



**ROCKET***LINX* ES8510/ES8510-XT  
*Industrial Ethernet Switch*

## **Industrial Managed Switch**

**7 - 10/100BASE-TX Ethernet Ports  
3 - Gigabit RJ45/SFP Combo Ports**

## **User Guide**



## **Copyright Notice**

Comtrol and RocketLinux are trademarks of Comtrol Corporation.

Microsoft and Windows are trademarks of Microsoft Corporation.

FireFox is a trademark of Mozilla Foundation.

PuTTY is a copyright of Simon Tatham.

Other product names mentioned herein may be trademarks and/or registered trademarks of their respective owners.

Ninth Edition, October 12, 2016

Copyright © 2010 - 2016. Comtrol Corporation.

All Rights Reserved.

Comtrol Corporation makes no representations or warranties with regard to the contents of this document or to the suitability of the Comtrol product for any particular purpose. Specifications are subject to change without notice. Some software or features may not be available at the time of publication. Contact your reseller for current product information.

## **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.

# Table of Contents

<b>Introduction .....</b>	<b>7</b>
<b>Hardware Installation .....</b>	<b>9</b>
Connect the Power and Ground.....	9
Connect the Digital Input s and Relay Outputs .....	10
Mount the ES8510 .....	11
Connect the Ethernet Ports .....	12
Connect SFP Transceivers (Combo Ports 8-10).....	13
LED Descriptions.....	13
Panel Layout.....	14
Reset Button .....	14
<b>Using PortVision DX .....</b>	<b>15</b>
PortVision DX Overview .....	15
PortVision DX Requirements.....	16
Installing PortVision DX.....	16
Configuring the Network Settings .....	18
Checking the Firmware Version.....	21
Uploading the Latest Firmware or Bootloader .....	22
Uploading Firmware to Multiple ES8510 Switches.....	23
Adding a New Device in PortVision DX .....	24
Using Configuration Files .....	25
Saving a Configuration File .....	25
Loading a Configuration File .....	25
Using the LED Tracker.....	26
Customizing PortVision DX .....	27
Accessing RocketLinux Documentation from PortVision DX.....	28
How to Download Documentation .....	28
How to Open Previously Downloaded Documents .....	29
<b>Configuration Using the Web User Interface.....</b>	<b>31</b>
<b>Configuration Overview .....</b>	<b>31</b>
Web User Interface .....	32
Secure Web User Interface.....	33
<b>Feature Overview .....</b>	<b>35</b>
<b>Basic Settings .....</b>	<b>44</b>
Switch Setting.....	44
Admin Password .....	46
IP Configuration .....	47
Time Setting.....	49
DHCP Server Configuration .....	52
DHCP Leased Entries .....	54
DHCP Option82 Relay Information.....	55
Backup and Restore.....	57
Backup the Configuration - Local File Method .....	58
Restore the Configuration - Local Method .....	58
Backup the Configuration - TFTP Server Method .....	59
Restore the Configuration - TFTP Server Method .....	60

Firmware Upgrade .....	61
Upgrading Firmware (Local File).....	61
Upgrading Firmware (TFTP Server).....	62
Load Default.....	62
System Reboot.....	63
<b>Port Configuration.....</b>	<b>64</b>
Port Control.....	64
Port Status .....	66
Rate Control .....	68
Port Trunking .....	69
Aggregation Setting .....	69
Aggregation Information.....	70
<b>Network Redundancy .....</b>	<b>71</b>
STP Configuration .....	72
STP Port Configuration.....	73
STP Information .....	74
MSTP Configuration.....	76
MSTP Port Configuration .....	78
MSTP Information .....	79
Redundant Ring .....	81
Redundant Ring Information .....	83
Loop Protection .....	84
<b>VLAN.....</b>	<b>85</b>
VLAN Configuration.....	86
VLAN Port Configuration .....	88
VLAN Information.....	90
Private VLAN.....	91
PVLAN Configuration .....	91
PVLAN Port Configuration .....	92
PVLAN Information .....	93
GVRP Configuration.....	94
<b>Traffic Prioritization .....</b>	<b>95</b>
QoS Setting .....	95
CoS-Queue Mapping.....	97
DSCP-Queue Mapping .....	98
<b>Multicast Filtering .....</b>	<b>99</b>
IGMP Query .....	100
IGMP Snooping.....	101
<b>SNMP .....</b>	<b>102</b>
SNMP Configuration .....	102
SNMP V3 Profile.....	103
SNMP Traps.....	104
<b>Security .....</b>	<b>105</b>
Port Security .....	105
IP Security.....	106
802.1X Configuration.....	107
802.1X Port Configuration .....	109
802.1X Port Information.....	111
<b>Warning.....</b>	<b>112</b>
Fault Relay.....	112
Event Selection .....	113
SysLog Configuration .....	114
SMTP Configuration.....	115



