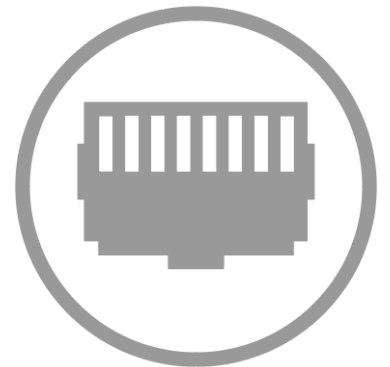




# MS Series

LAYER 3 SWITCHES WITH OVRC  
MS-1212, MS-2424, MS-2400, MS-2416, MS-4424

User Guide



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## FCC statement

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Caution:** Changes or modifications not expressly approved by Control4 could void the user's authority to operate the equipment. Shielded CAT5e or better cables are required in order to comply with the FCC Rules part 15 limits for a Class B digital device.

# Introduction

To accommodate residential networking needs, Pakedge offers five residential cloud-managed switch models: MS-1212, MS-2400, MS-2416, MS-2424, MS-4424. This all-new switch series offers low- to high-capacity switches that can be used on anything from a large to small home network.

With key Layer 2 and Layer 3 managed switch functionality, these devices are best suited for high-end multimedia and control applications.

## Switches

| Name   | SKU     |
|--|---------|
| Pakedge L3 Managed Switch, 12 1G PoE+ 190W, 2 10G SFP+     | MS-1212 |
| Pakedge L3 Managed Switch, 24 1G, 2 10G SFP+               | MS-2400 |
| Pakedge L3 Managed Switch, 24 1G 16 PoE+ 245W, 2 10G SFP+  | MS-2416 |
| Pakedge L3 Managed 24 Port Switch 24 Ports PoE+ 2 10G SFP+ | MS-2424 |
| Pakedge L3 Managed Switch, 44 1G 24 PoE+ 370W, 4 10G SFP+  | MS-4424 |

### Switch specifications\*

| Managed switch SKU | Total # of ports | Ports with no PoE support | Ports with PoE+ | Power budget | SFP+ ports    |
|--------------------|------------------|---------------------------|-----------------|--------------|---------------|
| MS-1212            | 12               | -                         | 12 ports        | 190W         | (2) 10G ports |
| MS-2400            | 24               | 24 ports                  | -               | -            | (2) 10G ports |
| MS-2416            | 24               | -                         | 16              | 245W         | (2) 10G ports |
| MS-2424            | 24               | -                         | 24              | 370W         | (2) 10G ports |
| MS-4424            | 44               | -                         | 24              | 370W         | (4) 10G ports |

\*For a full list of specifications, see the data sheet at [pkdgc.co/ms-ds](http://pkdgc.co/ms-ds).

## Technical Support

Pakedge is committed to providing you with exceptional support on all of our products. If you want to speak with one of our representatives, contact us at:

Email: [support@pakedge.com](mailto:support@pakedge.com)

Phone: **650-385-8703**

Visit our website for up-to-date support information at [www.pakedge.com](http://www.pakedge.com).

Be prepared to provide your product's model and serial number. Your model and serial numbers are printed on a label located on the electronic housing.

# Installing

For installation procedures, refer to the *Quick Start Guide* that came with the switch or go to [pkdge.co/ms-qsg](http://pkdge.co/ms-qsg). You can also visit the Dealer Portal for current manuals and quick start guides.

For rack installation, make sure that the amount of air flow required for safe operation of the equipment is not compromised.

**Caution:** If you install the switch in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room temperature. Make sure you install the equipment somewhere within the recommended temperature range. For free-standing installation, make sure that the switch has at least 3.75 cm (1.5 in.) of clearance on each side to allow for adequate air flow and cooling.

# Getting to know your switch

This manual outlines the steps for configuring the web user interface settings for the Pagedge MS Series and can be used for the following products: MS-1212, MS-2400, MS-2416, MS-2424, and MS-4424.

Package contents:

- Switch
- AC adapter
- Ethernet cable
- Rack mount set
- Quick Start Guide



## Front panel

| LED Type              | LED Color  | LED Definition  |
|-----------------------|------------|---|
| Power LED             | Blue       | <ul style="list-style-type: none"> <li>• Solid Blue: Device is on</li> <li>• Flicker Blue: Device is booting</li> <li>• Off: Device is off</li> </ul>   |
| PoE/Ethernet port LED | Blue/Amber | <ul style="list-style-type: none"> <li>• Solid Blue: No Data is Transmitting</li> <li>• Flicker Blue: Data is Transmitting</li> <li>• Off: Link Down</li> <li>• Solid Amber: PoE is Powering, No Data is Transmitting</li> <li>• Flicker Amber: PoE is Powering and Data is Transmitting</li> </ul> |
| SFP Port LED          | Blue       | <ul style="list-style-type: none"> <li>• <b>Solid Blue:</b> No Data is Transmitting</li> <li>• <b>Flicker Blue:</b> Data is Transmitting</li> <li>• <b>Off:</b> Link Down</li> </ul>  |

## Back panel



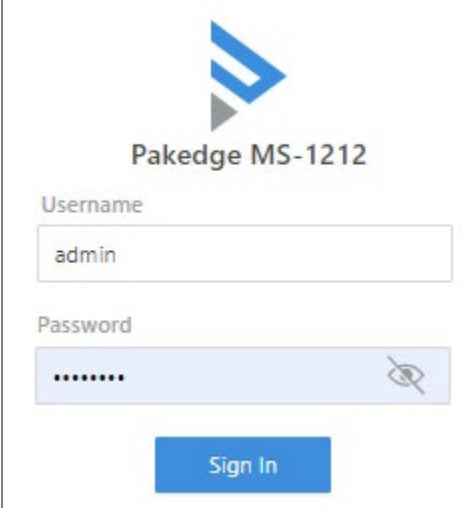
| Reset button press     | Result   |
|------------------------|--|
| >5 seconds <10 seconds | On button release between 5 and 10 seconds: Set login username/password to default |
| >=10 seconds           | On button release after 10 seconds: Revert to firmware default configurations      |



# Accessing the switch

## To access the switch's interface:

1. Connect the managed switch to a power source. The PWR LED lights up and the fans start.
2. Connect the switch to the network or directly to the router. Connect your computer to the same network.
3. Navigate to the network router in order to find the DHCP table. Look for the host name matching the model and MAC address of the switch and note the corresponding IP address obtained by the switch.
4. Navigate to the IP address listed in the router DHCP table for the switch.
5. Enter the Username and Password. The default username is **admin** and the password is **password**.



The image shows a login interface for a Pakedown MS-1212 switch. At the top is the Pakedown logo, a stylized blue and grey 'P' shape. Below the logo is the text 'Pakedown MS-1212'. There are two input fields: 'Username' with the text 'admin' entered, and 'Password' with a masked password of seven dots. To the right of the password field is an eye icon. Below the fields is a blue 'Sign In' button.

**Important:** You must change this default username and password.

# Navigating the switch

When you log in to the switch, you will see seven tabs: Overview, Connections, Configure, Interfaces, Backup, Logs, and Advanced.



Click a tab to configure and start monitoring your switch. See below for a summary of features on each tab.

## Tabs

| Tab         | Summary   | Sub-categories   |
|-------------|---|--|
| Overview    | Quick view of switch status and critical settings.  | n/a  |
| Connections | Displays a list of connected clients.   | n/a  |
| Configure   | Specifies device's network information (username, device name/location) and network protocol (DHCP or Static).  | n/a  |
| Interfaces  | Access and manage settings for the switch's physical and virtual interface settings.  | Port, VLAN, PoE  |
| Backup      | Save a configuration (backup) and then restore a configuration file.  |  |
| Logs        | Displays a sortable record of system events affected by the switch.   | n/a  |
| Advanced    | Less often used or more complex configuration settings. Perform maintenance, view statistics, and configure settings for various services and protocols (IGMP Snooping, STP, LLDP, etc.). | <ul style="list-style-type: none"> <li>• Firmware</li> <li>• IGMP Snooping</li> <li>• IGMP Snooping Querier</li> <li>• Multicast Forwarding Database</li> <li>• Spanning Tree</li> </ul> |

## Tab layouts

When you click on a tab, most will display a table.

This table lets you monitor, edit, and add specific switch settings.

| PoE  |           |      |          |            |                  |             | Add/Edit |
|--|-----------|------|----------|------------|------------------|-------------|----------|
| <span>⌵</span> <b>Port Configuration</b> <span>  </span> <span>General</span> <span>  </span> <span>Statistics</span> <span>  </span> <span>Details</span> |           |      |          |            |                  |             | ⋮        |
| View   |           |      |          |            |                  |             |          |
| Enable   | Interface | Name | Priority | Power Mode | Power Limit Type | Power Limit |          |
| <input checked="" type="checkbox"/>  | 0/1       |      | Low      | at30W      | User             | 30000       |          |
| <input checked="" type="checkbox"/>  | 0/2       |      | Low      | at30W      | User             | 30000       |          |

## Tiles and sub-tabs

If a tab has several sub-categories, it is divided into Tiles and Sub-tabs.

The screenshot shows the 'Interfaces' tab selected. It contains three tiles: 'Port' (Settings specific to physical switch port interfaces), 'VLAN' (Configurations for Layer 2 VLANs), and 'PoE' (Power over Ethernet settings and information). The 'PoE' tile is expanded to show sub-tabs: 'Port Configuration' (highlighted with a red box), 'General', 'Statistics', and 'Details'. Below the sub-tabs is a table with the following data:

| Enable                              | Interface | Name | Priority | Power Mode | Power Limit Type |
|-------------------------------------|-----------|------|----------|------------|------------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Low      | at30W      | User             |
| <input checked="" type="checkbox"/> | 0/2       |      | Low      | at30W      | User             |

On these tabs, select a tile and sub-tab to view its tables.

## Table content

From the open table, monitor, edit, or add specific switch settings.

The screenshot shows the 'PoE Port Configuration' table. It has a title 'PoE' and a sub-tab 'Port Configuration' (highlighted with a red box). There is an 'Add/Edit' button in the top right corner. Below the sub-tabs is a table with the following data:

| Enable                              | Interface | Name | Priority | Power Mode | Power Limit Type | Power Limit |
|-------------------------------------|-----------|------|----------|------------|------------------|-------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/2       |      | Low      | at30W      | User             | 30000       |

The rest of the guide outlines steps for configuring the settings on each tab.

# Viewing, adding, and editing

If a table allows for editing, an **Option** (⋮) icon displays above the table.

| Enable                              | Interface | Name | Type   | Physical Mode | Physical Status | Auto Negotiate Capabilities |
|-------------------------------------|-----------|------|--------|---------------|-----------------|-----------------------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         |
| <input checked="" type="checkbox"/> | 0/2       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         |
| <input checked="" type="checkbox"/> | 0/3       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         |

To change a switch setting, access a tab, click its **Option** (⋮) icon, then click **Add**, **Edit**, or **Delete**.

Pakedge MS-1212

Cancel **Apply**

Overview Connections Configure Interfaces Backup Logs Advanced

Edit Password


Current Password

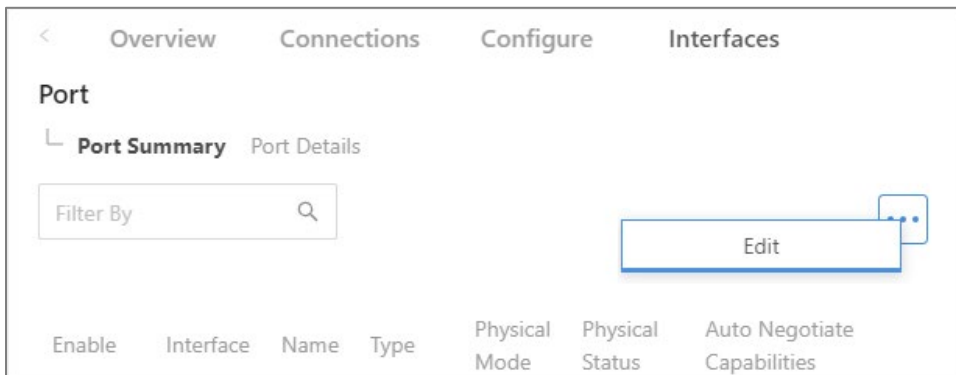
Complete the dialog, then click **Apply** (at the top of the page) to finalize your changes. **Important!** Changes will **not** be saved until you click **Save** in the dialog and **Apply** at the top of the page.

# Editing multiple items

On many tabs, you can edit several items at once.

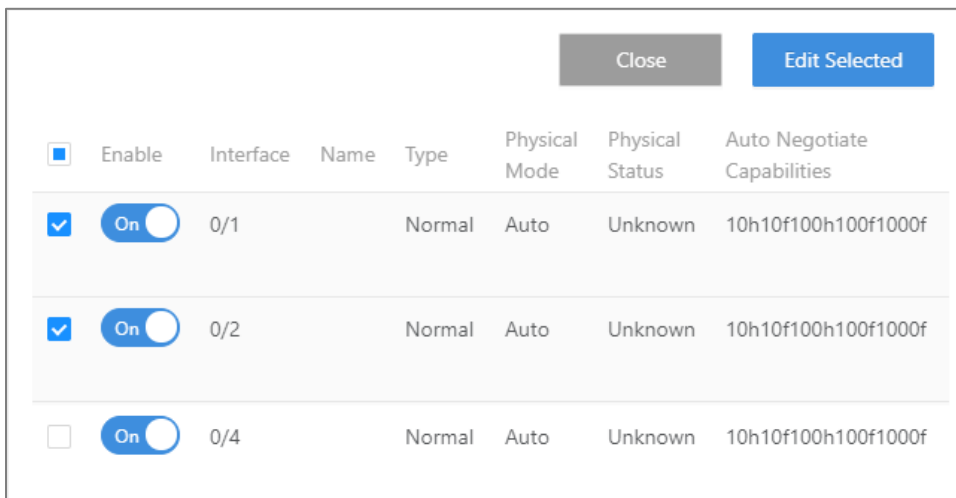
## To edit multiple items:

1. Log in to the switch. Navigate to the desired tab (or sub-tab).
2. From the tab, select the **Option**  icon (upper right) and click **Edit**.



An “edit” check box appears next to each item

3. Select the “edit” checkbox next to each item you want to edit, then click **Edit Selected**.



**Caution:** Editing multiple items requires caution. Be sure the correct items are selected before making changes.

4. Complete the dialog and click **Save**, then click **Apply** at the top of the page.
5. Designated changes are applied to the selected items.

# Configure

The first time you log in, you are brought to the *Configure* tab.

Here you must change your username and password (required) and specify the device's network information and network protocol.

- *Edit Password, Edit Username*
  - The first time you log in, you must change these from the defaults (“admin” and “password”) to new credentials.
- *General Device Information*
  - **Friendly Device Name:** Give the switch a descriptive name to identify it on its web interface screen.
  - **Device Location:** Describe the physical location of the switch here.
  - **Device Notes:** List any other useful information about the switch.
  - **Time Zone:** Select the time zone used for the switch’s event logs.
- *LAN*

**Mode:** Select **DHCP** or **Static**.

- *DHCP:* If you selected **DHCP**, the following fields are read only.
- *Static:* If you selected **Static**, complete the following fields:
  - **IP Address:** Enter the IP address for the switch’s local network. (For a DHCP network, this field is read-only.)
  - **Subnet Mask:** Enter the switch’s subnet mask. (For a DHCP network, this field is read-only.)

- **DHCP Start/End:** Assign the first and last IP addresses you would like to use in the DHCP range. Each interface can have up to four DHCP.
- **Primary DNS Server:** Assign the primary DNS server.

## Overview

The *Overview* tab gives you a quick view of the switch's status and critical settings.

The screenshot displays the Overview tab for a Pagedge MS-1212 switch. At the top, there are navigation tabs: Overview, Connections, Configure, Interfaces, Backup, Logs, and Advanced. The main header shows the device name 'Pagedge MS-1212' and a 'Location' field. Below this, the 'Current Status' is 'Up (for 1 Days 3 Hours 52 Minutes)', and there are two buttons: 'Update Firmware' and 'Restart Device'. A table lists various service metrics:

| Service         | Service Name    | Service Data                    |
|-----------------|-----------------|---------------------------------|
| ActiveInterface | ActiveInterface | 2/14                            |
| PoeBudget       | PoeBudget       | 0W of 190W(0% utilized)         |
| CpuUsage        | CpuUsage        | 27%                             |
| MemoryUsage     | MemoryUsage     | 42%                             |
| Uptime          | Uptime          | 1 Days 3 Hours 52 Minutes       |
| Firmware        | Firmware        | 0.01.0.100035                   |
| SerialNumber    | SerialNumber    | TW...                           |
| vlans           | vlans           | 1                               |
| STP             | STP             | Root Status:False; BridgeID:... |

On this page, you will find information on the current firmware version, number of active ports on the switch, system-level PoE utilization, CPU and memory usage, uptime, serial number, and more.

If there is new firmware available for the switch, you will see a message alerting you with an option to download it.

- **Notifications:** System notifications display at the very top of the tab. This example shows a firmware update is available.
- **Device Name:** The device name (assigned in the *Configure* tab) appears here.
- **IP address and MAC address:** The device's assigned IP address and system MAC address is shown here.
- **Location:** Displays the configured "Location" of the device.
- **Current Status:** Shows the switch's up/down status.
- **Update Firmware:** Click to open the *Update Firmware* screen (also accessible under the *Advanced* tab). The screen also displays the firmware's release notes.
- **Restart device:** Click to restart (power cycle) the switch. It happens immediately, with no confirmation dialog.

- **Services:** Displays the status of current services and settings and indicates with an icon whether the service or setting is optimally configured.

# Connections

The *Connections* tab displays a list of connected clients.

| Interface | Name | Link Status | IP Address    | MAC Address | Up Time  | PoE | VLAN | TX/s    | RX/s    |
|-----------|------|-------------|---------------|-------------|----------|-----|------|---------|---------|
| 0/1       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/2       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/3       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/4       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/5       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/6       |      | down        |               |             |          | 0W  | 1    | 0.0 b   | 0.0 b   |
| 0/7       |      | 1G          | 192.168.1.127 |             | 01:03:49 | 0W  | 1    | 12.2 Kb | 360.0 b |

Click any column heading to sort the list by that field. Available fields are:

- **Interface:** Physical interface on the switch
- **Name:** Device name assigned by the user
- **Link Status:** Link speed/status of the interface
- **IP Address:** IP address of connected device (learned by LLDP)
- **MAC Address:** MAC address of connected device (learned by LLDP)
- **Up Time:** Up time for each interface
- **PoE:** PoE usage per interface
- **VLAN:** VLAN configured on the port
- **TX:** Traffic transported from the port
- **RX:** Traffic received by the port

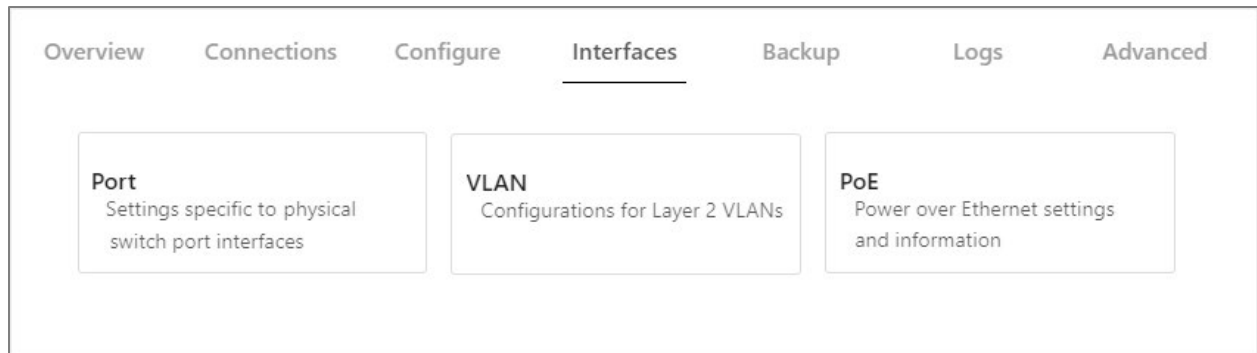


# Interfaces

The *Interfaces* tab provides management features for the switch's physical and virtual interfaces and PoE settings (port, VLAN, and PoE settings).

## Tiles

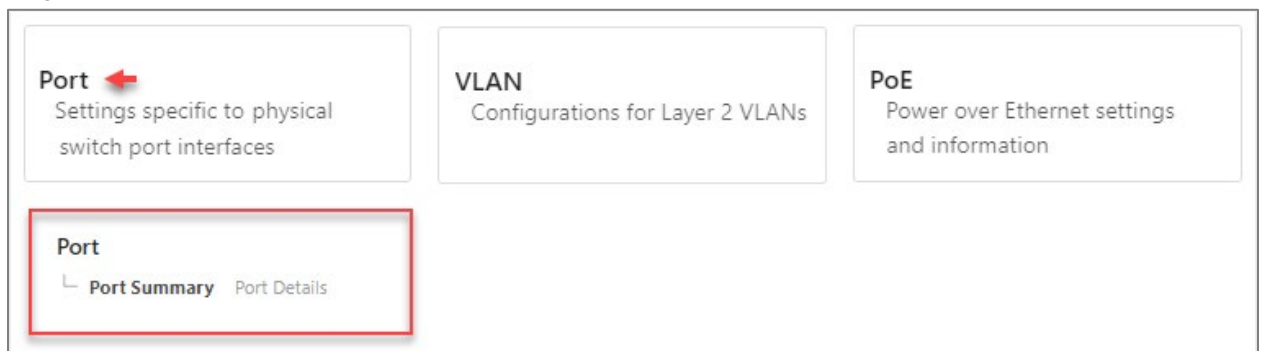
The *Interfaces* tab opens to three tiles: *Ports*, *VLANs*, and *PoE*.



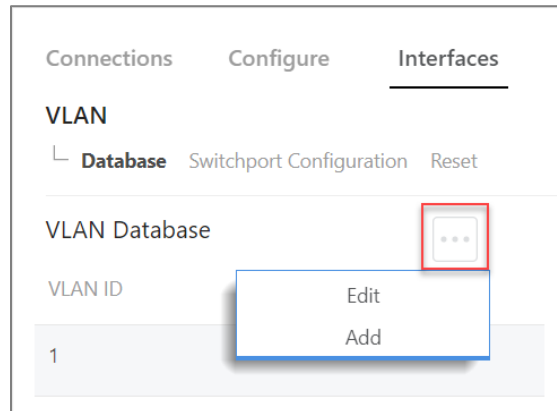
## Add or edit an interface

### To add or edit an interface:

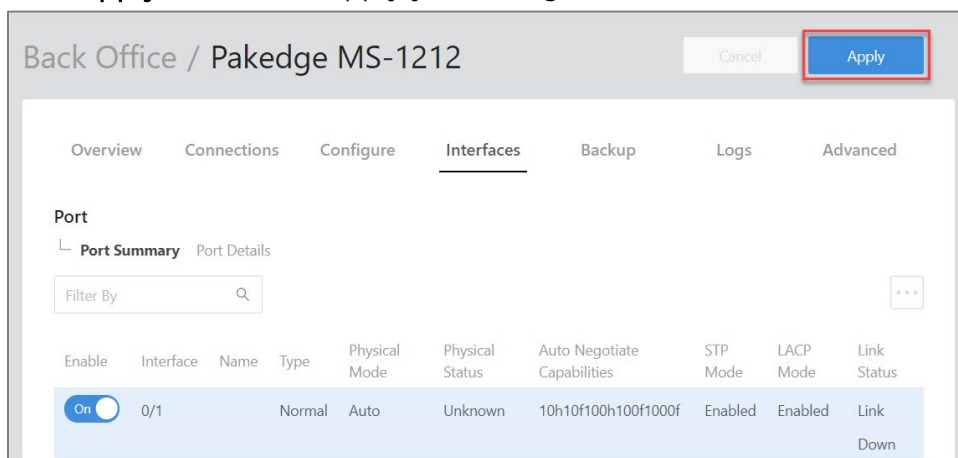
1. Log in to the switch and click the **Interfaces** tab, then click a tile (Port, VLAN, PoE).



2. From the tile, select a sub-tab (*Port>Port Summary*), then click the **Option** (⋮) icon.
  - a. To edit, click the **Option** (⋮) icon and click **Edit**.
  - b. To add, click the **Option** (⋮) icon and click **Add**.



3. Make any adjustments, then click **Continue**.
4. Click **Apply** to save and apply your changes.



**Important!** Your changes will not be saved until you click **Apply**.

## Completing the dialog

Depending on the selected interface, you will see different editing options. See below for a summary of each tile.

## Tiles

- **Port:** Manage the port summary and port details.
- **VLAN:** Manage the VLAN database, switchport configurations, or reset the VLAN.
- **PoE:** Manage PoE settings: Port Configuration, General, Statistics, and Details.

# Ports

To access Ports, go to **Interfaces > Ports**.

On the **Interface** tab's first tile, **Ports**, view or manage physical switch port settings.

**Port**

Port Summary Port Details

Filter By

| Enable                              | Interface | Name | Type   | Physical Mode | Physical Status | Auto Negotiate Capabilities | STP Mode | LACP Mode | Link Status  |
|-------------------------------------|-----------|------|--------|---------------|-----------------|-----------------------------|----------|-----------|--------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/> | 0/2       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/> | 0/3       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/> | 0/4       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |

Choose from two sub-tabs:

- **Port Summary:** View or configure key port settings, including the port name, port status, enable/disable various modes, and configure autonegotiation.
- **Port Details:** View port information such as physical addresses, port list bit offset, and interface index.

Overview Connections Configure Interfaces

**Port**

Port Summary **Port Details**

| Interface | Name | Physical Address | PortList Bit Offset | Interface Index |
|-----------|------|------------------|---------------------|-----------------|
| 0/1       |      |                  | 1                   | 1               |
| 0/2       |      |                  | 2                   | 2               |
| 0/3       |      |                  | 3                   | 3               |

Click a sub-tab to access its settings.

