IPLinx Ethernet Switch Planning and Configuration Guide 5000 Series

Rev 160802

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Ethernet Switch Planning

Networking Strategy

When planning a deployment using IPLinx 5000 series encoders and decoders, consider the location of the source equipment and displays as well as the number of sources and displays in areas of the installation. Some installations may need a single network switch that will work with a centralized distribution model. Other installations may require a distributed deployment with multiple switches to meet the demands of the project.

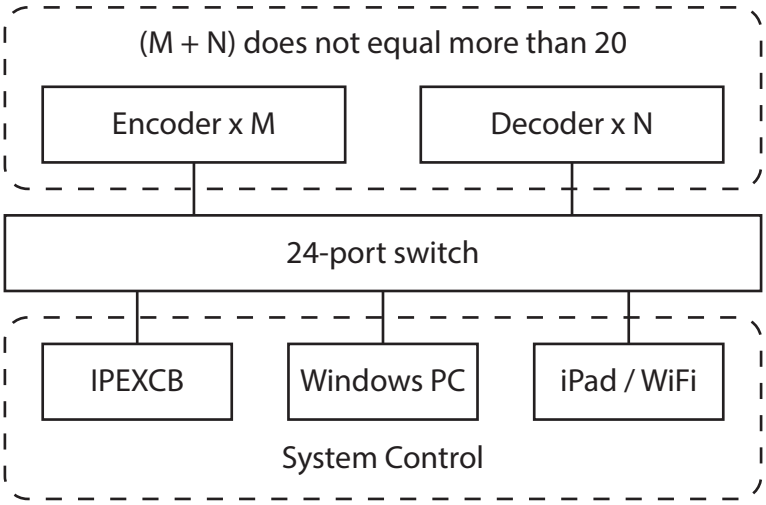
The following table shows various recommendations of required equipment based on the installation requirements.

Encoder/Decoder Information		**Network Strategy**	
Distribution Status	Total Quantity	Network Topology	Recommended Switch
Centralized	Less than or equal to 20 total encoders and decoders	Single switch	Managed 24 port gigabit switch
	Less than or equal to 44 total encoders and decoders		Managed 48 port gigabit switch
	More than 44 encoders and decoders	Multiple switches	Managed 24 or 48 port gigabit switch
Distributed	No requirement		

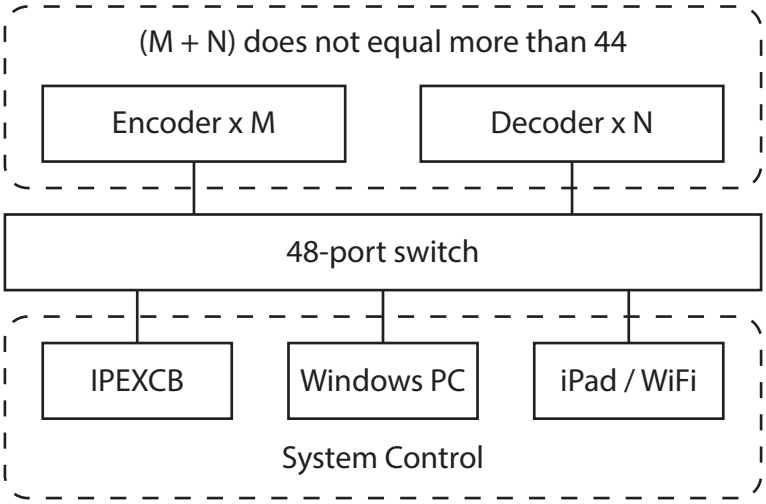
Single Switch Networking

When the encoders and decoders are deployed in an environment that will rely on a centralized distribution model and the total number of encoders and decoders do not exceed 44 units, a single gigabit switch will be required for the installation.

Below is an example of a small centralized installation that does not require more than 20 encoders and decoders.



Below is an example of a small centralized installation that does not require more than 44 encoders and decoders.

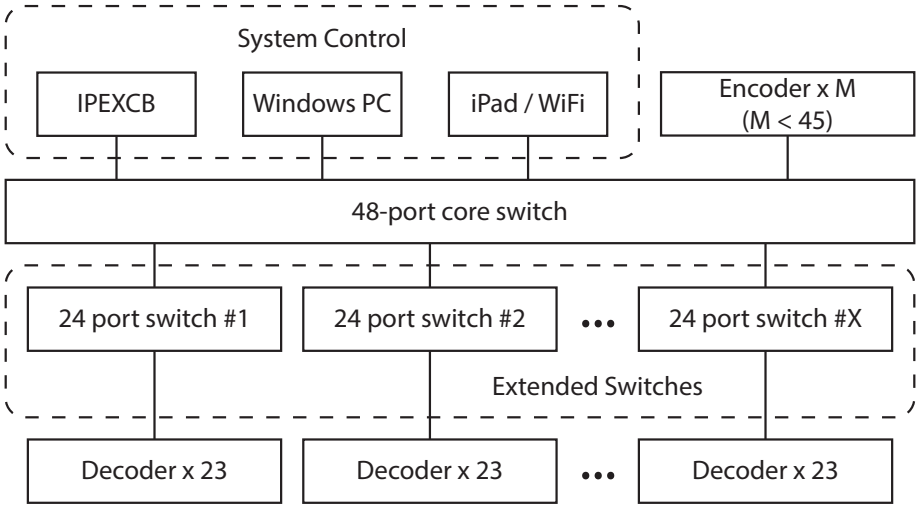


Multiple Switch Networking

When the encoders and decoders are deployed in an environment that will rely on a distribution model with multiple hubs or the total number of encoders and decoders exceed 44 units, a multiple gigabit switch distribution model will be required for the installation. ***Note***: IPEX5000 series systems have been tested up to 96 total ports.

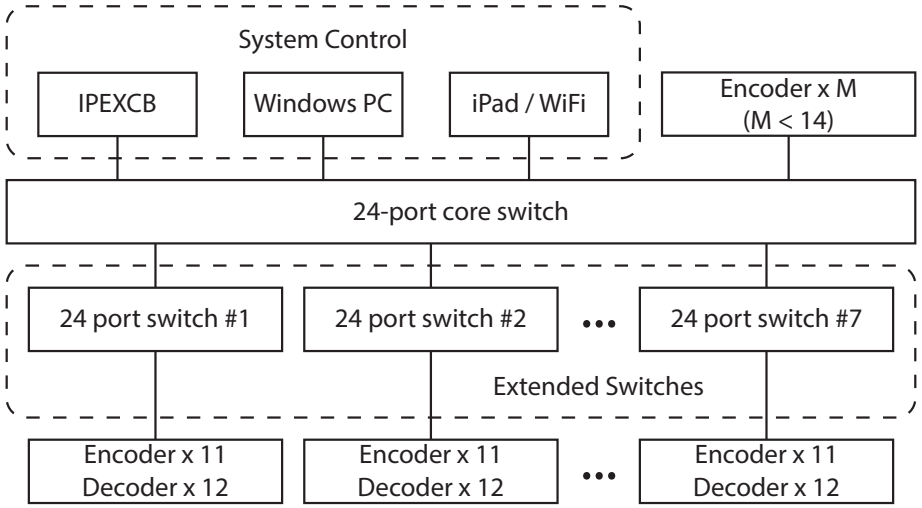
Basic Multiple Switch Networking

Below is an example of a multiple hub installation that utilizes multiple switches to expand the total number of encoders and decoders with the sources in a centralized location.



Complex Multiple Switch Networking

Below is an example of a multiple hub installation with some encoders at the core switch location and other encoders and decoders at other locations in the installation.



Calculating System Bandwidth

The IPLinx 5000 Series utilizes the JPEG2000 compression codec to deliver video resolutions up to 4K/UHD. When JPEG2000 delivers 4K video, momentary transfer rates per encoding stream can reach as high as 850 Mbps which will require a gigabit Ethernet switch. When calculating bandwidth, multiply 850 Mbps per encoding video stream to determine your maximum bandwidth requirement, the decoders in an IPLinx system will not impact bandwidth.

Example: (8) 4K/UHD sources are used with (8) IPEX5001 encoders therefore:
8 * 850 Mbps = 6800 Mbps OR 6.8 Gbps, this is your maximum bandwidth required by this series

Compare this bandwidth requirement to the switching capacity of the IP switch to determine if the switch is appropriate.

Choosing an Ethernet Switch

In IP video networking, the Ethernet switches must support the following functions:

- Multicast forwarding or filtering
- IGMP Snooping
- IGMP Querier
- IGMP Snooping Fast Leave
- Jumbo Frames (8000 bytes or larger)

If the system design requires multiple hubs, the Ethernet switches must support the following additional functions:

- Dynamic Multicast Router Port
- Forwarding Unknown Multicast to Multicast Router Port Only

Each manufacturer will have different processes and procedures to enable these required functions. The required functions may have a slightly different name by manufacturer. Finally, some lesser known brands of switches may have limited support for the functions required. Please see the “Ethernet Switch Configurations” section for a list of manufacturers and product series that have been tested to work well with the IPLinx encoders and decoders.

Basic Ethernet Switch Configuration Settings

The configuration of the switches will vary based on the networking strategies employed for the installation.

Feature of Switch	Single Switch Networking	Multiple Switch Networking	
		Core Switch	Extended Switch
Green or energy-saving feature	Disabled	Disabled	Disabled
Multicast forwarding or filtering	Enabled	Enabled	Enabled
IGMP snooping	Enabled	Enabled	Enabled
IP address of IGMP querier			N/A
IGMP querier	Enabled	Enabled	Disabled
IGMP snooping fast leave	Enabled	Disabled	Enabled
Dynamic multicast router port	Disabled	Disabled	Enabled
Forward unknown multicast	Disabled	Disabled	Router port only
Jumbo frame	Enabled	N/A	N/A

Power over Ethernet (PoE)

Overview

Each manufacturer will have different processes and procedures to enable these required functions. The required functions may have a slightly different name by manufacturer. Finally, some lesser known brands of switches may have limited support for the functions required. Please see the “Ethernet Switch Configurations” section for a list of manufacturers and product series that have been tested to work well with the IPLinx encoders and decoders.

A PoE system consists of Power Source Equipment (PSE) and Powered Device (PD).

- A PSE is a device such as a PoE Ethernet switch that will provide the PD with power over the Ethernet cable. The PSE will also manage the power requirements for the attached devices.
- A PD is a device powered by a PSE. Examples include IPLinx encoders and decoders, as well as wireless access points. The electric modules that receive power from the PSE are called PD modules.

Over the years, the PoE standard has developed into two versions: IEEE 802.3af and IEEE 802.3at:

- IEEE 802.3af states that the PSE must provide 15.4 watts of DC power at the port in order to guarantee 12.95 watts of DC power will be available to the PD.
- IEEE 802.3at Type 1 uses the same power requirements as IEEE 802.3af. IEEE 802.3at Type 2, known as PoE+ or PoE Plus, provides up to 32 watts of DC power at the port in order to guarantee 25.5 watts of DC power will be available to the PD.

The two PoE standards also provide different options for transmitting power via the Ethernet cable. Alternative A passes DC voltage over pins 1, 2, 3, and 6 (orange and green pairs). Alternative B passes DC voltage over pins 4, 5, 7, and 8 (blue and brown pairs).

In general, the PoE standard consists of the two versions above. When PoE is mentioned in this guide, IEEE 802.3af will be implied for simplicity.

Choosing a PoE Switch

When choosing a PoE switch, pay close attention to the power capacity of the Ethernet switch. In the current market, many PoE Ethernet switches may be unable to provide enough power on all ports simultaneously. For example, many 48 port PoE Ethernet switches can provide up to 370W of DC power. If each port needs 15.4 W based on the PoE standard, these switches can only supply power up to 24 ports (370 ÷ 15.4 = 24).

PoE Power Sourcing Equipment Guidelines

All of the IPLinx products are Class 0 devices that comply with the PoE standard, which provides up to 15.4 watts of DC power at the PSE. It is highly recommended to calculate the total number of ports the Ethernet switch is able to power by using 15.4 watts on each port. The following formula should be used to calculate the number of ports that can be reliably powered by the Ethernet switch.

Pc ÷ 15.4 = N

Pc is the power capacity of the Ethernet switch. N indicates the total number of ports that will be properly powered via PoE on the Ethernet switch.

According to the formula above, 24 port switches with a 370 watt or above power capacity and 48 port switches with a 740 watt capacity will provide the necessary amount of power for all IPLinx devices. If the proposed Ethernet switch cannot provide enough power, some of the IPLinx devices will require power from the included power supply. Disable PoE support on the ports of the devices that are externally powered to prevent damaging any of the networking equipment.

PoE Powered Devices Notes

The actual power consumption of the encoders and decoders is far less than 15.4 watts. Theoretically, this would allow more PD devices to be connected to a PoE switch that may have a lower than recommended power capacity. However, the effective inrush current of the encoders and decoders may cause a temporary increased load condition on the port, which will limit the number of PoE PD devices on a low power capacity Ethernet switch.

Based on lab testing results of PoE consumption for each product, including effective inrush current, the maximum load on the PSE for the IPLinx devices are below.

- 15.4 watts: IPEX5001, IPEX5002, and IPEXCB

Some switches provide an option to set a maximum load to an output port. If the proposed Ethernet switch supports this functionality, the above maximums can be configured.

Other PoE Considerations

Non-PoE Capable Ports

The number of PD units that a PoE Ethernet switch can supply power to may be less than the total number of available ports. The PoE function should be disabled on ports that are not used to provide power so that system stability will not be affected by connecting too many PD units with local power supplies. For more information, consult the user guide for the proposed Ethernet switch.

Higher PoE Power Consumption

The encoder and decoder power consumption is measured when the power is provided by the supplied power adapter. During this testing, the PD modules are not active. When the encoders and decoders are powered by a PoE Ethernet switch, the PD modules are active and consume more power than being powered locally. Power consumption measured when powered by PoE switches is higher than when using a local power adapter.

Cabling

Full consideration of cable power consumption (line loss) was taken when IEEE created the PoE standards. The calculation for total line loss is not necessary when using qualified Category 5e or greater cables. Low quality cables may prevent a PoE switch from providing adequate power to a PD.

USB Devices

PoE power capacity of the switch is limited. If a PD connects to a USB device, consideration must be made regarding the power consumption of the USB device. The IPEX5002 only supports HID devices, such as a mouse or a keyboard. The increased power requirement for these devices, though minimal, has been calculated into the maximum power draw to ensure stable operation. Connecting a non-supported device, such as a USB flash drive, may cause the IPEX5002 to draw too much power.

Recommended IP Switches

Below is a detailed list of IP switches and hardware network configurations that has been tested and verified for use with JPEG2000 / 5000 Series IPLinx systems. ***Note***: IPLinx 5000 Series is approved to work up to 96 total ports or 4 stacked 24 port switches.

Switch Manufacturer	Model	Single Switch Networking	Multiple Switch Networking	
			Cascade	Stack
Cisco	SG300-28 / SG300-28P	Yes	No	No
	SG500-28 / SG500-28P SG500-52MP / SG500-52	Yes	Yes	Yes
	WS-C2960S-24PS-L WS-C2960X-24TS-L WS-C2960X-24PS-L	Yes	Yes	No
Niveo	NGSME24G4S	Yes	Yes	Yes
	NGSME24T2H	Yes	No	No
	NGSME24T2H-AV	Yes	No	No
	NGSME48T2H	Yes	No	No
Luxul	AMS-4424P	Yes	Yes	Yes

Wireless Access Devices

In order for the IPLinx Control software on iPad to connect to the IP video network, it is necessary to deploy a wireless access device, such as a Wi-Fi router or Wi-Fi access point (AP). Either type of device will be acceptable to provide this functionality.

Wi-Fi Radio Bands

Wi-Fi mainly operates in the 2.4 GHz and 5 GHz spectrum. The 2.4 GHz spectrum is getting pretty crowded now that a large number of Wi-Fi devices are operating on the same frequencies; it is difficult to maintain a stable and high-speed data channel for video preview functionality of the IPLinx Control software. The 5 GHz spectrum will provide faster data rates, fewer disconnections, less interference and a more enjoyable experience.

Communication Channels

The 2.4 GHz and 5 GHz spectrum have multiple radio channels, which allow a large number of wireless networks to operate within the spectrum. It may be necessary to use a Wi-Fi analyzer app to configure the wireless access device to a vacant or rarely used channel. For more information, consult the user guide for the proposed wireless access device.

IGMP Querier

Many wireless access devices, especially wireless routers, use IGMP querier by default. These devices will regularly send IGMP query messages to the network, which affects IGMP snooping and interferes with the system operation. It is recommended to use wireless access devices without IGMP querier or disable IGMP querier.

Please note that many wireless access devices do not mention IGMP querier in the user documentation. Please the manufacturer for the proposed wireless access device to determine if it uses IGMP querier or if that function can be disabled.

Network Connection

Wi-Fi routers are usually equipped with multiple Ethernet ports. One of these ports is a WAN port; the others are LAN ports. If a Wi-Fi router is used, connect one of its LAN ports to the IP video Ethernet switch, ensuring that wireless access devices and the IP video system are on the same subnet.

Some Wi-Fi routers cannot be configured to use Class B IP ranges, such as 169.254.1.34. In these instances, connect the WAN port to the Ethernet switch.

If the IP video system is using a multiple switch topology, connect the wireless access device to the core Ethernet switch.

IPLinx System Configuration

This networking and switch guide will assist you in planning and configuring IP switches for IPLinx systems. Once networking strategy has been decided upon and the IP switches are properly configured, IPLinx systems can be configured with the IPLinx Configurator Software that is available for download on-line. The IPEXCB Control Interface manual will assist you in using the IPLinx Configurator Software which is also available for download on-line.

Download IPEXCB Configuration Manual

Download IPLinx Configurator Software

Ethernet Switch Configurations

Different brands or models of switches have unique configuration methods to work with the IPLinx IP video product lines. This section provides the basic settings necessary to configure IP video networking for common Ethernet switches. For more information, consult the user guide for the proposed Ethernet switch.

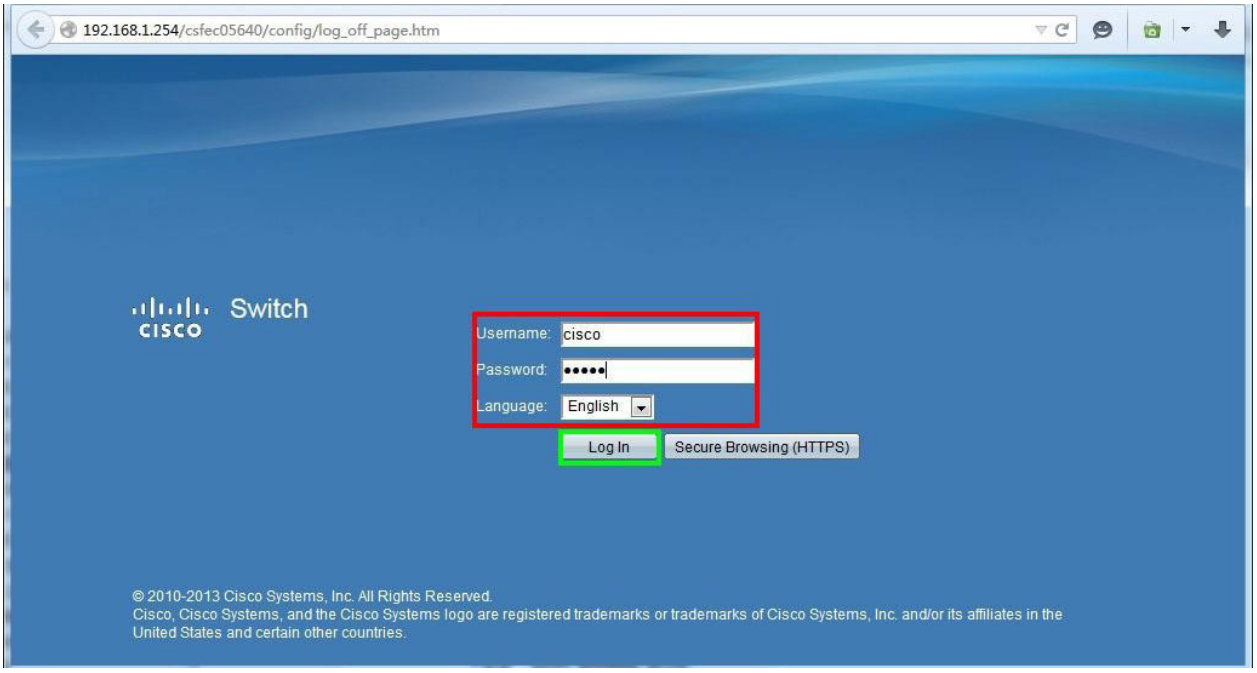
Cisco SG300 Series Switches

For Cisco SG300 series switches, the models SG300-28 and SG300-28P are recommended for use. These switches can only be used in single switch networking due to issues with how they handle multicast.

Log in to the Switch Web GUI

The default IP address of the switch is 192.168.1.254. Set a static IP address of the PC to ensure it is in the same IP range as the switch, such as 192.168.1.42.

Open a web browser and navigate to the IP address of the switch (192.168.1.254).

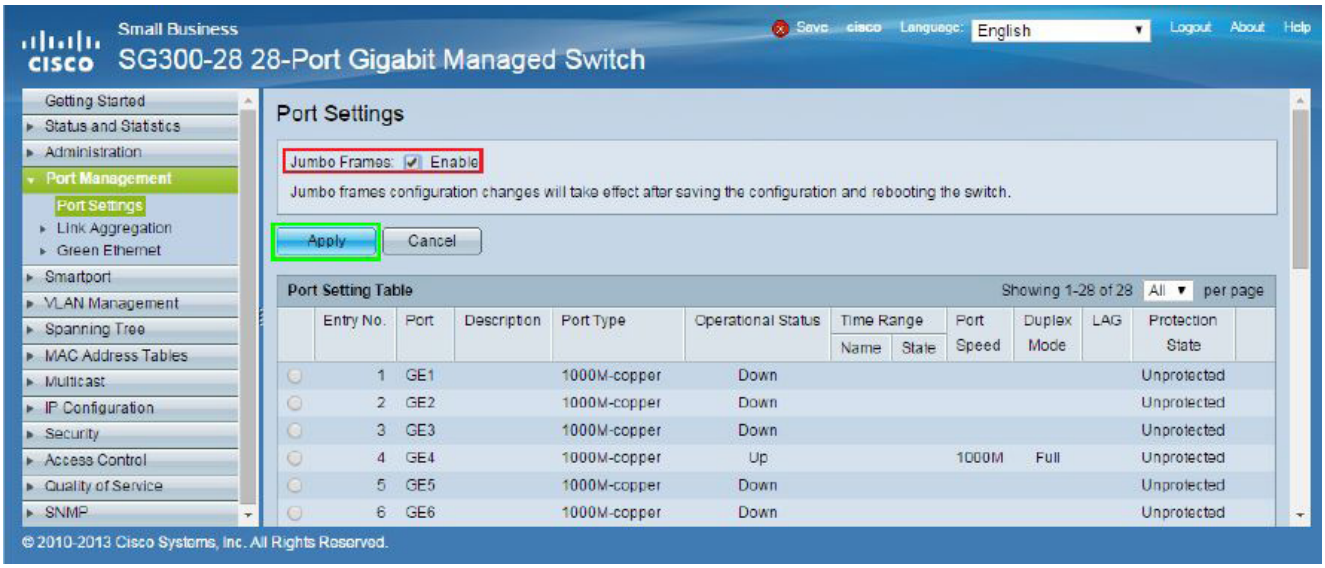


Input the username and password (default of both is *cisco*).

