

## Savant IP Video Network Configuration Guide

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Document Number:	009-1552-07
Document Date:	April 2021
Document Supports:	da Vinci 8.7 and Higher

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This document describes how to configure a 10 gigabit switch to support a Savant IP Video system. Details include:

- Adding the 10G Switch to a RacePoint Blueprint configuration,
- Using the Auto-Configure option in Blueprint to configure a supported NetGear 10G switch,
- OR Manually Configuring the 10G Switch.

The 10G switches supported within a Savant IP Video configuration are:

- M4300 8x8F
- M4300 12x12F
- M4300 24x24F
- M4300 16X
- M4300 24X
- M4300 48X
- M4300 96X
- M4300 48XF

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# 1. Overview

This document details the requirements for compatibility of 10-Gigabit (10G) network switches with Savant IP Video systems, and provides instructions for configuration of supported switches within the Savant environment.

## 1.1. Minimum Supported Releases

The minimum supported runtime or higher is required for each NetGear 10G switch to function correctly within the Savant environment. The table below shows the minimum supported release for each switch.

Minimum Release	Switch
da Vinci 8.7	M4300 8x8F M4300 12x12F M4300 24x24F
da Vinci 8.8	M4300 96X
da Vinci 8.8.2	M4300 24X
da Vinci 9.1	M4300 48X
da Vinci 9.2	M4300 16X
da Vinci 9.2.2	M4300 48XF

## 1.2. NetGear M4300 10G Switch Control Port

The control port is the Ethernet connection between the 10G Switch and the non-10G network. This port differs depending on the model. Refer to the table below to ensure that the correct control port is utilized for the model of switch being deployed on site.

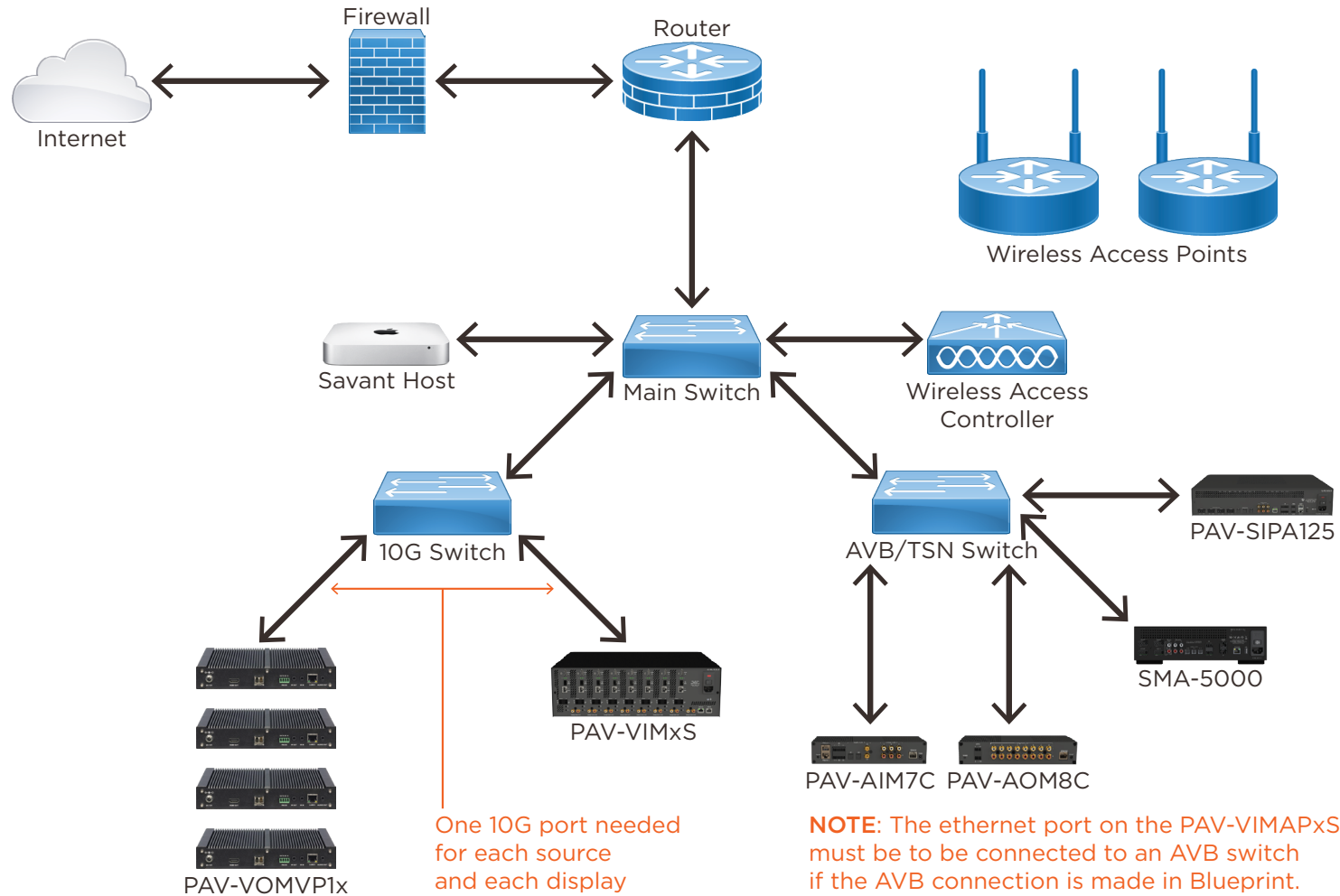
Model	Port
M4300 8X8F	9
M4300 12X12F	13
M4300 24X24F	25
M4300 16X	1
M4300 24X	1
M4300 48X	1
M4300 96X	1
M4300 48XF	48