---

<b>Monitor and Diag.....</b>	<b>116</b>
LLDP Configuration .....	116
MAC Address Table .....	118
Port Statistics .....	120
Port Mirroring.....	121
Event Logs.....	122
Ping Utility.....	122
<b>Device Front Panel.....</b>	<b>123</b>
<b>Save to Flash.....</b>	<b>124</b>
<b>Logout.....</b>	<b>124</b>
 <b>Configuration Using the Command Line Interface (CLI) .....</b>	 <b>126</b>
<b>Overview .....</b>	<b>126</b>
Using the Serial Console .....	127
Using a Telnet/SSH Console .....	130
<b>Command Line Interface Introduction .....</b>	<b>131</b>
User EXEC Mode.....	132
<b>Accessing the Options for a Command.....</b>	<b>132</b>
Privileged EXEC Mode .....	134
Global Configuration Mode .....	135
(Port) Interface Configuration .....	136
(VLAN) Interface Configuration .....	137
<b>Command Mode Summary .....</b>	<b>137</b>
<b>Basic Settings (CLI) .....</b>	<b>139</b>
<b>Port Configuration (CLI) .....</b>	<b>145</b>
<b>Network Redundancy (CLI) .....</b>	<b>148</b>
<b>VLAN (CLI) .....</b>	<b>156</b>
<b>Private VLAN (CLI) .....</b>	<b>159</b>
<b>Traffic Prioritization (CLI) .....</b>	<b>163</b>
<b>Multicast Filtering (CLI).....</b>	<b>166</b>
<b>SNMP (CLI) .....</b>	<b>169</b>
<b>Security (CLI) .....</b>	<b>170</b>
<b>Warnings (CLI) .....</b>	<b>172</b>
<b>Monitor and Diag (CLI) .....</b>	<b>175</b>
<b>Saving to Flash (CLI) .....</b>	<b>178</b>
<b>Logging Out (CLI).....</b>	<b>178</b>
<b>Service (CLI) .....</b>	<b>178</b>
 <b>Complete CLI List.....</b>	 <b>179</b>
User EXEC Mode.....	179
Privileged EXEC Mode .....	180
Global Configuration Mode.....	185
Port Interface Configuration Mode.....	190
VLAN Interface Configuration Mode.....	192
 <b>ModBus TCP /IP Support .....</b>	 <b>193</b>
<b>Overview .....</b>	<b>193</b>
<b>Modbus TCP/IP Function Codes .....</b>	<b>194</b>
<b>Error Checking .....</b>	<b>194</b>
<b>Exception Response .....</b>	<b>195</b>
<b>Modbus TCP Register Table.....</b>	<b>195</b>
<b>CLI Commands for Modbus TCP/IP .....</b>	<b>202</b>

**Technical Support .....203**  
    **Control SFP Modules ..... 203**  
    **Control Private MIB..... 203**  
    **Control Support ..... 203**

# Introduction

The ES8510 and the ES8510-XT are managed industrial Ethernet switches that are equipped with seven 10/100BASE-TX ports and three Combo ports.

The three Gigabit Combo ports provide:

- Copper RJ45 Ethernet ports (10BASE-T, 100BASE-TX and 1000BASE-TX)
- SFP slots (100BASE-FX and 1000BASE-SX/LX)

When an SFP port is active and installed on a Combo port, the corresponding Combo RJ45 port is inactivated. For example, if an SFP transceiver is installed and active on **8SFP** port, Combo RJ45 Port 8 becomes inactive.

The embedded software supports full Layer 2 networking features. In addition, ES8510 provides ring redundancy, network control, security, and alert features. The ES8510 also supports an RS-232 console interface for out of band management. The ES8510 has a rugged aluminum housing and was designed for industrial environments. The ES8510 provides a wide operating temperature and the ES8510-XT is NEMA TS2 certified and provides an extended operating temperature.