Select a language for the web GUI interface. All examples in the guide will be using English.

Click *Log In*.

Enable Jumbo Frames

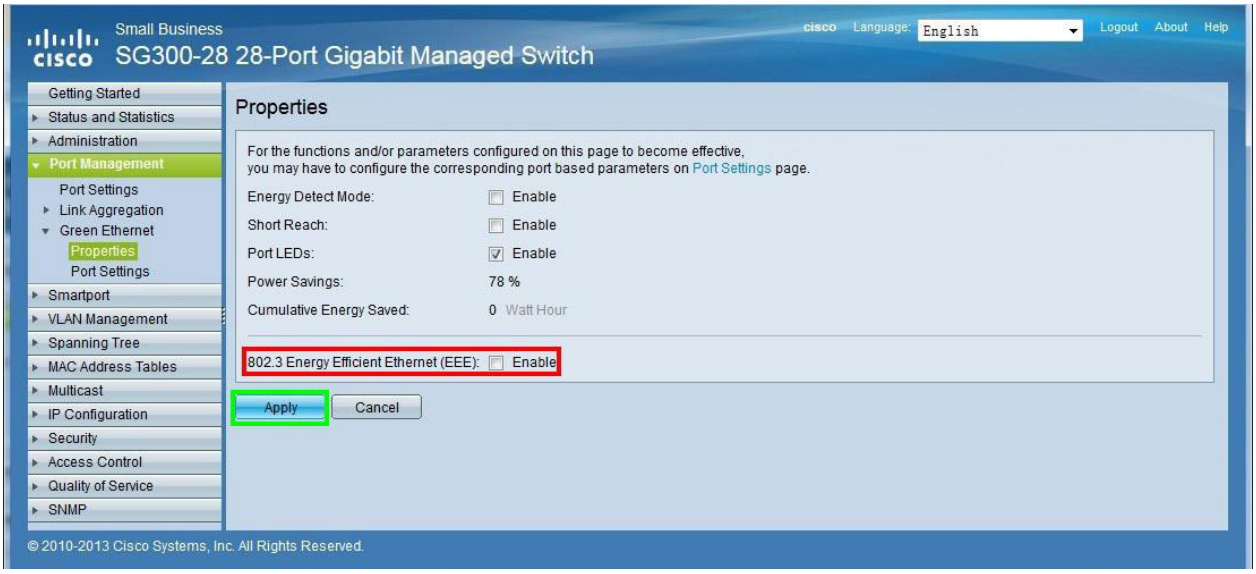


Navigate to *Port Management* > *Port Settings*

Check ***Enable*** for Jumbo Frames.

Click the *Apply* button.

Disable 802.3 Energy Efficient Ethernet (EEE)

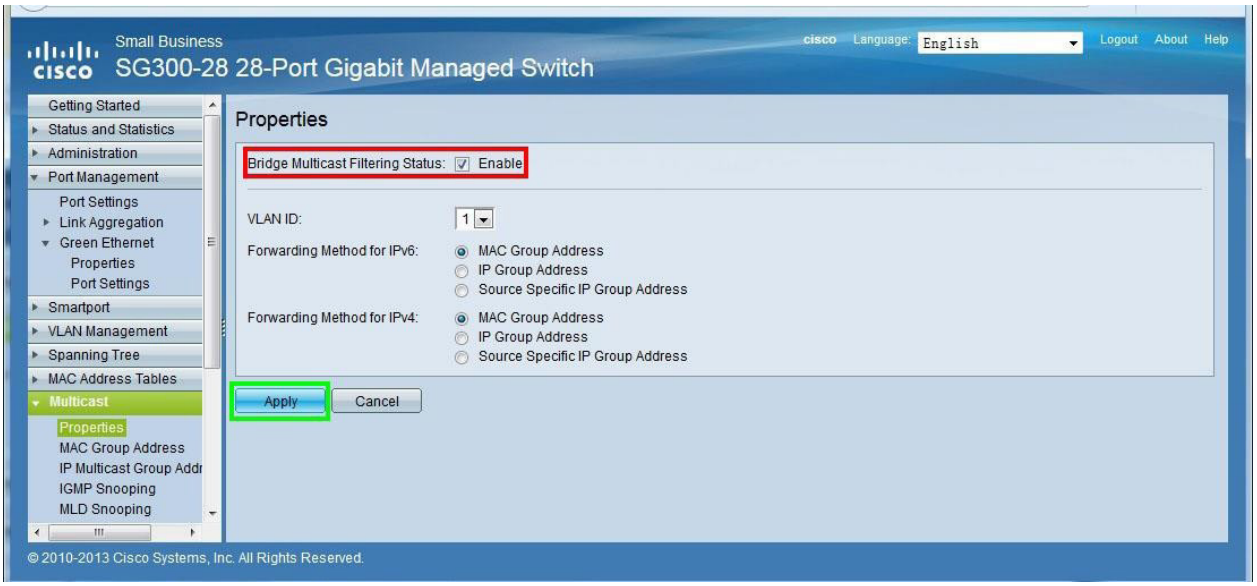


Navigate to *Port Management* > *Green Ethernet* > *Properties*.

Uncheck *Enable* for *802.3 Energy Efficient Ethernet (EEE)*.

Click the *Apply* button.

Enable Multicast Forwarding

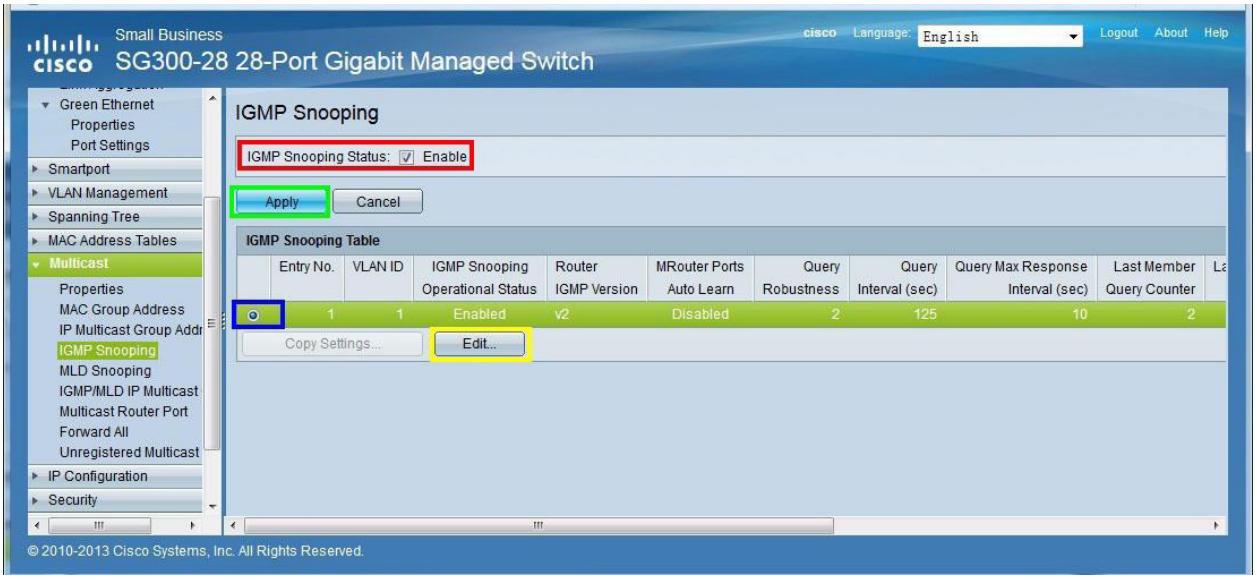


Navigate to *Multicast* > *Properties*.

Check *Enable* for *Bridge Multicast Filtering Status*.

Click the *Apply* button.

Enable IGMP Snooping



Navigate to *Multicast* > *IMGP Snooping*.

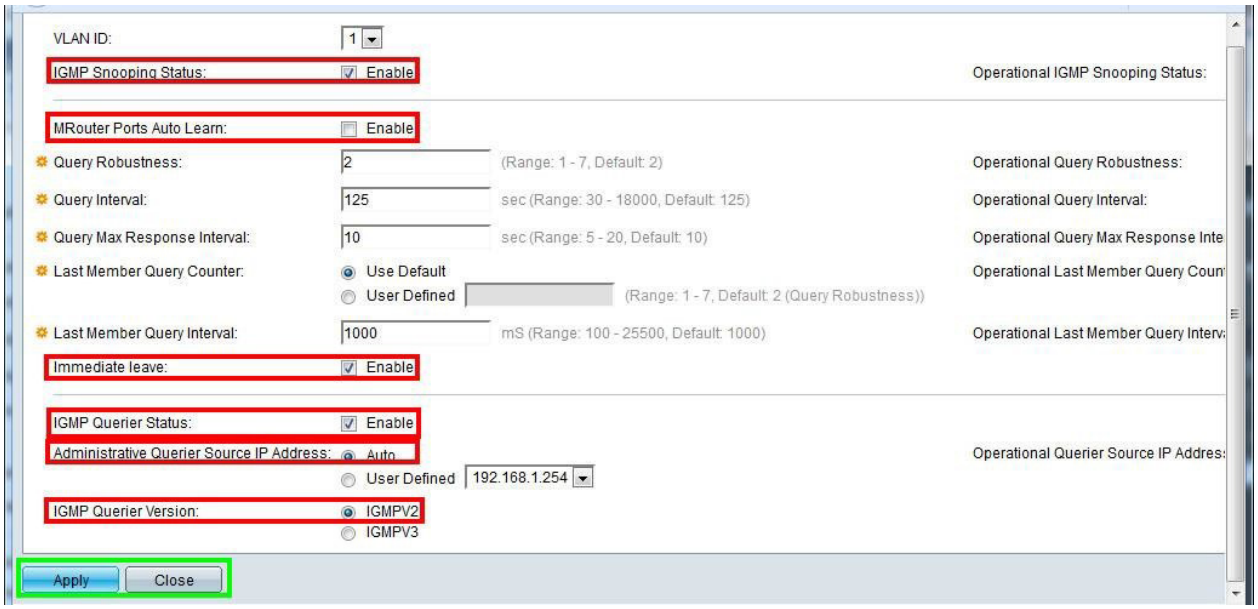
Check *Enable* for *IMGP Snooping Status*.

Click the *Apply* button.

Select the first item (VLAN1) under *IGMP Snooping Table*.

Click the *Edit…* button.

Configure IGMP Snooping for Single Switch Network



Check *Enable* for *IMGP Snooping Status*.

Uncheck *Enable* for *MRouter Ports Auto Learn*.

Check *Enable* for *Immediate leave*.

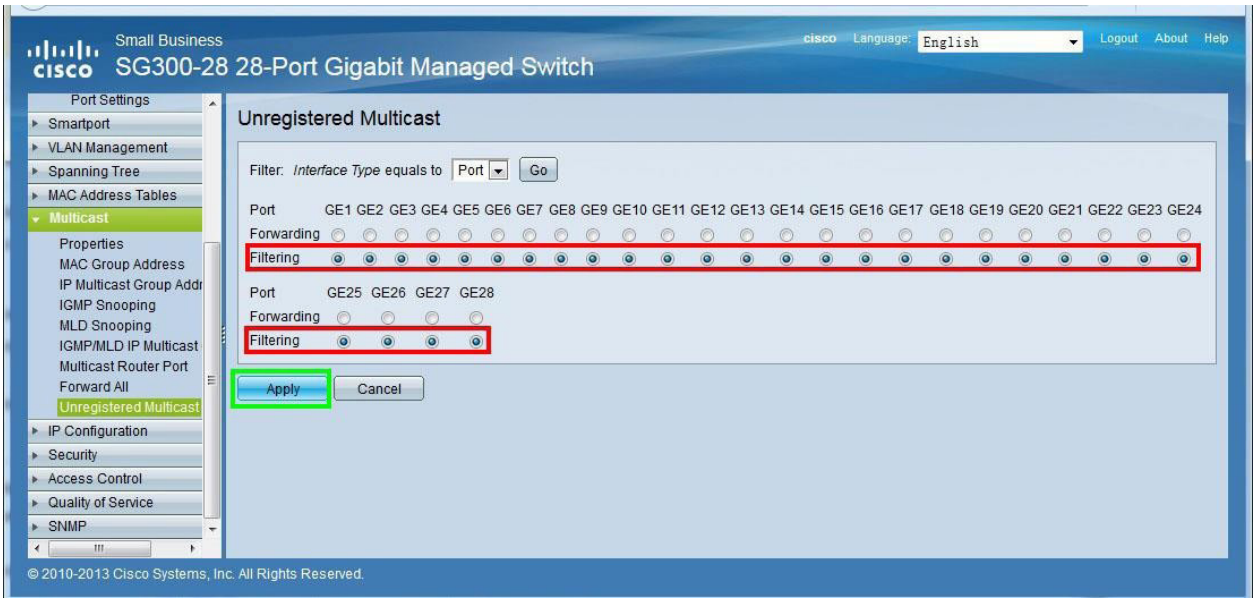
Check *Enable* for *IGMP Querier Status*.

Select *Auto* for *Administrative Querier Source IP Address*.

Select *IGMPV2* for *IGMP Querier Version*.

Click the *Apply* then the *Close* buttons.

Unregistered Multicast



Navigate to *Multicast* > *Unregistered Multicast*.

Select *Filtering* for all ports.

Click the *Apply* button.

PoE Configuration

For PoE switches, make sure to disable PoE in ports that are not used to power PoE devices. This section takes switch SG300-28P as an example to introduce how to disable its PoE functionality to ports 17-24 that are not used to power PoE devices.

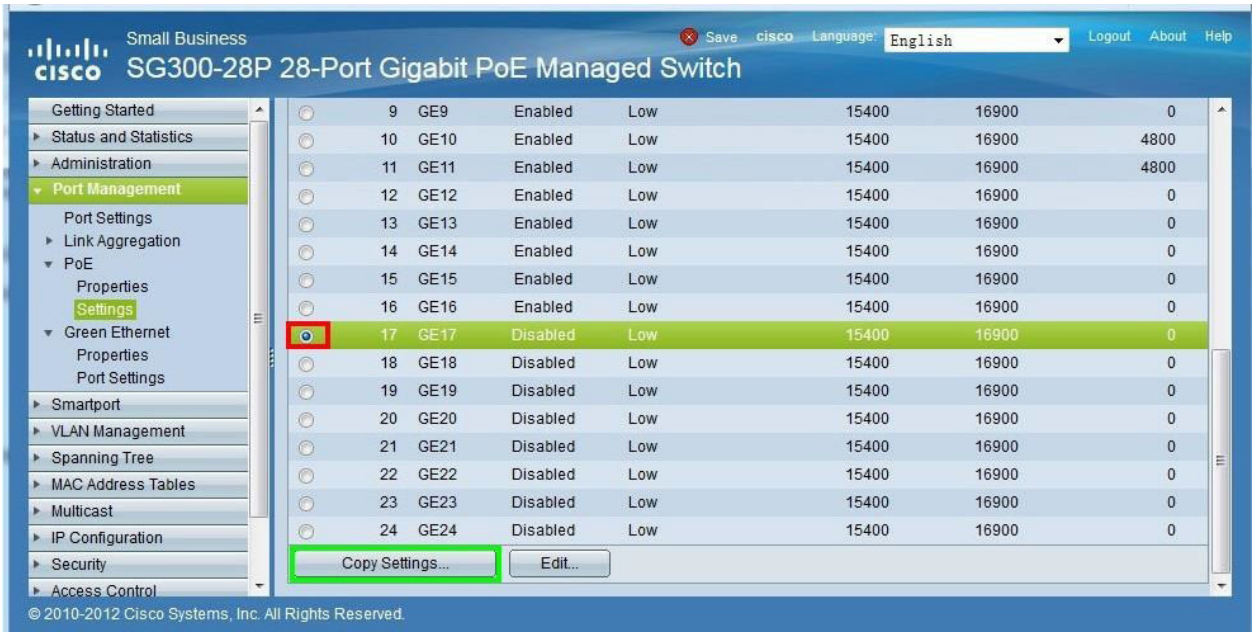
Navigate to *Port Management* > *PoE* > *Settings*.

Select *Port 17 (GE17)*.

Click the *Edit…* button.

Uncheck *Enable* for *PoE Administrative Status*.

Click the *Apply* then the *Close* buttons.



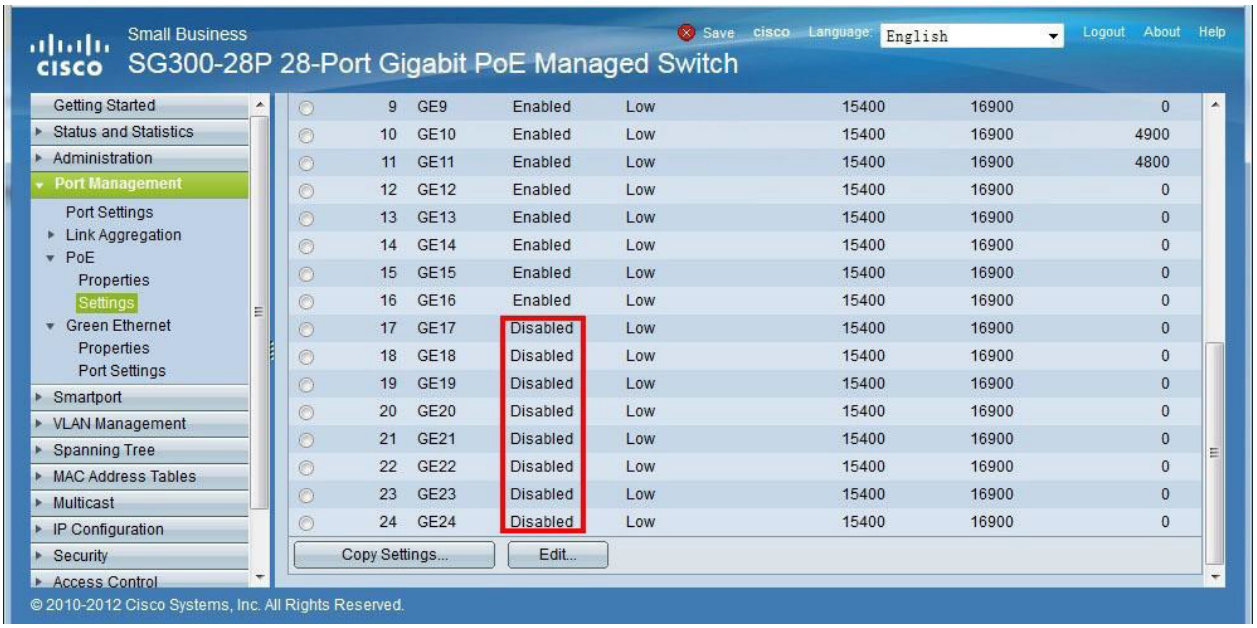
On the PoE Settings screen (*Port Management* > *PoE* > *Settings*), port 17 has PoE disabled.

Select *Port 17*.

Click the *Copy Settings…* button.

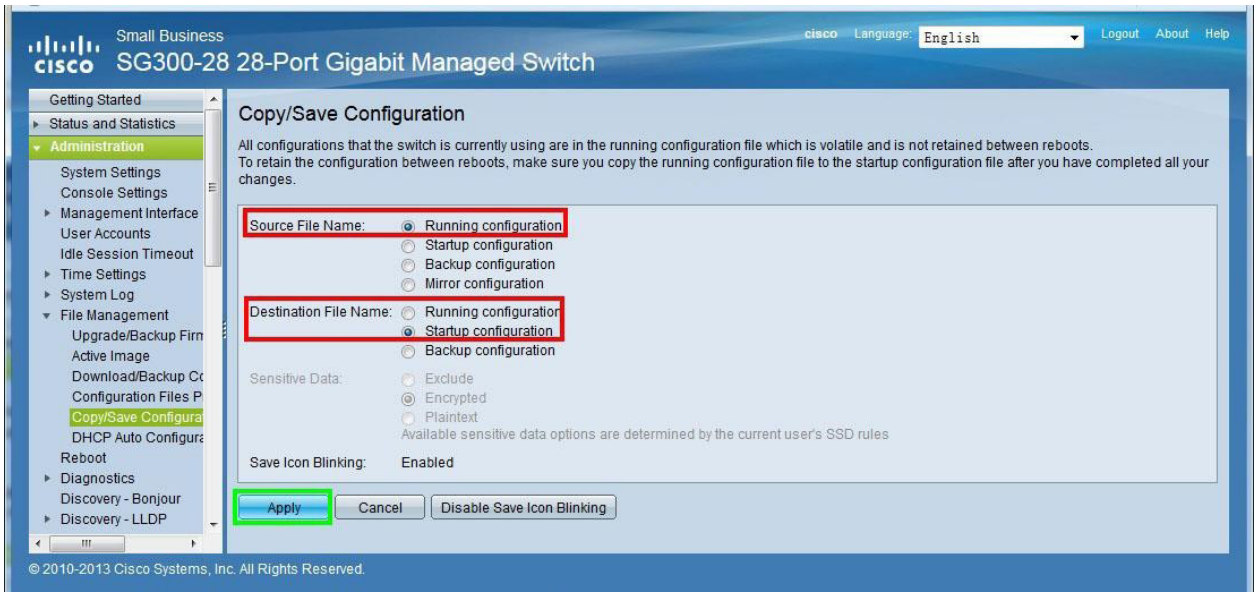
Enter *18-24* in the field labeled *Copy configuration from entry 17 (GE17) to*. This will copy the PoE configuration of port 17 to ports 18 through 24. If the destination ports are not successive, refer to the examples to the right of the text field.