## Port Summary

To access Port Summary, go to **Interfaces > Ports > Port Summary**.


The first sub-tab is **Port Summary**.

From the **Port Summary** sub-tab, view or configure key port settings. Monitor port status, enable/disable various modes, and configure auto-negotiation and other settings.

| Port  |           |      |        |               |                 |                             |          |           |              |
|---|-----------|------|--------|---------------|-----------------|-----------------------------|----------|-----------|--------------|
| <span>↳ Port Summary</span> <span>Port Details</span> |           |      |        |               |                 |                             |          |           |              |
| Filter By <input type="text" value=""/>               |           |      |        |               |                 |                             |          |           |              |
| Enable  | Interface | Name | Type   | Physical Mode | Physical Status | Auto Negotiate Capabilities | STP Mode | LACP Mode | Link Status  |
| <input checked="" type="checkbox"/>                   | 0/1       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/>                   | 0/2       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/>                   | 0/3       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |
| <input checked="" type="checkbox"/>                   | 0/4       |      | Normal | Auto          | Unknown         | 10h10f100h100f1000f         | Enabled  | Enabled   | Link<br>Down |

## Edit

To edit available *Port Summary* settings:

1. Log in to the switch, then click **Interfaces > Port > Port Summary**.
2. Click **Option** () , then click **Edit**.
3. Check the box next to items you want to edit, then click **Edit Selected**.

**Caution!** When editing multiple ports, make sure the correct ports are selected before making changes.

4. Complete the dialog (see below).
5. In the dialog, click **Save**, then click **Apply** at the top of the page to save your changes.

*Completing the dialog*

For help completing the dialog, see the table below.

Fields below can be viewed, edited, or both.

| Field                                | Function   |
|--------------------------------------|--|
| Enable                               | Turns port on/off.   |
| Interface                            | Identifies the port or link aggregation.   |
| Name                                 | Edit the name of an interface.   |
| Type                                 | Displays interface type.   |
| Admin Mode (Enabled/Disabled)        | When editing, use this field to enable or disable the interface's <b>Administrative Mode</b> . <b>Note:</b> If a port or LAG is administratively disabled, it cannot forward traffic.  |
| Physical Mode (Auto Negotiate/Speed) | Port speed and duplex mode. If the mode is <b>Auto</b> , the duplex mode and speed are set from the auto-negotiation process.  |
| Auto Negotiate Capabilities          | Indicates the list of configured capabilities for a port when <b>Auto Negotiate</b> is on.   |
| Speed                                | If Auto Negotiate is turned off, <b>Speed</b> indicates default speed (in Mbps) allocated to the selected ports.   |
| Physical Status                      | Indicates the port speed and duplex mode for physical interfaces. The physical status for LAGs is not reported.  |
| STP Mode (Enable/Disable)            | The Spanning Tree Protocol (STP) <b>Administrative Mode</b> associated with the port or LAG.   |
| LACP Mode (Enable/Disable)           | Shows the <b>Administrative Mode</b> of the Link Aggregation Control Protocol (LACP).  |
| Link Status, Link Trap               | Indicates whether the link is up or down. The link is the physical connection between the port or LAG and the interface on another device.   |
| MTU                                  | When editing, specify the <b>MTU</b> (Maximum Transmit Unit) of the interface.   |
| Broadcast Storm Recovery Level       | When editing, specify the broadcast storm control threshold for the port. Broadcast storm control limits the number of broadcast frames accepted and forwarded by the port. <ul style="list-style-type: none"> <li>• Enable/Disable, then select a percentage or PPS.</li> <li>• Select None/Shutdown/Trap.</li> </ul> |
| Multicast Storm Recovery Level       | When editing, specify the multicast storm control threshold for the port. This setting limits the number of multicast frames accepted and forwarded by the port. <ul style="list-style-type: none"> <li>• Enable/Disable, then select a percentage or PPS.</li> <li>• Select None/Shutdown/Trap.</li> </ul>            |

|                              |   |
|------------------------------|---|
| Unicast Storm Recovery Level | <p>When editing, specify the unicast storm control threshold for the port. Unicast storm control limits the number of unicast frames accepted and forwarded by the switch.</p> <ul style="list-style-type: none"> <li>• Enable/Disable, then select a percentage or PPS.</li> <li>• Select None/Shutdown/Trap.</li> </ul> |
|------------------------------|---|

### Edit port names

You can edit the display name for each port on this page. Port names help distinguish one port from another (for example, Touch Screen, Camera, Controller).

#### To edit port names:

1. Log in to the switch.
2. Click **Interfaces > Port > Port Details**.
3. Click the **Option** (⋮) icon and click **Edit**.
4. Select the check box next to items you want to edit, then click **Edit Selected**.
 

**Caution!** When editing multiple ports, make sure the correct ports are selected before making changes.
5. Enter the port's new name.
6. Click **Save**, then click **Apply** to save your changes.

### Port Details

To access Port Details, go to **Interfaces > Ports > Port Details**.

Under Port Details, edit each port's name or view port information such as Physical Address, Port List Bit Offset, and Interface Index.

| Interface | Name | Physical Address | PortList Bit Offset | Interface Index |
|-----------|------|------------------|---------------------|-----------------|
| 0/1       |      |                  | 1                   | 1               |
| 0/2       |      |                  | 2                   | 2               |
| 0/3       |      |                  | 3                   | 3               |

# VLAN

To access the VLAN tile, go to **Interfaces > VLAN**.

On the **Interface** tab's second tile, VLAN, you can configure Layer 2 VLANs.



Choose from three sub-tabs:

- **Database:** View active VLANs and create new VLANs.
- **Switchport Configuration:** View/edit each switchport Interface, Name, Switchport Mode, Native VLAN, and Tagged VLANs.
- **Reset:** Return VLAN configuration parameters to their default values.

## Database

To access VLAN database information, go to **Interfaces > VLAN > Database**.

The first VLAN sub-tab is **Database**.

From the *VLAN Database* sub-tab, view, edit, or create active VLANs.

| VLAN ID | Name     |
|---------|----------|
| 1       | VLAN0002 |
| 2       | VLAN0003 |
| 3       | VLAN0003 |
| 4       | VLAN0004 |

### Create VLAN

To add a VLAN in the VLAN database:

1. Go to **Interfaces > VLAN > VLAN Database**.
2. On the upper right, click the **Option** (⋮) icon.
3. Click **Add**.
4. Complete the dialog, then click **Apply** to activate the new VLAN.

### Edit VLAN Data Base

To edit a VLAN in the VLAN database:

1. Go to **Interfaces > VLAN > VLAN Database**.
2. On the upper right, click the **Option** (⋮) icon.
3. Click **Edit**.
4. Complete the dialog, then click **Apply** to save your work.

### Completing the dialog

See below for help completing the *Add VLAN* dialog.

The screenshot shows a dialog box titled "Add VLAN" with a close button in the top right corner. The dialog contains two input fields: "VLAN ID or Range" with the value "2" and "Name" with the value "VLAN 2". At the bottom of the dialog, there are two buttons: "Cancel" and "Add".

### Explanations

| Field            | Function   |
|------------------|--|
| VLAN ID or Range | Add a new VLAN to the list of VLAN interfaces on the router. |
| Name             | Enter a name to label the VLAN for identification.           |



## Switchport Configuration

To access the VLAN switchport configuration, go to **Interfaces > VLAN > Switchport Configuration**.

The second VLAN sub-tab is *Switchport Configuration*.

| Interface | Name | Switchport Mode | Access VLAN | Native VLAN | Allow VLANs |
|-----------|------|-----------------|-------------|-------------|-------------|
| 0/1       |      | Access          | 1           | 1           | 1-4093      |
| 0/2       |      | Access          | 1           | 1           | 1-4093      |
| 0/3       |      | Access          | 1           | 1           | 1-4093      |
| 0/4       |      | Access          | 1           | 1           | 1-4093      |

From the *Switchport Configuration* sub-tab, assign switchport settings per port. Select **Switchport Mode Access** or **Trunk**.

## Edit Switchport Configuration

To edit **Switchport Configuration**:

1. Select **Interfaces > VLAN > Switchport Configuration**.
2. Click the **Option** (⋮) icon, then click **Edit**.
3. Select the check box next to items you want to edit, then click **Edit Selected**.  
**Caution!** Before making changes, make sure the correct ports are selected.
4. Complete the dialog.
5. Click **Save**, then click **Apply** to save your changes.

## Completing the dialog

See below for help completing the *Edit Switchport Configuration* dialog.

**Edit Switchport Configuration** ✕

Switchport Configuration Selected: 2,3

Switchport Mode

Access

Access VLAN

1

Priority

0

Cancel Save

## Explanations: Switchport Configuration dialog

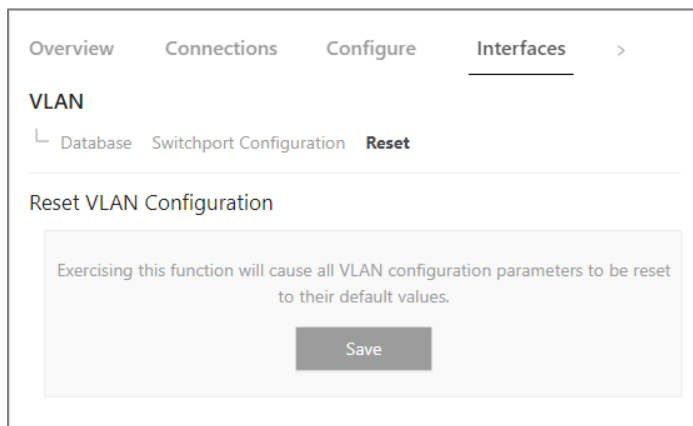
| Field           | Function   |
|-----------------|--|
| Interface       | Interface associated with the rest of the data in the row.<br><i>Note: When editing, this field identifies all interfaces that are being configured.</i>   |
| Name            | Name associated with the Interface on the row.   |
| Switchport Mode | The switchport mode of the interface, which is one of the following: <ul style="list-style-type: none"> <li>• <b>Access:</b> Access mode is suitable for ports connected to end stations or end users. Access ports participate only in one VLAN. They accept and transmit untagged packets.</li> <li>• <b>Trunk:</b> Trunk mode is intended for ports that are connected to other switches. Trunk ports can participate in multiple VLANs and accept both tagged and untagged packets.</li> </ul> |
| Native VLAN     | The VLAN ID assigned to untagged or priority tagged frames received on this port in either Access or Trunk modes.<br>This value is also known as the Port VLAN ID (PVID). In a tagged frame, the VLAN is identified by the VLAN ID in the tag.   |
| Tagged VLANs    | The VLAN ID(s) allowed to communicate on this port using 802.1q tagging as well as Untagged. The Native VLAN (PVID) should always be included in this setting along with Tagged VLANs that are to be allowed on the port.  |
| Priority        | Default 802.1p priority assigned to untagged packets arriving at the interface.  |

## VLAN Subpage: Reset

To access the VLAN reset feature, go to **Interfaces > VLAN > Reset**.

From the *Reset* sub-tab, click the **Reset** button to return the VLAN configuration parameters to their default values.

1. Go to **Interfaces > VLAN > Reset** to reset VLAN configurations.



2. Click **Save** to reset all VLAN configuration parameters to their default values.

## PoE

To access the PoE tile, go to **Interfaces > PoE**.

On the *Interface* tab's third tile, **PoE**, view and manage PoE (Power over Ethernet) settings.

| Enable                              | Interface | Name | Priority | Power Mode | Power Limit Type | Power Limit |
|-------------------------------------|-----------|------|----------|------------|------------------|-------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/2       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/3       |      | Low      | at30W      | User             | 30000       |

Choose from four sub-tabs: *Port Configuration*, *General Settings*, *Statistics*, and *Details*.

- **Port Configuration:** View/configure key port settings.
  - *Enable the port. Select a port Name, Priority, Power Mode, Power Limit.*

- **General:** View/configure additional port settings.
  - *Set the port's System Threshold, enable/disable Power Management Mode and Traps.*
- **Statistics:** View only. *Monitor counters for key port statistics.*
  - *Counters: Overload Counter, Short Counter, Power Denied Counter, MPS Absent Counter, Invalid Signature Counter.*
- **Details:** View only. *View other port statistics.*
  - View settings for each interface: Max Power, Class, Output Voltage/Current/Power, Temperature, Status, and Fault Status.

## Port Configuration

To access PoE port configurations, go to **Interfaces > PoE > Port Configuration**.

The first PoE sub-tab is *Port Configuration*.

From the *Port Configuration* sub-tab, view/edit current port settings.

The screenshot shows the PoE configuration page with the following table:

| Enable                              | Interface | Name | Priority | Power Mode | Power Limit Type | Power Limit |
|-------------------------------------|-----------|------|----------|------------|------------------|-------------|
| <input checked="" type="checkbox"/> | 0/1       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/2       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/3       |      | Low      | at30W      | User             | 30000       |
| <input checked="" type="checkbox"/> | 0/4       |      | Low      | at30W      | User             | 30000       |

See below for an explanation of each setting.

