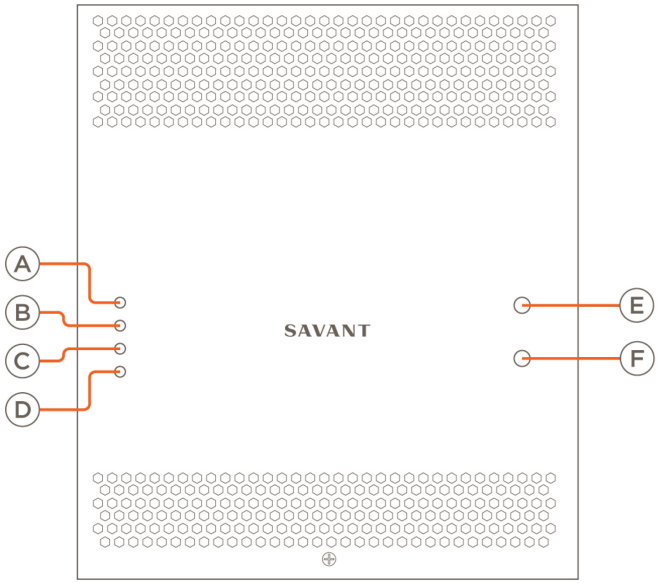


A	Power Input	12V DC.
B	DP In	Display Port: Not used.
C	HDMI In	19-Pin Type A HDMI female digital audio/video input. Supports HDMI 2.0a. HDMI 2.0 complaint cable required for 4K content.

D	Optical out or 10 GbE	10G input from the IP Video network switch. SFP+ (PAV-VIMVP1F) RJ-45 (PAV-VIMVP1C)
E	RS-232	4-pin Control Connector. Transmits and receives serial data to and from serial controllable devices. For pin-out information, refer to the RS-232 Wiring section below.
F	IR OUT	3.5 mm IR Emitter connection. Transmits IR signals via an IR Flasher (5V tolerant) to devices with an IR input or IR receiver.
G	IR IN	Not used.
H	LAN (C)	1G of reserved network data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. 8-pin RJ-45 female connection. This is a courtesy port it will not work for all network functions. Example: Spanning tree devices are not supported by this port. **IMPORTANT!** Do not connect this port to a network switch.
I	Link LED	**Solid Orange** - Link is established. **Off** – No link established.
J	Link Activity LED	**Green Blinking** - Indicates data activity. **Off** – No Activity.
K	Audio	3.5 mm Analog Audio Output. Requires HDMI input PCM audio format. Direct Line Level 2.1 V_{RMS} Output.

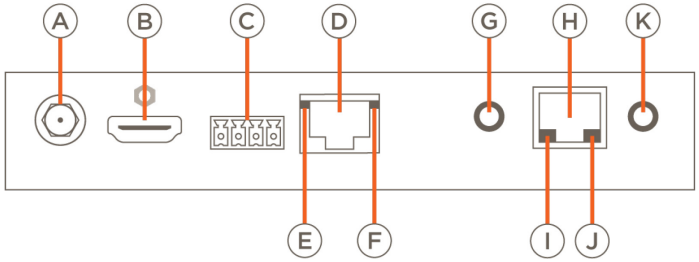
3.4 PAV-VIM1C

Top Panel



A	Power LED	**Off** - Device is off. No power applied. **Blue** - Main board is powered.
B	Video LED	**Off** - No video signal detected. **Blue** - Video signal detected.
C	Link TX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Sending Ethernet Data.
D	Link RX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Receiving Ethernet.
E	P1	Reserved for future use.
F	RSVD	Reserved for future use.

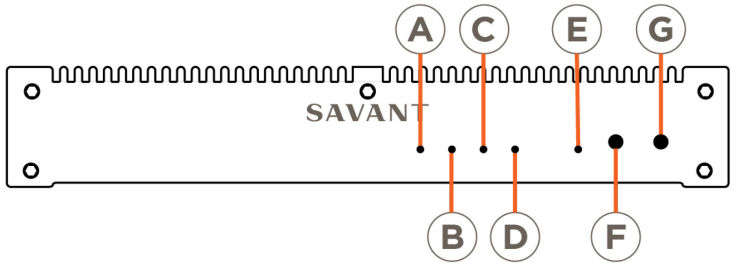
Rear Panel



A	DC 12V	12V DC.
B	HDMI In	19-Pin Type A HDMI female digital audio/video input. Supports HDMI 2.0a. HDMI 2.0 complaint cable required for 4K content.
C	RS232	4-pin Control Connector. Transmits and receives serial data to and from serial controllable devices. For pin-out information, refer to the RS-232 Wiring section below.
D	10GbE	RJ-45 port. 10G output to the IP Video network switch.
E	Link LED	**Solid Green** - Link is established. **Off** – No link established.
F	Link Activity LED	**Yellow Blinking** - Indicates data activity. **Off** – No Activity.
G	IR Out	3.5 mm IR Emitter connection. Transmits IR signals via an IR Flasher (5V tolerant) to devices with an IR input or IR receiver.
H	LAN	1G of reserved network data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. 8-pin RJ-45 female connection. **IMPORTANT!** Do not connect this port to a network switch.
I	Link LED	**Solid Green** - Link is established. **Off** – No link established.
J	Link Activity LED	**Yellow Blinking** - Indicates data activity. **Off** – No Activity.
K	Audio	3.5 mm Analog Audio Output. Requires HDMI input PCM audio format. Direct Line Level 2.1 V_{RMS} Output.

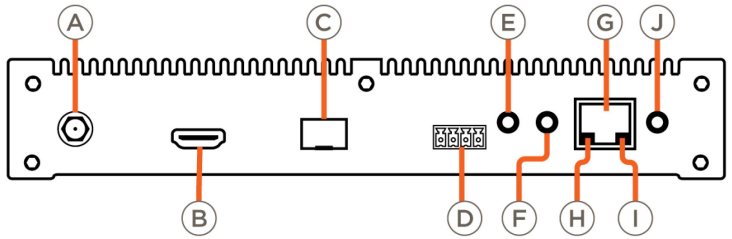
3.5 PAV-VOMVP1F or PAV-VOMVP1C

Front Panel



Ⓐ	RSVD LED	Reserved for future use. **Blue** - LED on by default.
Ⓑ	Link TX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Sending Ethernet Data.
Ⓒ	Link RX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Receiving Ethernet.
Ⓓ	Video LED	**Off** - No video signal detected. **Blue** - Video signal detected.
Ⓔ	Power LED	**Off** - Device is off. No power applied. **Red** - Main board is powered.
Ⓕ	P1	Reserved for future use.
Ⓖ	RSVD	Reserved for future use.