Click the *Apply* button.



On the PoE Settings screen (*Port Management* > *PoE* > *Settings*), ports 17 through 24 have PoE disabled.

Save Configuration

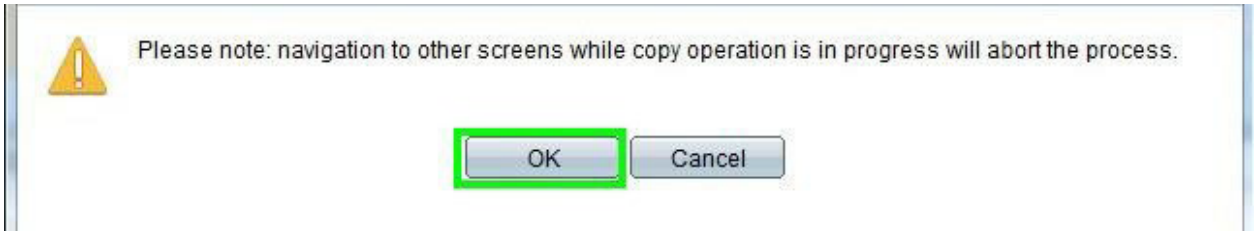


Navigate to *Administration* > *File Management* > *Copy/Save Configuration*.

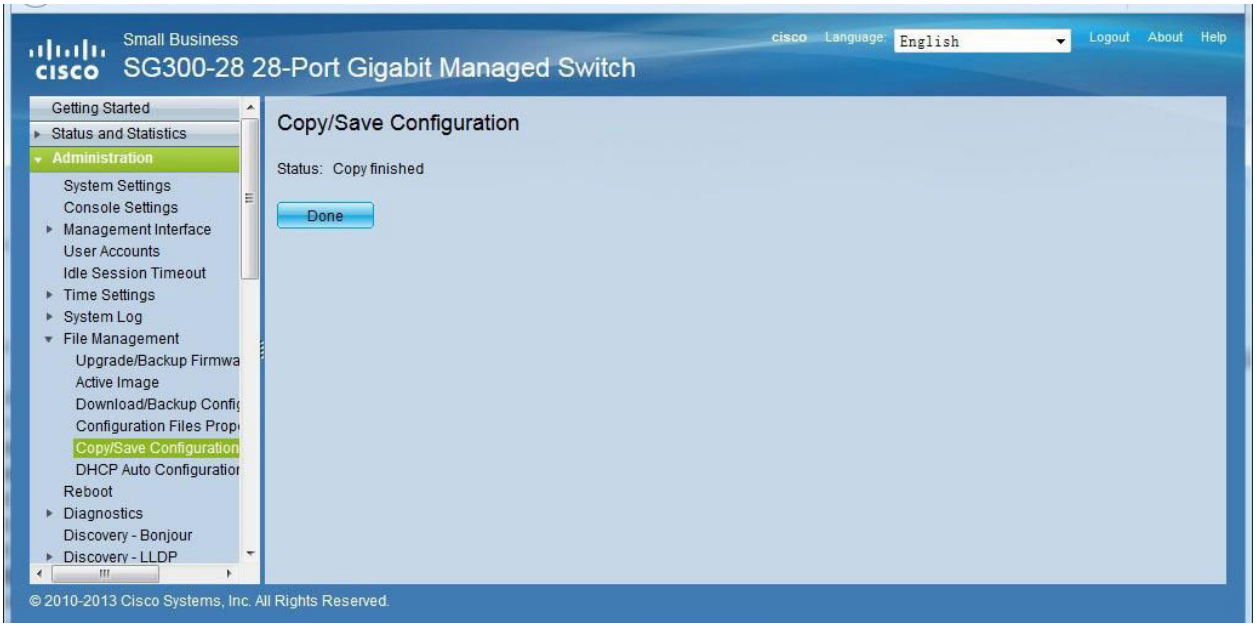
Select *Running configuration* for *Source File Name*.

Select *Startup configuration* for *Destination File Name*.

Click the *Apply* button.

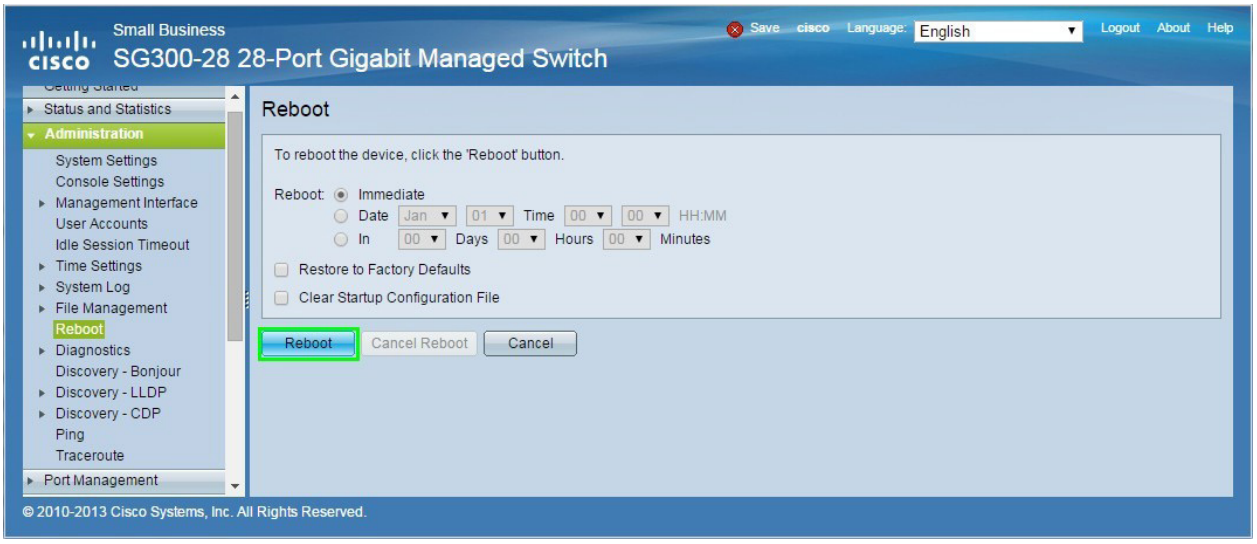


Click the *OK* button on the warning screen to start the copy process, which will ensure the settings will return if the switch is powered off.



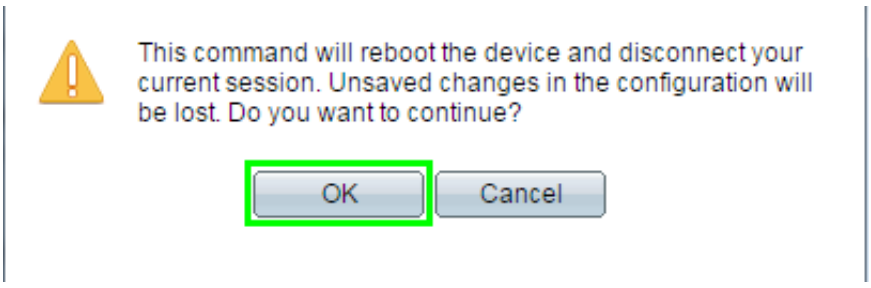
Once the copy/save configuration procedure is complete, click the *Done* button.

Reboot Switch



Navigate to *Administration* > *Reboot*.

Click the *Apply* button.



Click the *OK* button to confirm the reboot. After the switch reboots, it will run with the confirmed configuration.

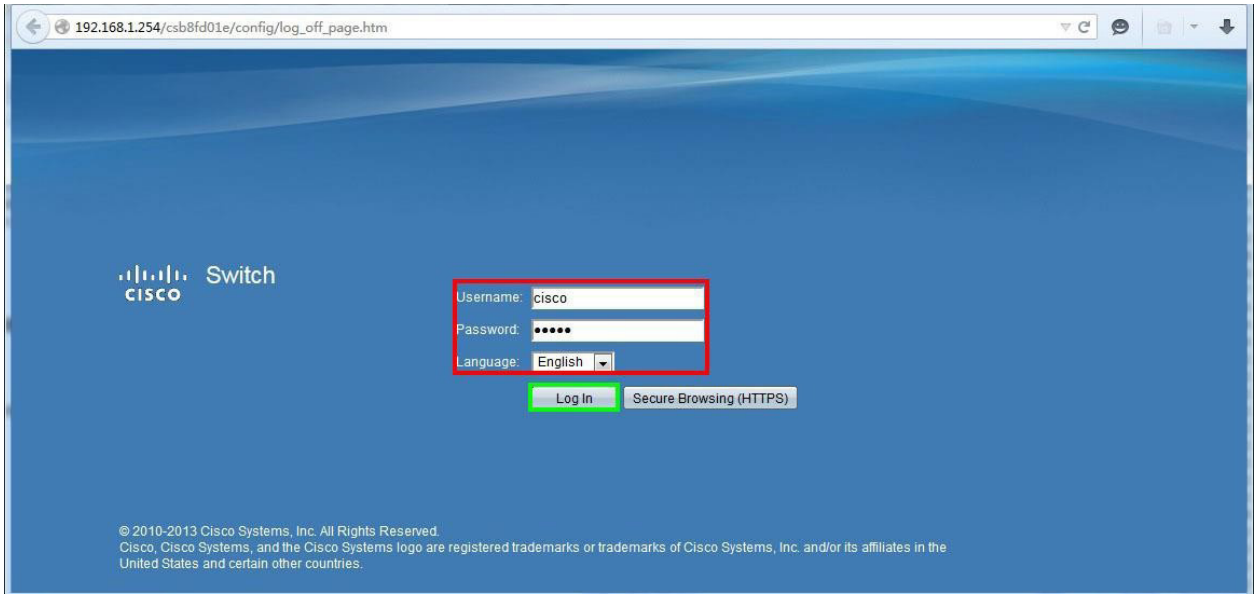
Cisco SG500 Series Switches

For Cisco SG500 series switches, the models SG500-28, SG500-28P, SG500-52, and SG500-52P are recommended for use. These switches are almost identical in the setup and configuration as the SG300 series, but can handle single switch and multiple switch networking.

Log in to the Switch Web GUI

The default IP address of the switch is 192.168.1.254. Set a static IP address of the PC to ensure it is in the same IP range as the switch, such as 192.168.1.42.

Open a web browser and navigate to the IP address of the switch (192.168.1.254).

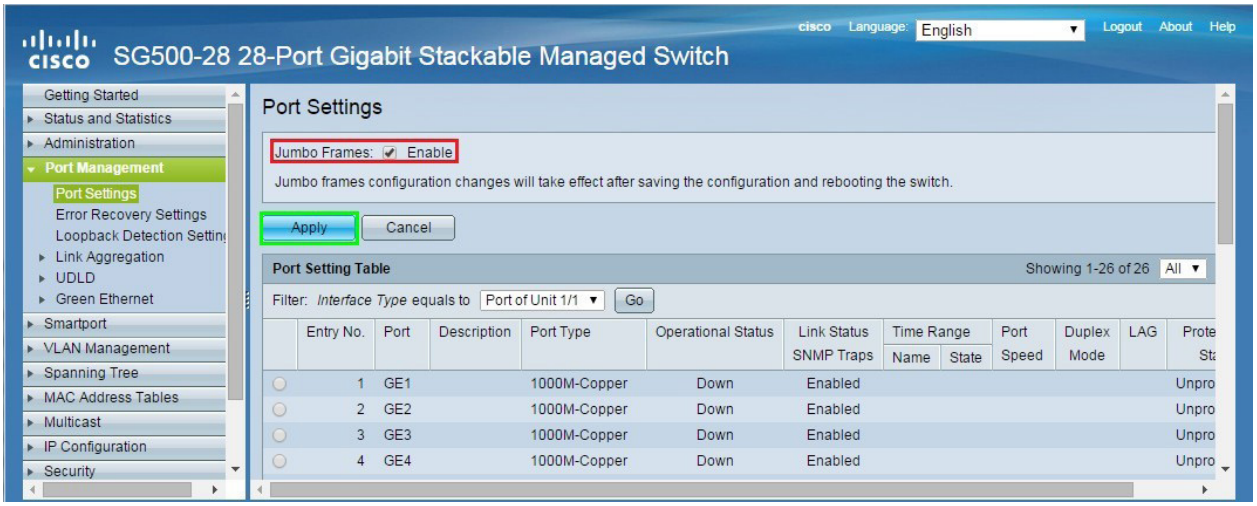


Input the username and password (default of both is *cisco*).

Select a language for the web GUI interface. All examples in the guide will be using English.

Click *Log In*.

Enable Jumbo Frames

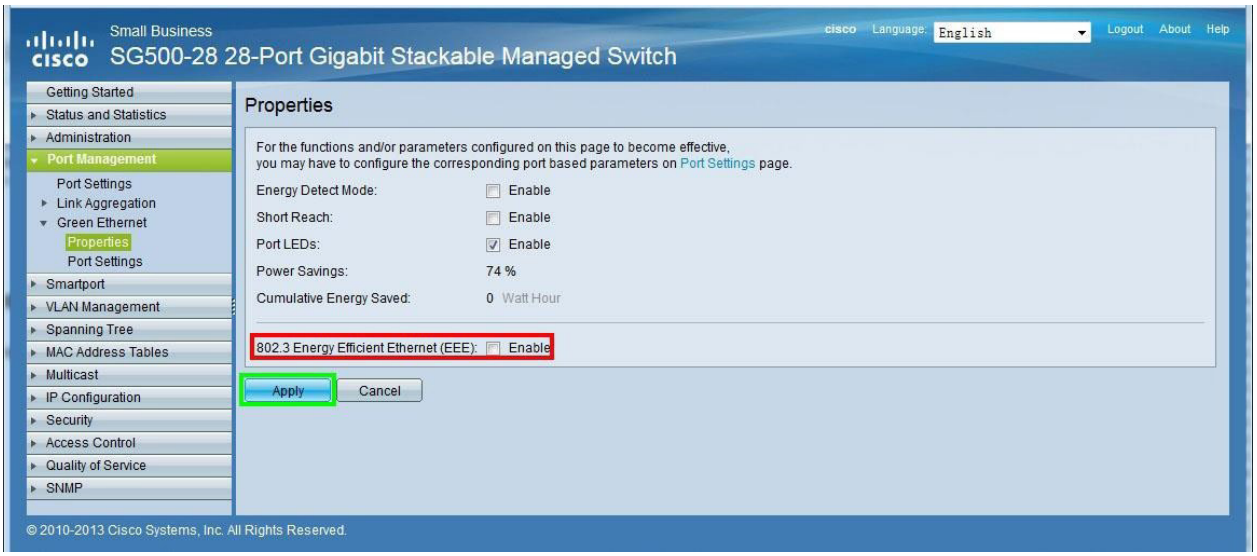


Navigate to *Port Management* > *Port Settings*.

Check *Enable* for *Jumbo Frames*.

Click the *Apply* button.

Disable 802.3 Energy Efficient Ethernet (EEE)

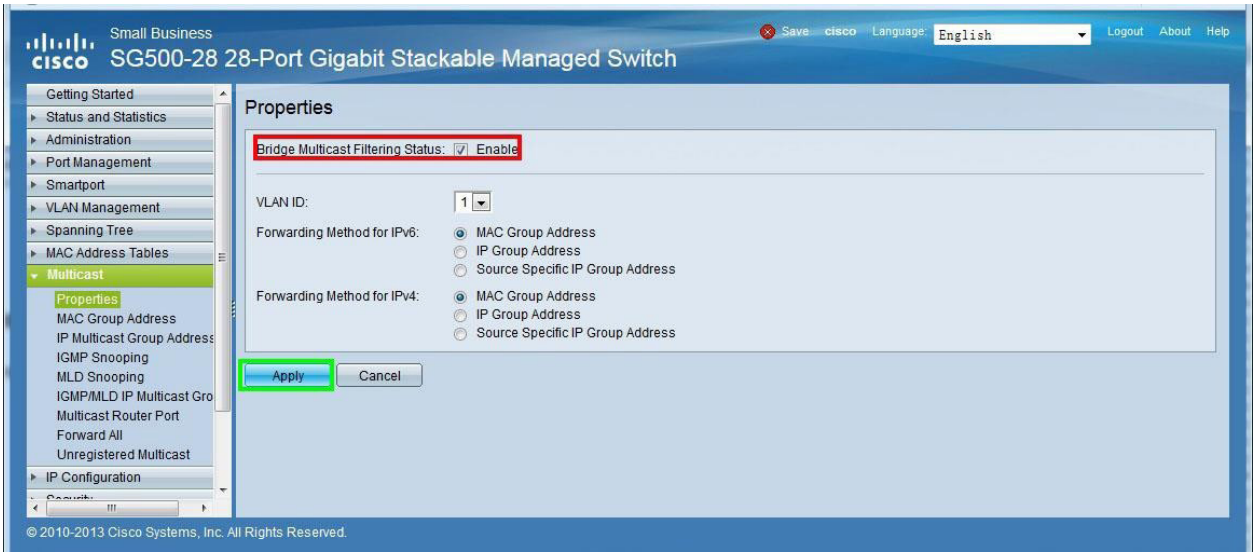


Navigate to *Port Management* > *Green Ethernet* > *Properties*.

Uncheck *Enable* for *802.3 Energy Efficient Ethernet (EEE)*.

Click the *Apply* button.

Enable Multicast Forwarding

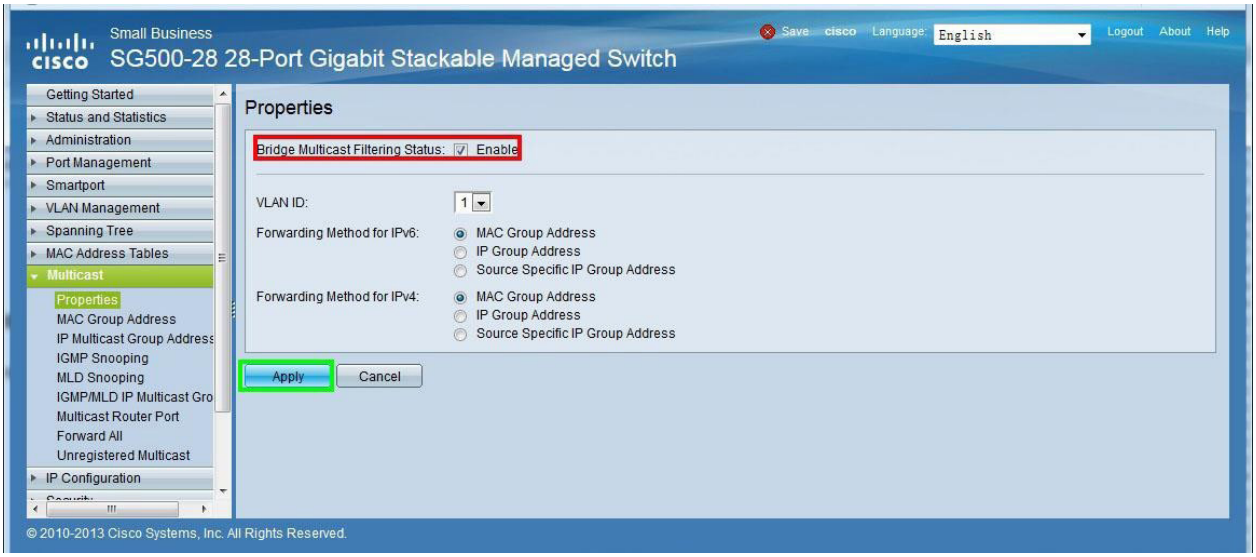


Navigate to *Multicast* > *Properties*.

Check *Enable* for *Bridge Multicast Filtering Status*.

Click the *Apply* button.

Enable IGMP Snooping



Navigate to *Multicast* > *IMGP Snooping*.

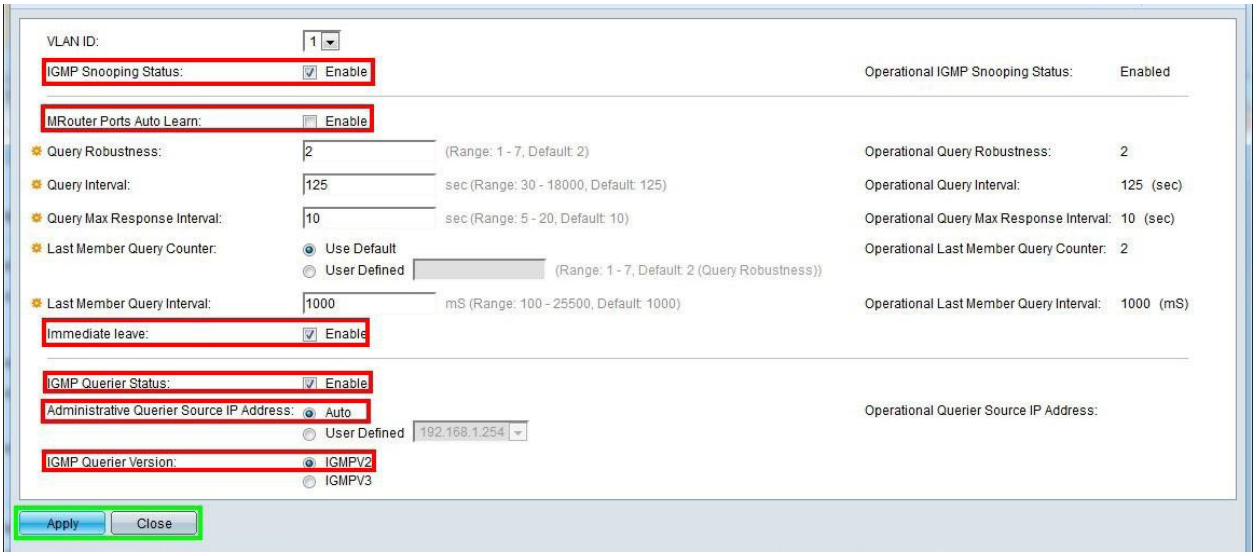
Check *Enable* for *IMGP Snooping Status*.

Click the *Apply* button.

Select the first item (VLAN1) under *IGMP Snooping Table*.

Click the *Edit…* button.

Configure IGMP Snooping for Single Switch Network



Check *Enable* for *IMGP Snooping Status*.