## 2. Network Topology

10G Switches being utilized for Savant IP Video distribution should be connected to the same network switch as the Savant Host. Unmanaged switches should not be connected to the 10G Switch handling IP Video distribution. The image below is a basic network diagram. It does not imply all network connections.

### ⚠ Important Notes:

- 10G connections to PAV-VIMxS/VIMAPxS devices use SFP+ ports. Either fiber or Direct Attach copper cables can be used.
- 10G connections to PAV-VOMVP1x devices can use either SFP+ ports with fiber cabling or RJ-45 ports with CAT-6 or above cabling, depending on the cable length.



### 3. Auto-Configure (Recommended)

Enabling Auto-Configure will prompt the Host to check the configuration of the 10G switch each time it is restarted. If the settings check fails, the configuration will be sent to the 10G switch. Using the **Auto-Configure** option is the preferred method of configuration for all supported 10G switches with da Vinci 8.8 and higher Savant runtime software.

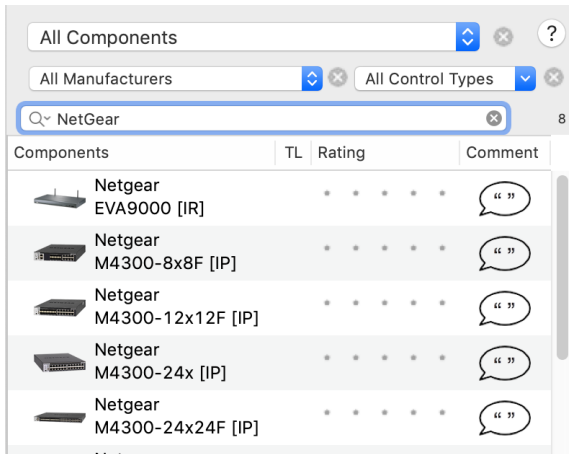


#### IMPORTANT NOTES:

- **DO NOT make any physical video connections to the 10G Switch** until the auto-configure process has been completed for the first time. The only connections that should be made to the switch being configured are power and between the **control connection** of the 10G Switch and the network.
- If the switch is placed in the Layout window and has an IP address assigned in Blueprint, skip to [step 8](#).