Rear Panel

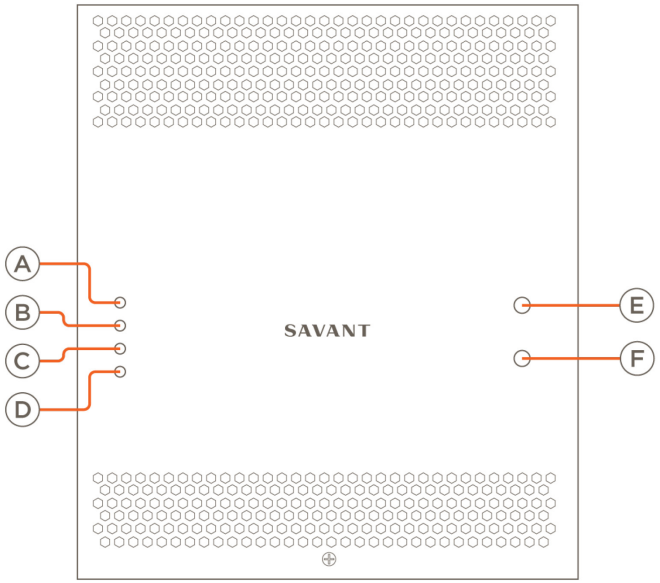


A	Power Input	12V DC.
B	HDMI Out	19-Pin Type A HDMI female digital audio/video output. Supports HDMI 2.0a. HDMI 2.0 complaint cable required for 4K content.
C	Optical In or 10 GbE	10G input from the IP Video network switch. SFP+ (PAV-VOMVP1F) RJ-45 (PAV-VOMVP1C)

D	RS-232	4-pin Control Connector. Transmits and receives serial data to and from serial controllable devices. For pin-out information, refer to the RS-232 Wiring section below.
E	IR OUT	3.5 mm IR Emitter connection. Transmits IR signals via an IR Flasher (5V tolerant) to devices with an IR input or IR receiver.
F	IR IN	Not used.
G	LAN (C)	1G of reserved network data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. 8-pin RJ-45 female connection. This is a courtesy port it will not work for all network functions. Example: Spanning tree devices are not supported by this port. **IMPORTANT!** Do not connect this port to a network switch.
H	Link LED	**Solid Orange** - Link is established. **Off** – No link established.
I	Link Activity LED	**Green Blinking** - Indicates data activity. **Off** – No Activity.
J	Audio	3.5 mm Analog Audio Output. Requires HDMI input PCM audio format. Direct Line Level 2.1 V_{RMS} Output. **IMPORTANT!** Support for this port requires da Vinci 8.9 or higher.

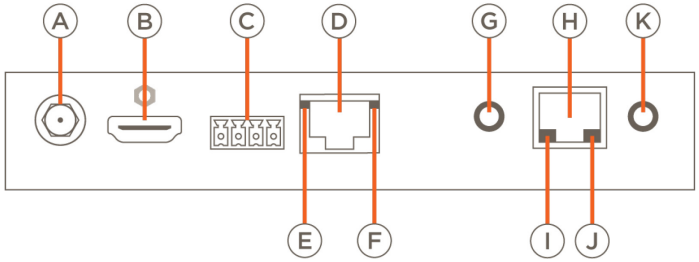
3.6 PAV-VOM1C

Top Panel



A	Power LED	**Off** - Device is off. No power applied. **Blue** - Main board is powered.
B	Video LED	**Off** - No video signal detected. **Blue** - Video signal detected.
C	Link TX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Sending Ethernet Data.
D	Link RX LED	**Off** - No valid connection. **Blue** - Valid link. **Blinking** - Receiving Ethernet.
E	P1	Reserved for future use.
F	RSVD	Reserved for future use.

Rear Panel



A	DC 12V	12V DC
B	HDMI Out	19-Pin Type A HDMI female digital audio/video output. Supports HDMI 2.0a HDMI 2.0 complaint cable required for 4K content.
C	RS232	4-pin Control Connector. Transmits and receives serial data to and from serial controllable devices. For pin-out information, refer to the RS-232 Wiring section below.
D	10GbE	RJ-45 port. 10G input from the IP Video network switch.
E	Link LED	**Solid Green** - Link is established. **Off** – No link established.
F	Link Activity LED	**Yellow Blinking** - Indicates data activity. **Off** – No Activity
G	IR Out	3.5 mm IR Emitter connection. Transmits IR signals via an IR Flasher (5V tolerant) to devices with an IR input or IR receiver
H	LAN	1G of reserved network data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. 8-pin RJ-45 female connection. **IMPORTANT!** Do not connect this port to a network switch.
I	Link LED	**Solid Green** - Link is established. **Off** – No link established.
J	Link Activity LED	**Yellow Blinking** - Indicates data activity. **Off** – No Activity
K	Audio	3.5 mm Analog Audio Output. Requires HDMI input PCM audio format. Direct Line Level 2.1 V_{RMS} Output. **IMPORTANT!** Support for this port requires da Vinci 8.9 or higher.

IMPORTANT!

The PAV-VOM1C is not supported for audio only applications.

4 Wiring and Connections

4.1 HDMI Cables

Important items to consider when planning or installing a system using IP Video devices.

- High quality HDMI cables are very important when passing UHD. Adding deep color and HDR raises the need for high quality cables.
- Long HDMI cables can introduce signal degradation, so Savant recommends using the shortest possible HDMI cables.

4.2 Audio Connections

Audio connections on the IP Video devices are audio outputs. On the Video input devices this will output the audio from the HDMI input.

4.3 10G Ethernet

Fiber (SFP+)
Enhanced small form-factor pluggable connection. Use a Savant certified Direct Access Copper (DAC) SFP+ cable to connect the chassis to the 10G switch, or Savant certified fiber and fiber connectors along with Savant certified SFP+ modules.

Transport Distance	
DAC cable	6 ft (2 m)
OM3 multi-mode Fiber	1000ft (300 m)

Copper (RJ-45)
RJ-45 10G Ethernet connection.

Transport Distance	
Cat5e	100ft (30m)
Cat6	100ft (30m)
Cat6a	300ft (100m)
Cat7	300ft (100m)

TIP!
The distances in the above Copper table are tested with two patch cables included. If the cable is a homerun (single unbroken length) the distance can be up to 150ft (50m) for Cat5e/Cat6.

4.4 1G Ethernet/LAN

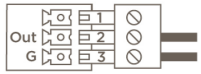
Standard RJ-45 port that uses 1G reserved data bandwidth commonly used to connect any network compliant device to transmit its data onto the Ethernet network by sharing the 10G network link. This is a courtesy port it will not work for all network functions. Example: Spanning tree devices are not supported by this port.

IMPORTANT! Do not connect this port to a network switch.

4.5 IR Wiring

PAV-VIMxS

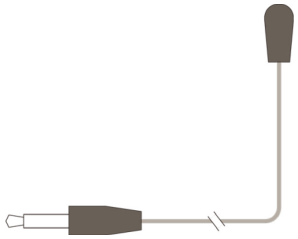
IR connections are made using a 3-pin Control Connector supplied with the device. The wire slips into the hole and locks with a screw located at the top of the connector.



PIN 1	Not Used
PIN 2	IR +
PIN 3	IR -

PAV-VOMVP1x

IR connection are made using 3.5 mm IR Emitter supplied with the device.



IMPORTANT: IR Wiring Precautions

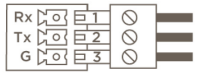
Ensure that all IR emitters are within 15 feet (4.6 meters) from the controller's location.

Use of 3rd party blinking 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.

4.6 RS-232 Wiring

PAV-VIMxS

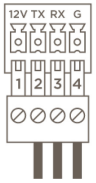
Serial control connections are made using a 3-pin Control Connector supplied with the device. The wire slips into the hole and locks with a screw located at the top of the connector.



PIN 1	Receive
PIN 2	Transmit
PIN 3	Ground

PAV-VOMVP1x/PAV-VIMVP1x/PAV-VOM1C/PAV-VIM1C

Serial control connection are made using a 4-pin Control Connector supplied with the device. The wire slips into the hole and locks with a screw located at the top of the connector.