Uncheck *Enable* for *MRouter Ports Auto Learn*.

Check *Enable* for *Immediate leave*.

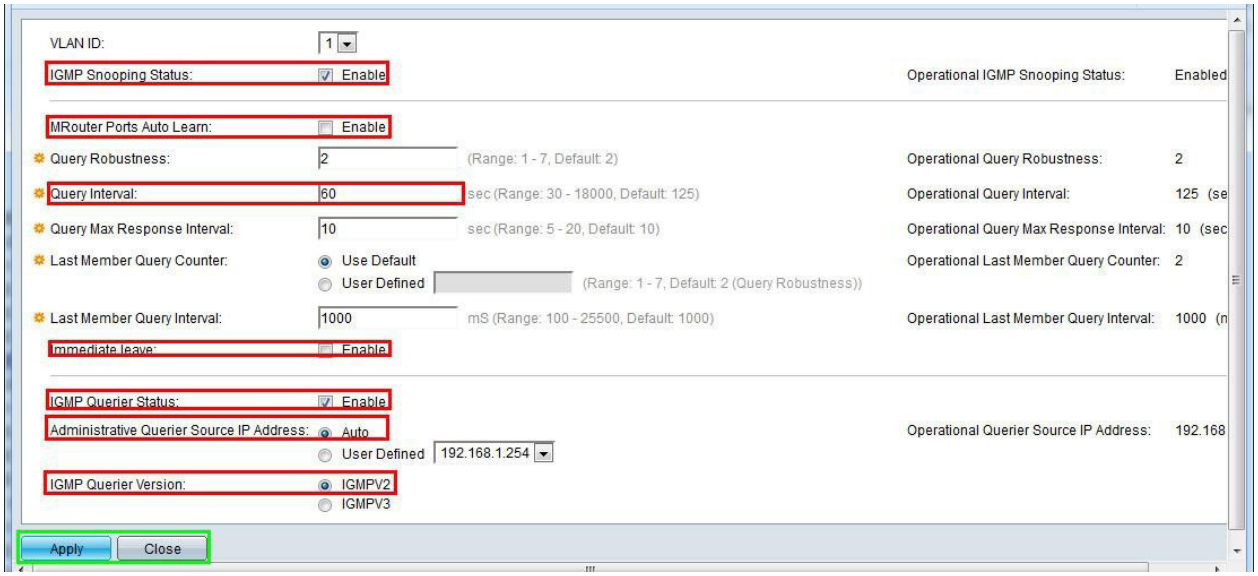
Check *Enable* for *IGMP Querier Status*.

Select *Auto* for *Administrative Querier Source IP Address*.

Select *IGMPV2* for *IGMP Querier Version*.

Click the *Apply* then the *Close* buttons.

Configure IGMP Snooping for Core Switch in a Multiple Switch Network



Check *Enable* for *IMGP Snooping Status*.

Uncheck *Enable* for *MRouter Ports Auto Learn*.

Set *60* for *Query Interval*.

Check *Enable* for *Immediate leave*.

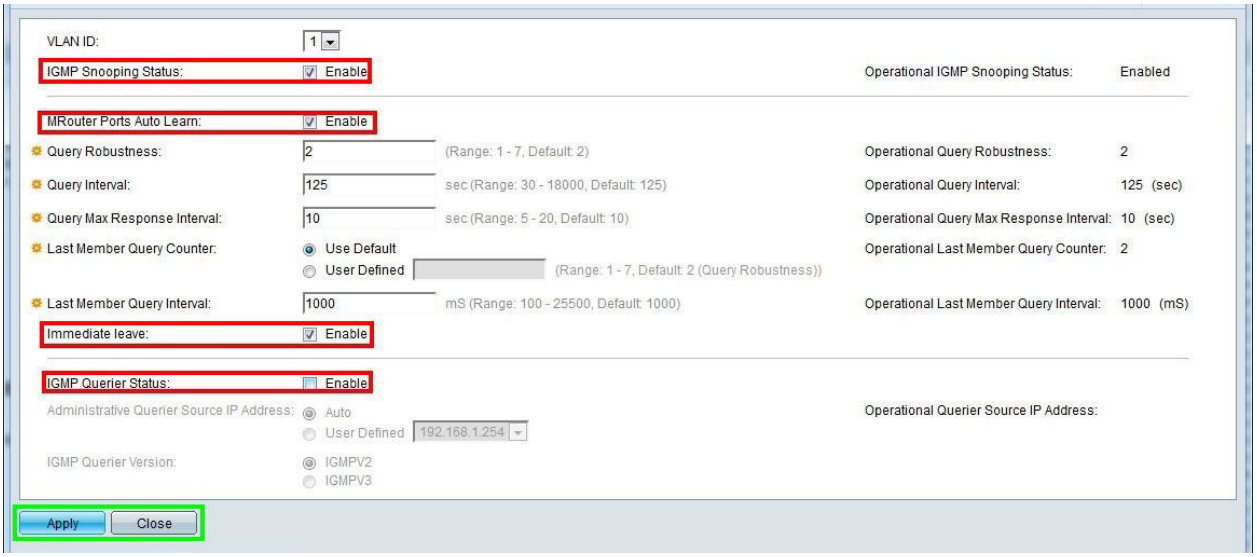
Check *Enable* for *IGMP Querier Status*.

Select *Auto* for *Administrative Querier Source IP Address*.

Select *IGMPV2* for *IGMP Querier Version*.

Click the *Apply* then the *Close* buttons.

Configure IGMP Snooping for Extended Switch in a Multiple Switch Network



Check *Enable* for *IMGP Snooping Status*.

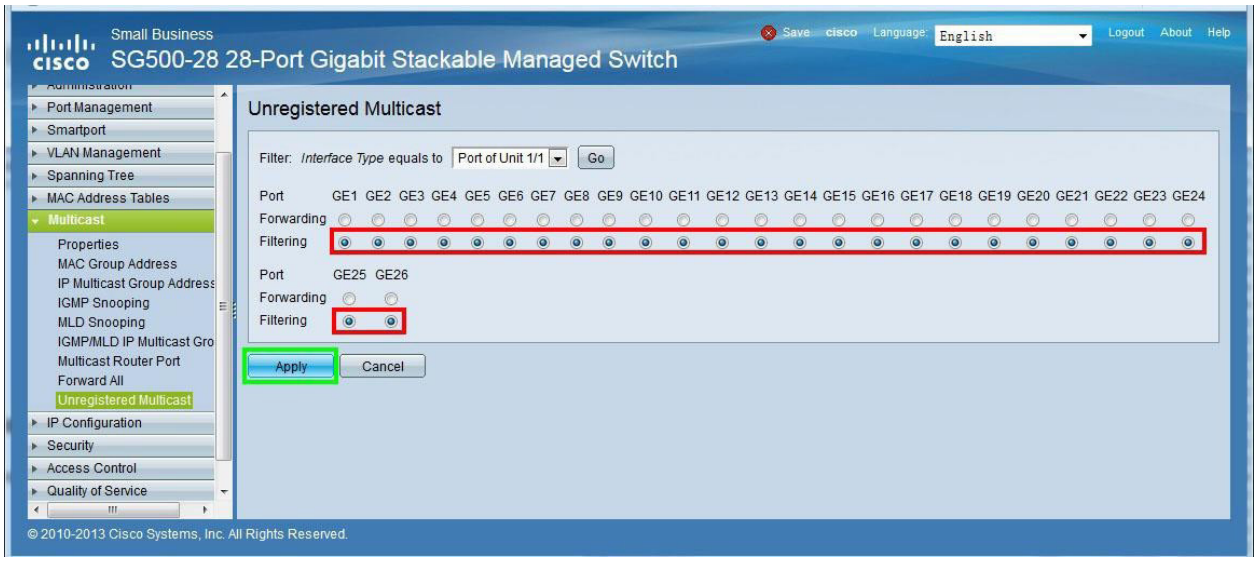
Uncheck *Enable* for *MRouter Ports Auto Learn*.

Check *Enable* for *Immediate leave*.

Uncheck *Enable* for *IGMP Querier Status*.

Click the *Apply* then the *Close* buttons.

Unregistered Multicast for Single Switch or Core Switch in a Multiple Switch Network

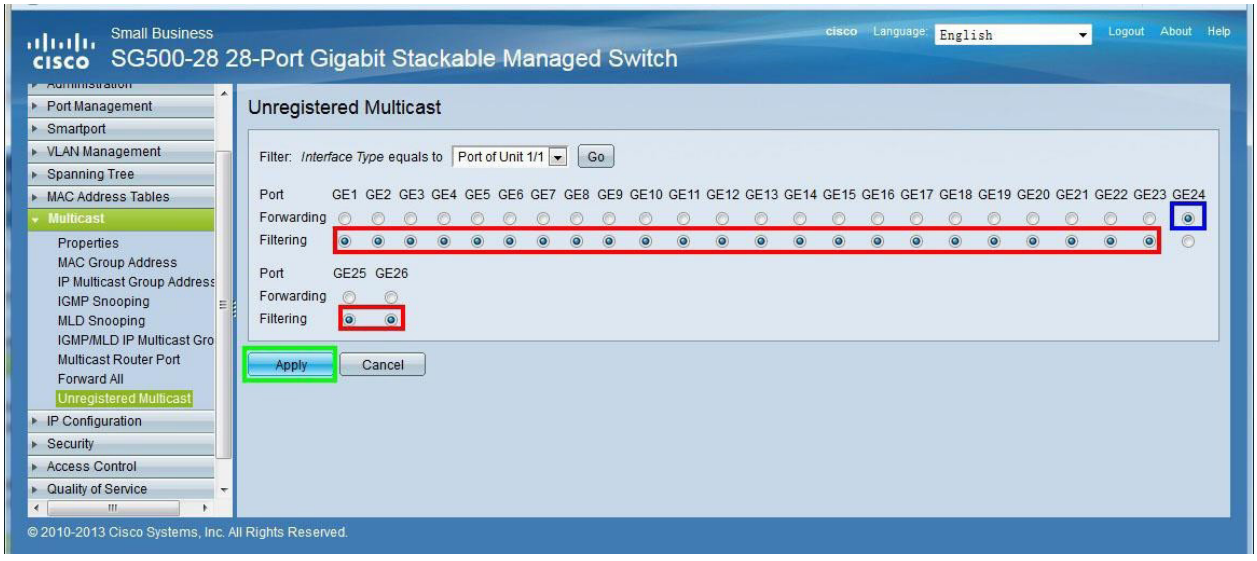


Navigate to *Multicast* > *Unregistered Multicast*.

Select *Filtering* for all ports.

Click the *Apply* button.

Unregistered Multicast for Extended Switch in a Multiple Switch Network



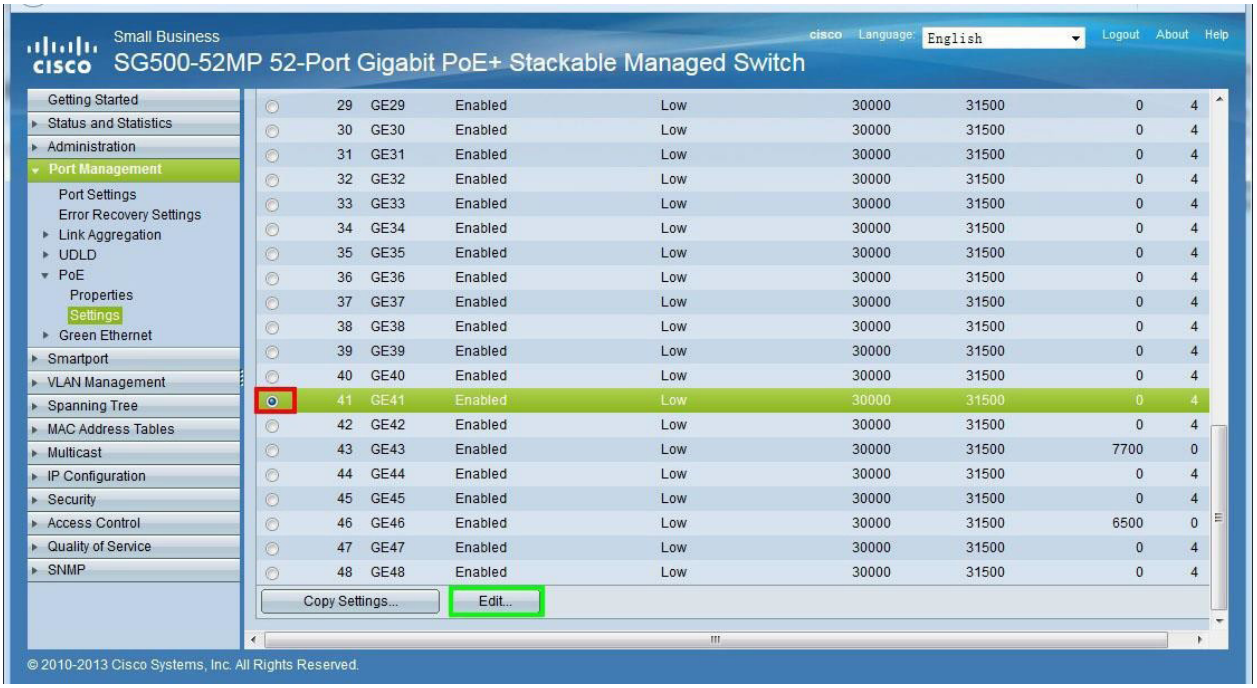
Navigate to *Multicast* > *Unregistered Multicast*.

Select *Filtering* for all ports except for the port connected to the core switch, such as port 24 in the image above.

Click the *Apply* button.

PoE Configuration

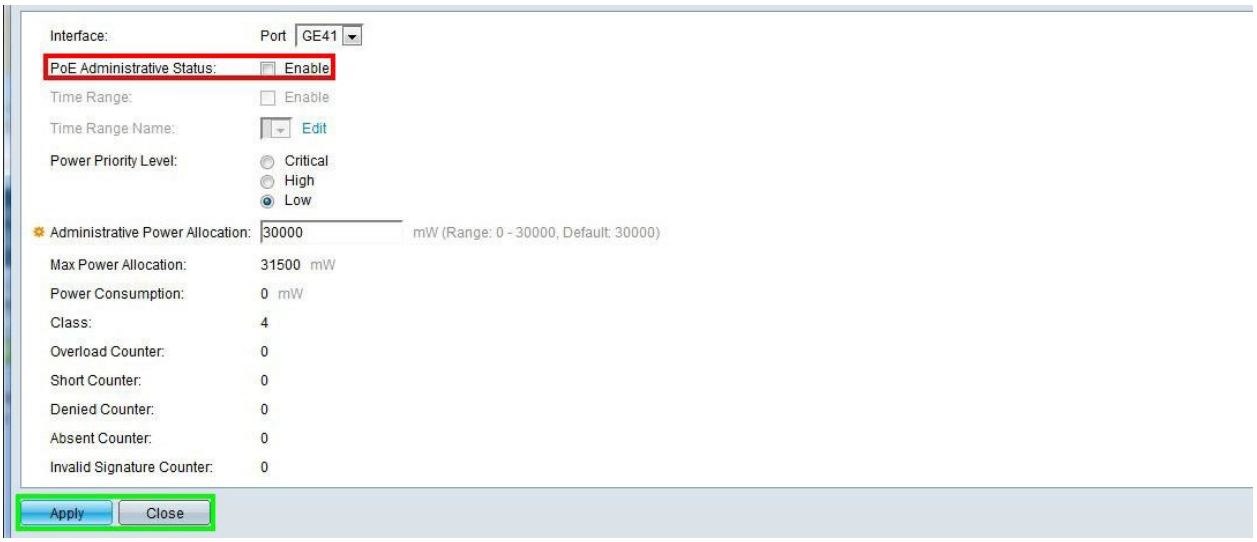
For PoE switches, make sure to disable PoE in ports that are not used to power PoE devices. This section takes switch SG500-52P as an example to introduce how to disable its PoE functionality to ports 41-48 that are not used to power PoE devices.



Navigate to *Port Management* > *PoE* > *Settings*.

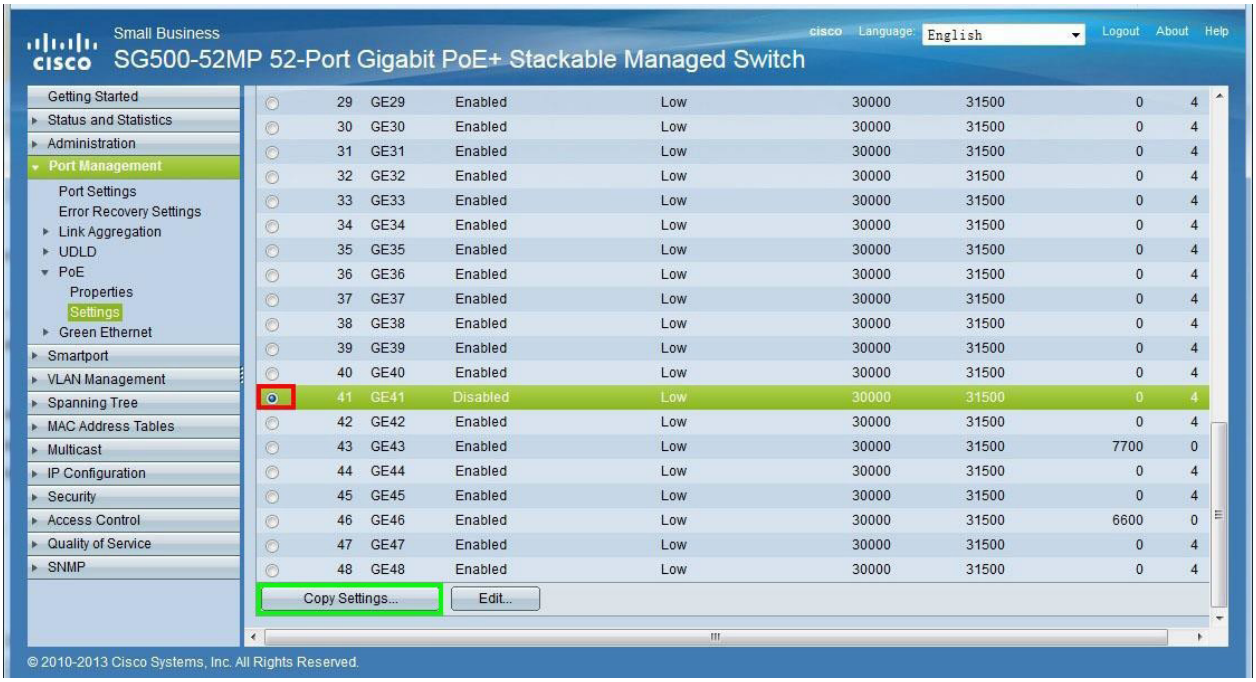
Select *Port 41 (GE41)*.

Click the *Edit…* button.



Uncheck *Enable* for *PoE Administrative Status*.

Click the *Apply* then the *Close* buttons.



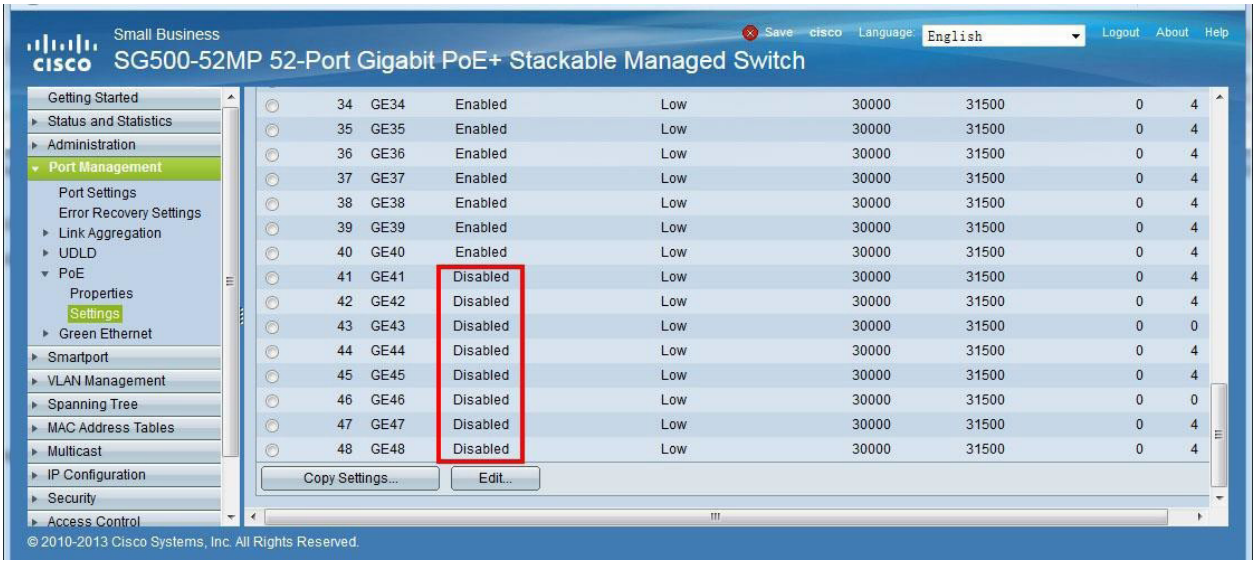
On the PoE Settings screen (*Port Management* > *PoE* > *Settings*), port 41 has PoE disabled.

Select *Port 41*.

Click the *Copy Settings…* button.

Enter *42-48* in the field labeled Copy configuration from entry 41 (GE41) to. This will copy the PoE configuration of port 41 to ports 42 through 48. If the destination ports are not successive, refer to the examples to the right of the text field.

Click the *Apply* button.



On the PoE Settings screen (*Port Management* > *PoE* > *Settings*), ports 41 through 48 have PoE disabled.

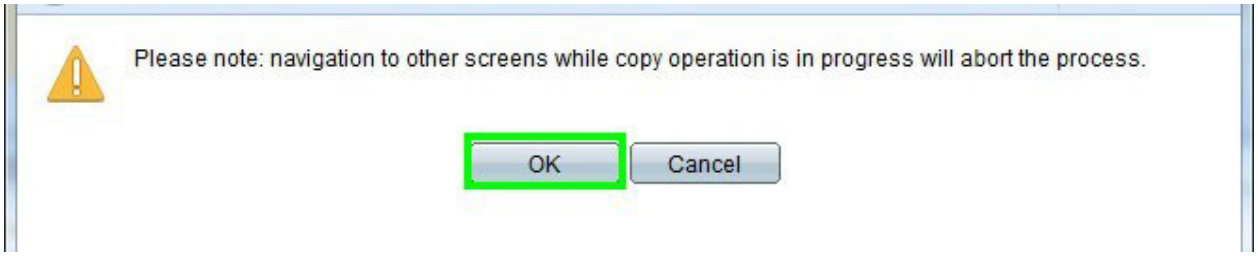
Save Configuration

Navigate to *Administration* > *File Management* > *Copy/Save Configuration*.