#### 3.1. Add Switch to Configuration

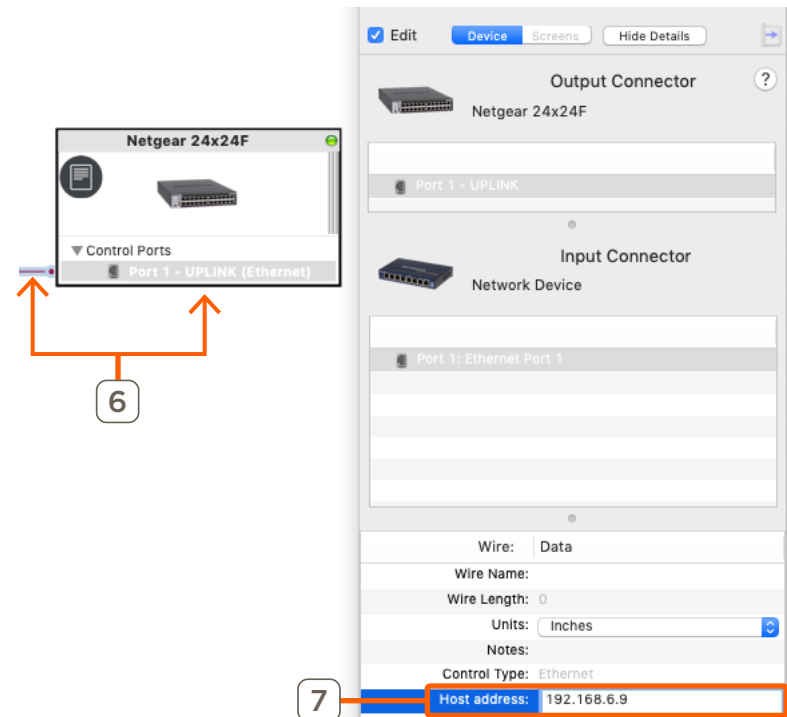
1. Click **Show Library**.
2. In the Search bar, type **netgear**



3. Select the switch Profile matching the exact model used on site and drag it into a **Shared Equipment** zone, naming it as desired.
4. Place the 10G switch in the **Layout** window.
5. Make the proper control connection for the model of switch in use. See [Section 1.2](#) for the specific port.

#### 3.2. Enter Switch IP Address

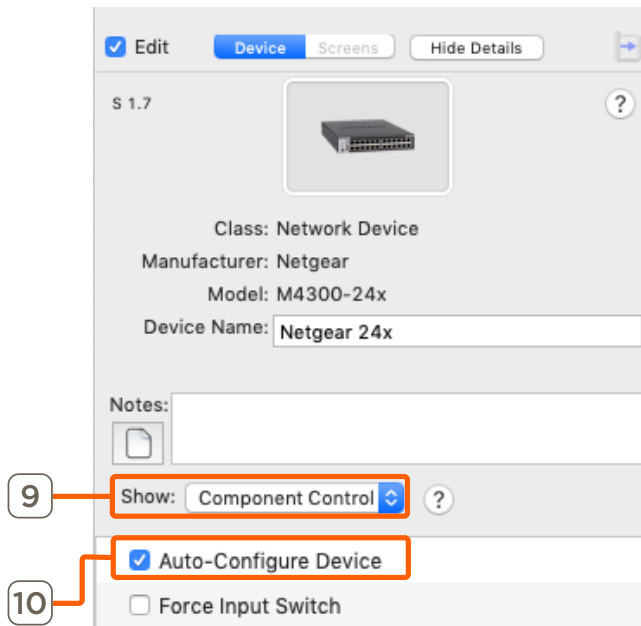
6. Highlight the control connection and open Inspector (**CMD + I**).
7. Select the **Host Address** field and enter the IP address of the 10G switch.



**IMPORTANT NOTE:** Savant recommends using an IP addressing scheme other than 192.168.0.x as this may cause a failure to properly acquire an IP address from a DHCP server.

### 3.3. Enable Auto-Configure

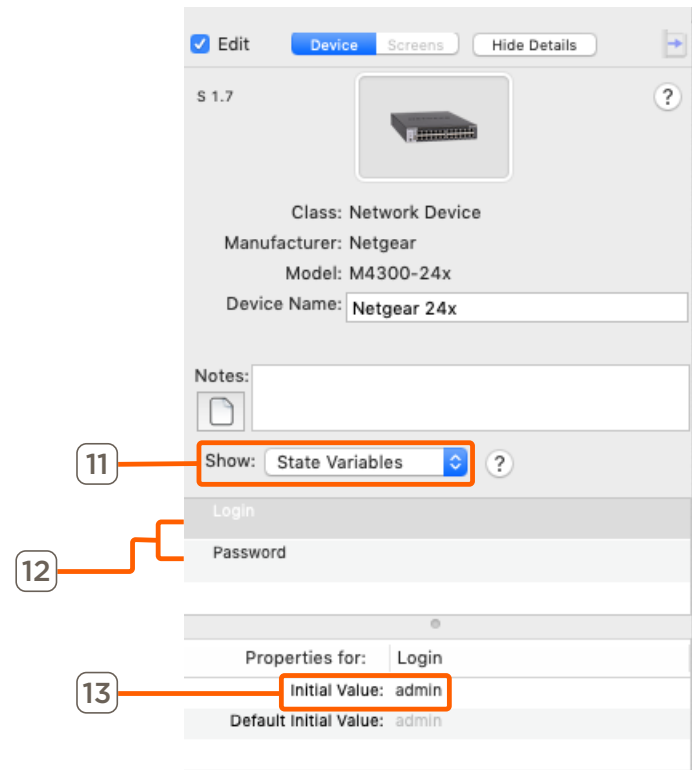
- Open Inspector for the 10G switch.
- Select **Component Control** from the **Show** drop-down menu.
- Select the **Auto-Configure Device** check-box.