PIN 1	12V Do Not Use
PIN 2	Transmit
PIN 3	Receive
PIN 4	Ground

4.7 Network

The PAV-VIMxS uses a standard RJ-45 port complying with IEEE 802.3 Ethernet standards. This port is used for communication with the Savant Host.

The VOMVP1x uses a shared Ethernet connection from its 10G connection.

4.8 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 IP Video devices before shutting it down. See Appendix C: UPS Recommendations for more information.

4.9 Checking and Replacing the Fuse

Only the PAV-VIMxS has a field replaceable fuse. For fuse information please see the products Quick Reference Guide.

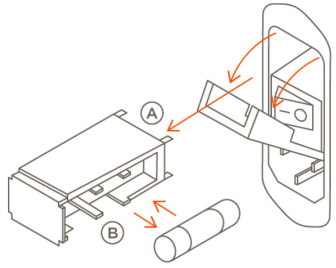
ELECTRIC SHOCK HAZARD:

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.



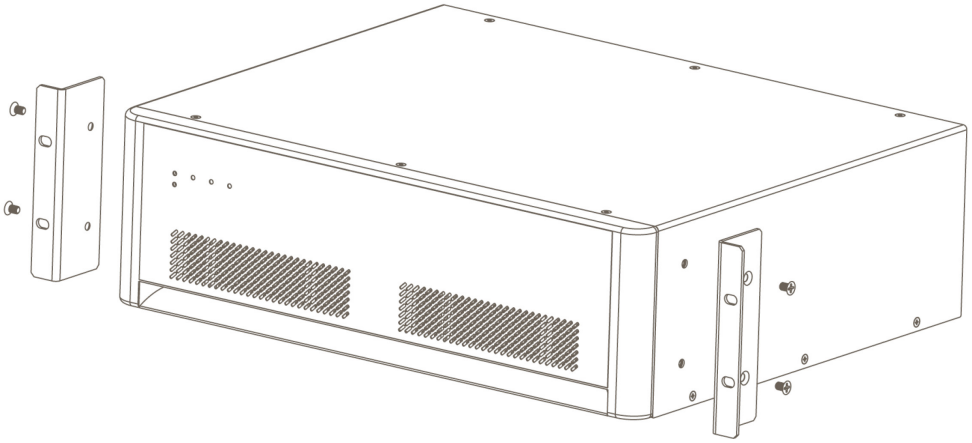
(A) Connection Pins Towards Unit
(B) Open Side of Cartridge Towards Power Switch

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

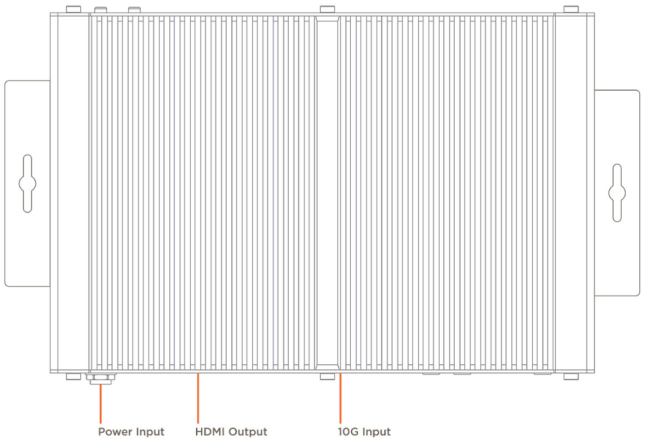
5.1 Install PAV-VIM8S/VIM4S

The Savant IP Video Transmitter can be mounted in a 3U rack style enclosure and is compatible with all standard 19-inch NEMA rack mounts. The rack ears need to be attached prior to placing in a rack



5.2 Install PAV-VOMVP1x/VIMVP1x

The Savant IP Video Receiver or Transmitter can be placed on a solid flat surface or can be mounted on a wall with the included mounting brackets. If installing this unit behind a display, ensure enough air can pass though the grooves on the top of the unit. This will maximize heat dissipation. Savant recommends aligning the grooves vertically as shown below.

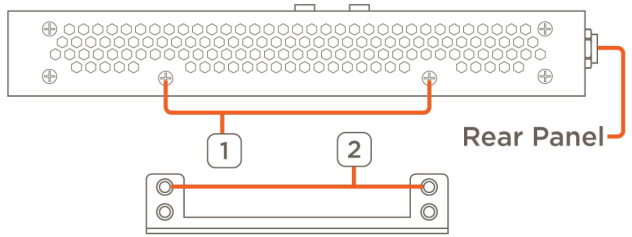


5.3 Install PAV-VIM1C/VOM1C

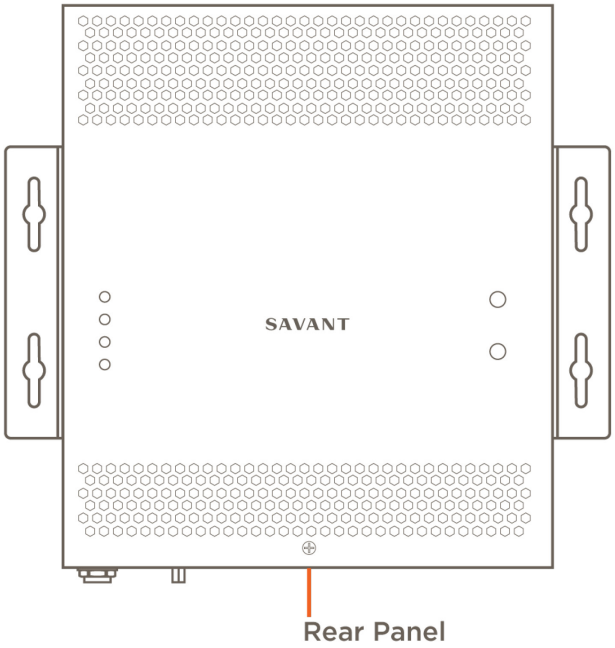
Wall Mounted

To install the PAV-VIM1C/VOM1C the installer must remove two of the chassis screws on each side and use them to attach the included mounting brackets. Please follow the steps below.

1. Remove the two case screws in the center of the device (Shown in the image below).
2. Align the bracket using the top holes.
   NOTE: This will leave an air gap behind the device.
3. Replace the case screws attaching the bracket.



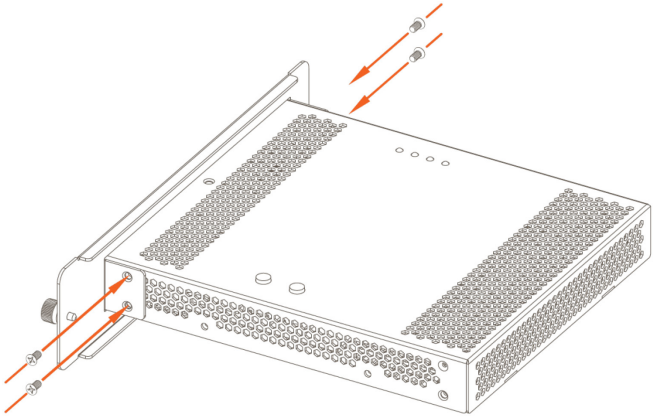
If the device is going to be mounted vertically Savant recommends aligning the device with the rear of the device facing down. This will allow the best heat dissipation.



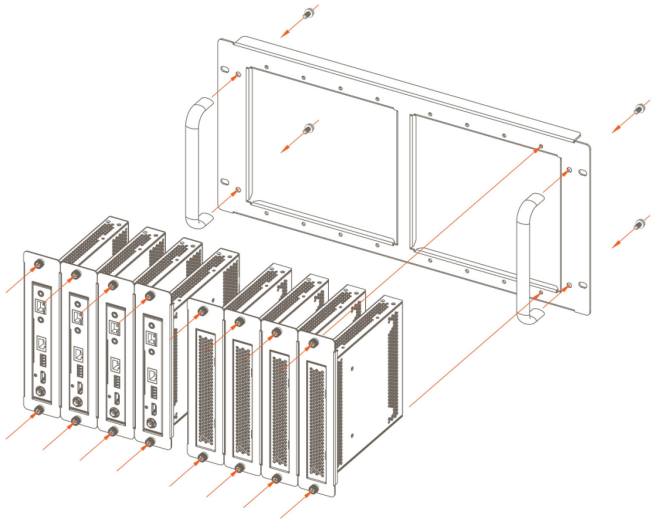
Rack Install

The PAV-VIM1C can be attached to this rack with the connections facing front or rear, to fit the needs of the installation.
To attach a PAV-VIM1C do the following:

1. Remove the brackets for all the PAV-VIM1C to be installed.
2. Remove the four case screws from one end of the PAV-VIM1C.
3. Align the case screws with the bracket.
4. Replace the screws attaching the bracket.
5. Repeat steps 2 to 4 for each PAV-VIM1C.



6. Align the handle with screw holes.
7. Attach the handle with the screws provided.
8. Repeat steps 6 and 7 for the second handle.
9. Install the shelf in the rack using rack screws (not supplied)



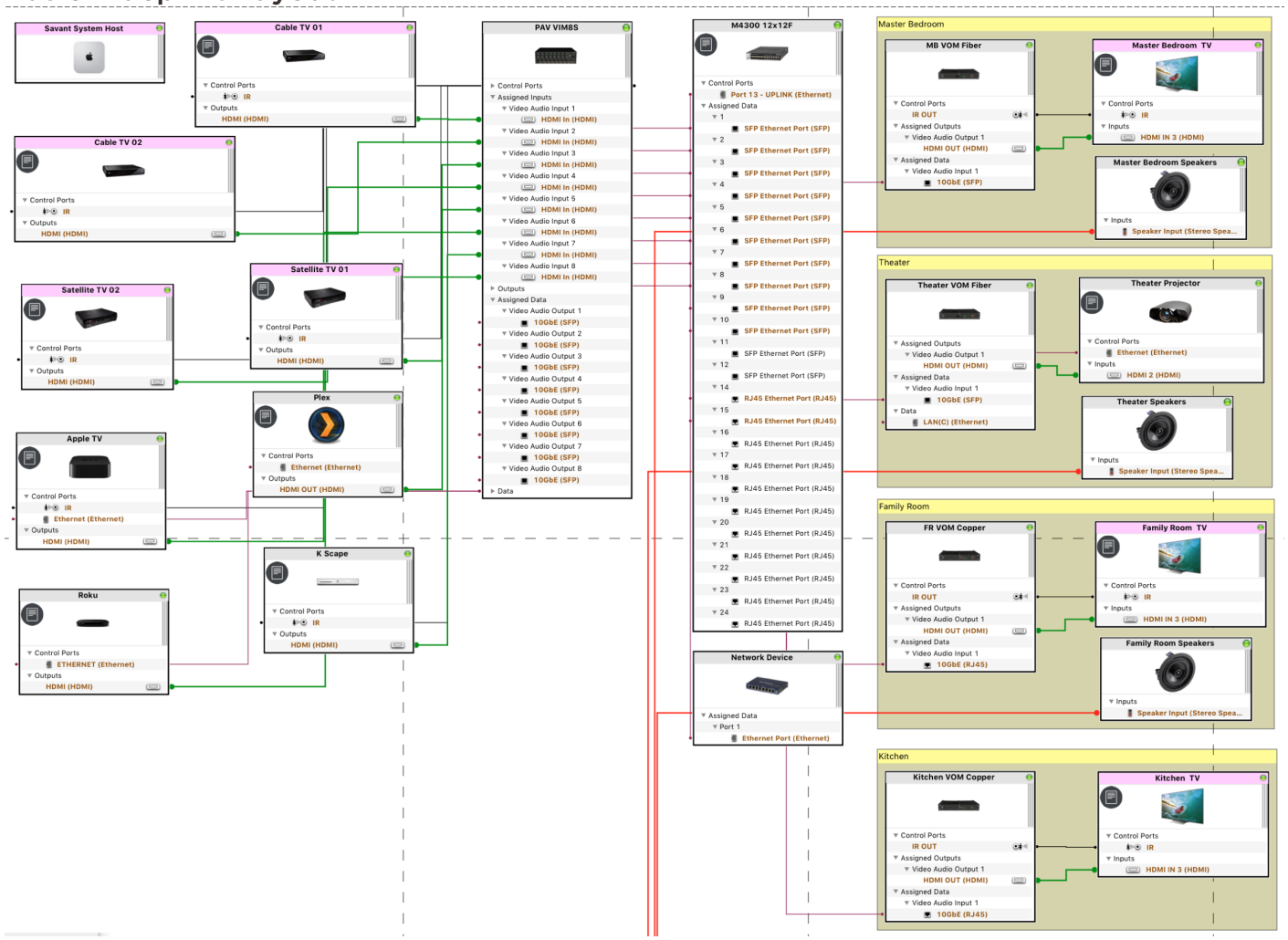
10. Install each PAV-VIM1C with the bracket attached using the captive screws on the bracket.

6 Blueprint Configuration

Required Devices

- Savant Pro Host
- IP Video Transmitter
- IP Video Receiver
- 10G Network Switch
- Video Sources
- HD/UHD Displays

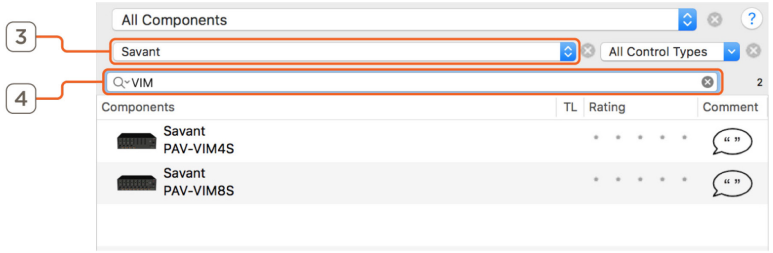
6.1 Basic Blueprint Layout



6.2 Adding a PAV-VIMxS to a Configuration

In an open Blueprint configuration

1. Click **Show Library**.
2. Click the All Manufacturers.
3. Select Savant.

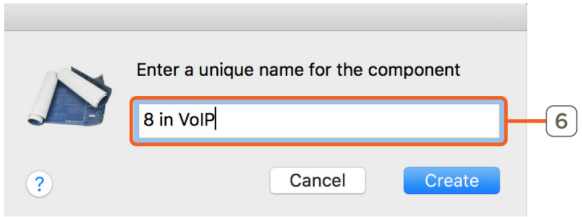


4. In the Search bar type VIM.
5. Select the Video Input IP Transmitter that is needed and drag it into a Shared Equipment zone.