Select *Running configuration* for *Source File Name*.

Select *Startup configuration* for *Destination File Name*.

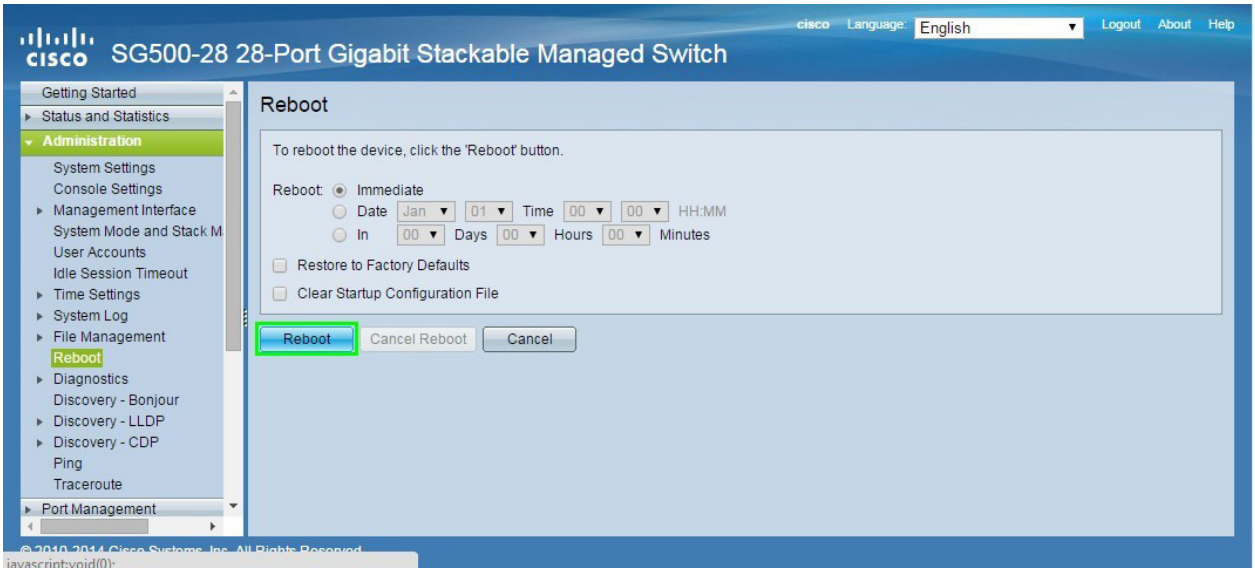
Click the *Apply* button.



Click the *OK* button on the warning screen to start the copy process, which will ensure the settings will return if the switch is powered off.

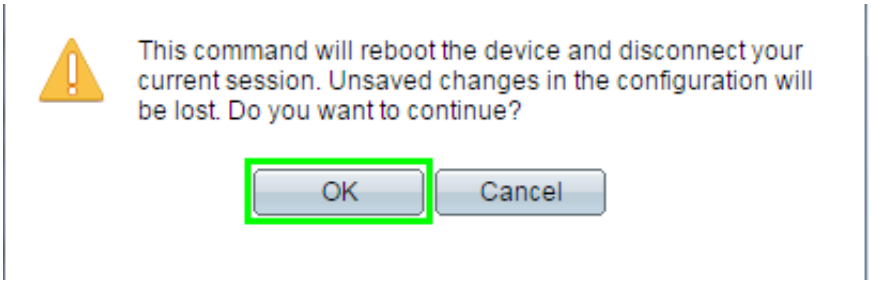
Once the copy/save configuration procedure is complete, click the *Done* button.

Reboot Switch



Navigate to *Administration* > *Reboot*.

Click the *Apply* button.



Click the *OK* button to confirm the reboot. After the switch reboots, it will run with the confirmed configuration.

Luxul Switches

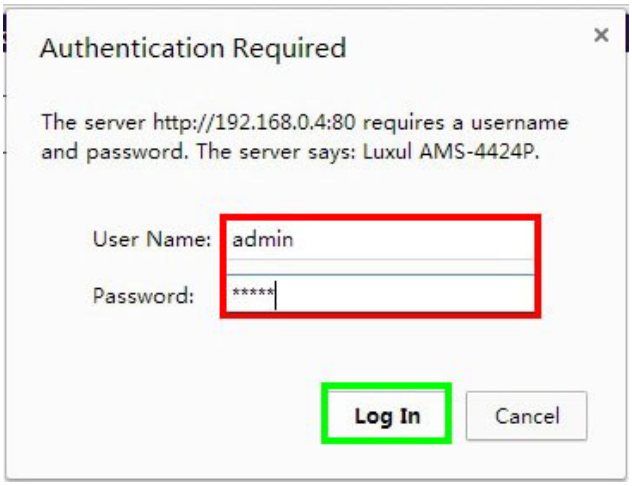
Luxul Ethernet switches can be used in single switch networking or multiple switch networking.

Please note: Luxul switches are not supported for use with video walls.

Log in to the Switch Web GUI

The default IP address of the switch is 192.168.0.4. Set a static IP address of the PC to ensure it is in the same IP range as the switch, such as 192.168.0.42.

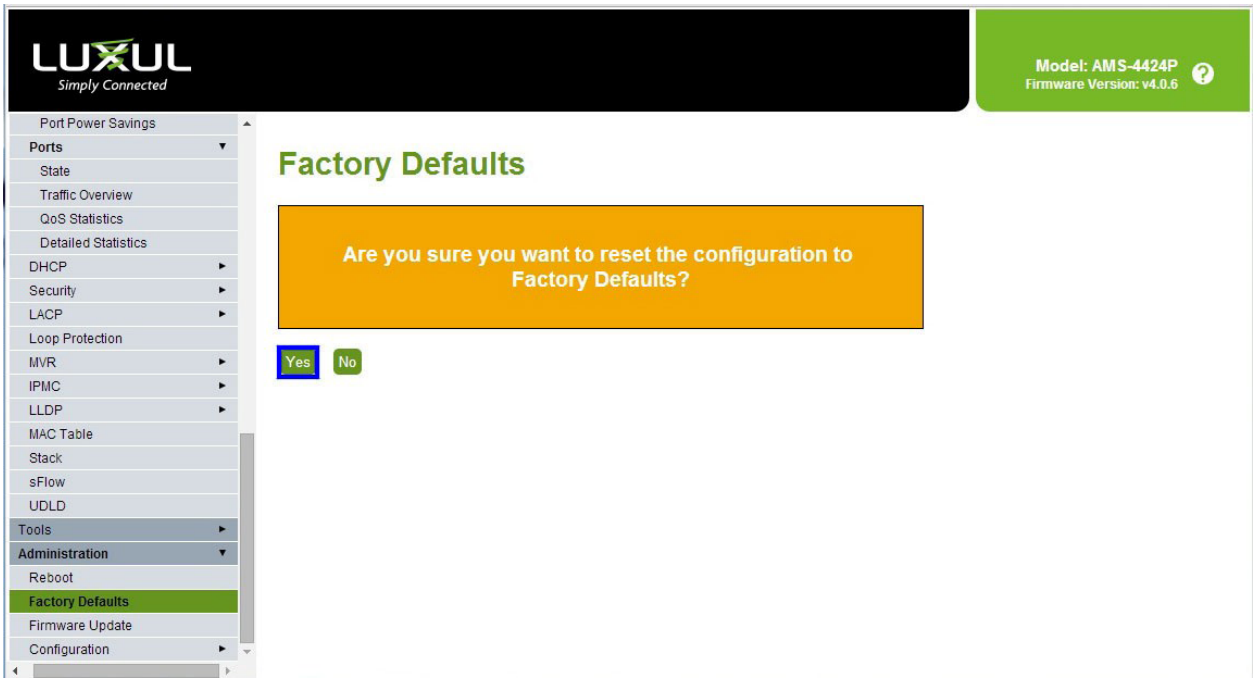
Open a web browser and navigate to the IP address of the switch (192.168.0.4).



Input the username and password (default of both is *admin*).

Click the *Log In* button.

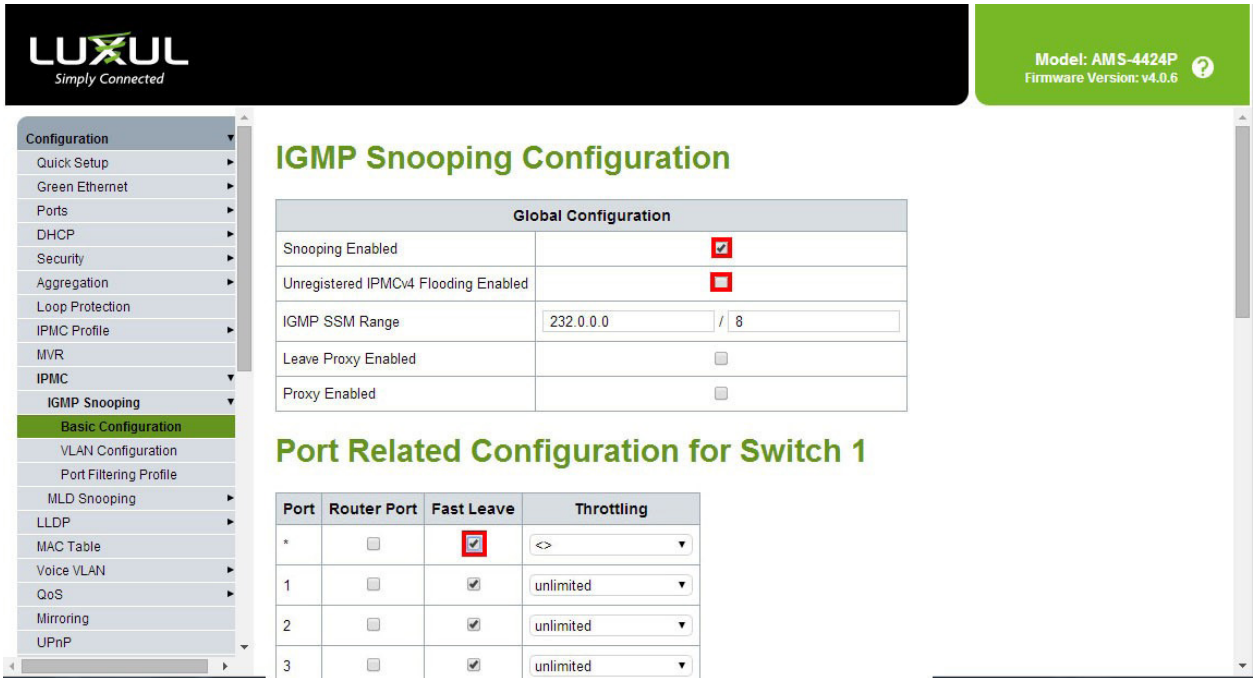
Resetting to Factory Defaults



Navigate to *Administration* > *Factory Defaults*.

Click the *Yes* button.

IGMP Configuration for Single Switch Network or Extended Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

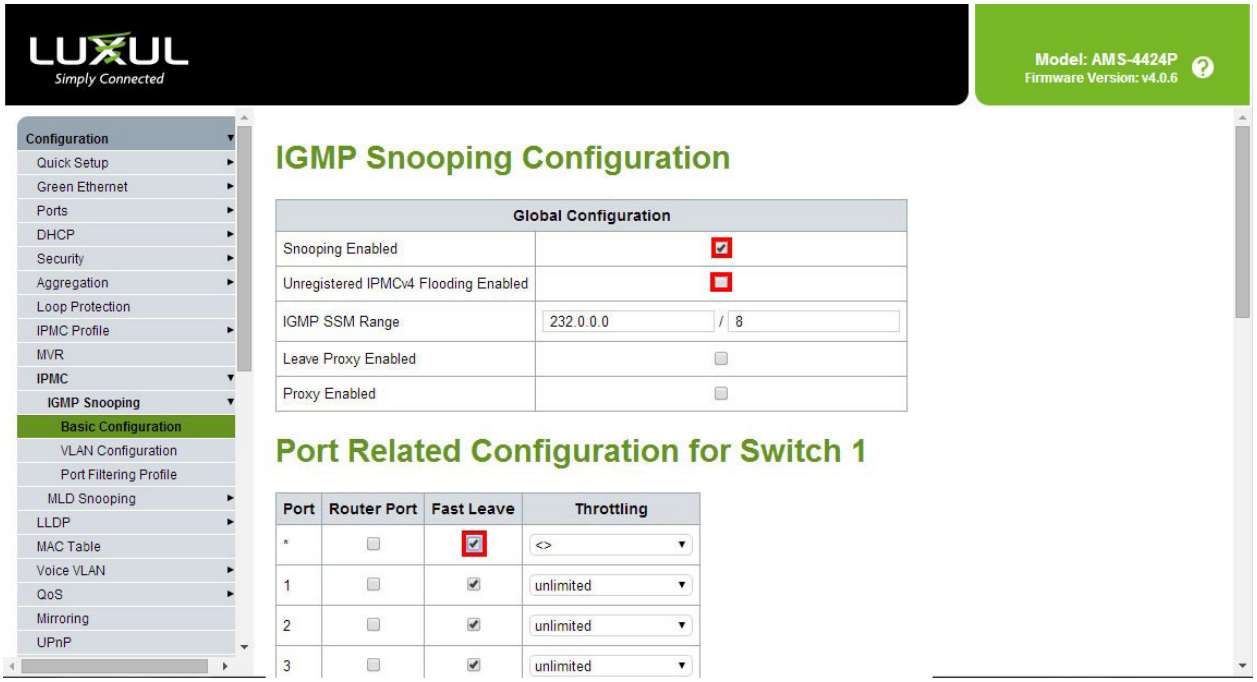
Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

Check the *Fast Leave* box in the all ports (*) row.

Scroll to the bottom of the page and click the *Save* button.

IGMP Configuration for Core Switch in a Multiple Switch Network

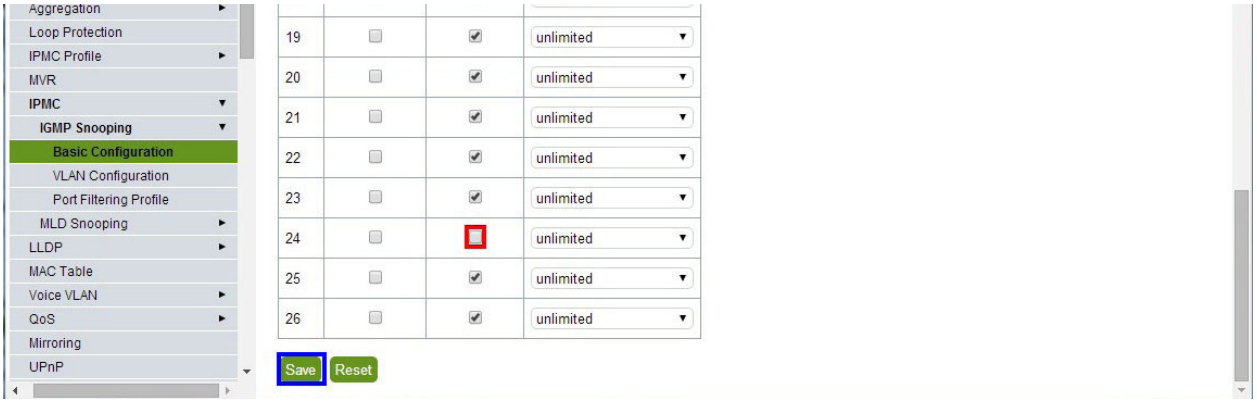


Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

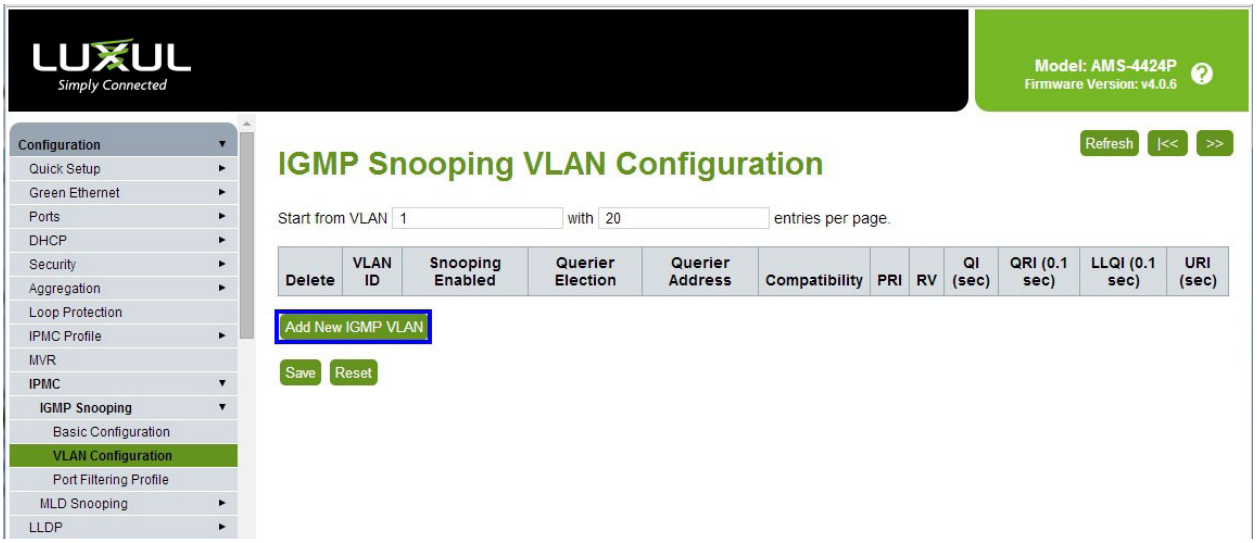
Check the *Fast Leave* box in the all ports (*) row.



Uncheck the *Fast Leave* box for ports connected to extended switches.

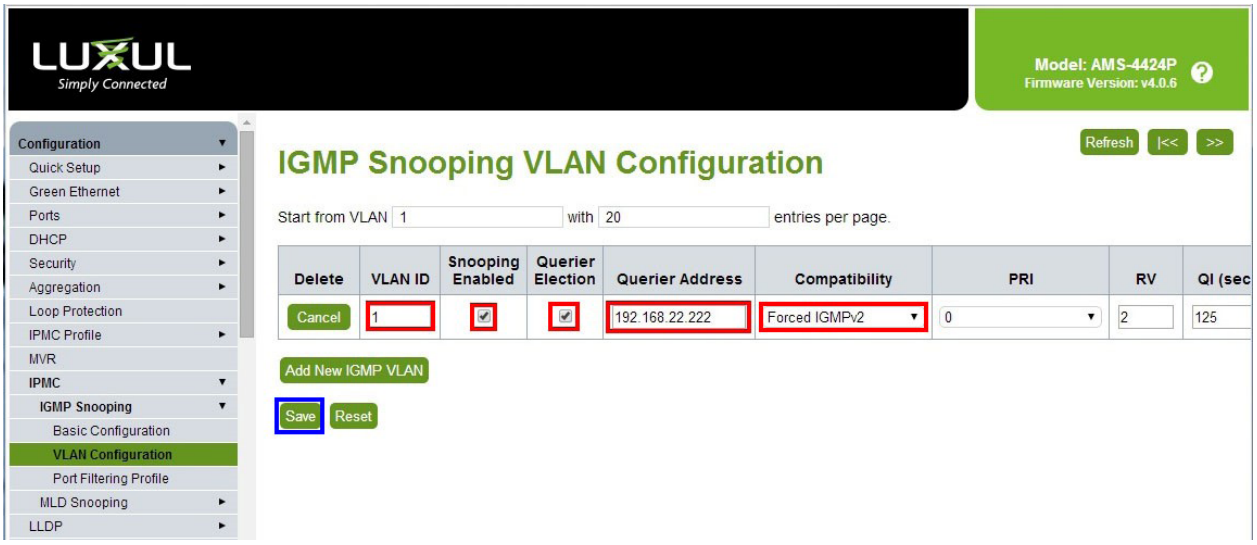
Scroll to the bottom of the page and click the *Save* button.

VLAN Configuration for Single Switch Network or Core Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

Check the *Snooping Enabled* box.

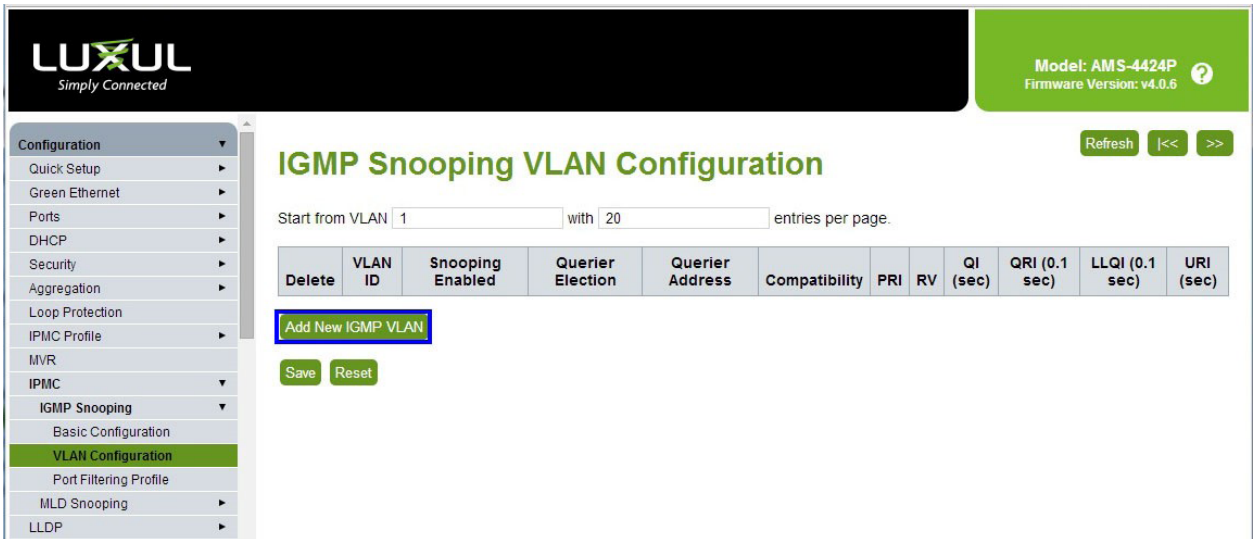
Check the *Querier Election* box.