### 3.4. Change Username and Password

After the initial login, a password change will be forced. When changing the username or password, same credentials must also be changed in the Blueprint configuration.

- Under the **Show** drop-down, select **State Variables**.
- Select the **Login** (username) or **Password** field.
- Change the **Initial Value** field as desired.



#### IMPORTANT NOTES:

- This process does **NOT** set the username or password on the switch.
- This is only for the local user. **DO NOT CHANGE** the **Enable** password in the 10G Switch WebUI.

## 4. Script Configure (Legacy)

For systems running 8.7 or 8.7.1, 10G switches for IP Video deployment can be configured via the scripts linked in the steps below. The scripts are still available for download, however there is no script available for supported switches added with da Vinci 8.8 and higher.

### IMPORTANT NOTES:

- These steps are to be done with the switch at its factory default settings. **DO NOT** set a password on the switch before running this script.
- **DO NOT make any physical video connections until the script is complete.** The only connections that should be made to the switch being configured are power and a single network connection. For the correct port, refer to [section 1.2](#).

1. Download the Configuration scripts via the link below:

<http://cdn.software.s3.amazonaws.com/scripts/Netgear/ConfigScripts.zip>

2. Using Finder, navigate to the download location.
3. Double click on the ConfigScripts.zip to unzip and open the ConfigScripts folder.
4. Select the script for the model of switch in-use on site and move the script file to the Desktop of the SDE.
5. Ensure that the switch's **control port** is connected to the same main network switch as the Savant Host.

```
Last login: Wed Jan 10 16:58:53 on ttys004
```

```
csmith-mbp:~ chris.smith$ sh ~/Desktop/ConfigScripts/M4300-24X24F-Config.sh
```

```
IMPORTANT! The only connections that should be made to the switch being configured are power and a single main network uplink plugged into port 25.
```

```
DO NOT have any other copper or fiber connections made to this switch until the configuration is complete.
```

```
This configuration tool assumes the default login for the network switch (user: admin & no password)
```

```
Enter the IP address of the Netgear switch and press Enter:
```

```
10.0.1.9
```

```
Please wait while the switch is being configured. This can take up to 45 seconds...
```

```
Trying 10.0.1.9...
```

```
Connected to 10.0.1.9.
```

```
Escape character is '^]'
```

```
User:admin
```

```
Password:
```

```
(M4300-24X24F) >
```

```
(M4300-24X24F) >enable
```

```
(M4300-24X24F) #clear config
```

6. Confirm the IP address of the 10G switch using network scanning software.

7. Open Terminal on the SDE.

8. Type: **sh ~/Desktop/<NameOfScriptFile>.sh**

```
Example: sh ~/Desktop/M4300-24X24F-Config.sh
```

9. When prompted, enter the IP Address of the NetGear switch.

10. Press the **Enter** key to run the script and configure the switch. An example of the Terminal output for a successfully completed script configuration is shown below:

```
(M4300-24X24F) (Config-router)#exit
```

```
(M4300-24X24F) (Config)#router ospf
```

```
(M4300-24X24F) (config-router)#exit
```

```
(M4300-24X24F) (Config)#ipv6 router ospf
```

```
(M4300-24X24F) (Config-rtr)#exit
```

```
(M4300-24X24F) (Config)#exit
```

```
(M4300-24X24F) #save
```

```
This operation may take a few minutes.
```

```
Management interfaces will not be available during this time.
```

```
Are you sure you want to save? (y/n) y
```

```
Config file 'startup-config' created successfully .
```

```
Configuration Saved!
```

```
(M4300-24X24F) #
```

```
(M4300-24X24F) #Connection closed by foreign host.
```

```
csmith-mbp:~ chris.smith$
```

## 5. Manual Configuration (Reference only)

This section is an overview for the settings of Savant-qualified NetGear 10G ProSafe M4300 switches. Only the settings needed for the Savant IP Video environment are described and no other setting are noted. These steps are to be done with the switch at its **Factory Default** settings.