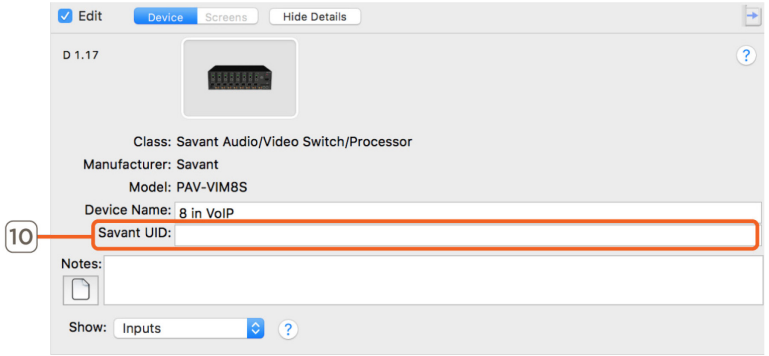
HELPFUL INFO:

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.

6. Name the Device.



7. Place the Video IP Transmitter in the layout window.
8. Select the Video Input IP Transmitter.
9. Open Inspector.
10. Enter the UID.



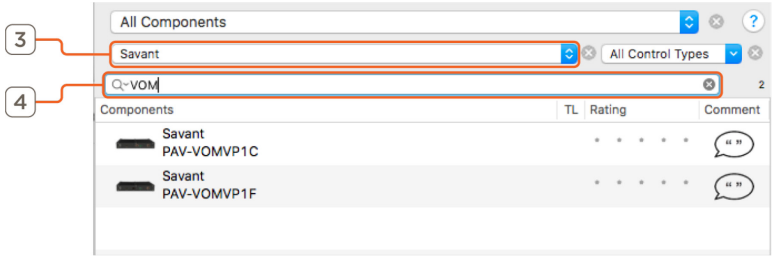
NOTE:

The Ethernet connection is implied in Blueprint.

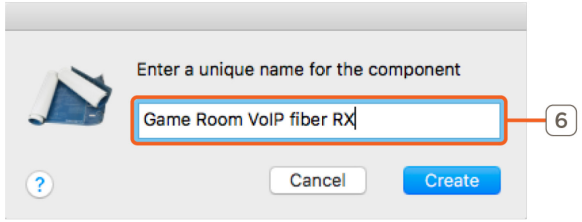
6.3 Adding a IP Video Output Receiver to a Configuration

In an open Blueprint configuration

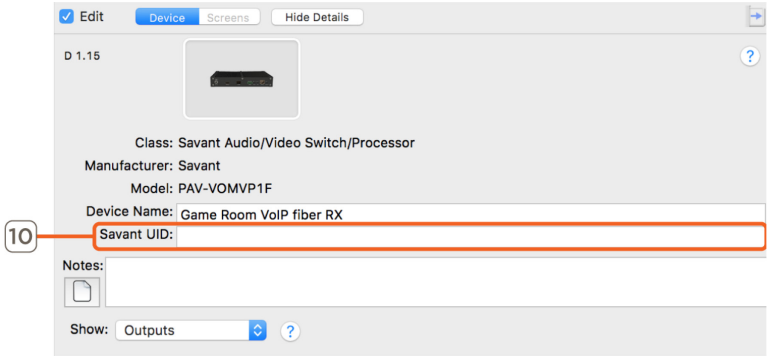
1. Click **Show Library**.
2. Click the All Manufacturers.
3. Select Savant.



4. In the Search bar type VOM.
5. Select the IP Video Output Receiver that is needed and drag it into the User zone that is will be used.
6. Name the Device.



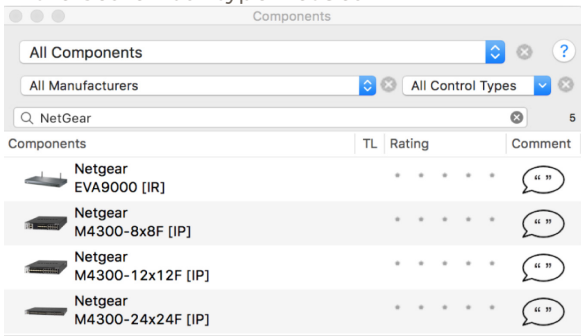
7. Place the IP Video Receiver in the layout window.
8. Select the IP Video Output Receiver.
9. Open Inspector.
10. Enter the UID.



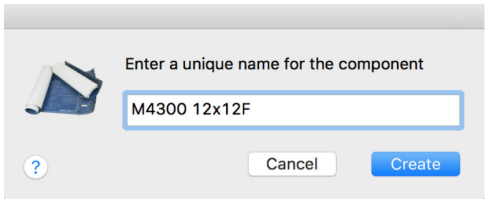
6.4 Adding a 10G Switch to a Configuration

This process is to add a NetGear ProSafe M4300 10G network switch to the configuration. See **Savant IP Video Network Configuration Guide** on the **Savant Customer Community** for information on how to set up this device before its Video connection are made. In an open Blueprint configuration do the following.

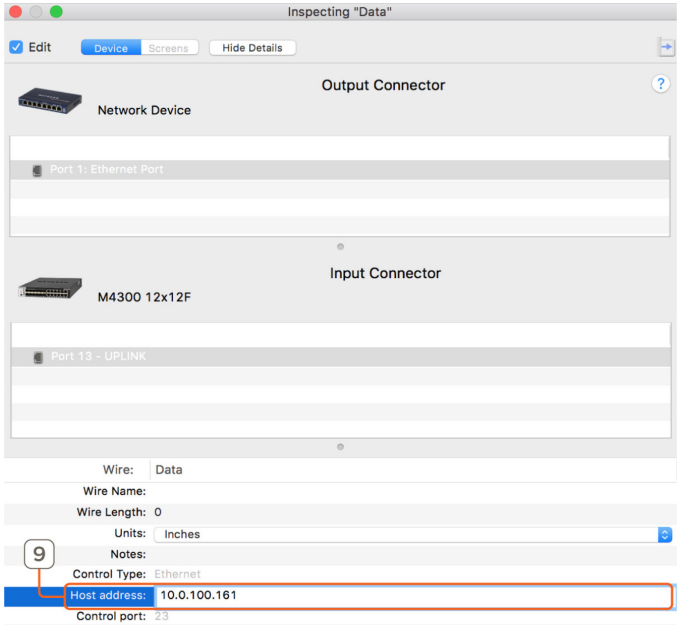
1. Click **Show Library**.
2. In the Search bar type NetGear.



3. Select the M4300 10G switch that is needed and drag it into a Shared Equipment zone.
4. Name the Device.



5. Place the M4300 10G switch in the Layout window.
6. Make Control Connection.
7. Select the Control Connection.
8. Open Inspector.
9. Enter the IP Address of the switch on the Host address field.