Enter *192.168.22.222* in the *Querier ID* box.

Select *Forced IGMPv2* from the *Compatibility* drop-down list.

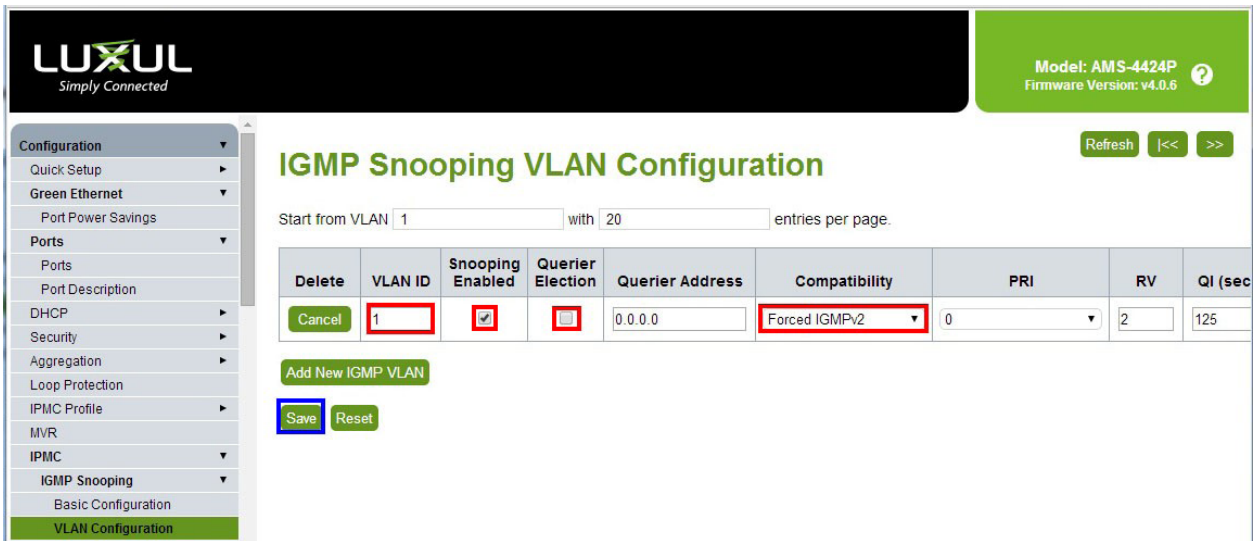
Click the *Save* button.

VLAN Configuration for Extended Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

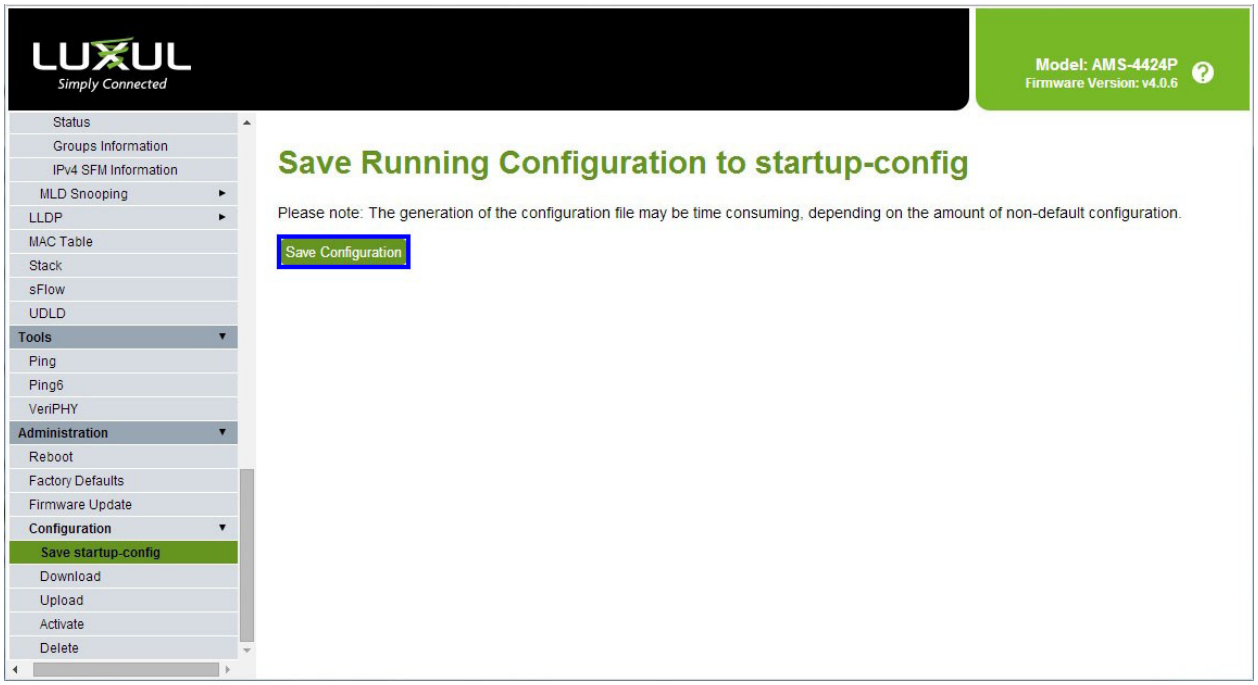
Check the *Snooping Enabled* box.

Uncheck the *Querier Election* box.

Select *Forced IGMPv2* from the *Compatibility* dropdown list.

Click the *Save* button.

Save Configuration

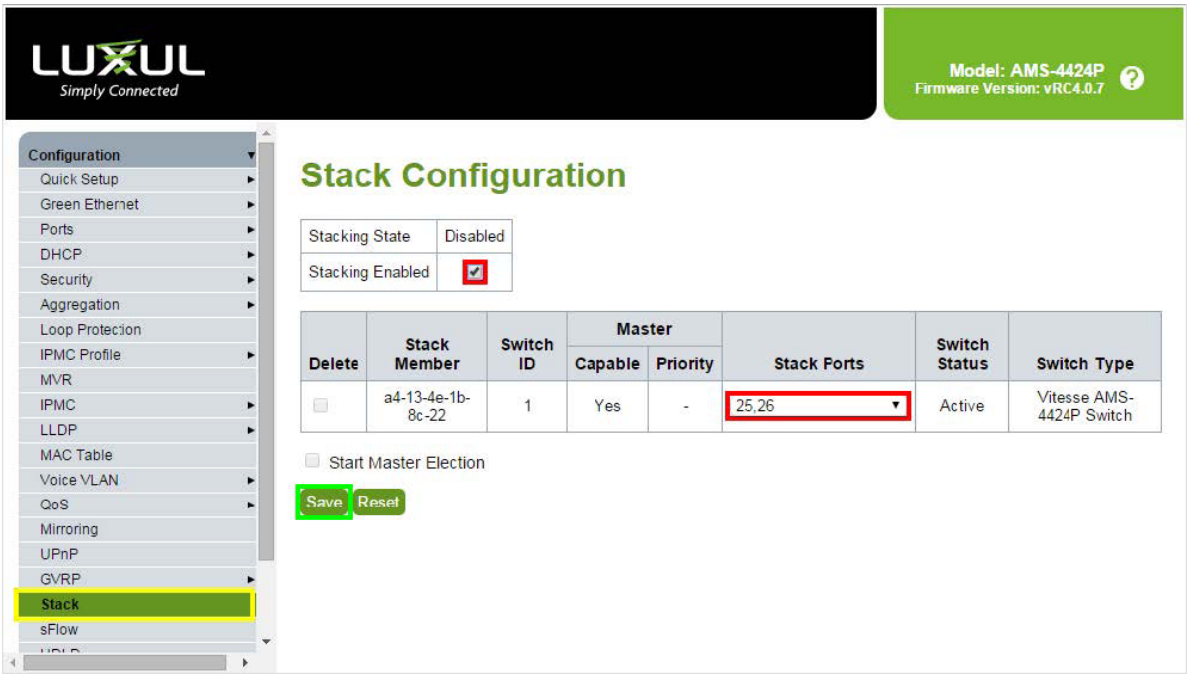


Navigate to *Administration* > *Configuration* > *Save startup-config*.

Click the *Save Configuration* button.

Configuration for Switch Stacking

The following configuration setings are for stacking Luxul switches utilizing the IP switch stack ports.



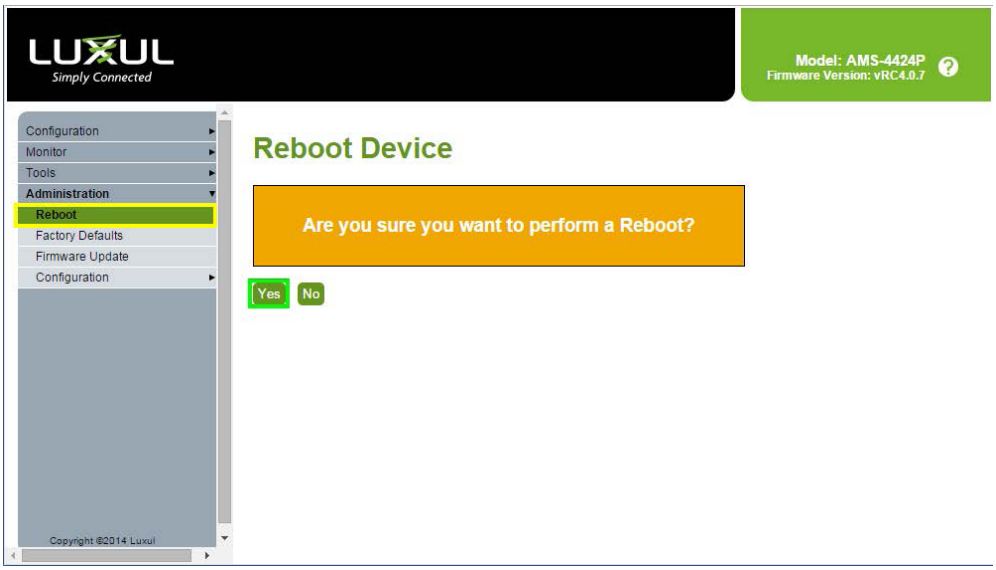
Navigate to *Configuration* > *Stack*

Check *Stacking Enabled*

Select *25,26* for *Stack Ports*

Click the *Save* button.

This will prompt you to restart the switch device for the stack feature to work.



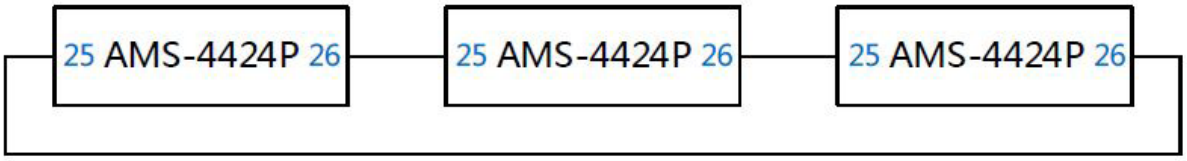
Navigate to *Administration* > *Reboot*

Click the *Yes* button.

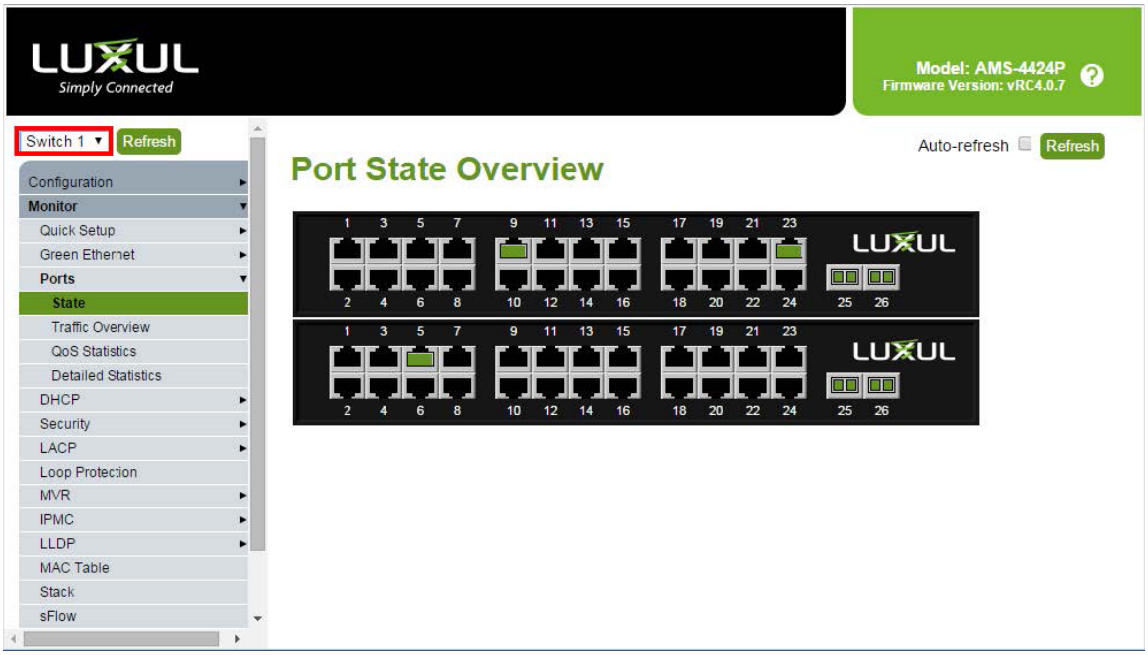
Connecting Stacked Switches

This networking configuration will require multimode fiber optical cabling and the appropriate SFP+ transceivers. Please contact the switch manufacturer if you need assistance with specifying the correct networking transceivers and fiber optic cabling.

Using fiber optic jumper cables, connect port 25 of the first switch to port 26 of the the second switch, then connect port 25 of the second switch to port 26 of the first switch. This will form a ring topology. Below is an example of three stacked network switches using the ring topology.



Confirming Stacked Switch Configuration

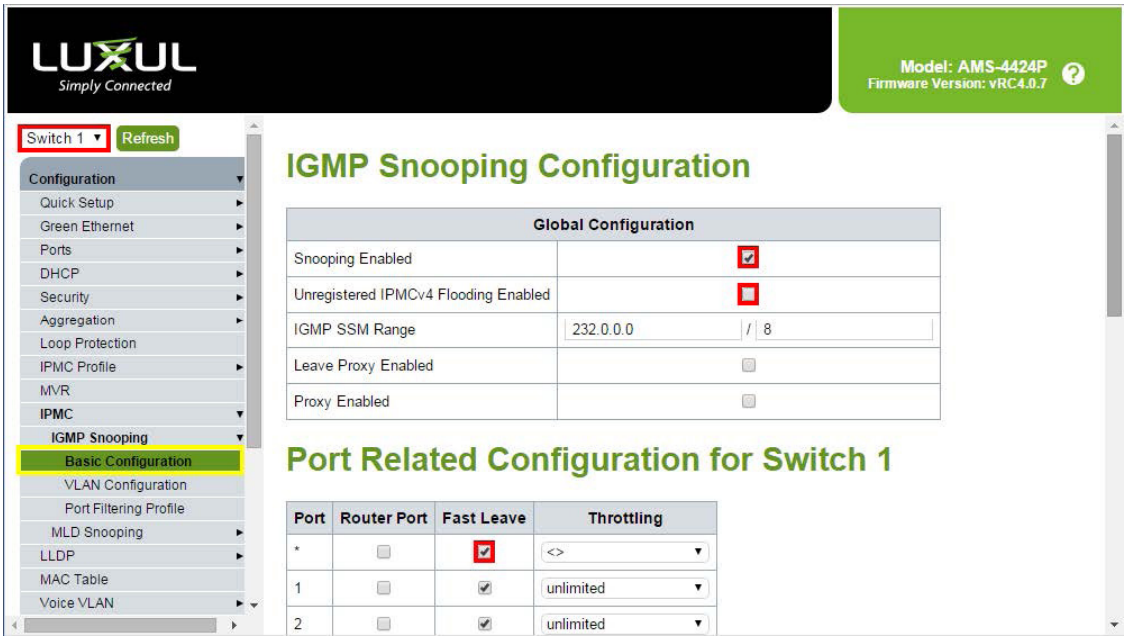


Navigate to *Monitor* > *Ports* > *State* to confirm that the stacking feature has been enabled and all connectivity is being shown

Note: When all switches have been properly stacked and connected you will see a drop down menu in the top left corner of the switches web server that will allow you choose a switch to be configured.

IGMP Configuration for Switch in a Stacked Configuration

NOTE: All switches in a stacked network configuration should be configured in the same manner as followed.



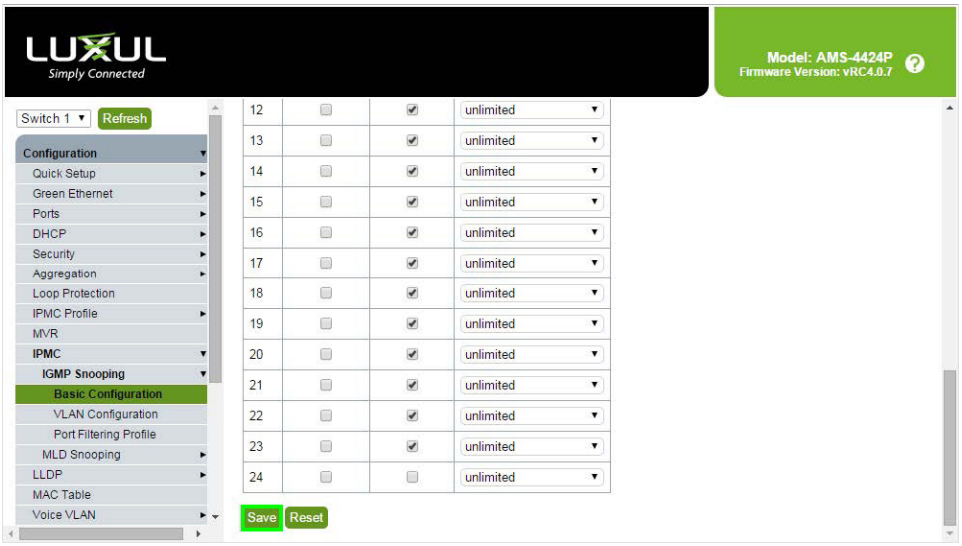
Choose the next switch in the stacked configuration in the drop down menu to the upper left.

Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

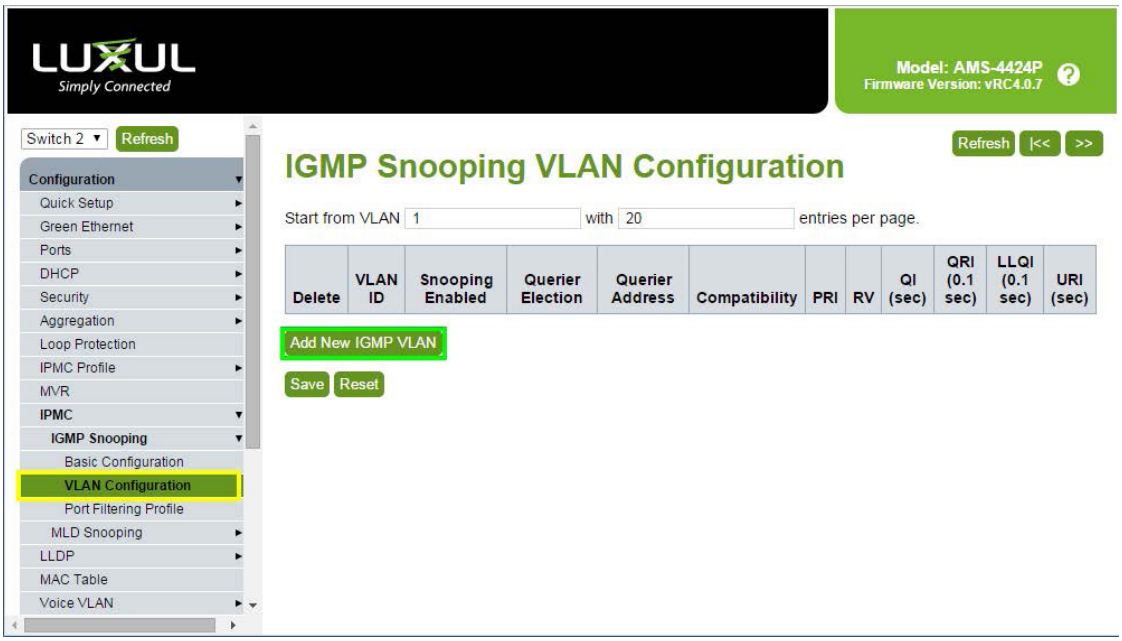
Check the *Fast Leave* box in the all ports (*) row.



Scroll to the bottom of the page and click the *Save* button.

VLAN Configuration for Switch in a Stacked Configuration

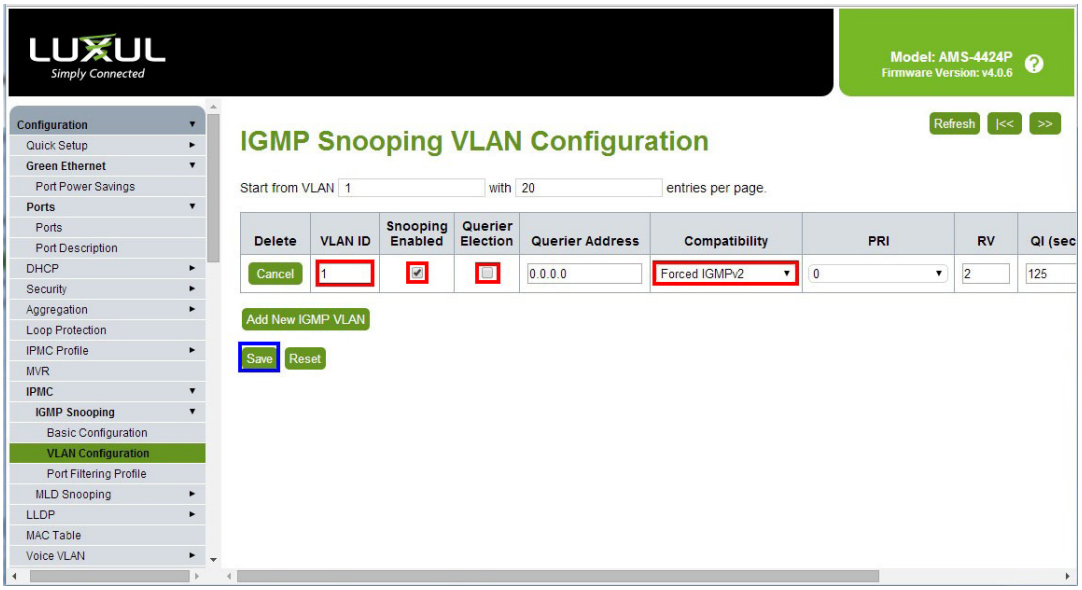
NOTE: All switches in a stacked network configuration should be configured in the same manner as followed.