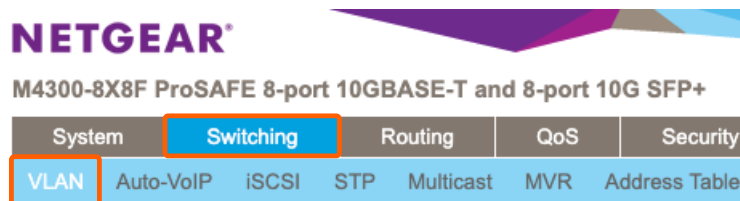


### IMPORTANT NOTES:

- **DO NOT make any physical video connections until the configuration is complete.** The only connections that should be made to the switch being configured are power and a single network connection using the **switch-specific control port**.
- Savant recommends using an IP addressing scheme other than 192.168.0.x as this may cause a failure to properly acquire an IP address from a DHCP server.

### 5.1. VLAN Setup

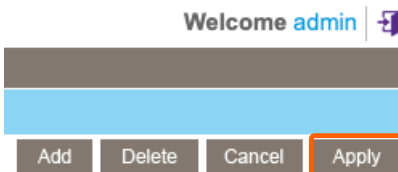
1. Use network scanning software to find the IP address of the switch.
2. Connect to the switch via a web browser by entering the IP address in the address bar of an internet browser.
3. Enter the User ID and Password. Default username: **admin**. Default password: **N/A** (leave blank as there is no default password)
4. Go to **Switching > VLAN**.



5. Add a VLAN, entering a **VLAN ID** and **VLAN Name**. Savant recommends the following values be entered:

VLAN ID:	1
VLAN Name:	default

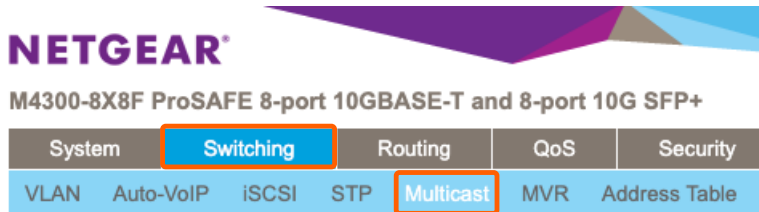
6. Click **Apply** in the upper right corner of the browser window.



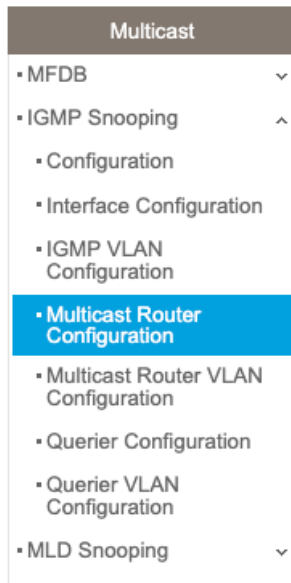


## 5.2. Multicast Configuration

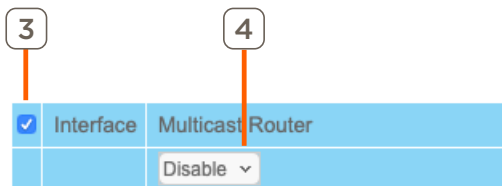
1. Go to Switching > Multicast.



2. Click on IGMP Snooping > Multicast Router Configuration.



3. Click the checkbox to select all.
4. Select **Disable** under Multicast Router.  
Note: Multicast must be disabled on the main network router as well.



- Click **Apply** in the upper right corner of the browser window.
- Still within **Switching > Multicast**, navigate to **IGMP Snooping > Configuration**.
- Configure the settings as follows:

Multicast		IGMP Snooping Configuration	
• MFDB	▼	Admin Mode	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
• IGMP Snooping	▲	Multicast Control Frame Count	78290
• Configuration		Validate IGMP IP header	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
• Interface Configuration		Interfaces Enabled for IGMP Snooping	1/0/1 - 1/0/16
• IGMP VLAN Configuration		Proxy Querier Mode	<input type="radio"/> Disable <input checked="" type="radio"/> Enable

Admin Mode	Enabled
Validate IGMP IP header	Enabled
Proxy Querier Mode	Enabled

- Click **Apply** in the upper right corner of the browser window.

### 5.3. IGMP VLAN Configuration

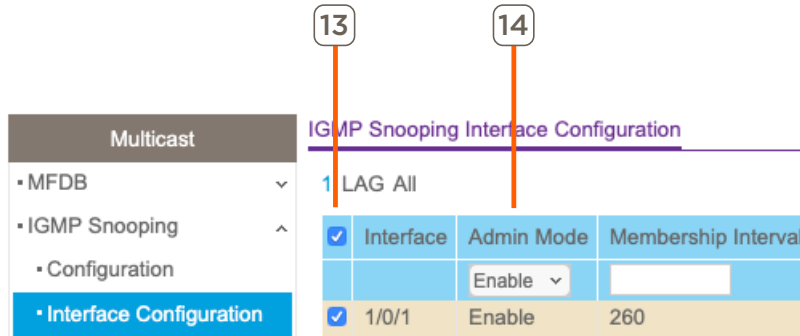
- Go to **IGMP Snooping > IGMP VLAN Configuration**.
- Apply the settings listed in the table below to the IGMP VLAN Configuration.

Multicast		IGMP VLAN Configuration													
• VLAN ID	<input type="text" value="1"/>	Admin Mode	<input checked="" type="checkbox"/>	Fast Leave	<input checked="" type="checkbox"/>	Membership Interval	<input type="text" value="260"/>	Maximum Response Time	<input type="text" value="10"/>	Multicast Router Expiry Time	<input type="text" value="60"/>	Report Suppression	<input type="checkbox"/>	Proxy Querier	<input checked="" type="checkbox"/>

Category	Value
VLAN ID	1
Admin Mode	Enable
Fast Leave	Enable
Membership Interval	600
Maximum Response Time	120
Multicast Router Expiry Time	60
Report Suppression	Disable
Proxiy Querier	Enable

- Click **Apply** in the upper right corner of the browser window.

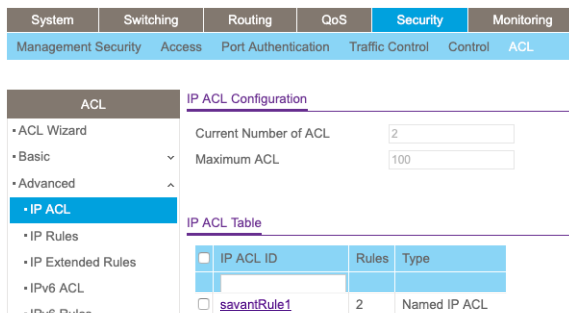
- Navigate to **IGMP Snooping > Interface Configuration**.
- Select all ports.
- Change Admin Mode to **Enabled**.



- Click **Apply**.

## 5.4. Access Control List (ACL) Creation

- Go to **Security > ACL**.
- Click on **Advanced > IP ACL**.



**NOTE:** As of da Vinci 9.4 and Netgear firmware 12.0.7.12, **savantRule1** has been removed.

- In the **IP ACL ID** field enter: 101.
- Select **Add** in the top right corner.
- Click the 101 Hyperlink that now populates under **IP ACL ID**.

6. Select **Add** in the top right corner and configure the Extended ACL Rule Configuration as follows:

<b>(A)</b>	<b>Sequence Number</b>	10
<b>(B)</b>	<b>Action</b>	Deny
<b>(C)</b>	<b>Match Every</b>	False
<b>(D)</b>	<b>Protocol Type</b>	IP
<b>(E)</b>	<b>Dst.</b>	224.0.0.0

The screenshot displays the 'Extended ACL Rule Configuration(100-199)' window. The configuration is as follows:

- ACL ID/Name: 101
- Sequence Number: 10
- Action: Deny
- Logging: Disable
- Interface: (empty)
- Match Every: False
- Protocol Type: IP
- TCP Flag: URG
- Src: IP Address
- Src L4: Range
- Dst: IP Address (224.0.0.0)
- Dst L4: Range
- IGMP Type: (empty)
- ICMP: Type
- Fragments: Disable
- Service Type: IP DSCP

- Select **Apply**.
- Select **Add** in the top right corner to create another rule and configure it as follows:

**ACL** **Extended ACL Rule Configuration(100-199)**

- ACL Wizard
- Basic
- Advanced
- **IP ACL**
- IP Rules
- IP Extended Rules
- IPv6 ACL

ACL ID/Name: 101  
 Sequence Number: 20  
 Action:  Permit  
 Deny  
 Disable  
 Mirror  
 Redirect  
 Logging:   
 Interface:   
 Match Every: True

---

Sequence Number	20
Action	Permit
Match Every	True

- Select **Apply**.
- Click on **Advanced > IP Binding Configuration**.
- Select ACL ID 101.
- Change the Direction to **Outbound**.
- Click the **Control Port**.