The ES8510 is managed by Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON). Security is enhanced with advanced features such as IEEE 802.1Q VLAN and port/IP security. Performance is optimized by QoS and IGMP Snooping/Query. Redundant Ring technology enables superb self-healing capability for network failure and it also provides an advanced redundant network solution; Ring Coupling and Rapid Dual Homing technology. Ring Coupling and Rapid Dual Homing technology means that an Ethernet Ring can be extended more easily whether with Comtrol switches or other managed switches.

Event warnings can be sent to the network administrator by email or system log and to field engineers by relay output.

This guide refers to the ES8510 unless there is something specific to the ES8510-XT.

Detailed specifications for the ES8510 are available on the Comtrol [web site](#).

You can refer to [Feature Overview](#) on Page 35 for web user interface features.



# Hardware Installation

You can use the following subsections to install the RocketLinx ES8510.

- [Connect the Power and Ground](#)
- [Connect the Digital Input s and Relay Outputs](#) on Page 10
- [Mount the ES8510](#) on Page 11
- [Connect the Ethernet Ports](#) on Page 12
- [Connect SFP Transceivers \(Combo Ports 8-10\)](#) on Page 13
- [LED Descriptions](#) on Page 13
- [Panel Layout](#) on Page 14
- [Reset Button](#) on Page 14

## Connect the Power and Ground

---

Use the following procedure to connect the power and ground.



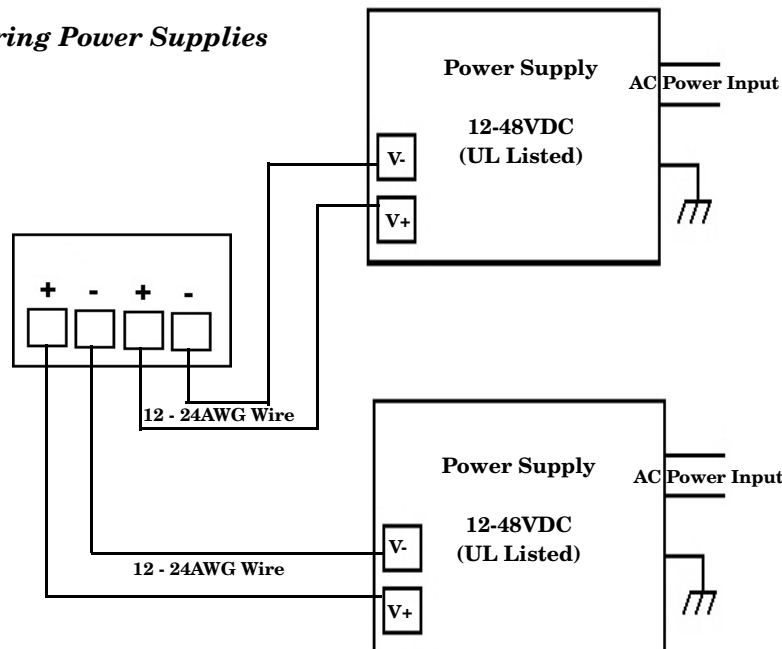
***This switch is intended to be installed in a RESTRICTED ACCESS LOCATION ONLY.***

You can use the following procedure to connect power and the ground to the ES8510.

1. Connect the DC power inputs by inserting the positive and negative wires (12-24AWG) into the PW+ and PW- contacts.

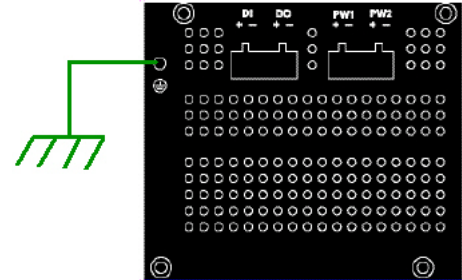
**Note:** Power should be disconnected from the power supply before connecting it to the switch. Otherwise, your screw driver blade can inadvertently short your terminal connections to the grounded enclosure. Tighten the wire-clamp screws to prevent the wires from coming loose.

### Wiring Power Supplies





- PW1 and PW2 support power redundancy and reverse polarity protection.
  - Accepts a positive or negative power source but PW1 and PW2 must apply to the same mode.
  - If both power inputs are connected, the ES8510 is powered from the highest connected voltage.
  - The ES8510 can emit an alarm if PW1 or PW2 are no longer receiving power. See the [Warning](#) discussion on [Page 112](#) to configure an alarm.
2. Connect a ground wire between the chassis and earth ground using 12-24AWG wire to ensure that the ES8510 is not damaged by noise or electrical shock.
- