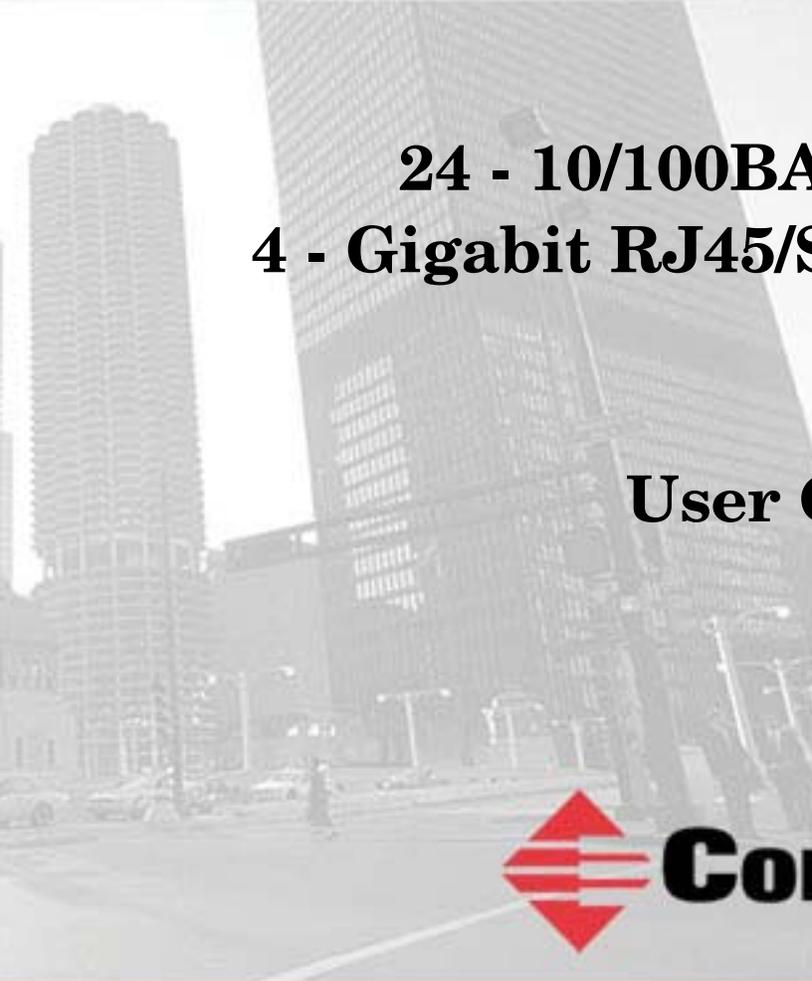




**RocketLinx ES9528-XT**

**Industrial Rack Mount  
Managed Switch**



**24 - 10/100BASE-TX Ports  
4 - Gigabit RJ45/SFP Combo Ports**



**User Guide**



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# **Federal Communications Commission (FCC) Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.



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# Introduction

The ES9528-XT is a rack mount managed Ethernet switch that is equipped with:

- 24 Fast Ethernet ports
- Four Gigabit RJ45/SFP Combo ports

The ES9528-XT was designed for control rooms where high-port density and performance is required. The four Gigabit Combo port design allows 10/100/1000BASE-TX triple speed, and the SFP ports accept all types of Gigabit SFP transceivers, including Gigabit SX, LX, LHX, ZX and XD for several connections and distances.

ES9528-XT is a fan-less switch with low power consumption.

The ES9528-XT allows you to connect up to twelve 100M rings plus 2 Gigabit rings. ES9528-XT supports jumbo frame, featuring up to 9,216 bytes packet size for large size file transmission.

The embedded software supports Multiple Spanning Tree Protocol (MSTP) and Multiple Ring technology for ring redundancy protection. Full layer 2 management features include VLAN, IGMP Snooping, LACP for network control, SNMP, LLDP for network management. Secured access is protected by Port Security, IEEE 802.1x and flexible Layer 2/4 Access Control List.

The ES9528-XT provides a wide operating temperature and the ES9528-XT-XT is NEMA TS2 certified and provides an extended operating temperature.

Detailed specifications for the ES9528-XT are available on the Control [web site](#).

You can refer to [Feature Overview](#) on Page 33 for web user interface features.



# Hardware Installation

You can use the following subsections to install the RocketLinx ES9528-XT.

- [Connect the Power and Ground](#)
- [Mount the ES9528-XT](#) on Page 10
- [Connect the Ethernet Ports](#) on Page 11
- [Connect SFP Transceivers \(Combo Ports 25-28\)](#) on Page 11
- [LED Descriptions](#) on Page 12

## Connect the Power and Ground

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Use the following procedure to connect the power and ground.



***This switch is intended to be installed in a RESTRICTED ACCESS LOCATION ONLY.***

1. Connect the power cord to the AC power input connector. The available AC power range is 90-264VAC.
2. Connect a ground wire between the chassis and earth ground using 12-24AWG wire to ensure that the ES9528-XT is not damaged by noise or electrical shock.
  - a. Loosen the ground screw on the back of the ES9528-XT.
  - b. Insert the ground wire.
  - c. Tighten the ground screw after the ground wire is connected.



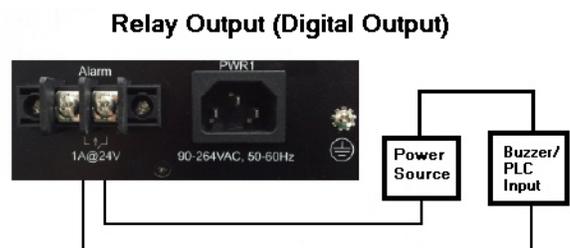
## Connect the Relay Outputs

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If desired, connect the Relay Output (DO). The relay contacts are energized, (open) for normal operation and close for fault conditions that can be defined using the ES9528-XT web user interface or Command Line Interface. See [Fault Relay](#) on Page 128 or [Global Configuration Mode](#) on Page 153 for information about configuring events. The events include:

- Dry output
- Port link failure
- Ping failure
- Ping reset
- Ring failure

*The relay contact supports 1A at 24VDC. Do not apply voltage and current that exceeds these specifications.*



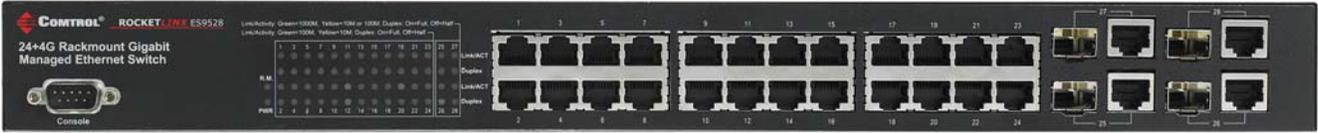
## Mount the ES9528-XT

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You can use the following procedure to mount the ES9528-XT into a rack.

1. Attach the brackets to the ES9528-XT by using the screws provided in the rack mounting kit.



2. Mount the ES9528-XT in a 19-inch rack by using the four rack-mounting screws provided in the kit.

**Temperature:** Verify that the rack environment temperature conforms to the specified operating temperature range. If necessary, refer to the Control web site for operating temperature ranges.

**Mechanical Loading:** Do not place any equipment on top of the switch. In a high vibration environment, additional rack mounting protection is necessary.

**Grounding:** Rack-mounted equipment should be properly grounded. On the back panel of the ES9528-XT, there is one earth ground screw. Loosen the earth ground screw with a screwdriver; then tighten the screw after earth ground wire is

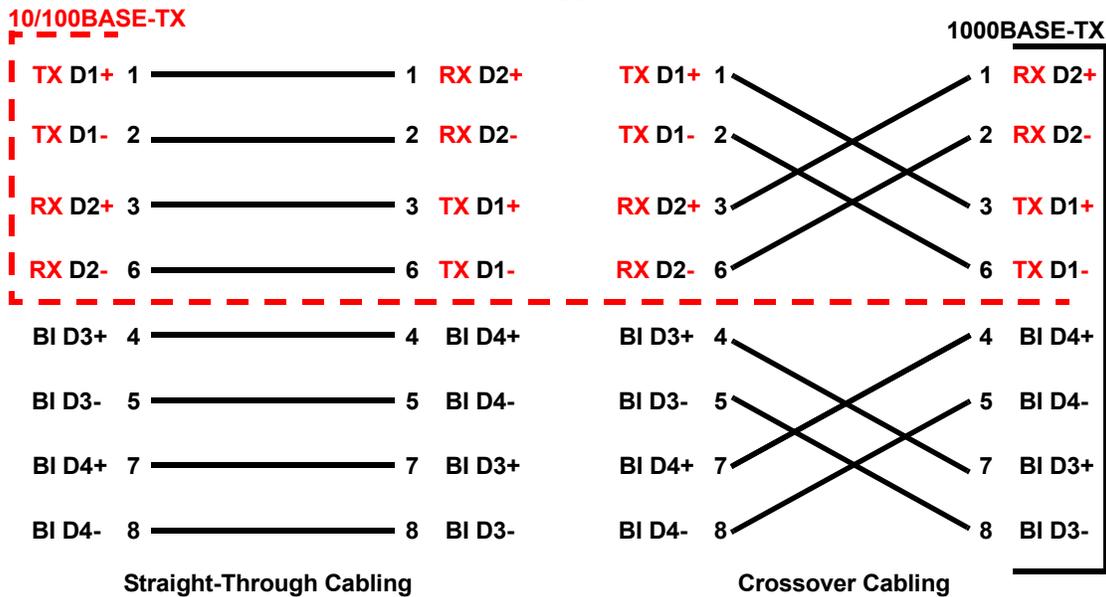
## Connect the Ethernet Ports

You can use the following information to connect standard Ethernet cables between the ES9528-XT Ethernet ports and the network nodes.

- Ports 1-24 are Fast Ethernet (10/100BASE-TX) ports
- Ports 25-28 are RJ45/SFP Combo Gigabit ports that support (10/100/1000BASE-TX / 1000BASE-X).

See [Connect SFP Transceivers \(Combo Ports 25-28\)](#) on Page 11 for information about SFP installation.

All of the Ethernet ports automatically detect the signal from the connected devices to negotiate the link speed and duplex mode (half- or full-duplex). Auto MDI/MDIX allows you to connect another switch, hub, or workstation without changing straight-through or crossover cables. Crossover cables cross-connect the transmit lines at each end to the received lines at the opposite end.



Connect one side of an Ethernet cable into any switch port and connect the other side to your attached device. The **LNK/ACT** LED is lit when the cable is correctly connected. Always make sure that the cables between the switches and attached devices (for example, switch, hub, or workstation) are less than 100 meters (328 feet) and meet these requirements.

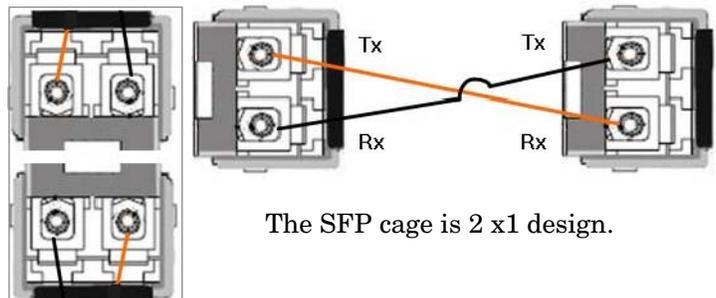
- **10BASE-T:** Category 3 or higher cable
- **100BASE-TX:** Category 5 or higher cable
- **1000BASE-TX:** Category 5 or higher cable

## Connect SFP Transceivers (Combo Ports 25-28)

The ES9528-XT equips four Gigabit SFP ports combined with RJ45 Gigabit Ethernet ports (Ports 25-28). The SFP ports accept standard mini GBIC SFP transceivers that support 1000BASE-X (1000BASE-SX/LX/LH $\bar{X}$ /XD/ZX).

To ensure system reliability, Comtrol recommends using [Comtrol certified SFP Transceivers](#).

**Note:** 100BASE-FX is not supported in Gigabit Combo ports.



The SFP cage is 2 x 1 design.

1. Plug the SFP transceiver into the SFP fiber transceiver.
2. Connect the transmit channel to the receive channel at each end.
3. Check the direction/angle of the fiber transceiver and the fiber cable.

**Note:** This is a Class 1 Laser/LED product. Do not stare at the Laser/LED Beam.

The SFP port does not function until the fiber cable is linked to another active device. The SFP and corresponding RJ45 ports work in an exclusive mode. Traffic sent or received through the SFP module has priority thus no traffic is sent or received over the corresponding RJ45 connection. To use the RJ45 connection, remove the corresponding SFP.

Multi-Mode cables should not exceed 2KM and Single-Mode cables should not exceed 30km.

## LED Descriptions

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This subsection provides information about the ES9528-XT LEDs. You can also refer to [Device Front Panel](#) on Page 141 for information about using the web user interface to remotely view LED information.

LED Name	LED On	LED Blinking	LED Off
PWR (Power)	Green: Power available		No power
R.S. (Ring Status)	Green: Working Ring Master	Amber blinking: Ring failed	Ring function not enabled
Alarm	Red: Relay output triggered		
LEDs 1-24 Link/Act		Green: Link Active	Not connected
LEDs 1-24 Duplex	Amber: Full-Duplex		Not connected or Half-Duplex
LEDs 25-28 Link/Act		Green: Link Active	Not connected
LEDs 25-28 Speed	Amber: 1000Mbps		Not connected or not operating at 1000Mbps
SFP Link State		Green: Link Active	Not connected

# Using PortVision DX

There are several ways to configure network information. Control Technical Support recommends connecting the ES9528-XT to a PC or laptop running [Windows](#) and installing *PortVision DX* for initial configuration.

This section shows how to use PortVision DX for initial network configuration and discusses how to:

- Install PortVision DX ([Page 14](#))
- Configure the network address ([Page 16](#))
- Check the firmware and bootloader version on the ES9528-XT to verify that the latest versions are loaded ([Page 19](#)) before configuration
- Download the latest version firmware and bootloader and upload it to the ES9528-XT ([Page 20](#))
- Perform other PortVision DX tasks, such as:
  - Uploading firmware to multiple ES9528-XT switches ([Page 21](#))
  - Adding a new RocketLinx (managed or unmanaged) or a third party device to PortVision DX to maintain device information on your network ([Page 22](#))
  - Using configuration files for use in configuring multiple installations with the same features ([Page 23](#))
  - Using the LED Tracker ([Page 24](#))
- Organize how PortVision DX displays your Control Ethernet attached products ([Page 23](#))
- Access the latest documentation for your Control Ethernet attached product

Optionally, you can use the web user interface or the CLI to perform these tasks on the ES9528-XT using these subsections:

- [IP Configuration](#) on Page 44
- [Firmware Upgrade](#) on Page 62
- [Basic Settings \(CLI\)](#) on Page 157

## PortVision DX Overview

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PortVision DX automatically detects Control Ethernet attached products physically attached to the local network segment so that you can configure the network address, upload firmware, and manage the following products:

- RocketLinx (managed) switches
- DeviceMaster family
  - DeviceMaster DM
  - DeviceMaster PRO
  - DeviceMaster LT
  - DeviceMaster RTS
  - DeviceMaster Serial Hub
- DeviceMaster Industrial Gateway family
  - DeviceMaster EIP
  - DeviceMaster MOD
  - DeviceMaster UP
- IO-Link Master family

In addition to identifying Control Ethernet attached products, you can use PortVision DX to display any

third-party switch and hardware that may be connected directly to those devices. All non-Control products and unmanaged RocketLinx switches are treated as non-intelligent devices and have limited feature support. For example, you cannot configure or update firmware on a third-party switch.

## PortVision DX Requirements

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Use PortVision DX to identify, configure, update, and manage the ES9528-XT on Windows XP SP3 through Windows 10 operating systems (at the time of publication).

PortVision DX requires that you connect the Comtrol Ethernet attached product to the same network segment as the Windows host system if you want to be able to scan and locate it automatically during the configuration process.

## Installing PortVision DX

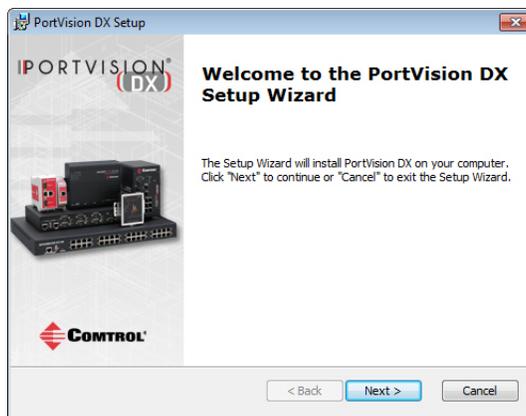
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During initial configuration, PortVision DX automatically detects and identifies ES9528-XT switches, if they are in the same network segment.

You can download the latest version of PortVision DX from: [http://downloads.comtrol.com/rocketlinx/portvision\\_dx](http://downloads.comtrol.com/rocketlinx/portvision_dx).

1. Execute the `PortVision_DX[version].msi` file.

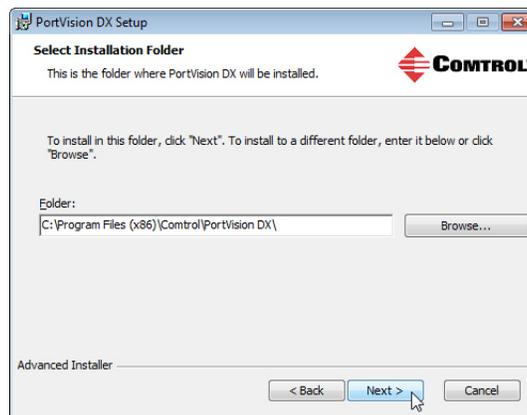


**Note:** Depending on your operating system, you may need to respond to a Security Warning to permit access.

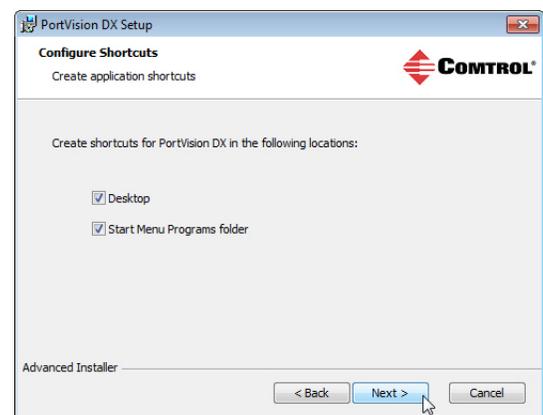
2. Click **Next** on the *Welcome* screen.
3. Click **I accept the terms in the License Agreement** and **Next**.



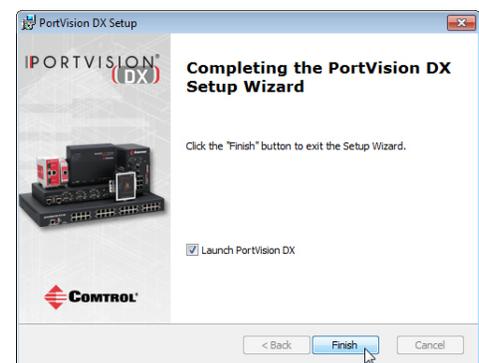
- Click **Next** or optionally, browse to a different location and then click **Next**.



- Click **Next** to configure the shortcuts.
- Click **Install**.



- Depending on the operating system, you may need to click **Yes** to the *Do you want to allow the following program to install software on this computer?* query.
- Click **Launch PortVision DX** and **Finish** in the last installation screen.
- Depending on the operating system, you may need to click **Yes** to the *Do you want to allow the following program to make changes to this computer?* query.
- Go the next subsection to use PortVision DX to program the network information.



## Configuring the Network Settings

The ES9528-XT has the following default values when shipped from the factory:

- IP address: 192.168.250.250
- Subnet mask: 255.255.255.0
- Gateway address: 192.168.250.1

Use the following procedure to change the default network settings on the ES9528-XT for your network.

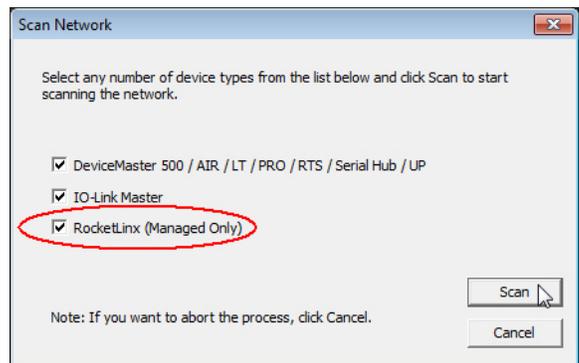
1. If necessary, start PortVision DX using the **PortVision DX** desktop shortcut or from the **Start** button, click **All Programs > Control > PortVision DX > PortVision DX**.

**Note:** Depending on your operating system, you may need to click **Yes** to the *Do you want to allow the following program to make changes to this computer?* query.

2. Click the **Scan** button in the *Toolbar*.
3. Select the Control Ethernet attached products that you want to locate and then click **Scan**.

**Note:** If the Control Ethernet attached product is not on the local segment and it has been programmed with an IP address, it will be necessary to manually add the Control Ethernet attached product to PortVision DX.

4. Highlight the ES9528-XT for which you want to program network information and open the **Properties** screen using one of these methods.
  - Double-click the ES9528-XT in the *Device Tree* or *Device List* pane.
  - Highlight the ES9528-XT in the *Device Tree* or *Device List* pane and click the **Properties** button.
  - Right-click the ES9528-XT in the *Device Tree* or *Device List* pane and click **Properties** in the popup menu



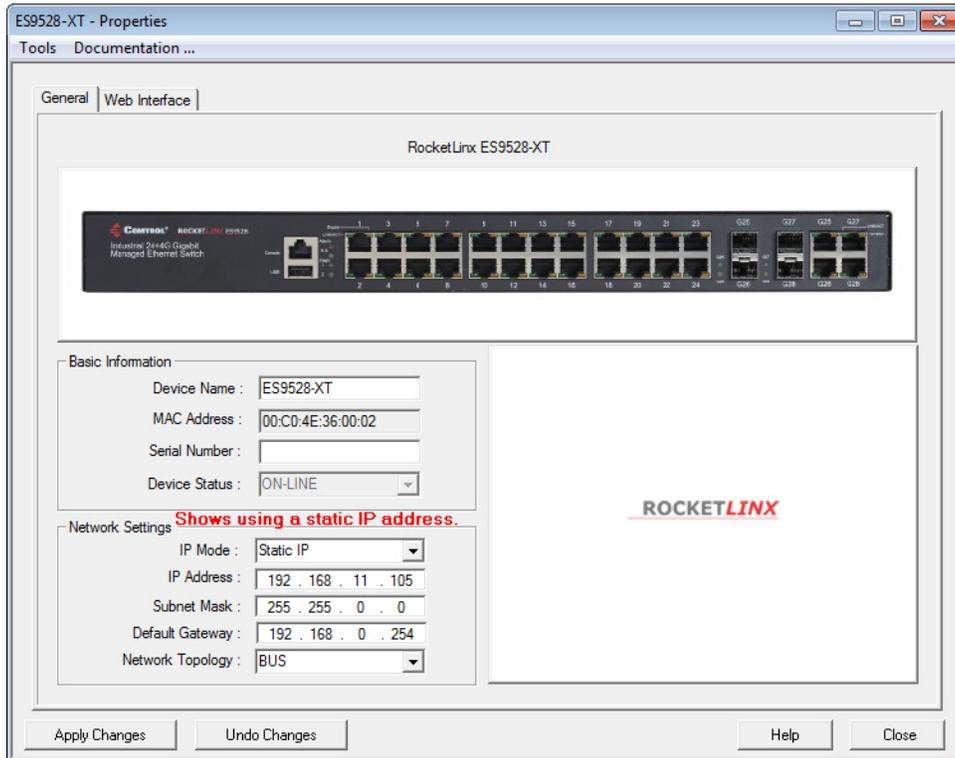
- Highlight the ES9528-XT, click the **Manage** menu and then **Properties**.

The screenshot shows the PortVision DX application window. The interface is divided into several panes:

- Device Tree Pane:** Located at the top right, it shows a folder structure. A red arrow points to the 'Scan Results [88 / 88]' folder, with the text: "The contents of this folder are displayed below in the Device List". Another red arrow points to the expand/collapse icon, with the text: "You can expand the tree and also view the devices in the Device Tree pane."
- Device List Pane:** Located at the bottom right, it displays a table of devices. The table has columns for Device Name, Model, IP Address, MAC Address, Software Version, and Status. The device 'Device 36:00:02' (Model ES9528-XT) is highlighted, and a context menu is open over it. The 'Properties' option in the menu is circled in red.
- Device List Table:**

Device Name	Model	IP Addr...	MAC Address	Software Version	Status
Device 3C:00:02	ES8508F-MM	192.168.0.164	00:0C:45:2C:00:02	1.3.2 (b1.6.1.5)	ON-LINE
Device 2D:00:08	ES7506	192.168.0.164	00:0C:45:2C:00:02	1.3.2 (b1.6.4.5)	ON-LINE
Device 32:00:00	ES7528	192.168.0.164	00:0C:45:2C:00:02	1.3.2 (b0.3.0.10)	ON-LINE
Device 35:00:09	ES8509-XT	192.168.0.164	00:0C:45:2C:00:02	1.3.1.5	ON-LINE
Device 2C:00:6C	ES8510	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.6.2.12)	ON-LINE
Device 34:00:08	ES7510	192.168.0.164	00:0C:45:2C:00:02	beta4 (b1.2.1.6)	ON-LINE
Device 36:00:02	ES9528-XT	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.1.0.4)	ON-LINE
Device 30:00:10	ES8510-XTE	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.6.2.12)	ON-LINE
Device 38:00:02	ES7510-XT	192.168.0.164	00:0C:45:2C:00:02	beta7 (b1.4.1.6)	ON-LINE
Device 3A:00:0D	ES8508	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.5.1.5)	ON-LINE
Device 2F:03:1D	ES8510-XT	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.6.2.12)	ON-LINE
Device 1C:FF:5D	ES8510-XT	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.6.2.12)	ON-LINE
Device 5A:00:0D	ES8510-XT	192.168.0.164	00:0C:45:2C:00:02	beta2 (b1.6.2.12)	ON-LINE
Device 17:FF:FB	PRO-8P (DB9)	192.168.0.164	00:0C:45:2C:00:02	et/IP 1.2.0	ON-LINE
Device 07:FF:FC	RTS-4P (DB9)	192.168.0.164	00:0C:45:2C:00:02	k 9.18	ON-LINE
Device 42:FF:F8	RTS-1P (5-30V)	192.168.0.164	00:0C:45:2C:00:02	Server 9.30	ON-LINE
Device 29:FF:F5	RTS-2P (2E)	192.168.0.164	00:0C:45:2C:00:02	Server 9.35	ON-LINE
Device 15:04:7A	UP-1P (5V)	192.168.0.164	00:0C:45:2C:00:02	k 9.34	ON-LINE
Device 07:42:84	UP-1P (5V)	192.168.0.164	00:0C:45:2C:00:02	et/IP 4.10	ON-LINE

5. *Optionally*, rename the ES9528-XT in the **Device Name** field for a PortVision DX friendly name. The default name displays as *Device* and the last three sets of hex numbers from the MAC address.



**Note:** The MAC address and Device Status fields are automatically populated and you cannot change these values.

6. *Optionally*, enter the serial number, which is on a label on the ES9528-XT.
7. Select **DHCP IP** or **Static IP** for the *IP Mode*.

- If you select **DHCP IP**, go to [Step 8](#).
- If you select **Static IP**:
  - Enter a unique **IP address** as required for your site.
  - Enter a valid **Subnet Mask** value for your network.
  - Enter a valid **Default Gateway** value for your network.

8. *Optionally*, select the **Network Topology** type, which is an informational field.
9. Click **Apply Changes** to update the network information on the ES9528-XT.

**Note:** If you are deploying multiple ES9528-XT switches that share common values, you can save the configuration file and load that configuration onto other ES9528-XT switches. See [Using Configuration Files](#) on Page 23 for more information.

10. Click **Close** to exit the *Properties* window.
11. You should verify that you have the latest firmware loaded on the ES9528-XT because a newer version typically includes feature enhancements and bug fixes. Refer to [Checking the Firmware Version](#) on Page 19 and if necessary, [Uploading the Latest Firmware or Bootloader](#) on Page 20.
12. If you have the latest firmware, you can begin feature configuration, see one of these sections:
  - [Configuration Using the Web User Interface](#) on Page 29
  - [Configuration Using the Command Line Interface \(CLI\)](#) on Page 144
  - Right-click the ES9528-XT in the *Device List* pane and click **Webpage** in the popup menu.

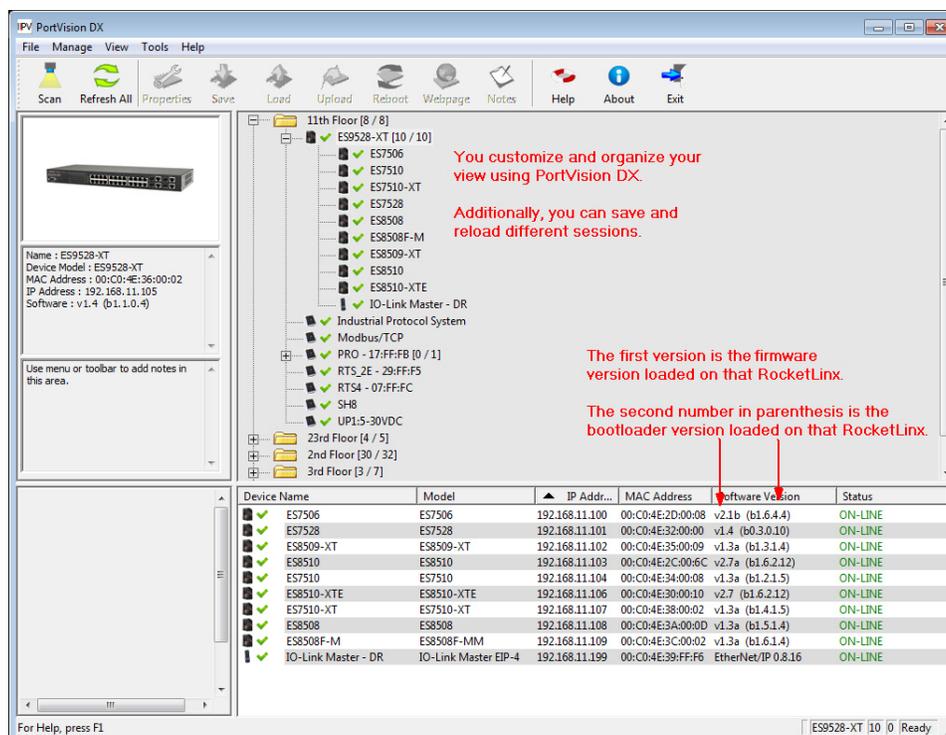
**Note:** The default User Name and Password are both **admin**.

## Checking the Firmware Version

Checking your web interface and bootloader versions is easy in PortVision DX.

Control recommends loading the latest firmware and bootloader so that you have all of the latest feature enhancements and bug fixes.

1. If the ES9528-XT is not displayed in PortVision DX, click the **Scan** button.
2. Select the Control Ethernet attached product type and click the **Scan** button.
3. Locate the ES9528-XT in the *Device List* pane. Under *Software Version*: The first number reflects the firmware version and the second number displays the bootloader version.



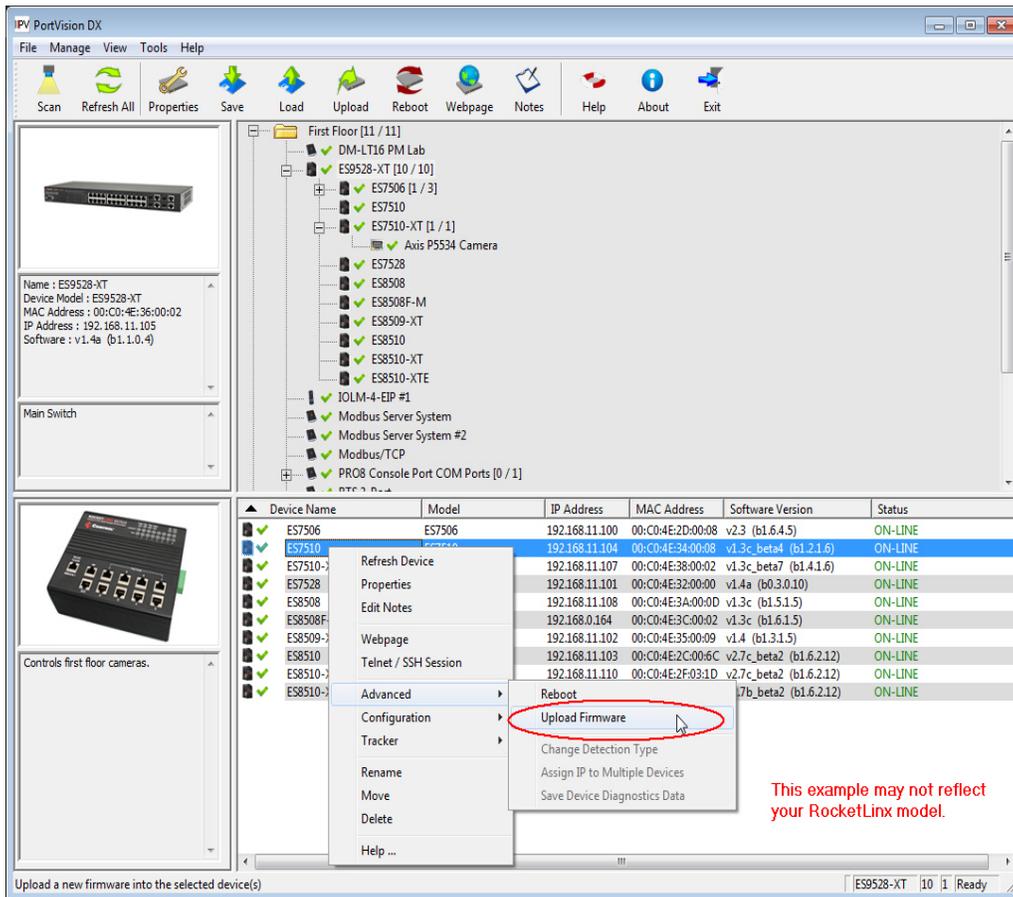
4. Check the [Control download](#) site for the latest firmware and bootloader. Simply, click your product type and click the **Software** link and check the latest version against the version on the ES9528-XT.

Use the next subsection for procedures to upload the firmware (web interface) and bootloader.

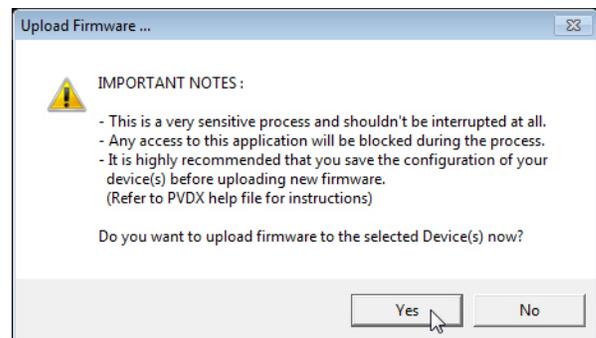
## Uploading the Latest Firmware or Bootloader

You can use the following procedure to upload the latest firmware or bootloader.

1. If you have not done so, download the latest firmware and bootloader using the previous subsection.
2. Right-click the ES9528-XT in the *Device List* pane that you want to update, click **Advanced --> Upload firmware**.



3. Navigate to the location of the firmware files, select the appropriate file, and then click **Open**.
4. Click **Yes** to the *Upload Firmware* message.
5. Click **Ok** to the message notifying you that you should wait to use the ES9528-XT when the status returns to ON-LINE.
6. Right-click the ES9528-XT in the *Device List* pane and click **Refresh**. Optionally, you can click the **Refresh** button in the *Toolbar* and that refreshes all devices in PortVision DX.
7. Verify that the version change is reflected in under the *Software Version*.

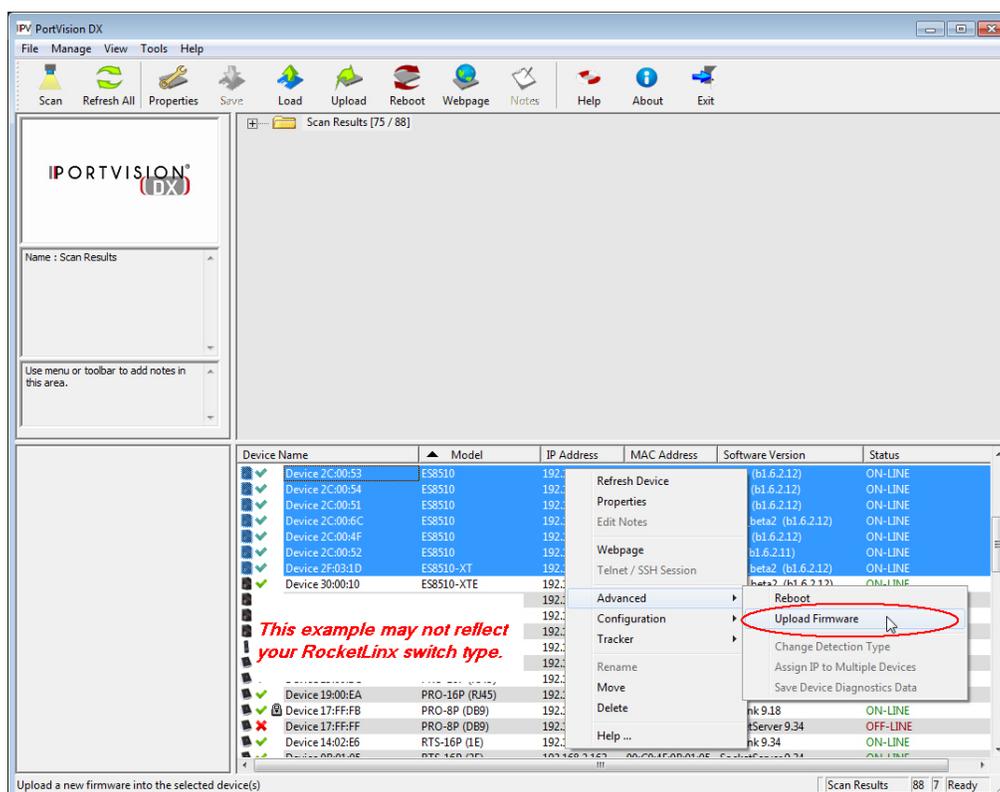


## Uploading Firmware to Multiple ES9528-XT Switches

You can use this procedure if your ES9528-XT is connected to the host PC, laptop, or if the ES9528-XT resides on the local network segment.

**Note:** Technical support does not advise uploading bootloader to multiple ES9528-XT switches. Remember that uploading firmware reboots the ES9528-XT, which depending on your network connections may cause firmware uploading to fail on another ES9528-XT.

1. If the ES9528-XT is not displayed in PortVision DX, click the **Scan** button.
2. Select the Control Ethernet attached product type and click the **Scan** button.
3. Shift-click the multiple ES9528-XT switches on the **Main** screen that you want to update and right-click and then click **Advanced > Upload Firmware**.



4. Browse, click the firmware (.bin) file, **Open** (Please locate the new firmware), and then click **Yes** (Upload Firmware).

It may take a few minutes for the firmware to upload onto all of the ES9528-XT switches. The ES9528-XT reboots itself during the upload process.

5. Click **Ok** to the advisory message about waiting to use the device until the status reads **ON-LINE**.

In the next polling cycle, PortVision DX updates the *Device List* pane and displays the new firmware version.

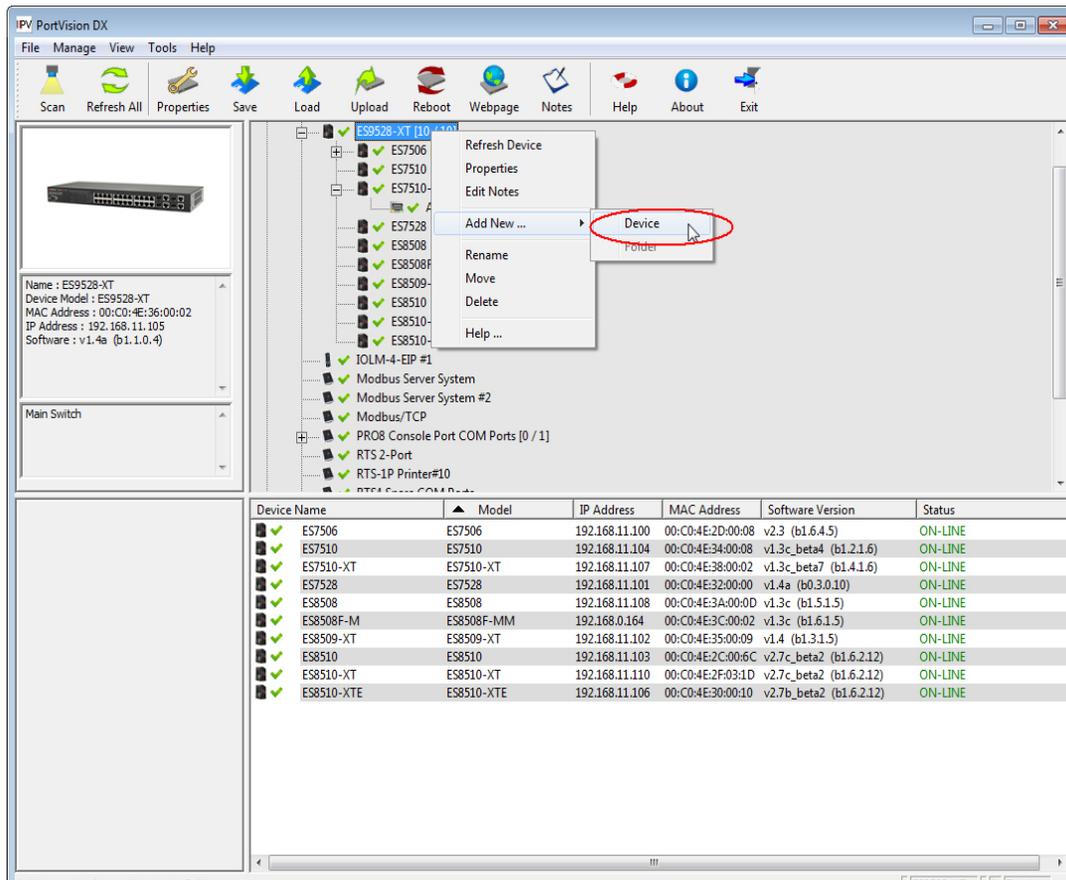
## Adding a New Device in PortVision DX

You can add a new ES9528-XT manually, if you do not want to scan the network to locate it or you want to pre-configure an ES9528-XT before connecting it to the network. Optionally, you can also add unmanaged devices or RocketLinux switches to maintain information about devices on the network.

See the PortVision DX help system for additional information about adding unmanaged RocketLinux switches or third party devices or switches.

Use the following procedure to add a remote ES9528-XT to PortVision DX.

1. Access the *New Device* window using one of these methods:
  - Click **Add New > Device** in the *Manage* menu.
  - Right-click a folder or a RocketLinux switch in the *Device Tree* pane and click **Add New > Device**.



2. Select the appropriate RocketLinux in the **Device Type** drop list.
3. Select the appropriate model in the **Device Model** drop list.
4. Enter a friendly device name in the **Device Name** list box.
5. Optionally, enter the serial number in the **Serial Number** list box.

6. Enter the IP Address for the ES9528-XT. It is not necessary to enter the Subnet Mask and Default Gateway
7. Click **Ok** to close the *Add New Device* window. It may take a few moments to save the ES9528-XT.
8. If necessary, click **Refresh** for the new RocketLinx to display in the *Device Tree* or *Device List* panes. The RocketLinx shows **OFF-LINE** if it is not connected to the local network or if an incorrect IP address was entered.

## Using Configuration Files

If you are deploying multiple ES9528-XT switches that share common firmware values, you can save the configuration file (.dc) from the *Main* screen in PortVision DX and load that configuration onto other ES9528-XT switches.

### Saving a Configuration File

Use this procedure to save a configuration file.

1. Highlight the ES9528-XT in the *Device List* pane and use one of the following methods:
  - Click the **Save** button.
  - Right-click and then click **Configuration > Save**.
2. Browse to the location you want to save the file, enter a file name, and click **Save**.
3. Click **Ok** to close the *Save Configuration Completed* message.

### Loading a Configuration File

Use the following procedure to load a previously saved a ES9528-XT configuration file. Load a configuration file and apply it to a selected ES9528-XT switch or switches from the *Device List* pane.

Use this procedure to load a configuration file using the *Device List* pane to one or more ES9528-XT switches.

1. Highlight the device or devices in the *Device List* pane and use one of the following methods:
  - Click the **Load** button
  - Right-click and then click **Configuration > Load**
2. Click **Yes** to the warning that it will take 25 seconds per device and it may also reboot the devices.
3. Browse to the location of the configuration file, click the file name (.dc) and then **Open**.
4. Close the *Load Configuration* popup message.

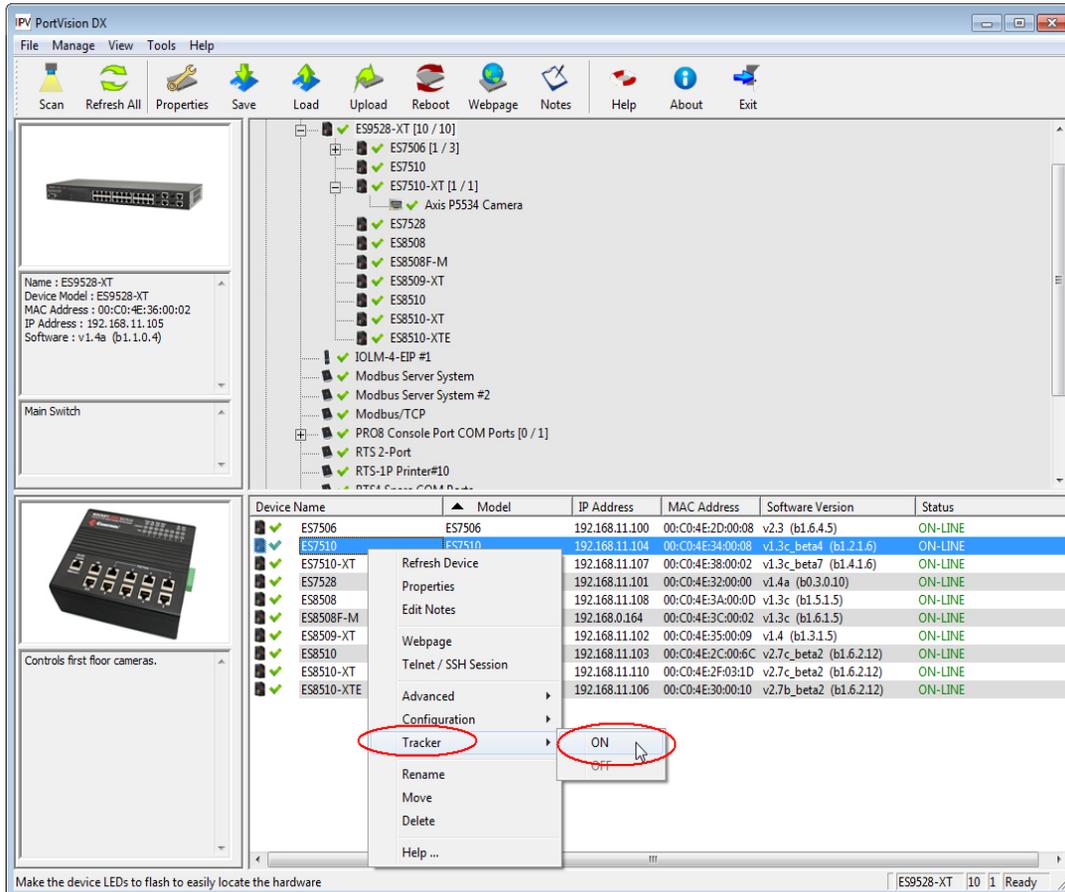
## Using the LED Tracker

RocketLinx managed switches support the LED Tracker feature, which allows you to toggle on/off the LEDs on a specific device so that you can locate the physical unit.