**ACL** **IP Binding Configuration**

- ACL Wizard
- Basic
- Advanced
- IP ACL
- IP Rules
- IP Extended Rules
- IPv6 ACL
- IPv6 Rules
- **IP Binding Configuration**

ACL ID: 101  
 Direction: Outbound  
 Sequence Number: 0 (1 to 4294967295)

Unit 1

Ports: 1 3 5 7 9 11 13 15  
 2 4 6 8 10 12 14 16

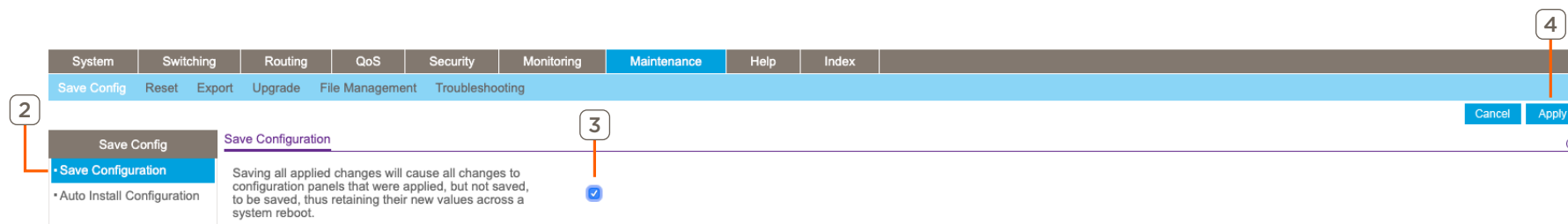
Control Port: 9

Cancel Apply

- Select **Apply** in the top right corner.

## 5.5. Save Configuration

1. Go to **Maintenance > Save Config**.
2. Click **Save Configuration**.
3. Click the Check-box.
4. Click **Apply** in the upper right corner of the browser window.



## Appendix A: Non-NetGear 10G Switch Requirements

When using a 10G network switch that is not listed in the [Supported 10G Network Switch](#) section above, special consideration must be taken for selecting and configuring settings. The list below outlines the requirements for any 10G switch being used with a Savant IP Video system:

**IMPORTANT!** The settings listed below may not be available on all 10G switches. Products that do not support one or more of the settings below cannot be supported for use with a Savant IP Video system.

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

### Optional:

- Enable FAST LEAVE on all ports for the VLAN in use (FAST LEAVE will make changing services faster.)

## Appendix B: Static IP

For switches requiring a static IP address, the IP address must be assigned before proceeding with the rest of the configuration process. Refer to manufacturer documentation for the switch in use for details on how to assign a static IP address.

## Appendix C: Update Firmware

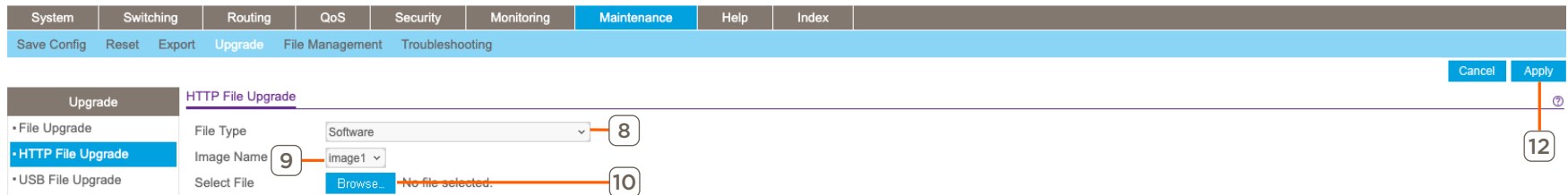
Savant-supported NetGear 10G Switches must run the recommended firmware. Review the product-specific store page for the latest supported firmware.