Choose the next switch in the stacked configuration in the drop down menu to the upper left.

Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

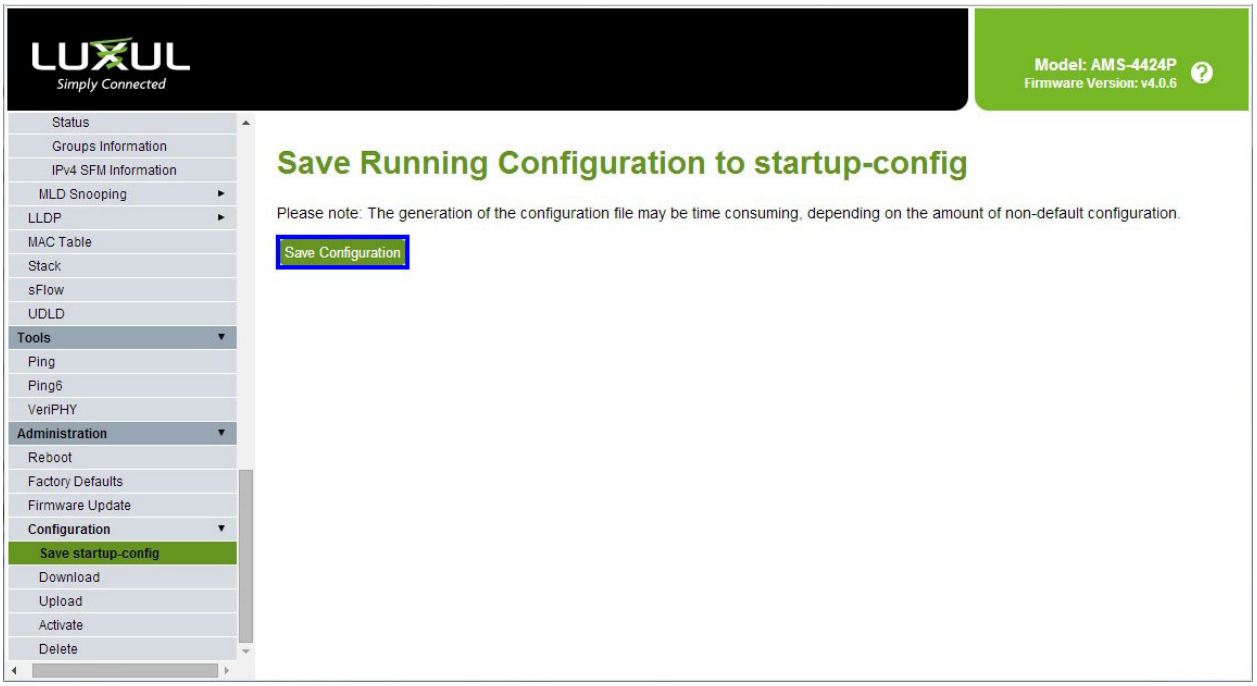
Check the *Snooping Enabled* box.

Uncheck the *IGMP Election* box.

Select *Forced IGMPv2* from the *Compatibility* drop-down list.

Click the *Save* button.

Save Configuration



Navigate to *Administration* > *Configuration* > *Save startup-config*.

Click the *Save Configuration* button.

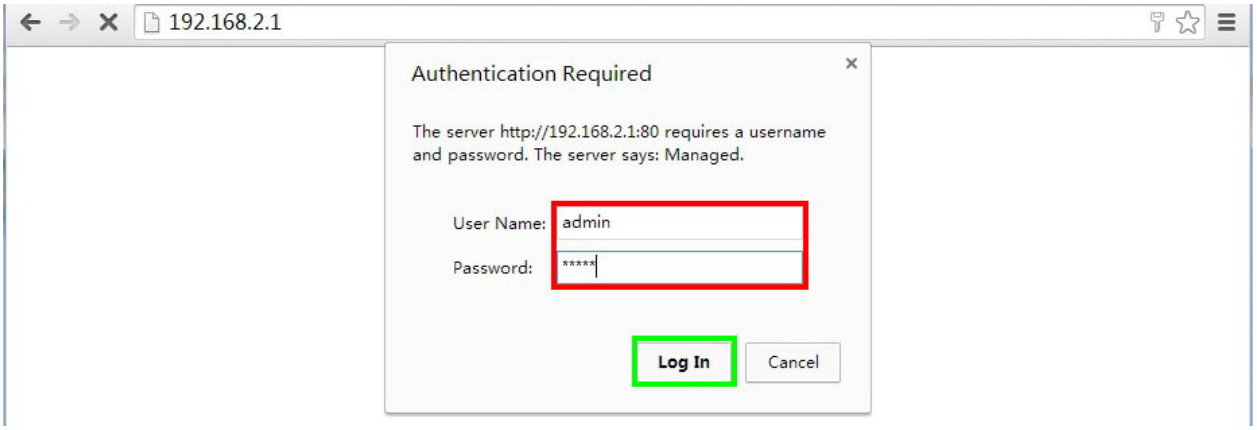
Niveo Switches

Niveo Ethernet switches can be used in single switch networking or multiple switch networking.

Log in to the Switch Web GUI

The default IP address of the switch is 192.168.2.1. Set a static IP address of the PC to ensure it is in the same IP range as the switch, such as 192.168.2.42.

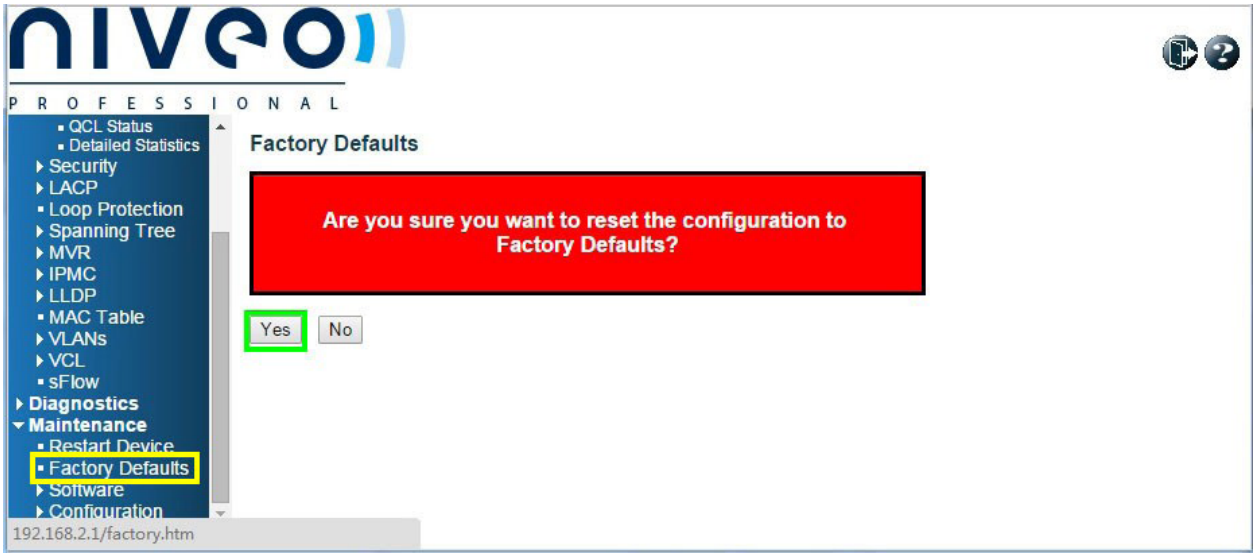
Open a web browser and navigate to the IP address of the switch (192.168.2.1).



Input the username and password (default of both is *admin*).

Click the *Log In* button.

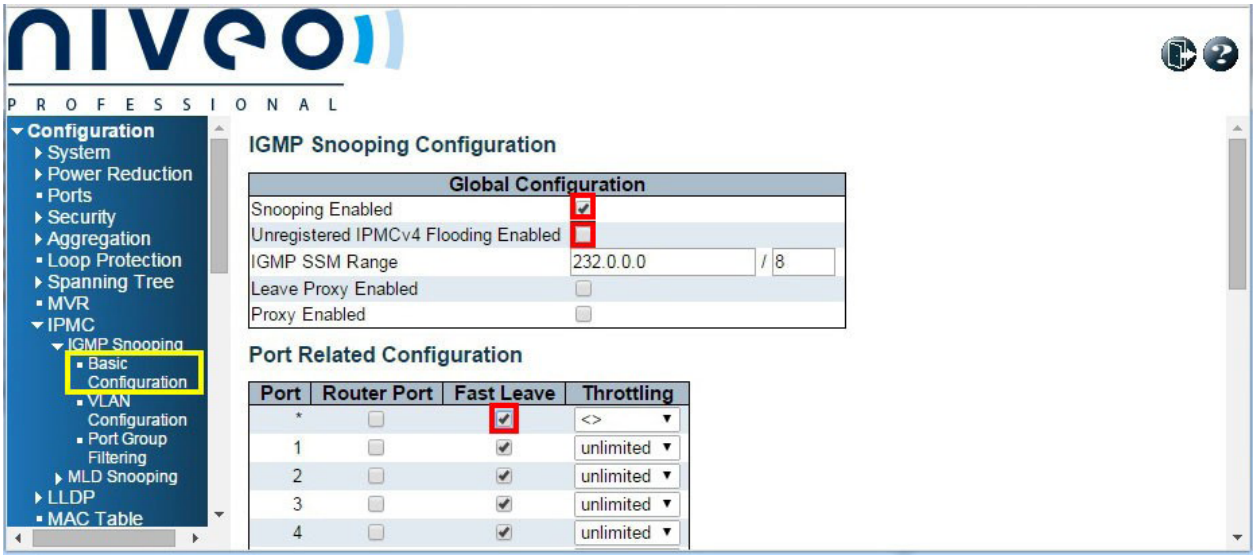
Resetting to Factory Defaults



Navigate to *Maintenance* > *Factory Defaults*.

Click the *Yes* button.

IGMP Configuration for Single Switch Network or Extended Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

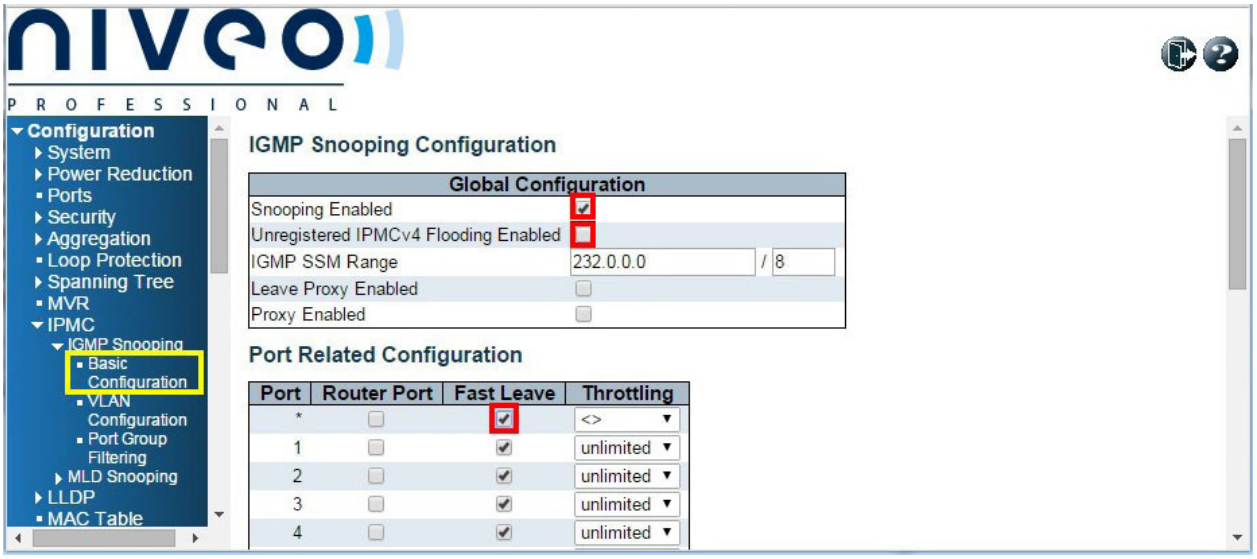
Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

Check the *Fast Leave* box in the all ports (*) row.

Scroll to the bottom of the page and click the *Save* button.

IGMP Configuration for Core Switch in a Multiple Switch Network

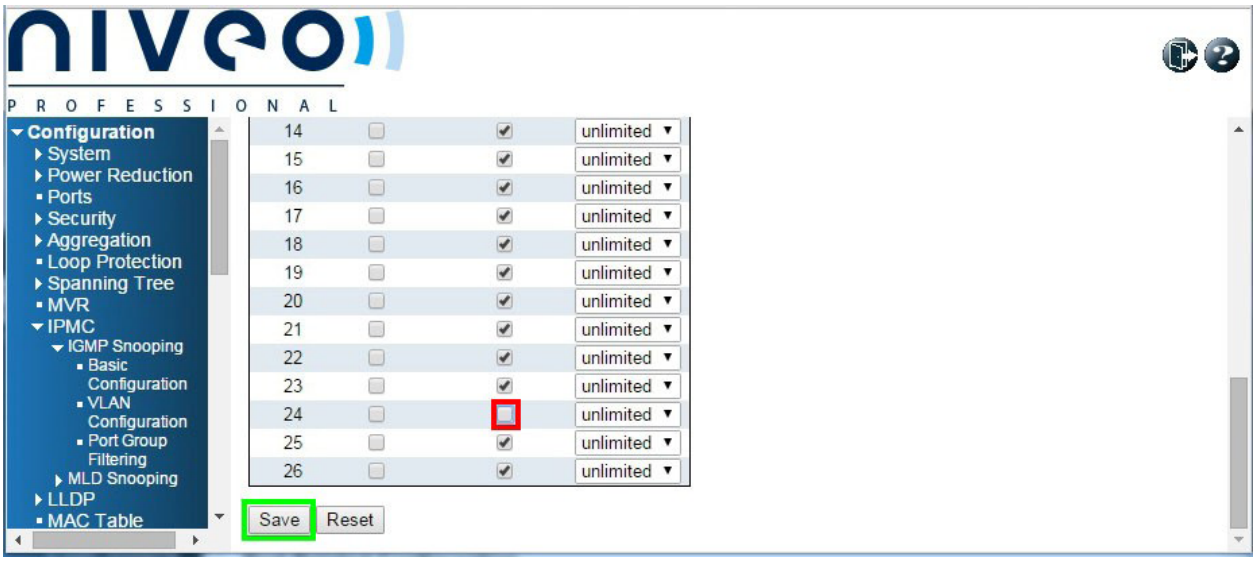


Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

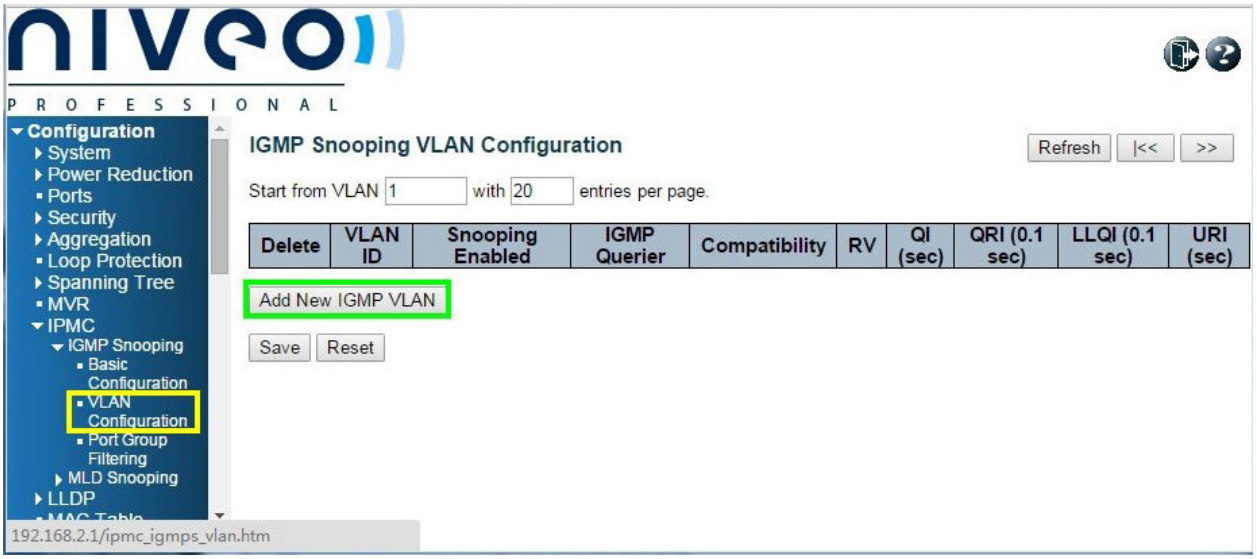
Check the *Fast Leave* box in the all ports (*) row.



Uncheck the *Fast Leave* box for ports connected to extended switches.

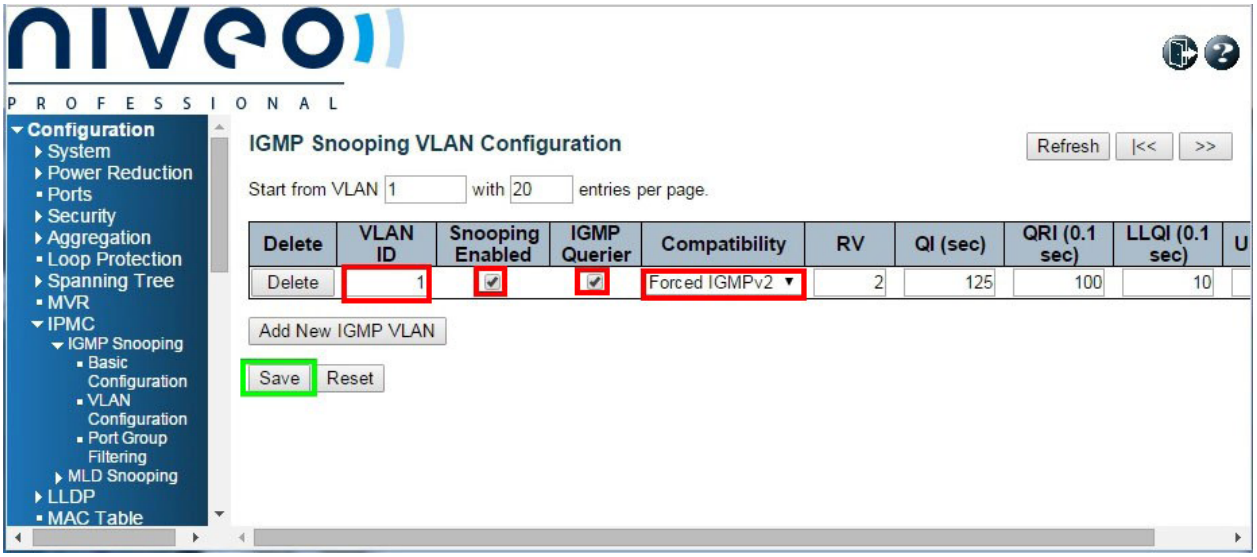
Scroll to the bottom of the page and click the *Save* button.

VLAN Configuration for Single Switch Network or Core Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

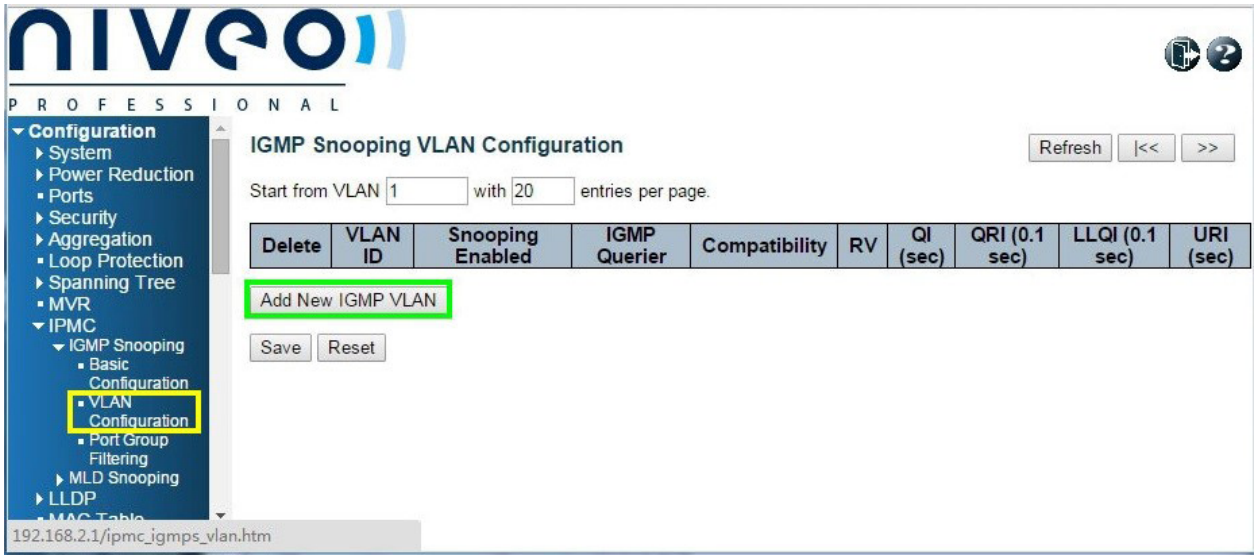
Check the *Snooping Enabled* box.

Check the *IGMP Querier* box.

Select *Forced IGMPv2* from the *Compatibility* drop-down list.

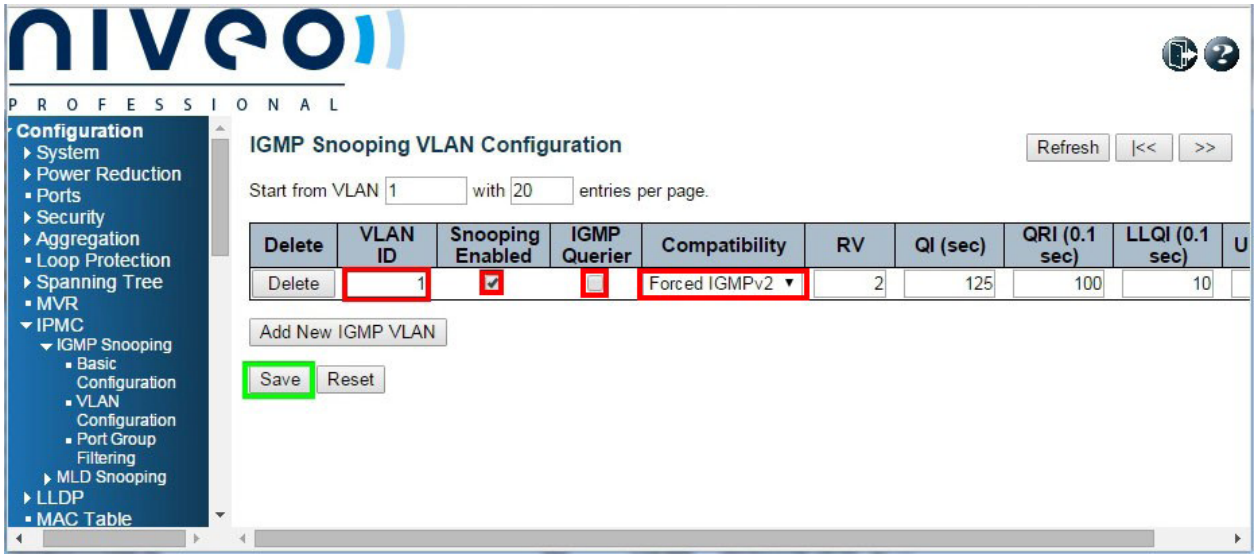
Click the *Save* button.

VLAN Configuration for Extended Switch in a Multiple Switch Network



Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

Check the *Snooping Enabled* box.

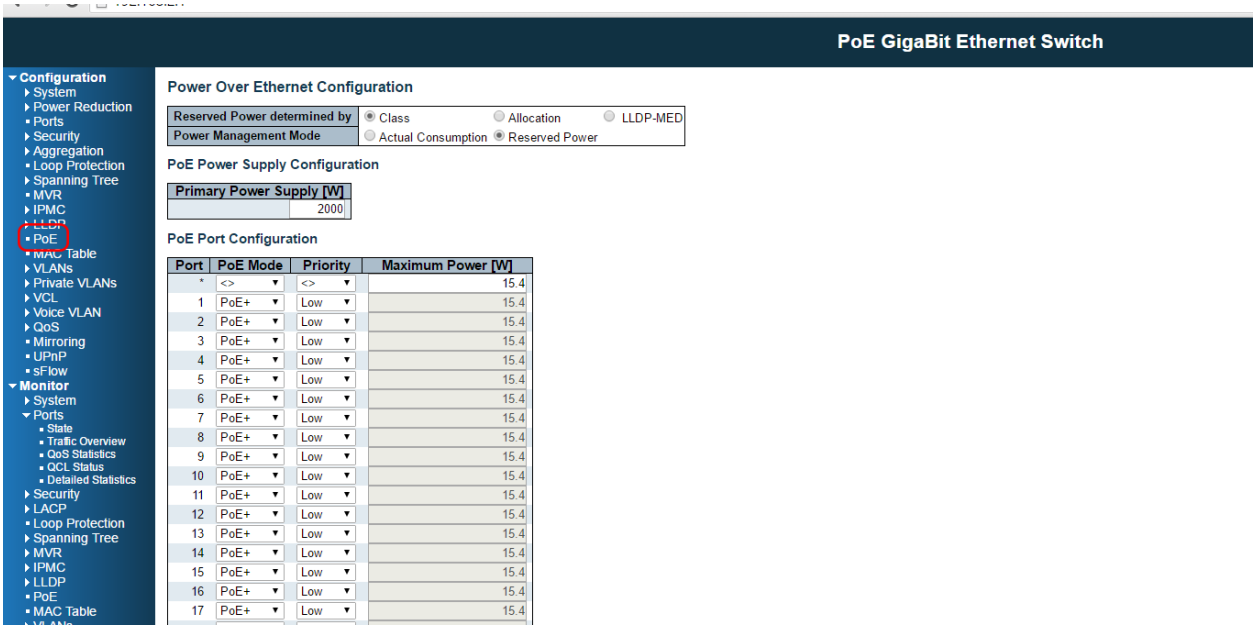
Uncheck the *IGMP Querier* box.

Select *Forced IGMPv2* from the *Compatibility* drop-down list.

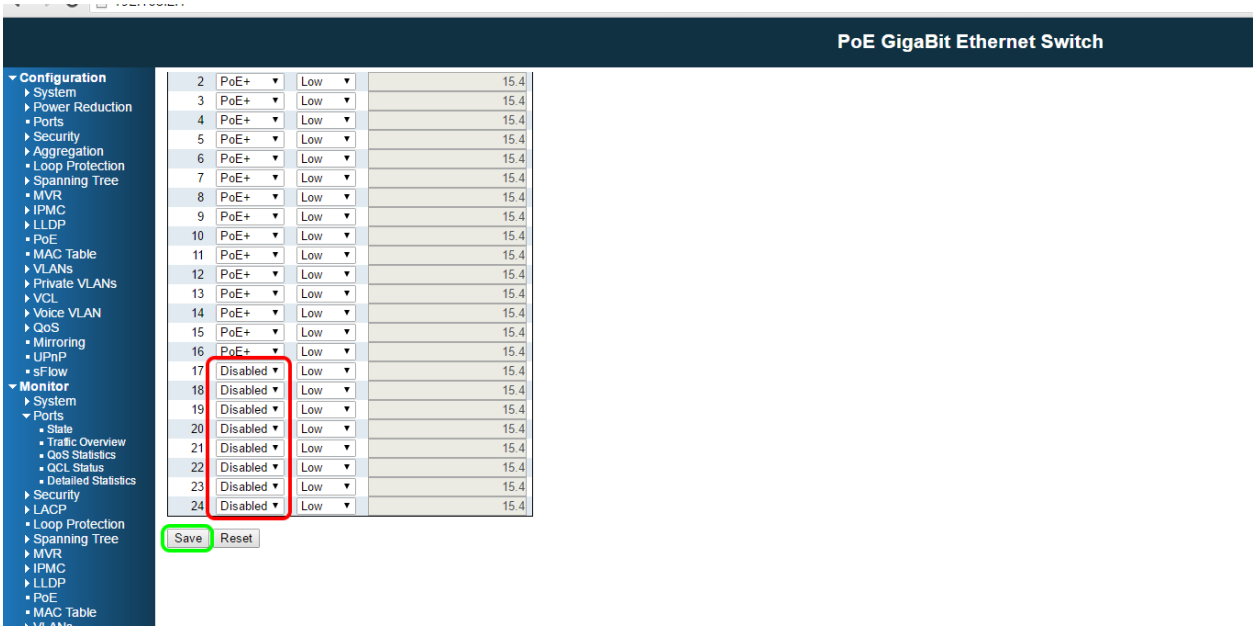
Click the *Save* button.

PoE Configuration

For PoE switches, make sure to disable PoE in ports that are not used to power PoE devices. This example will show how to disable the PoE functionality to ports 17-24 that are not used to power PoE devices.



Navigate to *Configuration* > *PoE*.

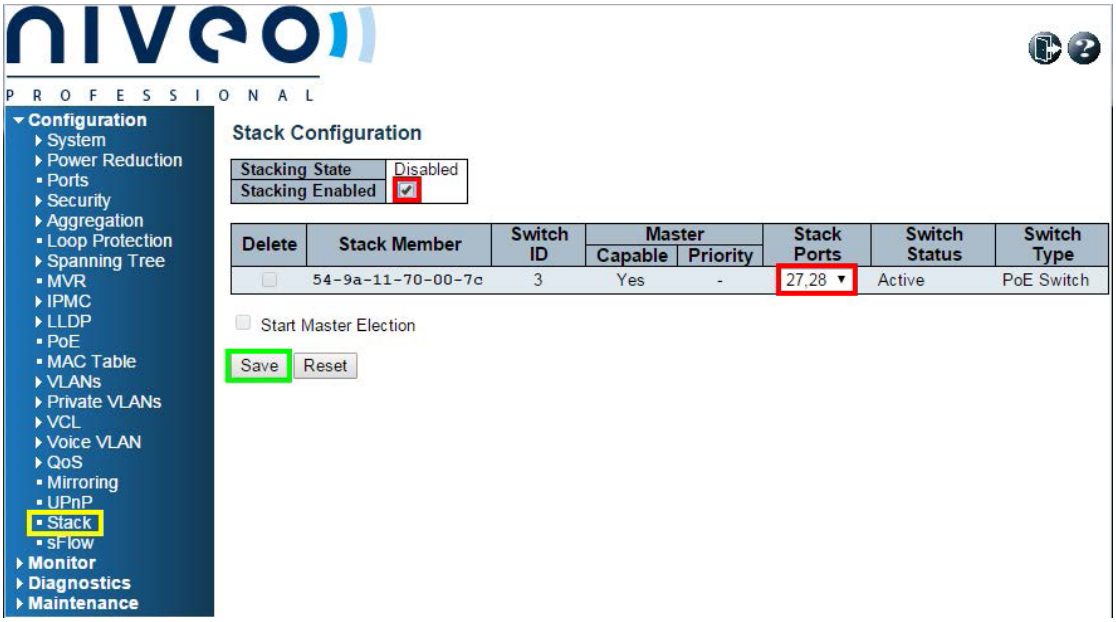


Select *Disabled* from the *PoE* dropdown list for ports 17 through 24.

Click the *Save* button.

Configuration for Switch Stacking

The following configuration setings are for stacking Niveo switches utilizing the IP switch stack ports.



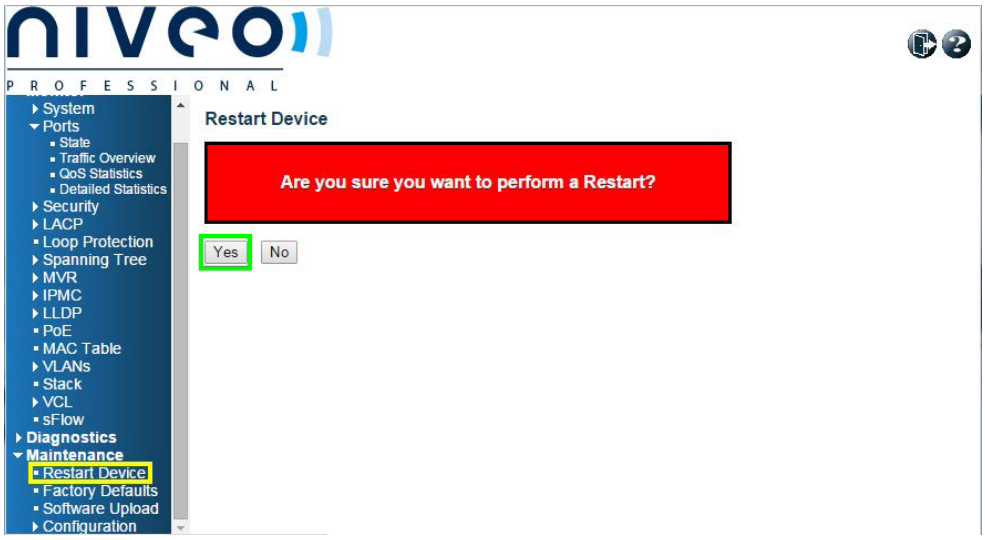
Navigate to *Configuration* > *Stack*

Check *Stacking Enabled*

Select *27,28* for *Stack Ports*

Click the *Save* button.

This will prompt you to restart the switch device for the stack feature to work.



Navigate to *Maintenance* > *Restart Device*

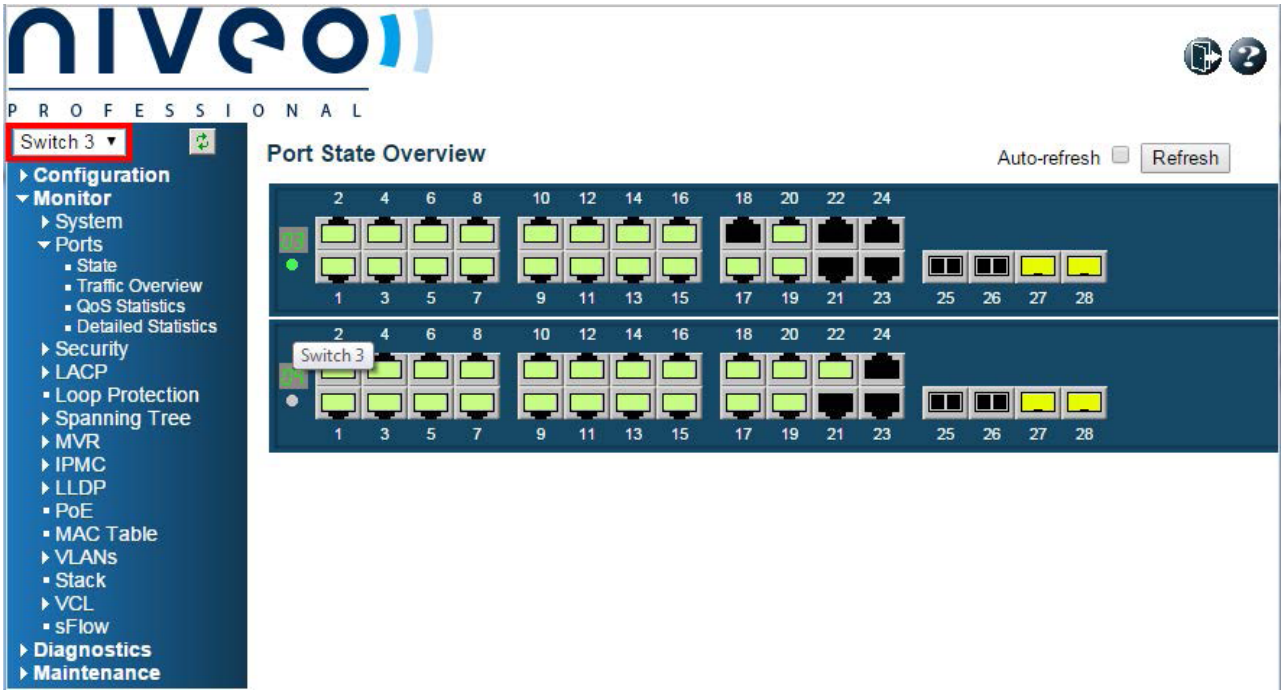
Click the *Yes* button.

Connecting Stacked Switches

This networking configuration will require multi-mode fiber optical cabling and the appropriate SFP+ transceivers. Please contact the switch manufacturer if you need assistance with specifying the correct networking transceivers and fiber optic cabling.

Using fiber optic jumper cables, connect port 27 of the first switch to port 28 of the the second switch, then connect port 27 of the second switch to port 28 of the first switch. This will form a ring topology. Below is an example of three stacked network switches using the ring topology.

Confirming Stacked Switch Configuration

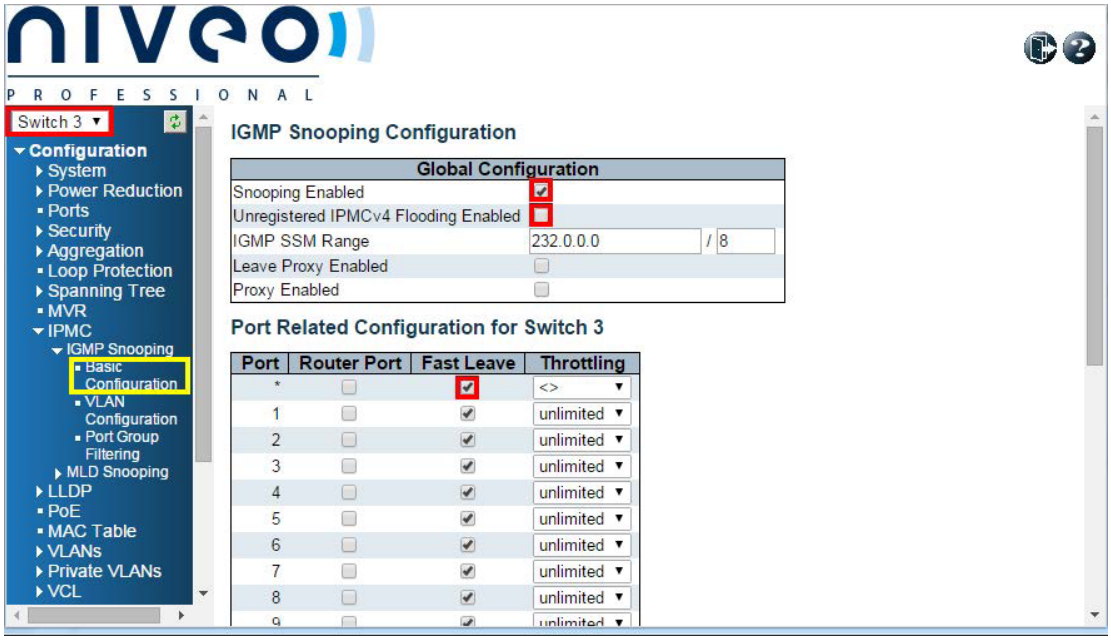


Navigate to *Monitor > Ports > State* to confirm that the stacking feature has been enabled and all connectivity is being shown

Note: When all switches have been properly stacked and connected you will see a drop down menu in the top left corner of the switches web server that will allow you choose a switch to be configured.

IGMP Configuration for Switch in a Stacked Configuration

NOTE: All switches in a stacked network configuration should be configured in the same manner as followed.



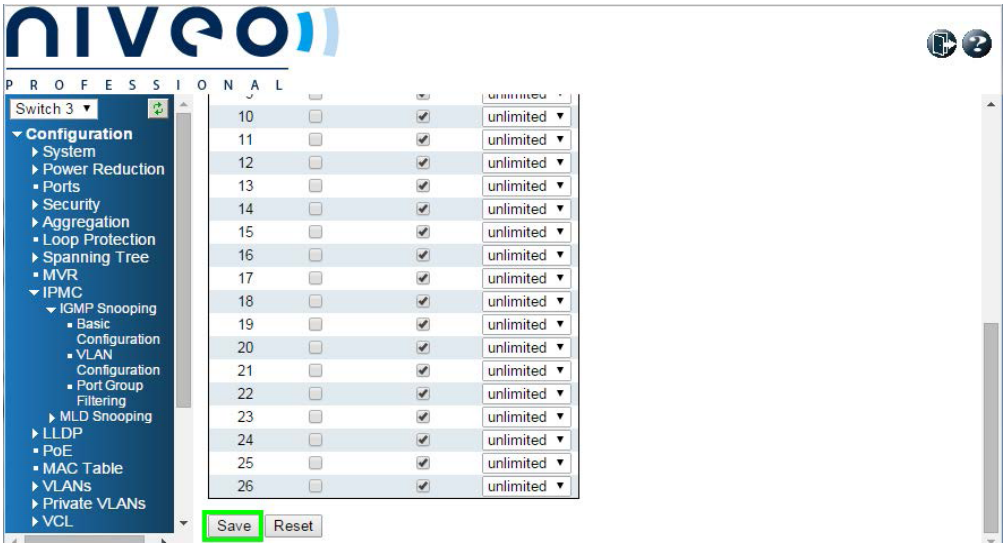
Choose the next switch in the stacked configuration in the drop down menu to the upper left.

Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *Basic Configuration*.

Check the *Snooping Enabled* box.

Uncheck the *Unregistered IPMCv4 Flooding Enabled* box.

Check the *Fast Leave* box in the all ports (*) row.



Scroll to the bottom of the page and click the *Save* button.

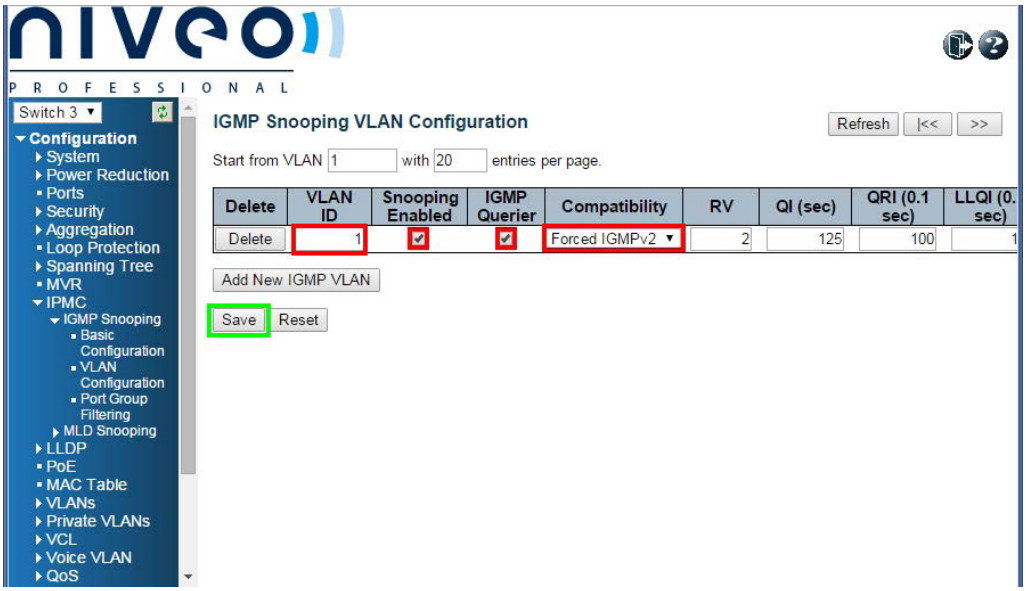
VLAN Configuration for Switch in a Stacked Configuration

NOTE: All switches in a stacked network configuration should be configured in the same manner as followed.

Choose the next switch in the stacked configuration in the drop down menu to the upper left.

Navigate to *Configuration* > *IPMC* > *IGMP Snooping* > *VLAN Configuration*.

Click the *Add New IGMP VLAN* button.



Enter *1* in the *VLAN ID* box.

Check the *Snooping Enabled* box.

Uncheck the *IGMP Querier* box.

Select *Forced IGMPv2* from the *Compatibility* drop-down list.

Click the *Save* button.

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