Use this procedure to toggle the **LED Tracker** feature on RocketLinx switches.

1. Right-click the ES9528-XT in the *Device List* pane, click **Tracker**, and then click **ON**.

The ES9528-XT SYS LED will flash for five seconds.



2. If necessary, you may need to click **Tracker** and **ON** several times to catch the flashing **SYS LED**.

## Customizing PortVision DX

You can customize how PortVision DX displays the devices. You can even create sessions tailored for specific audiences. You can also add shortcuts to other applications using **Tools > Applications > Customize** feature.

The following illustrates how you can customize your view.

The screenshot shows the PortVision DX application window. The interface includes a menu bar (File, Manage, View, Tools, Help), a toolbar with icons for Scan, Refresh All, Properties, Save, Load, Upload, Reboot, Webpage, Notes, Help, About, and Exit. The main area is divided into several panes:

- Left Pane:** Contains the PortVision DX logo and a text field labeled "Name: First Floor". Below it is a note: "Use menu or toolbar to add notes in this area."
- Device Tree Pane:** A hierarchical tree view showing folders and devices. The "First Floor [11 / 11]" folder is selected. Its contents are listed below in the Device List pane. A red arrow points from the folder name to the list. A red text box explains: "The contents of this folder is displayed below in the Device List pane below. See the PortVision DX help system for procedures on organizing your devices and customizing your view in PortVision DX."
- Device List Pane:** A table displaying the details of the selected folder's contents. The table has columns for Device Name, Model, IP Address, MAC Address, Software Version, and Status. The status for all devices is "ON-LINE".

Device Name	Model	IP Addr...	MAC Address	Software Version	Status
ES9528-XT	ES9528-XT	192.168.11.105	00:C0:4E:36:00:02	v1.4a (b1.1.0.4)	ON-LINE
SH8 Console Port COM P...	SH-8P (DB9)	192.168.11.14	00:C0:4E:1C:FF:FD	NS-Link 9.28	ON-LINE
IOLM-4-EIP #1	4-EIP	192.168.11.198	00:C0:4E:39:00:23	EtherNet/IP 1.2.0	ON-LINE
PRO8 Console Port COM...	PRO-8P (DB9)	192.168.11.20	00:C0:4E:17:FF:FB	NS-Link 9.18	ON-LINE
RTS4 Spare COM Ports	RTS-4P (DB9)	192.168.11.23	00:C0:4E:07:FF:FC	SocketServer 9.30	ON-LINE
RTS-1P Printer#10	RTS-1P (5-30V)	192.168.11.40	00:C0:4E:42:FF:F8	SocketServer 9.35	ON-LINE
RTS 2-Port	RTS-2P (2E)	192.168.11.52	00:C0:4E:29:FF:F5	NS-Link 9.34	ON-LINE
Modbus/TCP	UP-1P (5V)	192.168.11.53	00:C0:4E:15:04:7A	EtherNet/IP 4.10	ON-LINE
Modbus Server System #2	UP-4P (DB9)	192.168.11.54	00:C0:4E:07:43:84	Modbus Server 4.04	ON-LINE
Modbus Server System	UP-1P (5-30V)	192.168.11.55	00:C0:4E:21:05:CD	Modbus Server 4.04	ON-LINE
DM-LT16 PM Lab	DM-LT16	192.168.11.60	00:C0:4E:40:00:5D	SocketServer 9.33	ON-LINE

The status bar at the bottom shows "For Help, press F1" and "First Floor | 1 | Ready".

See the PortVision DX Help system for detailed information about modifying the view. For example, the above screen shot illustrates devices layered in folders.

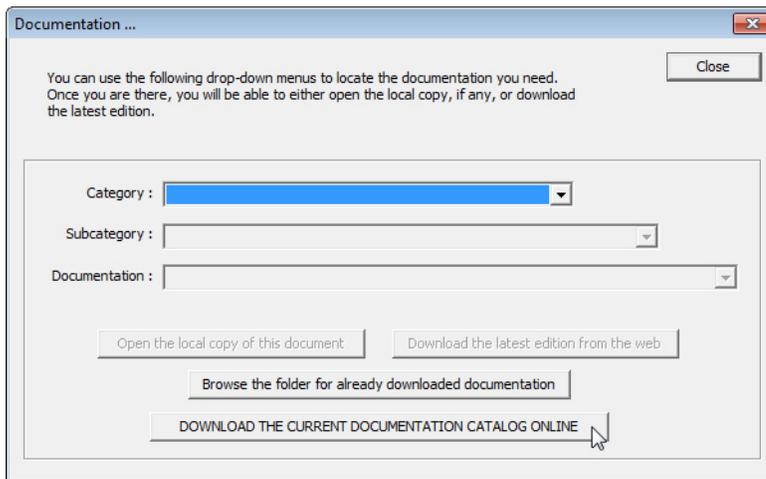
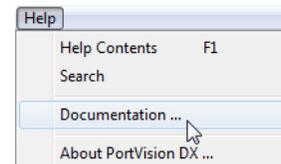
## Accessing RocketLinx Documentation from PortVision DX

You can use this procedure in PortVision DX to [download](#) and [open the previously downloaded documents](#) for the RocketLinx.

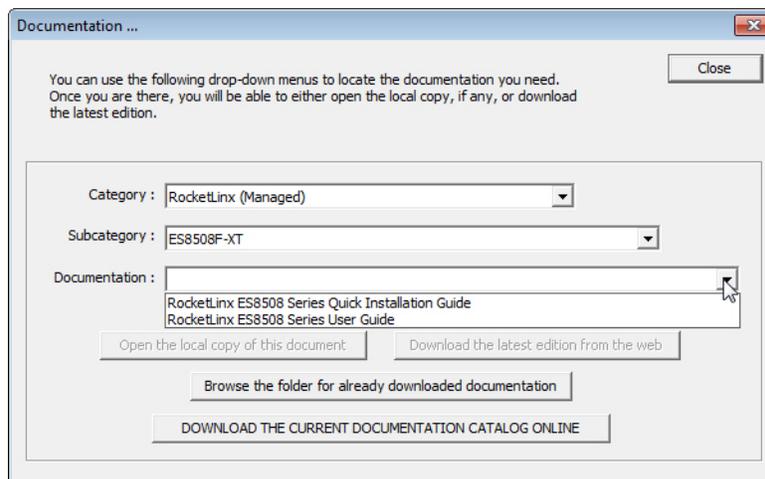
### How to Download Documentation

Use this procedure to initially download a document or documents.

1. If necessary, open PortVision DX.
2. Click **Help > Documentation**.
3. Optionally, click the **DOWNLOAD THE CURRENT DOCUMENTATION CATALOG ONLINE** button to make sure that the latest documentation is available to PortVision DX.



4. Select the product **Category** from the drop list.
5. Select the document you want to download from the **Documentation** drop list.



**Note:** This image may not reflect your RocketLinx.

6. Click the **Download the latest edition from the web** button.

**Note:** It may take a few minutes to download, depending on your connection speed. The document opens automatically after it has downloaded.

7. Click **Close** if you have downloaded all of the documents that you wanted.

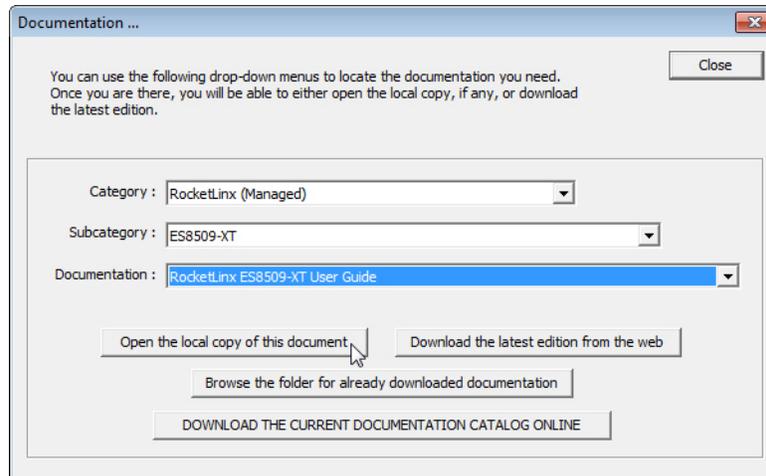
## How to Open Previously Downloaded Documents

Use the following procedure to access previously downloaded documents in PortVision DX.

**Note:** *Optionally, you can browse to the Program Files (x86) > Control > PortVision DX > Docs subdirectory and open the document.*

1. If necessary, open **PortVision DX > Start/Programs > Control > PortVision DX > PortVision DX** or use the desktop shortcut.
2. Click **Help > Documentation**.
3. Click the **Open the local copy of the document** button to view the document.

**Note:** *This image may not reflect your RocketLinx.*



**Note:** *If the document fails to open, it may be that your browser has been disabled. You can still access the document by clicking the **Browse the folder for already downloaded documentation** button and opening the document with your custom browser.*

4. Click **Close** in the *Documentation...* popup, unless you want to open or download other documents.



# Configuration Using the Web User Interface

The ES9528-XT provides in-band and out-band configuration methods:

- Out-band management means that you configure the ES9528-XT using the RS-232 console cable and the Command Line Interface (CLI) to access the ES9528-XT without attaching an admin PC to the network. You can use out-band management if you lose the network connection to the ES9528-XT. The CLI and Telnet are discussed in [Configuration Using the Command Line Interface \(CLI\)](#) on Page 144.
- In-band management means that you connect remotely using the ES9528-XT IP address through the network. You can remotely connect with the ES9528-XT web user interface or a Telnet console and the CLI. The ES9528-XT provides HTTP web user interface ([Page 30](#)) and secure HTTPS web user interface ([Page 31](#)) for web management.

## Configuration Overview

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This subsection discusses a minimum level of configuration required to operate the ES9528-XT.

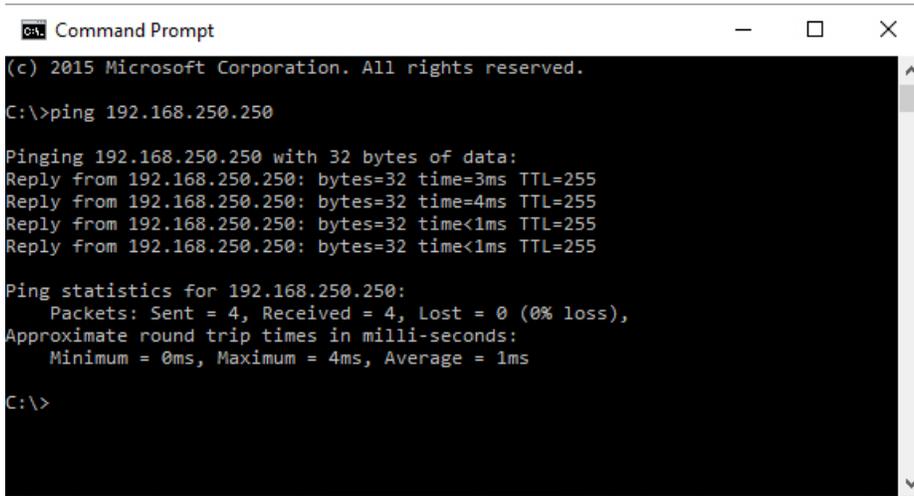
1. If you have not done so, install the hardware, see [Hardware Installation](#) on Page 9.
2. If you are planning on using in-band management, you need to program the ES9528-XT IP address to meet your network requirements. The easiest way to configure the IP address is using a Windows system and PortVision DX, see [Configuring the Network Settings](#) on Page 16.
3. Configure other features as desired. You can refer to the [Feature Overview](#) on Page 33 to locate configuration information or use these links:
  - [Basic Settings](#) on Page 41
  - [Port Configuration](#) on Page 66
  - [Network Redundancy](#) on Page 78
  - [VLAN](#) on Page 94 and [Private VLAN](#) on Page 99
  - [Traffic Prioritization](#) on Page 105
  - [Multicast Filtering](#) on Page 110
  - [SNMP](#) on Page 114
  - [Security](#) on Page 117
  - [Warning](#) on Page 128
  - [Monitor and Diag](#) on Page 133
  - [Device Front Panel](#) on Page 141
  - [Save \(to Flash\)](#) on Page 142
  - [Logout](#) on Page 142

## Web User Interface

You can use any standard web browser to configure and communicate with the ES9528-XT from anywhere on the network.

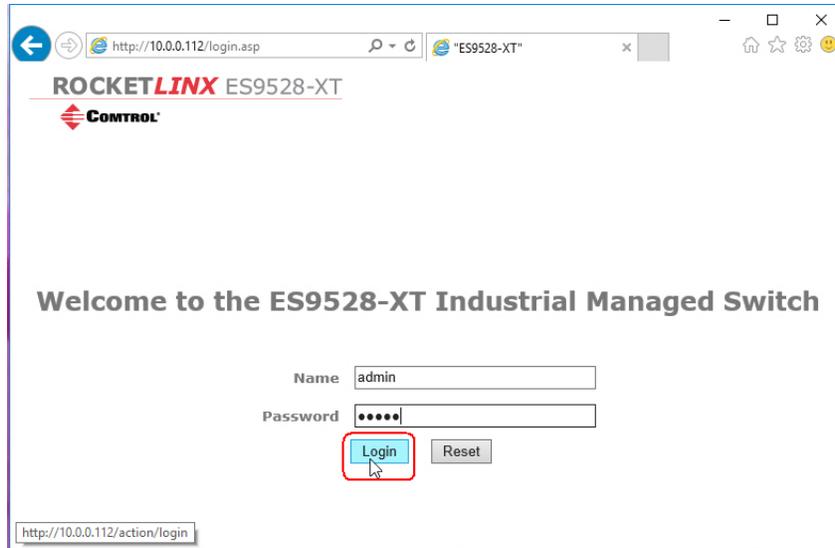
The default IP address for the ES9528-XT is **192.168.250.250**.

1. Open a command prompt window and ping the IP address for the ES9528-XT to verify a normal response time.



**Note:** If you did not program the IP address for your network using PortVision DX ([Configuring the Network Settings](#) on Page 16), you need to change your computer IP address to **192.168.250.x** (Network Mask: 255.255.0.0).

2. Launch the web browser on the PC using one of these methods:
  - Right-click the ES9528-XT in PortVision DX and click **Webpage**.
  - Open your browser, enter the IP address of the switch, and then press **Enter**. For example: **http://10.0.0.112**.
3. Enter the user name, the password, and click **OK**. The default user name and password are both **admin**.



4. If you have not done so, you can change the ES9528-XT IP address to meet your network environment.
  - a. Double-click **Basic Setting**.
  - b. Click **IP Configuration**.
    - To use static addressing, enter a valid IP address, subnet mask and default gateway.
    - To use DHCP, click **Enable** in the **DHCP Client** drop list.
  - c. Click **Apply**.

You can use the [Feature Overview](#) on Page 33 to locate other features that you may want to configure.

## Secure Web User Interface

The ES9528-XT web user interface also provides secured management through an HTTPS login so that all of the configuration commands are secure.

If you did not program the IP address for your network using PortVision DX ([Configuring the Network Settings](#) on Page 16), you need to change your computer IP address to **192.168.250.x** (Network Mask: 255.255.0.0). The default IP address for the ES9528-XT is *192.168.250.250*.

1. Open a command prompt window and ping the IP address for the ES9528-XT to verify a normal response time.

```

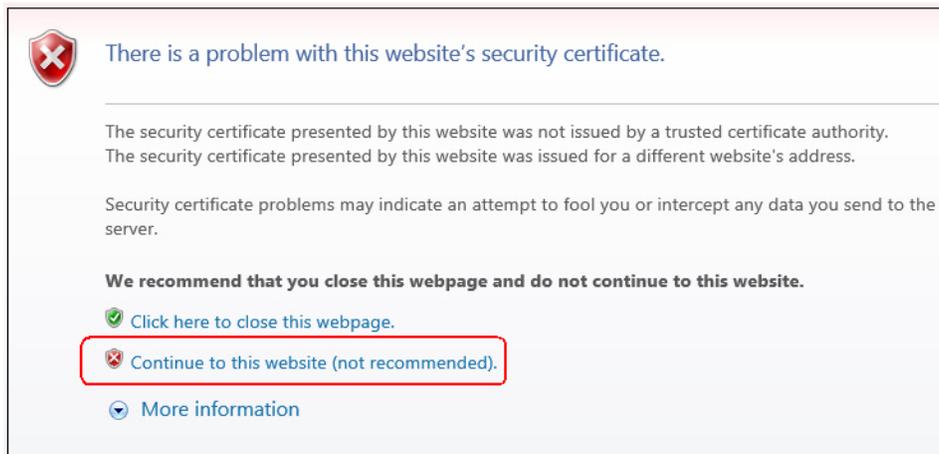
Command Prompt
(c) 2015 Microsoft Corporation. All rights reserved.
C:\>ping 192.168.250.250

Pinging 192.168.250.250 with 32 bytes of data:
Reply from 192.168.250.250: bytes=32 time=3ms TTL=255
Reply from 192.168.250.250: bytes=32 time=4ms TTL=255
Reply from 192.168.250.250: bytes=32 time<1ms TTL=255
Reply from 192.168.250.250: bytes=32 time<1ms TTL=255

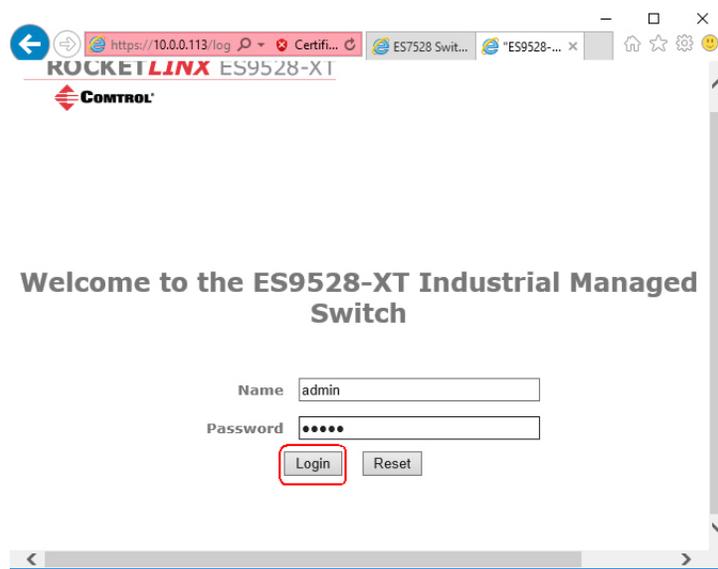
Ping statistics for 192.168.250.250:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>
  
```

2. Launch the web browser and type **https://192.168.250.250** (or the IP address of the ES9528-XT).and then press **Enter**.
3. Click **Continue to the web site (not recommended)**.



4. Enter the user name and the password and click **OK**. The default name and password are both **admin**.



5. If you have not done so, you can change the ES9528-XT IP address to meet your network environment.
  - a. Double-click **Basic Setting**.
  - b. Click **IP Configuration**.
    - To use static addressing, enter a valid IP address, subnet mask and default gateway.
    - To use DHCP, click **Enable** in the **DHCP Client** drop list.
  - c. Click **Apply**.

## Feature Overview

The following table provides detailed information about ES9528-XT features and provides the location of the configuration information in the web user interface.

Type	Category	Details
802.1x Port-Based Network Access Control Configuration	<a href="#">802.1x Configuration</a> on Page 110	<ul style="list-style-type: none"> <li>• System Authentication Control - Enable/Disable</li> <li>• Authentication Method - RADIUS or Local</li> <li>• RADIUS Server - IP Address, Shared Key, Server Port, and Accounting Port</li> <li>• Local RADIUS User - User Name, Password, and VID</li> <li>• Secondary RADIUS Server - IP Address, Shared Key, Server Port, and Accounting Port</li> <li>• Local RADIUS User List</li> </ul>
802.1x Port-Based Network Access Control Port Configuration	<a href="#">802.1x Port Configuration</a> on Page 111	<p>Port Configuration</p> <ul style="list-style-type: none"> <li>• Port Control - Auto, Forced Authorized, or Force Unauthorized</li> <li>• Re-authentication - Enable/Disable</li> <li>• Maximum Request</li> <li>• Guest VLAN</li> <li>• Host Mode - Single/Multi</li> <li>• Admin Control Direction - Both or In</li> </ul> <p>Timeout Configuration</p> <ul style="list-style-type: none"> <li>• Port by Port</li> <li>• Re-Authentication Periods</li> <li>• Quiet Period</li> <li>• Tx Period</li> <li>• Supplicant Timeouts</li> <li>• Server Timeouts</li> </ul>
802.1x Port-Based Network Access Control Port Status	<a href="#">802.1x Port Status</a> on Page 113	<ul style="list-style-type: none"> <li>• Port by Port</li> <li>• Port Control</li> <li>• Authorize Status</li> <li>• Authorized Supplicant</li> <li>• Oper Control Direction</li> </ul>
Admin Password	<a href="#">Admin Password</a> on Page 50	<ul style="list-style-type: none"> <li>• Admin</li> </ul>
Backup and Restore	<a href="#">Backup and Restore</a> on Page 60	Local or TFTP
CoS-Queuing Mapping	<a href="#">CoS-Queue Mapping</a> on Page 100	<ul style="list-style-type: none"> <li>• CoS 0 through 7</li> <li>• Queue 0 through 3</li> <li>• Queue 3 highest priority</li> </ul>

Type	Category	Details
DHCP Server Configuration	<a href="#">DHCP Server Configuration</a> on Page 56 <a href="#">DHCP Leased Entries</a> on Page 58 <a href="#">DHCP Relay Agent</a> on Page 59	<ul style="list-style-type: none"> <li>• DHCP Server Configuration                         <ul style="list-style-type: none"> <li>- Excluded Addresses and Manual Binding</li> <li>- Port and IP Address</li> <li>- Option 82</li> </ul> </li> <li>• DHCP Leased Entries</li> <li>• DHCP Relay Agent                         <ul style="list-style-type: none"> <li>- Helper Address 1-4</li> <li>- DHCP Option82 Relay Agent (Circuit ID/Remote ID)</li> </ul> </li> </ul>
DSCP-Queuing Mapping	<a href="#">DSCP-Queue Mapping</a> on Page 101	<ul style="list-style-type: none"> <li>• DSCP 0 through 7</li> <li>• Queue 0 through 3</li> <li>• Queue 3 highest priority</li> </ul>
Event Selection	<a href="#">Event Selection</a> on Page 116	<ul style="list-style-type: none"> <li>• Device Cold Start</li> <li>• Device Warm Start</li> <li>• Authentication Failure</li> <li>• Time Synchronization Failure</li> <li>• Super Ring Topology Change</li> <li>• Port by Port Event Selection</li> </ul>
Filter Set/Attach	<a href="#">Security</a> on Page 108	<ul style="list-style-type: none"> <li>• Packet Filtering by MAC or IP</li> <li>• IP Filter ID/Name</li> <li>• Ingress Ports</li> </ul>
GMRP Configuration	<a href="#">Multicast Filtering</a> on Page 102	<ul style="list-style-type: none"> <li>• Enable/Disable</li> <li>• Port by Port Basis</li> </ul>
GVRP Configuration	<a href="#">GVRP Configuration</a> on Page 93	<ul style="list-style-type: none"> <li>• 2K Entries</li> <li>• Enable/Disable GVRP Protocol</li> <li>• State - Enable/Disable</li> <li>• Join Timer</li> <li>• Leave Timer</li> <li>• Leave All Timer</li> </ul>
IGMP Query	<a href="#">IGMP Query</a> on Page 104	<ul style="list-style-type: none"> <li>• Version - Version 1, Version 2, or Disable</li> <li>• Query Intervals</li> <li>• Query Maximum Response Time</li> </ul>
IGMP Snooping	<a href="#">IGMP Snooping</a> on Page 103	<ul style="list-style-type: none"> <li>• Enable/Disable</li> <li>• VID</li> <li>• Port by Port IGMP Snooping Table                         <ul style="list-style-type: none"> <li>- IP Address</li> <li>- VID</li> </ul> </li> </ul>
IP Configuration	<a href="#">Basic Settings</a> on Page 49	<ul style="list-style-type: none"> <li>• IPv4 and IPv6 support</li> <li>• DHCP</li> <li>• DNS1 and DNS2</li> </ul>

Type	Category	Details
Jumbo Frame	<a href="#">Basic Settings</a> on Page 49	<ul style="list-style-type: none"> <li>• System MTU 1522 (Range 64-9216)</li> </ul>
MAC Address Table (8K)	<a href="#">MAC Address Table</a> on Page 120	<ul style="list-style-type: none"> <li>• Aging Time (Sec)</li> <li>• Static Unicast MAC Address - MAC Address, VID, and Port</li> <li>• Port by Port MAC Address Table View               <ul style="list-style-type: none"> <li>- Static Unicast</li> <li>- Dynamic Unicast</li> <li>- Static Multicast</li> <li>- Dynamic Multicast</li> </ul> </li> </ul>
MSTP Configuration	<a href="#">MSTP Configuration</a> on Page 78	<ul style="list-style-type: none"> <li>• MSTP Region Configuration - Name and Revision</li> <li>• New MST Instance - Instance ID, VLAN Group, and Instance Priority</li> <li>• Current MST Instance Configuration - Instance ID, VLAN Group, and Instance Priority</li> </ul>
MSTP Information	<a href="#">MSTP Information</a> on Page 82	<ul style="list-style-type: none"> <li>• Instance ID</li> <li>• Root Information               <ul style="list-style-type: none"> <li>- Root Address</li> <li>- Root Priority</li> <li>- Root Port</li> <li>- Root Path Cost</li> <li>- Maximum Age</li> <li>- Hello Time</li> <li>- Forward Delay</li> </ul> </li> <li>• Port Information               <ul style="list-style-type: none"> <li>- Role</li> <li>- Port State</li> <li>- Path Cost</li> <li>- Port Priority</li> <li>- Link Type</li> <li>- Edge Port</li> </ul> </li> </ul>
MSTP Port Configuration	<a href="#">MSTP Port Configuration</a> on Page 81	Instance ID <ul style="list-style-type: none"> <li>• Port</li> <li>• Path Cost</li> <li>• Priority</li> <li>• Link Type</li> <li>• Edge Port</li> </ul>
Ping Utility	<a href="#">Ping Utility</a> on Page 126	Target IP Address

Type	Category	Details
Port Control	<a href="#">Port Control</a> on Page 68	<ul style="list-style-type: none"> <li>• Enable/Disable Port State</li> <li>• Speed/Duplex - Auto-Negotiation, 10 Full/Half, 100 Full/Half, and 1000 Full (Ports 25-28)</li> <li>• Flow control - Disable/Symmetric</li> <li>• User-Defined Description</li> </ul>
Port Mirror Mode	<a href="#">Port Mirroring</a> on Page 123	<ul style="list-style-type: none"> <li>• Port Mirror Mode - Enable/Disable</li> <li>• Port by Port                             <ul style="list-style-type: none"> <li>- Source Port - Rx and Tx</li> <li>- Destination Port - Rx and Tx</li> </ul> </li> </ul>
Port Statistics	<a href="#">Port Statistics</a> on Page 122	Port by Port <ul style="list-style-type: none"> <li>• Type</li> <li>• Link</li> <li>• State</li> <li>• Rx and Tx Good</li> <li>• Rx and Tx Bad</li> <li>• Rx Abort</li> <li>• Collision</li> </ul>
Port Status	<a href="#">Port Status</a> on Page 70	<ul style="list-style-type: none"> <li>• Port Type</li> <li>• Link - Up/Down</li> <li>• State - Enable/Disable</li> <li>• Speed/Duplex</li> <li>• Flow Control</li> </ul>
Port Trunk	<a href="#">Aggregation Setting</a> on Page 73 <a href="#">Aggregation Status</a> on Page 74	Aggregation Settings <ul style="list-style-type: none"> <li>• Group ID - Trunk 1-8</li> </ul> Trunk Type - Static or 802.3ad LACP Aggregation Status by Trunk <ul style="list-style-type: none"> <li>• Type</li> <li>• Aggregated Ports</li> <li>• Individual Ports</li> <li>• Link down Ports</li> </ul>
PVLAN Configuration	<a href="#">PVLAN Configuration</a> on Page 95	<ul style="list-style-type: none"> <li>• VLAN ID</li> <li>• PVLAN Type - None, Primary, Isolated, and Community</li> </ul>
PVLAN Information	<a href="#">PVLAN Information</a> on Page 97	<ul style="list-style-type: none"> <li>• Primary VLAN</li> <li>• Secondary VLAN</li> <li>• Secondary VLAN Type</li> <li>• Ports</li> </ul>

Type	Category	Details
PVLAN Port Configuration	<a href="#">PVLAN Port Configuration</a> on Page 96	Port Configuration <ul style="list-style-type: none"> <li>• PVLAN Port Type - Normal, Host, or Promiscuous</li> <li>• VLAN ID</li> </ul> PVLAN Association <ul style="list-style-type: none"> <li>• Secondary VLAN</li> <li>• Primary VLAN</li> </ul>
QoS Setting	<a href="#">QoS Setting</a> on Page 98	QoS Priority Mode <ul style="list-style-type: none"> <li>• Port-Based</li> <li>• CoS</li> <li>• DSCP</li> </ul> Queue scheduling <ul style="list-style-type: none"> <li>• Use Weighted Round Robin Scheme</li> <li>• Use A Strict Priority Scheme</li> <li>•</li> </ul>
Rate Control	<a href="#">Rate Control</a> on Page 70	<ul style="list-style-type: none"> <li>• Ingress Rate (1 Mbps to 100Mbps)</li> <li>• Egress Rate (1 Mbps to 100Mbps)</li> </ul>
Redundant Ring	<a href="#">Redundant Ring</a> on Page 84	<ul style="list-style-type: none"> <li>• Ring ID and Name</li> <li>• Ring Configuration                             <ul style="list-style-type: none"> <li>- ID</li> <li>- Name</li> <li>- Version (Super Ring and Rapid Super Ring)</li> <li>- Device Priority</li> <li>- Ring Port</li> <li>- Path Cost</li> <li>- Ring Port2</li> <li>- Path Cost</li> <li>- Rapid Dual Homing</li> <li>- Ring Status</li> </ul> </li> </ul>
Redundant Ring Information	<a href="#">Redundant Ring Information</a> on Page 86	<ul style="list-style-type: none"> <li>• 32 Ring ID Maximum (0-31)</li> <li>• Supports Up To 12 x 100M Rings Plus 2 Gigabit Rings Aggregation Capability</li> <li>• Version</li> <li>• Role</li> <li>• Status</li> <li>• RM MAC</li> <li>• Blocking Port</li> <li>• Role Transition Count</li> <li>• Ring State Transition Count</li> </ul>

Type	Category	Details
Reset/Reboot	<a href="#">Load Default</a> on Page 66 <a href="#">System Reboot</a> on Page 67	<ul style="list-style-type: none"> <li>• Reset to Factory Default Values</li> <li>• Reboot from Interface</li> </ul>
SNMP Configuration	<a href="#">SNMP Configuration</a> on Page 105	<ul style="list-style-type: none"> <li>• V1/V2c Community</li> <li>• Public - Read Only or Read and Write</li> <li>• Private - Read Only or Read and Write</li> </ul>
SNMP Traps	<a href="#">SNMP Traps</a> on Page 107	<ul style="list-style-type: none"> <li>• Enable/Disable</li> <li>• Trap Server - Server IP Address, Community, and Version (V1 or V2c)</li> <li>• Trap Server Profile - Displays Server IP, Community, and Version</li> </ul>
SNMP V3 Profile	<a href="#">SNMP V3 Profile</a> on Page 106	SNMP V3 <ul style="list-style-type: none"> <li>• User Name</li> <li>• Security Level</li> <li>• Authentication Level</li> <li>• Authentication Password</li> <li>• DES Password</li> </ul> SNMP V3 Users - Displays Profile Information
Storm Control	<a href="#">Storm Control</a> on Page 72	Rate Control <ul style="list-style-type: none"> <li>• Broadcast Rate (0-100000 Kbits)</li> <li>• Destination Lookup Failure (DLF) Rate (0-1000000 Kbits)</li> <li>• Multicast Rate (0-100000 Kbits)</li> </ul> Port Configuration <ul style="list-style-type: none"> <li>• Ports 1-28 (Enable/Disable)</li> <li>• Broadcast Rate</li> <li>• DLF Rate</li> <li>• Multicast Rate</li> </ul>
STP Configuration	<a href="#">STP Configuration</a> on Page 75	<ul style="list-style-type: none"> <li>• STP, RSTP, MSTP, or Disable</li> <li>• Bridge Address</li> <li>• Bridge Priority</li> <li>• Maximum Age</li> <li>• Hello Time</li> <li>• Forward Delay</li> </ul>

Type	Category	Details
STP Information	<a href="#">STP Information</a> on Page 77	<ul style="list-style-type: none"> <li>• Root Information               <ul style="list-style-type: none"> <li>- Root Address</li> <li>- Root Priority</li> <li>- Root Port</li> <li>- Root Path Cost</li> <li>- Maximum Age</li> <li>- Hello Time</li> <li>- Forward Delay</li> </ul> </li> <li>• Port Information               <ul style="list-style-type: none"> <li>- Role</li> <li>- Port State</li> <li>- Path Cost</li> <li>- Port Priority</li> <li>- Link Type</li> <li>- Edge Port</li> <li>- Aggregated (D/Type)</li> </ul> </li> </ul>
STP Port Configuration	<a href="#">STP Port Configuration</a> on Page 76	Port by Port <ul style="list-style-type: none"> <li>• STP State</li> <li>• Path Cost</li> <li>• Priority</li> <li>• Link Type</li> <li>• Edge Port</li> </ul>
SYSLOG Mode	<a href="#">SysLog Configuration</a> on Page 118	<ul style="list-style-type: none"> <li>• Disable, Local, Remote, or Both</li> <li>• Remote IP Address</li> </ul>
System Event Logs	<a href="#">Event Log</a> on Page 124	<ul style="list-style-type: none"> <li>• Index</li> <li>• Date</li> <li>• Time</li> <li>• Event Log</li> </ul>
Time Setting	<a href="#">Time Setting</a> on Page 53	<ul style="list-style-type: none"> <li>• IEEE 1588</li> <li>• Manual or NTP Client</li> <li>• Time Zone Setting</li> <li>• Daylight Savings Time</li> </ul>
Topology Discovery	<a href="#">Topology Discovery (LLDP)</a> on Page 125	<ul style="list-style-type: none"> <li>• LLDP - Enable/Disable</li> <li>• LLDP Configuration - Timer and Hold Time</li> <li>• LLDP Port State - Local Port, Neighbor ID, Neighbor IP, and Neighbor VID</li> </ul>
Unknown Multicast	<a href="#">Unknown Multicast</a> on Page 104	<ul style="list-style-type: none"> <li>• Send to Query Ports</li> <li>• Send to All Ports</li> <li>• Discard</li> </ul>

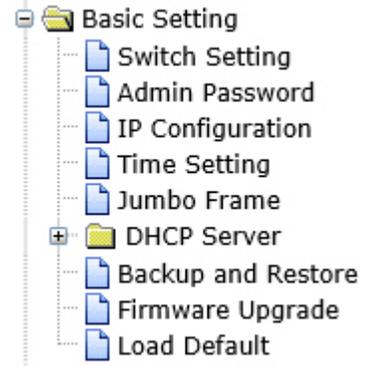
Type	Category	Details
Upgrade Firmware	<a href="#">Firmware Upgrade</a> on Page 64	Local or TFTP
VLAN Configuration	<a href="#">VLAN Configuration</a> on Page 90	<ul style="list-style-type: none"> <li>• Tunneling support for 256</li> <li>• Management VLAN ID</li> <li>• Static VLAN - ID and Name</li> <li>• Static VLAN Configuration - VLAN ID, Name, and Ports (Options: No VLAN, Trunk Link, or Access Link)</li> </ul>
VLAN Port Configuration	<a href="#">VLAN Port Configuration</a> on Page 89	<ul style="list-style-type: none"> <li>• PVID</li> <li>• Tunnel Mode</li> <li>• EtherType</li> <li>• Accept Frame Type</li> <li>• Ingress Filtering</li> </ul>
VLAN Table	<a href="#">VLAN Table</a> on Page 94	<ul style="list-style-type: none"> <li>• VLAN ID</li> <li>• Name</li> <li>• Status</li> <li>• Port by Port</li> </ul>
Warning - SMTP Configuration	<a href="#">SMTP Configuration</a> on Page 119	<ul style="list-style-type: none"> <li>• Email Alert - Enable/Disable</li> <li>• SMTP Server IP</li> <li>• Mail Account</li> <li>• Authentication</li> <li>• User Name</li> <li>• Password</li> <li>• Recipient Email Address 1-4</li> </ul>

## Basic Settings

The *Basic Setting* group allows you the ability to configure switch information, IP address, User name/ Password of the system. It also allows you to do firmware upgrade, backup and restore configuration, reload factory default, and reboot the system.

The following web pages are included in this group:

- [Switch Setting](#) on Page 41
- [Admin Password](#) on Page 43
- [IP Configuration](#) on Page 44
- [Time Setting](#) on Page 46
- [Jumbo Frame](#) on Page 49
- [DHCP Server Configuration](#) on Page 50
  - [DHCP Leased Entries](#) on Page 52
  - [DHCP Option82 Relay Information](#) on Page 53
- [Backup and Restore](#) on Page 56
- [Firmware Upgrade](#) on Page 62
- [Load Default](#) on Page 64
- [System Reboot](#) on Page 65



Optionally, you can use the CLI for configuration, see [Basic Settings \(CLI\)](#) on Page 157.

## Switch Setting

You can assign the **System Name**, **Location**, **Contact** and view ES9528-XT information.

**Welcome to the ES9528-XT Industrial Managed Switch**

---

System Name	<input type="text" value="ES9528-XT V2"/>
System Location	<input type="text" value="PM Lab"/>
System Contact	<input type="text" value="DLR"/>
System OID	1.3.6.1.4.1.2882.2.2.23
System Description	ES9528-XT Industrial Managed Switch
Firmware Version	2.0_b6-20161122-17:03:48
Device MAC	00C04E5B0000
Serial Number	2073-000001
Manufacturing Date	2015/12/23

<b>Switch Setting Page</b>	
System Name	You can assign a name to the ES9528-XT with up to 64 characters. After you configure the name, the CLI system selects the first 12 characters as the name in CLI system.
System Location	You can specify the ES9528-XT physical location with up to 64 characters.
System Contact	You can specify contact people with up to 64 characters by typing the Administrator's name, mail address or other information.
System OID	The SNMP Object ID of the ES9528-XT. You can follow the path to find its private MIB in an MIB browser. <i>Note: When you attempt to view private MIB, you should first compile private MIB files into your MIB browser.</i>
System Description	ES7528 Industrial Managed Ethernet Switch
Firmware Version	Displays the firmware version installed in this ES9528-XT.
Device MAC	Displays a unique hardware address (MAC address) assigned at the factory.
Serial Number	Displays the serial number of the ES7528.
Manufacture Date	Displays the date of manufacture.
Apply	Click <b>Apply</b> to apply the settings. <i>Note: You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## Admin Password

You can change the user name and the password here to enhance security.

**Admin Password**

---

Name	<input type="text" value="admin"/>
New Password	<input type="text"/>
Confirm Password	<input type="text"/>

---

**RADIUS Server**

RADIUS Server IP	<input type="text"/>
Shared Key	<input type="text"/>
Server Port	<input type="text"/>

**Secondary RADIUS Server**

RADIUS Server IP	<input type="text"/>
Shared Key	<input type="text"/>
Server Port	<input type="text"/>

---

<b>Admin Password Page</b>	
<b>Administrator</b>	
Name	You can enter a new user name here. The default name is <b>admin</b> .
Password	You can enter a new password here. The default password is <b>admin</b> .
Confirm Password	You need to type the new password again to confirm it.
<b>RADIUS Server</b>	
RADIUS Server IP	The IP address of the RADIUS server.
Shared Key	The password for communication between switch and RADIUS Server.
Server Port	The UDP port of the RADIUS server.
<b>Secondary RADIUS Server</b>	
RADIUS Server IP	The IP address of the RADIUS server.
Shared Key	The password for communication between switch and RADIUS Server.
Server Port	The UDP port of the RADIUS server.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## IP Configuration

This web page allows you to configure the ES9528-XT's IP address settings.

### IP Configuration Help

---

**DHCP Client** Disable ▾

Apply

---

**IPv4 Configuration**

IP Address	<input type="text" value="10.0.0.116"/>
Subnet Mask	<input type="text" value="255.255.0.0"/>
Default Gateway	<input type="text"/>
DNS Server 1	<input type="text"/>
DNS Server 2	<input type="text"/>

Apply

---

**IPv6 Configuration**

IPv6 Address	Prefix Length
<input type="text"/>	<input type="text"/>

Add

**IPv6 Default Gateway**

Apply

<input type="checkbox"/>	IPv6 Address
<input type="checkbox"/>	<input type="text" value="fe80::2c0:4eff:fe5f:68/64"/>

Remove Reload

---

**IPv6 Neighbor Table**

Neighbor	Interface	MAC Address	State

Reload

---

<b>IP Configuration Page</b>	
DHCP Client	You can select to <b>Enable</b> or <b>Disable</b> the DHCP Client function. When the DHCP Client function is enabled, an IP address is assigned to the switch from the network's DHCP server. In this mode, the default IP address is replaced by the one assigned by DHCP server. If DHCP Client is disabled, then the IP address that you specified is used.
IP Address Default: 192.168.250.250	You can assign the IP address reserved by your network for the ES9528-XT. If the DHCP Client function is enabled, you do not need to assign an IP address to the ES9528-XT, because it is overwritten by the DHCP server and displays here.
Subnet Mask Default: 255.255.255.0	You can assign the subnet mask for the IP address here. If the DHCP Client function is enabled, you do not need to assign the subnet mask. . <b>Note:</b> <i>In the CLI, the enabled bit of the subnet mask is used to represent the number displayed in the web management interface. For example, 8 represents: 255.0.0.0, 16 represents: 255.255.0.0, 24 represents: 255.255.255.0.</i>
Default Gateway Default: 192.168.250.1	You can assign the gateway for the switch here. <b>Note:</b> <i>In the CLI, use 0.0.0.0/0 to represent the default gateway.</i>
DNS Server 1/2	The Domain Name System (DNS) is a hierarchical naming system built on a distributed database for computers, services, or any resource connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. Most importantly, it translates domain names meaningful into the numerical identifiers associated with networking equipment for the purpose of locating and addressing these devices worldwide.
IPv6 Address	You can enter an IPv6 address for the ES9528-XT. An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits (two octets). The groups are separated by colons (:), and the length of IPv6 address is 128bits. The 64-bit interface identifier is automatically generated from the MAC address for the ES9528-XT using the modified EUI-64 format.
Prefix Length	This IPv6 prefix specifies the size of a network or subnet. The default is 64.
IPv6 Default Gateway	The IPv6 default gateway IP address identifies the gateway (for example, a router) that receives and forwards those packets whose addresses are unknown to the local network. The agent uses the default gateway address when sending alert packets to the management workstation on a network other than the local network.
IPv6 Address	This table shows the IPv6 addresses that have been added to the management VLAN. To remove an entry, click the check box next to it and then click the <b>Remove</b> button. To reload the list, click the <b>Reload</b> button.
<b>IPv6 Neighbor Table</b>	
Neighbor	The <i>IPv6 Neighbor Table</i> lists neighbors of the ES9528-XT.
Interface	The interface connected to the neighbor.
MAC address	This is the MAC address of the neighbor.
State	This displays the Neighbor Unreachability Detection (NUD) state of the neighbor entry.
Remove	Click the <b>Remove</b> button to remove an IPv6 configuration or IPv6 Neighbor Table entry.
Reload	Click the <b>Reload</b> button to reload IPv6 configuration.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> <i>You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## Time Setting

Time Setting allows you to set the time manually or through a Network Time Protocol (NTP) server. NTP is used to synchronize computer clocks on the Internet. You can configure NTP settings here to synchronize the clocks of several switches on the network. The ES9528-XT also provides Daylight Saving functionality.

**Time Setting**
Help

---

<b>Current Time</b>	Yr <input type="text" value="2015"/> Mon <input type="text" value="01"/> Day <input type="text" value="6"/> Hr <input type="text" value="06"/> Mn <input type="text" value="15"/> Sec <input type="text" value="02"/> <input type="button" value="Get PC Time"/>
<b>Time Zone</b>	(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London ▼
<b>NTP</b>	<input type="checkbox"/> Enable NTP client update
<b>Primary server</b>	<input type="text" value="N/A"/>
<b>Secondary server</b>	<input type="text" value="N/A"/>
<b>Daylight saving Time</b>	Disable ▼
<b>Daylight Saving Start</b>	1st ▼ Sun ▼ in Jan ▼ at 00 ▼ 00 ▼
<b>Daylight Saving End</b>	1st ▼ Sun ▼ in Jan ▼ at 00 ▼ 00 ▼

---

<b>Time Setting Page</b>	
<b>Current Time</b>	<p><b>Manual Setting:</b> Click the <b>Get PC Time</b> button to get PC's time setting for the ES9528-XT or enter the appropriate information in the fields provided.</p> <p><b>NTP client:</b> Click <b>Time Setting Source</b> if you want the NTP client to permit the ES9528-XT to enable the NTP client service. NTP client is automatically enabled if you change the Time Setting Source to NTP Client. The system sends a request packet to acquire current time from the NTP server you assign.</p>
<b>Time Zone</b>	Select the time zone where the ES9528-XT is located. The following table lists the time zones for different locations for your reference. The default time zone is (GMT) Greenwich Mean Time.
<b>NTP</b>	Click this check box to enable NTP (Network Time Protocol).
<b>Primary/Secondary Server</b>	The Primary Server is the primary NTP server for which you want to synchronize time. The Secondary Server is the back up NTP server to use if the Primary Server becomes unavailable.
<b>Daylight Saving Time</b>	You can enable <b>Daylight Saving Time</b> and then set the <b>Daylight Saving Time Start</b> and <b>End</b> times. During Daylight Saving Time, the ES9528-XT time is one hour earlier than the actual time.
<b>Apply</b>	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

```
Switch(config)# clock timezone
01 (GMT-12:00) Eniwetok, Kwajalein
02 (GMT-11:00) Midway Island, Samoa
03 (GMT-10:00) Hawaii
```

04 (GMT-09:00) Alaska  
 05 (GMT-08:00) Pacific Time (US & Canada), Tijuana  
 06 (GMT-07:00) Arizona  
 07 (GMT-07:00) Mountain Time (US & Canada)  
 08 (GMT-06:00) Central America  
 09 (GMT-06:00) Central Time (US & Canada)  
 10 (GMT-06:00) Mexico City  
 11 (GMT-06:00) Saskatchewan  
 12 (GMT-05:00) Bogota, Lima, Quito  
 13 (GMT-05:00) Eastern Time (US & Canada)  
 14 (GMT-05:00) Indiana (East)  
 15 (GMT-04:00) Atlantic Time (Canada)  
 16 (GMT-04:00) Caracas, La Paz  
 17 (GMT-04:00) Santiago  
 18 (GMT-03:00) Newfoundland  
 19 (GMT-03:00) Brasilia  
 20 (GMT-03:00) Buenos Aires, Georgetown  
 21 (GMT-03:00) Greenland  
 22 (GMT-02:00) Mid-Atlantic  
 23 (GMT-01:00) Azores  
 24 (GMT-01:00) Cape Verde Is.  
 25 (GMT) Casablanca, Monrovia  
 26 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London  
 27 (GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna  
 28 (GMT+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague  
 29 (GMT+01:00) Brussels, Copenhagen, Madrid, Paris  
 30 (GMT+01:00) Sarajevo, Skopje, Sofija, Vilnius, Warsaw, Zagreb  
 31 (GMT+01:00) West Central Africa  
 32 (GMT+02:00) Athens, Istanbul, Minsk  
 33 (GMT+02:00) Bucharest  
 34 (GMT+02:00) Cairo  
 35 (GMT+02:00) Harare, Pretoria  
 36 (GMT+02:00) Helsinki, Riga, Tallinn  
 37 (GMT+02:00) Jerusalem  
 38 (GMT+03:00) Baghdad  
 39 (GMT+03:00) Kuwait, Riyadh  
 40 (GMT+03:00) Moscow, St. Petersburg, Volgograd  
 41 (GMT+03:00) Nairobi  
 42 (GMT+03:30) Tehran  
 43 (GMT+04:00) Abu Dhabi, Muscat  
 44 (GMT+04:00) Baku, Tbilisi, Yerevan  
 45 (GMT+04:30) Kabul  
 46 (GMT+05:00) Ekaterinburg  
 47 (GMT+05:00) Islamabad, Karachi, Tashkent  
 48 (GMT+05:30) Calcutta, Chennai, Mumbai, New Delhi  
 49 (GMT+05:45) Kathmandu  
 50 (GMT+06:00) Almaty, Novosibirsk  
 51 (GMT+06:00) Astana, Dhaka  
 52 (GMT+06:00) Sri Jayawardenepura

53 (GMT+06:30) Rangoon  
54 (GMT+07:00) Bangkok, Hanoi, Jakarta  
55 (GMT+07:00) Krasnoyarsk  
56 (GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi  
57 (GMT+08:00) Irkutsk, Ulaan Bataar  
58 (GMT+08:00) Kuala Lumpur, Singapore  
59 (GMT+08:00) Perth  
60 (GMT+08:00) Taipei  
61 (GMT+09:00) Osaka, Sapporo, Tokyo  
62 (GMT+09:00) Seoul  
63 (GMT+09:00) Yakutsk  
64 (GMT+09:30) Adelaide  
65 (GMT+09:30) Darwin  
66 (GMT+10:00) Brisbane  
67 (GMT+10:00) Canberra, Melbourne, Sydney  
68 (GMT+10:00) Guam, Port Moresby  
69 (GMT+10:00) Hobart  
70 (GMT+10:00) Vladivostok  
71 (GMT+11:00) Magadan, Solomon Is., New Caledonia  
72 (GMT+12:00) Auckland, Wellington  
73 (GMT+12:00) Fiji, Kamchatka, Marshall Is.  
74 (GMT+13:00) Nuku'alofa

## Jumbo Frame

The typical Ethernet frame range is from 64 to 1500. Jumbo Frame supports 1500-9712 with a default of 2000. This is sufficient for general usages. However, when users want to transmit large files, the files may be divided into many small size packets. When the transmission speed becomes slow, long size Jumbo frame may solve the issue.

The ES9528-XT allows you configure the size of the Maximum Transmission Unit (MTU). You can increase the MTU size to support jumbo frames on all interfaces by setting the Jumbo Frame MTU. You can freely change the available packet size.

### Jumbo Frame Help

---

System MTU
2000 ▼

Apply
Cancel

---

Jumbo Frame	Description
System MTU	Change the MTU size for all Fast Ethernet interfaces on the switch stack. The range is 1515 to 9712 bytes; the default is 1518 bytes.
Apply	Click <b>Apply</b> to apply the settings. <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>
Reset	Click to <b>Reset</b> the MTU to the default value.

## DHCP Server Configuration

---

Use this page to configure DHCP server services.

**Server Configuration**

---

**Global Setting**

---

**Address Pool Setting**

Network	<input type="text" value="0.0.0.0"/>
Mask	<input type="text" value="0.0.0.0"/>
Default Gateway	<input type="text" value="0.0.0.0"/>
Lease Time	<input type="text" value="604800"/> <small>(00~31536000 seconds)</small>

---

**Excluded Address List**

Excluded IP\*

Index	Address
-------	---------

---

**Static Port/IP Binding List**

Port

IP Address

Index	Port	Address
-------	------	---------

---

**Static MAC/IP Binding List**

MAC Address

IP Address

Index	MAC	Address
-------	-----	---------

---

**Option82/IP Binding List**

Circuit ID

Remote ID

IP Address

Index	Circuit ID	Remote ID	Address
-------	------------	-----------	---------

---

<b>DHCP Server Configuration Page</b>	
Global Setting	You can select to <b>Enable</b> or <b>Disable</b> the DHCP Server function. The ES9528-XT assigns a new IP address to link partners.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.
<b>Address Pool Setting</b>	
Network	Enter the IPv4 address for the DHCP server.
Subnet Mask	Enter the subnet mask for the DHCP server.
Default Gateway	Enter the IP gateway address for the DHCP server.
Lease Time	Enter the Lease Time in seconds for the client.
<b>Excluded Address List</b>	
Excluded IP	You can type a specific address into the <b>Excluded IP</b> field for the DHCP server reserved IP address. The IP addresses listed in the <b>Excluded Address List Table</b> are not assigned to the network devices. Add or remove an IP address from the <b>Excluded Address List</b> by clicking <b>Add</b> or <b>Remove</b> . <b>Note:</b> By default, only the table heading are displayed until an IP address is entered in the <b>Excluded IP</b> field and added using the <b>Add</b> button.
<b>Static Port/IP Binding List</b>	
Port	Enter the client port number for the DHCP server.
IP Address	Enter the client IP address for the DHCP server. After entering the port number and IP address, click <b>Add</b> . To remove a port and associated IP address, click <b>Remove</b> . Click <b>Reload</b> to reload selected port and IP address entries. <b>Note:</b> By default, only the table heading are displayed until information is entered in the <b>Port</b> and <b>IP Address</b> fields and added using the <b>Add</b> button.
<b>Static MAC/IP Binding List</b>	
IP Address	The ES9528-XT provides an IP address binding and removing function. Enter the specified IP address, and then click <b>Add</b> to add a new IP address binding rule for a specified link partner, like a PLC, or any device without <b>DHCP client</b> function. To remove an IP address from the Manual Binding List, highlight the rule and click <b>Remove</b> .
MAC Address	The ES9528-XT provides a MAC address binding and removing function. Enter the specified MAC address, and then click <b>Add</b> to add a new MAC address binding rule for a specified link partner, like a PLC, or any device without <b>DHCP client</b> function. The MAC address format is xxxx.xxxx.xxxx; for example, 00C0.4E5B.0001. To remove a MAC address from the Static MAC/IP Binding List, highlight the rule and click <b>Remove</b> . <b>Note:</b> By default, only the table heading are displayed until information is entered in the <b>IP Address</b> and <b>MAC Address</b> fields and added using the <b>Add</b> button.

DHCP Server Configuration Page (Continued)	
Option82/IP Binding List	
Circuit ID	The Circuit ID of the Option82 IP address configuration.
Remote ID	The Remote ID of the Option82 IP address configuration. After entering the IP Address, Circuit ID, and Remote ID, click <b>Add</b> . Click the <b>Remove</b> button to remove selected Option82 IP Address table entries. Click the <b>Reload</b> button to reload selected Option82 IP Address table entries.
IP Address	Option 82 IP Address Configuration: fully supports DHCP relay function. The IP address of the Option82 IP address configuration. <b>Note:</b> By default, only the table heading are displayed until information is entered in the <b>Circuit ID</b> , <b>Remote ID</b> , and <b>IP Address</b> fields and added using the <b>Add</b> button.

### DHCP Leased Entries

The ES9528-XT provides a table that displays assigned IP addresses.

Leased Entries  

---

Index	IP Address	MAC Address	Leased Time Remains

---

DHCP Leased Entries Page	
Index	Index of DHCP leased entries.
Binding	Manual or auto binding IP addresses and MAC addresses.
IP Address	The IP address of the leased entry.
MAC Address	The MAC Address of the leased entry.
Lease Time(s)	The lease time of the leased entry (in seconds).
Reload	Click to reload DHCP leased entries.

**Note:** By default, only the table heading are displayed until there is data to display.

## DHCP Option82 Relay Information

This subsection discusses the *DHCP Option82 Relay Information* page.

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

**Option82 Information**
Help

---

**DHCP Relay Agent** Disable ▾

Apply

---

**Helper Address**

Helper Address

Add

<input type="checkbox"/>	Helper Address 1	<input style="width: 80px;" type="text"/>
<input type="checkbox"/>	Helper Address 2	<input style="width: 80px;" type="text"/>
<input type="checkbox"/>	Helper Address 3	<input style="width: 80px;" type="text"/>
<input type="checkbox"/>	Helper Address 4	<input style="width: 80px;" type="text"/>

Remove

---

**Relay Policy**

Replace  
 Keep  
 Drop

Apply

<b>DHCP Option82 Relay Information Page</b>	
<b>Relay Agent</b>	You can select to <b>Enable</b> or <b>Disable</b> the DHCP Option82 Relay function, which assigns a new IP address to link partners.
<b>Helper Address</b>	
<b>Helper Address</b>	Enter the DHCP Server address for the Relay Agent and click <b>Add</b> . The Helper Addresses appear in the table below.
<b>Helper Address 1-4</b>	DHCP Server addresses for the Relay Agent.
<b>Relay Policy</b>	
<b>Relay policy replace</b>	Replaces the existing option 82 field and adds new option 82 field. This is the default when the DHCP Relay Agent is enabled.
<b>Relay policy keep</b>	Keeps the original option 82 field and forwards to server.
<b>Relay policy drop</b>	Drops the option 82 field and do not add any option 82 field.

**Circuit ID**

Port 1  Default (VLAN/Port)  User Defined

Apply

Port	Circuit ID	HEX value
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		

DHCP Option82 Relay Information Page	
<b>Circuit ID</b>	
Circuit ID	<p><b>Default:</b> Default value of the Circuit-ID.</p> <p><b>Port:</b> Port of the switch.</p> <p><b>Circuit ID:</b> The Circuit ID includes information specific to which circuit the request came in on. It is an identifier that is specific to the relay agent, so the type of circuit varies depending on the relay agent.</p>
<b>Remote ID</b>	
Remote-ID	<p><b>Default:</b> Default value of the Remote-ID.</p> <p><b>IP Address:</b> IP Address of the switch.</p> <p><b>Remote ID:</b> The Remote-ID carries information relating to the remote host end of the circuit, which is the MAC address of the relay.</p>

**Remote ID**

- Default (MAC Address)
- IP Address
- User Defined

Remote ID	HEX value
<input type="text"/>	<input type="text"/>

## Backup and Restore

You can use the **Backup** option to save the current configuration saved in the ES9528-XT flash to a PC or laptop or your TFTP server.

This allows you to use the **Restore** option to restore a configuration file back to the ES9528-XT or load the same settings to another ES9528-XT. Before you can restore a configuration file, you must first save the backup configuration file to a local system or your TFTP server. The ES9528-XT then can download this file back into the flash.

The ES9528-XT configuration file is a standard text file. You can open the file with WordPad or Notepad. You can also modify the file, add/remove the configuration settings, and then restore the file back to the ES9528-XT.

**Backup and Restore**
Help

---

**Local Files**

Load Settings from File	<input type="text" value=""/>	Browse...	Upload
Save Settings to File	<input type="text" value=""/> Save...		

---

**USB**

Load Setting From File	<input type="text" value="ES9528-XT-00C04E5B0000.conf"/>	Restore	
Save Settings to USB	<input type="text" value="ES9528-XT-00C04E5B00"/>	Save to USB	

---

**TFTP**

IP	<input type="text" value=""/>
File Name	<input type="text" value="ES9528-XT-00C04E5B00"/>
Load/Save Settings	<input type="text" value="Load"/> <input type="button" value="Submit"/>

Optionally, you can use *PortVision DX* to back up and restore configuration files. There are three modes to backup and restore the configuration file on the web page:

- Local File (PC or laptop)
- TFTP Server
- USB Storage

<b>Backup &amp; Restore Page</b>	
Backup Configuration	<ul style="list-style-type: none"> <li>• <b>Local File:</b> The ES9528-XT acts as a file server and you can save the file to a local location, see <a href="#">Backup the Configuration - Local File Method</a> on Page 57.</li> <li>• <b>TFTP Server:</b> The ES9528-XT acts as a TFTP client, see <a href="#">Backup the Configuration - TFTP Server Method</a> on Page 60.</li> <li>• <b>USB Storage:</b> The ES9528-XT acts as an USB control viewer. Make sure that your USB flash drive is already inserted into the ES9528-XT before selecting the Backup configuration file name. Refer to <a href="#">Firmware Upgrade</a> on Page 62.</li> </ul> <p><b>Note:</b> Pointing to the wrong file causes the entire configuration to be skipped.</p>

Backup & Restore Page (Continued)	
Restore Configuration	<p>You can select Local File, TFTP Server, or USB Storage to restore the startup configuration. For procedures, see the appropriate method for your situation:</p> <ul style="list-style-type: none"> <li>• <a href="#">Restore the Configuration - Local Method</a> on Page 58</li> <li>• <a href="#">Restore the Configuration - USB Storage</a> on Page 59</li> <li>• <a href="#">Restore the Configuration - TFTP Server Method</a> on Page 61</li> </ul>
<ul style="list-style-type: none"> <li>• The ES9528-XT provides a default configuration file in the ES9528-XT. To load the default configuration file, you can use the <b>Reset</b> on the <a href="#">Load Default</a> page on <a href="#">Page 64</a> or the <b>Reload</b> command in the CLI (<a href="#">Page 147</a>).</li> <li>• You can use the CLI to view the latest settings running in the ES9528-XT. The information are the settings you have configured but have not yet saved to the flash. The settings must be saved to the flash in order to work after a power recycle. Use the <b>running-config</b> command to view the configuration file, see <a href="#">Show Running Configuration</a> on Page 147.</li> </ul> <p><b>Note:</b> <i>Since the Fast Ethernet Port Volume of the ES9528-XT is changeable, the Port volume may not be the same when you plug-in a different module. In some conditions, when backing up the switch's ports configuration from one to another, the configuration of the source unit replaces the configuration of the target switch even if the port volume is not the same. The port setting of the Port 7, 8, 15, 16, 23 and 24, etc. may be reset to default once the system can't find the port. Make sure that you take this into consideration before you backup / restore configurations.</i></p> <ul style="list-style-type: none"> <li>• After you save the <b>running-config</b> to flash, the new settings are kept and work after the power is cycled. Use the <b>show startup-config</b> to view it in the CLI. The <b>Backup</b> command can only backup the configuration file to your PC or TFTP server.</li> </ul>	

*Backup the Configuration - Local File Method*

Use the following procedure to use the Local File method to save a configuration file.

1. Open the ES9528-XT web user interface and open the **Backup and Restore** page under *Basic Settings*.
2. Click the **Save** button next to the **Save Settings to a file** option. (The next step is slightly different depending on your browser.)

**Backup and Restore**
Help

---

**Local Files**

Load Settings from File	<input type="text" value=""/>	Browse...	Upload
Save Settings to File	Save...		

---

**USB**

Load Setting From File	<input type="text" value="ES9528-XT-00C04E5B0000.conf"/>	Restore
Save Settings to USB	<input type="text" value="ES9528-XT-00C04E5B00"/>	Save to USB

---

**TFTP**

IP	<input type="text" value=""/>	
File Name	<input type="text" value="ES9528-XT-00C04E5B00"/>	
Load/Save Settings	<input type="text" value="Load"/>	Submit

3. Browse to the location that you want to store the backup configuration file, optionally enter a file name, and click **Save**. The default configuration file name is the RocketLinX ES9528-XT with a dash, followed by the MAC address of the ES9528-XT.

**Note:** You cannot use spaces in the path to the target file.

### Restore the Configuration - Local Method

---

Use the following steps to upload a configuration that is stored locally.

1. Open the web user interface for the ES9528-XT and open the **Backup and Restore** page under *Basic Settings*.
2. Click the **Browse** button next to the **Load Settings from File** option. (The next step is dependent on the browser.)
3. Navigate to the configuration file location, select the file, and click the **Open** button.
4. Click the **Upload** button.

The screenshot shows the 'Backup and Restore' web interface. At the top, there is a 'Help' button. Below it, the 'Local Files' section is active. It contains two rows of controls. The first row has a 'Load Settings from File' label, a text input field containing 'C:\1\_Work\_Files\Backup\_Co', a 'Browse...' button, and an 'Upload' button which is highlighted with a red rectangle. The second row has a 'Save Settings to File' label and a 'Save...' button. Below the 'Local Files' section is the 'USB' section, which has a 'Load Setting From File' label, a dropdown menu showing 'ES9528-XT-00C04E5B0000.conf', a 'Restore' button, a 'Save Settings to USB' label, a text input field containing 'ES9528-XT-00C04E5B00', and a 'Save to USB' button. At the bottom is the 'TFTP' section, which has an 'IP' label and an empty text input field, a 'File Name' label, a text input field containing 'ES9528-XT-00C04E5B00', a 'Load/Save Settings' label, a dropdown menu showing 'Load', and a 'Submit' button.

5. Click **Yes** to the *Are you sure that you want to upload the configuration file* message.
  6. Click **Ok** to the *Please reboot the system* message.
  7. Open the *Reboot* page and click **Yes**.
- You are returned to the log in page.

*Backup the Configuration - USB Storage*

Use this procedure to backup the configuration file to the root of a USB flash drive.

1. Insert a flash drive in to the USB port.
2. Open the web user interface for the ES9528-XT, open the **Backup and Restore** page under *Basic Settings*.
3. Under the **USB** category, click the **Save to USB** button.

**Backup and Restore**

---

**Local Files**

Load Settings from File	<input type="text"/>	<input type="button" value="Browse..."/>	<input type="button" value="Upload"/>
Save Settings to File	<input type="button" value="Save..."/>		

---

**USB**

Load Setting From File	<input type="text"/>	<input type="button" value="Restore"/>
Save Settings to USB	ES9528-XT-00C04E5B0C	<input type="button" value="Save to USB"/>

---

**TFTP**

IP	<input type="text"/>
File Name	ES9528-XT-00C04E5B0C
Load/Save Settings	Load <input type="button" value="Submit"/>

4. Click the **Ok** button when *The settings were successfully changed* message appears.

*Restore the Configuration - USB Storage*

Use this procedure to restore a configuration file from the root of a USB drive to the ES9528-XT.

1. Insert the flash drive that contains the configuration file into the USB port.
2. Open the web user interface for the ES9528-XT, open the **Backup and Restore** page under *Basic Settings*.
3. Under the **USB** category, if necessary, select the backup file name in the **Load Setting From File** drop box.
4. Click the **Restore** button.

**Backup and Restore**

---

**Local Files**

Load Settings from File	<input type="text"/>	<input type="button" value="Browse..."/>	<input type="button" value="Upload"/>
Save Settings to File	<input type="button" value="Save..."/>		

---

**USB**

Load Setting From File	ES9528-XT-00C04E5B0001.conf	<input type="button" value="Restore"/>
Save Settings to USB	ES9528-XT-00C04E5B0C	<input type="button" value="Save to USB"/>

---

**TFTP**

IP	<input type="text"/>
File Name	ES9528-XT-00C04E5B0C
Load/Save Settings	Load <input type="button" value="Submit"/>

5. Click **Ok** to the *Please reboot the system* Message.

6. Click **Reboot** at the bottom of the navigational tree.
7. Click the **Reboot** button.
8. Click **Yes** to the *Do you want to reboot* message.

*Backup the Configuration - TFTP Server Method*

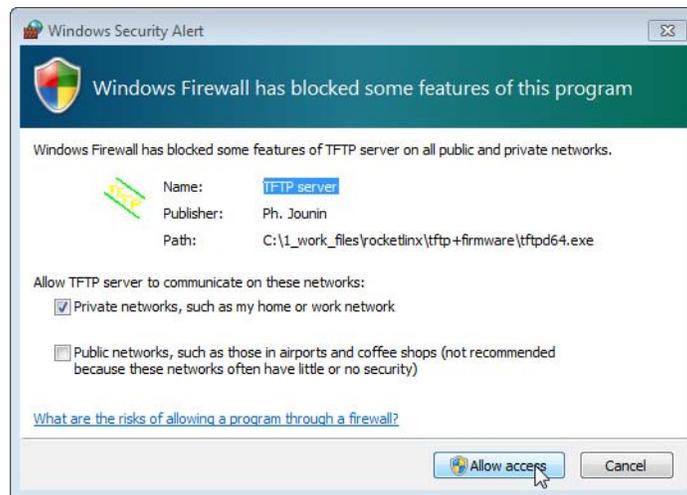
---

If you do not have a TFTP server, you can download one from Control using the [Start the TFTP Server](#) subsection.

**Start the TFTP Server**

Use this procedure to download either the 32-bit or the 64-bit version from Control.

1. If necessary, download the appropriate **.zip** file for your operating system from: [http://downloads.control.com/contribs/utilities/3rd\\_party\\_utils\\_free/tftp\\_server](http://downloads.control.com/contribs/utilities/3rd_party_utils_free/tftp_server) to your system and unzip the file.
2. Execute the TFTP server application, click **Allow access**, and the TFTP server opens.



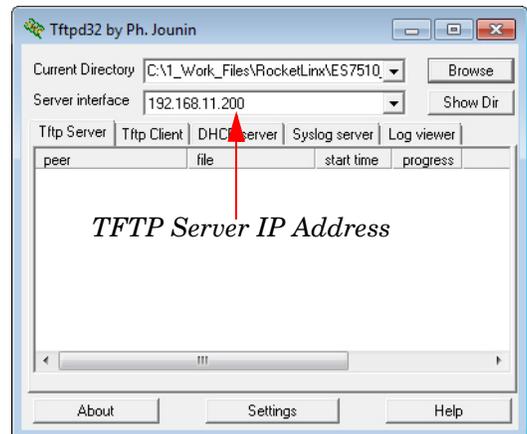
3. Leave the TFTP server open and go to [Create a Backup File](#) on Page 60.

*Note: You will need the TFTP Server IP address in the next procedure.*

**Create a Backup File**

You must have a TFTP server open.

1. Open the ES9528-XT web user interface and open the **Backup and Restore** page under *Basic Settings*.
2. Enter the TFTP IP address in the **IP** field.
3. Optionally, change the file name. The default configuration file name is ES9528-XT with a dash, followed by the MAC address of the ES9528-XT.
4. Select **Save** from the **Load/Save Settings** drop list.



- Click the **Submit** button.

**Backup and Restore** Help

---

**Local Files**

Load Settings from File	<input type="text"/>	Browse...	Upload
Save Settings to File	<input type="text"/>		
	Save...		

---

**USB**

Load Setting From File	ES9528-XT-00C04E5B0000.conf	Restore	
Save Settings to USB	ES9528-XT-00C04E5B00	Save to USB	

---

**TFTP**

IP	192.168.11.202		
File Name	ES9528-XT-00C04E5B00		
Load/Save Settings	Save	<b>Submit</b>	

**Note:** You cannot use spaces in the path to the target file.

- Click **OK** to close the popup message.  
The backup file is located in the same directory that the TFTP server resides.

*Restore the Configuration - TFTP Server Method*

To restore a configuration file, you must open a TFTP server. If necessary, use [Start the TFTP Server](#) on Page 60.

The backup file must be located in the same directory that the TFTP server resides for this procedure to work.

- Open the ES9528-XT web user interface, open the **Backup and Restore** page under *Basic Settings*.
- Enter the TFTP IP address in the **IP** field.
- If necessary, enter the configuration file name.
- Select **Load** from the **Load/Save Settings** drop list.
- Click the **Submit** button.

**Backup and Restore** Help

---

**Local Files**

Load Settings from File	<input type="text"/>	Browse...	Upload
Save Settings to File	<input type="text"/>		
	Save...		

---

**USB**

Load Setting From File	ES9528-XT-00C04E5B0000.conf	Restore	
Save Settings to USB	ES9528-XT-00C04E5B00	Save to USB	

---

**TFTP**

IP	10.0.0202		
File Name	ES9528-XT-00C04E5B00		
Load/Save Settings	Load	<b>Submit</b>	

- Click **Ok** to *Please reboot the system!* message.

7. Open the **Reboot** page.

## Firmware Upgrade

Use this section to update the ES9528-XT with the latest firmware. Control provides the latest firmware on the Control [download site](#). Updated firmware may include new features, bug fixes, or other software changes. Control Technical Support suggests you use the latest firmware before installing the ES9528-XT at a customer site.

**Note:** *Optionally, you can use PortVision DX to upload the latest firmware. If you need to upload a new version of the Bootloader, you must use PortVision DX or the CLI. You cannot use the web user interface to upload the Bootloader.*

Firmware Upgrade Page	
Select File	Use the browse button to locate the firmware file that you want to load.
Upgrade	Click the <b>Upgrade</b> button to load the firmware.
Firmware Upgrade	<ul style="list-style-type: none"> <li>• <b>Local File</b> - see <a href="#">Upgrading Firmware (Local File)</a> on Page 62</li> <li>• <b>USB Storage</b> - see <a href="#">Upgrading the Firmware (USB Storage)</a> on Page 63</li> <li>• <b>TFTP Server</b> - see <a href="#">Upgrading Firmware (TFTP Server)</a> on Page 64</li> </ul>

### Upgrading Firmware (Local File)

You can use this procedure to upgrade the web interface firmware (not Bootloader).

**Note:** *You can also use PortVision DX to upload the web interface firmware. You must use PortVision DX or the CLI to upload the Bootloader firmware.*

You can use this procedure to upgrade the web interface firmware (not Bootloader).

1. Open the ES9528-XT web user interface, open the **Firmware Upgrade** page under *Basic Settings*.
2. Click the **browse** button, locate the firmware, highlight the **.bin** file, and click **Open**.
3. Click the **Upgrade** button.

The screenshot shows the 'Firmware Upgrade' page with a 'Help' button. It is divided into three sections: 'Local file', 'USB', and 'TFTP'.  
 - **Local file:** A 'Select File' field shows a path 'P:\Tech\_Area\3-RocketLinx\_Software\_Archive\2\_Firmw'. Below it are 'Upgrade' and 'Cancel' buttons. The 'Upgrade' button is highlighted with a red box.  
 - **USB:** A 'Select File' dropdown menu shows 'ES9528-XT-v2.0\_b6.bin'. Below it are 'Upgrade' and 'Cancel' buttons.  
 - **TFTP:** Two input fields for 'IP' and 'File Name' are shown. Below them are 'Upgrade' and 'Cancel' buttons.

After a few moments, a system message appears notifying you not to disconnect power, which is followed up with a *rebooting* message

**Note:** *The system is automatically rebooted after you finish upgrading firmware. You should alert the attached users before updating the firmware that network interruption may occur.*

*Upgrading the Firmware (USB Storage)*

You can upgrade the firmware from the USB port for the web user interface.

1. Open the web user interface for the ES9528-XT, open the **Firmware Upgrade** page under *Basic Settings*.
2. Insert the USB drive that contains the firmware into the USB port.

The screenshot shows the 'Firmware Upgrade' web interface. At the top, there is a 'Firmware Upgrade' title and a 'Help' button. Below this, there are three sections: 'Local file', 'USB', and 'TFTP'. The 'Local file' section has a 'Select File' dropdown showing a local path and a 'Browse...' button, with 'Upgrade' and 'Cancel' buttons below. The 'USB' section has a 'Select File' dropdown showing 'ES9528-XT-v2.0\_b6.bin' with a yellow highlight, and the 'Upgrade' button is circled in red with a mouse cursor over it. The 'TFTP' section has 'IP' and 'File Name' input fields and 'Upgrade' and 'Cancel' buttons below.

3. Select the appropriate firmware file from the **Select File** drop list.
  4. Click the **Upgrade** button.
- Note:** *It takes several minutes to upload the firmware file to the ES9528-XT.*
5. Click **OK** to the *Firmware upgrading don't turn off the switch!* message.

### Upgrading Firmware (TFTP Server)

---

You can use this procedure to upgrade the firmware (not Bootloader).

**Note:** You can also use PortVision DX to upload firmware. You must use PortVision DX or the CLI to upload Bootloader.

1. Open a TFTP server, if necessary, see [Start the TFTP Server](#) on Page 60.
2. Place the ES9528-XT .bin file in the same directory where the TFTP server resides.
3. If necessary, open the web user interface, open the **Firmware Upgrade** page in the *Basic Settings* group.
4. Enter the TFTP IP address in the **IP** field.
5. Enter firmware file name, and click the **Upgrade** button.

Firmware Upgrade Help

---

**Local file**

Select File  Browse...

Upgrade Cancel

---

**USB**

Select File  ▼

Upgrade Cancel

---

**TFTP**

IP

File Name  ×

Upgrade Cancel

After a few moments, a system message appears notifying you not to disconnect power, which is followed up with a *rebooting* message

**Note:** The system is automatically rebooted after you finish upgrading firmware. You should alert the attached users before updating the firmware that network interruption may occur.

### Load Default

---

You can reset the ES9528-XT configuration values to default settings, excluding the network information.

**Note:** You can also use PortVision DX to reset the switch to the default configuration values (excluding the network settings.).

1. Click the **Reset** button, if you want the ES9528-XT to reset all configurations to factory default settings.

Load default Help

---

**Reset settings to default?**

Reset

The system displays a popup message window after finishing. The default settings work after rebooting the ES9528-XT.

2. Click **OK** in the popup message to reset the configuration to the defaults.
3. Click **OK** to the *Please reboot the switch to reload default settings except IP address* message.
4. Go to the **Reboot** page, click the **Yes** button.

### Reboot

---

Do you want to reboot?

Yes

---

## System Reboot

---

**System Reboot** allows you to reboot the device. Most feature changes require a switch reboot to take affect.

**Note:** *Before rebooting, remember to click **Save** to save your settings. Otherwise, the settings you are lost when the ES9528-XT is powered off.*

Click the **Yes** button to reboot your ES9528-XT.

### Reboot

---

Do you want to reboot?

Yes

---

## Port Configuration

---

---

The *Port Configuration* group allows you to enable/disable port state, or configure port auto-negotiation, speed, duplex, flow control, port aggregation settings (port trunking), and rate limit control. It also allows you to view port status and aggregation information. The following pages are included in this group:

- [Port Control](#)
- [Port Status](#) on Page 69
- [Rate Control](#) on Page 71
- [Storm Control](#) on Page 72
- [Port Trunking](#) on Page 74

Optionally, you can use the CLI for configuration, see [Port Configuration \(CLI\)](#) on Page 163.

## Port Control

The *Port Control* page allows you to enable/disable port state, or configure the port auto-negotiation, speed, duplex, and flow control.

Select the port you want to configure and make changes to the port. The following table provides information about the different port control options.

**Note:** *If both ends are not at the same speed, they cannot link with each other. If both ends are not in the same duplex mode, they are connected by half-duplex mode.*

Port Control

Port	State	Speed/Duplex	Flow Control	Description
1	Enable	AutoNegotiation	Disable	
2	Enable	AutoNegotiation	Disable	
3	Enable	AutoNegotiation	Disable	
4	Enable	AutoNegotiation	Disable	
5	Enable	AutoNegotiation	Disable	
6	Enable	AutoNegotiation	Disable	
7	Enable	AutoNegotiation	Disable	
8	Enable	AutoNegotiation	Disable	
9	Enable	AutoNegotiation	Disable	
10	Enable	AutoNegotiation	Disable	
11	Enable	AutoNegotiation	Disable	
12	Enable	AutoNegotiation	Disable	
13	Enable	AutoNegotiation	Disable	
14	Enable	AutoNegotiation	Disable	
15	Enable	AutoNegotiation	Disable	
16	Enable	AutoNegotiation	Disable	
17	Enable	AutoNegotiation	Disable	
18	Enable	AutoNegotiation	Disable	
19	Enable	AutoNegotiation	Disable	
20	Enable	AutoNegotiation	Disable	
21	Enable	AutoNegotiation	Disable	
22	Enable	AutoNegotiation	Disable	
23	Enable	AutoNegotiation	Disable	
24	Enable	AutoNegotiation	Disable	
25	Enable	C: AutoNegotiation F: AutoNegotiation	Disable	
26	Enable	C: AutoNegotiation F: AutoNegotiation	Disable	
27	Enable	C: AutoNegotiation F: AutoNegotiation	Disable	
28	Enable	C: AutoNegotiation F: AutoNegotiation	Disable	

Port Configuration Page	
State	You can enable or disable the state of this port. Once you click <b>Disable</b> , the port stops to link to the other end and stops to forward any traffic. The default setting is <b>Enable</b> which means all the ports are workable when you receive the ES9528-XT.
Speed/Duplex	<p>You can configure port speed and duplex mode of each port. Below are the selections you can choose:</p> <ul style="list-style-type: none"> <li>• Fast Ethernet Ports 1~ 2416 (fa1~fa24) <ul style="list-style-type: none"> <li>- Auto Negotiation (default)</li> <li>- 10M full-duplex (10 Full)</li> <li>- 10M half-duplex (10 Half)</li> <li>- 100M full-duplex (100 Full)</li> <li>- 100M half-duplex (100 Half)</li> </ul> </li> <li>• Gigabit Ethernet Port 25~28: (gi25~gi28) <ul style="list-style-type: none"> <li>- Auto Negotiation (default)</li> <li>- 10M full-duplex (10 Full)</li> <li>- 10M half-duplex (10 Half)</li> <li>- 100M full-duplex (100 Full)</li> <li>- 100M half-duplex (100 Half)</li> <li>- 1000M full-duplex (1000 Full)</li> </ul> </li> </ul> <p><b>Note:</b> The Gigabit SFP ports (SFP 25, 26, 27 and 28) support 100M and 1000M Full modes.</p>
Flow Control	<p><b>Enable</b> means that you need to activate the flow control function of the remote network device in order to let the flow control of that corresponding port on the switch to work.</p> <p><b>Disable</b> (default) means that you do not need to activate the flow control function of the remote network device, as the flow control of that corresponding port on the switch works.</p>
MDIX	<p>MDIX detects whether a straight-through or crossover cable is in use. By default this setting is set to Auto, which means the switch automatically detects the type of cable being used and adjusts accordingly.</p> <ul style="list-style-type: none"> <li>• <b>Auto</b> - automatically detect and negotiate communications between the connected devices.</li> <li>• <b>Normal</b> - manually set for use with a straight-through cable</li> <li>• <b>xOver</b> - manually set for use with a crossover cable</li> </ul>
Description	Click this field if you want to enter a port description.
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## Port Status

**Note:** The *Port Status* page displays the current port status, including Small Form Factory (SFP) fiber transceivers with Digital Diagnostic Monitoring (DDM) functionality that provides real time information of SFP transceiver and allows you to diagnose the optical fiber signal received and launched. The web user interface can display the vendor name, wave length and distance of all Control Gigabit SFP transceivers. If you see *Unknown* information, it may mean that the vendor doesn't provide their information or that the information of their transceiver can't be read.

### Port Status

[Help](#)

Port	Link	State	Speed/Duplex	Flow Control	SFP Vendor	Wavelength	Distance
1	Up	Enable	100 Full	Disable	---	---	---
2	Down	Enable	---	Disable	---	---	---
3	Down	Enable	---	Disable	---	---	---
4	Down	Enable	---	Disable	---	---	---
5	Down	Enable	---	Disable	---	---	---
6	Down	Enable	---	Disable	---	---	---
7	Down	Enable	---	Disable	---	---	---
8	Down	Enable	---	Disable	---	---	---
9	Down	Enable	---	Disable	---	---	---
10	Down	Enable	---	Disable	---	---	---
11	Down	Enable	---	Disable	---	---	---
12	Down	Enable	---	Disable	---	---	---
13	Down	Enable	---	Disable	---	---	---
14	Down	Enable	---	Disable	---	---	---
15	Down	Enable	---	Disable	---	---	---
16	Down	Enable	---	Disable	---	---	---
17	Down	Enable	---	Disable	---	---	---
18	Down	Enable	---	Disable	---	---	---
19	Down	Enable	---	Disable	---	---	---
20	Down	Enable	---	Disable	---	---	---
21	Down	Enable	---	Disable	---	---	---
22	Down	Enable	---	Disable	---	---	---
23	Down	Enable	---	Disable	---	---	---
24	Down	Enable	---	Disable	---	---	---
25	Up	Enable	1000 Full	Disable	Control	1310 nm	10000 m
26	Down	Enable	---	Disable	---	---	---
27	Down	Enable	---	Disable	---	---	---
28	Down	Enable	---	Disable	---	---	---

### SFP DDM

Port	SFP Scan/Eject	SFP DDM	Temperature (degree)		Tx Power (dBm)		Rx Power (dBm)	
			Current	Range	Current	Range	Current	Range
25	---	Enable	---	---	---	---	---	---
26	---	Enable	---	---	---	---	---	---
27	---	Enable	---	---	---	---	---	---
28	---	Enable	---	---	---	---	---	---

[Reload](#) [Apply](#) [Scan All](#) [Eject All](#)

### Port Status Page

Link	Shows link status; <b>Up</b> means the link is up and <b>Down</b> means that the link is down.
State	Shows the port state. If the state is enabled it displays <b>Enable</b> . If the port is disabled or shutdown, it displays <b>Disable</b> .
Speed/Duplex	Current working status of the port.

<b>Port Status Page (Continued)</b>	
Flow Control	The state of the flow control.
SFP Vendor	Vendor name of the SFP transceiver that is plugged into the SFP port or ports.
Wavelength	The wave length of the SFP transceiver that is plugged into the SFP port or ports.
Distance	The distance of the SFP transceiver that is plugged into the SFP port or ports.
SFP Scan/ Eject	<p>You can choose from these options:</p> <ul style="list-style-type: none"> <li>• <b>Scan:</b> Scan the SFP transceiver and display the information.</li> <li>• <b>Eject:</b> Eject the SFP transceiver that you have selected. You can eject one port or eject all by click the <b>Eject All</b> button.</li> </ul>
SFP DDM	When you select, enable, this scans a SFP DDM transceiver and displays the information.
Temperature	Displays the current temperature detected and acceptable temperature range for the DDM SFP transceiver.
Tx Power (dBm)	Displays the current transmit power detected and acceptable Tx power range for the DDM SFP transceiver.
Rx Power (dBm)	Displays the current received power and acceptable Rx power range for the DDM SFP transceiver.
Scan All	Click the <b>Scan All</b> button to scan for all SFPs.
Eject All	You can eject one or all of the DDM SFP transceivers. To eject all of the SFPs, click <b>Eject All</b> .

## Rate Control

Rate limiting is a form of flow control used to enforce a strict bandwidth limit at a port. You can program separate transmit (Egress Rule) and receive (Ingress Rule) rate limits at each port, and even apply the limit to certain packet types as described below. You can increment the volume step by 64Kbps in the blank.

**Rate Control**

Port	Ingress Rule(Kbps)	Egress Rule(Kbps)
1	<input type="text" value="0"/>	<input type="text" value="0"/>
2	<input type="text" value="0"/>	<input type="text" value="0"/>
3	<input type="text" value="0"/>	<input type="text" value="0"/>
4	<input type="text" value="0"/>	<input type="text" value="0"/>
5	<input type="text" value="0"/>	<input type="text" value="0"/>
6	<input type="text" value="0"/>	<input type="text" value="0"/>
7	<input type="text" value="0"/>	<input type="text" value="0"/>
8	<input type="text" value="0"/>	<input type="text" value="0"/>
9	<input type="text" value="0"/>	<input type="text" value="0"/>
10	<input type="text" value="0"/>	<input type="text" value="0"/>
11	<input type="text" value="0"/>	<input type="text" value="0"/>
12	<input type="text" value="0"/>	<input type="text" value="0"/>
13	<input type="text" value="0"/>	<input type="text" value="0"/>
14	<input type="text" value="0"/>	<input type="text" value="0"/>
15	<input type="text" value="0"/>	<input type="text" value="0"/>
16	<input type="text" value="0"/>	<input type="text" value="0"/>
17	<input type="text" value="0"/>	<input type="text" value="0"/>
18	<input type="text" value="0"/>	<input type="text" value="0"/>
19	<input type="text" value="0"/>	<input type="text" value="0"/>
20	<input type="text" value="0"/>	<input type="text" value="0"/>
21	<input type="text" value="0"/>	<input type="text" value="0"/>
22	<input type="text" value="0"/>	<input type="text" value="0"/>
23	<input type="text" value="0"/>	<input type="text" value="0"/>
24	<input type="text" value="0"/>	<input type="text" value="0"/>
25	<input type="text" value="0"/>	<input type="text" value="0"/>
26	<input type="text" value="0"/>	<input type="text" value="0"/>
27	<input type="text" value="0"/>	<input type="text" value="0"/>
28	<input type="text" value="0"/>	<input type="text" value="0"/>

Rate Control Page	
Ingress Rule (Kbps)	Ingress Rule (Kbps): Ingress rate in Kbps, the rate range is from 1 to 1000000 Kbps and zero means no limit. The rate automatically converts to a multiple of 64 Kbps value. The default value is no limit.
Egress Rule (Kbps)	Egress Rule (Kbps): Egress rate in Kbps, the rate range is from 1 to 1000000 Kbps and zero means no limit. The rate will automatically convert to a multiple of 64 Kbps value. The default value is no limit.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## Storm Control

Storm Control is similar to Rate Control. Rate Control filters all the traffic over the threshold you input by the user interface. Storm Control allows you to define the rate for specific Packet Types.

**Storm Control**

---

Port	Broadcast	DLF	Multicast	Rate(Kbits/sec)
1	Disable ▾	Disable ▾	Disable ▾	0
2	Disable ▾	Disable ▾	Disable ▾	0
3	Disable ▾	Disable ▾	Disable ▾	0
4	Disable ▾	Disable ▾	Disable ▾	0
5	Disable ▾	Disable ▾	Disable ▾	0
6	Disable ▾	Disable ▾	Disable ▾	0
7	Disable ▾	Disable ▾	Disable ▾	0
8	Disable ▾	Disable ▾	Disable ▾	0
9	Disable ▾	Disable ▾	Disable ▾	0
10	Disable ▾	Disable ▾	Disable ▾	0
11	Disable ▾	Disable ▾	Disable ▾	0
12	Disable ▾	Disable ▾	Disable ▾	0
13	Disable ▾	Disable ▾	Disable ▾	0
14	Disable ▾	Disable ▾	Disable ▾	0
15	Disable ▾	Disable ▾	Disable ▾	0
16	Disable ▾	Disable ▾	Disable ▾	0
17	Disable ▾	Disable ▾	Disable ▾	0
18	Disable ▾	Disable ▾	Disable ▾	0
19	Disable ▾	Disable ▾	Disable ▾	0
20	Disable ▾	Disable ▾	Disable ▾	0
21	Disable ▾	Disable ▾	Disable ▾	0
22	Disable ▾	Disable ▾	Disable ▾	0
23	Disable ▾	Disable ▾	Disable ▾	0
24	Disable ▾	Disable ▾	Disable ▾	0
25	Disable ▾	Disable ▾	Disable ▾	0
26	Disable ▾	Disable ▾	Disable ▾	0
27	Disable ▾	Disable ▾	Disable ▾	0
28	Disable ▾	Disable ▾	Disable ▾	0

---

<b>Storm Control Page</b>	
Broadcast	Enable or disable broadcast storm control on the corresponding port.
Broadcast Rate (Kbits/sec)	The Broadcast Rate range is from 0 to 100000 Kbits/sec. Zero means that there is no limit.
DLF	Enable or disable destination lookup failure storm control on this port.
DLF Rate (Kbits/sec)	Destination lookup failure rate limit range from 0 to 100000 Kbits/sec, Zero means that there is no limit.
Multicast	Enable or disable multicast storm control on this port.
Multicast Rate (Kbits/sec)	The range is from 0 to 100000 Kbits/sec. Zero means that there is no limit.
Apply	<p>Click <b>Apply</b> to apply the settings. It may take some time and the web user interface may become slow, this is normal condition.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## Port Trunking

---

Port Trunking allows you to group multiple Ethernet ports in parallel to increase link bandwidth. The aggregated ports can be viewed as a physical port that has a bandwidth equal to the combined bandwidth of each trunked port. The member ports of the same trunk group can balance the loading and backup for each other. The Port Trunking feature is usually used when you need higher bandwidth for the network backbone. This is an inexpensive way for you to transfer more data.

The aggregated ports can interconnect to the another switch that also supports Port Trunking. Control supports two types of port trunking:

- Static Trunk
- IEEE 802.3ad

There are some different descriptions for the port trunking. Different manufacturers may use different descriptions for their products, like Link Aggregation Group (LAG), Link Aggregation Control Protocol, Ethernet Trunk, or Ether Channel.

When the other end uses IEEE 802.3ad LACP, you should assign IEEE 802.3ad LACP to the trunk. When the other end uses non-802.3ad, you can then use Static Trunk.

There are two pages for port trunking, [Aggregation Configuration](#) on Page 75 and [Aggregation Information](#) on Page 77.

Aggregation Configuration

Use the *Port Trunk - Aggregation Configuration* page to set up port trunking.

Port Trunk - Aggregation Configuration Help

Aggregation Configuration

Port	Group ID	Trunk Type
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	
13	0	
14	0	
15	0	
16	0	
17	0	
18	0	
19	0	
20	0	
21	0	
22	0	
23	0	
24	0	
25	0	
26	0	
27	0	
28	0	

Load Balance Setting

GroupID	TrunkType
1	src-dst-mac
2	src-dst-mac
3	src-dst-mac
4	src-dst-mac
5	src-dst-mac
6	src-dst-mac
7	src-dst-mac
8	src-dst-mac

Apply Reload

<b>Aggregation Setting Page</b>	
Group ID	<b>Group ID</b> is the ID for the port trunking group. Ports with same group ID are in the same group.
Trunk Type	<b>Static</b> or <b>802.3ad LACP</b> . Each trunk group can only support <b>Static</b> or <b>802.3ad LACP</b> . Non-active ports cannot be setup here.
Load Balance Type	There are several load balance types based on dst-ip (Destination IP), dst-mac (Destination MAC), src-dst-ip (Source and Destination IP), src-dst-mac (Source and Destination MAC), src-ip (Source IP), src-mac (Source MAC).
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

Aggregation Information

The *Port Trunk - Aggregation Information* page shows the status of port aggregation. Once the aggregation ports are negotiated, you see the following status.

**Port Trunk - Aggregation Information**

---

Group ID	Type	Aggregated Ports	Individual Ports	Link Down Ports
1	N/A			
2	N/A			
3	N/A			
4	N/A			
5	N/A			
6	N/A			
7	N/A			
8	N/A			

---

<b>Aggregation Status Page</b>	
Group ID	Displays Trunk 1 to Trunk set up.
Type	The Type is <b>Static</b> or <b>LACP</b> . Static means that LACP is disabled and configured statically by the Administrator.
Aggregated Ports	When LACP links, you can see the member ports in the <b>Aggregated</b> column.
Individual Ports	When <b>LACP</b> is enabled, member ports of LACP group that are not connected to the correct LACP member ports are displayed in the <b>Individual</b> column.
Link Down Ports	When <b>LACP</b> is enabled, member ports of LACP group that are not linked up are displayed in the <b>Link Down</b> column.
Reload	Click <b>Reload</b> to reload aggregation settings.

## Network Redundancy

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It is critical for industrial applications that the network remains running at all times. The ES9528-XT supports:

- *Standard Rapid Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP)*  
The ES9528-XT supports RSTP versions IEEE 802.1D-2004, IEEE 802.1D-1998 STP, and IEEE 802.1w RSTP.
- *Multiple Spanning Tree Protocol (MSTP)*  
MSTP implements IEEE 802.1s, which uses RSTP for rapid convergence, enables VLANs to be grouped into a spanning-tree instance, with each instance having a spanning-tree topology independent of other spanning-tree instances. This architecture provides multiple forwarding paths for data traffic, enables load balancing, and reduces the number of spanning-tree instances required to support a large number of VLANs. MSTP was originally defined in the IEEE 802.1s and later merged into the IEEE 802.1Q-2003 specification.
- *Redundant Ring*  
The Redundant Ring features 0 ms for restore and less than ms10 ms for fail over for 100BASE-TX copper ports. Other interfaces may take longer due to media characteristics.
- *Rapid Dual Homing (RDH)*  
Advanced RDH technology allows the ES9528-XT to connect with a core managed switch easily. With RDH technology, you can also couple several Rapid Super Rings or RSTP groups together, which is also known as Auto Ring Coupling.

The following pages are included in this group:

- [STP Configuration](#) on Page 79
- [STP Port Configuration](#) on Page 80
- [STP Information](#) on Page 82
- [MSTP Configuration](#) on Page 84
- [MSTP Port Configuration](#) on Page 86
- [MSTP Information](#) on Page 88
- [Redundant Ring Configuration](#) on Page 90
- [Redundant Ring Information](#) on Page 92
- [ERPS Configuration](#) on Page 93

Optionally, you can use the CLI to configure these features, see [Network Redundancy \(CLI\)](#) on Page 166.

## STP Configuration

This page allows you to select the STP mode and configure the global STP/RSTP bridge configuration. Spanning Tree Protocol (STP; IEEE 802.1D) provides a loop-free topology for any LAN or bridged network.

Rapid Spanning Tree Protocol (RSTP; IEEE 802.1w) is an evolution of the Spanning Tree Protocol (STP), and was introduced with the IEEE 802.1w standard, and provides faster spanning tree convergence after a topology change. In most cases, IEEE 802.1w can also revert back to IEEE 802.1D in order to interoperate with legacy bridges on a per-port basis. The new edition of the IEEE 802.1D standard, IEEE 802.1D-2004, incorporates the IEEE 802.1t-2001 and IEEE 802.1w standards.

Multiple Spanning Tree Protocol (MSTP; IEEE 802.1s) which uses RSTP for rapid convergence, enables VLANs to be grouped into a spanning-tree instance, with each instance having a spanning-tree topology independent of other spanning-tree instances. This architecture provides a loop-free topology with load balancing while reducing the number of spanning-tree instances required to support a large number of VLANs. MSTP was originally defined in the IEEE 802.1s and later merged into the IEEE 802.1Q-2003 specification.

**STP Configuration** Help

---

**STP Mode** Disable ▼

**Bridge Configuration**

Bridge Address	
Bridge Priority	0 ▼
Max Age	6 ▼
Hello Time	1 ▼
Forward Delay	4 ▼

Apply
Cancel

<b>STP Configuration Page</b>	
STP Mode	Select the spanning tree protocol: STP, RSTP or MSTP or disable STP.
<b>Bridge Configuration</b>	
Bridge Address	A value used to identify the bridge. This item cannot be modified.
Bridge Priority	A value used to identify the bridge. The bridge with the lowest value has the highest priority and is selected as the root. Enter a number 0 through 61440 in increments of 4096.
Max Age (See Note)	The number of seconds a bridge waits without receiving Spanning-Tree Protocol configuration messages before attempting to reconfigure. Enter a number of 6 - 40.
Hello Time (See Note)	The number of seconds between the transmissions of Spanning-Tree Protocol configuration messages. Enter a number of 1 through 10.
Forward Delay (See Note)	The number of seconds a port waits before changing from its Spanning-Tree Protocol learning and listening states to the forwarding state. Enter a number 4 - 30.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.
<b>Note:</b> $2 * (\text{Forward Delay Time} - 1)$ should be greater than or equal to the Max Age. The Max Age should be greater than or equal to $2 * (\text{Hello Time} + 1)$ .	

## STP Port Configuration

This page allows you to configure the port parameter after you have enabled STP, RSTP, or MSTP.

**STP Port Configuration** Help

Port	STP State	Path Cost	Port Priority	Link Type	Edge Port
1	Enable	200000	128	Auto	Enable
2	Enable	200000	128	Auto	Enable
3	Enable	200000	128	Auto	Enable
4	Enable	200000	128	Auto	Enable
5	Enable	200000	128	Auto	Enable
6	Enable	200000	128	Auto	Enable
7	Enable	200000	128	Auto	Enable
8	Enable	200000	128	Auto	Enable
9	Enable	200000	128	Auto	Enable
10	Enable	200000	128	Auto	Enable
11	Enable	200000	128	Auto	Enable
12	Enable	200000	128	Auto	Enable
13	Enable	200000	128	Auto	Enable
14	Enable	200000	128	Auto	Enable
15	Enable	200000	128	Auto	Enable
16	Enable	200000	128	Auto	Enable
17	Enable	200000	128	Auto	Enable
18	Enable	200000	128	Auto	Enable
19	Enable	200000	128	Auto	Enable
20	Enable	200000	128	Auto	Enable
21	Enable	200000	128	Auto	Enable
22	Enable	200000	128	Auto	Enable
23	Enable	200000	128	Auto	Enable
24	Enable	200000	128	Auto	Enable
25	Enable	20000	128	Auto	Enable
26	Enable	20000	128	Auto	Enable
27	Enable	20000	128	Auto	Enable
28	Enable	20000	128	Auto	Enable

Apply Cancel

<b>STP Port Configuration Page</b>	
STP State	You can enable/disable STP/RSTP/MSTP on a port by port basis. You can disable the STP state when connecting a device in order to avoid STP waiting periods.
Path Cost	The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number from 1 through 200000000.
Port Priority	Decide which port should be blocked by priority on your LAN. Enter a number from 0 - 240 in increments of 16.
Link Type	Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port in question is connected to exactly one other bridge (that is, it is served by a point-to-point LAN segment), or if it is connected to two or more bridges (that is., it is served by a shared medium LAN segment). This configuration allows the p2p status of the link to be controlled by an administrator.

<b>STP Port Configuration Page (Continued)</b>	
Edge Port	<p>Present in implementations that support the identification of edge ports. All ports directly connected to end stations cannot create bridging loops in the network and can thus directly transition to forwarding, and skipping the listening and learning stages.</p> <p>When a non-bridge device connects an edge port, this port is in a blocking state and turn to forwarding state in 2*Hello Time seconds. When the bridge device connects an edge port, this port is a non-edge port automatic.</p>
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## STP Information

The *STP Information* page allows you to see the ES9528-XT root information and port status.

**STP Information**

---

**Root Information**

Root Address	00c0.4e2c.008c
Root Priority	32768
Root Port	1
Root Path Cost	400000
Max Age	20 second(s)
Hello Time	2 second(s)
Forward Delay	15 second(s)

---

**Port Information**

Port	Role	Port State	Path Cost	Port Priority	Link Type	Edge Port	Aggregated(ID/Type)
1	Root	Forwarding	200000	128	P2P	Non-Edge	/
2	Designated	Forwarding	200000	128	P2P	Non-Edge	/
3	Disabled	Disabled	200000	128	P2P	Edge	/
4	Disabled	Disabled	200000	128	P2P	Edge	/
5	Disabled	Disabled	200000	128	P2P	Edge	/
6	Disabled	Disabled	200000	128	P2P	Edge	/
7	Designated	Forwarding	200000	128	P2P	Non-Edge	/
8	Disabled	Disabled	200000	128	P2P	Edge	/
9	Designated	Forwarding	200000	128	P2P	Edge	/
10	Disabled	Disabled	200000	128	P2P	Edge	/
11	Disabled	Disabled	200000	128	P2P	Edge	/
12	Disabled	Disabled	200000	128	P2P	Edge	/
13	Disabled	Disabled	200000	128	P2P	Edge	/
14	Disabled	Disabled	200000	128	P2P	Edge	/
15	Disabled	Disabled	200000	128	P2P	Edge	/
16	Disabled	Disabled	200000	128	P2P	Edge	/
17	Designated	Forwarding	200000	128	P2P	Non-Edge	/
18	Disabled	Disabled	200000	128	P2P	Edge	/
19	Disabled	Disabled	200000	128	P2P	Edge	/
20	Disabled	Disabled	200000	128	P2P	Edge	/
21	Disabled	Disabled	200000	128	P2P	Edge	/
22	Disabled	Disabled	200000	128	P2P	Edge	/
23	Disabled	Disabled	200000	128	P2P	Edge	/
24	Disabled	Disabled	200000	128	P2P	Edge	/
25	Disabled	Disabled	200000	128	P2P	Edge	/
26	Designated	Forwarding	200000	128	P2P	Edge	/
27	Designated	Forwarding	200000	128	P2P	Non-Edge	/
28	Disabled	Disabled	200000	128	P2P	Edge	/

STP Information Page	
Root Information	
Root Address	Root bridge address, which is the bridge with the smallest (lowest) bridge ID.
Root Priority	Root bridge priority, the bridge with the lowest value has the highest priority and is selected as the root.
Root Port	Root port of this bridge.
Root Path Cost	Root path cost.
Max Age	The number of seconds a bridge waits without receiving Spanning-Tree Protocol configuration messages before attempting to reconfigure.
Hello Time	The number of seconds between the transmissions of Spanning-Tree Protocol configuration messages.

<b>STP Information Page (Continued)</b>	
Forward Delay	The number of seconds a port waits before changing from its Spanning-Tree Protocol learning and listening states to the forwarding state.
<b>Port Information</b>	
Role	Descriptive information about the STP/RSTP switch port role. Role: Root, Designated, Alternate, Backup, Disabled, Unknown.
Port State	Descriptive information about the STP/RSTP switch port state. State: Blocking, Listening, Learning, Forwarding, Disabled, Unknown.
Path Cost	The cost of the path to the other bridge from this transmitting bridge at the specified port. Path cost range is 1 through 200000000.
Port Priority	Decide which port should be blocked by priority in your LAN. Range is 0 through 240 in increments of 16.
Link Type	Operational link type. Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port in question can be concerned to exactly one other bridge (that is, it is served by a point-to-point LAN segment), or can be connected to two or more bridges (that is, it is served by a shared medium LAN segment).
Edge Port	Operational edge port state. Present in implementations that support the identification of edge ports. All ports directly connected to end stations cannot create bridging loops in the network and can thus directly transition to forwarding, skipping the listening and learning stages. When the non-bridge device connects an edge port, this port is in blocking state and turn to forwarding state in 2*Hello Time seconds. When the bridge device connects an edge port, this port is a non-edge port automatic.
Aggregated (ID/Type)	This is the aggregated port information. The ID is the aggregation ID (Trunk ID) and the Type is either Static or LACP.
Reload	Click the <b>Reload</b> button to reload STP information.

## MSTP Configuration

Multiple Spanning Tree Protocol (MSTP) is a direct extension of RSTP. It can provide an independent spanning tree for different VLANs. It simplifies network management, creates a faster convergence than RSTP by limiting the size of each region, and prevents VLAN members from being segmented from the rest of the group (as sometimes occurs with IEEE 802.1D STP).

While using MSTP, there are some new concepts of network architecture. A switch may belong to different groups, act as root or designate switch, or generate BPDU packets for the network to maintain the forwarding table of the spanning tree. MSTP can also provide load balancing between switches.

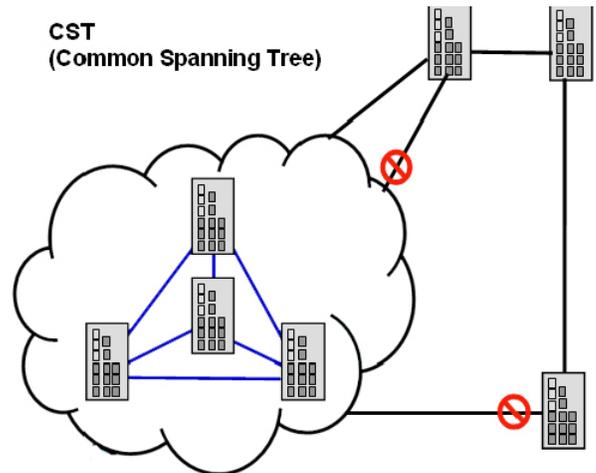
One VLAN can be mapped to a Multiple Spanning Tree Instance (MSTI). The maximum number of instances that the ES9528-XT supports is 16, with a range from 0-15. The MSTP builds a separate Multiple Spanning Tree (MST) for each instance to maintain connectivity among each of the assigned VLAN groups. An Internal Spanning Tree (IST) is used to connect all the MSTP switches within an MST region. An MST Region may contain multiple MSTP instances.

The following figure shows a MSTP instance with two VLANs. Each instance has a root node and forwarding paths.

A Common Spanning Tree (CST) interconnects all adjacent MST regions and acts as a virtual bridge node for communications with STP or RSTP nodes in the global network. MSTP connects all bridges and LAN segments with a single Common Internal Spanning Tree (CIST). The CIST is formed as a result of the running spanning tree algorithm between switches that support the STP, RSTP, or MSTP protocols.

The following diagram shows a CST attached to a larger network. In this network, a Region may have different instances and its own forwarding path and table, however, the CST acts as a single bridge.

This is the *MSTP Configuration* page.



**MSTP Configuration** Help

---

**MST Region Configuration**

Region Name

Revision

Apply Cancel

---

**Add MST Instance**

Instance ID

VLAN Group

Instance Priority

Add

---

**MST Instance Configuration**

Instance ID	VLAN Group	Instance Priority

Apply Remove Selected Cancel

<b>MSTP Configuration Page</b>	
<b>MST Region Configuration</b>	
Region Name	A name used to identify the MST Region. Maximum length: 32 characters.
Revision	A value used to identify the MST Region. Range: 0-65535; Default: 0).
Apply	Click the <b>Apply</b> button to apply the <b>MST Region Configuration</b> .
<b>New MST Instance</b>	
Instance ID	A value used to identify the MST instance, valid value are 1 through 15. Instance 0 (CIST, Common Internal Spanning Tree) is a special instance of spanning-tree known as IST or Internal Spanning Tree (=MSTI00).
VLAN Group	Give a VLAN group to map this MST instance. Use a VLAN number (for example, 10), range (for example:1-10) or mixing format (for example: 2,4,6,4-7,10).
Instance Priority	A value used to identify the MST instance. The MST instance with the lowest value has the highest priority and is selected as the root. Enter a number 0 through 61440 in increments of 4096.
Add	Click the <b>Add</b> button to add the <b>New MST Instance</b> .
<b>Current MST Instance Configuration</b>	
Instance ID	A value used to identify the MST instance. Instance 0 (CIST, Common Internal Spanning Tree) is a special instance of spanning-tree known as IST or Internal Spanning Tree (=MSTI00).
VLAN Group	Provide a VLAN group to map this MST instance. Use the VLAN number, for example: 10. You can set a range, for example: 1-10) or set specific VLANs, for example: 2,4,6,4-7.
Instance Priority	A value used to identify the MST instance. The MST instance with the lowest value has the highest priority and is selected as the root. Enter a number 0 through 61440 in increments of 4096.
Apply	Click the <b>Apply</b> button to apply the <b>current MST instance configuration</b> . <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## MSTP Port Configuration

This page allows you to configure the port settings. Choose the Instance ID that you want to configure.

**MSTP Port Configuration** Help

---

Instance ID 0 ▼

Port	Path Cost	Port Priority	Link Type	Edge Port
1	<input type="text"/>	▼	▼	▼
2	<input type="text"/>	▼	▼	▼
3	<input type="text"/>	▼	▼	▼
4	<input type="text"/>	▼	▼	▼
5	<input type="text"/>	▼	▼	▼
6	<input type="text"/>	▼	▼	▼
7	<input type="text"/>	▼	▼	▼
8	<input type="text"/>	▼	▼	▼
9	<input type="text"/>	▼	▼	▼
10	<input type="text"/>	▼	▼	▼
11	<input type="text"/>	▼	▼	▼
12	<input type="text"/>	▼	▼	▼
13	<input type="text"/>	▼	▼	▼
14	<input type="text"/>	▼	▼	▼
15	<input type="text"/>	▼	▼	▼
16	<input type="text"/>	▼	▼	▼
17	<input type="text"/>	▼	▼	▼
18	<input type="text"/>	▼	▼	▼
19	<input type="text"/>	▼	▼	▼
20	<input type="text"/>	▼	▼	▼
21	<input type="text"/>	▼	▼	▼
22	<input type="text"/>	▼	▼	▼
23	<input type="text"/>	▼	▼	▼
24	<input type="text"/>	▼	▼	▼
25	<input type="text"/>	▼	▼	▼
26	<input type="text"/>	▼	▼	▼
27	<input type="text"/>	▼	▼	▼
28	<input type="text"/>	▼	▼	▼

Apply Cancel

<b>MSTP Port Configuration Page</b>	
Instance ID	Select an Instance ID to display and modify MSTP instance setting.
<b>Port Configuration</b>	
Path Cost	The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number from 1 through 200000000.
Port Priority	Decide which port should be blocked by priority on your LAN. Enter a number from 0 through 240 in increments of 16.
Link Type	Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port in question is connected to exactly one other bridge (that is, it is served by a point-to-point LAN segment), or if it's connected to two or more bridges (that is, it is served by a shared medium LAN segment). This configuration allows the p2p status of the link to be controlled by an administrator.

<b>MSTP Port Configuration Page (Continued)</b>	
Edge Port	Present in implementations that support the identification of edge ports. All ports directly connected to end stations cannot create bridging loops in the network and can thus directly transition to forwarding, and skipping the listening and learning stages. When the non-bridge device connects an edge port, this port is in a blocking state and turn to forwarding state in 2*Hello Time seconds. When the bridge device connects an edge port, this port is a non-edge port automatic.
Apply	Click the <b>Apply</b> button to apply the configuration. <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## MSTP Information

---

This page allows you to see the current MSTP information. Choose the Instance ID first. If the instance is not added, the information remains blank.

MSTP Information

---

Instance ID

**Root Information**

Root Address	
Root Priority	
Root Port	
Root Path Cost	
Max Age	
Hello Time	
Forward Delay	

---

**Port Information**

Port	Role	Port State	Path Cost	Port Priority	Link Type	Edge Port
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						

<b>MSTP Information Page</b>	
Instance ID	Select an instance ID to display MSTP instance information. Instance 0 (CIST, Common Internal Spanning Tree) is a special instance of spanning-tree known as IST or Internal Spanning Tree (=MSTI00).
<b>Root Information</b>	
Root Address	Root bridge address, which is the bridge with the smallest (lowest) bridge ID.
Root Priority	Root bridge priority, the bridge with the lowest value has the highest priority and is selected as the root.
Root Port	Root port of this bridge.
Root Path Cost	Root path cost.
Max Age	The number of seconds a bridge waits without receiving Spanning-Tree Protocol configuration messages before attempting to reconfigure.
Hello Time	The number of seconds between the transmissions of Spanning-Tree Protocol configuration messages.
Forward Delay	The number of seconds a port waits before changing from its Spanning-Tree Protocol learning and listening states to the forwarding state.
<b>Port Information</b>	
Port Role	Descriptive information about the MSTP switch port role. Role: Master, Root, Designated, Alternate, Backup, Boundary, Disabled, Unknown.
Port State	Descriptive information about the MSTP switch port state. State: Blocking, Listening, Learning, Forwarding, Disabled, Unknown.
Path Cost	The cost of the path to the other bridge from this transmitting bridge at the specified port. Path cost range is 1 through 200000000.
Port Priority	Decide which port should be blocked by priority in your LAN. The range is 0 through 240 in increments of 16.
Link Type	Operational link type. Some of the rapid state transactions that are possible within MSTP are dependent upon whether the port in question can be concerned to exactly one other bridge (that is, it is served by a point-to-point LAN segment), or can be connected to two or more bridges (that is, it is served by a shared medium LAN segment).
Edge Port	Operational edge port state. Present in implementations that support the identification of edge ports. All ports directly connected to end stations cannot create bridging loops in the network and can thus directly transition to forwarding, skipping the listening and learning stages. When the non-bridge device connects an edge port, this port is in blocking state and turn to forwarding state in 2*Hello Time seconds. When the bridge device connects an edge port, this port is a non-edge port automatic.
Reload	Click the <b>Reload</b> button to reload MSTP instance information.

## Redundant Ring Configuration

The most common industrial network redundancy is to form a ring or loop. Typically, managed switches are connected in series and the last switch is connected back to the first one. In such connection, you can implement Redundant Ring technology.

**Redundant Ring Configuration**

---

**Add Ring**

Ring ID:

Name:

---

**Ring Configuration**

Ring ID	Name	Version	Device Priority	Ring Port1	Path Cost	Ring Port2	Path Cost	Rapid Dual Homing	RDH Ext. ID	Ring Status

---

**Redundant Chain Configuration**

Ring ID	Role	Edge Port

---

**Rapid Dual Homing Port Configuration**

Ring ID	Auto Detect	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Redundant Ring Page	
Ring ID/Name	To create a Redundant Ring select the Ring ID, which has range from 0 to 31. If the name field is left blank, the name of this ring is automatically named with the Ring ID. The maximum number of rings is 32. <b>Note:</b> Once a ring is created, you cannot change it.
Ring Configuration	
Ring ID	Once a Ring is created, the Ring ID appears, and cannot be changed. In multiple ring environments, the traffic can only be forwarded under the same Ring ID. Remember to check the Ring ID when there are more than one ring in existence.
Name	This field shows the name of the Ring. If it is not entered when creating, it is automatically named by the rule <i>RingID</i> .
Device Priority	The switch with highest priority (highest value) is automatically selected as the <b>Ring Master (RM)</b> . When one of the ring ports on this switch becomes a forwarding port and the other one becomes a blocking port. If all of the switches have the same priority, the switch with the highest MAC address is selected as the Ring Master.
Ring Port1	In a <b>Rapid Super Ring</b> environment, you should have two Ring ports. Whether this switch is a Ring Master or not. When configuring <b>Rapid Super Rings</b> , two ports should be selected to be Ring ports. For a Ring Master, one of the Ring Ports becomes the forwarding port and the other one becomes the blocking port.
Path Cost	Change the <b>Path Cost</b> of Ring Port1, if this switch is the Ring Master of a Ring, then it determines the blocking port. The port with higher <b>Path Cost</b> in the two Ring Ports becomes the blocking port, If the <b>Path Cost</b> is the same, the port with larger port number becomes the blocking port.

<b>Redundant Ring Page (Continued)</b>	
Ring Port2	Assign another port for ring connection.
Path Cost	Change the Path Cost of Ring Port2.
Rapid Dual Homing	<p>Rapid Dual Homing is an important feature of Rapid Super Ring redundancy technology. When you want to connect multiple RSR or form redundant topology with other vendors, RDH allows you to have a maximum of seven multiple links for redundancy without any problem.</p> <p>In RDH, you do not need to configure a specific port to connect to other protocol. The RDH selects the fastest link for the primary link and blocks all the other links to avoid a loop. If the primary link failed, RDH automatically forwards the secondary link for a network redundant. If there are more connections, they are standby links and are recovered if both primary and secondary links are broken.</p>
RDH Ext ID	This is the Rapid Dual Homing Extension ID. The Extension ID and Ring ID cannot be the same, when dual home to the same external network. The Extension ID range is from 0 to 7. With the combination of Extension ID (0 to 7) and Ring ID (0 to 31), the ES7810-XT supports up to 256 (8 x 32) different dual homing rings.
Ring status	To <b>Enable/Disable</b> the Ring, remember to enable the Ring after you add it.
<b>Super Chain Configuration</b>	
ID	The Ring Identifier referring to this Ring (Chain).
Role	Super Chain has two node roles, <b>Border</b> and <b>Member</b> . <b>Border</b> is the node, which connects to an external network. <b>Member</b> is the node except the <b>Border</b> node in the Super Chain.
Edge Port	<b>Edge Port</b> is one of ring ports of <b>Border</b> node. It is used to connect to an external network.
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## Redundant Ring Information

This page shows Redundant Ring information.

### Redundant Ring Information

Ring ID	Version	Role	Status	RM MAC	Blocking Port	Role Transition Count	Ring State Transition Count

Redundant Ring Information Page	
Ring ID	The Ring ID.
Role	This ES9528-XT is the RM (Ring Master) or nonRM (non-ring master).
Status	If this field is <b>Normal</b> it means the redundancy is approved. If any one of the link in this Ring is broken, then the status is <b>Abnormal</b> .
RM MAC	The MAC address of Ring Master of this Ring, which helps to find the redundant path.
Blocking Port	Shows which is blocked port of RM.
Role Transition Count	Shows how many times this ES9528-XT has changed its Role from nonRM to RM or from RM to nonRM.
Ring State Transition Count	Shows how many times the Ring status has been transformed between <b>Normal</b> and <b>Abnormal</b> state.
Reload	Click to reload redundant ring information.

## ERPS Configuration

ERPS is Ethernet Ring Protection Switching and it was created by ITU-T. ERPS is often referred to as G.8032.

The primary advantage of this feature is that it is an industry standard ring technology so that you can drop the ES9528-XT into a G.8032 ring with other manufacturers' switches.

**ERPS Configuration** Help

---

**ERPS** Disable ▼

Version	
Node State	
Node Role	RPL Owner <span style="font-size: 0.8em;">▼</span>
Control Channel	VLAN 1 <span style="font-size: 0.8em;">▼</span>
Ring Port 1	Port 1 <span style="font-size: 0.8em;">▼</span>
Ring Port 2	Port 1 <span style="font-size: 0.8em;">▼</span>
RPL Port	Ring Port 1 <span style="font-size: 0.8em;">▼</span>

Apply
Cancel

<b>ERPS Configuration Page</b>	
ERPS	Enable or disable the ERPS function.
<b>ERPS Configuration</b>	
Version	ERPS has version 1 and 2.
Node State	The current state of the node, <b>Idle</b> and <b>Protection</b> .
Node Role	The role of the node, <b>RPL Owner</b> and <b>Ring Node</b> . The <b>RPL owner</b> is an Ethernet ring node adjacent to the RPL.
Control Channel	Control Channel provide a communication channel for ring automatic protection switching (R-APS) information.
Ring Port 1 / 2	A ring link is bounded by two adjacent nodes and a port for a ring link is called a ring port.
RPL Port	The ring protection link (RPL) is the ring link which under normal conditions, that is without any failure or request, is blocked for traffic channel, to prevent the formation of loops.
Apply	Click <b>Apply</b> to apply the settings. <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

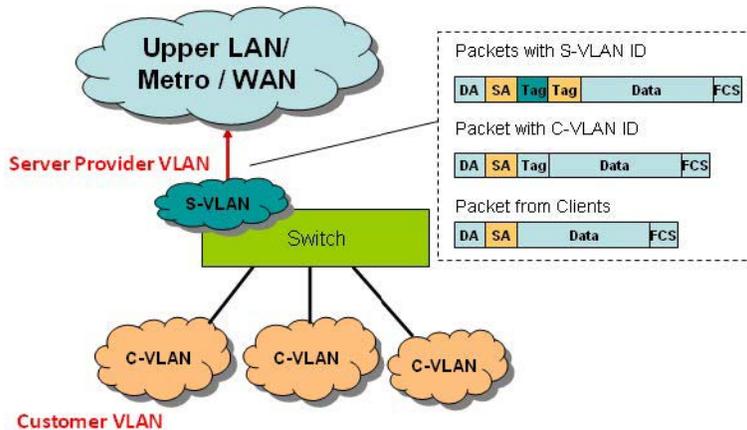
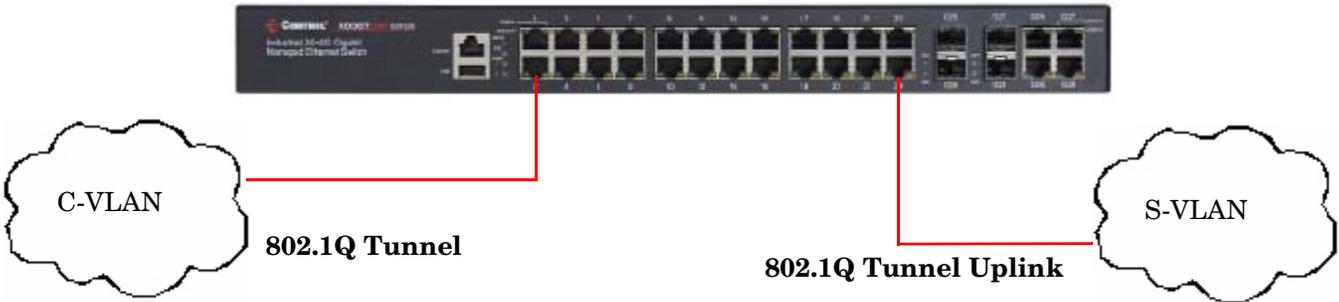
## VLAN

A Virtual LAN (VLAN) is a logical grouping of nodes for the purpose of limiting a broadcast domain to specific members of a group without physically grouping the members. The VLAN allows you to isolate network traffic so that only members of the VLAN could receive traffic from the same VLAN members. Basically, creating a VLAN from a switch is the logical equivalent of physically reconnecting a group of network devices to another Layer 2 switch, without actually disconnecting these devices from their original switches.

The ES9528-XT supports IEEE 802.1Q VLAN, which is also known as Tag-Based VLAN. This Tag-Based VLAN allows a VLAN to be created across different switches. IEEE 802.1Q tag-based VLAN makes use of VLAN control information stored in a VLAN header attached to IEEE 802.3 packet frames. This tag contains a VLAN Identifier (VID) that indicates which VLAN a frame belongs to. Since each switch only has to check a frame's tag, without the need to dissect the contents of the frame, this saves a lot of computing resources within the ES9528-XT.

The following figure displays an IEEE 802.1Q VLAN.

The ES9528-XT supports VLAN tunneling (QinQ), which expands the number of VLANs by adding a tag to the 802.1Q packets. The original VLAN is usually identified as Customer VLAN (C-VLAN) and the new VLAN is Service VLAN(S-VLAN). By adding the additional tag, QinQ increases the possible number of VLANs. After QinQ is enabled, the ES9528-XT can reach up to 256x256 VLANs. With different standard tags, it also improves network security.



VLAN Configuration pages allow you to add and remove a VLAN, configure port Ingress/Egress parameters, and view the VLAN table. The following pages are included in this group:

- [VLAN Configuration](#) on Page 95
- [VLAN Configuration](#) on Page 95
- [VLAN Information](#) on Page 98
- [Private VLAN](#) on Page 99

- [PVLAN Configuration](#) on Page 99
- [PVLAN Port Configuration](#) on Page 101
- [PVLAN Information](#) on Page 102
- [GVRP Configuration](#) on Page 103

Optionally, you can use the CLI for configuration, see [VLAN \(CLI\)](#) on Page 175.

## VLAN Configuration

Use this page to assign the Management VLAN, create the static VLAN, and assign the Egress rule for the member ports of the VLAN.

VLAN Configuration Page	
Management VLAN ID	<p>The management VLAN ID is the VLAN ID of the CPU interface so that only member ports of the management VLAN can ping and access the switch. The default management VLAN ID is 1.</p> <p>Click <b>Apply</b> after you enter the VLAN ID.</p>
Static VLAN	<p>You can assign a VLAN ID and VLAN Name for the new static VLAN.</p> <ul style="list-style-type: none"> <li>• <b>VLAN ID:</b> This is used by the switch to identify different VLANs. A valid VLAN ID is between 1 and 4,094, 1 is the default VLAN.</li> <li>• <b>VLAN Name:</b> This is a reference for the network administrator to identify different VLANs. The VLAN name may up to 12 characters in length. If you do not provide a VLAN name, the system automatically assigns a VLAN name. The rule is VLAN (VLAN ID).</li> </ul> <p>Click <b>Add</b> to create a new VLAN. The new VLAN displays in the <i>Static VLAN Configuration</i> table. After creating the VLAN, the status of the VLAN remains Unused, until you add ports to the VLAN.</p> <p><b>Note:</b> Before changing the management VLAN ID by web or Telnet, remember that the port attached by the administrator should be the member port of the management VLAN; otherwise the administrator cannot access the switch through the network. The ES9528-XT supports a maximum of 256 VLANs.</p>

**VLAN Configuration Page (Continued)**

Static VLAN Configuration

- **VLAN ID:** The VLAN identifier for this VLAN.
  - **Name:** The name of the VLAN.
  - **1 - 28:** The corresponding port number on the VLAN.
    - -- Not available
    - **U** Untag, indicates that egress/outgoing frames are not VLAN tagged.
    - **T** Tag, indicates that egress/outgoing frames are LAN tagged.
  - Click **Apply** to apply the settings.
- Note: You must **Save** the settings (Page 142), if you want to maintain these settings if the ES9528-XT is powered off.*
- Click **Remove Selected** to remove the selected static VLAN.
  - Click **Reload** to reload static VLAN configuration.

The following figure shows a static VLAN configuration table. Two new VLANs were created (VLAN2 and Test). Egress rules of the ports are not configured.

**Static VLAN Configuration**

VLAN ID	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<input type="checkbox"/> 1	VLAN1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
<input type="checkbox"/> 2	VLAN2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<input type="checkbox"/> 3	Test	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

This figure displays how to configure the Egress rule of the ports.

Use the following steps to configure Egress rules:

1. Assign Egress rule of the ports to **U** or **T**.
2. Press **Apply** to apply the setting.

**Static VLAN Configuration**

VLAN ID	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<input type="checkbox"/> 1	VLAN1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
<input type="checkbox"/> 2	VLAN2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<input checked="" type="checkbox"/> 3	Test	--	--	--	U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

If you want to remove one VLAN, select the VLAN entry and then click the **Remove** button.

## VLAN Port Configuration

The *VLAN Port Configuration* page allows you to configure VLAN port parameters on a specific port. These parameters include the port VLAN ID (PVID), Tunnel Mode, Accept Frame Type and Ingress Filtering.

VLAN Port Configuration

Port	PVID	Tunnel Mode	EtherType	Accept Frame Type
1	1	None	0x8100	Admit All
2	1	None	0x8100	Admit All
3	1	None	0x8100	Admit All
4	1	None	0x8100	Admit All
5	1	None	0x8100	Admit All
6	1	None	0x8100	Admit All
7	1	None	0x8100	Admit All
8	1	None	0x8100	Admit All
9	1	None	0x8100	Admit All
10	1	None	0x8100	Admit All
11	1	None	0x8100	Admit All
12	1	None	0x8100	Admit All
13	1	None	0x8100	Admit All
14	1	None	0x8100	Admit All
15	1	None	0x8100	Admit All
16	1	None	0x8100	Admit All
17	1	None	0x8100	Admit All
18	1	None	0x8100	Admit All
19	1	None	0x8100	Admit All
20	1	None	0x8100	Admit All
21	1	None	0x8100	Admit All
22	1	None	0x8100	Admit All
23	1	None	0x8100	Admit All
24	1	None	0x8100	Admit All
25	1	None	0x8100	Admit All
26	1	None	0x8100	Admit All
27	1	None	0x8100	Admit All
28	1	None	0x8100	Admit All

VLAN Port Configuration Page	
PVID	Enter the port VLAN ID (PVID). The PVID allows the switches to identify which port belongs to which VLAN. To keep things simple, it is recommended that PVID is equivalent to VLAN IDs. The values of PVIDs are from 0 to 4,095 (0 and 4,095 are reserved), 1 is the default value; 2 to 4,094 are valid and available in this column.
Tunnel Mode	<p>None - IEEE 802.1Q tunnel mode is disabled.</p> <p><b>802.1Q Tunnel:</b> QinQ is applied to the ports which connect to the C-VLAN. The port receives a tagged frame from the C-VLAN. You need to add a new tag (Port VID) as an S-VLAN VID. When the packets are forwarded to the C-VLAN, the S-VLAN tag is removed. After <b>802.1Q Tunnel</b> mode is assigned to a port, the egress setting of the port should be <i>Untag</i>, it indicates that the egress packet is always untagged. This is configured in the <b>Static VLAN Configuration</b> table (<a href="#">Page 95</a>).</p> <p><b>802.1Q Tunnel Uplink:</b> QinQ is applied to the ports which connect to the S-VLAN. The port receives a tagged frame from the S-VLAN. When the packets are forwarded to the S-VLAN, the S-VLAN tag is kept. After <b>802.1Q Tunnel Uplink</b> mode is assigned to a port, the egress setting of the port should be <i>Tag</i>, it indicates that the egress packet is always tagged. This is configured in the <b>Static VLAN Configuration</b> table (<a href="#">Page 95</a>). For example, if the VID of S-VLAN/Tunnel Uplink is 10, the VID of C-VLAN/Tunnel is 5. The 802.1Q Tunnel port receives Tag 5 from C-VLAN and adds Tag 10 to the packet. When the packets are forwarded to S-VLAN, Tag 10 is kept.</p>

VLAN Port Configuration Page (Continued)	
EtherType	This allows you to define the EtherType manually. This is an advanced QinQ parameter that allows you to define the transmission packet type.
Accept Frame Type	When you select <b>Tag Only</b> the device discards untagged frames or Priority-Tagged only frames received on this port. When you select <b>Admit All</b> , untagged frames or Priority-Tagged only frames received on this port are accepted and assigned to the PVID for this frame. This control does not affect VLAN independent BPDU frames, such as STP, GVRP and LACP. It does affect VLAN dependent BPDU frames, such as GMRP.
Apply	Click <b>Apply</b> to apply the settings. <i>Note: You must <b>Save</b> the settings (Page 142), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## VLAN Information

The *VLAN Information* page displays the current settings of your VLAN table, including VLAN ID, Name, Status, and Egress rule of the ports.

VLAN Information

---

VLAN ID	Name	Status	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	VLAN1	Static	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

---

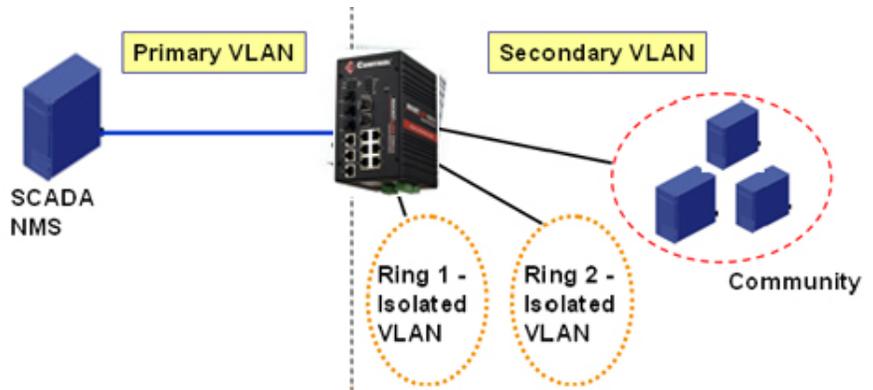
VLAN Information Page	
VLAN ID	The ID of the VLAN.
Name	The name of the VLAN.
Status	<p><b>Static</b> means that this is a manually configured static VLAN.</p> <p><b>Unused</b> means this VLAN is created by web user interface/CLI and has no member ports and the VLAN is not workable yet.</p> <p><b>Dynamic</b> means this VLAN was learnt by GVRP.</p> <ul style="list-style-type: none"> <li>-- No VLAN setting.</li> <li><b>T</b> A Trunk Link is a LAN segment used for multiplexing VLANs between VLAN bridges. All the devices that connect to a Trunk Link must be IEEE 802.1Q VLAN-aware, which sends and receives frames with IEEE 802.1Q tags.</li> <li><b>U</b> An Access Link is a LAN segment used to multiplex one or more IEEE 802.1Q VLAN-unaware devices into a Port of a VLAN Bridge. Devices that are connected to an Access Link sends and receives frames without IEEE 802.1Q tagging, which is the identification of the VLAN it belongs to.</li> </ul>

## Private VLAN

A private VLAN helps to resolve the primary VLAN ID shortage, client ports' isolation and network security issues. The private VLAN features provides primary and secondary VLANs within a single switch.

**Primary VLAN:** The uplink port is usually a member of the primary VLAN. A primary VLAN contains promiscuous ports that can communicate with Secondary VLANs.

**Secondary VLAN:** The client ports are usually defined within secondary VLAN. The secondary VLAN includes Isolated and Community VLANs. The client ports can be isolated VLANs or can be grouped in the same Community VLAN. The ports within the same community VLAN can communicate with each other, however, the isolated VLAN ports cannot.



This figure shows a typical private VLAN network. A SCADA/Public Server or NMS workstation is usually located in a primary VLAN. Client PCs and rings are usually located within the secondary VLAN.

Optionally, you can use the CLI for configuration, see [Private VLAN \(CLI\)](#) on Page 178.

## PVLAN Configuration

PVLAN Configuration allows you to assign a private VLAN type. Choose the private VLAN types for each VLAN you want configure.

**Note:** You must have previously configured a VLAN in the VLAN Configuration screen. Refer to [VLAN Configuration](#) on Page 95 for information.

**Private VLAN Configuration** Help

VLAN ID	Private VLAN Type
2	Primary
3	Isolated

Apply

### Private VLAN Configuration Page

VLAN ID	<ul style="list-style-type: none"> <li><i>Primary VLAN</i> - The uplink port is usually the primary VLAN. Ports within a primary VLAN can communicate with ports in a secondary VLAN</li> <li><i>Secondary VLAN</i> - The client ports are usually defined within secondary VLAN. The secondary VLAN includes Isolated VLAN and Community VLANs. The client ports can be isolated VLANs or can be grouped in the same Community VLAN. The ports within the same community VLAN can communicate with each other. However, the isolated VLAN ports cannot.</li> </ul>
---------	---

<b>Private VLAN Configuration Page (Continued)</b>	
Private VLAN Type	<ul style="list-style-type: none"><li>• <b>None:</b> The VLAN is not included in private VLAN.</li><li>• <b>Primary:</b> A primary VLAN contains promiscuous ports that can communicate with the secondary VLANs.</li><li>• <b>Isolated:</b> The member ports of the VLAN are isolated.</li><li>• <b>Community:</b> The member ports of the VLAN can communicate with each other.</li></ul>
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## PVLAN Port Configuration

The *PVLAN Port Configuration* page allows you to configure the port configuration and private VLAN associations.

### PVLAN Port Configuration Help

#### Port Configuration

Port	PVLAN Port Type	VLAN ID
1	Normal	None
2	Normal	None
3	Normal	None
4	Normal	None
5	Normal	None
6	Normal	None
7	Normal	None
8	Normal	None
9	Normal	None
10	Normal	None
11	Normal	None
12	Normal	None
13	Normal	None
14	Normal	None
15	Normal	None
16	Normal	None
17	Normal	None
18	Normal	None
19	Normal	None
20	Normal	None
21	Normal	None
22	Normal	None
23	Normal	None
24	Normal	None
25	Normal	None
26	Normal	None
27	Normal	None
28	Normal	None

Apply

#### Private VLAN Association

Secondary VLAN	Primary VLAN

Private VLAN Port Configuration Page	
PVLAN Port Type	<p>The following options are available:</p> <p><b>Normal:</b> Normal ports remain in their original VLAN configuration.</p> <p><b>Host:</b> Host ports can be mapped to the secondary VLAN.</p> <p><b>Promiscuous:</b> Promiscuous ports can be associated to the primary VLAN.</p>
VLAN ID	<p>After assigning the port type, this displays the available VLAN ID for which the port can associate.</p>

Private VLAN Port Configuration Page (Continued)	
Private VLAN Association	
Secondary VLAN	After the isolated and community VLANs are configured in the <i>Private VLAN Configuration</i> page, the VLANs belonging to the second VLAN are displayed.
Primary VLAN	After the Primary VLAN Type is assigned in <i>Private VLAN Configuration</i> page, the secondary VLAN can associate to the primary VLAN ID. <b>Note:</b> Before configuring PVLAN port type, the private VLAN Association should be done first.

### PVLAN Information

---

The *PVLAN Information* page allows you to see the private VLAN information. Click **Reload** to refresh the page contents.

#### PVLAN Information

[Help](#)

Primary VLAN	Secondary VLAN	Secondary VLAN Type	Port
2	--	--	--
--	3	Isolated	--

[Reload](#)

## GVRP Configuration

GARP VLAN Registration Protocol (GVRP) allows you to set-up VLANs automatically rather than manual configuration on every port on every switch in the network. GVRP conforms to the IEEE 802.1Q specification. This defines a method of tagging frames with VLAN configuration data that allows network devices to dynamically exchange VLAN configuration information with other devices.

GARP (Generic Attribute Registration Protocol), a protocol that defines procedures by which end stations and switches in a local area network (LAN) can register and de-register attributes, such as identifiers or addresses, with each other. Every end station and switch thus has a current record of all the other end stations and switches that can be reached. GVRP, like GARP, eliminates unnecessary network traffic by preventing attempts to transmit information to unregistered users. In addition, it is necessary to manually configure only one switch and all the other switches are configured accordingly.

**GVRP Configuration**

---

**GVRP Protocol**

Port	State	Join Timer	Leave Timer	Leave All Timer
1	Disable <input type="button" value="v"/>	20	60	1000
2	Disable <input type="button" value="v"/>	20	60	1000
3	Disable <input type="button" value="v"/>	20	60	1000
4	Disable <input type="button" value="v"/>	20	60	1000
5	Disable <input type="button" value="v"/>	20	60	1000
6	Disable <input type="button" value="v"/>	20	60	1000
7	Disable <input type="button" value="v"/>	20	60	1000
8	Disable <input type="button" value="v"/>	20	60	1000
9	Disable <input type="button" value="v"/>	20	60	1000
10	Disable <input type="button" value="v"/>	20	60	1000
11	Disable <input type="button" value="v"/>	20	60	1000
12	Disable <input type="button" value="v"/>	20	60	1000
13	Disable <input type="button" value="v"/>	20	60	1000
14	Disable <input type="button" value="v"/>	20	60	1000
15	Disable <input type="button" value="v"/>	20	60	1000
16	Disable <input type="button" value="v"/>	20	60	1000
17	Disable <input type="button" value="v"/>	20	60	1000
18	Disable <input type="button" value="v"/>	20	60	1000
19	Disable <input type="button" value="v"/>	20	60	1000
20	Disable <input type="button" value="v"/>	20	60	1000
21	Disable <input type="button" value="v"/>	20	60	1000
22	Disable <input type="button" value="v"/>	20	60	1000
23	Disable <input type="button" value="v"/>	20	60	1000
24	Disable <input type="button" value="v"/>	20	60	1000
25	Disable <input type="button" value="v"/>	20	60	1000
26	Disable <input type="button" value="v"/>	20	60	1000
27	Disable <input type="button" value="v"/>	20	60	1000
28	Disable <input type="button" value="v"/>	20	60	1000

**Note:** Timer unit is centisecond.

---

<b>GVRP Configuration Page</b>	
GVRP Protocol	Allows you to <b>Enable/Disable</b> GVRP globally.
State	After enabling GVRP globally, you can still <b>Enable/Disable</b> GVRP by port.
Join Timer	Controls the interval of sending the GVRP Join BPDU (Bridge Protocol Data Unit). An instance of this timer is required on a per-port, per-GARP participant basis.
Leave Timer	Controls the time to release the GVRP reservation after having received the GVRP Leave BPDU. An instance of the timer is required for each state machine that is in the LV state.
Leave All Timer	Controls the period to initiate the garbage collection of registered VLAN. The timer is required on a per-port, per-GARP participant basis.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

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## Traffic Prioritization

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Quality of Service (QoS) provides a traffic prioritization mechanism which allows you to deliver better service to certain flows. QoS can also help to alleviate congestion problems and ensure high-priority traffic is delivered first. This section allows you to configure *Traffic Prioritization* settings for each port with regard to setting priorities.

The ES9528-XT QoS supports eight physical queues, weighted fair queuing (WRR) and Strict Priority scheme, that follows the IEEE 802.1p CoS tag and IPv4 TOS/DiffServ information to prioritize the traffic of your industrial network.

The following web pages are included in this group:

- [QoS Setting](#)
- [CoS-Queue Mapping](#) on Page 108
- [DSCP-Queue Mapping](#) on Page 109

Optionally, you can use the CLI for configuration, see [Traffic Prioritization \(CLI\)](#) on Page 182.

## QoS Setting

---

Use this subsection to set up QoS settings for the ES9528-XT.

### QoS Setting

---

#### QoS Trust Mode

- 802.1P Priority Tag
  - DSCP/TOS Code Point
- 

#### Queue Scheduling

- Strict Priority Scheme
- Weighted Round Robin Scheme

Queue	0	1	2	3	4	5	6	7
Weight	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾

Note: Set all of the priority index to 1 means the standard Round Robin schemem.