### Download Firmware

1. Download the NetGear firmware version from the Savant Store.
2. Un-compress the firmware .zip file.

### Upgrade Firmware

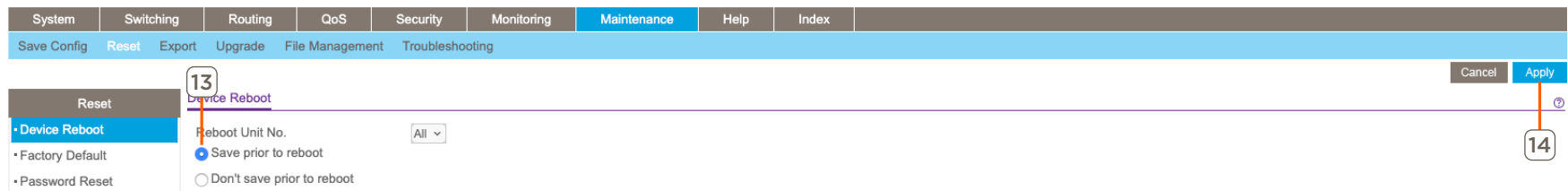
3. Use a network scanning software to find the IP address of the switch and connect to that address via an Internet browser.
4. Enter the User ID and Password for the switch. Default username: **admin**. Default password: **N/A** (leave blank, there is no default password)
5. Go to **Maintenance > Upgrade > HTTP File Upgrade**.
6. Select **Software**.
7. Select **image1**.
8. Click **Browse...** and navigate to the download location, clicking **Open** on the firmware folder.
9. Click **Apply**. This process will take a couple of minutes to complete.



10. Select **image2**.
11. Repeat steps 8 and 9.

### Reboot Switch

12. Navigate to **Maintenance > Reset > Device Reboot**.
13. Select **Save** prior to reboot.
14. Click **Apply**.





## Appendix D: M4300-24X/48X/96X Modules

NetGear M4300-24X have SFP+ ports on the rear while 48X switches have SFP+ ports on the front of the unit. They are linked to the following RJ45 ports.

Model	SFP+ Ports	Linked Copper Ports
M4300-24X	4	21-24
M4300-48X	4	45-48

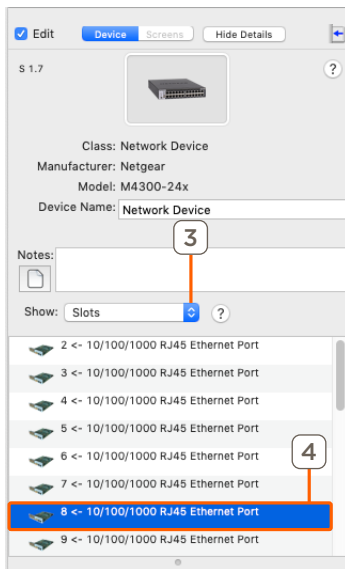
If a connection to one of the SFP+ ports is made, the corresponding RJ45 port becomes inactive. By default, Blueprint has RJ45 modules installed in the SFP+ linked copper ports.

**NOTE:** M4300-96X is a modular chassis with no SFP+ ports linked to copper ports. Modules can be adjusted to suit the needs of the site. Modules must be updated to reflect any changes made on-site.

To replace and remove modules in Blueprint, do the following:


### Remove Blueprint Module

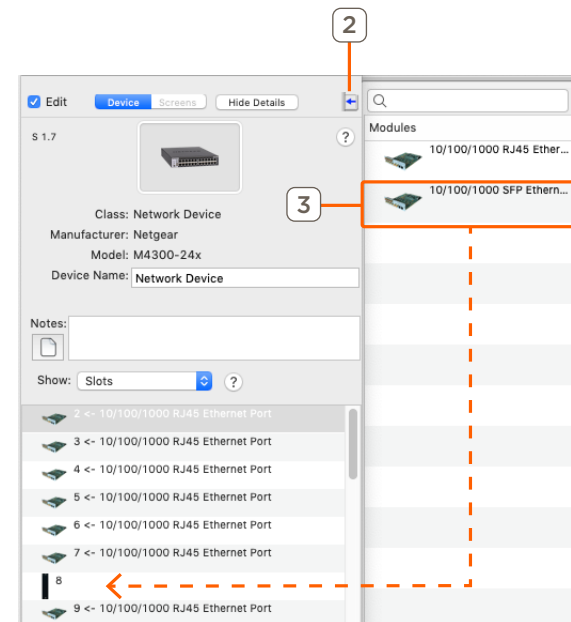
1. Select the M4300-24X switch.
2. Open inspector (**CMD + I**).
3. Click the **Show:** drop-down and select **Slots**.
4. Select the desired port.



5. Press the **Backspace** key.
6. A pop-up window will appear to confirm, select **Delete**.

### Add Blueprint Module

1. While inspecting the switch, navigate to **Show: Slots**.
2. Open the Module Drawer .
3. Click and drag the module to the emptied slot.



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