NOTES:

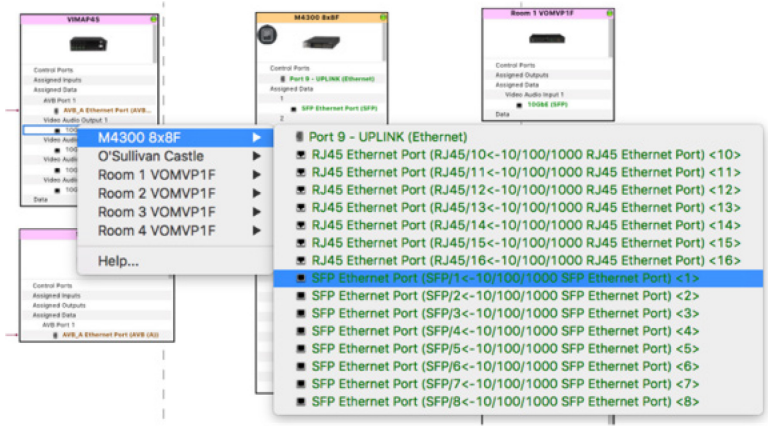
- The control connection is required for services to generate correctly.
- The IP Address is needed for System Monitor information to populate (This feature as added in da Vinci 8.8 release).
- In the physical installation this control connection uses one of the RJ-45 10G connections. This is the switch's uplink port that is configured in the Savant Video over IP Network Configuration Guide.

6.5 Making 10G Connections

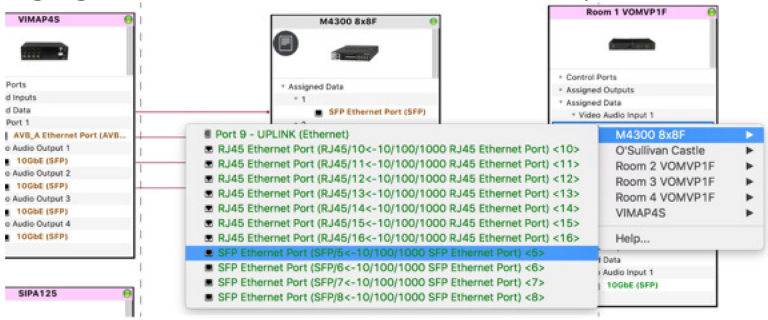
This section is an example how to correctly make the 10G Blueprint connections. All components must be added to the configuration and placed in the Layout window first. Connecting sources and endpoints is not detailed in this example.

The example below uses the following components:
(1) - PAV-VIM4S
(4) - PAV-VOMVP1F
(1) - NetGear M4300 8x8F switch

1. Select the VIM4S.
2. Right-click on the first 10GbE (SFP) port.
3. Highlight the M4300 8x8F then the desired SFP port and left-click.



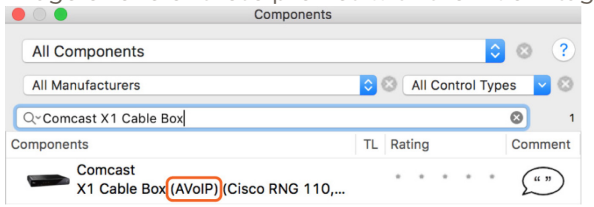
4. Repeat steps 1 to 3 for each Input that is used.
5. Select the first PAV-VOMVP1F.
6. Right-click on the 10GbE (SFP) port.
7. Highlight the M4300 8x8F then the desired SFP port and left-click.



8. Repeat steps 5 to 7 for each Output in the system.

6.6 Source Profiles

Some device profiles require a “AVoIP” version of the profile to be compatible with the control connections of the Video over IP devices. Below is a image of one of these profiles with the AVoIP tag highlighted.



This example supports several model numbers. While searching for devices to add to the configuration if two version appear in the search and the device is going to be controlled by a Video over IP control port use the profile with the AVoIP tag in the profile name. For more information on available profiles see the **Savant IP Video: AV Devices May Require Alternate Profile for IR Control Application Note** on the **Savant Customer Community**.

⚠ **IMPORTANT!** These profiles are only needed prior to da Vinci 8.8.

6.7 Expansion

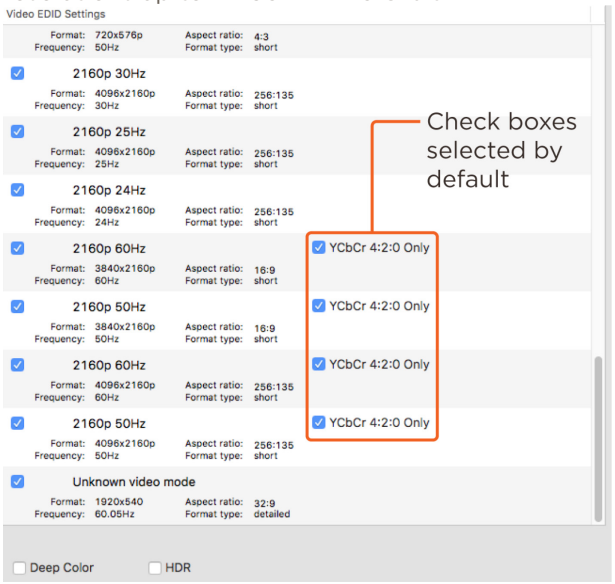
The Savant IP Video system has unlimited scalability. The limit is the amount of ports on the 10G switch. For instance, on a 96 port 10G Network switch: 1x95, 2x94, and so on up to 95x1. In addition, add as many receivers required in the installation based on the number of displays.

Every source and display require a port on the 10G switch.

7 Best Practices

Once the system is installed and the configuration has been uploaded to the Host, this section shows some best practices for testing a Savant IP Video system.

Initial Audio and Video setup/testing should be done using the default EDID. The default EDID has support for PCM audio up to 8 channels and video resolutions up to 4k 60hz 4:2:0 8-bit.



Testing

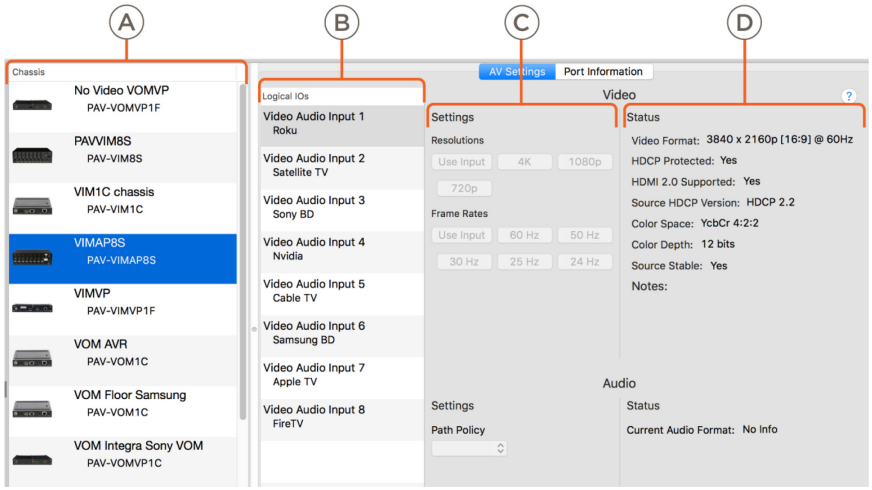
Every source should be tested with every A/V zone. Savant recommends testing a single source with one A/V zone at a time.

1. Activate the first Video source to a single Zone.
2. Does Video pass?
   a. NO: Check System Monitor for the resolution of the Input and then the output, Scale the VOM to 1080p. If 1080p passes there may be an issue with either the TV or cabling. Replace HDMI cable and test again.
   b. YES: Check Audio
3. Does Audio pass?
   a. NO: In System Monitor set the audio path policy for the PAV-VOM to “Downmix”. If audio is still not present verify audio is enabled on the source.
   b. YES: Continue to the next Zone.
4. Repeat with the same source until all Video zones have been tested. Repeat with all other Video sources in the same manner as shown above.

After this testing is complete. Add more advanced EDIDs and test again.