---

#### Port Setting

Port	Queue
1	0 ▾
2	0 ▾
3	0 ▾
4	0 ▾
5	0 ▾
6	0 ▾
7	0 ▾
8	0 ▾
9	0 ▾
10	0 ▾
11	0 ▾
12	0 ▾
13	0 ▾
14	0 ▾
15	0 ▾
16	0 ▾
17	0 ▾
18	0 ▾
19	0 ▾
20	0 ▾
21	0 ▾
22	0 ▾
23	0 ▾
24	0 ▾
25	0 ▾
26	0 ▾
27	0 ▾
28	0 ▾

---

<b>QoS Setting Page</b>	
<b>QoS Trust Mode</b>	
802.1P priority tag	If 802.1P is selected the ES9528-XT relies on a packet's CoS information to determine priority. This is related to the settings in the <i>CoS-Queue Mapping</i> page.
DSCP/TOS code point	If DSCP/TOS is selected the switch will rely on a packet's differentiated services code point information to determine priority. This is related to the settings in the <i>DSCP-Priority Mapping</i> page.
<b>Queue Scheduling</b>	
Strict priority scheme	Packets with higher priority in the queue are always processed first, except that there is no packet with higher priority.
Weighted Round Robin scheme	This scheme allows you to assign new weight ratio for each class. The 10 is the highest ratio. The ratio of each class is: $W_x / W_0 + W_1 + W_2 + W_3 + W_4 + W_5 + W_6 + W_7$ (Total volume of Queue 0-7)
<b>Port Setting</b>	
Priority	Indicates the default port priority value for untagged or priority-tagged frames. When the ES9528-XT receives the frames, the ES9528-XT attaches the value to the CoS field of the incoming VLAN-tagged packets. You can enable 0,1,2,3,4,5,6 or 7 to the port. Default priority type is <b>COS</b> . The system provides default CoS-Queue table to which you can refer for the next command.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## CoS-Queue Mapping

---

Use this page to change the CoS values into a Physical Queue mapping table. Since the switch fabric of the ES9528-XT supports eight queues, Lowest, Low, Middle and High. You should therefore assign how to map CoS value to the level of the physical queue.

Class of service (CoS) is a 3 bit field within a layer two Ethernet frame header defined by IEEE 802.1p when using IEEE 802.1Q tagging. The field specifies a priority value of between 0 and 7 inclusive that can be used by Quality of Service (QoS) disciplines to differentiate traffic.

While CoS operates only on Ethernet at the data link layer, other QoS mechanisms (such as DiffServ) operate at the network layer and higher. Others operate on other physical layers. Although IEEE 802.1Q tagging must be enabled to communicate priority information from switch to switch, some switches use CoS to internally classify traffic for QoS purposes.

Differentiated Services (DiffServ) is a model where traffic is treated by intermediate systems with relative priorities based on the type of services (ToS) field. Defined in RFC2474 and RFC2475, the DiffServ standard supersedes the original specification for defining packet priority described in RFC791. DiffServ increases the number of definable priority levels by reallocating bits of an IP packet for priority marking. The DiffServ architecture defines the DiffServ field, which supersedes the ToS field in IPv4 to make per-hop behavior (PHB) decisions about packet classification and traffic conditioning functions, such as; metering, marking, shaping, and policing.

### CoS-Queue Mapping

COS	0	1	2	3	4	5	6	7
Queue	0 ▾	1 ▾	2 ▾	3 ▾	4 ▾	5 ▾	6 ▾	7 ▾

Note : Queue 7 is the highest priority queue in using Strict Priority scheme.

After configuration, press **Apply** to enable the settings.

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

## DSCP-Queue Mapping

Use this page to change DSCP values to Physical Queue mapping table. Since the switch fabric of the ES9528-XT only supports eight queues. Lowest, Low, Middle and High users should therefore assign how to map DSCP values to the level of the physical queue. You should therefore assign how to map DSCP value to the level of the queue. You can change the mapping table to follow the upper layer 3 switch or routers' DSCP setting.

**DSCP-Priority Mapping**

---

DSCP	0	1	2	3	4	5	6	7
Priority	0 ▾	0 ▾	0 ▾	0 ▾	0 ▾	0 ▾	0 ▾	0 ▾
DSCP	8	9	10	11	12	13	14	15
Priority	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾	1 ▾
DSCP	16	17	18	19	20	21	22	23
Priority	2 ▾	2 ▾	2 ▾	2 ▾	2 ▾	2 ▾	2 ▾	2 ▾
DSCP	24	25	26	27	28	29	30	31
Priority	3 ▾	3 ▾	3 ▾	3 ▾	3 ▾	3 ▾	3 ▾	3 ▾
DSCP	32	33	34	35	36	37	38	39
Priority	4 ▾	4 ▾	4 ▾	4 ▾	4 ▾	4 ▾	4 ▾	4 ▾
DSCP	40	41	42	43	44	45	46	47
Priority	5 ▾	5 ▾	5 ▾	5 ▾	5 ▾	5 ▾	5 ▾	5 ▾
DSCP	48	49	50	51	52	53	54	55
Priority	6 ▾	6 ▾	6 ▾	6 ▾	6 ▾	6 ▾	6 ▾	6 ▾
DSCP	56	57	58	59	60	61	62	63
Priority	7 ▾	7 ▾	7 ▾	7 ▾	7 ▾	7 ▾	7 ▾	7 ▾

---

After configuration, press **Apply** to enable the settings.

**Note:** You must *Save the settings* ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

## Multicast Filtering

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For multicast filtering, the ES9528-XT uses IGMP (Internet Group Management Protocol) Snooping technology. IGMP is an internet protocol that provides a way for internet device to report its multicast group membership to adjacent routers. Multicasting allows one computer on the internet to send data to a multitude of other computers that have identified themselves as being interested in receiving the originating computer's data.

Multicasting is useful for such applications as updating the address books of mobile computer users in the field, sending out newsletters to a distribution list, and broadcasting streaming media to an audience that has tuned into the event by setting up multicast group membership.

In effect, IGMP Snooping manages multicast traffic by making use of switches, routers, and hosts that support IGMP. Enabling IGMP Snooping allows the ports to detect IGMP queries, report packets, and manage multicast traffic through the switch. IGMP has three fundamental types of messages, as shown in the following table.

Messages	
Query	A message sent from the querier (an IGMP router or a switch) that asks for a response from each host that belongs to the multicast group.
Report	A message sent by a host to the querier to indicate that the host wants to be or is a member of a given group indicated in the report message.
Leave Group	A message sent by a host to the querier to indicate that the host has quit as a member of a specific multicast group.

You can enable **IGMP Snooping** and **IGMP Query** functions. This section illustrates the information of the IGMP Snooping function, including different multicast groups' VID and member ports, and IP multicast addresses that range from 224.0.0.0 to 239.255.255.255.

The following web pages are included in this group:

- [IGMP Query](#) on Page 111
- [IGMP Snooping](#) on Page 112
- [GMRP Configuration](#) on Page 113

Optionally, you can use the CLI for configuration, see [Multicast Filtering \(CLI\)](#) on Page 185.

## IGMP Query

Use this page to configure the *IGMP Query* feature. Since the ES9528-XT can only be configured by member ports of the management VLAN, the IGMP Query can only be enabled on the management VLAN. If you want to run IGMP Snooping feature in several VLANs, first check to see whether each VLAN has its own IGMP Querier.

The IGMP querier periodically sends query packets to all end-stations on the LANs or VLANs that are connected to it. For networks with more than one IGMP querier, a switch with the lowest IP address becomes the IGMP querier.

**IGMP Query**

---

Enable	Disable ▾
Version	v2 ▾
Query Interval	125
Query Maximum Response Time(s)	10

---

IGMP Query Page	
Version	<p>Select <b>Version 1</b>, <b>Version 2</b> or <b>Disable</b>.</p> <ul style="list-style-type: none"> <li><b>Version 1</b> means IGMP V1 General Query</li> <li><b>Version 2</b> means IGMP V2 General Query. The query is forwarded to all multicast groups in the VLAN.</li> <li><b>Disable</b> allows you to disable IGMP Query.</li> </ul>
Query Interval(s)	The period of query (seconds) sent by querier. Enter a number between 1 and 65,535.
Query Maximum Response Time	This option is available when you select <b>Version 2</b> . The span querier detect (seconds) to confirm there are no more directly connected group members on a LAN. Enter a number between 1 and 25.
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## IGMP Snooping

Use this page to enable the IGMP Snooping feature, assign IGMP Snooping for specific VLANs, and view the *IGMP Snooping Table* from a dynamic learnt or static that you provide..

IGMP Snooping/Filtering Help

---

IGMP Snooping Global Setting Disable ▼

Apply

---

IGMP Snooping VLAN Setting

VLAN	IGMP Snooping	Filtering Mode
1	Disable ▼	Broadcast Unknown ▼

Apply

---

IGMP Snooping Table

Multicast Address	VLAN ID	Interface

Reload

<b>IGMP Snooping Page</b>	
IGMP Snooping Global Setting	You can select to <b>Enable</b> or <b>Disable</b> IGMP Snooping. After enabling IGMP Snooping, you can then enable IGMP Snooping for specific VLAN using the <i>IGMP Snooping VLAN Setting</i> table.
<b>IGMP Snooping VLAN Setting</b>	
VLAN	Refers to the VLAN number that was configured using the <i>VLAN Configuration</i> page.
IGMP Snooping	Select <b>Enable</b> to start IGMP snooping on the selected VLAN.
Filtering Mode	The available filtering modes are: <ul style="list-style-type: none"> <li><b>Broadcast-Unknown-</b> The unknown multicast is broadcast to all ports even if they are not member ports of the groups.</li> <li><b>Discard-Unknown -</b> The unknown multicast is discarded. Non-member ports do not receive the unknown multicast streams.</li> <li><b>Source-only-learning -</b> This is forwarding unknown multicast traffic to all ports that are already members of a multicast group.</li> </ul>
IGMP Snooping Table	This table displays the multicast group IP address, VLAN ID it belongs to, and member ports of the multicast group. The ES9528-XT supports 256 multicast groups. Click <b>Reload</b> to refresh the table.

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

## GMRP Configuration

GARP Multicast Registration Protocol (GMRP) is a Generic Registration Protocol (GARP) application that provides a multicast traffic management facility at Layer 2 similar to what IGMP provides at Layer 3. GMRP and GARP are industry-standard protocols first introduced as part of IEEE 802.1D.

GMRP Configuration	
GMRP Global Setting	Enable/Disable GMRP protocol.
State	The state of the GMRP operation on a selected port. The value enabled indicates that the GMRP is enabled on this port as long as the GMRP protocol is also enabled for this device. When disabled, but the GMRP protocol is still enabled for the device, GMRP is disabled on the selected port.
Apply	Click <b>Apply</b> to apply the settings.  <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

### GMRP Configuration Help

GMRP Global Setting Disable ▾

Apply

### GMRP Port Setting

Port	State
1	Disable
2	Disable
3	Disable
4	Disable
5	Disable
6	Disable
7	Disable
8	Disable
9	Disable
10	Disable
11	Disable
12	Disable
13	Disable
14	Disable
15	Disable
16	Disable
17	Disable
18	Disable
19	Disable
20	Disable
21	Disable
22	Disable
23	Disable
24	Disable
25	Disable
26	Disable
27	Disable
28	Disable

Apply

## SNMP

---

Simple Network Management Protocol (SNMP) is a protocol to exchange management information between network devices. SNMP is a member of the TCP/IP protocol suite. The ES9528-XT supports SNMP v1 and v2c and v3.

An SNMP managed network consists of two main components: agents and a manager. An agent is a management software module that resides in a managed switch. An agent translates the local management information from the managed device into a SNMP compatible format. The manager is the console through the network.

The following web pages are included in this group:

- [SNMP Configuration](#)
- [SNMP V3 Profile](#) on Page 115
- [SNMP Traps](#) on Page 116

Optionally, you can use the CLI for configuration, see [SNMP \(CLI\)](#) on Page 189.

### SNMP Configuration

---

Use this page to configure the SNMP v1/v2c Community. The community string can be viewed as the password because SNMP v1/v2c does not request you to enter a password before you try to access the SNMP agent.

**SNMP V1/V2c Configuration** Help

	Community String	Privilege
<input type="checkbox"/>	public	Read Only ▾
<input type="checkbox"/>	private	Read and Write ▾
<input type="checkbox"/>		Read Only ▾
<input type="checkbox"/>		Read Only ▾

Apply
Remove

The community includes two privileges:

- **Read Only** privilege, you only have the ability to read the values of MIB tables. The default community string is **public**.
- **Read and Write** privilege, you have the ability to read and set the values of MIB tables. The default community string is **private**.

The ES9528-XT allows you to assign four community strings. Type the community string, select the privilege, and then click **Apply**.

**Note:** *When you first install the device in your network, we recommend that you change the community string. Most SNMP management applications use public and private as the default community name, this could be a network security leak.*

## SNMP V3 Profile

SNMP v3 can provide more security functions when you perform remote management through SNMP protocol. It delivers SNMP information to the administrator with user authentication; all of data between the ES9528-XT and the administrator are encrypted to ensure secure communication.

**SNMP V3 Profile**

---

**SNMP V3**

User Name	<input type="text"/>
Security Level	None <input type="button" value="v"/>
Authentication Level	MD5 <input type="button" value="v"/>
Authentication Password	<input type="text"/>
DES Password	<input type="text"/>

---

**SNMP V3 Users**

User Name	Security Level	Authentication Protocol	Authentication Password	Privacy Protocol	Privacy Password

SNMP V3 Profile Page	
User Name	SNMP v3 user name.
Security Level	Select the following levels of security: <b>None</b> , <b>Authentication</b> , and <b>Authentication and Privacy</b> .
Authentication Level	<p>Select either <b>MD5</b> (Message-Digest algorithm 5) or <b>SHA</b> (Secure Hash Algorithm).</p> <ul style="list-style-type: none"> <li><b>MD5</b> is a widely used cryptographic hash function with a 128-bit hash value.</li> <li><b>SHA</b> functions refer to five Federal Information Processing Standard-approved algorithms for computing a condensed digital representation.</li> </ul> <p>The ES9528-XT provides two user authentication protocols in MD5 and SHA. You need to configure SNMP v3 parameters for your SNMP tool with the same authentication method.</p>
Authentication Password	Enter the SNMP v3 user authentication password.
DES Password	Enter the password for SNMP v3 user DES Encryption.
Add	Click to add an SNMP v3 user.
SNMP V3 Users	<p>This table provides SNMP v3 user information.</p> <p>Click <b>Remove</b> to remove a selected SNMP v3 user.</p> <p>Click <b>Reload</b> to reload SNMP v3 user information.</p>

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

## SNMP Traps

SNMP Trap is the notification feature defined by SNMP protocol. All the SNMP management applications can understand such trap information. So you do not need to install new applications to read the notification information.

SNMP Trap Page	
SNMP Trap	Click <b>Enable</b> or <b>Disable</b> SNMP trap functionality.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.
SNMP Trap Server	
Server IP	The SNMP trap server IP address.
Community	The SNMP trap server community string.
Version	The SNMP trap version, V1 or V2c.
Add	Click the <b>Add</b> button to add a SNMP server.
Trap Server Profile	
Server IP	The SNMP trap server IP address
Community	The SNMP trap server community string.
Version	The SNMP trap version, V1 or V2c.
Remove	Click <b>Remove</b> to remove selected SNMP server.
Reload	Click the <b>Reload</b> button to reload SNMP server information.

You can see the change of the SNMP predefined standard traps and Control pre-defined traps. The pre-defined traps can be found on the [Control ftp site](#).

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

**SNMP Trap**
Help

---

SNMP Trap
Disable ▾

---

SNMP Trap Server

Server IP	<input style="width: 90%;" type="text"/>
Community	<input style="width: 90%;" type="text"/>
Version	V1 ▾

---

Trap Server Profile

Server IP	Version	Community

---

## Security

---

The ES9528-XT provides several security features for you to secure your connection. The following pages are included in this group:

- [Filter Set \(Access Control List\)](#)
  - [IP Filter](#) on Page 118
  - [MAC Filter \(Port Security\)](#) on Page 120
  - [Filter Attach](#) on Page 122
- [802.1X Configuration](#) on Page 123
- [802.1X Port Configuration](#) on Page 125
- [802.1X Port Information](#) on Page 127

Optionally, you can use the CLI for configuration, see [Security \(CLI\)](#) on Page 190.

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### Filter Set (Access Control List)

---

The Filter Set is known as Access Control List (ACL) feature. There are two major types:

- [IP Filter](#) on Page 118, which is called IP security in other RocketLinux models and supports the IP Standard access list, and advanced IP based access lists.
- [MAC Filter \(Port Security\)](#) on Page 120, which is called Port Security in other RocketLinux switches. It allows you to define the access rule based on the MAC address.

You can use Access Control Entry (ACE) to define a Permit or Deny rule for specific IP or MAC address, or IP groups by network mask in each ACE. One ACL may include several ACEs. The system checks the ACEs one after another and forwards the data based on the result.

If the rules conflict, the oldest entry is selected.

IP Filter

Click **IP Filter** and type the **ID/Name** to configure security using IP addresses. Click **Reload** to refresh settings and **Delete** to remove one of the entries.

**IP Filter**

---

**IP Filter Group**

(1-99) IP Standard Access List  
 (100-199) IP Extended Access List  
 (1300-1999) IP Standard Access List (expanded range)  
 (2000-2699) IP Standard Access List (expanded range)

Select	Group Number	Type
<input type="checkbox"/>		

---

**IP Filter Setting**

Group Number	<input type="text"/>
Source IP	<input type="text"/>
Source Wildcard	<input type="text" value="any"/>
Destination IP	<input type="text"/>
Destination Wildcard	<input type="text" value="any"/>
Protocol	<input type="text" value="IP"/>
Action	<input type="radio"/> Permit <input type="radio"/> Deny

---

**IP Filter List**

Select	Group Number	Type	Source IP	Source Wildcard	Destination IP	Destination Wildcard	Protocol	Action
<input type="checkbox"/>								

IP Filter	
IP Filter Group	Enter an applicable Group Number to specify whether it is an IP Standard and IP Extended access list. <ul style="list-style-type: none"> <li>IP Standard Access List This type of ACL allows you to define filter rules according to the source IP address.</li> <li>IP Extended Access List This type of ACL allows you to define filter rules according to the source IP address, destination IP address, Source TCP/UDP port, destination TCP/UDP port and ICMP type and code.</li> </ul>
Add	After entering an IP filter group number, click <b>Add</b> .
Select	Select this field to delete or reload this entry.
Group Number	This is the number that represents the Filter Group.
Type	This is the Filter Group type (standard or extended).
Reload	Reloads the rule table.

Highlight an IP Filter ID/Name and click **Edit** to configure the IP Filter Rules.

IP Filter List	
Group Number	This is the Filter Group number.
Source IP	Type the source IP address of the packet.
Source Wildcard	This is the mask of the source IP address.
Destination IP	This is the destination IP address of the packet.
Destination Wildcard	This is the mask of the destination IP address.
Add	Adds the rule to the Filter.
Remove	Removes the selected rule from the Filter.

Wildcard	Bit	Number of Allowances	Note
Any	11111111.11111111	All	All IP addresses or a mask 255.255.255.255
Host	0.0.0.0	1	Only the source or destination
0.0.0.3	0.0.0.0.(00000011)	3	
0.0.0.7	0.0.0.0.(00000111)	7	
0000.0000.000F	0.0.0.0.(11111111)	15	
....			

**Note:** The mask is a wildcard mask: the high-order bits of the mask that are binary zeros determine how many corresponding high-order bits in the IP address are significant. The selected action applies to any source address with these high-order bits.

MAC Filter (Port Security)

The MAC Filter allows you to define the Access Control List for a specific MAC address or a group of MAC addresses.

**MAC Filter**

---

**MAC Filter Group**

Select	Group Name
<input type="checkbox"/>	eng

---

**MAC Filter Setting**

Group Name	eng <input type="button" value="v"/>
Source MAC	<input type="text"/>
Source Wildcard	any <input type="button" value="v"/>
Destination MAC	<input type="text"/>
Destination Wildcard	any <input type="button" value="v"/>
Action	<input type="radio"/> Permit <input type="radio"/> Deny
<input type="button" value="Add"/>	

---

**MAC Filter List**

Select	Group Name	Source MAC	Source Wildcard	Destination MAC	Destination Wildcard	Action
<input type="checkbox"/>						

---

MAC Filter	
MAC Filter Group	The name for this MAC Filter entry.
Select	If you select this and click the Delete button, the corresponding Filter Group is deleted.
Group Name	This is the MAC group name
Reload	Click Reload to reload the Filter Group table.
MAC Filter Setting	
Group Name	This is the MAC Filter Group name.
Source MAC	Type the MAC address that you want to configure. The format is AABB.CCDD.EEFF.
Source Wildcard	You can define a single host or a group of hosts based on the wildcard. Some of the allowance examples are shown in the following table.
Destination MAC	Type the MAC address that you want to configure. The format is AABB.CCDD.EEFF.
Destination Wildcard	You can define a single host or a group of hosts based on the wildcard. Some of the allowance examples are shown in the following table.
Action	Select <b>Permit</b> to allow traffic from specified sources or <b>Deny</b> to deny traffic from those sources.

Wildcard	Bit	Number of Allowances	Note
Any	1111.1111.1111	All	
Host		1	Only the source or destination
0000.0000.0003	0000.0000.000(00000011)	3	
0000.0000.0007	0000.0000.000(00000111)	7	
0000.0000.000F	0000.0000.000(11111111)	15	
....			

Highlight an IP Filter ID/Name and click **Edit** to configure the IP Filter Rules.

MAC Filter List	
Group Number	This is the Filter Group number.
Source IP	Type the source IP address of the packet.
Source Wildcard	This is the mask of the source IP address.
Destination IP	This is the destination IP address of the packet.
Destination Wildcard	This is the mask of the destination IP address.
Add	Adds the rule to the Filter.
Delete	Removes the selected rule from the Filter.

Once you finish configuring the MAC settings, click **Add** to apply your configuration.

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

### Filter Attach

---

Initially, the interfaces associated with the selected device have no Filter attached to them. To attach or detach a Filter: select the port for the interface to which you want to attach a Filter or from which you want to detach a Filter.

**Filter Attach**

---

**Filter Attach**

Port	Port 1 ▾
MAC Filter	-- ▾
IP Filter	-- ▾

---

**Filter Attach List**

Port	MAC Filter	IP Filter
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		

---

Click the **Apply** button to apply the Filter configurations.

**Note:** You must **Save** the settings ([Page 142](#)), if you want to maintain these settings if the ES9528-XT is powered off.

## 802.1X Configuration

IEEE 802.1X is the protocol that performs authentication to obtain access to IEEE 802 LANs. It is port-base network access control. With the function, the ES9528-XT could control which connection is available or not.

### 802.1X Configuration Help

**System Auth Control** Disable ▾

**Authentication Method** RADIUS ▾

Apply

#### RADIUS Server

RADIUS Server IP	<input type="text" value="192.168.10.100"/>
Shared Key	<input type="text" value="radius-key"/>
Server Port	<input type="text" value="1812"/>
Accounting Port	<input type="text" value="1813"/>

#### Secondary RADIUS Server

RADIUS Server IP	<input type="text"/>
Shared Key	<input type="text"/>
Server Port	<input type="text"/>
Accounting Port	<input type="text"/>

Apply

#### Local RADIUS User

User Name	Password	VID
<input type="text"/>	<input type="text"/>	<input type="text"/>

Apply

#### Local RADIUS User List

Delete	Name	Password	VID
<input type="checkbox"/>			

Delete

IEEE 802.1x Page	
System Auth Control	<b>Enable</b> or <b>Disable</b> the IEEE 802.1x authentication.
Authentication Method	<b>RADIUS</b> is an authentication server that provides a key for authentication. When you use this method, you must connect the switch to the server. If you select <b>Local</b> for the authentication method, the switch uses the local user database that can be created in this page for authentication.
RADIUS Server	
RADIUS Server IP	The IP address of the RADIUS server.
Shared Key	The password used to communicate between the ES9528-XT and the RADIUS Server.
Server Port	The UDP port of the RADIUS server.

<b>IEEE 802.1x Page (Continued)</b>	
Accounting Port	The port for packets that contains the account login or logout information.
<b>Secondary RADIUS Server</b>	
RADIUS Server IP	You can set a Secondary RADIUS Server, if the primary RADIUS server goes down.
Shared Key	The password used to communicate between the ES9528-XT and the secondary RADIUS Server.
Server Port	The UDP port of the secondary RADIUS server.
Accounting Port	The port for packets that contains the account login or logout information for the secondary server.
Local RADIUS User	<p>You can add an Account/Password for local authentication.</p> <ul style="list-style-type: none"> <li>• User name: The user name of the local RADIUS user.</li> <li>• Password: The password of the local RADIUS user.</li> <li>• VID: The VLAN ID (VID) of the local RADIUS user.</li> </ul> <p>Click the <b>Add</b> button to add a local RADIUS user.</p>
Local RADIUS User List	<p>Shows the account information, select <b>Remove</b> to remove a selected account.</p> <ul style="list-style-type: none"> <li>• User name: The user name of the local RADIUS user.</li> <li>• Password: The password of the local RADIUS user.</li> <li>• VID: The VLAN ID (VID) of the local RADIUS user.</li> </ul>

## 802.1X Port Configuration

After configuring the **RADIUS Server** or **Local RADIUS User List**, you also need to configure the authentication mode, authentication behavior, applied VLAN for each port, and permitted communications.

802.1X Port Configuration [Help](#)

### 802.1X Port Configuration

Port	Port Control	Re-authentication	Max Request	Guest VLAN	Host Mode	Admin Control Direction
<input type="checkbox"/> 1	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 2	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 3	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 4	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 5	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 6	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 7	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 8	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 9	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 10	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 11	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 12	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 13	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 14	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 15	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 16	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 17	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 18	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 19	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 20	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 21	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 22	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 23	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 24	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 25	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 26	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 27	Force Authorized	Disable	2	0	Single	Both
<input type="checkbox"/> 28	Force Authorized	Disable	2	0	Single	Both

### 802.1X Timeout Configuration

Port	Re-Auth Period(s)	Quiet Period(s)	Tx period(s)	Supplicant Timeout(s)	Server Timeout(s)
1	3600	60	30	30	30
2	3600	60	30	30	30
3	3600	60	30	30	30
4	3600	60	30	30	30
5	3600	60	30	30	30
6	3600	60	30	30	30
7	3600	60	30	30	30
8	3600	60	30	30	30
9	3600	60	30	30	30
10	3600	60	30	30	30
11	3600	60	30	30	30
12	3600	60	30	30	30
13	3600	60	30	30	30
14	3600	60	30	30	30
15	3600	60	30	30	30
16	3600	60	30	30	30
17	3600	60	30	30	30
18	3600	60	30	30	30
19	3600	60	30	30	30
20	3600	60	30	30	30
21	3600	60	30	30	30
22	3600	60	30	30	30
23	3600	60	30	30	30
24	3600	60	30	30	30
25	3600	60	30	30	30
26	3600	60	30	30	30
27	3600	60	30	30	30
28	3600	60	30	30	30

<b>802.1x Port Configuration Page</b>	
Port control	<b>Force Authorized</b> means that this port is authorized; the data is free to move in/out. <b>Force unauthorized</b> is just the opposite, the port is blocked. To control this port with a RADIUS server, select <b>Auto</b> for port control.
Reauthentication	If this field is enabled, the ES9528-XT requests the client to re-authenticate. The default time interval is 3600 seconds.
Max Request	This is the maximum times that the ES9528-XT allows a client request.
Guest VLAN	The permitted range for this field is 0 to 4094. If this field is set to 0, that means the port is blocked after an authentication failure. Otherwise, the port is set to Guest VLAN.
Host Mode	If there is more than one device connected to this port, set the Host Mode to <b>Single</b> , which means only the first PC to authenticate successfully can access this port. If this port is set to <b>Multi</b> , all of the devices can access this port once any one of them passes the authentication.
Admin Control Direction	Use this to determine which devices can only send data or both send and receive data.
Apply	Click <b>Apply</b> to apply the settings.
Initialize Selected	Click to set the authorization state of the selected port to initialize status.
Reauthenticate Selected	Click to send an EAP Request to the requestor to request reauthentication.
Default Selected	Click to reset the configurable IEEE 802.1x parameters of selected port to the default values.
<b>802.1x Timeout Configuration</b>	
Re-Auth Period(s)	Controls the re-authentication time interval (seconds), you can enter a range of 1 - 65535.
Quiet Period(s)	When authentication fails, the ES9528-XT waits for a period and then tries to communicate with the RADIUS server again.
Tx Period(s)	The time interval of the authentication request.
Supplicant Timeout(s)	The timeout for the client authentication.
Sever Timeout(s)	The timeout for the server response for authentication.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## 802.1X Port Information

Use the *802.1X Port Information* page to observe the port status for **Port Control Status**, **Authorize Status**, **Authorized Supplicant**, and **Oper Control Direction** for each port.

### 802.1X Port Information

[Help](#)

Port	Port Control	Authorized Status	Authorized Supplicant	Oper Control Direction
1	Force Authorized	Authorized	NONE	Both
2	Force Authorized	Authorized	NONE	Both
3	Force Authorized	Authorized	NONE	Both
4	Force Authorized	Authorized	NONE	Both
5	Force Authorized	Authorized	NONE	Both
6	Force Authorized	Authorized	NONE	Both
7	Force Authorized	Authorized	NONE	Both
8	Force Authorized	Authorized	NONE	Both
9	Force Authorized	Authorized	NONE	Both
10	Force Authorized	Authorized	NONE	Both
11	Force Authorized	Authorized	NONE	Both
12	Force Authorized	Authorized	NONE	Both
13	Force Authorized	Authorized	NONE	Both
14	Force Authorized	Authorized	NONE	Both
15	Force Authorized	Authorized	NONE	Both
16	Force Authorized	Authorized	NONE	Both
17	Force Authorized	Authorized	NONE	Both
18	Force Authorized	Authorized	NONE	Both
19	Force Authorized	Authorized	NONE	Both
20	Force Authorized	Authorized	NONE	Both
21	Force Authorized	Authorized	NONE	Both
22	Force Authorized	Authorized	NONE	Both
23	Force Authorized	Authorized	NONE	Both
24	Force Authorized	Authorized	NONE	Both
25	Force Authorized	Authorized	NONE	Both
26	Force Authorized	Authorized	NONE	Both
27	Force Authorized	Authorized	NONE	Both
28	Force Authorized	Authorized	NONE	Both

[Reload](#)

## Warning

The ES9528-XT provides several types of warning features for you to remotely monitor the status of the attached devices or changes in your network. The features include Fault Relay, System Log, and SMTP Email Alert.

The following web pages are included in this group:

- [Fault Relay](#)
- [Event Selection](#) on Page 130
- [SysLog Configuration](#) on Page 131
- [SMTP Configuration](#) on Page 132

Optionally, you can use the CLI for configuration, see [Warnings \(CLI\)](#) on Page 194.

## Fault Relay

The ES9528-XT provides one alarm relay output (DO) that can support multiple fault conditions. The relay contacts are energized (open) for normal operation and close under fault conditions. The fault conditions include power failure, Ethernet port link faults, Ring topology changes, Ping failures, DI state changes or ping remote IP address failure.

**Fault Relay Setting** Help

---

<b>Relay 1</b>	
<input checked="" type="radio"/> None	Disable
<input type="radio"/> Power Failure	Power ID <input type="text" value="1"/> <span style="font-size: small;">▼</span>
<input type="radio"/> Port Failure	Port <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 13 <input type="checkbox"/> 14 <input type="checkbox"/> 15 <input type="checkbox"/> 16 <input type="checkbox"/> 17 <input type="checkbox"/> 18 <input type="checkbox"/> 19 <input type="checkbox"/> 20 <input type="checkbox"/> 21 <input type="checkbox"/> 22 <input type="checkbox"/> 23 <input type="checkbox"/> 24 <input type="checkbox"/> 25 <input type="checkbox"/> 26 <input type="checkbox"/> 27 <input type="checkbox"/> 28
<input type="radio"/> Super Ring Failure	Ring Failure
<input type="radio"/> Ping Failure	IP Address <input type="text"/>
<input type="radio"/> Ping Reset	IP Address <input type="text"/> Reset Time(s) <input type="text"/> Hold Time(s) <input type="text"/>
<input type="radio"/> Dry Output	On Period(s) <input type="text"/> Off Period(s) <input type="text"/>

<b>Fault Relay</b>	
Relay 1	This displays whether the Relay status is on or off. You must select a fault relay option and click <b>Apply</b> for the status to display as on.
LinkFailure	Monitors port link down events for the selected ports.
Super Ring failure	Monitors ring topology changes.
Ping Failure	If the target IP address does not reply to the ping request, the fault relay is enabled.
Ping Reset	<p>Pings target device and triggers the relay to emulate to emulate a power reset on the remote device if the remote system crashes.</p> <ul style="list-style-type: none"> <li><b>IP Address:</b> Remote device IP address whose power wiring is connected with relay output.</li> <li><b>Reset Time (Sec):</b> Duration that the relay contact is opened to emulate the power switch is off. After the reset time, the relay closes to emulate that the power switch is on.</li> <li><b>Hold Time (Sec):</b> Boot time that the remote device requires. After the relay contact closes the ES9528-XT starts pinging after the hold time.</li> </ul>

Fault Relay	
Dry Output	<p>The relay continuously opens and closes the contacts. The available range is 0-65535 seconds.</p> <p><b>Note:</b> Do not use this function with any other event.</p> <ul style="list-style-type: none"> <li>• <b>On Period:</b> Duration of the relay output short (closed).</li> <li>• <b>Off Period:</b> Duration of the relay output open.</li> </ul>
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

**Fault Relay Setting**

---

Relay 1	Status is Off		
<input type="checkbox"/> Link Failure	Port	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 13 <input type="checkbox"/> 14 <input type="checkbox"/> <input type="checkbox"/> 15 <input type="checkbox"/> 16 <input type="checkbox"/> 17 <input type="checkbox"/> 18 <input type="checkbox"/> 19 <input type="checkbox"/> 20 <input type="checkbox"/> 21 <input type="checkbox"/> 22 <input type="checkbox"/> 23 <input type="checkbox"/> 24 <input type="checkbox"/> 25 <input type="checkbox"/> 26 <input type="checkbox"/> 27 <input type="checkbox"/> 28	
<input type="checkbox"/> Super Ring Failure	Ring Failure		
<input type="checkbox"/> Ping Failure	IP Address	<input type="text"/>	
<input type="checkbox"/> Ping Reset	IP Address	Reset Time(s)	Hold Time(s)
	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Dry Output	On Period(s)	Off Period(s)	
	<input type="text"/>	<input type="text"/>	

---

## Event Selection

Event Types can be divided into two basic groups: System Events and Port Events. System Events are related to the overall function of the switch, whereas Port Events are related to the activity of specific ports.

**Event Selection**
Help

---

**System Event Selection**

Device Cold Start  
 Authentication Failure  
 Fault Relay 1  
 Ring Event  
 SFP Event

Device Warm Start  
 Time Synchronization Failure

**Port Event Selection**

Port	Link State
1	Disable ▾
2	Disable ▾
3	Disable ▾
4	Disable ▾
5	Disable ▾
6	Disable ▾
7	Disable ▾
8	Disable ▾
9	Disable ▾
10	Disable ▾
11	Disable ▾
12	Disable ▾
13	Disable ▾
14	Disable ▾
15	Disable ▾
16	Disable ▾
17	Disable ▾
18	Disable ▾
19	Disable ▾
20	Disable ▾
21	Disable ▾
22	Disable ▾
23	Disable ▾
24	Disable ▾
25	Disable ▾
26	Disable ▾
27	Disable ▾
28	Disable ▾

Apply
Cancel

System Event	Warning is sent when....
Device Cold Start	Power is cut off and then reconnected.
Device Warm Start	Reboot the device by CLI or web user interface.
Authentication failure	An incorrect password or SNMP Community String is entered.
Time Synchronize Failure	Accessing the NTP Server is failing.
Fault Relay	A Fault Relay has occurred.
Ring Event	A ring event has occurred.
Relay 1	Select Relay 1 and when this event occurs, the device sends notification.
SFP Event	The information read from the DDM SFP transceiver is over temperature or out the range of TX/RX power.

Port Event	Warning is sent when.....
Link-Up	The port is connected to another device.
Link-Down	The port is disconnected. For example, the cable is pulled out or the opposing devices is down.
Both	The link status changed.
Port Event	Warning Event is sent when.....
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

### SysLog Configuration

The *System Log* page provides the system administrator ES9528-XT events history. There are two System Log modes provided by the ES9528-XT, **Local** mode and **Remote** mode.

**Syslog Configuration**

---

Syslog Mode	Disable ▾
Remote IP Address	<input type="text"/>

Note: When enabled Local and Both mode, you can monitor the system logs in the [Monitor and Diag]/Event log] page.

---

Warning - SysLog Configuration Page	
Syslog Mode	There are two system logs available: <ul style="list-style-type: none"> <li><b>Local Mode:</b> The ES9528-XT prints the events that have been selected in the Event Selection page to the System Log table of the ES9528-XT. You can monitor the system logs in the <i>Monitor and Diag / Event Log</i> page.</li> <li><b>Remote Mode:</b> Assign the IP address of the System Log server. The ES9528-XT sends the events that occurred in the selected in <i>Event Selection</i> page to System Log server that you assign.</li> <li><b>Both:</b> This enables both <b>Local</b> and <b>Remote</b> modes.</li> </ul>
Remote IP Address	The IP address of the System log server.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

When enabling **Local** or **Both** modes, you can monitor the system logs in the *Monitor and Diag / Event Log* page.

## SMTP Configuration

The ES9528-XT supports an email alert feature. The ES9528-XT sends the events that have occurred to a remote email server. The email warning conforms to the SMTP standard.

The *E-mail Alert* page allows you to assign the SMTP Server IP, Sender E-mail, and Receiver E-mail. If the SMTP server requests authentication, you can set up the user name and password.

### SMTP Configuration Help

---

**Email Alert** Disable ▼

<b>SMTP Server IP</b>	<input type="text" value="192.168.0.1"/>
<b>Mail Account</b>	<input type="text" value="user@example.com"/>
<input type="checkbox"/> Authentication	
<b>User Name</b>	<input type="text"/>
<b>Password</b>	<input type="password"/>
<b>Confirm Password</b>	<input type="password"/>
<b>Rcpt Email Address 1</b>	<input type="text"/>
<b>Rcpt Email Address 2</b>	<input type="text"/>
<b>Rcpt Email Address 3</b>	<input type="text"/>
<b>Rcpt Email Address 4</b>	<input type="text"/>

Apply
Cancel

<b>SMTP Configuration Page</b>	
SMTP Server IP Address	Enter the IP address of the email server.
Mail Account	The mail account for the SMTP server.
Authentication	Click the check box to enable password.
User Name	Enter an email account name (maximum 40 characters).
Password	Enter the password of the email account.
Confirm Password	Re-type the password of the email account.
<i>You can set up to 4 email addresses to receive email alarm from the ES9528-XT.</i>	
Rcpt E-mail Address 1	The first email address to receive an email alert from the ES9528-XT (maximum 40 characters).
Rcpt E-mail Address 2	The second email address to receive an email alert from the ES9528-XT (maximum 40 characters).
Rcpt E-mail Address 3	The third email address to receive an email alert from the ES9528-XT (maximum 40 characters).
Rcpt E-mail Address 4	The fourth email address to receive an email alert from the ES9528-XT (maximum 40 characters).
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## Monitor and Diag

The ES9528-XT provides several web user interface pages for you to monitor the status of the switch or diagnostics when encountering problems related to the ES9528-XT. The features include MAC Address Table, Port Statistics, Port Mirror, Event Log, and Ping.

The following web pages are included in this group:

- [LLDP Configuration](#) on Page 133
- [MAC Address Table](#)
- [Port Statistics](#) on Page 137
- [Port Mirroring](#) on Page 139
- [Event Logs](#) on Page 140
- [Ping Utility](#) on Page 140

Optionally, you can use the CLI for configuration, see [Monitor and Diag \(CLI\)](#) on Page 197.

### LLDP Configuration

The ES9528-XT supports topology discovery or LLDP (IEEE 802.1AB Link Layer Discovery Protocol) functionality that can help to discovery multi-vendor’s network devices on the same segment by a network monitoring system (NMS) that supports LLDP functionality.

With LLDP functionality, NMS can easily maintain the topology map, display port ID, port description, system description, and VLAN ID. Once a link failure occurs, the topology changes the events that can be updated to the NMS as well. The **LLDP Port State** can display the neighbor ID and IP learnt from the connected devices.

**LLDP Configuration** Help

---

**LLDP** Disable ▾

LLDP Timer	30
LLDP Hold Time	120

Apply
Cancel

---

**LLDP Port State**

Local Port	Neighbor ID	Neighbor IP	Neighbor VID

Reload

<b>LLDP Configuration Page</b>	
LLDP	Select <b>Enable/Disable</b> to enable/disable LLDP function.
<b>LLDP Configuration</b>	
LLDP timer	This is the interval time of each LLDP in seconds; valid values are from 5 to 254. The default is 30 seconds when LLDP is enabled.
LLDP hold time	The Time to Live (TTL) timer. The LLDP state expires when the LLDP is not received by the hold time. The default is 120 seconds when LLDP is enabled. and the range is from 10 to 255.

<b>LLDP Configuration Page (Continued)</b>	
<b>LLDP Port State</b>	
Local Port	The current port number that linked with network device.
Neighbor ID	The MAC address of the peer device on the same network segment.
Neighbor IP	The IP address of the peer device on the same network segment.
Neighbor VID	The VLAN ID of the peer device on the same network segment.
Apply	Click <b>Apply</b> to apply the settings. <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</i>

## MAC Address Table

The ES9528-XT provides 8K entries in the *MAC Address Table*. You can change the Aging time, add Static Unicast MAC Address, monitor the MAC address or sort them by different packet types and ports.

**MAC Address Table**

---

**Aging Time(secs)**

---

**Static Unicast MAC Address**

MAC Address	VID	Port
<input type="text"/>	<input type="text"/>	Port 1 <input type="button" value="v"/>

---

**Static Multicast MAC Address**

Multicast MAC Address	VID	Port
<input type="text"/>	<input type="text"/>	Port 1 <input type="button" value="v"/>

---

**MAC Address Table**

MAC Address	Address Type	VID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<input type="checkbox"/> 00c0.4e54.0079	Dynamic Unicast	1									V																			
<input type="checkbox"/> 00c0.4e38.0002	Dynamic Unicast	1	V																											
<input type="checkbox"/> 00c0.4e5e.0003	Dynamic Unicast	1																	V											
<input type="checkbox"/> 00c0.4e35.0009	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e3a.000d	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e42.fff8	Dynamic Unicast	1	V																											
<input type="checkbox"/> 00c0.4e38.0002	Dynamic Unicast	1	V																											
<input type="checkbox"/> 00c0.4e3c.0002	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e5b.0001	Dynamic Unicast	1	V																											
<input type="checkbox"/> 00c0.4e07.4384	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e15.047a	Dynamic Unicast	1	V																											
<input type="checkbox"/> 0040.f4a8.c3e7	Dynamic Unicast	1																								V				
<input type="checkbox"/> 0030.18a7.85c2	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e39.010c	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e07.fff0	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e2c.006c	Dynamic Unicast	1	V																											
<input type="checkbox"/> 00c0.4e2d.0008	Dynamic Unicast	1						V																						
<input type="checkbox"/> 00c0.4e17.fff0	Dynamic Unicast	1						V																						

MAC Address Table Page	
Aging Time (Sec)	<p>Each switch fabric has a size limit to write the learnt MAC address. To save more entries for a new MAC address, the switch fabric ages out a non-used MAC address entry per the Aging Time timeout.</p> <p>This value determines the interval that an automatically learnt MAC address entry remains valid in the forwarding database, since its last access as a source address, before being purged. The value should be increments of 15 in seconds.</p> <p>The minimum age time is 15 seconds. The maximum age time is 3825 seconds or almost 64 minutes. The default <b>Aging Time</b> is 300 seconds.</p> <p>If the value is set to 0, the aging function is disabled and all learned addresses remain in the database forever.</p>
Static Unicast MAC Address	<p>Some applications may require that you type in the static Unicast MAC address to its MAC address table. Type the MAC address (format: xxxx.xxxx.xxxx), select its VID, and Port ID, and then click <b>Add</b> to add it to MAC Address Table.</p>
MAC Address Table	<p>This displays all the MAC addresses learnt by the switch fabric.</p> <p>The packet types include Management Unicast, Static Unicast, Dynamic Unicast, Static Multicast, and Dynamic Multicast.</p> <p>The table allows you to sort the address by the packet types and port.</p>
Address Types	<ul style="list-style-type: none"> <li>• <b>Management Unicast</b> means the MAC address of the switch. It belongs only to the CPU port.</li> <li>• <b>Static Unicast</b> MAC addresses can be added and deleted.</li> <li>• <b>Dynamic Unicast</b> MAC is a MAC address learnt by the switch Fabric.</li> <li>• <b>Static Multicast</b> can be added by the CLI and can be deleted using the web user interface and CLI.</li> <li>• <b>Dynamic Multicast</b> appears after you enabled IGMP and the switch learnt IGMP report.</li> <li>• <b>Management Multicast</b> - multicast address that is configured for management purposes, such as GVRP and so on. Management entries are read-only.</li> </ul> <p>Dynamic and static entries can be removed.</p>
Remove	<p>Click to remove the static Unicast/Multicast MAC address.</p>
Reload	<p>Click to reload to refresh the table. The new learnt Unicast/Multicast MAC address are updated in the <i>MAC Address Table</i>.</p>
Apply	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 142</a>), if you want to maintain these settings if the ES9528-XT is powered off.</p>

## Port Statistics

Use this page to view operation statistics for each port. The statistics that can be viewed include **Link Type**, **Link State**, **Rx Good**, **Rx Bad**, **Rx Abort**, **Tx Good**, **Tx Bad** and **Collisions**.

**Note:** *If you see an increase of Bad, Abort or Collision counts, that may mean the network cable is not properly connected or the network performance of the port is poor. Check your network cable, the network interface card of the connected device, the network application, or reallocate the network traffic.*

The following information provides a view of the current port statistic information.

Port Statistics

Port	Type	Link	State	Rx Good	Rx Bad	Rx Abort	Tx Good	Tx Bad	Collision
<input type="checkbox"/> 1	100	Connected	Enable	24053078	0	0	24288031	0	0
<input type="checkbox"/> 2	100	Connected	Enable	4770628	0	0	33333001	0	0
<input type="checkbox"/> 3	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 4	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 5	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 6	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 7	100	Connected	Enable	19253513	0	0	38895347	0	0
<input type="checkbox"/> 8	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 9	100	Connected	Enable	577174	0	0	32661419	0	0
<input type="checkbox"/> 10	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 11	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 12	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 13	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 14	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 15	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 16	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 17	100	Connected	Enable	1955088	0	0	32732498	0	0
<input type="checkbox"/> 18	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 19	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 20	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 21	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 22	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 23	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 24	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 25	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 26	100	Connected	Enable	17297187	0	0	45709335	0	0
<input type="checkbox"/> 27	1000	Connected	Enable	328874	0	0	32908827	0	0
<input type="checkbox"/> 28	0	Disconnected	Enable	0	0	0	0	0	0

Port Statistics Page	
Type	Indicates the port type.
Link	Indicates the link status; <b>Up</b> or <b>Down</b> .
State	Indicates the link state; <b>Enable</b> or <b>Disable</b> .
Rx Good	The count of good frames received, which is the total number of received unicast, broadcast, multicast, and pause frames.
Rx Bad	The count of bad frames received, which is the total number of undersized, fragments, oversized, jabber, receive errors ( <b>RxErr</b> ), and frame check sequence errors ( <b>FCSErr</b> ) frames.
Rx Abort	The count of abort frames received, which is the total number of discarded and filtered frames.

<b>Port Statistics Page (Continued)</b>	
Tx Good	The count of good frames transmitted, which is the total number of transmitted unicast, broadcast, multicast and pause frames.
Tx Bad	The count of <b>FCSErr</b> frames transmitted.
Collision	The count of collision frames, including single, multiple, excessive, and late collisions frames.
Clear Selected	Click to clear selected port counts.
Clear All	Click to clear all counts.
Reload	Click to reload all counts.

## Port Mirroring

Port mirroring (also called *port spanning*) is a tool that allows you to mirror the traffic from one or more ports onto another port, without disrupting the flow of traffic on the original port. Any traffic that goes into or out of the **Source Ports** is duplicated at the **Destination Ports**. This traffic can then be analyzed at the Destination Port using a monitoring device or application. The network administrator typically utilizes this tool for diagnostics, debugging, or fending off attacks.

Port Mirroring

---

Port Mirroring  ▼

Port	Source Port		Destination Port
	Rx	Tx	
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

Port Mirroring Mode Page	
Port Mirror Mode	Select <b>Enable</b> or <b>Disable</b> to enable/disable port mirroring.
Source Port	<p>This is also known as <i>Monitor Port</i>. These are the ports that you want to monitor. The traffic of all source/monitor ports is copied to destination/analysis ports. You can choose a single port, or any combination of ports, but you can only monitor them in Rx or TX only.</p> <p>Click the check box of the <b>Port ID</b>, <b>Rx</b>, <b>Tx</b> or both to select the source ports.</p>

Port Mirroring Mode Page (Continued)	
Destination Port	This is also known as <i>Analysis Port</i> . You can analyze the traffic of all the monitored ports at this port without affecting the flow of traffic on the port or ports being monitored. Only one RX/TX of the destination port can be selected. The network administrator typically connects a LAN analyzer or Netxray device to this port.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 142</a> ), if you want to maintain these settings if the ES9528-XT is powered off.

## Event Logs

---

The System Log feature was introduced in [SysLog Configuration](#) on Page 131. When **System Log Local** mode is selected, the ES9528-XT records events that occurred in the local log table. This page shows the log table. The entry includes the index, occurred data and time, and content of the events.

**Event Logs**

---

Index	Date	Time	Event Log

---

Click **Clear** to clear the entries. Click **Reload** to refresh the table.

## Ping Utility

---

This page provides a **Ping Utility** to ping a remote device and check whether the device is alive or not. Type the **Target IP** address of the target device and click **Start** to start the ping.

**Ping**

---

Destination

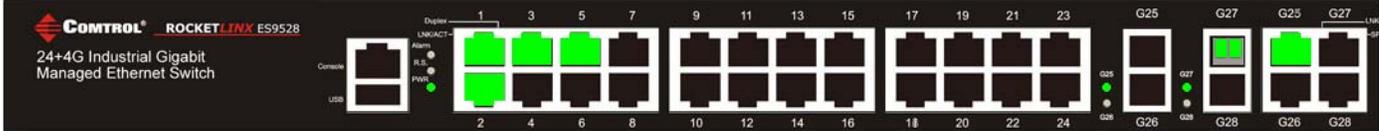
---

After few seconds, you can see the result in the **Result** field.

## Device Front Panel

The **Device Front Panel** allows you to see the LED status of the ES9528-XT.

### Device Front Panel



LED Name	LED On/Link Up	LED Off/Link Down
PWR (Power)	Green	Black
R.S. (Ring Signal)	Green	Black
LEDs 1-24	Green	Black: Not connected
LEDs 25-28	Green	Black: Not connected
SFP Link State	Green: On Gray: Plugged in but not linked up	Black: Not connected

**Note:** There is not a CLI command for this feature. If you can view the physical LEDs, you can use the [LED Descriptions](#) on Page 12, which provide detailed LED information. If you need to locate your ES9528-XT in a rack, you can use the LED Tracker feature in PortVision DX.

## Save (to Flash)

---

---

The **Save** page saves any changes to the configuration to the flash.

If the switch loses power before clicking **Save Configuration** causes loss of the new settings. Applying changes on web user interface pages do not save the changes to the flash.

After selecting **Save Configuration**, click **Save to Flash** to save your new configuration.

**Save**

---

**Do you want to save configuration to flash?**

---

Optionally, you can use the CLI, see [Saving to Flash \(CLI\)](#) on Page 200.

## Logout

---

---

Click the **Logout** option in the web user interface to manually logout the web connection.

If you have saved your changes, click **Yes** to logout, **No** to remain the web user interface.

**Logout**

---

**Do you want to logout?**

---



# Configuration Using the Command Line Interface (CLI)

## Overview

---

The ES9528-XT provides in-band and out-band configuration methods:

- Out-band management means that you configure the ES9528-XT using the RS-232 console cable and the Command Line Interface (CLI) to access the ES9528-XT without attaching an admin PC to the network. You can use out-band management if you lose the network connection to the ES9528-XT.
- In-band management means that you connect remotely using the ES9528-XT IP address through the network. You can remotely connect with the ES9528-XT embedded web user interface or a Telnet console and the CLI.

If you are planning on using in-band management, you need to program the ES9528-XT IP address to meet your network requirements. The easiest way to configure the IP address is using a Windows system and PortVision DX, which is discussed in [Configuring the Network Settings](#) on Page 16.

If you want to use the web user interface for configuration, see [Configuration Using the Web User Interface](#) on Page 29.

Use the following procedures to access the ES9528-XT using the CLI:

- [Using the Serial Console](#)
- [Using a Telnet/SSH Console](#)

This section contains information about the following groups of commands:

- [Basic Settings \(CLI\)](#) on Page 157
- [Port Configuration \(CLI\)](#) on Page 163
- [Network Redundancy \(CLI\)](#) on Page 166
- [VLAN \(CLI\)](#) on Page 175 and [Private VLAN \(CLI\)](#) on Page 178
- [Traffic Prioritization \(CLI\)](#) on Page 182
- [Multicast Filtering \(CLI\)](#) on Page 185
- [SNMP \(CLI\)](#) on Page 189
- [Security \(CLI\)](#) on Page 190
- [Warnings \(CLI\)](#) on Page 194
- [Monitor and Diag \(CLI\)](#) on Page 197
- [Saving to Flash \(CLI\)](#) on Page 200
- [Logging Out \(CLI\)](#) on Page 200
- [Service \(CLI\)](#) on Page 200

## Using the Serial Console

Control provides one RS-232 RJ45 console cable with the ES9528-XT.

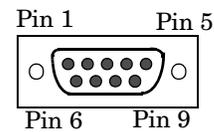
**Note:** A system COM port is required to use a serial console connection. If you do not have an available COM port, use the [Using a Telnet/SSH Console](#) procedure on [Page 148](#).

1. Attach the RS-232 connector (DB9 female) to your PC COM port and connect the other end to the **Console** port of the ES9528-XT. If you misplace the cable, you can use this console cable pin assignment or purchase a null-modem cable. If building a replacement cable, at a minimum, you need to connect Tx, Rx, and ground signals.

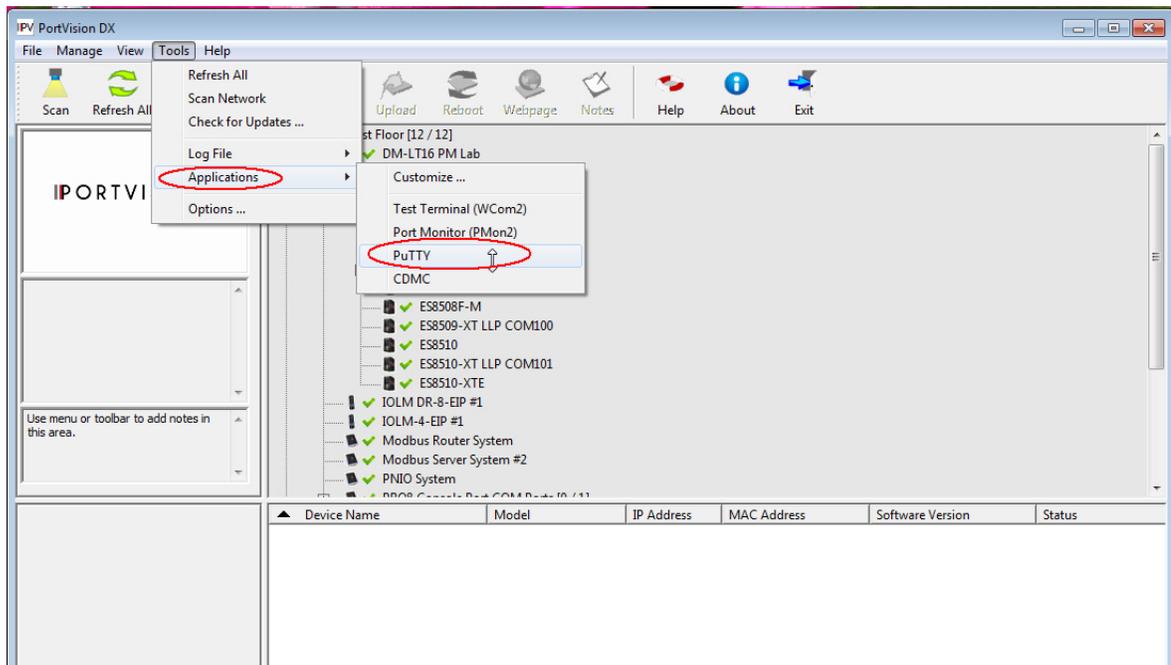
RJ45 Pin	RJ45 Signal
5	DTR
7	Tx
6	Rx
3	DSR
4	Gnd
1	CTS
8	RTS
2	CD

DB9F Pin	DB9 Signal
1	CD
2	Rx
3	Tx
4	DTR
5	Gnd
6	Not Used
7	RTS
8	CTS
9	RI

Serial End

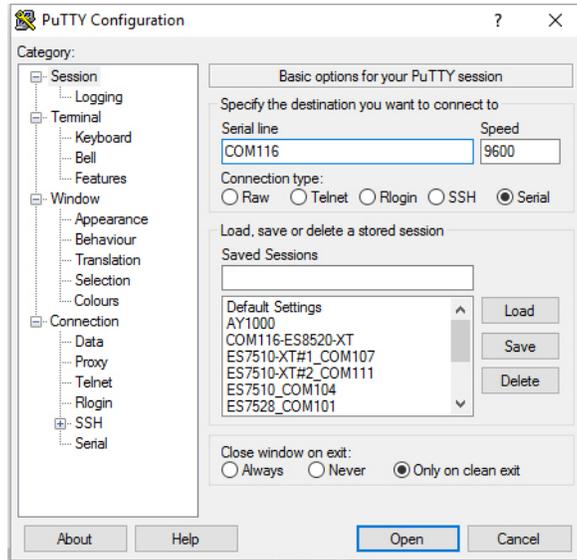


2. Start a terminal program such as HyperTerminal or use PuTTY, which is included with PortVision DX. The following example illustrates using PuTTY.
3. Open PortVision DX, click **Tools | Applications | PuTTY**.



4. Click **Serial** for the **Connection type**.

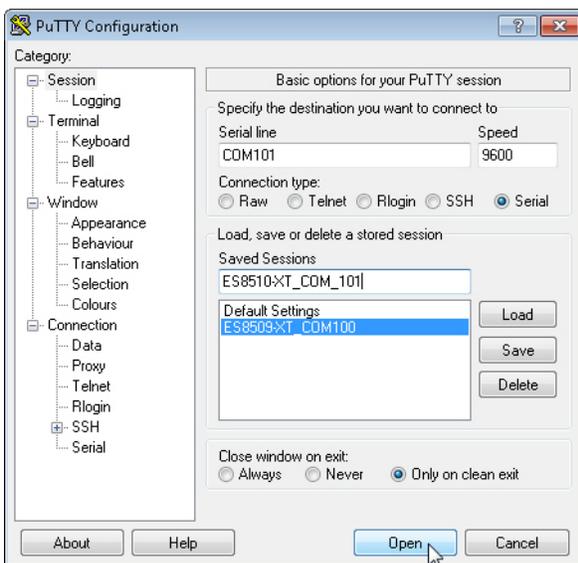
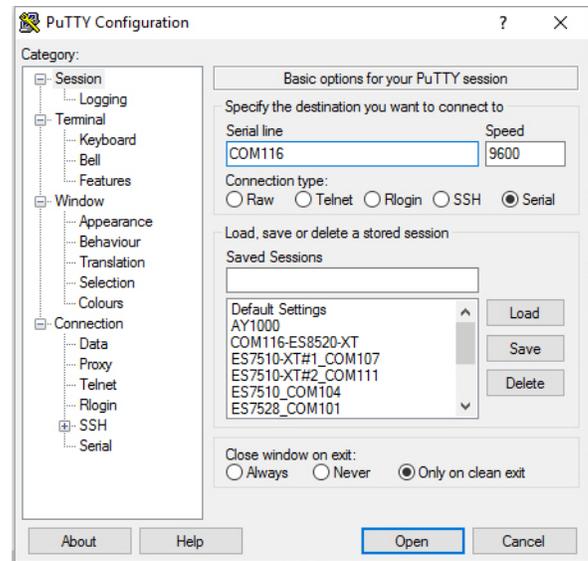
5. Type a **Host Name** to represent the COM port.



- 6. Click **Serial** on the left side under **Category**.
- 7. Configure the serial line with the following characteristics.

Serial Settings	Value
Baud Rate	9600
Data bits	8
Parity	None
Stop Bit	1
Flow Control	None

- 8. Click **Session** under **Category** in the menu.
- 9. Type an appropriate **Saved Session** name and click **Save**.



10. Click **Open**.

11. Press **Enter**.
12. Log in to the switch. The default user name is **admin**, password, **admin**.
  - a. Type the login and press the **Enter** key.
  - b. Type the password and press the **Enter** key.

```
Switch login: admin
Password:

ES9528-XT (version 2.0_b6-201611122-17:03:48).

Switch>
```

13. If necessary, configure the IP address for your network. The following example shows how to program an IP address of 192.168.11.252 with a Class B subnet mask (255.255.0.0).

```
Switch> enable
Switch# configure terminal
Switch(config)# int vlan1
Switch(config-if)# ip address 192.168.11.252/16
```

For more information about using the CLI, see [Command Line Interface Introduction](#) on Page 149.

## Using a Telnet/SSH Console

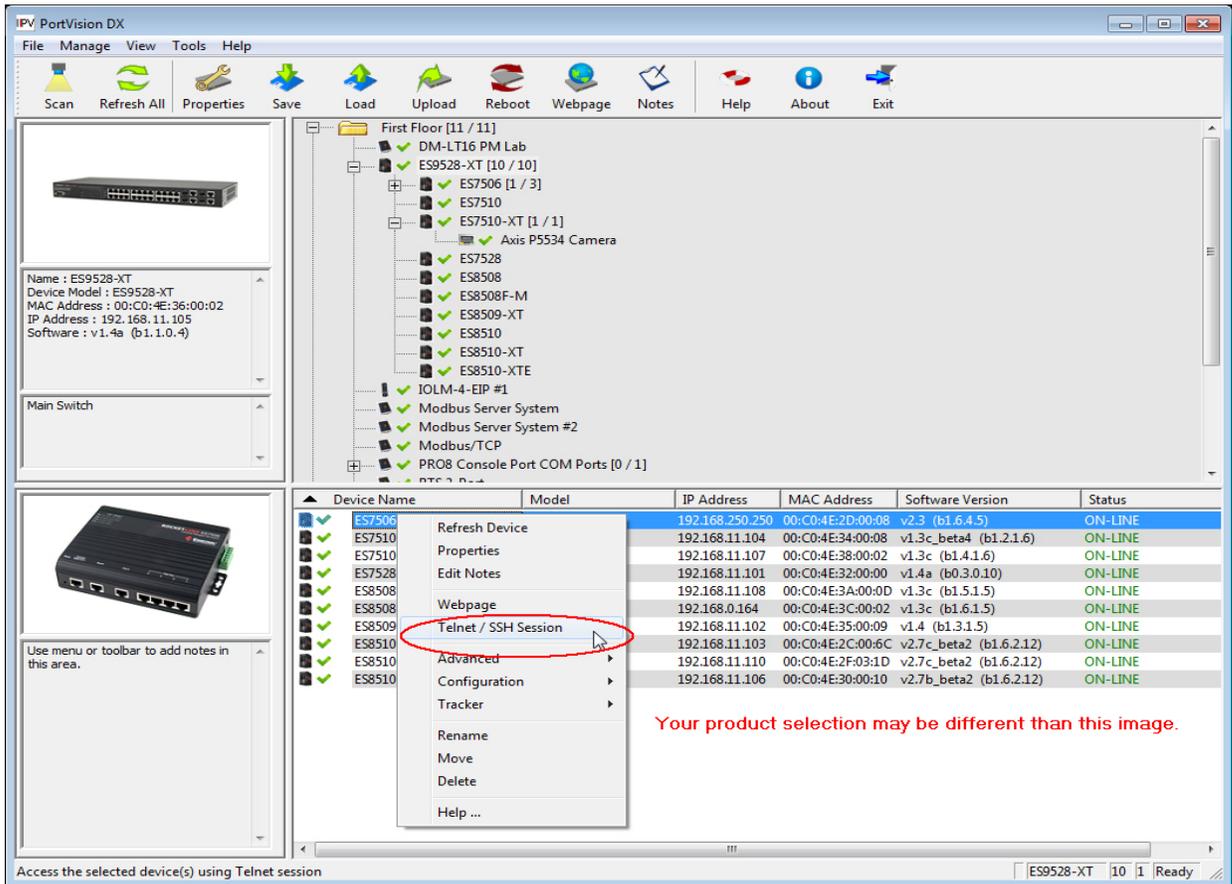
The ES9528-XT supports a Telnet console or SSH console with the Command Line Interface (CLI), which is the same as what you see using the RS-232 console port. The SSH connection can secure all the configuration commands you send to the ES9528-XT.

SSH is a client/server architecture while the ES9528-XT is the SSH server. When you want to make SSH connection with the ES9528-XT, you can use PortVision DX or download an SSH client tool.

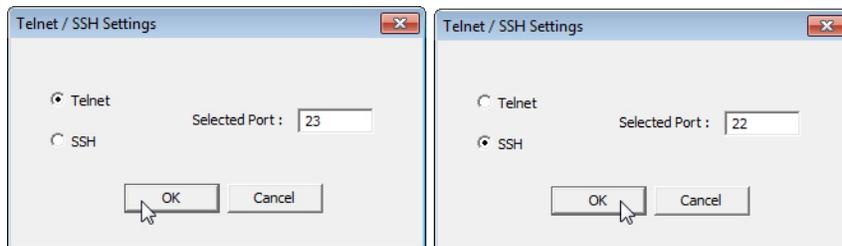
The next discussion provides procedures to use PortVision DX with a Telnet or SSH connection.

You can use PortVision DX to access the CLI using the following procedure.

1. If you have not done so, install PortVision DX ([Installing PortVision DX](#) on Page 14).
2. Start PortVision DX.
3. Right-click the ES9528-XT in the *Device List* pane (lower) and click **Telnet/SSH**.



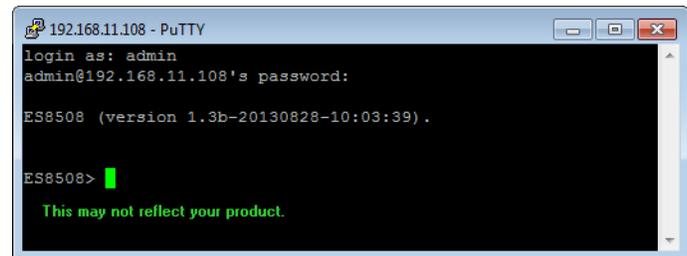
4. Select either Telnet or SSH and leave the default port number.



If you selected SSH, click **Yes**.

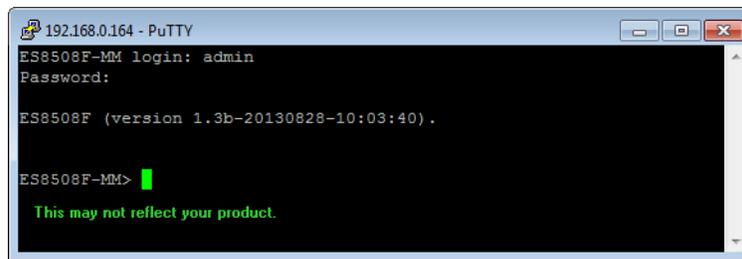


- Enter the user name (default = **admin**).
- Enter the password (default = **admin**).



If you selected **Telnet**:

- Enter the user name (default = **admin**).
- Enter the password (default = **admin**).



All the commands you see in SSH are the same as the CLI commands you see through the RS-232 console. For more information about using the CLI, see [Command Line Interface Introduction](#) on Page 149.

## Command Line Interface Introduction

The Command Line Interface (CLI) is the user interface to the ES9528-XT embedded software. You can view the system information, show the status, configure the switch, and receive a response back from the system by keying in a command.

There are several different command modes. Each command mode has its own access ability, available command lines and uses different command lines to enter and exit. These modes are:

- [User EXEC Mode](#) on Page 150, which includes commands to ping or telnet to a remote device, and show some basic information and to access *Privileged EXEC* mode
- [Privileged EXEC Mode](#) on Page 152, which provides a view current configuration, reset default, reload switch, show system information, save configuration, and access *Global Configuration* mode
- [Global Configuration Mode](#) on Page 153, which you can use configure all ES9528-XT features and access to one of the *Interface Configuration* modes
- [\(Port\) Interface Configuration](#) on Page 154, which can be used to configure port settings
- [\(VLAN\) Interface Configuration](#) on Page 155, which can be used to configure the settings for a specific VLAN

Refer to [Configuration Using the Command Line Interface \(CLI\)](#) on Page 144 to access the CLI.

## User EXEC Mode

---

When you login to the ES9528-XT with the CLI, you are in *User EXEC* mode.

In *User EXEC* mode, you can ping, telnet to a remote device, and show some basic information.

Type the command and press **Enter**:

- **enable** to access *Privileged EXEC* mode ([Privileged EXEC Mode](#) on Page 152).
- **exit** to logout.
- **?** to see the command list.
- **list** to review the *User EXEC* mode commands and corresponding options.

```
Switch>
  enable      Turn on privileged mode command
  exit        Exit current mode and down to previous mode
  list        Print command list
  ping        Send echo messages
  quit        Exit current mode and down to previous mode
  show        Show running system information
  telnet      Open a telnet connection
  traceroute  Trace route to destination
```

For the complete list of commands with options, refer to [User EXEC Mode](#) on Page 201.

## Accessing the Options for a Command

---

The following example illustrates how to view the description and options for a command. This example illustrates the **show** command and the firmware version displayed may not reflect your firmware version.

**Note:** *The ? does not appear on the screen.*

1. If you type **show?** (without a space between **show** and the **?**; do not press the **Enter** key) the ES9528-XT provides a basic description of that command.

```
Switch login: admin
Password:

Switch (version 2.7 -20130314 - 15:23:41)
switch> show
  show Show running system information
```

**Note:** *The firmware version may not reflect your RocketLinx model.*

2. If you type **show ?** (with a space between **show** and the **?**; do not press the **Enter** key) the ES9528-XT provides information about the options for that command.

```
Switch> show
  gvrp      GARP VLAN Registration Protocol
  ip        IP information
  version   Displays ISS version
Switch> show
```

3. Type **show ip ?** (with a space between **show** and the **?**, do not press the **Enter** key) to review the options for **ip**.

```
Switch> show ip
  forwarding IP forwarding status
  route      IP routing table
```

4. Type **show ip route** and press the **Enter** key to view the IP routing tables for the ES9528-XT.

```
Switch> show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       B - BGP, > - selected route, * - FIB route

S>* 0.0.0.0/0 [1/0] via 192.168.0.254, vlan1
C>* 127.0.0.0/8 is directly connected, lo
C>* 192.168.0.0/16 is directly connected, vlan1
```

5. If you type **list** and press **Enter**, the ES9528-XT provides you information about all of the commands and options for a mode. The following example shows the available commands and their options for *User EXEC* mode.

```
ES9528-XT> list
enable
exit
list
ping A.B.C.D
ping WORD
ping X:X::X:X
quit
show gvrp statistics [IFNAME]
show ip forwarding
show ip route
show ip route A.B.C.D
show ip route A.B.C.D/M
show ip route supernets-only
show version
telnet WORD
telnet WORD PORT
traceroute WORD
```

## Privileged EXEC Mode

---

If you type **enable** in *User EXEC* mode, you can access *Privileged EXEC* mode. In this mode, the ES9528-XT allows you to view current configuration, reset default, reload switch, show system information, save configuration, and enter *Global Configuration* mode.

Type the following commands and press the **Enter** key:

- **configure terminal** to access *Global Configuration* mode ([Global Configuration Mode](#) on Page 153).
- **exit** to close the CLI.
- **?** to see the command list.
- **list** to review the *Privileged EXEC* mode commands and corresponding options.

For the complete list of commands and options, refer to [Privileged EXEC Mode](#) on Page 202.

```
Switch>enable
Switch#
  archive      manage archive files
  clear        Reset functions
  clock        Configure time-of-day clock
  configure    Configuration from vty interface
  copy         Copy from one file to another
  debug        Debugging functions
  dir          Display a list of files
  disable      Turn off privileged mode command
  dot1x        IEEE 802.1x standard access security control
  end          End current mode and change to enable mode
  exit         Exit current mode and down to previous mode
  list         Print command list
  mac          MAC interface commands
  no           Negate a command or set its defaults
  pager        Terminal pager
  ping         Send echo messages
  quit         Exit current mode and down to previous mode
  reboot       Reboot system
  reload       copy a default-config file to replace the current one
  show         Show running system information
  telnet       Open a telnet connection
  terminal     Set terminal line parameters
  traceroute   Trace route to destination
  usb          USB
  write        Write running configuration to memory, network, or terminal
```

## Global Configuration Mode

If you type **configure terminal** in *Privileged EXEC* mode, you can then access *Global Configuration* mode. In *Global Configuration* mode, you can configure all ES9528-XT features. Type the following commands and press the **Enter** key:

- **interface** *IFNAME/VLAN*, to access the corresponding *Interface Configuration* mode.
- **exit** to return to *Privileged EXEC* mode.
- **?** to see the command list.
- **list** to review the *Global Configuration* mode commands and corresponding options.

The following is a list of available command lists of *Global Configuration* mode. For the complete list of commands and options, refer to [Global Configuration Mode](#) on Page 207..

Switch# configure terminal	Optionally, type config term
Switch(config)#	
access-list	Add an access list entry
administrator	Administrator account setting
arp	Set a static ARP entry
auth	Authentication
clock	Configure time-of-day clock
default	Set a command to its defaults
dot1x	IEEE 802.1x standard access security control
end	End current mode and change to enable mode
erps	Ethernet Ring Protection Switching (ITU-T G.8032)
exit	Exit current mode and down to previous mode
gmrp	GMRP protocol
gvrp	GARP VLAN Registration Protocol
hostname	Set system's network name
interface	Select an interface to configure
ip	IP information
ipv6	IP information
lacp	Link Aggregation Control Protocol
list	Print command list
lldp	Link Layer Discovery Protocol
log	Logging control
mac	Global MAC configuration subcommands
mac-address-table	Mac address table
mirror	Port mirroring
modbus	Modbus TCP slave
nameserver	DNS Server
netvision	NetVision protocol
no	Negate a command or set its defaults
ntp	Configure NTP
qos	Quality of Service (QoS)
redundant-ring	Configure redundant ring
relay	relay output type information
router	Enable a routing process
service	System service
sfp	Small form-factor pluggable
smtp-server	SMTP server configuration
snmp-server	SNMP server
spanning-tree	spanning tree algorithm
system	System setting
trunk	Trunk group configuration
vlan	Virtual LAN
warning-event	Warning event selection
write-config	Specify config files to write to

## (Port) Interface Configuration

---

When you type **interface IFNAME** in *Global Configuration* mode, you can access *Interface Configuration* mode. In this mode you can configure port settings.

The port interface names for the Fast Ethernet ports are fa1 through fa28. The port interface names for Gigabit Ethernet port are gi25 through gi28.

Type the interface name, for example fa1, when you want to enter a certain interface configuration mode. Type the following commands and press the **Enter** key:

- **exit** to return to *Privileged EXEC* mode.
- **?** to see the command list.
- **list** to review the *Interface Configuration* mode commands and corresponding options. The following list is the available commands for the *Port Interface Configuration* mode.

For the complete list of commands and options, refer to [Port Interface Configuration Mode](#) on Page 212.

```
Switch(config)# interface fa1
Switch(config-if)#
  acceptable          Configure 802.1Q acceptable frame types of a port
  auto-negotiation    Enable auto-negotiation state of a given port
  description          Interface specific description
  dot1x               IEEE 802.1x standard access security control
  duplex              Specify duplex mode of operation for a port
  end                  End current mode and change to enable mode
  ethertype           Ethertype
  exit                Exit current mode and down to previous mode
  flowcontrol         Set flow-control value for an interface
  garp                General Attribute Registration Protocol
  ip                  Interface Internet Protocol config commands
  lacp                Link Aggregation Control Protocol
  list                Print command list
  loopback            Specify loopback mode of operation for a port
  mac                 MAC interface commands
  no                  Negate a command or set its defaults
  qos                 Quality of Service (QoS)
  quit                Exit current mode and down to previous mode
  rate-limit          Rate limit configuration
  sfp                 Small form-factor pluggable
  shutdown            Shutdown the selected interface
  spanning-tree        spanning-tree protocol
  speed               Specify the speed of a Fast Ethernet port or a
                     Gigabit Ethernet port
  storm-control        Enables packet flooding rate limiting features
  switchport          Set switching mode characteristics
```

## (VLAN) Interface Configuration

If you type **interface VLAN VLAN-ID** in *Global Configuration* mode, you can access *VLAN Interface Configuration* mode. In this mode, you can configure the settings for the specific VLAN.

The VLAN interface name of VLAN 1 is VLAN 1, VLAN 2 is VLAN 2.

Type **exit** to return to the previous mode. Type **?** to see the available command list.

For the complete list of commands and options, refer to [VLAN Interface Configuration Mode](#) on Page 214.

```
Switch(config)# interface vlan 1
Switch(config-if)#
  description  Interface specific description
  end          End current mode and change to enable mode
  exit        Exit current mode and down to previous mode
  ip          Interface Internet Protocol config commands
  ipv6        Interface Internet Protocol config commands
  list        Print command list
  no          Negate a command or set its defaults
  quit        Exit current mode and down to previous mode
  shutdown    Shutdown the selected interface
```

## Command Mode Summary

This table is a summary of the five command modes.

Mode: Main Function	Access and Exit Mode	Prompt
<b>User EXEC:</b> This is the first level of access. You can ping, telnet a remote device, and show some basic information.	<ul style="list-style-type: none"> <li>Access <i>User EXEC</i> mode: Login successfully.</li> <li>Exit: <b>exit</b> to logout.</li> <li>Next mode: Type <b>enable</b> to enter <i>Privileged EXEC</i> mode.</li> </ul>	Switch>
<b>Privileged EXEC:</b> Allows you to view current configuration, reset the default values, reload the switch, show system information, save configuration and enter <i>Global Configuration</i> mode.	<ul style="list-style-type: none"> <li>Access <i>Privileged EXEC</i> mode: Type <b>enable</b> in <i>User EXEC</i> mode.</li> <li>Exec: Type <b>disable</b> to exit to <i>User EXEC</i> mode.</li> <li>Type <b>exit</b> to logout.</li> <li>Next mode: Type <b>configure terminal</b> to enter <i>Global Configuration</i> mode.</li> </ul>	Switch#
<b>Global Configuration:</b> Configure all of the features that the ES9528-XT provides.	<ul style="list-style-type: none"> <li>Access <i>Global Configuration</i> mode: Type <b>configure terminal</b> in <i>Privileged EXEC</i> mode.</li> <li>Exit: Type <b>exit</b> or <b>end</b> or press <b>Ctrl-Z</b> to exit.</li> <li>Next mode: Type <b>interface IFNAME/ VLAN VID</b> to enter <i>Interface Configuration</i> mode.</li> </ul>	Switch(config)#
<b>Port Interface Configuration:</b> Configure port related settings.	<ul style="list-style-type: none"> <li>Access <i>Port Interface Configuration</i> mode: Type <b>interface IFNAME</b> in global configuration mode.</li> <li>Exit: Type <b>exit</b> or <b>Ctrl+Z</b> to <i>Global Configuration</i> mode.</li> <li>Type <b>end</b> to return to <i>Privileged EXEC</i> mode.</li> </ul>	Switch(config-if)#

Mode: Main Function	Access and Exit Mode	Prompt
VLAN Interface Configuration: Configure settings for a specific VLAN.	<ul style="list-style-type: none"> <li>Access <i>VLAN Interface Configuration</i> mode: Type <b>interface VLAN VID</b> in <i>Global Configuration</i> mode.</li> <li>Exit: Type <b>exit</b> or <b>Ctrl+Z</b> to return to <i>Global Configuration</i> mode.</li> <li>Type <b>end</b> to return to <i>Privileged EXEC</i> mode.</li> </ul>	Switch(config-vlan)#

The following are useful commands to save you typing time and to avoid typing errors.

Press ? to see all of the available commands in a mode. It helps you to see the next command you can type.

```
Switch(config)# interface (?)
IFNAME      Interface's name
vlan        Select a vlan to configure
```

Type a *Character?* (shown below) to see all of the available commands starting with this character.

```
Switch(config)# a?
access-list  Add an access list entry
administrator Administrator account setting
auth         Authentication
```

Press the **Tab** key, which helps you to input the command quicker. If there is only one available command in the next, click the **Tab** key to help finish the typing.

```
Switch# co (tab) (tab)
Switch# configure terminal

Switch(config)# ad (tab)
Switch(config)# administrator
```

Key Combination	Function
<b>Ctrl+C</b>	To stop executing the unfinished command.
<b>Ctrl+S</b>	To lock the screen of the terminal - you cannot input any command.
<b>Ctrl+Q</b>	To unlock the screen which is locked by <b>Ctrl+S</b> .
<b>Ctrl+Z</b>	To exit <i>Configuration</i> mode.

## Basic Settings (CLI)

The *Basic Setting* group provides you with the ability to configure switch information, IP address, User name/ Password of the system. It also allows you to do firmware upgrade, backup and restore configuration, reload factory default, and reboot the system.

Optionally, you can use the web user interface for configuration, see [Basic Settings](#) on Page 41.

This table provides detailed information about the CLI commands for basic settings.

Switch Setting	
System Name	Switch(config)# hostname DWORD Network name of this system Switch(config)# hostname ES9528-XT Switch(config)#
System Location	Switch(config)# snmp-server location Minnesota
System Contact	Switch(config)# snmp-server contact support@control.com
Display	Switch# show snmp-server name ES9528-XT Switch# show snmp-server location Minnesota Switch# show snmp-server contact support@control.com Switch> show version Hardware Information : Product Name : ES9528-XT Serial Number : 2073-000001 MAC Address : 00C04E5B0000 Manufacturing Date : 2015/12/23 Software Information : Loader Version : 2.0.0.3 Firmware Version : 1.0-20151214-17:28:02 Switch# show hardware mac MAC Address: 00C04E5B0002
Admin Password	
User Name and Password	Switch(config)# administrator NAME Administrator account name Switch(config)# administrator admin PASSWORD Administrator account password Switch(config)# administrator admin admin Change administrator account admin and password admin success.
Display	Switch# show administrator Administrator account information name: admin password: admin

IP Configuration	
<p>IP Address/Mask (192.168.250.250, 255.255.255.0)</p> <p>The enabled bit of the subnet mask is used to represent the number displayed in the web user interface. For example, 8 represents: 255.0.0.0, 16 represents: 255.255.0.0, 24 represents:255.255.255.0.</p>	<pre>Switch(config)# int vlan 1 Switch(config-if)# ip address dhcp Switch(config-if)# ip address 192.168.250.8/24 Switch(config-if)# ip dhcp client Switch(config-if)# ip dhcp client renew  Switch(config-if)# ipv6 address ; IPv6 configuration X:X::X:X/M IPv6 address (e.g. 3ffe:506::1/48) Switch(config-if)# ipv6 address 3ffe:506::1/48</pre>
Gateway	<pre>Switch(config)# ip route 0.0.0.0/0 192.168.250.254/24</pre>
Remove Gateway	<pre>Switch(config)# no ip route 0.0.0.0/0 192.168.250.254/24</pre>
Display	<pre>Switch# show running-config ..... ! interface vlan1  ip address 192.168.250.8/24  no shutdown ! ip route 0.0.0.0/0 192.168.250.254/24 !</pre>
Time Setting	
NTP Server	<pre>Switch(config)# ntp peer enable disable primary secondary Switch(config)# ntp peer primary IPADDR Switch(config)# ntp peer primary 192.168.250.250</pre>
Time Zone	<pre>Switch(config)# clock timezone 26 Sun Jan 1 04:13:24 2006 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London</pre> <p><b>Note:</b> By typing <code>clock timezone?</code>, you can see the timezone list. Then choose the number of the timezone you want to select.</p>
IEEE 1588	<pre>Switch(config)# ptpd run &lt;cr&gt; preferred-clock Preferred Clock slave Run as slave</pre>

<b>Time Setting (Continued)</b>	
Display	<pre>Switch # sh ntp associations Network time protocol   Status: Disabled   Primary peer: N/A   Secondary peer: N/A Switch # show clock Sun Jan  1 04:14:19 2006 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London  Switch # show clock timezone clock timezone (26) (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London  Switch# show ptpd PTPd is enabled Mode: Slave</pre>
<b>Jumbo Frame</b>	
Jumbo Frame	<pre>Switch(config)# system mtu  1518 bytes  2000 bytes  2032 bytes  9712 bytes Switch(config)# system mtu 9712</pre>

DHCP Server	
DHCP Server configuration	<pre> Enable DHCP Server on ES9528-XT Switch Switch# Switch# configure terminal Switch(config)# router dhcp Switch(config-dhcp)# service dhcp  Configure DHCP network address pool Switch(config-dhcp)#network 50.50.50.0/4 -(network/mask) Switch(config-dhcp)#default-router 50.50.50.1                     </pre>
Lease time configure	<pre> Switch(config-dhcp)#lease 300 (300 sec)                     </pre>
DHCP Relay Agent	<pre> Enable DHCP Relay Agent Switch# Switch# configure terminal Switch(config)# router dhcp Switch(config-dhcp)# service dhcp Switch(config-dhcp)# ip dhcp relay information option  Enable DHCP Relay policy Switch(config-dhcp)# ip dhcp relay information policy <u>replace</u> drop      Relay Policy keep      Drop/Keep/Replace option 82 field replace Switch(config-dhcp)# ip dhcp relay information option &lt;cr&gt; circuit-id  Configure Circuit-ID remote-id   Configure Remote-ID Switch(config-dhcp)# ip dhcp relay information option option Option82 Switch(config-dhcp)# ip dhcp relay information option                     </pre>
Show DHCP server information	<pre> Switch# show ip dhcp server statistics DHCP Server ON Address Pool 1     network:192.168.17.0/24     default-router:192.168.17.254     leasetime:300 Excluded Address List     IP Address ----- (list excluded address) Manual Binding List     IP Address      MAC Address ----- (list IP &amp; MAC binding entry) Leased Address List     IP Address      MAC Address      Leased Time Remains ----- (list leased Time remain information for each entry)                     </pre>

<b>DHCP Server (continued)</b>	
DHCP Commands	<pre>Switch(config)# router dhcp Switch(config-dhcp)#   default-router DHCP Default Router end          Exit current mode and down to previous enable mode exit        Exit current mode and down to previous mode ip          IP protocol lease      DHCP Lease Time list       Print command list network    dhcp network no         Remove quit      Exit current mode and down to previous mode service    Enable service</pre>
DHCP Server Enable	<pre>Switch(config-dhcp)# service dhcp</pre>
DHCP Server IP Pool (Network/Mask)	<pre>Switch(config-dhcp)# network   A.B.C.D/M network/mask ex. 10.10.1.0/24 Switch(config-dhcp)# network 192.168.10.0/24</pre>
DHCP Server – Default Gateway	<pre>Switch(config-dhcp)# default-router   A.B.C.D address Switch(config-dhcp)# default-router 192.168.10.254</pre>
DHCP Server – lease time	<pre>Switch(config-dhcp)# lease   TIME second Switch(config-dhcp)# lease 1000 (1000 second)</pre>
DHCP Server – Static IP and MAC binding	<pre>Switch(config-dhcp)# ip dhcp static   MACADDR MAC address Switch(config-dhcp)# ip dhcp static 00C0.4E5B.0001   A.B.C.D leased IP address Switch(config-dhcp)# ip dhcp static 00C0.4E5B.0001   192.168.10.99</pre>
DHCP Relay – Enable DHCP Relay	<pre>Switch(config-dhcp)# ip dhcp relay information   option Option82   policy Option82 Switch(config-dhcp)# ip dhcp relay information option</pre>
DHCP Relay – DHCP policy	<pre>Switch(config-dhcp)# ip dhcp relay information policy   drop Relay Policy   keep Drop/Keep/Replace option82 field   replace Switch(config-dhcp)# ip dhcp relay information policy drop Switch(config-dhcp)# ip dhcp relay information policy keep Switch(config-dhcp)# ip dhcp relay information policy replace</pre>
DHCP Relay – IP Helper Address	<pre>Switch(config-dhcp)# ip dhcp helper-address   A.B.C.D Switch(config-dhcp)# ip dhcp helper-address 192.168.10.200</pre>
Reset DHCP Settings	<pre>Switch(config-dhcp)# ip dhcp reset</pre>

Backup and Restore	
Backup Startup Configuration File	<pre>Switch# copy startup-config tftp: 192.168.250.33/ default.conf Writing Configuration [OK]</pre> <p><b>Note:</b> To backup the latest startup configuration file, you should save current settings to flash first. You can refer to <a href="#">Save (to Flash)</a> on Page 142 to see how to save settings to the flash.</p> <p><i>In the example above, 192.168.250.33 is the TFTP server's IP and default.conf is name of the configuration file. Your environment may use different IP addresses or different file name. Type target TFTP server IP or file name in this command.</i></p>
Restore Configuration	Switch# copy tftp: 192.168.250.33/default.conf startup-config
Show Startup Config	Switch# show startup-config
Show Running Config	Switch# show running-config
Show USB storage files	Switch# dir usb-stick default.conf ES7528v1.0.bin
eject USB storage	Switch# usb eject USB storage has ejected
Firmware Upgrade	
Firmware Upgrade	<pre>Switch# archive download-sw /overwrite tftp 192.168.11.33 ES9528-XT.bin Firmware upgrading, don't turn off the switch! Tftping file ES9528-XT.bin Firmware upgrading ..... ..... ..... ..... ..... ..... Firmware upgrade success!! Rebooting.....</pre>
Load Default	
Load Default	<pre>Switch# reload default-config file Reload OK! Switch# reboot</pre>
System Reboot	
Reboot	Switch# reboot

## Port Configuration (CLI)

The Port Configuration group allows you to enable/disable port state, or configure port auto-negotiation, speed, duplex, flow control, rate limit control, and port aggregation settings. It also allows you to view port status and aggregation information.

There are 24 Fast Ethernet ports. Use fa1, fa2...fa24 to represent Port 1 to Port 24. The four Gigabit/Combo ports (Ports 25-28) are identified as: gi25, gi26, gi27 and gi28.

Optionally, you can use the web user interface for configuration, see [Port Configuration](#) on Page 66.

This table provides detailed information about the CLI commands for port configuration.

Port Control	
Port Control – State	<pre>Switch(config-if)# shutdown          -&gt; Disable port state interface fastethernet1 is shutdown now. Switch(config-if)# no shutdown      -&gt; Enable port state interface fastethernet1 is up now.</pre>
Port Control – Auto Negotiation	<pre>Switch(config)# interface fa1 Switch(config-if)# auto-negotiation Auto-negotiation of port 1 is enabled!</pre>
Port Control – Force Speed/ Duplex	<pre>Switch(config-if)# speed 100 set the speed mode ok! Switch(config-if)# duplex full set the duplex mode ok!</pre>
Port Control – Flow Control	<pre>Switch(config-if)# flowcontrol on Flowcontrol on for port 1 set ok! Switch(config-if)# flowcontrol off Flowcontrol off for port 1 set ok!</pre>
Port Status	
Port Status	<pre>Switch# show interface fa1 Interface fastethernet1   Administrative Status : Enable   Operating Status : Connected   Duplex : Full   Speed : 100   MTU: 1518   Flow Control :off   Default Port VLAN ID: 1   Ingress Filtering : Disabled   Acceptable Frame Type : All   Port Security : Disabled   Auto Negotiation : Disable   Loopback Mode : None   STP Status: forwarding   Default CoS Value for untagged packets is 0.   Mdx mode is Disable.   Medium mode is Copper.</pre> <p><b>Note:</b> Administrative Status -&gt; Port state of the port. Operating status -&gt; Current status of the port. Duplex -&gt; Duplex mode of the port. Speed -&gt; Speed mode of the port. Flow control -&gt; Flow Control status of the port.</p>

Rate Control																					
Rate Control – Ingress or Egress	<pre>Switch(config-if)# rate-limit     egress    Outgoing packets     ingress   Incoming packets</pre> <p><b>Note:</b> To enable rate control, you should select the Ingress or Egress rule first; then assign the packet type and bandwidth.</p>																				
Rate Control - Bandwidth	<pre>Switch(config-if)# rate-limit ingress bandwidth     &lt;0-1000000&gt; Limit in kilobits per second (FE: 0-100000, GE: 0-1000000, 0 is no limit)</pre> <pre>Switch(config-if)# rate-limit ingress bandwidth 800</pre> <p>Set the ingress rate limit 800Kbps for Port 1..</p>																				
Storm Control																					
Storm Control – Packet Type	<pre>Switch(config-if)# storm-control     broadcast Broadcast packets     dlf        Destination Lookup Failure     multicast  Multicast packets</pre>																				
Storm Control - Rate	<pre>Switch(config-if)# storm-control broadcast     &lt;0-100000&gt; Rate limit value 0~100000Kbyte/sec</pre> <pre>Switch(config-if)# storm-control broadcast 10000 limit_rate = 10000</pre> <p>Set rate limit for Broadcast packets.</p> <pre>Switch(config-if)# storm-control multicast 10000 limit_rate = 10000</pre> <p>Set rate limit for Multicast packets.</p> <pre>Switch(config-if)# storm-control dlf 10000 limit_rate = 10000</pre> <p>Set rate limit for Destination Lookup Failure packets.</p>																				
Port Trunking																					
LACP	<pre>Switch(config)# lacp group 1 fa8-10</pre> <p>Group 1 based on LACP(IEEE 802.3ad) is enabled!</p> <p><b>Note:</b> The interface list is fa1,fa3-5, fa8-10 and a different speed port cannot be aggregated together.</p>																				
Static Trunk	<pre>Switch(config)# trunk group 2 fa6-7</pre> <p>Trunk group 2 enable ok!</p>																				
Display - LACP	<pre>ES9528-XT# show lacp internal</pre> <p>LACP group 1 internal information:</p> <table border="1"> <thead> <tr> <th>Port</th> <th>LACP Port</th> <th>Admin Key</th> <th>Oper Key</th> <th>Port State</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>1</td> <td>8</td> <td>8</td> <td>0x45</td> </tr> <tr> <td>9</td> <td>1</td> <td>9</td> <td>9</td> <td>0x45</td> </tr> <tr> <td>10</td> <td>1</td> <td>10</td> <td>10</td> <td>0x45</td> </tr> </tbody> </table> <p>LACP group 2 is inactive  LACP group 3 is inactive  LACP group 4 is inactive</p>	Port	LACP Port	Admin Key	Oper Key	Port State	8	1	8	8	0x45	9	1	9	9	0x45	10	1	10	10	0x45
Port	LACP Port	Admin Key	Oper Key	Port State																	
8	1	8	8	0x45																	
9	1	9	9	0x45																	
10	1	10	10	0x45																	

**Port Trunking (Continued)**

<p>Display - Trunk</p>	<pre> Switch# show trunk group 1 FLAGS:      I -&gt; Individual          P -&gt; In channel             D -&gt; Port Down  Trunk Group GroupID  Protocol  Ports -----+-----+-----  1          LACP      8(D) 9(D) 10(D) Switch# show trunk group 2 FLAGS:      I -&gt; Individual          P -&gt; In channel             D -&gt; Port Down  Trunk Group GroupID  Protocol  Ports -----+-----+-----  2          Static    6(D) 7(P) Switch#         </pre>
------------------------	--

## Network Redundancy (CLI)

It is critical for industrial applications that the network remains running at all times. The ES9528-XT supports:

- Standard Rapid Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP)  
The ES9528-XT supports RSTP versions IEEE 802.1D-2004, IEEE 802.1D-1998 STP, and IEEE 802.1w RSTP.
- Multiple Spanning Tree Protocol (MSTP)  
MSTP implements IEEE 802.1s, which uses RSTP for rapid convergence, enables VLANs to be grouped into a spanning-tree instance, with each instance having a spanning-tree topology independent of other spanning-tree instances. This architecture provides multiple forwarding paths for data traffic, enables load balancing, and reduces the number of spanning-tree instances required to support a large number of VLANs. MSTP was originally defined in the IEEE 802.1s and later merged into the IEEE 802.1Q-2003 specification.
- Redundant Ring  
The Redundant Ring features 0 ms for restore and about 10 ms for fail over for 100BASE-TX copper ports. Other interfaces may take longer due to media characteristics.
- Rapid Dual Homing (RDH)  
Advanced RDH technology allows the ES9528-XT to connect with a core managed switch easily and conveniently. With RDH technology, you can also couple several Rapid Super Rings or RSTP groups together, which is also known as Auto Ring Coupling.

Optionally, you can use the web user interface for configuration, see [Network Redundancy](#) on Page 78.

This table provides detailed information about the CLI command lines for network redundancy.

Global (STP, RSTP, and MSTP)	
Enable	Switch(config)# spanning-tree enable
Disable	Switch(config)# spanning-tree disable
Mode	Switch(config)# spanning-tree mode rst the rapid spanning-tree protocol (802.1w) stp the spanning-tree prtotcol (802.1d) mst the multiple spanning-tree protocol (802.1s) Switch(config)# spanning-tree mode Switch(config)# spanning-tree mode mst Spanning-Tree Mode change to be MSTP (802.1s) Switch(config)# spanning-tree mode stp Spanning-Tree Mode change to be STP(802.1d) . Switch(config)# spanning-tree mode rst Spanning-Tree Mode change to be RSTP(802.1w) . Switch(config)# spanning-tree mode mst Spanning-Tree Mode change to be MSTP(802.1s) .
Bridge Priority	Switch(config)# spanning-tree priority <0-61440> the value of bridge priority in multiple of 4096 Switch(config)# spanning-tree priority 4096
Bridge Times	Switch(config)# spanning-tree bridge-times (forward Delay) (max-age) (Hello Time) Switch(config)# spanning-tree bridge-times 15 20 2  <i>This command allows you configure all the timing in one time.</i>

Global (STP, RSTP, and MSTP) (Cont.)	
Forward Delay	Switch(config)# spanning-tree forward-time <4-30> the value of forward delay time in seconds Switch(config)# spanning-tree forward-time 15
Max Age	Switch(config)# spanning-tree max-age <6-40> the value of message maximum age time in seconds Switch(config)# spanning-tree max-age 20
Hello Time	Switch(config)# spanning-tree hello-time <1-10> the value of hello time in seconds Switch(config)# spanning-tree hello-time 2
MSTP	
Enter the MSTP Configuration Tree	Switch(config)# spanning-tree mst MSTMAP the mst instance number or range configuration enter mst configuration mode forward-time the forward delay time hello-time the hello time max-age the message maximum age time max-hops the maximum hops sync sync port state of exist vlan entry Switch(config)# spanning-tree mst configuration Switch(config)# spanning-tree mst configuration Switch(config-mst)# abort exit current mode and discard all changes end exit current mode, change to enable mode and apply all changes exit exit current mode and apply all changes instance the mst instance list Print command list name the name of mst region no Negate a command or set its defaults quit exit current mode and apply all changes revision the revision of mst region show show mst configuration
Region Configuration	Region Name: Switch(config-mst)# name NAME the name string Switch(config-mst)# name control Region Revision: Switch(config-mst)# revision <0-65535> the value of revision Switch(config-mst)# revision 65535
Mapping Instance to VLAN (Ex: Mapping VLAN 2 to Instance 1)	Switch(config-mst)# instance <1-15> target instance number Switch(config-mst)# instance 1 vlan VLANMAP target vlan number(ex.10) or range(ex.1-10) Switch(config-mst)# instance 1 vlan 2

MSTP (continued)	
Display Current MST Configuration	<pre>Switch(config-mst)# show current Current MST configuration Name      [control] Revision  65535 Instance  Vlans Mapped ----- 0         1,4-4094 1         2 2         3 ----- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D -----</pre>
Remove Region Name	<pre>Switch(config-mst)# no name      name configure revision  revision configure instance  the mst instance Switch(config-mst)# no name</pre>
Remove Instance example	<pre>Switch(config-mst)# no instance &lt;1-15&gt; target instance number Switch(config-mst)# no instance 2</pre>
Show Pending MST Configuration	<pre>Switch(config-mst)# show pending Pending MST configuration Name      []      (-&gt;The name is removed by no name) Revision  65535 Instance  Vlans Mapped ----- 0         1,3-4094 1         2      (-&gt;Instance 2 is removed by no instance 2) ----- Config HMAC-MD5 Digest: 0x3AB68794D602FDF43B21C0B37AC3BCA8 -----</pre>
Apply the setting and go to the configuration mode	<pre>Switch(config-mst)# quit apply all mst configuration changes Switch(config)#</pre>
Apply the setting and go to the global mode	<pre>Switch(config-mst)# end apply all mst configuration changes Switch#</pre>

MSTP (Continued)	
<p>Abort the Setting and go to the configuration mode.</p> <p>Show Pending to see the new settings are not applied.</p>	<pre>Switch(config-mst)# abort discard all mst configuration changes Switch(config)# spanning-tree mst configuration Switch(config-mst)# show pending Pending MST configuration Name      [control] (-&gt;The name is not applied after Abort settings.) Revision  65535 Instance  Vlans Mapped ----- 0         1,4-4094 1         2 2         3 (-&gt; The instance is not applied after Abort settings.) ----- Config HMAC-MD5 Digest: 0xAC36177F50283CD4B83821D8AB26DE62 -----</pre>
RSTP	
System RSTP Setting	The mode should be rstp, timings can be configured in the global settings listed in the previous examples.
Port Configuration Mode	
Port Configuration	<pre>Switch(config)# interface fa1 Switch(config-if)# spanning-tree   bpdudfilter      a secure BPDU process on edge-port interface   bpduguard        a secure response to invalid configurations (received BPDU sent by self)   cost              change an interface's spanning-tree port path cost   edge-port         interface attached to a LAN segment that is at the end of a bridged LAN or to an end node   link-type         the link type for the Rapid Spanning Tree   mst               the multiple spanning-tree   port-priority     the spanning tree port priority   stp-state         the bridge port STP state</pre>
Port Path Cost	<pre>Switch(config-if)# spanning-tree cost &lt;1-200000000&gt; 16-bit based value range from 1-65535, 32-bit based value range from 1-200,000,000 Switch(config-if)# spanning-tree cost 200000</pre>
Port Priority	<pre>Switch(config-if)# spanning-tree port-priority &lt;0-240&gt; Number from 0 to 240, in multiple of 16 Switch(config-if)# spanning-tree port-priority 128</pre>
Link Type - Auto	Switch(config-if)# spanning-tree link-type auto
Link Type - P2P	Switch(config-if)# spanning-tree link-type point-to-point

Port Configuration Mode (Continued)	
Link Type – Share	Switch(config-if)# spanning-tree link-type shared
Edge Port	Switch(config-if)# spanning-tree edge-port enable Switch(config-if)# spanning-tree edge-port disable
MSTP Port Configuration	Switch(config-if)# spanning-tree mst MSTMAP cost <1-200000000> the value of mst instance port cost Switch(config-if)# spanning-tree mst MSTMAP port-priority <0-240> the value of mst instance port priority in multiple of 16
Global Information	
Active Information	<pre>Switch# show spanning-tree active Spanning-Tree : Enabled          Protocol : MSTP Root Address : 00C0.4E5B.0001    Priority : 32768 Root Path Cost : 0                Root Port : N/A Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address : 00C0.4E5B.0001  Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15 BPDU transmission-limit : 3  Port      Role      State      Cost      Prio.Nbr  Type      Aggregated ----- fa1  Designated Forwarding  200000    128.1    P2P(RSTP)  N/A fa2  Designated Forwarding  200000    128.2    P2P(RSTP)  N/A</pre>
RSTP Summary	<pre>Switch# show spanning-tree summary Spanning-Tree : Enabled          Protocol : MSTP Root Address : 00c0.4e5B.004f    Priority : 32768 Root Path Cost : 400000          Root Port : 10 Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address 00c0.4e5B.0001    Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15 BPDU transmission-limit : 3 BPDU Skewing Detection : Disabled Backbonefast : Disabled Topology Change Flag : False     Topology Change Detected Flag : False Topology Change Count : 571      Last Topology Change from : 0000.0000.0000 Timers: hello 0, topology change 0  Summary of connected spanning tree ports : Port-State Summary Blocking  Listening  Learning  Forwarding  Disabled ----- 1         0         0         1           8  Port Link-Type Summary AutoDetected  PointToPoint  SharedLink  EdgePort ----- 10            0             0           8</pre>

Global Information (Continued)	
Port Info	<pre>Switch# show spanning-tree interface fa1 Interface fastethernet1 of Bridge is Alternate Blocking Edge Port : Edge (Non-Edge)          BPDU Filter : Disabled Link Type : Auto (Point-to-point)    BPDU Guard : Disabled Timers : message-age 4, forward-delay 0 BPDUs : sent 26, received 34037 TCNs : sent 0, received 0 Message Expired Count : 0             Forward Transition Count : 8 Aggregation Group: N/A Type: N/A Aggregated with : N/A  Port information  port id 128.6          priority 128 cost 200000 Designated root  address 00c0.4e5b.004f priority 32768 cost 200000 Designated bridge address 00c0.4e5b.0007 priority 32768 port id 128.5</pre>
MSTP Information	
MSTP Configuration	<pre>Switch# show spanning-tree mst configuration Current MST configuration (MSTP is Running) Name      [comtrol] Revision  65535 Instance  Vlans Mapped ----- 0         1,4-4094 1         2 2         3 ----- Config HMAC-MD5 Digest: 0xAC36177F50283CD4B83821D8AB26DE62 -----</pre>
Display all MST Information	<pre>Switch# show spanning-tree mst ##### MST00  vlans mapped: 1,4-4094 Bridge      address 00C0.4E5B.0001  priority 32768 (sysid 0) Root        this switch for CST and IST Configured  max-age 2, hello-time 15, forward-delay 20, max-hops 20  Port  Role      State      Cost      Prio.Nbr  Type ----- fa1  Designated Forwarding  200000    128.1    P2P Internal (MSTP) fa2  Designated Forwarding  200000    128.2    P2P Internal (MSTP)  ##### MST01  vlans mapped: 2 Bridge      address 00C0.4E5B.0001  priority 32768 (sysid 1) Root        this switch for MST01  Port  Role      State      Cost      Prio.Nbr  Type ----- fa1  Designated Forwarding  200000    128.1    P2P Internal (MSTP) fa2  Designated Forwarding  200000    128.2    P2P Internal (MSTP)</pre>

MSTP Information (Continued)	
Display all MST Information	<pre>Switch# show spanning-tree mst ##### MST00 vlans mapped: 1-4094 Bridge address 00c0.4e30.0001 priority 32768 (sysid 0) Root address 00c0.4e2c.004f priority 32768 (sysid 0) port 10 path cost 400000 Regional root this switch Operational max-age 2, hello-time 15, forward-delay 20 Configured max-age 2, hello-time 15, forward-delay 20, max-hops 20  Port Role State Cost Prio.Nbr Type ----- fa2 Alternate Blocking 200000 128.6 P2P Bound(RSTP) fa1 Root Forwarding 200000 128.10 P2P Bound(RSTP)</pre>
MSTP Root Information	<pre>Switch# show spanning-tree mst root MST Root Root Root Root Max Hello Fwd Instance Address Priority Cost Port age dly ----- MST00 00C0.4E5B.0001 32768 0 N/A 20 2 15 MST01 00C0.4E5B.0001 32768 0 N/A 20 2 15 MST02 00C0.4E5B.0001 32768 0 N/A 20 2 15</pre>
MSTP Instance Information	<pre>Switch# show spanning-tree mst 1 ##### MST01 vlans mapped: 2 Bridge address 00C0.4E5B.0001 priority 32768 (sysid 1) Root this switch for MST01  Port Role State Cost Prio.Nbr Type ----- fa1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) fa2 Designated Forwarding 200000 128.2 P2P Internal(MSTP)</pre>
MSTP Port Information	<pre>Switch# show spanning-tree mst interface fa1 Interface fastethernet1 of MST00 is Designated Forwarding Edge Port : Edge (Edge) BPDU Filter : Disabled Link Type : Auto (Point-to-point) BPDU Guard : Disabled Boundary : Internal(MSTP) BPDUs : sent 6352, received 0  Instance Role State Cost Prio.Nbr Vlans mapped ----- 0 Designated Forwarding 200000 128.1 1,4-4094 1 Designated Forwarding 200000 128.1 2 2 Designated Forwarding 200000 128.1 3</pre>

Redundant Ring	
Create or configure a Ring	<pre>Switch(config)# redundant-ring 1 Ring 1 created Switch(config-redundant-ring)#</pre> <p><b>Note:</b> 1 is the target Ring ID which is going to be created or configured.</p>
Super Ring Version	<pre>Switch(config-redundant-ring)# version     default          set default to Redundant ring     rapid-super-ring rapid super ring     super-ring       super ring</pre> <pre>Switch(config-redundant-ring)# version rapid-super-ring</pre>
Priority	<pre>Switch(config-redundant-ring)# priority     &lt;0-255&gt; valid range is 0 to 255     default set default</pre> <pre>Switch(config-redundant-ring)# super-ring priority 100</pre>
Ring Port	<pre>Switch(config-redundant-ring)# port     IFLIST Interface list, ex: fa1,fa3-5,gi25-28     cost   path cost</pre> <pre>Switch(config-redundant-ring)# port fa1,fa2</pre>

Ring Info	
Ring Info	<pre> Switch# show redundant-ring [Ring ID] [Ring1] Ring1 Current Status : Disabled Role           : Disabled Ring Status    : Abnormal Ring Manager   : 0000.0000.0000 Blocking Port  : N/A Giga Copper    : N/A Configuration : Version        : Super Ring Priority       : 128 Ring Port      : fa1, fa2 Path Cost      : 100, 200 Dual-Homing II : Disabled Statistics : Watchdog sent   0, received   0, missed   0 Link Up  sent   0, received   0 Link Down sent  0, received   0 Role Transition count 0 Ring State Transition count 1  Ring ID is optional. If the ring ID is typed, this command only displays the information of the target Ring.                     </pre>

## VLAN (CLI)

A Virtual LAN (VLAN) is a logical grouping of nodes for the purpose of limiting a broadcast domain to specific members of a group without physically grouping the members. The VLAN allows you to isolate network traffic so that only members of the VLAN could receive traffic from the same VLAN members. Basically, creating a VLAN from a switch is the logical equivalent of physically reconnecting a group of network devices to another Layer 2 switch, without actually disconnecting these devices from their original switches.

The ES9528-XT supports IEEE 802.1Q VLAN, which is also known as Tag-Based VLAN. This Tag-Based VLAN allows a VLAN to be created across different switches. IEEE 802.1Q tag-based VLAN makes use of VLAN control information stored in a VLAN header attached to IEEE 802.3 packet frames. This tag contains a VLAN Identifier (VID) that indicates which VLAN a frame belongs to. Since each switch only has to check a frame's tag, without the need to dissect the contents of the frame, this also saves a lot of computing resources within the switch.

Optionally, you can use the web user interface for configuration, see [VLAN](#) on Page 94.

The following table provides detailed information about command lines for the VLAN.

VLAN Port Configuration	
VLAN Port PVID	Switch(config-if)# switchport trunk native vlan 2 Set port default vlan id to 2 success
Port Accept Frame Type	Switch(config)# inter fa1 Switch(config-if)# acceptable frame type all any kind of frame type is accepted! Switch(config-if)# acceptable frame type vlantaggedonly only vlan-tag frame is accepted!
Ingress Filtering (for Fast Ethernet Port 1)	Switch(config)# interface fa1 Switch(config-if)# ingress filtering enable ingress filtering enable Switch(config-if)# ingress filtering disable ingress filtering disable
Egress rule – Untagged (for VLAN 2)	Switch(config-if)# switchport access vlan 2 switchport access vlan - success
Egress rule – Tagged (for VLAN 2)	Switch(config-if)# switchport trunk allowed vlan add 2
Display – Port Ingress Rule (PVID, Ingress Filtering, Acceptable Frame Type)	Switch# show interface fa1 Interface fastethernet1 Administrative Status : Enable Operating Status : Not Connected Duplex : Auto Speed : Auto Flow Control :off Default Port VLAN ID: 2 Ingress Filtering : Disabled Acceptable Frame Type : All Port Security : Disabled Auto Negotiation : Enable Loopback Mode : None STP Status: disabled Default CoS Value for untagged packets is 0. Mdix mode is Auto. Medium mode is Copper.

VLAN Port Configuration (continued)	
Display – Port Egress Rule (Egress rule, IP address, status)	<pre>Switch# show running-config ..... ! interface fastethernet1   switchport access vlan 1   switchport access vlan 3   switchport trunk native vlan 2 ..... interface vlan1   ip address 192.168.250.8/24   no shutdown</pre>
VLAN Configuration	
Create VLAN (2)	<pre>Switch(config)# vlan 2 vlan 2 success  Switch(config)# interface vlan 2 Switch(config-if)#</pre> <p><b>Note:</b> <i>In the CLI configuration, you should first create a VLAN interface. Then you can start to add/remove ports. The default status of the created VLAN is unused until you add member ports to it.</i></p>
Remove VLAN	<pre>Switch(config)# no vlan 2 no vlan success</pre> <p><b>Note:</b> <i>You can only remove the VLAN when the VLAN is in unused mode.</i></p>
VLAN Name	<pre>Switch(config)# vlan 2 vlan 2 has exists Switch(config-vlan)# name v2  Switch(config-vlan)# no name</pre> <p><b>Note:</b> <i>Use no name to change the name to default name, VLAN VID.</i></p>
VLAN description	<pre>Switch(config)# interface vlan 2 Switch(config-if)# Switch(config-if)# description this is the VLAN 2  Switch(config-if)# no description -&gt;Delete the description.</pre>
IP address of the VLAN	<pre>Switch(config)# interface vlan 2 Switch(config-if)# Switch(config-if)# ip address 192.168.250.18/24 Switch(config-if)# no ip address 192.168.250.8/24 -&gt;Delete the IP address</pre>
Create multiple VLANs (VLAN 5-8)	<pre>Switch(config)# interface vlan 5-8</pre>
Shutdown VLAN	<pre>Switch(config)# interface vlan 2 Switch(config-if)# shutdown Switch(config-if)# no shutdown -&gt;Turn on the VLAN</pre>

VLAN Configuration (continued)	
Display – VLAN table	<pre>Switch# sh vlan VLAN Name      Status  Trunk Ports          Access Ports ----- 1    VLAN1      Static   -                    fa1-7,gi25-28    VLAN2 Unused         -              - 3    test       Static  fa4-7,gi25-28      fa1-3,fa7,gi25-28</pre>
Display – VLAN interface information	<pre>Switch# show interface vlan1 interface vlan1 is up, line protocol detection is disabled   index 14 metric 1 mtu 1500 &lt;UP,BROADCAST,RUNNING,MULTICAST&gt;   HWaddr: 00:c0:4e:ff:01:b0   inet 192.168.250.100/24 broadcast 192.168.250.255     input packets 639, bytes 38248, dropped 0, multicast packets 0     input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0     output packets 959, bytes 829280, dropped 0     output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0     collisions 0</pre>
GVRP Configuration	
GVRP enable/disable	<pre>Switch(config)# gvrp mode   disable  Disable GVRP feature globally on the switch   enable   Enable GVRP feature globally on the switch Switch(config)# gvrp mode enable Gvrp is enabled on the switch!</pre>
Configure GVRP timer	<pre>Switch(config)# inter fa1 Switch(config-if)# garp timer   &lt;10-10000&gt;</pre>
Join timer /Leave timer/ LeaveAll timer	<pre>Switch(config-if)# garp timer 20 60 1000</pre> <p><b>Note:</b> The unit of this timer is centiseconds.</p>
Management VLAN	
Management VLAN	<pre>Switch(config)# int vlan 1 (Go to management VLAN) Switch(config-if)# no shutdown</pre>
Display	<pre>Switch# show running-config ... ! interface vlan1   ip address 192.168.250.17/24   ip igmp   no shutdown ! ...</pre>

## Private VLAN (CLI)

A private VLAN helps to resolve the primary VLAN ID shortage, client ports' isolation and network security issues. The Private VLAN features provides primary and secondary VLANs within a single switch.

**Primary VLAN:** The uplink port is usually a member of the primary VLAN. A primary VLAN contains promiscuous ports that can communicate with Secondary VLANs.

**Secondary VLAN:** The client ports are usually defined within secondary VLAN. The secondary VLAN includes Isolated and Community VLANs. The client ports can be isolated VLANs or can be grouped in the same Community VLAN. The ports within the same community VLAN can communicate with each other, however, the isolated VLAN ports cannot.

Optionally, you can use the web user interface for configuration, see [Private VLAN](#) on Page 98.

The following table provides detailed information about command lines for private VLAN port configuration, VLAN configuration, and VLAN table display.

Private VLAN Configuration	
Create VLAN	<pre>Switch(config)# vlan 2 vlan 2 success Switch(config-vlan)#     end          End current mode and change to enable mode     exit        Exit current mode and down to previous mode     list       Print command list     name      Assign a name to vlan     no        no     private-vlan  Configure a private VLAN</pre>
Private VLAN Type	<p><i>Go to the VLAN you want configure first.</i></p> <pre>Switch(config)# vlan (VID)</pre>
Choose the Types	<pre>Switch(config-vlan)# private-vlan     community  Configure the VLAN as an community private VLAN     isolated   Configure the VLAN as an isolated private VLAN     primary    Configure the VLAN as a primary private VLAN</pre>
Primary Type	<pre>Switch(config-vlan)# private-vlan primary &lt;cr&gt;</pre>
Isolated Type	<pre>Switch(config-vlan)# private-vlan isolated &lt;cr&gt;</pre>
Community Type	<pre>Switch(config-vlan)# private-vlan community &lt;cr&gt;</pre>

Private VLAN Port Configuration	
Go to the port configuration	<pre>Switch(config)# interface (port_number, ex: fa1) Switch(config-if)# switchport private-vlan     host-association Set the private VLAN host association     mapping          map primary VLAN to secondary VLAN</pre>
Private VLAN Port Type	<pre>Switch(config-if)# switchport mode     private-vlan Set private-vlan mode Switch(config-if)# switchport mode private-vlan     host          Set the mode to private-vlan host     promiscuous  Set the mode to private-vlan promiscuous Switch(config-if)# switchport mode private-vlan promiscuous     &lt;cr&gt;</pre>
Promiscuous Port Type	<pre>Switch(config-if)# switchport mode private-vlan host     &lt;cr&gt;</pre>
Host Port Type	
Private VLAN Port Configuration PVLAN Port Type	<pre>Switch(config)# interface fa1 Switch(config-if)# switchport mode private-vlan host</pre>
Host Association primary to secondary  (The command is only available for host port.)	<pre>Switch(config-if)# switchport private-vlan host-association     &lt;2-4094&gt; Primary range VLAN ID of the private VLAN port     association Switch(config-if)# switchport private-vlan host-association 2     &lt;2-4094&gt; Secondary range VLAN ID of the private VLAN port     association Switch(config-if)# switchport private-vlan host-association 2 3</pre>
Mapping primary to secondary VLANs  (This command is only available for promiscuous port)	<pre>Switch(config)# interface fa1 Switch(config-if)# switchport mode private-vlan promiscuous Switch(config-if)# switchport private-vlan mapping 2 add 3 Switch(config-if)# switchport private-vlan mapping 2 add 4 Switch(config-if)# switchport private-vlan mapping 2 add 5</pre>
Private VLAN Information	
Private VLAN Information	<pre>Switch# show vlan private-vlan FLAGS:      I -&gt; Isolated          P -&gt; Promiscuous            C -&gt; Community Primary Secondary Type              Ports ----- 2         3         Isolated          fa1(P),fa2(I) 2         4         Community         fa2(P),fa3(C) 2         5         Community         fa2(P),fa1(C),fa3(I) 10        -         -                 -</pre>

Private VLAN Information (Continued)	
Running Config Information	<pre>Switch# show run Building configuration...  Current configuration: hostname Switch vlan learning independent ! vlan 1 ! vlan 2   private-vlan primary ! vlan 3   private-vlan isolated ! vlan 4   private-vlan community ! vlan 5   private-vlan community ! ..... ..... interface fastethernet7   switchport access vlan add 2,5   switchport trunk native vlan 5   switchport mode private-vlan host   switchport private-vlan host-association 2 5 ! interface fastethernet   switchport access vlan add 2,4   switchport trunk native vlan 4   switchport mode private-vlan host   switchport private-vlan host-association 2 4 ! interface gigabitethernet9   switchport access vlan add 2,5   switchport trunk native vlan 5   switchport mode private-vlan host   switchport private-vlan host-association 2 3 ! interface gigabitethernet10   switchport access vlan add 2,5   switchport trunk native vlan 2   switchport mode private-vlan promiscuous   switchport private-vlan mapping 2 add 3-5 ..... .....</pre>
Private VLAN Type	
Private VLAN Port Information	

Private VLAN Information (Continued)	
PVLAN Type	Switch# show vlan private-vlan type
	Vlan Type                      Ports
	-----
	2    primary                    fa3
	3    isolated                    fa2
	4    community                  fa1
5    community                  fa4,fa5	
10   primary                    -	
Host List	Switch# show vlan private-vlan port-list
	Ports Mode                    Vlan
	-----
	1    normal                      -
	2    normal                      -
	3    normal                      -
	4    normal                      -
	5    normal                      -
	6    normal                      -
	7    host                         5
	8    host                         4
9    host                         3	
10   promiscuous                2	

## Traffic Prioritization (CLI)

Quality of Service (QoS) provides a traffic prioritization mechanism which allows you to deliver better service to certain flows. QoS can also help to alleviate congestion problems and ensure high-priority traffic is delivered first. This section allows you to configure Traffic Prioritization settings for each port with regard to setting priorities.

ES9528-XT QoS supports four physical queues, weighted fair queuing (WRR) and Strict Priority scheme, that follows the IEEE 802.1p COS tag and IPv4 TOS/DiffServ information to prioritize the traffic of your industrial network.

Optionally, you can use the web user interface for configuration, see [Traffic Prioritization](#) on Page 105. This table provides detailed information about command lines for traffic prioritization configuration

QoS Setting	
Queue Scheduling – Strict Priority	<pre>Switch(config)# qos queue-sched sp   Strict Priority wrr  Weighted Round Robin Switch(config)# qos queue-sched sp The queue scheduling scheme is setting to Strict Priority.</pre>
Queue Scheduling - WRR	<pre>Switch(config)# qos queue-sched wrr &lt;1-10&gt;  Weights for COS queue 0 (queue_id 0) Switch(config)# qos queue-sched wrr 10 &lt;1-10&gt;  Weights for COS queue 1 (queue_id 1) ..... Switch(config)# qos queue-sched wrr 1 2 3 4 The queue scheduling scheme is setting to Weighted Round Robin.  Assign the ratio for the 4 classes of service.</pre>
Port Setting – CoS (Default Port Priority)	<pre>Switch(config)# interface fa1 Switch(config-if)# qos priority &lt;0-3&gt;  Assign a priority queue Switch(config-if)# qos priority 3 The priority queue is set 3 ok.</pre> <p><b>Note:</b> When change the port setting, you should Select the specific port first. Ex: fa1 means fast Ethernet port 1.</p>

QoS Setting (Continued)	
QoS Priority Mode	<pre>Switch(config)# qos priority cos          CoS dscp        DSCP/TOS port-based  Port-based Switch(config)# qos priority dscp  Switch# show qos priority QoS Priority Mode: DSCP</pre>
Display - Queue Scheduling	<pre>Switch# show qos queue-sched QoS queue scheduling scheme : Weighted Round Robin COS queue 0 = 1 COS queue 1 = 2 COS queue 2 = 3 COS queue 3 = 4</pre>
Display – Port Priority Setting (Port Default Priority)	<pre>Switch# show qos port-priority Port Default Priority : Port  Priority Queue -----+-----    1      7    2      0    3      0    4      0    5      0 .....   25      0   26      0   27      0   28      0</pre>
CoS-Queue Mapping	
Format	<pre>Switch(config)# qos cos-map PRIORITY Assign an priority (3 highest) Switch(config)# qos cos-map 1 QUEUE Assign an queue (0-3)  <b>Note:</b> Format: qos cos-map priority_value queue_value.</pre>
Map CoS 0 to Queue 1	<pre>Switch(config)# qos cos-map 0 1 The CoS to queue mapping is set ok.</pre>
Map CoS 1 to Queue 0	<pre>Switch(config)# qos cos-map 1 0 The CoS to queue mapping is set ok.</pre>
Map CoS 2 to Queue 0	<pre>Switch(config)# qos cos-map 2 0 The CoS to queue mapping is set ok.</pre>
Map CoS 3 to Queue 1	<pre>Switch(config)# qos cos-map 3 1 The CoS to queue mapping is set ok.</pre>
Map CoS 4 to Queue 2	<pre>Switch(config)# qos cos-map 4 2 The CoS to queue mapping is set ok.</pre>

CoS-Queue Mapping (cont)	
Map CoS 5 to Queue 2	Switch(config)# qos cos-map 5 2 The CoS to queue mapping is set ok.
Map CoS 6 to Queue 3	Switch(config)# qos cos-map 6 3 The CoS to queue mapping is set ok.
Map CoS 7 to Queue 3	Switch(config)# qos cos-map 7 3 The CoS to queue mapping is set ok.
Display – CoS-Queue mapping	Switch# sh qos cos-map CoS to Queue Mapping : CoS Queue ---- + ----- 0 1 1 0 2 0 3 1 4 2 5 2 6 3 7 3
DSCP-Queue Mapping	
Format	Switch(config)# qos dscp-map <0-63> Assign an priority (63 highest) Switch(config)# qos dscp-map 0 <0-3> Assign an queue (0-3)  <b>Format:</b> qos dscp-map priority_value queue_value
Map DSCP 0 to Queue 1	Switch(config)# qos dscp-map 0 1 The TOS/DSCP to queue mapping is set ok.
Display – DSCO-Queue mapping	Switch# show qos dscp-map DSCP to Queue Mapping : (dscp = d1 d2)  d2   0 1 2 3 4 5 6 7 8 9 d1   -----+----- 0   1 1 1 1 1 1 1 1 0 0 1   0 0 0 0 0 0 0 0 0 0 2   0 0 0 0 1 1 1 1 1 1 3   1 1 2 2 2 2 2 2 2 2 4   2 2 2 2 2 2 2 2 3 3 5   3 3 3 3 3 3 3 3 3 3 6   3 3 3 3

## Multicast Filtering (CLI)

For multicast filtering, the ES9528-XT uses IGMP (Internet Group Management Protocol) Snooping technology. IGMP is an internet protocol that provides a way for internet device to report its multicast group membership to adjacent routers. Multicasting allows one computer on the internet to send data to a multitude of other computers that have identified themselves as being interested in receiving the originating computers data.

Multicasting is useful for such applications as updating the address books of mobile computer users in the field, sending out newsletters to a distribution list, and broadcasting streaming media to an audience that has tuned into the event by setting up multicast group membership.

In effect, IGMP Snooping manages multicast traffic by making use of switches, routers, and hosts that support IGMP. Enabling IGMP Snooping allows the ports to detect IGMP queries, report packets, and manage multicast traffic through the switch. IGMP has three fundamental types of messages, as shown in the following table.

Message	
Query	A message sent from the querier (an IGMP router or a switch) that asks for a response from each host that belongs to the multicast group.
Report	A message sent by a host to the querier to indicate that the host wants to be or is a member of a given group indicated in the report message.
Leave Group	A message sent by a host to the querier to indicate that the host has quit as a member of a specific multicast group.

You can enable **IGMP Snooping** and **IGMP Query** functions. This section illustrates the information of the IGMP Snooping function, including different multicast groups' VID and member ports, and IP multicast addresses that range from 224.0.0.0 to 239.255.255.255.

Optionally, you can use the web user interface for configuration, see [Multicast Filtering](#) on Page 110.

The following table provides detailed information about command lines for multicast filtering configuration.

IGMP Snooping	
IGMP Snooping - Global	Switch(config)# ip igmp snooping IGMP snooping is enabled globally. Specify on which vlans IGMP snooping enables
IGMP Snooping - VLAN	Switch(config)# ip igmp snooping vlan VLANLIST allowed vlan list all all existed vlan Switch(config)# ip igmp snooping vlan 1-2 IGMP snooping is enabled on VLAN 1-2.
Disable IGMP Snooping - Global	Switch(config)# no ip igmp snooping IGMP snooping is disabled globally ok.
Disable IGMP Snooping - VLAN	Switch(config)# no ip igmp snooping vlan 3 IGMP snooping is disabled on VLAN 3.

<b>IGMP Snooping (Continued)</b>	
Display – IGMP Snooping Setting	<pre>Switch# sh ip igmp interface vlan1 enabled: Yes version: IGMPv1 query-interval; 125s query-max-response-time: 10s  Switch# sh ip igmp snooping IGMP snooping is globally enabled Vlan1 is IGMP snooping enabled Vlan2 is IGMP snooping enabled Vlan3 is IGMP snooping disabled</pre>
Display – IGMP Table	<pre>Switch# sh ip igmp snooping multicast all VLAN   IP Address          Type    Ports ----   - 1       239.192.8.0        IGMP    fa6, 1       239.255.255.250   IGMP    fa6,</pre>
<b>IGMP Query</b>	
IGMP Query V1	<pre>Switch(config)# int vlan 1 Switch(config-if)# ip igmp v1</pre>
IGMP Query V2	<pre>Switch(config)# int vlan 1 Switch(config-if)# ip igmp</pre>
IGMP Query version	<pre>Switch(config-if)# ip igmp version 1 Switch(config-if)# ip igmp version 2</pre>
IGMP Query Interval	<pre>Switch(config)# int vlan 1 (Go to management VLAN) Switch(config-if)# ip igmp Switch(config-if)# ip igmp query-interval 60 (Change query interval to 60 seconds, default value is 125 seconds)</pre>
IGMP Query Max Response Time	<pre>Switch(config)# int vlan 1 (Go to management VLAN) Switch(config-if)# ip igmp Switch(config-if)# ip igmp query-max-response-time 15 (Change query max response time to 15 seconds, default value is 10 seconds)</pre>
Disable	<pre>Switch(config)# int vlan 1 Switch(config-if)# no ip igmp</pre>

<b>IGMP Query (Continued)</b>	
Display	<pre>Switch# sh ip igmp interface vlan1 enabled: Yes version: IGMPv2 query-interval: 125s query-max-response-time: 10s  Switch# show running-config ... ! interface vlan1  ip address 192.168.250.17/24  ip igmp  no shutdown ! .....</pre>
<b>Unknown Multicast</b>	
Send Unknown Multicast to Query Ports	<pre>Switch(config)# ip igmp snooping source-only-learning IGMP Snooping Source-Only-Learning enabled</pre>
Send Unknown Multicast to All Ports	<pre>Switch(config)# no ip igmp snooping source-only-learning IGMP Snooping Source-Only-Learning disabled  Switch(config)# no mac-address-table multicast filtering Flooding unknown multicast addresses ok!</pre>
Discard All Unknown Multicast	<pre>Switch(config)# mac-address-table multicast filtering Filtering unknown multicast addresses ok!</pre>

<b>GMRP Configuration</b>	
Enable GMRP globally	Switch(config)# gmrp mode enable Gmrp is enabled on the switch!
Disable GMRP globally	Switch(config)# gmrp mode disable Gmrp is disabled on the switch!
Enable GMRP on a port	Switch(config)# gmrp mode enable fa1 Gmrp enabled on port 1 !
Disable GMRP on a port	Switch(config)# gmrp mode disable fa2 Gmrp disabled on port 2 !
Display	Switch# sh gmrp GMRP global enabled port 1 : enabled port 2 : enabled port 3 : disabled port 4 : disabled port 5 : disabled port 6 : disabled port 7 : disabled port 8 : disabled port 9 : disabled port 10 : disabled
<b>Force Filtering</b>	
Enable	Switch(config)# mac-address-table force filtering Filtering unknown multicast addresses ok!
Disable	Switch(config)# no mac-address-table force filtering Flooding unknown multicast addresses ok!

## SNMP (CLI)

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. The ES9528-XT supports SNMP v1 and v2c and V3.

An SNMP managed network consists of two main components: agents and a manager. An agent is a management software module that resides in a managed switch. An agent translates the local management information from the managed device into a SNMP compatible format. The manager is the console through the network.

Optionally, you can use the web user interface for configuration, see [SNMP](#) on Page 114.

The following table provides detailed information about command lines for SNMP configuration.

SNMP Community	
Read Only Community	Switch(config)# snmp-server community public ro community string add ok
Read Write Community	Switch(config)# snmp-server community private rw community string add ok
SNMP Trap	
Enable Trap	Switch(config)# snmp-server enable trap Set SNMP trap enable ok.
SNMP Trap Server IP without specific community name	Switch(config)# snmp-server host 192.168.250.33 SNMP trap host add OK.
SNMP Trap Server IP with version 1 and community	Switch(config)# snmp-server host 192.168.250.33 version 1 private SNMP trap host add OK. <b>Note:</b> Private is the community name, version 1 is the SNMP version.
SNMP Trap Server IP with version 2 and community	Switch(config)# snmp-server host 192.168.250.33 version 2 private SNMP trap host add OK.
Disable SNMP Trap	Switch(config)# no snmp-server enable trap Set SNMP trap disable ok.
Display	Switch# sh snmp-server trap SNMP trap: Enabled SNMP trap community: public  Switch# show running-config ..... snmp-server community public ro snmp-server community private rw snmp-server enable trap snmp-server host 192.168.250.33 version 2 admin snmp-server host 192.168.250.33 version 1 admin .....

## Security (CLI)

The ES9528-XT provides several security features for you to secure your connection. Optionally, you can use the web user interface for configuration, see [Security](#) on Page 117. This table provides information about the command lines for security configuration.

Securing Interfaces	
Display	Switch# show service Telnet : Disabled Http : Disabled
Telnet	Switch(config)# service telnet enable
HTTP	Switch(config)# service http enable
PortVision DX	Switch(config)# service netvision enable <b>Note:</b> <i>Disabling PortVision DX means that the switch displays as off-line in PortVision DX.</i>
Port Security	
Add MAC access list	Switch(config)# mac access-list extended NAME access-list name Switch(config)# mac access-list extended server1 Switch(config-ext-macl)# permit Specify packets to forward deny Specify packets to reject end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list no Negate a command or set its defaults quit Exit current mode and down to previous mode
Add IP Standard access list	Switch(config)# ip access-list extended Extended access-list standard Standard access-list Switch(config)# ip access-list standard <1-99> Standard IP access-list number <1300-1999> Standard IP access-list number (expanded range) WORD Access-list name Switch(config)# ip access-list standard 1 Switch(config-std-acl)# deny Specify packets to reject permit Specify packets to forward end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list no Negate a command or set its defaults quit Exit current mode and down to previous mode remark Access list entry comment

Port Security (Continued)	
Add IP Extended access list	<pre>Switch(config)# ip access-list extended &lt;100-199&gt;    Extended IP access-list number &lt;2000-2699&gt; Extended IP access-list number (expanded range) WORD        access-list name Switch(config)# ip access-list extended 100 Switch(config-ext-acl)# deny        Specify packets to reject permit     Specify packets to forward end         End current mode and down to previous mode exit        Exit current mode and down to previous mode list        Print command list no          Negate a command or set its defaults quit        Exit current mode and down to previous mode remark     Access list entry comment</pre>
Example 1: Edit MAC access list	<pre>Switch(config-ext-macl)#permit MACADDR    Source MAC address xxxx.xxxx.xxxx any         any source MAC address host        A single source host Switch(config-ext-macl)#permit host MACADDR    Source MAC address xxxx.xxxx.xxxx Switch(config-ext-macl)#permit host 00C0.4e5B.2233 MACADDR    Destination MAC address xxxx.xxxx.xxxx any         any destination MAC address host        A single destination host Switch(config-ext-macl)#permit host 00C0.4e5B.2233 host MACADDR    Destination MAC address xxxx.xxxx.xxxx Switch(config-ext-macl)#permit host 00C0.4e5B.2233 host 00C0.4e5B.2234 [IFNAME]    Egress interface name Switch(config-ext-macl)#permit host 00C0.4e5B.2233 host 00c01.4e5B.2234 gi25 <b>MAC Rule:</b> Permit/Deny wildcard Source_MAC wildcard Dest_MAC Egress_Interface.</pre>

Port Security (Continued)	
<p>Example 1: Edit IP Extended access list</p>	<pre>Switch(config)# ip access-list extended 100 Switch(config-ext-acl)#permit ip    Any Internet Protocol tcp   Transmission Control Protocol udp   User Datagram Protocol icmp  Internet Control Message Protocol Switch(config-ext-acl)#permit ip A.B.C.D Source address any    Any source host host   A single source host Switch(config-ext-acl)#permit ip 192.168.10.1 A.B.C.D Source wildcard bits Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 A.B.C.D Destination address any    Any destination host host   A single destination host Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 192.168.10.100 0.0.0.1 [IFNAME] Egress interface name Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 192.168.10.100 0.0.0.1 gi26</pre> <p><b>Note:</b> Follow the below rules to configure ip extended access list.</p> <p><b>IP Rule:</b> Permit/Deny Source_IP wildcard Dest_IP wildcard Egress_Interface</p> <p><b>TCP Rule:</b> Permit/Deny tcp Source_IP wildcard Dest_IP wildcard eq Given_Port_Number Egress_Interface</p> <p><b>UDP Rule:</b> Permit/Deny udp Source_IP wildcard Dest_IP wildcard eq Given_Port_Number Egress_Interface</p> <p><b>ICMP Rule:</b> Permit/Deny icmp Source_IP wildcard Dest_IP wildcard ICMP_Message_Type ICMP_Message_Code Egress_Interface</p>
<p>Add MAC</p>	<pre>Switch(config)# mac-address-table static 00C0.4e5B.0101 vlan 1 interface fa1 mac-address-table unicast static set ok!</pre>
<p>Port Security</p>	<pre>Switch(config)# interface fa1 Switch(config-if)# switchport port-security Disables new MAC addresses learning and aging activities!</pre> <p><b>Rule:</b> Add the static MAC, VLAN and Port binding first, then enable the port security to stop new MAC learning.</p>
<p>Disable Port Security</p>	<pre>Switch(config-if)# no switchport port-security Enable new MAC addresses learning and aging activities!</pre>
<p>Display</p>	<pre>Switch# show mac-address-table static Destination Address  Address Type      Vlan    Destination Port ----- 00C0.4e5B.0101      Static            1       fa1</pre>

802.1x	
enable	Switch(config)# dot1x system-auth-control Switch(config)#
diabile	Switch(config)# no dot1x system-auth-control Switch(config)#
authentic-method	Switch(config)# dot1x authentic-method local Use the local username database for authentication RADIUS Use the Remote Authentication Dial-In User Service (RADIUS) servers for authentication Switch(config)# dot1x authentic-method RADIUS Switch(config)#
RADIUS server-ip	Switch(config)# dot1x RADIUS Switch(config)# dot1x RADIUS server-ip 192.168.10.120 key 1234  RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 Switch(config)#
RADIUS server-ip	Switch(config)# dot1x RADIUS Switch(config)# dot1x RADIUS server-ip 192.168.10.120 key 1234  RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 Switch(config)#
RADIUS secondary-server-ip	Switch(config)# dot1x RADIUS secondary-server-ip 192.168.10.250 key 5678  Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) Secondary RADIUS Server IP : 192.168.10.250 Secondary RADIUS Server Key : 5678 Secondary RADIUS Server Port : 1812 Secondary RADIUS Accounting Port : 1813
User name/password for authentication	Switch(config)# dot1x username Control passwd Control vlan 1

## Warnings (CLI)

The ES9528-XT provides several types of warning features for you to remotely monitor the status of the attached devices or changes in your network. The features include Fault Relay, System Log and SMTP Email Alert.

Optionally, you can use the web user interface for configuration, see [Warning](#) on Page 128.

This table provides detailed information about the command lines of the warning configuration.

Fault Relay Output	
Relay Output	<pre>Switch(config)# relay 1 dry    dry output ping   ping failure port   port link failure ring   super ring failure</pre>
DI State	<pre>Switch(config)# relay 1 di 1      DI number Switch(config)# relay 1 di 1 high   high is abnormal low    low is abnormal Switch(config)# relay 1 di 1 high</pre>
Dry Output	<pre>Switch(config)# relay 1 dry &lt;0-65535&gt; turn on period in second Switch(config)# relay 1 dry 5 &lt;0-65535&gt; turn off period in second Switch(config)# relay 1 dry 5 5</pre>
Ping Failure	<pre>Switch(config)# relay 1 ping 192.168.250.33 &lt;cr&gt; reset  reset a device Switch(config)# relay 1 ping 192.168.250.33 reset &lt;1-65535&gt; reset time Switch(config)# relay 1 ping 192.168.250.33 reset 60 &lt;0-65535&gt; hold time to retry Switch(config)# relay 1 ping 192.168.250.33 reset 60 60</pre>
Port Link Failure	<pre>Switch(config)# relay 1 port PORTLIST port list Switch(config)# relay 1 port fa1-5</pre>
Power Failure	<pre>Switch(config)# relay 1 power &lt;1-2&gt; power id Switch(config)# relay 1 power 1 Switch(config)# relay 1 power 2</pre>
Power Failure	<pre>Switch(config)# relay 1 power &lt;1-&gt; power id any    Anyone power failure asserts relay Switch(config)# relay 1 power 1 Switch(config)# relay 1 power 2</pre>
Ring Failure	<pre>Switch(config)# relay 1 ring</pre>

Fault Relay Output (cont.)	
Disable Relay	<pre>Switch(config)# no relay  1 relay id Switch(config)# no relay 1 &lt;cr&gt;</pre>
Display	<pre>Switch# show relay 1 Relay Output Type : Port Link Port : 1, 2, 3, 4</pre>
Event Selection	
Event Selection	<pre>Switch(config)# warning-event coldstart      Switch cold start event warmstart      Switch warm start event linkdown       Switch link down event linkup         Switch link up event authentication Authentication failure event super-ring     Switch super ring topology change event sfp            Switch sfp event time-sync      Switch time synchronize event</pre>
Example: Cold Start event	<pre>Switch(config)# warning-event coldstart Set cold start event enable ok.</pre>
Example: Link Up event	<pre>Switch(config)# warning-event linkup  [IFNAME] Interface list, ex: fa1,fa3-5,gi25-28 Switch(config)# warning-event linkup fa1gi2 Set fa5 link up event enable ok.</pre>
Display	<pre>Switch# show warning-event Warning Event: Cold Start: Enabled Warm Start: Disabled Authentication Failure: Disabled Link Down: fa4-5 Link Up: fa4-5 Power Failure: Super Ring Topology Change: Disabled Fault Relay: Disabled Time synchronize Failure: Disabled</pre>

Syslog Configuration	
Local Mode	Switch(config)# log syslog local
Server Mode	Switch(config)# log syslog remote 192.168.250.33
Both	Switch(config)# log syslog local Switch(config)# log syslog remote 192.168.250.33
Disable	Switch(config)# no log syslog local
SMTP Configuration	
SMTP Enable	Switch(config)# smtp-server enable email-alert SMTP Email Alert set enable ok.
Sender mail	Switch(config)# smtp-server server 192.168.250.100 ACCOUNT SMTP server mail account, ex: admin@control.com Switch(config)# smtp-server server 192.168.250.100 admin@control.com SMTP Email Alert set Server: 192.168.250.100, Account: admin@control.com ok.
Receiver mail	Switch(config)# smtp-server receipt 1 abc@control.com SMTP Email Alert set receipt 1: abc@control.com ok.
Authentication with user name and password	Switch(config)# smtp-server authentication username admin password admin SMTP Email Alert set authentication Username: admin, Password: admin  <b>Note:</b> You can assign string to user name and password.
Disable SMTP	Switch(config)# no smtp-server enable email-alert SMTP Email Alert set disable ok.
Disable Authentication	Switch(config)# no smtp-server authentication SMTP Email Alert set Authentication disable ok.
Display	Switch# sh smtp-server SMTP Email Alert is Enabled Server: 192.168.250.100, Account: admin@control.com Authentication: Enabled Username: admin, Password: admin SMTP Email Alert Receipt: Receipt 1: abc@control.com Receipt 2: Receipt 3: Receipt 4:

## Monitor and Diag (CLI)

The ES9528-XT provides several types of features for you to monitor the status of the switch or diagnostic for you to check the problem when encountering problems related to the switch. The features include MAC Address Table, Port Statistics, Port Mirror, Event Log, and Ping.

Optionally, you can use the web user interface for configuration, see [Monitor and Diag](#) on Page 133.

This table provides detailed information about command lines of the Monitor and Diag configuration.

MAC Address Table	
Aging Time	<pre>Switch(config)# mac-address-table aging-time 350 mac-address-table aging-time set ok!</pre> <p><b>Note:</b> The default aging timeout value is 300.</p>
Add Static Unicast MAC address	<pre>Switch(config)# mac-address-table static 00c0.4e5B.0101 vlan 1 interface fastethernet5 mac-address-table ucast static set ok!</pre> <p><b>Rule:</b> mac-address-table static MAC_address VLAN VID interface interface_name</p>
Add Multicast MAC address	<pre>Switch(config)# mac-address-table multicast 00c0.4e5B.0101 vlan 1 interface fa3-4 Adds an entry in the multicast table ok!</pre> <p><b>Rule:</b> mac-address-table multicast MAC_address VLAN VID interface_list interface_name/range</p>
Show MAC Address Table – All types	<pre>Switch# show mac-address-table  ***** UNICAST MAC ADDRESS ***** Destination Address  Address Type      Vlan    Destination Port ----- 00c0.4e5B.ca3b      Dynamic           1       fa1 00c0.4e5B.0386      Dynamic           1       fa2 00c0.4e5B.0101      Static            1       fa3 00c0.4e5B.0102      Static            1       fa3 00c0.4e5B.0100      Management        1 ***** MULTICAST MAC ADDRESS ***** Vlan  Mac Address      COS    Status  Ports ----  - 1     00c0.4e5B.0800   0      fa6 1     00c0.4e5B.ffffa  0      fa4,fa6</pre>
Show MAC Address Table – Dynamic Learnt MAC addresses	<pre>Switch# show mac-address-table dynamic Destination Address  Address Type      Vlan    Destination Port ----- 00c0.4e5B.ca3b      Dynamic           1       fa4 00c0.4e5B.0386      Dynamic           1       fa6</pre>
Show MAC Address Table – Multicast MAC addresses	<pre>Switch# show mac-address-table multicast Vlan  Mac Address      COS    Status  Ports ----  - 1     00c0.4e5B.0800   0      fa5-6 1     00c0.4e5B.ffffa  0      af3,fa5-6</pre>

MAC Address Table (continued)	
Show MAC Address Table – Static MAC addresses	<pre>Switch# show mac-address-table static Destination Address  Address Type      Vlan      Destination Port ----- 00c0.4e5B.0101      Static            1         fa4 00c0.4e5B.0102      Static            1         fa5</pre>
Show Aging timeout time	<pre>Switch# show mac-address-table aging-time the mac-address-table aging-time is 300 sec.</pre>
Port Statistics	
Port Statistics	<pre>Switch# show rmon statistics fa4 (select interface) Interface fastethernet4 is enable connected, which has Inbound:   Good Octets: 178792, Bad Octets: 0   Unicast: 598, Broadcast: 1764, Multicast: 160   Pause: 0, Undersize: 0, Fragments: 0   Oversize: 0, Jabbers: 0, Discards: 0   Filtered: 0, RxError: 0, FCSError: 0 Outbound:   Good Octets: 330500   Unicast: 602, Broadcast: 1, Multicast: 2261   Pause: 0, Deferred: 0, Collisions: 0   SingleCollision: 0, MultipleCollision: 0   ExcessiveCollision: 0, LateCollision: 0   Filtered: 0, FCSError: 0 Number of frames received and transmitted with a length of:   64: 2388, 65to127: 142, 128to255: 11   256to511: 64, 512to1023: 10, 1024toMaxSize: 42</pre>
Port Mirroring	
Enable Port Mirror	<pre>Switch(config)# mirror en Mirror set enable ok.</pre>
Disable Port Mirror	<pre>Switch(config)# mirror disable Mirror set disable ok.</pre>
Select Source Port	<pre>Switch(config)# mirror source fa1-2   both  Received and transmitted traffic   rx    Received traffic   tx    Transmitted traffic Switch(config)# mirror source fa1-2 both Mirror source fa1-2 both set ok.</pre> <p><b>Note:</b> Select source port list and TX/RX/Both mode.</p>
Select Destination Port	<pre>Switch(config)# mirror destination fa6 Mirror destination fa6 set ok</pre>

Port Mirroring (continued)	
Display	<pre>Switch# show mirror Mirror Status : Enabled Ingress Monitor Destination Port : fa6 Egress Monitor Destination Port : fa6 Ingress Source Ports :fa1,fa2, Egress Source Ports :fa1,fa2,</pre>
Event Log	
Display	<pre>Switch# show event-log &lt;1&gt;Jan  1 02:50:47 snmpd[101]: Event: Link 4 Down. &lt;2&gt;Jan  1 02:50:50 snmpd[101]: Event: Link 5 Up. &lt;3&gt;Jan  1 02:50:51 snmpd[101]: Event: Link 5 Down. &lt;4&gt;Jan  1 02:50:53 snmpd[101]: Event: Link 4 Up.</pre>
Topology Discovery (LLDP)	
Enable LLDP	<pre>Switch(config)# lldp   holdtime Specify the holdtime of LLDP in seconds   run      Enable LLDP   timer    Set the transmission frequency of LLDP in seconds Switch(config)# lldp run LLDP is enabled!</pre>
Change LLDP timer	<pre>Switch(config)# lldp holdtime &lt;10-255&gt; Valid range is 10~255 Switch(config)# lldp timer &lt;5-254&gt; Valid range is 5~254</pre>
Ping	
Ping IP	<pre>Switch# ping 192.168.11.14 PING 192.168.11.14 (192.168.11.14): 56 data bytes 64 bytes from 192.168.11.14: icmp_seq=0 ttl=128 time=0.0 ms 64 bytes from 192.168.11.14: icmp_seq=1 ttl=128 time=0.0 ms 64 bytes from 192.168.11.14: icmp_seq=2 ttl=128 time=0.0 ms 64 bytes from 192.168.11.14: icmp_seq=3 ttl=128 time=0.0 ms 64 bytes from 192.168.11.14: icmp_seq=4 ttl=128 time=0.0 ms --- 192.168.11.14 ping statistics --- packets transmitted, 5 packets received, 0% packet loss round-trip min/avg/max = 1.3/1.3/1.4 ms</pre>

## Saving to Flash (CLI)

---

**Save Configuration** allows you to save any configuration you just made to the flash. Powering off the switch without saving the configuration causes loss of the new settings.

Saving to Flash	
Save to Flash	<pre>SWITCH# write Building Configuration... [OK]  Switch# copy running-config startup-config Building Configuration... [OK]</pre>

## Logging Out (CLI)

---

The CLI connection logs out of configure terminal mode, if you do not input any command after 30 seconds.

Logging Out	
Logout	<pre>SWITCH&gt; exit  SWITCH# exit</pre>

## Service (CLI)

---

The service command provides the ability to disable HTTP and Telnet.

**Note:** *There is not a web user interface page for the service command.*

Service	
Disable HTTP	<pre>Switch(config)# service http disable Switch(config)#</pre>
Enable HTTP	<pre>Switch(config)# service http enable Switch(config)#</pre>
Disable telnet	<pre>Switch(config)# service telnet disable Switch(config)#</pre>
Enable telnet	<pre>Switch(config)# service telnet enable Switch(config)#</pre>
PortVision DX	<pre>Switch(config)# service netvision enable</pre> <p><b>Note:</b> <i>Disabling PortVision DX means that the switch displays as off-line in PortVision DX.</i></p>

# Complete CLI List

This section provides the complete listing of RocketLinux ES9528-XT commands with the supporting options:

- [User EXEC Mode](#)
- [Privileged EXEC Mode](#) on Page 202
- [Global Configuration Mode](#) on Page 207
- [Port Interface Configuration Mode](#) on Page 212
- [VLAN Interface Configuration Mode](#) on Page 214

## User EXEC Mode

---

For information about accessing *User EXEC* mode, see [User EXEC Mode](#) on Page 201.

```
Switch> list
  enable
  exit
  list
  ping A.B.C.D
  ping WORD
  ping X:X::X:X
  quit
  show gvrp statistics [IFNAME]
  show ip forwarding
  show ip route
  show ip route A.B.C.D
  show ip route A.B.C.D/M
  show ip route supernets-only
  show version
  telnet WORD
  telnet WORD PORT
  traceroute WORD
```

## Privileged EXEC Mode

---

---

For information about accessing Privileged EXEC mode, see [Privileged EXEC Mode](#) on Page 202.

```
Switch# list
archive download-boot /overwrite tftp IPADDRESS IMAGE
archive download-boot /overwrite usb IMAGE
archive download-sw /overwrite tftp IPADDRESS IMAGE
archive download-sw /overwrite usb IMAGE
clear erps statistics
clear event-log
clear gvrp statistics [IFNAME]
clear lacp counters
clear mac-address-table dynamic
clear mac-address-table dynamic address MACADDR
clear mac-address-table dynamic interface IFNAME
clear mac-address-table dynamic vlan VLANID
clear redundant-ring statistics [0-31]
clear rmon statistics [IFNAME]
clear spanning-tree counters
clear spanning-tree counters interafce IFNAME
clear spanning-tree detected-protocols
clear spanning-tree detected-protocols interface IFNAME
clock set TIME MONTH DAY YEAR
configure terminal
copy running-config startup-config
copy startup-config tftp: URL
copy startup-config usb CONFIGURATION
copy tftp: URL (ssh-dss|ssh-rsa)
copy tftp: URL ssl-cert
copy tftp: URL startup-config
copy usb CONFIGURATION startup-config
debug dot1x all
debug dot1x errors
debug dot1x events
debug dot1x packets
debug dot1x registry
debug dot1x state-machine
debug erps (pdu|trace|debug|all)
debug gmrp
debug gvrp (all|rcv|tx|gvrp_event|vlan_event)
debug ip dhcp (all|event)
debug ip dhcp snooping
debug ip igmp
debug ip igmp snooping (all|group|management|router|timer)
debug l2 mac (all|trace|debug)
debug lacp (all|event|fsm|misc|packet)
debug lldp
debug mirror
debug misc [type] [sub]
debug proto pdu
debug qos
debug rate-limit
```

**Privileged EXEC Mode (continued)**

```

debug redundant-ring (pdu|trace|debug|rapid-dual-homing|rstp|multi-ring|all) <0-31>
debug snmp
debug spanning-tree (all|bpdu|config|events|general|root|sync|tc)
debug sw-rate-limit get <0-64>
debug sw-rate-limit ioctl_dump
debug sw-rate-limit pkt_dump
debug sw-rate-limit set <0-64> <0-1000>
debug sw-rate-limit set <0-64> off
debug system hardware led mode <0-100>
debug system hardware relay mode <0-100>
debug system info
debug system meminfo
debug trunk
debug vlan (all|trace|debug)
dir usb-stick
disable
dot1x initialize interface IFNAME
dot1x reauthenticate interface IFNAME
end
exit
list
mac access-group dump <1-1536>
mac access-group show
no debug dot1x all
no debug dot1x errors
no debug dot1x events
no debug dot1x packets
no debug dot1x registry
no debug dot1x state-machine
no debug erps
no debug gmrp
no debug gvrp (all|rcv|tx|gvrp_event|vlan_event)
no debug ip dhcp (all|event)
no debug ip dhcp snooping
no debug ip igmp
no debug ip igmp snooping (all|group|management|router|timer)
no debug l2 mac (all|trace|debug)
no debug lacp (all|event|fsm|misc|packet)
no debug lldp
no debug mirror
no debug proto
no debug qos
no debug rate-limit
no debug redundant-ring <0-31>
no debug snmp
no debug spanning-tree (all|bpdu|config|events|general|root|sync|tc)
no debug sw-rate-limit ioctl_dump
no debug sw-rate-limit pkt_dump
no debug system hardware led mode
no debug trunk
no debug vlan (all|trace|debug)

```

***Privileged EXEC Mode (continued)***

```
no pager
pager
ping A.B.C.D
ping WORD
ping X:X::X:X
quit
reboot
reload default-config file
reload default-ssh file
reload default-ssl file
show acceptable frame type [IFNAME]
show administrator
show auth radius
show clock
show clock summer-time
show clock timezone
show debugging dot1x
show debugging gvrp
show debugging ip dhcp
show debugging ip igmp
show debugging ip igmp snooping
show debugging lacp
show debugging snmp
show debugging spanning-tree
show dot1q-tunnel
show dot1x
show dot1x all
show dot1x authentic-method
show dot1x info
show dot1x interface IFNAME
show dot1x radius
show dot1x statistics interface IFNAME
show dot1x username
show erps
show ethernet-ip
show event-log
show garp timer [IFNAME]
show gmrp
show gvrp configuration [IFNAME]
show gvrp portstate IFNAME VID
show hardware led
show hardware mac
show interface [IFNAME]
show interface vlan [VLANID]
show ip access-group [INTERFACE]
show ip access-list
show ip access-list (<1-99>|<100-199>|<1300-1999>|<2000-2699>|WORD)
show ip dhcp relay
show ip dhcp server statistics
show ip forwarding
show ip igmp
show ip igmp group
```

**Privileged EXEC Mode (continued)**

```
show ip igmp interface IFNAME
show ip igmp query-interval
show ip igmp query-max-response-time
show ip igmp snooping
show ip igmp snooping multicast (dynamic|user|all) [VLANLIST]
show ip igmp snooping multicast count
show ip igmp snooping vlan (VLANLIST|all)
show ip igmp timers
show ip igmp version
show ip route
show ip route A.B.C.D
show ip route A.B.C.D/M
show ip route supernets-only
show ipv6 neighbour
show ipv6 route
show l2_interface [IFNAME]
show lacp counters [GROUPID]
show lacp group [1-8]
show lacp internal [1-8]
show lacp neighbor [1-8]
show lacp port-setting [IFNAME]
show lacp system-id
show lacp system-priority
show lldp
show lldp neighbors
show lldp statistics
show mac access-group [INTERFACE]
show mac access-list [WORD]
show mac-address-table
show mac-address-table aging-time
show mac-address-table dynamic
show mac-address-table dynamic address MACADDR
show mac-address-table dynamic interface IFNAME
show mac-address-table dynamic vlan VLANID
show mac-address-table multicast
show mac-address-table multicast MACADDR vlan VLANID
show mac-address-table multicast filtering
show mac-address-table static
show mac-address-table static address MACADDR
show mac-address-table static interface IFNAME
show mac-address-table static vlan VLANID
show mirror
show modbus
show nameserver
show netvision password
show ntp associations
show qos cos-map
show qos dscp-map
show qos port-priority
show qos queue-sched
show qos trust-mode
show rate-limit egress [IFNAME]
```

***Privileged EXEC Mode (continued)***

```
show rate-limit ingress [IFNAME]
show redundant-ring [0-31]
show relay 1
show relay 1 status
show rmon statistics [IFNAME]
show running-config
show service
show sfp
show sfp ddm
show smtp-server
show smtp-server authentication
show smtp-server email-alert
show smtp-server receipt
show smtp-server server
show snmp-server community
show snmp-server contact
show snmp-server host
show snmp-server info
show snmp-server location
show snmp-server name
show snmp-server trap
show snmp-server user
show spanning-tree active
show spanning-tree interface IFNAME
show spanning-tree mst
show spanning-tree mst <0-15>
show spanning-tree mst <0-15> interface IFNAME
show spanning-tree mst configuration
show spanning-tree mst interface IFNAME
show spanning-tree mst root
show spanning-tree summary
show startup-config
show storm-control [IFNAME]
show system mtu
show trunk group [1-8]
show trunk load-balance group [1-8]
show version
show vlan
show vlan (static|dynamic) [VLANID]
show vlan VLANID
show vlan management
show vlan name VLANNAME
show vlan private-vlan
show vlan private-vlan port-list
show vlan private-vlan type
show warning-event
telnet WORD
telnet WORD PORT
traceroute WORD
usb eject
write
write file
```

**Privileged EXEC Mode (continued)**

```
write memory
write terminal
```

**Global Configuration Mode**

For information about accessing *Global Configuration* mode, see [Global Configuration Mode](#) on Page 207.

```
Switch(config)# list
access-list test
administrator NAME PASSWORD
auth radius server A.B.C.D key RADIUS_KEY [PORT]
clock set TIME MONTH DAY YEAR
clock summer-time (enable|disable)
clock summer-time <1-5> <0-6> <1-12> START_TIME <1-5> <0-6> <1-12> END_TIME
clock timezone
  (01|02|03|04|05|06|07|08|09|10|11|12|13|14|15|16|17|18|19|20|21|22|23|24|25|26|27
  |28|29|30|31|32|33|34|35|36|37|38|39|40|41|42|43|44|45|46|47|48|49|50|51|52|53|54
  |55|56|57|58|59|60|61|62|63|64|65|66|67|68|69|70|71|72|73|74)
default dot1x system-auth-control
default gvrp configuration
default ip igmp snooping
dot1x authentic-method (radius|local)
dot1x radius secondary-server-ip A.B.C.D key RADIUS_KEY [PORT] [PORT]
dot1x radius server-ip A.B.C.D key RADIUS_KEY [PORT] [PORT]
dot1x system-auth-control
dot1x username WORD passwd WORD vlan <1-4094>
end
erps (enable|disable)
erps control-channel <1-4094>
erps node-role (rpl-owner|ring-node)
erps ring-port PORT1 PORT2
erps rpl ring-port (1|2)
erps timer guard-timer <10-2000>
erps timer wtr-timer <1-12>
erps version (1|default)
ethernet-ip run
exit
gmrp mode (enable|disable)
gmrp mode (enable|disable) IFNAME
gvrp mode (enable|disable)
gvrp mode (enable|disable) IFNAME
gvrp registration (normal|fixed|forbidden) IFNAME
hostname .DWORD
interface IFNAME
interface vlan VLAN-ID
ip access-list extended (<100-199>|<2000-2699>)
ip access-list extended WORD
ip access-list standard (<1-99>|<1300-1999>)
ip access-list standard WORD
ip forwarding
ip igmp snooping
```

**Global Configuration Mode (continued)**

```
ip igmp snooping immediate-leave
ip igmp snooping immediate-leave vlan (VLANLIST|all)
ip igmp snooping last-member-query-interval TIMEVALUE
ip igmp snooping last-member-query-interval TIMEVALUE vlan (VLANLIST|all)
ip igmp snooping source-only-learning vlan (VLANLIST|all)
ip igmp snooping vlan (VLANLIST|all)
ip route A.B.C.D A.B.C.D (A.B.C.D|INTERFACE)
ip route A.B.C.D/M (A.B.C.D|INTERFACE)
ipv6 route X:X::X:X/M (X:X::X:X|INTERFACE)
lacp group <1-8> IFLIST
list
lldp holdtime <10-255>
lldp run
lldp timer <5-254>
log stdout
log syslog local
log syslog remote A.B.C.D
mac access-list extended NAME
mac-address-table aging-time TIMEVALUE
mac-address-table multicast MACADDR vlan VLANID interface IFLIST
mac-address-table multicast filtering vlan (VLANLIST|all)
mac-address-table static MACADDR vlan VLANID interface IFNAME
mirror (enable|disable)
mirror destination IFNAME
mirror source IFLIST (rx|tx|both)
modbus (enable|disable)
modbus idle-timeout <200-10000>
modbus master <1-20>
modbus port <1-65535>
nameserver A.B.C.D
netvision password PASS
no administrator
no auth radius server A.B.C.D
no clock set
no clock summer-time
no clock timezone
no dot1x authentic-method
no dot1x radius secondary-server-ip
no dot1x system-auth-control
no dot1x username WORD
no erps control-channel
no erps node-role
no erps ring-port
no erps rpl
no erps timer guard-timer
no erps timer wtr-timer
no ethernet-ip run
no hostname [HOSTNAME]
no interface IFNAME
no interface vlan VLAN-ID
no ip access-list extended (<100-199>|<2000-2699>|WORD)
no ip access-list standard (<1-99>|<1300-1999>|WORD)
```

**Global Configuration Mode (continued)**

```
no ip forwarding
no ip igmp snooping
no ip igmp snooping immediate-leave
no ip igmp snooping immediate-leave vlan (VLANLIST|all)
no ip igmp snooping last-member-query-interval
no ip igmp snooping last-member-query-interval vlan (VLANLIST|all)
no ip igmp snooping source-only-learning vlan (VLANLIST|all)
no ip igmp snooping vlan (VLANLIST|all)
no ip route A.B.C.D A.B.C.D (A.B.C.D|INTERFACE)
no ip route A.B.C.D A.B.C.D (A.B.C.D|INTERFACE) <1-255>
no ip route A.B.C.D/M (A.B.C.D|INTERFACE)
no ipv6 route X:X::X:X/M (X:X::X:X|INTERFACE)
no lacp group <1-8>
no lldp run
no log stdout
no log syslog local
no log syslog remote
no mac access-list extended NAME
no mac-address-table aging-time
no mac-address-table multicast MACADDR vlan VLANID
no mac-address-table multicast MACADDR vlan VLANID interface IFLIST
no mac-address-table multicast filtering vlan (VLANLIST|all)
no mac-address-table static MACADDR vlan VLANID interface IFNAME
no mirror destination
no mirror source IFLIST (rx|tx|both)
no nameserver A.B.C.D
no netvision password
no ntp peer (primary|secondary)
no qos cos-map
no qos dscp-map
no qos queue-sched
no relay 1
no relay 1 dry
no relay 1 ping
no relay 1 ping reset
no relay 1 port
no relay 1 ring
no smtp-server authentication
no smtp-server authentication username password
no smtp-server enable email-alert
no smtp-server receipt <1-4>
no smtp-server server
no snmp-server community WORD (ro|rw)
no snmp-server community trap
no snmp-server contact
no snmp-server enable trap
no snmp-server host A.B.C.D [VERSION]
no snmp-server location
no snmp-server name
no snmp-server user WORD v3
no spanning-tree bridge-times
no spanning-tree forward-time
```

**Global Configuration Mode (continued)**

```
no spanning-tree hello-time
no spanning-tree max-age
no spanning-tree mst MSTMAP priority
no spanning-tree mst configuration
no spanning-tree mst forward-time
no spanning-tree mst hello-time
no spanning-tree mst max-age
no spanning-tree mst max-hops
no spanning-tree priority
no spanning-tree transmission-limit
no system mtu
no trunk group <1-8>
no trunk load-balance group <1-8>
no vlan [VLANID]
no warning-event (coldstart|warmstart)
no warning-event (linkdown|linkup) [IFLIST]
no warning-event authentication
no warning-event fault-relay
no warning-event fault-relay 1
no warning-event ring
no warning-event sfp
no warning-event time-sync
no write-config (daemon|integrated)
ntp peer (enable|disable)
ntp peer (primary|secondary) IPADDRESS
qos cos-map PRIORITY QUEUE
qos dscp-map DSCP PRIORITY
qos queue-sched sp
qos queue-sched wrr <1-10> <1-10> <1-10> <1-10> <1-10> <1-10> <1-10> <1-10>
qos trust-mode (cos|dscp)
redundant-ring <0-31>
relay 1 dry <0-65535> <0-65535>
relay 1 ping WORD
relay 1 ping WORD reset <1-65535> <0-65535>
relay 1 port PORTLIST
relay 1 ring
router dhcp
service http (enable|disable)
service netvision (enable|disable)
service telnet (enable|disable)
sfp ddm (enable|disable) all
sfp eject all
sfp scan all
smtp-server authentication
smtp-server authentication username WORD password WORD
smtp-server enable email-alert
smtp-server receipt <1-4> EMAIL
smtp-server server A.B.C.D ACCOUNT
snmp-server community WORD (ro|rw)
snmp-server community trap WORD
snmp-server contact .DWORD
snmp-server enable trap
```

**Global Configuration Mode (continued)**

```
snmp-server host A.B.C.D
snmp-server host A.B.C.D version (1|2) [COMMUNITY]
snmp-server location .DWORD
snmp-server name .DWORD
snmp-server user WORD v3 auth (md5|sha) WORD
snmp-server user WORD v3 noauth
snmp-server user WORD v3 priv (md5|sha) WORD des WORD
spanning-tree (enable|disable)
spanning-tree bridge-times <4-30> <6-40> <1-10>
spanning-tree forward-time <4-30>
spanning-tree hello-time <1-10>
spanning-tree max-age <6-40>
spanning-tree mode (stp|rst)
spanning-tree mode mst
spanning-tree mst MSTMAP priority <0-61440>
spanning-tree mst configuration
spanning-tree mst forward-time <4-30>
spanning-tree mst hello-time <1-10>
spanning-tree mst max-age <6-40>
spanning-tree mst max-hops <1-40>
spanning-tree mst sync vlan <1-4094>
spanning-tree pathcost method (long|short)
spanning-tree priority <0-61440>
spanning-tree transmission-limit <1-10>
system mtu (1518|2000|2032|9712)
trunk group <1-8> IFLIST
trunk load-balance group <1-8> (src-mac|dst-mac|src-dst-mac|src-ip|dst-ip|src-dst-
ip)
vlan <1-4094>
warning-event (coldstart|warmstart)
warning-event (linkdown|linkup) [IFLIST]
warning-event authentication
warning-event fault-relay
warning-event fault-relay 1
warning-event ring
warning-event sfp
warning-event time-sync
write-config (daemon|integrated)
```

## Port Interface Configuration Mode

---

---

For information about accessing *Port Interface Configuration* mode, see [Port Interface Configuration Mode](#) on Page 212.

```
Switch(config)# interface fa1
Switch(config-if)# list
  acceptable frame type (all|vlantaggedonly)
  auto-negotiation
  description .LINE
  dot1x admin-control-direction (both|in)
  dot1x default
  dot1x guest-vlan <1-4094>
  dot1x host-mode (single-host|multi-host)
  dot1x max-req <1-10>
  dot1x port-control (auto|force-authorized|force-unauthorized)
  dot1x reauthentication
  dot1x timeout (reauth-period|quiet-period|tx-period|supp-timeout|server-timeout)
    TIMEVALUE
  duplex (half|full)
  end
  ethertype [0x0800-0xFFFF]
  exit
  flowcontrol (off|on)
  garp join-timer <10-10000>
  garp leave-timer <30-30000>
  garp leaveall-timer <150-150000>
  ip access-group (<1-199> |<1300-2699>|WORD) in
  lacp timeout (long|short)
  list
  loopback
  mac access-group NAME in
  media-type sfp speed (100|1000)
  no description
  no dot1x admin-control-direction
  no dot1x guest-vlan
  no dot1x host-mode
  no dot1x max-req
  no dot1x port-control
  no dot1x reauthentication
  no dot1x timeout (reauth-period|quiet-period|tx-period|supp-timeout|server-
    timeout)
  no duplex
  no garp join-timer
  no garp leave-timer
  no garp leaveall-timer
  no ip access-group
  no lacp timeout
  no loopback
  no mac access-group
  no qos priority
  no rate-limit egress bandwidth
  no rate-limit ingress bandwidth
  no shutdown
```

**Port Interface Configuration Mode (continued)**

```
no spanning-tree bpdufilter
no spanning-tree bpduguard
no spanning-tree cost
no spanning-tree edge-port
no spanning-tree link-type
no spanning-tree mst MSTMAP cost
no spanning-tree mst MSTMAP port-priority
no spanning-tree port-priority
no spanning-tree stp-state
no speed
no storm-control (broadcast|dlf|multicast)
no switchport access vlan VLANID
no switchport block
no switchport dot1q-tunnel mode access
no switchport dot1q-tunnel mode uplink
no switchport mode private-vlan host
no switchport mode private-vlan promiscuous
no switchport mode svl
no switchport private-vlan host-association
no switchport trunk native vlan
qos priority DEFAULT-PRIORITY
quit
rate-limit egress bandwidth <32-1000000>
rate-limit ingress bandwidth <32-1000000>
sfp ddm (enable|disable)
sfp eject
sfp scan
shutdown
spanning-tree bpdufilter
spanning-tree bpduguard
spanning-tree cost <1-200000000>
spanning-tree edge-port
spanning-tree link-type (auto|point-to-point|shared)
spanning-tree mst MSTMAP cost <1-200000000>
spanning-tree mst MSTMAP port-priority <0-240>
spanning-tree port-priority <0-240>
spanning-tree stp-state (enable|disable)
speed (10|100|1000)
storm-control (broadcast|dlf|multicast) <32-1000000>
switchport access vlan VLANID
switchport access vlan add VLANLIST
switchport access vlan remove VLANLIST
switchport block (multicast|unicast|both)
switchport dot1q-tunnel mode access
switchport dot1q-tunnel mode uplink
switchport mode private-vlan host
switchport mode private-vlan promiscuous
switchport mode svl VLANID
switchport private-vlan host-association <2-4094> <2-4094>
switchport private-vlan mapping <2-4094> add VLANLIST
switchport private-vlan mapping <2-4094> remove VLANLIST
switchport trunk allowed vlan add VLANLIST
```

### ***Port Interface Configuration Mode (continued)***

```
switchport trunk allowed vlan remove VLANLIST
switchport trunk native vlan VLANID
```

## **VLAN Interface Configuration Mode**

---

---

For information about accessing VLAN Interface Configuration mode, see [VLAN Interface Configuration Mode](#) on Page 214.

```
Switch(config-if)# interface vlan1
Switch(config-if)# list
description .LINE
end
exit
ip address A.B.C.D/M
ip dhcp client
ip dhcp client renew
ip igmp
ip igmp last-member-query-count CNT
ip igmp last-member-query-interval SECONDS
ip igmp query-interval SECONDS
ip igmp query-max-response-time SECONDS
ip igmp robustness-variable CNT
ip igmp version (1|2)
ipv6 accept-ra
ipv6 address X:X::X:X/M
list
no description
no ip address A.B.C.D/M
no ip dhcp client
no ip igmp
no ipv6 accept-ra
no ipv6 address X:X::X:X/M
no shutdown
quit
shutdown
```

# ModBus TCP/IP Support

This section provides the following information:

- [Modbus TCP/IP Function Codes](#) on Page 216
- [Error Checking](#) on Page 216
- [Exception Response](#) on Page 217
- [Modbus TCP Register Table](#) on Page 217
- [CLI Commands for Modbus TCP/IP](#) on Page 224

## Overview

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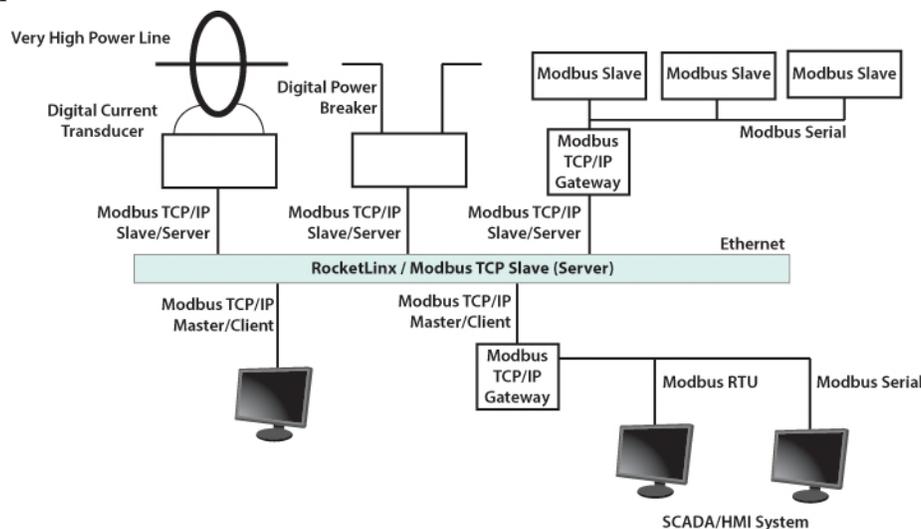
The ES9528-XT supports Modbus TCP/IP communications through the CLI, which does not support Modbus ASCII or Modbus RTU. This functionality is not available on a web user interface page.

Modbus TCP/IP is commonly used to communicate over TCP/IP networks, connecting over Port 502. Modbus TCP/IP is used in industrial automatic communications systems and has become a standard protocol for industrial communications to transfer data to analog I/O devices or PLC systems.

Modbus TCP/IP defines a simple protocol data unit independent of the underlying data link layer. The Modbus TCP/IP packet includes three parts:

- MBAP header is used in the TCP/IP header to identify the Modbus application data unit. The MBAP header also includes a unit identifier to recognize and communicate between multiple independent Modbus end units.
- Function code
- Data payload

Modbus devices communicate using a master (client) /slave (server) architecture, only one device can initiate a transaction and the others respond to the master/client. The other devices (slave/server) respond by supplying the requested data to the master/client, or by taking the action requested in the query. The slave/server can be any peripheral device that processes information and sends the output data to the master using Modbus TCP/IP protocol.



The ES9528-XT operates as slave/server device, while a typical master/client device is a host computer running appropriate application software, for example, a SCADA / HMI system. The ES9528-XT can be polled through Ethernet, thus the Modbus TCP/IP master can read or write to the Modbus registers provided by the Modbus TCP/IP.

The ES9528-XT firmware provides Modbus TCP/IP registers that map to the ES9528-XT operating system information which, includes the description, IP address, power status, interface status, interface information and inbound/outbound packet statistics. With the register support, you can read the information through the Modbus TCP/IP based progress/ display/ monitor applications and monitor the status of the switch easily.

## Modbus TCP/IP Function Codes

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Modbus TCP/IP devices use a subset of the standard Modbus TCP/IP function codes to access device-dependent information. Modbus TCP/IP function codes are defined in the following table.

Function Code	Name	Usage
01	Read Coils	Reads the state of a digital output.
02	Read Input Status	Reads the state of a digital input.
03	Read Holding Register	Reads the holding register in 16-bit register format.
04 (see note)	Read Input Registers	Reads data in 16-bit register format.
05	Write Coil	Writes data to force a digital output ON/OFF.
06	Write Single Register	Writes data in 16-bit register format.
15	Force Multiple Coils	Writes data to force multiple consecutive coils.

*Note: The ES9528-XT supports Function Code 04, the Read Input Registers. With this support, the remote SCADA or other Modbus TCP/IP applications can poll the information of the device and monitor the major status of the ES9528-XT.*

## Error Checking

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The utilization of the error checking helps eliminate errors caused by noise in the communications link. In Modbus TCP/IP mode, messages include an error-checking field that is based on a Cyclical Redundancy Check (CRC) method. The CRC field checks the contents of the entire message. It is applied regardless of any parity check method used for the individual BYTE characters of the message. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value it received in the CRC field.

## Exception Response

If an error occurs, the slave sends an exception response message to master consisting of the slave address, function code, exception response code and error check field. In an exception response, the slave sets the high-order bit (MSB) of the response function code to one.

Code	Name	Descriptions
01	Illegal Function	The message function received is not an allowable action.
02	Illegal Data Address	The address referenced in the data field is not valid.
03	Illegal Data Value	The value referenced at the addressed device location is not within range.
04	Slave Device Failure	An unrecoverable error occurred while the slave was attempting to perform the requested action.
05	Acknowledge	The slave has accepted the request and processing it, but a long duration of time is required to do so.
06	Slave Device Busy	The slave is engaged in processing a long-duration program command.
07	Negative Acknowledge	The slave cannot perform the program function received in the query.
08	Memory Parity Error	The slave attempted to read extended memory, but detected a parity error in the memory.

## Modbus TCP Register Table

The latest firmware provides the initial release of the Modbus TCP/IP client service support for factory automation applications. You can implement the modbus command using the command line interface in console and Telnet modes, which allows you to modify some parameters such as, idle time, number of Modbus masters, and the Modbus service port.

**Note:** The Modbus TCP client returns 0xFFFF to a Modbus master when pulling a reserved address.

Word Address	Data Type	Description
<b>System Information</b>		
0x0000	16 words	Vender Name = "Comtrol" Word 0 Hi byte = 'C' Word 0 Lo byte = 'o' Word 1 Hi byte = 'm' Word 1 Lo byte = 't' Word 2 Hi byte = 'r' Word 2 Lo byte = 'o' Word 3 Hi byte = 'l' Word 3 Lo byte = '\0' (other words = 0)

Word Address	Data Type	Description
<b>System Information (cont.)</b>		
0x0010	16 words	Product Name = "ES9528" Word 0 Hi byte = 'E' Word 0 Lo byte = 'S' Word 1 Hi byte = '9' Word 1 Lo byte = '5' Word 2 Hi byte = '2' Word 2 Lo byte = '8' Word 3 Hi byte = '\0' (other words = 0)
0x0010	16 words	Product Name = "ES9528-XT" Word 0 Hi byte = 'E' Word 0 Lo byte = 'S' Word 1 Hi byte = '9' Word 1 Lo byte = '5' Word 2 Hi byte = '2' Word 2 Lo byte = '8' Word 3 Hi byte = '.' Word 3 Lo byte = 'X' Word 4 Hi byte = 'T' Word 4 Lo byte = '\0' (other words = 0)
0x0020	128 words	SNMP system name (string)
0x00A0	128 words	SNMP system location (string)
0x0120	128 words	SNMP system contact (string)
0x01A0	32 words	SNMP system OID (string)
0x01C0	2 words	System uptime (unsigned long)
0x01C2 to 0x01FF	60 words	Reserved address space
0x0200	2 words	Hardware version
0x0202	2 words	S/N information
0x0204	2 words	CPLD version
0x0206	2 words	Bootloader version
0x0208	2 words	Firmware Version Word 0 Hi byte = major Word 0 Lo byte = minor Word 1 Hi byte = reserved Word 1 Lo byte = reserved

Word Address	Data Type	Description
0x020A	2 words	Firmware Release Date Firmware was released on 2010-08-11 at 09 o'clock Word 0 = 0x0B09 Word 1 = 0x0A08
0x020C	3 words	Ethernet MAC Address For example: MAC = 01-02-03-04-05-06 Word 0 Hi byte = 0x01 Word 0 Lo byte = 0x02 Word 1 Hi byte = 0x03 Word 1 Lo byte = 0x04 Word 2 Hi byte = 0x05 Word 2 Lo byte = 0x06
0x0300	2 words	IP address For example: IP = 192.168.250.250 Word 0 Hi byte = 0xC0 Word 0 Lo byte = 0xA8 Word 1 Hi byte = 0x0A Word 1 Lo byte = 0x01
0x020F to 0x2FF	241 words	Reserved address space
0x0302	2 words	Subnet Mask
0x0304	2 words	Default Gateway
0x0306	2 words	DNS Server
0x0308 to 0x3FF	248 words	Reserved address space (IPv6 or others)
0x0400	1 word	AC1 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0401	1 word	AC2 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0402	1 word	DC1 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0403	1 word	DC2 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0404 to 0x040F	12 words	Reserved address space

Word Address	Data Type	Description
<b>System Information (cont.)</b>		
0x0410	1 word	DI1 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0411	1 word	DI2 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0412	1 word	DO1 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0413	1 word	DO2 0x0000:Off 0x0001:On 0xFFFF: unavailable
0x0414 to 0x041F	12 words	Reserved address space
0x0420	1 word	RDY 0x0000:Off 0x0001:On
0x0421	1 word	RM 0x0000:Off 0x0001:On
0x0422	1 word	RF 0x0000:Off 0x0001:On
0x0423	1 word	RS

Word Address	Data Type	Description
<b>Port Information (32 Ports)</b>		
0x1000 to 0x11FF	16 words	Port Description
0x1200 to 0x121F	1 word	Administrative Status 0x0000: disable 0x0001: enable
0x1220 to 0x123F	1 word	Operating Status 0x0000: disable 0x0001: enable 0xFFFF: unavailable
0x1240 to 0x125F	1 word	Duplex 0x0000: half 0x0001: full 0x0003: auto (half) 0x0004: auto (full) 0x0005: auto 0xFFFF: unavailable
0x1260 to 0x127F	1 word	Speed 0x0001: 10 0x0002: 100 0x0003: 1000 0x0004: 2500 0x0005: 10000 0x0101: auto 10 0x0102: auto 100 0x0103: auto 1000 0x0104: auto 2500 0x0105: auto 10000 0x0100: auto 0xFFFF: unavailable
0x1280 to 0x129F	1 word	Flow Control 0x0000: off 0x0001: on 0xFFFF: unavailable
0x12A0 to 0x12BF	1 word	Default Port VLAN ID 0x0001-0xFFFF
0x12C0 to 0x12DF	1 word	Ingress Filtering 0x0000: disable 0x0001: enable

Word Address	Data Type	Description
<b>Port Information (32 Ports - cont.)</b>		
0x12E0 to 0x12FF	1 word	Acceptable Frame Type 0x0000: all 0x0001: tagged frame only
0x1300 to 0x131F	1 word	Port Security 0x0000: disable 0x0001: enable
0x1320 to 0x133F	1 word	Auto Negotiation 0x0000: disable 0x0001: enable 0xFFFF: unavailable
0x1340 to 0x135F	1 word	Loopback Mode 0x0000: none 0x0001: MAC 0x0002: PHY 0xFFFF: unavailable
0x1360 to 0x137F	1 word	STP Status 0x0000: disabled 0x0001: blocking 0x0002: listening 0x0003: learning 0x0004: forwarding
0x1380 to 0x139F	1 word	Default CoS Value for untagged packets
0x13A0 to 0x13BF	1 word	MDIX 0x0000: disable 0x0001: enable 0x0002: auto 0xFFFF: unavailable
0x13C0 to 0x13DF	1 word	Medium mode 0x0000: copper 0x0001: fiber 0x0002: none 0xFFFF: unavailable
0x13E0 to 0x14FF	288 words	Reserved address space
<b>SFP Information (32 Ports)</b>		
0x1500 to 0x151F	1 word	SFP Type
0x1520 to 0x153F	1 words	Wave length
0x1540 to 0x157F	2 words	Distance
0x1580 to 0x167F	8 words	Vender

Word Address	Data Type	Description
<b>SFP DDM Information (32 Ports)</b>		
0x1800 to 0x181F	1 words	Temperature
0x1820 to 0x185F	2 words	Alarm Temperature
0x1860 to 0x187F	1 words	Tx power
0x1880 to 0x18BF	2 words	Warning Tx power
0x18C0 to 0x18DF	1 words	Rx power
0x18E0 to 0x191F	2 words	Warning Rx power
0x1920 to 0x1FFF	1760 words	Reserved address space
<b>Inbound Packet Information</b>		
0x2000 to 0x203F	2 words	Good Octets
0x2040 to 0x207F	2 words	Bad Octets
0x2080 to 0x20BF	2 words	Unicast
0x20C0 to 0x20FF	2 words	Broadcast
0x2100 to 0x213F	2 words	Multicast
0x2140 to 0x217F	2 words	Pause
0x2180 to 0x21BF	2 words	Undersize
0x21C0 to 0x21FF	2 words	Fragments
0x2200 to 0x223F	2 words	Oversize
0x2240 to 0x227F	2 words	Jabbers
0x2280 to 0x22BF	2 words	Discards
0x22C0 to 0x22FF	2 words	Filtered frames
0x2300 to 0x233F	2 words	RxError
0x2340 to 0x237F	2 words	FCSError
0x2380 to 0x23BF	2 words	Collisions
0x23C0 to 0x23FF	2 words	Dropped Frames
0x2400 to 0x243F	2 words	Last Activated SysUpTime
0x2440 to 0x24FF	191 words	Reserved address space
<b>Outbound Packet Information</b>		
0x2500 to 0x253F	2 words	Good Octets
0x2540 to 0x257F	2 words	Unicast
0x2580 to 0x25BF	2 words	Broadcast
0x25C0 to 0x25FF	2 words	Multicast
0x2600 to 0x263F	2 words	Pause
0x2640 to 0x267F	2 words	Deferred
0x2680 to 0x26BF	2 words	Collisions
0x26C0 to 0x26FF	2 words	SingleCollision
0x2700 to 0x273F	2 words	MultipleCollision
0x2740 to 0x277F	2 words	ExcessiveCollision
0x2780 to 0x27BF	2 words	LateCollision
0x27C0 to 0x27FF	2 words	Filtered
0x2800 to 0x283F	2 words	FCSError
0x2840 to 0x29FF	447 words	Reserved address space

Word Address	Data Type	Description
<b>Number of Frames Received and Transmitted with a Length (Octets)</b>		
0x2A00 to 0x2A3F	2 words	64
0x2A40 to 0x2A7F	2 words	65 to 127
0x2A80 to 0x2ABF	2 words	128 to 255
0x2AC0 to 0x2AFF	2 words	256 to 511
0x2B00 to 0x2B3F	2 words	512 to 1023
0x2B40 to 0x2B7F	2 words	1024 to maximum size

## CLI Commands for Modbus TCP/IP

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The CLI commands for Modbus TCP/IP are listed in the following table.

<b>Modbus TCP/IP Commands</b>	
Enable	Switch(config)# modbus enable
Disable	Switch(config)# modbus disable
Set Modbus Interval Time between Request	Switch(config)# modbus idle-timeout <200-10000> Timeout value: 200-10000ms Switch(config)# modbus idle-timeout 200
Set Modbus TCP Master Communicate Session	Switch(config)# modbus master <1-20> Max Modbus TCP Master Switch(config)# modbus master 2
Set Modbus TCP Listening Port	Switch(config)# modbus port <1-65536> Port Number Switch(config)# modbus port 502

# Technical Support

## Control SFP Modules

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Control provides a variety of SFP transceivers. These certified SFP transceivers can be identified by the RocketLinx ES9528-XT and displayed in the web user interface. We recommend using [Control SFP transceivers](#) when configuring your RocketLinx ES9528-XT.

**Note:** *Low quality SFP transceivers may result in poor network performance and may not meet claimed distance or temperature ratings.*

## Control Private MIB

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Control supports many standard MIBs for users to configure or monitor the switch configuration by SNMP. However, since some commands can't be found in standard MIBs, Control provides a Private MIB file. Compile the private MIB file with your SNMP tool. The private MIB can be downloaded it from the [Control download Site](#).

The Private MIB tree is the same as the web tree. This is easier to understand and use. If you are not familiar with a standard MIB, you can directly use the private MIB to manage /monitor the switch, without the need to learn or find where the OIDs of the commands are.

## Control Support

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You can use one of the following methods to contact Control.

Contact Method	Web Address or Phone Number
Downloads	<a href="http://downloads.comtrol.com">http://downloads.comtrol.com</a>
Support	<a href="http://www.comtrol.com/support">http://www.comtrol.com/support</a>
Downloads	<a href="http://downloads.comtrol.com/html/ES9528-XT_main.htm">http://downloads.comtrol.com/html/ES9528-XT_main.htm</a>
Web Site	<a href="http://www.comtrol.com">http://www.comtrol.com</a>
Phone	763.957.6000