## Port Configuration settings

| Field     | Function  |
|-----------|---|
| Enable    | Indicates whether PoE is enabled/disabled on the interface. |
| Interface | Interface associated with the data in the row.              |
| Name      | Name associated with the Interface on the row.              |
| Priority  | Priority of the port when allocating available power.       |

|                      |   |
|----------------------|---|
| Power Mode           | When enabled, the port supports the PoE+ power standard, which allows for providing up to 30W of power.         |
| Power Limit Type     | Type of power limiting used for the port.   |
| Power Limit (mWatts) | Specifies power limit for the port.<br><i>Displays only when <b>Power Limit Type</b> is set to <b>User</b>.</i> |

## Edit Port Configuration settings

### To edit a Port Configuration setting:

1. Select **Interfaces > Port > PoE > Port Configuration**.
2. At the top of the page, click the **Option** (⋮) icon and click **Edit**.
3. Select the check box next to items you want to edit, then click **Edit Selected**.  
**Caution:** Before making changes, make sure the correct ports are selected.
4. Complete the dialog.
5. In the dialog, click **Save**, then click **Apply** to save your changes.

### Completing the dialog

See below for help completing the *Edit Port Configuration* dialog.

Edit Port Configuration
⊗

---

Port Configuration Selected: 1,2,3,4

Enable

On

Priority

Medium

Power Mode

Disable
  Legacy
  af15W
  at30W

*Explanations: Edit Port Configuration dialog*

| Field                | Function  |
|----------------------|---|
| Enable               | Indicates whether PoE is administratively enabled or disabled on the interface.   |
| Priority             | Priority of the port when allocating available power.   |
| Power Mode           | When enabled, the port supports the PoE+ power standard, which allows for providing up to 30W of power.   |
| Power Limit Type     | Type of power limiting used for the port.   |
| Power Limit (mWatts) | Power limit for the port, which can be specified. This field displays only when <i>Power Limit Type</i> is set to <i>User</i> .   |
| Detection Type       | Protocol(s) that can be used to detect the presence of a PD when connected to a PoE port. This setting should only need to be modified for compatibility with old endpoint devices. |
| Timer Schedule       | The time range from the list of time ranges configured on the system.   |

## General

To access general PoE settings, go to **Interfaces > PoE > General**.

From the *PoE General* sub-tab, view or configure additional port settings.

**PoE**

↳ Port Configuration **General** Statistics Details

Firmware Version 2.0.2.8

Operational Status off

Total Power Available: 190000 mWatts

Threshold Power: 171000 mWatts

Consumed Power: 0

**System Usage Threshold**

**Power Management Mode**

Port Auto Reset Mode

**Traps**

On the *General* sub-tab, edit the port's *System Threshold* or enable/disable *Power Management Mode* and *Traps*.

## Edit PoE General Settings

To adjust a setting on the *General* sub-tab:

1. Go to **Interfaces > PoE > General**.
2. Complete the fields.
3. To save your changes, click **Apply**.

### Explanations: PoE General setting

| Field  | Function   |
|--|--|
| Operational Status   | The current status of the switch PoE functionality.  |
| Total Power Available  | The total power in mW that can be provided by the switch.  |
| Threshold Power  | This value is determined by the configurable <i>System Usage Threshold</i> percent.  |
| Consumed Power   | The amount of power in mW currently being consumed by connected PoE devices.   |
| <b>System Usage Threshold (%)</b><br><i>Click to type.</i>       | A percentage of the total power available. This percentage determines the <i>Threshold Power</i> . The Threshold Power is the maximum amount of the PoE power budget that will be allocated from the switch. |
| <b>Power Management Mode</b><br><i>Select Static or Dynamic.</i> | The method by which the PoE controller determines supplied power.  |
| <b>Port Auto Reset Mode</b><br><i>Select/unselect.</i>           | Select/Unselect Auto Reset Mode.   |
| <b>Traps</b><br><i>Slide to enable/disable.</i>                  | Enable/Disable traps.  |

## Statistics (read only)

To access PoE statistics, go to **Interfaces > PoE > Statistics**.

From the third PoE sub-tab, **Statistics**, monitor counters for key PoE port activities.

| Overview  |      | Connections      | Configure     | <u>Interfaces</u>    | Backup             | Logs                      | Advanced |
|---|------|------------------|---------------|----------------------|--------------------|---------------------------|----------|
| <b>PoE</b>  |      |                  |               |                      |                    |                           |          |
| <span>└</span> Port Configuration   General <b>Statistics</b> Details |      |                  |               |                      |                    |                           |          |
| Interface   | Name | Overload Counter | Short Counter | Power Denied Counter | MPS Absent Counter | Invalid Signature Counter |          |
| 0/1   |      | 0                | 0             | 0                    | 0                  | 0                         |          |
| 0/2   |      | 0                | 0             | 0                    | 0                  | 0                         |          |
| 0/3   |      | 0                | 0             | 0                    | 0                  | 0                         |          |
| 0/4   |      | 0                | 0             | 0                    | 0                  | 0                         |          |

- **Counters available for monitoring:**  
Overload Counter, Short Counter, Power Denied Counter, MPS Absent Counter, Invalid Signature Counter.

No editing features are available on this page.

### Explanations

| Field                     | Function   |
|---------------------------|--|
| Refresh                   | Click to refresh PoE port statistics.  |
| Interface                 | Interface associated with the rest of the data in the row.   |
| Name                      | The name associated with the Interface on the row.   |
| Overload Counter          | Number of times there has been a power overload.   |
| Short Counter             | Number of times there has been a short-circuit condition.  |
| Power Denied Counter      | Number of times the powered device has been denied power.  |
| MPS Absent Counter        | Number of times power has stopped because the powered device was not detected.   |
| Invalid Signature Counter | <p>Number of times an invalid signature was received.</p> <p>Signature detection is a stage in detecting the presence of a powered device, where a resistance value on the powered device is expected to be found within a particular range.</p> |



## Details (read only)

To access PoE details, go to **Interfaces > PoE > Details**.

From the fourth *PoE* sub-tab, **Details**, monitor additional PoE information for each interface.

| Overview  | Connections | Configure  | Interfaces         | Backup      | Logs                   | Advanced               |                       |                 |           |              |
|---|-------------|------------|--------------------|-------------|------------------------|------------------------|-----------------------|-----------------|-----------|--------------|
| <b>PoE</b>  |             |            |                    |             |                        |                        |                       |                 |           |              |
| <span>└</span> Port Configuration   General   Statistics <b>Details</b> |             |            |                    |             |                        |                        |                       |                 |           |              |
| Interface   | Name        | High Power | Max Power (mWatts) | Class       | Output Voltage (Volts) | Output Current (mAmps) | Output Power (mWatts) | Temperature (C) | Status    | Fault Status |
| 0/1   |             | Enabled    | 30000              | Not Defined | 0                      | 0                      | 0                     | 31              | Searching | No Error     |
| 0/2   |             | Enabled    | 30000              | Not Defined | 0                      | 0                      | 0                     | 31              | Searching | No Error     |
| 0/3   |             | Enabled    | 30000              | Not Defined | 0                      | 0                      | 0                     | 31              | Searching | No Error     |
| 0/4   |             | Enabled    | 30000              | Not Defined | 0                      | 0                      | 0                     | 31              | Searching | No Error     |

View each interface's *Max Power*, *Class*, *Output Voltage/Current/ Power*, *Temperature*, *Status*, and *Fault Status*.

No editing features are available on this page.

### Explanations

| Field                  | Function  |
|------------------------|---|
| Interface              | Interface associated with the rest of the data in the row.  |
| Name                   | User-assigned name for the interface on the row.  |
| High Power             | Indicates whether High Power mode is enabled or disabled.   |
| Max Power (mWatts)     | Displays the configured power limit.  |
| Class                  | If <i>Power Limit Type</i> is set to <i>Class</i> , this field displays the class of the connected device, as learned in LLDP messages. |
| Output Voltage (Volts) | Voltage being applied to the connected device.  |

|                        |  |
|------------------------|--|
| Output Current (mAmps) | Current (in mA) being drawn by the powered device. |
| Output Power (mWatts)  | Power (in mW) being drawn by the connected device. |
| Temperature (°C)       | Temperature (in °C) measured at the PoE port.      |
| Status                 | Current powering status of the interface.          |
| Fault Status           | Fault information (if any).                        |

## Backup


The *Backup* tab allows you to save a configuration (backup) and restore the configuration file.

The screenshot shows the 'Backup' tab selected in the navigation menu. Under 'Create Backup', there is a blue 'Save Configuration' button. Under 'Restore Configuration File', there is a 'Choose File' button with the text 'No File Selected' and a grey 'Restore' button.

- **Save Configuration:** Click to save a file that contains all of this switch's settings.
- **Choose File:** Click to select a saved configuration backup file to use for restoring settings.
- **Restore:** Click to restore switch settings using the selected configuration backup file.

# Logs

The *Logs* tab displays a record of system events affected by the switch. The events are categorized by severity, timestamp, component, and details.

| Overview                       | Connections        | Configure | Interfaces  | Backup | Logs | Advanced   |
|--------------------------------|--------------------|-----------|---|--------|------|--|
| Filter By <input type="text"/> |                    |           |   |        |      | <br>OPTIONS |
| Severity                       | Log Time           | Component | Detail  |        |      |  |
| info                           | Jan 16<br>15:44:58 | USER_MGR  | [INFO] HTTPS Session 25 started for user support connected from 10.11.110.146                       |        |      |  |
| info                           | Jan 16<br>15:44:43 | TRAPMGR   | [NOTE] HTTPS session : Login to the switch is not successful, User ID: support                      |        |      |  |
| info                           | Jan 16<br>15:44:43 | USER_MGR  | [INFO] HTTPS session : User support couldn't login to the switch due to unsuccessful authentication |        |      |  |
| info                           | Jan 16<br>15:38:36 | USER_MGR  | [INFO] HTTPS Session 24 ended for user support connected from 10.11.110.146                         |        |      |  |
| info                           | Jan 16             | USER_MGR  | [INFO] HTTPS Session 24 started for user support connected from 10.11.110.146                       |        |      |  |


## To change the number of log items displayed:

1. In the **Logs** tab, click the **OPTIONS** () button, then click the number of rows to display at one time.

## To clear or refresh the log:

1. In the **Logs** tab, click the **OPTIONS** () button, then click **Clear Logs** or **Refresh Logs**. The log file is cleared or refreshed.

## To download the log:

1. In the **Logs** tab, click the **OPTIONS** () button, then click **Download Logs**.
2. Accept the default **logs.txt** filename or type a new name, then navigate to the destination folder and click **Save**. The log file is saved.

**Tip:** When troubleshooting, save log files often, using filenames in a date/timestamp format, for example, **2020-06-09-1013a.txt**.

| Overview                       | Connections        | Configure | Interfaces  | Backup | Logs | Advanced |
|--------------------------------|--------------------|-----------|---|--------|------|----------|
| Filter By <input type="text"/> |                    |           |   |        |      | ...      |
| Severity                       | Log Time           | Component | Detail  |        |      |          |
| Minor                          | Oct 11<br>20:43:47 | BONJOUR   | [INFO] Bonjour received Hostname CHANGED event                              |        |      |          |
| Minor                          | Oct 11<br>20:43:47 | BONJOUR   | [INFO] Bonjour received Hostname CHANGED event                              |        |      |          |
| Major                          | Oct 11<br>20:43:46 | DHCP_CLI  | [INFO] set_variable_tag : Tag already set with size(22)                     |        |      |          |
| Debug                          | Oct 11<br>20:39:43 | CLI_WEB   | [NOTE] Telnet send did not complete. Reason Socket operation on non-socket. |        |      |          |
| Critical                       | Oct 11<br>20:39:42 | USER_MGR  | [INFO] HTTP Session 14 started for user admin connected from 10.21.1.24     |        |      |          |

## Reset to factory default settings

While setting up or troubleshooting, you may need to reboot the switch or restore it to its factory default settings.

**Caution:** Do *not* power off the switch during a factory reset.

### Reset using the interface

**To only restart the switch, maintaining all settings:**

1. In the **Overview** or **Connections** tab, click **Restart Device**. The switch restarts.

**To reset to factory default settings, deleting all user settings:**

**Caution:** Performing this reset will delete all of your settings on the switch.

1. In the **Overview** or **Connections** tab, click **Reset to Default**.
2. Click **Factory Default**, then click **Yes**. The switch restarts with default configurations.

## Reset using the physical RESET button

Your switch has a recessed RESET button accessible through a pinhole next to the Ethernet port underneath the switch.

### To only reboot the switch, maintaining all settings:

1. While power is connected, insert a narrow, pointed object (such as a straightened paper clip) into the hole.
2. Press and release the button.

### To reset to factory default settings, deleting all user settings:

**Caution:** Performing this reset will delete all of your settings on the switch.

1. While power is connected, insert a narrow, pointed object (such as a straightened paper clip) into the hole.
2. Press and hold the button for at least **ten** seconds, then release it.

## Advanced

From the **Advanced** tab, perform advanced tasks.

Perform maintenance, view statistics, and configure settings for various services and protocols.

Below is a summary of each feature available on the **Advanced** tab.

| Advanced feature                | Summary   |
|---------------------------------|---|
| IGMP Snooping                   | Manage, configure, and monitor <i>IGMP Snooping</i> settings per VLAN interface.  |
| IGMP Snooping Querier           | Manage, configure, and monitor <i>IGMP Snooping Querier</i> settings.<br>Set the query interval, configure VLAN query settings, and view VLAN status.   |
| Unregistered Multicast Behavior | Configure the behavior of Unregistered multicast traffic when <i>IGMP Snooping</i> is enabled. Allows for exception rules to be created allowing some multicast groups to continue to flood while the rest are set to <i>Drop</i> . |
| Spanning Tree Protocol          | Manage, configure, and monitor STP activity for <i>MST</i> , <i>MST Ports</i> , and <i>CST Ports</i> .  |
| IP IGMP                         | Allows ports to be configured as a dedicated network for IGMP Snooping. Ports become a routable interface with a dedicated IP address and IGMP Snooping is isolated to the individual port and the network below that port.         |
| IP Multicast                    | Configure IP Multicast Routing using Protocol-Independent Multicast - Sparse Mode (PIM-SM) to make the switch act as a multicast router for the network.  |
| IP Multicast Information        | Monitor IP Multicast Routing Information for Elected Bootstrap Router, Rendezvous Point Mapping, and Multicast Route Table.   |
| Firmware                        | Update the switch firmware for functionality improvements and feature enhancements.   |

## Configuring IGMP Snooping

*Internet Group Management Protocol (IGMP) Snooping* is a feature that allows a switch to forward multicast traffic intelligently on the switch. Multicast IP traffic is traffic that is destined to a host group. Host groups are identified by class D IP addresses, which range from 224.0.0.0 to 239.255.255.255. Based on the IGMP query and report messages, the switch forwards traffic only to the ports that request the multicast traffic. This prevents the switch from broadcasting the traffic to all ports and possibly affecting network performance.

A traditional Ethernet network may be separated into different network segments to prevent placing too many devices onto the same shared media. Bridges and switches connect these segments. When a packet with a broadcast or multicast destination address is received, the switch will forward a copy into each of the remaining network segments in accordance with the IEEE MAC Bridge standard. Eventually, the packet is made accessible to all nodes connected to the network.

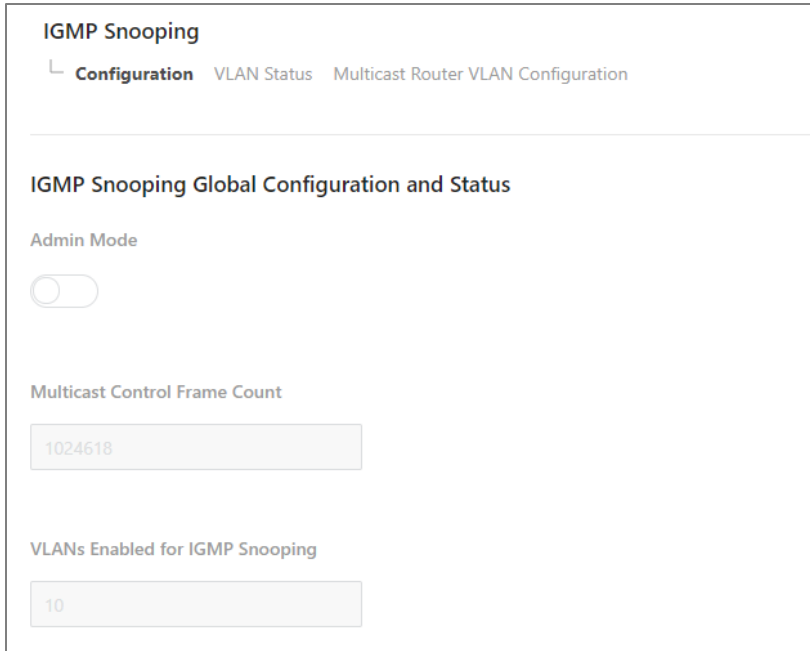
This approach works well for broadcast packets that are intended to be seen or processed by all connected nodes. In the case of multicast packets, however, this approach could lead to less efficient use of network bandwidth, particularly when the packet is intended for only a small number of nodes. Packets will be flooded into network segments where no node has any interest in receiving the packet. While nodes will rarely incur any processing overhead to filter packets addressed to un-requested group addresses, they are unable to transmit new packets onto the shared media for the period of time that the multicast packet is flooded. The problem of wasting bandwidth is even worse when the LAN segment is not shared, for example in Full Duplex links. Allowing switches to snoop IGMP packets is a creative effort to solve this problem. The switch uses the information in the IGMP packets as they are being forwarded throughout the network to determine which segments should receive packets directed to the group address.

To access the *IGMP Snooping* configuration menu:

1. Click the switch's **Advanced** tab, then click the **IGMP Snooping** tile.



The *IGMP Snooping* screen opens.



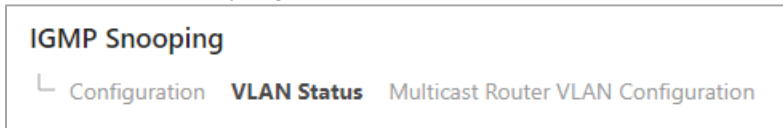
| Field                           | Description   |
|---------------------------------|---|
| Admin Mode                      | Toggle the <b>Admin Mode</b> button to <b>Enable</b> or <b>Disable</b> IGMP Snooping globally. The default is <i>disabled</i> . This must be enabled before configuring IGMP Snooping per VLAN interface. |
| Multicast Control Frame Count   | Shows the number of multicast control frames that have been processed by the CPU. This field is read only.  |
| VLANs enabled for IGMP Snooping | Lists the VLANs currently enabled for IGMP snooping. This field is read only.   |

## Enabling VLAN IGMP snooping status

Use this page to enable or disable IGMP snooping on system VLANs and to view and configure per-VLAN IGMP snooping settings. Only VLANs that are enabled for IGMP snooping appear in the table.

### To enable and view VLAN IGMP snooping status:

1. In the *IGMP Snooping* screen, click the **VLAN Status** tab.



The *IGMP Snooping VLAN Status* screen opens.

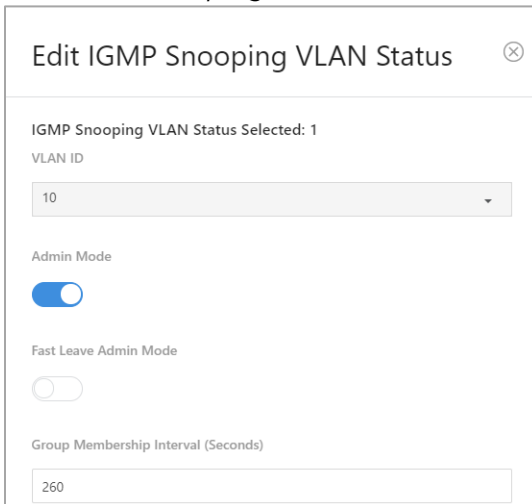
| IGMP Snooping VLAN Status |                                     |                       |                                     |                             |  |                         |        | OPTIONS |
|---------------------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------------|--|-------------------------|--------|---------|
| VLAN ID                   | Admin Mode                          | Fast Leave Admin Mode | Group Membership Interval (Seconds) | Max Response Time (Seconds) | Multicast Router Expiration Time (Seconds) | Report Suppression Mode | Action |         |
| 10                        | <input checked="" type="checkbox"/> | Disabled              | 260                                 | 10                          | 0  | Disabled                | ...    |         |

| Field                                      | Description   |
|--|---|
| VLAN ID                                    | The VLAN associated with the rest of the data in the row. Only VLANs that have been configured on the system and are not already enabled for IGMP snooping appear in the list. When modifying IGMP snooping settings, this field identifies the VLAN that is being configured.  |
| Admin Mode                                 | The administrative mode of IGMP snooping on the VLAN. IGMP snooping must be enabled globally and on a VLAN for the VLAN to be able to snoop IGMP packets to determine which network segments should receive multicast packets directed to the group address.                    |
| Fast Leave Admin Mode                      | The administrative mode of Fast Leave on the VLAN. If <i>Fast Leave</i> is enabled, the VLAN can be immediately removed from the Layer 2 forwarding table entry upon receiving an IGMP leave message for a multicast group without first sending out MAC-based general queries. |
| Group Membership Interval (Seconds)        | The number of seconds the VLAN should wait for a report for a particular group on the VLAN before the IGMP snooping feature deletes the VLAN from the group.  |
| Max Response Time (Seconds)                | The number of seconds the VLAN should wait after sending a query if it does not receive a report for a particular group. The specified value should be less than the Group Membership Interval.   |
| Multicast Router Expiration Time (Seconds) | The number of seconds the VLAN should wait to receive a query before it is removed from the list of VLANs with multicast routers attached.  |
| Report Suppression Mode                    | The IGMPv1 and IGMPv2 report suppression mode. The device uses IGMP report suppression to limit the membership report traffic sent to multicast-capable   |



|  |  |
|--|--|
|  | <p>routers. When this mode is enabled, the device does not send duplicate reports to the multicast router. Note that this mode is supported only when the multicast query has IGMPv1 and IGMPv2 reports. This feature is not supported when the query includes IGMPv3 reports. The options are as follows:</p> <ul style="list-style-type: none"> <li>• <b>Enabled:</b> Only the first IGMP report from all hosts for a group IGMP report is forwarded to the multicast routers.</li> <li>• <b>Disabled:</b> The device forwards all IGMP reports from all hosts in a multicast group to the multicast routers.</li> </ul> |
|--|--|

2. To change the IGMP snooping settings for an IGMP-snooping-enabled VLAN, click the three-dot menu (⋮) next to the entry with the settings to change, then click **Edit**. The *Edit IGMP Snooping VLAN Status* screen opens.



**Edit IGMP Snooping VLAN Status** (X)

IGMP Snooping VLAN Status Selected: 1

VLAN ID  
10

Admin Mode

Fast Leave Admin Mode

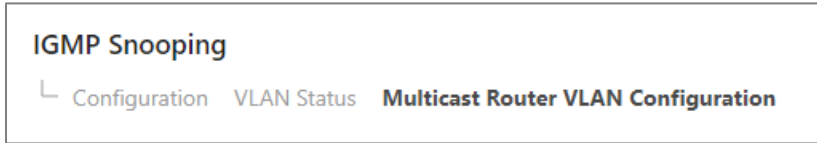
Group Membership Interval (Seconds)  
260

3. Change the settings, then click **Save**.

## Configuring multicast router VLANs

### To configure multicast router VLANs:

1. In the *IGMP Snooping* screen, click the **Multicast Router VLAN Configuration** tab.



The *Multicast Router VLAN Configuration* screen opens.

| Interface | Name            | VLAN IDs | OPTIONS |
|-----------|-----------------|----------|---------|
| 0/1       | MolP Controller |          |         |
| 0/2       | MolP TX-215B3E  |          |         |
| 0/3       | Nvidia Shield   |          |         |
| 0/4       | Roku 4          |          |         |
| 0/5       | WA-2200-O       |          |         |
| 0/6       | RK-1            |          |         |
| 0/7       | MS-1212 - 1.110 |          |         |

- 2. Click to select the interface to change, then click **Edit Selected**.

| Filter By | Interface                           | Name | VLAN IDs        |
|-----------|-------------------------------------|------|-----------------|
|           | <input checked="" type="checkbox"/> | 0/1  | MoIP Controller |

The *Edit Multicast Router VLAN Configuration* screen opens.

### Edit Multicast Router VLAN Configuration

Multicast Router VLAN Configuration Selected: 1

2 items       0 item

1

10

Navigation: >>> <<<

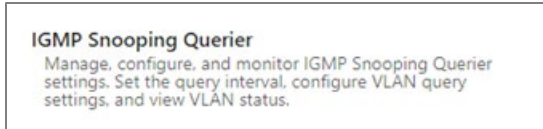
No Data

Buttons: Cancel Save

# Configuring IGMP Snooping Querier

To access the *IGMP Snooping Querier* configuration menu:

1. Click the switch's **Advanced** tab, then click the **IGMP Snooping** tile.



The *IGMP Snooping Querier Configuration* screen opens.

| Field                             | Description   |
|-----------------------------------|---|
| Admin Mode                        | When enabled, the IGMP snooping querier sends out periodic IGMP queries that trigger IGMP report messages from the switches that want to receive IP multicast traffic. IGMP snooping listens to these IGMP reports to establish appropriate forwarding.             |
| IP Address                        | The snooping querier address to be used as source address in periodic IGMP queries. This address is used when no IP address is configured on the VLAN on which the query is being sent. The default entry to allow the switch to use its own IP address is 0.0.0.0. |
| IGMP Version                      | The IGMP protocol version used in periodic IGMP queries.  |
| Query Interval (Seconds)          | The amount of time the IGMP snooping querier on the device should wait between sending periodic IGMP queries.   |
| Querier Expiry Interval (Seconds) | The amount of time the device remains in non-querier mode after it has discovered that there is a multicast querier in the network.   |

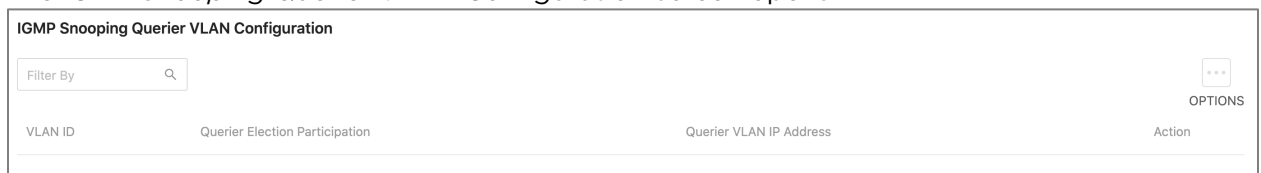
## VLAN Configuration

Use this page to enable the IGMP snooping querier feature on one or more VLANs and to configure per-VLAN IGMP snooping querier settings. Only VLANs that have the IGMP snooping querier feature enabled appear in the table.

1. In the *IGMP Snooping Querier* screen, click the **VLAN Configuration** tab.

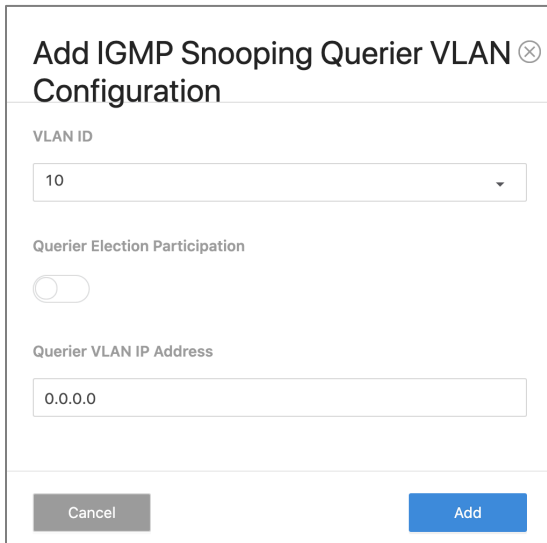


The *IGMP Snooping Querier VLAN Configuration* screen opens.



| Field                          | Description   |
|--------------------------------|---|
| VLAN ID                        | The VLAN on which the IGMP snooping querier is enabled. When enabling the IGMP snooping querier on a VLAN, use this menu to select the desired VLAN. Only VLANs that have been configured on the system and are not already enabled for the IGMP snooping querier appear in the menu. When modifying IGMP snooping querier settings, this field identifies the VLAN that is being configured.   |
| Querier Election Participation | The participation mode for the IGMP snooping querier election process: <ul style="list-style-type: none"> <li>• <b>Enabled:</b> The IGMP snooping querier on this VLAN participates in the querier election process when it discovers the presence of another querier in the VLAN. If the snooping querier finds that the other querier source IP address is lower than its own address, it stops sending periodic queries. If the snooping querier wins the election (because it has the lowest IP address), then it continues sending periodic queries.</li> <li>• <b>Disabled:</b> When the IGMP snooping querier on this VLAN sees other queriers of the same version in the VLAN, the snooping querier moves to the non-querier state and stops sending periodic queries.</li> </ul> |
| Querier VLAN IP Address        | The IGMP snooping querier address the VLAN uses as the source IP address in periodic IGMP queries sent on the VLAN. If this value is not configured, the VLAN uses the global IGMP snooping querier IP address.   |

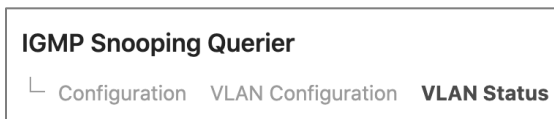
- To add the IGMP snooping querier settings for an IGMP-snooping enabled VLAN, click the three-dot Option menu (⋮) next to the entry with the settings to change, then click **Add**. The *Add IGMP Snooping Querier VLAN Configuration* screen opens.



## VLAN Status

Use this page to view information about the IGMP snooping querier status for all VLANs that have the snooping querier enabled.

- In the *IGMP Snooping Querier* screen, click the **VLAN Status** tab.



The *IGMP Snooping Querier VLAN Status* screen opens.

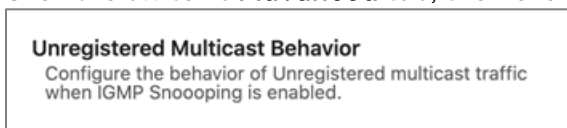


| VLAN ID | State | Version | Last IP Address | Last Version | Max Response Time (Seconds) |
|---------|-------|---------|-----------------|--------------|-----------------------------|
|         |       |         |                 |              |                             |

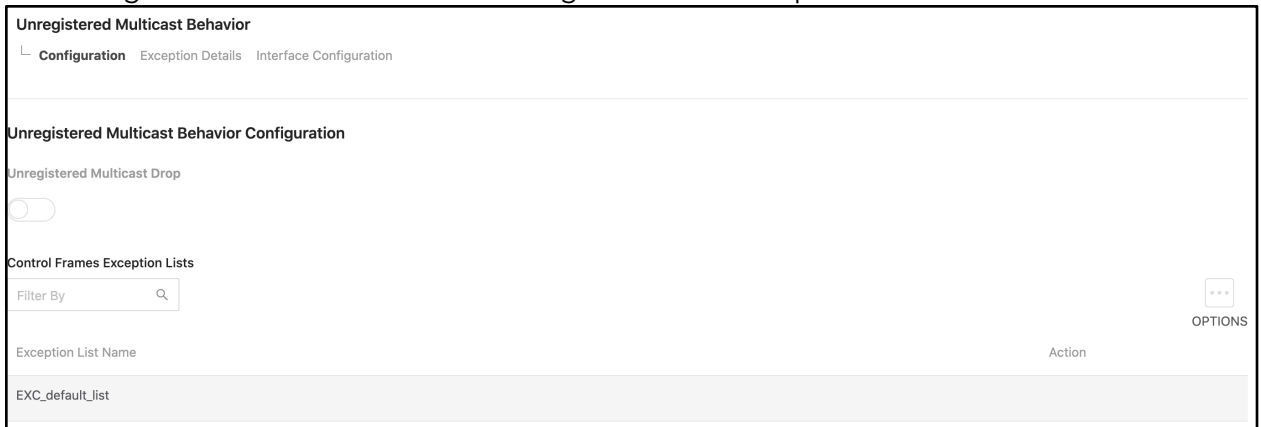
## Configuring Unregistered Multicast Behavior

To access the *Unregistered Multicast Behavior* configuration menu:

- Click the switch's **Advanced** tab, then click the **Unregistered Multicast Behavior** tile.



The *Unregistered Multicast Behavior Configuration* screen opens.

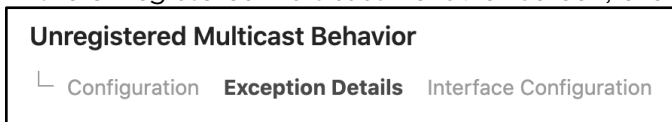


| Field                       | Description   |
|-----------------------------|---|
| Unregistered Multicast Drop | When enabled along with IGMP Snooping being enabled on a VLAN, multicast packets destined for any multicast group address which has not been learned by a port on the switch will be dropped. When disabled, any unregistered multicast will be flooded on the switch. Traffic destined for the multicast addresses within 224.0.0.x will continue to flood with <i>Drop</i> set to <b>Enabled</b> as these groups are required for IGMP messaging. |
| Exception List Name         | Displays the default ACL exception list available to the switch. In the future, additional lists may be added.  |

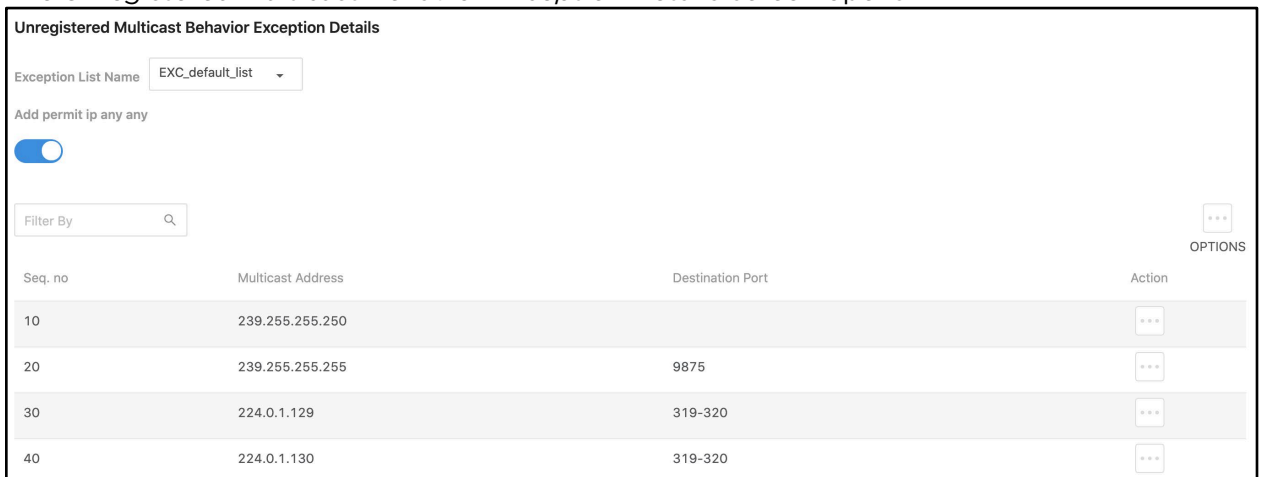
## Exception Details

Use this page to configure which Multicast addresses and destination ports should be allowed to continue flooding while *Unregistered Multicast Behavior* is set to **Drop**.

1. In the *Unregistered Multicast Behavior* screen, click the **Exception Details** tab.



The *Unregistered Multicast Behavior Exception Details* screen opens.

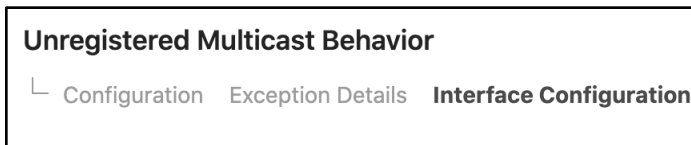


| Field                   | Description   |
|-------------------------|---|
| Exception List Name     | Allows for multiple exception lists to be edited on this page. Currently only one exception list is supported.  |
| Add “permit ip any any” | This will add an ACL rule to permit IP traffic from and to any. This is defaulted to be included, because it is needed in order to continue accessing the switch and passing traffic while <i>Unregistered Multicast</i> is set to <b>Drop</b> . This should be required in only rare cases where other ACLs have been configured which satisfy this rule. <b>DISABLING THIS SETTING MAY CAUSE ALL DATA THROUGH THE SWITCH TO STOP AND ACCESS TO BE BLOCKED. CONSOLE ACCESS WOULD BE REQUIRED TO REGAIN ACCESS WITHOUT A FACTORY RESET TO DEFAULTS.</b> |
| Seq. no                 | The ACL rule number for each exception entry  |
| Multicast Address       | The Multicast Address to be allowed to flood  |
| Destination Port        | The optional destination port of traffic destined for the Multicast Address. This can be left blank to specify any port, a single port, or a range of ports using “-“.  |

## Interface Configuration

Use this page to configure which Exception Lists are applied to each port. Currently only one Exception List can be created. In the future, multiple lists may be added.

1. In the *Unregistered Multicast Behavior* screen, click the **Interface Configuration** tab.



The *Exception List Interface Configuration* screen opens.

| Exception List Interface Configuration |        |                  |              |
|--|--------|------------------|--------------|
| Filter By <input type="text"/>         |        |                  | ⋮<br>OPTIONS |
| Interface                              | Name   | Exception List   | Action       |
| 0/1                                    | Port 1 | EXC_default_list |              |
| 0/2                                    | Port 2 | EXC_default_list |              |
| 0/3                                    | Port 3 | EXC_default_list |              |



# Configuring Spanning Tree Protocol

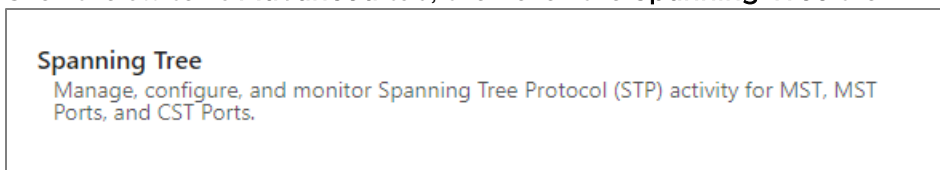
The Spanning Tree Protocol (STP) provides a tree topology for any arrangement of bridges. STP also provides one path between end stations on a network, eliminating loops. Spanning tree versions supported include Common STP, Multiple STP, and Rapid STP. Classic STP provides a single path between end stations, avoiding and eliminating loops.

Multiple Spanning Tree Protocol (MSTP) supports multiple instances of Spanning Tree to efficiently channel VLAN traffic over different interfaces. Each instance of the Spanning Tree behaves in the manner specified in IEEE 802.1w, Rapid Spanning Tree (RSTP), with slight modifications in the working but not the end effect (chief among the effects is the rapid transitioning of the port to “Forwarding”). The difference between the RSTP and the traditional STP (IEEE 802.1D) is the ability to configure and recognize full-duplex connectivity and ports which are connected to end stations, resulting in rapid transitioning of the port to “Forwarding” state and the suppression of Topology Change Notification. These features are represented by the parameters “point to point” and “edgeport.” MSTP is compatible to both RSTP and STP. It behaves appropriately to STP and RSTP bridges.

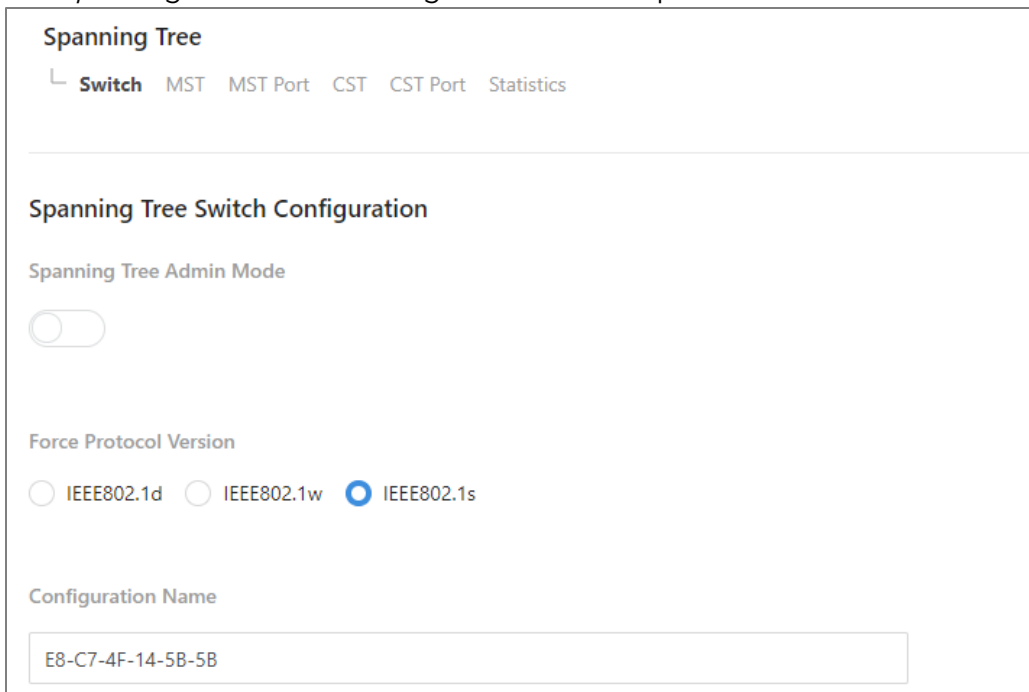
A MSTP bridge can be configured to behave entirely as a RSTP bridge or a STP bridge.

## To access the *Spanning Tree Switch Configuration* menu:

1. Click the switch’s **Advanced** tab, then click the **Spanning Tree** tile.



The *Spanning Tree Switch Configuration* screen opens.

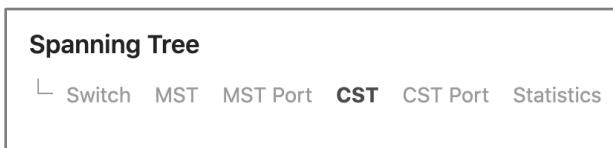


| Field                         | Description  |
|-------------------------------|--|
| Spanning Tree Admin Mode      | The administrative mode of STP on the device. When enabled, the device participates in the root bridge election process and exchanges Bridge Protocol Data Units (BPDUs) with other switches in the spanning tree to determine the root path costs and maintain topology information.  |
| Force Protocol Version        | The STP version the device uses, which is one of the following: <ul style="list-style-type: none"> <li>• IEEE 802.1d: Classic STP provides a single path between end stations, avoiding and eliminating loops.</li> <li>• IEEE 802.1w: Rapid Spanning Tree Protocol (RSTP) behaves like classic STP but also has the ability to configure and recognize full-duplex connectivity and ports that are connected to end stations, resulting in rapid transitioning of the port to the Forwarding state and the suppression of Topology Change Notifications.</li> <li>• IEEE 802.1s: Multiple Spanning Tree Protocol (MSTP) includes all the advantages of RSTP and also supports multiple spanning tree instances to efficiently channel VLAN traffic over different interfaces. MSTP is compatible with both RSTP and STP.</li> </ul> |
| Configuration Name            | The name of the MSTP region. Each switch that participates in the same MSTP region must share the same Configuration Name, Configuration Revision Level, and MST-to-VLAN mappings.   |
| Configuration Revision Level  | The revision number of the MSTP region. This number must be the same on all switches that participate in the MSTP region.  |
| Configuration Digest Key      | The 16-byte signature of type HMAC-MD5 created from the MST Configuration Table (a VLAN ID-to-MST ID mapping).   |
| Configuration Format Selector | The version of the configuration format being used in the exchange of BPDUs.   |

## CST Configuration

Use the *CST Configuration* page to configure the Common Spanning Tree (CST) settings. The settings and information on this page define the device within the spanning tree topology that connects all STP/RSTP bridges and MSTP regions.

1. In the *Spanning Tree* screen, click the **CST** tab.



The *Spanning Tree CST* screen opens.

| Spanning Tree  |                                    |
|--|------------------------------------|
| <ul style="list-style-type: none"> <li>↳ Switch MST MST Port <b>CST</b> CST Port Statistics</li> </ul> |                                    |
| <b>Spanning Tree CST Configuration</b>   |                                    |
| Bridge Priority  | <input type="text" value="32768"/> |
| Bridge Max Age   | <input type="text" value="20"/>    |
| Bridge Forward Delay   | <input type="text" value="15"/>    |

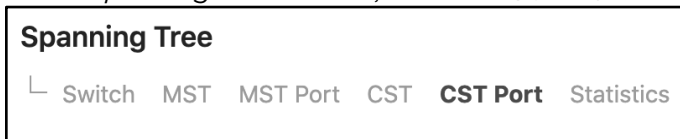
| Field                       | Description   |
|-----------------------------|---|
| Bridge Priority             | The value that helps determine which bridge in the spanning tree is elected as the root bridge during STP convergence. A lower value increases the probability that the bridge becomes the root bridge.   |
| Bridge Max Age              | The amount of time a bridge waits before implementing a topological change.   |
| Bridge Hello Time           | The amount of time the root bridge waits between sending hello BPDUs.   |
| Bridge Forward Delay        | The amount of time a bridge remains in a listening and learning state before forwarding packets.  |
| Spanning Tree Maximum Hops  | The maximum number of hops a Bridge Protocol Data Unit (BPDU) is allowed to traverse within the spanning tree region before it is discarded.  |
| BPDU Guard                  | When enabled, can disable edge ports that receive BPDU packets. This prevents a new device from entering the existing STP topology, so devices that were originally not a part of STP are not allowed to influence the STP topology.  |
| BPDU Filter                 | When enabled, filters the BPDU traffic on the edge ports. When spanning tree is disabled on a port, BPDU filtering allows BPDU packets received on that port to be dropped.   |
| Spanning Tree Tx Hold Count | The maximum number of BPDUs that a bridge is allowed to send within a hello time window.  |
| Bridge Identifier           | A unique value that is automatically generated based on the bridge priority value and the base MAC address of the bridge. When electing the root bridge for the spanning tree, if the bridge priorities for multiple bridges are equal, the bridge with the lowest MAC address is elected as the root bridge. |
| Time Since Topology Change  | The amount of time that has passed since the topology of the spanning tree has changed since the device was last reset.   |
| Topology Change Count       | The number of times the topology of the spanning tree has changed.  |

|                   |  |
|-------------------|--|
| Topology Change   | Indicates whether a topology change is in progress on any port assigned to the CST. If a change is in progress, the value is True. Otherwise, it is False.   |
| Designated Root   | The bridge identifier of the root bridge for the CST. The identifier is made up of the bridge priority and the base MAC address.   |
| Root Path Cost    | The path cost to the designated root for the CST. Traffic from a connected device to the root bridge takes the least-cost path to the bridge. If the value is 0, the cost is automatically calculated based on port speed. |
| Root Port         | The port on the bridge with the least-cost path to the designated root for the CST.  |
| Max Age           | The amount of time a bridge waits before implementing a topological change.  |
| Forward Delay     | The forward delay value for the root port bridge.  |
| Hold Time         | The minimum amount of time between transmissions of Configuration BPDUs.   |
| CST Regional Root | The bridge identifier of the CST regional root. The identifier is made up of priority value and the base MAC address of the regional root bridge.  |
| CST Path Cost     | The path cost to the CST tree regional root.   |

## CST Port Configuration

Use the CST Port page to view and configure the Common Spanning Tree (CST) settings for each interface on the device.

1. In the *Spanning Tree* screen, click the **CST Port** tab.



The *Spanning Tree CST Port* screen opens.

The screenshot shows the 'Spanning Tree CST Port Summary' screen. It includes a search filter and a table with the following data:

| Interface | Name   | Port Role | Port Forwarding State | Port Priority | Port Path Cost | Description | Action |
|-----------|--------|-----------|-----------------------|---------------|----------------|-------------|--------|
| 0/1       | Port 1 | Disabled  | Manual Forwarding     | 128           | 0              |             | ...    |
| 0/2       | Port 2 | Disabled  | Manual Forwarding     | 128           | 0              |             | ...    |
| 0/3       | Port 3 | Disabled  | Manual Forwarding     | 128           | 0              |             | ...    |

- Select one interface to edit and view detailed information, or select multiple interfaces to edit.

**Edit CST Port Entry** ⊗

---

**CST Port Entry Selected: 1**

Port Priority

Admin Edge Port

Port Path Cost

External Port Path Cost

| Field                   | Description  |
|-------------------------|--|
| Port Priority           | The priority for the port within the CST. This value is used to determine which port on a switch becomes the root port when two ports have the same least-cost path to the root. The port with the lower priority value becomes the root port. If the priority values are the same, the port with the lower interface index becomes the root port. |
| Admin Edge Port         | Select this option to administratively configure the interface as an edge port. An <i>edge port</i> is an interface that is directly connected to a host and is not at risk of causing a loop.   |
| Port Path Cost          | The path cost from the port to the root bridge.  |
| External Port Path Cost | The cost of the path from the port to the CIST root. This value becomes important when the network includes multiple regions.  |
| Port Mode               | The administrative mode of spanning tree on the port.  |
| Auto Edge               | When enabled, Auto Edge allows the interface to become an edge port if it does not receive any BPDUs within a given amount of time.  |
| Root Guard              | When enabled, Root Guard allows the interface to discard any superior information it receives to protect the root of the device from changing. The port gets put into discarding state and does not forward any frames.  |
| Loop Guard              | When enabled, Loop Guard prevents an interface from erroneously transitioning from a blocking state to forwarding when the interface stops receiving BPDUs. The port is marked as being in <i>loop-inconsistent state</i> . In this state, the interface does not forward frames.  |
| TCN Guard               | When enabled, TCN Guard restricts the interface from propagating any topology change information received through that interface.  |

|   |                   |
|---|-------------------|
| Auto-calculate Port PathCost:             | Enabled           |
| Hello Timer:                              | 2                 |
| Auto-calculate External Port Path Cost:   | Enabled           |
| BPDU Guard Effect:                        | Disabled          |
| Port ID:                                  | 80:01             |
| Port Up Time Since Counters Last Cleared: | 8d:21:16:9        |
| Port Forwarding State:                    | Manual Forwarding |
| Port Role:                                | Disabled          |
| Designated Root:                          |                   |
| Designated Cost:                          | 0                 |
| Designated Bridge:                        |                   |
| Designated Port:                          | 00:00             |
| Topology Change Acknowledge:              | False             |
| Edge Port:                                | Disabled          |
| Point-to-point MAC:                       | True              |
| CST Regional Root:                        |                   |
| CST Path Cost:                            | 0                 |
| Loop Inconsistent State:                  | False             |
| Transitions Into LoopInconsistentState:   | 0                 |
| Transitions Out Of LoopInconsistentState: | 0                 |

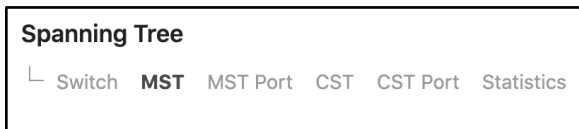
| Field                                    | Description   |
|--|---|
| Auto-calculate Port Path Cost            | Shows whether the path cost from the port to the root bridge is automatically determined by the speed of the interface (Enabled) or configured manually (Disabled).   |
| Hello Timer                              | The amount of time the port waits between sending hello BPDUs.  |
| Auto-calculate External Port Path Cost   | Shows whether the path cost from the port to the CIST root is automatically determined by the speed of the interface (Enabled) or configured manually (Disabled).   |
| BPDU Guard Effect                        | Shows the status of BPDU Guard Effect on the interface. When enabled, BPDU Guard Effect can disable edge ports that receive BPDU packets. This prevents a new device from entering the existing STP topology, so devices that were originally not a part of STP are not allowed to influence the STP topology.  |
| Port ID                                  | A unique value that is automatically generated based on the port priority value and the interface index.  |
| Port Up Time Since Counters Last Cleared | The amount of time that the port has been up since the counters were cleared.   |
| Port Role                                | The role of the port within the CST, which is one of the following: <ul style="list-style-type: none"> <li>• <b>Root:</b> A port on the non-root bridge that has the least-cost path to the root bridge.</li> <li>• <b>Designated:</b> A port that has the least-cost path to the root bridge on its segment.</li> <li>• <b>Alternate:</b> A blocked port that has an alternate path to the root bridge.</li> <li>• <b>Backup:</b> A blocked port that has a redundant path to the same network segment as another port on the bridge.</li> <li>• <b>Master:</b> The port on a bridge within an MST instance that links the MST instance to other STP regions.</li> <li>• <b>Disabled:</b> The port is administratively disabled and is not part of the spanning tree.</li> </ul> |

|   |   |
|---|---|
| Designated Root                           | The bridge ID of the root bridge for the CST.   |
| Designated Cost                           | The path cost offered to the LAN by the designated port.  |
| Designated Bridge                         | The bridge ID of the bridge with the designated port.   |
| Designated Port                           | The port ID of the designated port.   |
| Topology Change Acknowledge               | Indicates whether the next BPDU to be transmitted for this port will have the topology change acknowledgment flag set.  |
| Edge Port                                 | Indicates whether the interface is configured as an edge port (Enabled).  |
| Point-to-point MAC                        | Indicates whether the link type for the interface is a point-to-point link.   |
| CST Regional Root                         | The bridge ID of the bridge that has been elected as the root bridge of the CST region.   |
| CST Path Cost                             | The path cost from the interface to the CST regional root.  |
| Loop Inconsistent State                   | Identifies whether the interface is currently in a loop-inconsistent state. An interface transitions to a loop-inconsistent state if Loop Guard is enabled and the port stops receiving BPDUs. In this state, the interface does not transmit frames. |
| Transitions Into LoopInconsistent State   | The number of times this interface has transitioned into loop inconsistent state.   |
| Transitions Out Of LoopInconsistent State | The number of times this interface has transitioned out of loop inconsistent state.   |

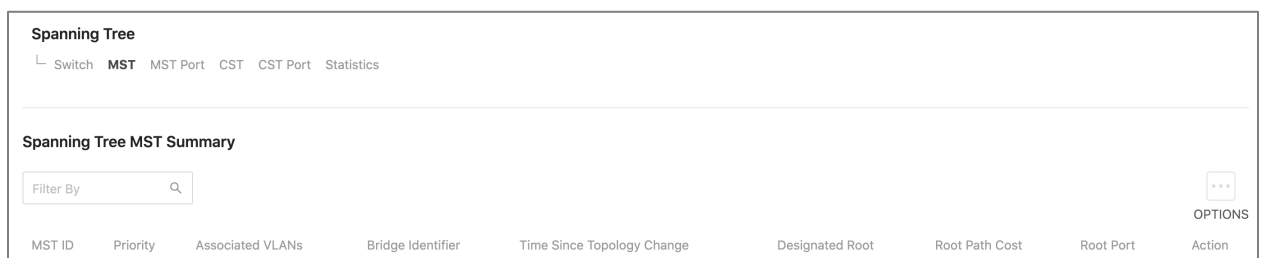
## MST Configuration

Use the *MST Configuration* page to view and configure the Multiple Spanning Tree Instances (MSTIs) on the device. Multiple Spanning Tree Protocol (MSTP) allows the creation of MSTIs based upon a VLAN or groups of VLANs. Configuring MSTIs creates an active topology with a better distribution of network traffic and an increase in available bandwidth when compared to classic STP.

1. In the *Spanning Tree* screen, click the **MST** tab.



The *Spanning Tree MST* screen opens.

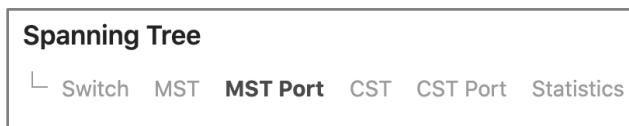


| Field                      | Description   |
|----------------------------|---|
| MST ID                     | The number that identifies the MST instance.  |
| Priority                   | The bridge priority for the spanning-tree instance. This value affects the likelihood that the bridge is selected as the root bridge. A lower value increases the probability that the bridge is selected as the root bridge.   |
| Associated VLANs           | The number of VLANs that are mapped to the MSTI. This number does not contain any information about the VLAN IDs that are mapped to the instance.   |
| Bridge Identifier          | A unique value that is automatically generated based on the bridge priority value of the MSTI and the base MAC address of the bridge. When electing the root bridge for an MST instance, if the bridge priorities for multiple bridges are equal, the bridge with the lowest MAC address is elected as the root bridge. |
| Time Since Topology Change | The amount of time that has passed since the topology of the MSTI has changed.  |
| Designated Root            | The bridge identifier of the root bridge for the MST instance. The identifier is made up of the bridge priority and the base MAC address.   |
| Root Path Cost             | The path cost to the designated root for this MST instance. Traffic from a connected device to the root bridge takes the least-cost path to the bridge. If the value is 0, the cost is automatically calculated based on port speed.  |
| Root Port                  | The port on the bridge with the least-cost path to the designated root for the MST instance.  |

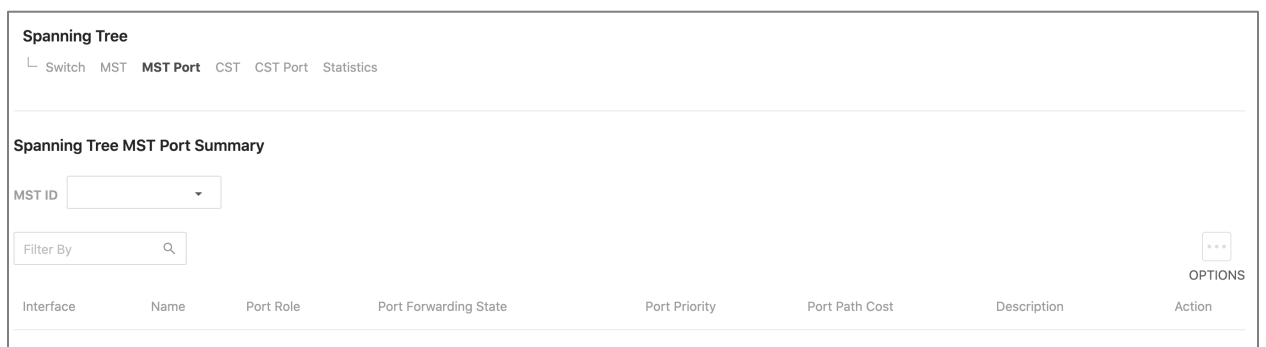
## MST Port Configuration

Use this page to view and configure the Multiple Spanning Tree (MST) settings for each interface on the device.

1. In the *Spanning Tree* screen, click the **MST Port** tab.



The *Spanning Tree MST Port* screen opens.





An MST instance must first be created under the *MST* tab before an MST ID can be selected. Once selected, all ports are shown, can be configured, and more detail can be viewed by selecting **Edit** for the desired interface.

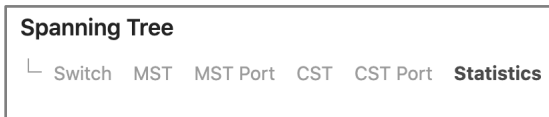
| Field                                    | Description   |
|--|---|
| Auto-calculate Port Path Cost            | Shows whether the path cost from the port to the root bridge is automatically determined by the speed of the interface (Enabled) or configured manually (Disabled).   |
| Hello Timer                              | The amount of time the port waits between sending hello BPDUs.  |
| Auto-calculate External Port Path Cost   | Shows whether the path cost from the port to the CIST root is automatically determined by the speed of the interface (Enabled) or configured manually (Disabled).   |
| BPDU Guard Effect                        | Shows the status of BPDU Guard Effect on the interface. When enabled, BPDU Guard Effect can disable edge ports that receive BPDU packets. This prevents a new device from entering the existing STP topology, so devices that were originally not a part of STP are not allowed to influence the STP topology.  |
| Port ID                                  | A unique value that is automatically generated based on the port priority value and the interface index.  |
| Port Up Time Since Counters Last Cleared | The amount of time that the port has been up since the counters were cleared.   |
| Port Role                                | The role of the port within the CST, which is one of the following: <ul style="list-style-type: none"> <li>• <b>Root:</b> A port on the non-root bridge that has the least-cost path to the root bridge.</li> <li>• <b>Designated:</b> A port that has the least-cost path to the root bridge on its segment.</li> <li>• <b>Alternate:</b> A blocked port that has an alternate path to the root bridge.</li> <li>• <b>Backup:</b> A blocked port that has a redundant path to the same network segment as another port on the bridge.</li> <li>• <b>Master:</b> The port on a bridge within an MST instance that links the MST instance to other STP regions.</li> <li>• <b>Disabled:</b> The port is administratively disabled and is not part of the spanning tree.</li> </ul> |
| Designated Root                          | The bridge ID of the root bridge for the CST.   |
| Designated Cost                          | The path cost offered to the LAN by the designated port.  |
| Designated Bridge                        | The bridge ID of the bridge with the designated port.   |
| Designated Port                          | The port ID of the designated port.   |
| Topology Change Acknowledge              | Indicates whether the next BPDU to be transmitted for this port will have the topology change acknowledgment flag set.  |
| Edge Port                                | Indicates whether the interface is configured as an edge port (Enabled).  |
| Point-to-point MAC                       | Indicates whether the link type for the interface is a point-to-point link.   |
| CST Regional Root                        | The bridge ID of the bridge that has been elected as the root bridge of the CST region.   |
| CST Path Cost                            | The path cost from the interface to the CST regional root.  |

|   |   |
|---|---|
| Loop Inconsistent State                   | Identifies whether the interface is currently in a loop-inconsistent state. An interface transitions to a loop-inconsistent state if Loop Guard is enabled and the port stops receiving BPDUs. In this state, the interface does not transmit frames. |
| Transitions Into LoopInconsistent State   | The number of times this interface has transitioned into loop-inconsistent state.   |
| Transitions Out Of LoopInconsistent State | The number of times this interface has transitioned out of loop-inconsistent state.   |

## Spanning Tree Statistics

Use the Spanning Tree Statistics page to view information about the number and type of bridge protocol data units (BPDUs) transmitted and received on each port.

1. In the *Spanning Tree* screen, click the **Statistics** tab.



The *Spanning Tree Statistics* screen opens.

| Spanning Tree Statistics |        |              |              |               |               |               |               |               |               |
|--------------------------|--------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Interface                | Name   | STP BPDUs Rx | STP BPDUs Tx | RSTP BPDUs Rx | RSTP BPDUs Tx | MSTP BPDUs Rx | MSTP BPDUs Tx | SSTP BPDUs Rx | SSTP BPDUs Tx |
| 0/1                      | Port 1 | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 0             |
| 0/2                      | Port 2 | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 0             |
| 0/3                      | Port 3 | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 0             |
| 0/4                      | Port 4 | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 0             |

| Field         | Description   |
|---------------|---|
| Interface     | The port or link aggregation group (LAG) associated with the rest of the data in the row. |
| Name          | The user-configured name of the port or link aggregation group (LAG).                     |
| STP BPDUs Rx  | The number of classic STP (IEEE 802.1d) BPDUs received by the interface.                  |
| STP BPDUs Tx  | The number of classic STP BPDUs sent by the interface.                                    |
| RSTP BPDUs Rx | The number of RSTP (IEEE 802.1w) BPDUs received by the interface.                         |
| RSTP BPDUs Tx | The number of RSTP BPDUs sent by the interface.   |
| MSTP BPDUs Rx | The number of MSTP (IEEE 802.1s) BPDUs received by the interface.                         |
| MSTP BPDUs Tx | The number of MSTP BPDUs sent by the interface.   |

# Firmware

Click this tile to access cloud and local firmware upgrades.

**New Firmware Available v0.9.9** ⋮

[What's New / Release Notes 08/30/2018](#)

**Features:**

- 1-click remote management with BakPak Lite
  - View WAN settings
  - Edit LAN settings
  - Edit wireless SSID configuration and security profiles
- Configure 2 additional Pakedge WAPs directly from the WR-1
  - Requires WAPs to be on firmware version 1.20 or later

**Bug fixes:**

- Some GUI compatibility issues with Internet Explorer 11
- Speed test results may reflect slower download speeds when connecting to certain servers
- Some secondary controllers are not discovered via SDDP when connected to wireless with multicast enhancements enabled

**Hot fix:**

- Addressed issue in 1.02.0 which could cause a US region wireless setting to be lost on factory default. Please update to this patch as soon as possible

[Upgrade](#)

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**Current / Installed Firmware v0.3.0.0**

[Release Notes 08/28/2018](#)

If your firmware is up to date, this screen shows your current firmware version and provides a link for that firmware's *Release Notes*.

If a firmware update is available, this screen also shows the update version and the update's *Release Notes*. Click **Upgrade** to update the firmware from the cloud.



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