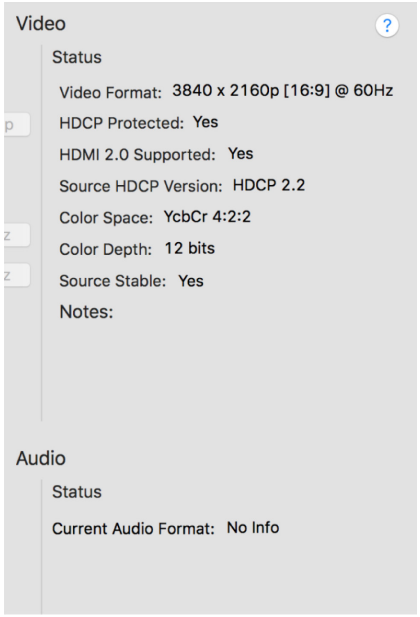
8 System Monitor

In System Monitor, there is a **AVoIP Info** tab for information gathering and changing settings. This System Monitor tab will only display in a system that has the Video over IP devices in the configuration.



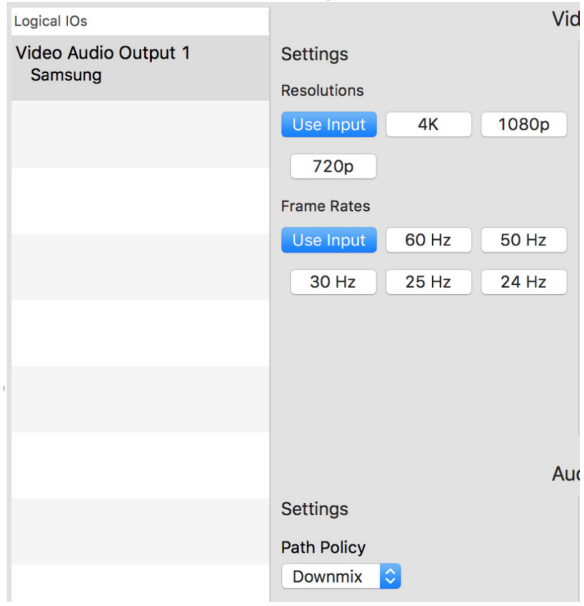
A	Chassis	List of Video over IP devices in the configuration.
B	Logical IOs	List of inputs or outputs on the device selected in the Chassis window.
C	Settings	Video and Audio settings, down mixing audio or video scaling settings can be changed in this section. See Video/Audio Settings section below for more information.
D	Status	Displays the current status of selected I/O. See Video/Audio Status section below for more information.

8.1 Video/Audio Status



Video Format – Displays active video resolution and frame rate.
HDCP Protected – Displays if HDCP is enabled
HDMI 2.0 Supported – Displays if the connected device supports HDMI 2.0.
Source HDCP Version – Displays the HDCP version from the source content.
Color Space – Displays the color format used in the current Video
Color Depth – Displays the active number of bits for color data.
Source Stable – Displays if video is received from the connected source.
Current Audio Format – Displays current audio format.
Not supported on the PAV-VIMxS, PAV-VIMVP1x, and PAV-VIM1C.

8.2 Video/Audio Setting



Resolutions

- **Use Input**: Will pass the received video resolution to the endpoint.
- **4K**: Scale to UHD (3840x2160).
- **1080p**: Scale to Full HD (1920x1080)
- **720p**: Scale to HD (1280x720)

Frame Rates

- **Use Input**: Will pass the received video frame rate to the endpoint.
- **60 Hz**: Fixed Frame Rate of 60 frames per second.
- **50 Hz**: Fixed Frame Rate of 50 frames per second.
- **30 Hz**: Fixed Frame Rate of 30 frames per second.
- **25 Hz**: Fixed Frame Rate of 25 frames per second.
- **24 Hz**: Fixed Frame Rate of 24 frames per second.

Path Policy – Dropdown menu with the following options.

- **Dynamic**: Enables the multi-channel to 2 channel PCM.
- **Pass-thru**: Pass-through the HDMI audio format to the endpoint.
- **Downmix**: Enables the multi-channel to 2 channel PCM.

IMPORTANT!

- This will only downmix Multi-channel PCM audio to Stereo PCM. It is not compatible with encoded Bit stream audio formats.
- Routing Bitstream audio from a PAV-VIM1C device to a PAV-VOM device that has an audio configuration setting of Dynamic or Down mix will result in no audio from the PAV-VOM. To support bitstream audio from a PAV-VIM1C source, the PAV-VOM device should be configured with a Pass-through audio setting in the AVoIP Info tab of System Monitor.

NOTE: Scaling HDCP 2.2 sources to a HDCP 1.4 sync device requires the resolution input of the HDCP 2.2 source to be 4K 60 4:2:0 8Bit or below.

For a Basic understanding of how these options affect the system review the following:

Use Input resolution and frame rate

- Virtually no switching latency, always less than 120 microseconds of video latency.
- Output colorspace is the same as the source.
- Video latency depends on display to source synchronization time.
- HDR supported.
- 3D modes supported.

Scale video output resolution only

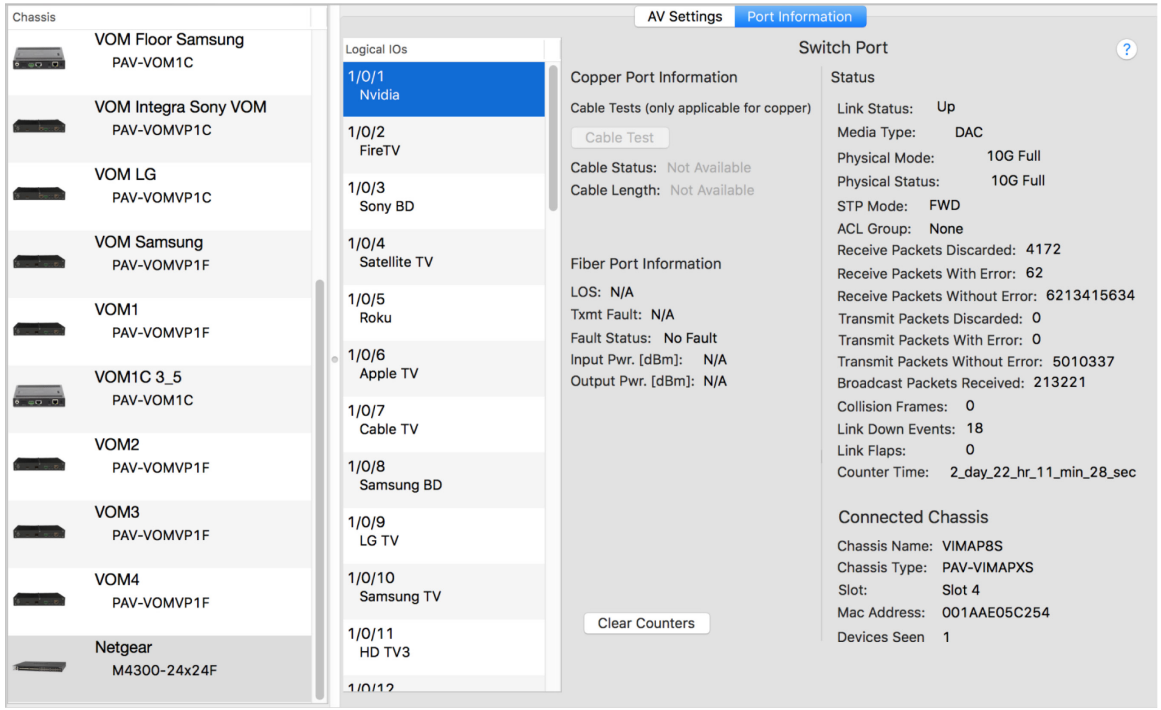
- Very low switching latency (less than 4ms).
- Output colorspace is always RGB 8bit.
- Video latency depends on display to source synchronization time.

Fixed Frame Rate used

- Display timing remains constant. There is no need to resync on input changes.
- Switching time is dependent on the network switch.
  For switches with the IGMP FASTLEAVE feature enabled, switching time is < 0.1 seconds.
- Output colorspace is always RGB 8bit
- Latency is never less than one frame, but never more than two frames.
- Video stutter may occur due to frame rate conversion frame slips.

8.3 NetGear Switch Information

The NetGear M4300 switches display status information in System Monitor. This requires a control connection to be made in Blueprint and the IP Address of the NetGear switch to be defined. This feature requires da Vinci 8.8 or higher.



Logical IOs – Lists port number and the name of the connected device. The port numbering displays as 1/0/x. The last number is the port number. The SFP+ ports start at 1. Selecting a Logical IO can take up to 20 seconds for the status information to fully populate.

Port Information – Displays connection status of the connected port. This information is mainly used it troubleshooting.

Appendix A: 10G Network Requirements

The following list is the settings that need to be configured on any Switch that is being used for the Audio/Video over IP system.

IMPORTANT!

Not all of these settings are on all network switches.

- 10G Managed Switch with SFP+ ports
- IGMP Snooping Enabled.
- Enable IGMP Snooping on all ports for the VLAN in use.
- IGMP Querier Enabled.
- Enable IGMP Querier on all ports for the VLAN in use.
- Filter/Drop Unregistered Multicast Traffic Enabled.
- Unregistered Multicast Flooding Disabled.
- FASTLEAVE enabled (Optional*).
- Enable FASTLEAVE on all ports for the VLAN in use (Optional*).

* FASTLEAVE will make changing services faster.

Switch considerations

One SFP+ port is needed for each source. And one 10G port is needed for each endpoint. The type of port needed depends on the cable length to the Video Output IP Receiver. If the cable length is more than 300ft (100m) it will require the use of a PAV-VOMVPF1 using a SFP+ port on the switch.

Appendix B: Accessories

SKU	Description	Image
CON-FSFP1-00 CON-FSFP10-00	Fiber Transceiver Module (Single or 10 Pack)	
CON-F2010-00	LC Multimode OM3 Fiber Connectors (10 Pack)	
CBL-F2500-00	Duplex OM3 Indoor/Outdoor Plenum Rated Multi-Mode Fiber (1000ft)	
CBL-HDMI2M1-00 CBL-HDMI2M2-00 CBL-HDMI2M3-00	High Speed Category HDMI 2.0 Cable (1,2, or 3 Meter)	
CBL-SFPDACM2-00	SFP+ Direct Attach Copper Cable (2 meter)	
FTK-F2000-00	Fiber Termination kit	
FTK-FTEST-00	Fiber Test Kit	

Appendix C: UPS Recommendations

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 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.

⚠ **IMPROTANT!** 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.

Appendix D: EDID Optimization

Enhanced HDMI source capabilities can create compatibility issue with less capable displays. Below are tables to show examples of possible EDID changes for testing and use.

Default EDID (4K@60hz 4:2:0 8 bit video, PCM audio up to 8 channel)

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Native HDMI audio (Multi-channel PCM)	Native HDMI audio (Multi-channel PCM)	All HDMI audio	Source audio input 2 channel PCM only

EDID: 4K@60hz 4:2:0 8 bit video, PCM audio up to 8 channel, Dolby/DTS surround audio

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output)	Native HDMI audio	Native HDMI audio	Native HDMI audio	Source audio input 2 channel PCM only (If encoded audio is used by the source analog outputs will output audio noise)

EDID: 4K@60hz 4:2:0 8 bit video, PCM audio up to 8 channel, Dolby/DTS surround audio, Dolby Digital Plus

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (Many TVs do not decode Dolby Digital Plus)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (Many TVs do not decode Dolby Digital Plus)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (Many TVs do not decode Dolby Digital Plus)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (Many TVs do not decode Dolby Digital Plus)	Native HDMI audio	Native HDMI audio	Native HDMI audio	Source audio input 2 channel PCM only (If encoded audio is used by the source analog outputs will output audio noise)

EDID: 4K@60hz 4:2:0 8 bit video, PCM audio up to 8 channel, Dolby/DTS surround audio, HBR audio (Dolby TureHD/DTS HD)

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	Pass-Though (Use Input)	Pass-Though (Use Input)	Resolution Scaled to 1080p	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (TVs are not HBR audio capable)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (TVs are not HBR audio capable)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (TVs are not HBR audio capable)	Multi to 2 Channel checked (If Dolby/ DTS are used they will be passed to the HDMI output) (TVs are not HBR audio capable)	Native HDMI audio	Native HDMI audio	Native HDMI audio	Source audio input 2 channel PCM only (If encoded audio is used by the source analog outputs will output audio noise)

EDID: 4K@60hz 4:4:4 8 bit video, PCM audio up to 8 channel)

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input)	Pass-Though (Use Input) (4:4:4 content will need to be scaled)	Resolution Scaled to 1080p (If source uses HDCP 2.2 video will NOT display)	Pass-Though (Use Input)	Pass-Though (Use Input) (4:4:4 content will need to be scaled)	Resolution Scaled to 1080p (If source uses HDCP 2.2 video will NOT display)	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Native HDMI audio (Multi-channel PCM)	Native HDMI audio (Multi-channel PCM)	All HDMI audio	Source audio input 2 channel PCM only

EDID: 4K@60hz 4:4:4 8 bit video, HDR and Deep Color enabled, PCM audio up to 8 channel)

	HDCP 1.4 Source	HDCP 2.2 4K@60hz 4:4:4 HDR capable TV	HDCP 2.2 4K@60hz 4:4:4 non-HDR capable TV	HDCP 2.2 4K@60hz 4:2:0 non-HDR capable TV	HDCP 1.4 1080p TV	HDCP 2.2 4K@60hz 4:4:4 HDR AVR HBR audio capable	HDCP 2.2 4K@60hz 4:2:0 non-HDR AVR HBR audio capable	HDCP 1.4 1080p AVR Up to Dolby audio capable	Analog audio output on the VIM chassis in use
VOM Video Mode	N/A	Pass-Though (Use Input)	Pass-Though (Use Input) (Video will display but will not be in HDR)	Pass-Though (Use Input) (Video will display but will not be in HDR) (4:4:4 content will need to be scaled)	Resolution Scaled to 1080p (If source uses HDCP 2.2 video will NOT display)	Pass-Though (Use Input)	Pass-Though (Use Input) (Video will display but will not be in HDR) (4:4:4 content will need to be scaled)	Resolution Scaled to 1080p (If source uses HDCP 2.2 video will NOT display)	N/A
VOM Audio Mode	N/A	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Multi to 2 Channel checked	Native HDMI audio (Multi-channel PCM)	Native HDMI audio (Multi-channel PCM)	All HDMI audio	Source audio input 2 channel PCM only

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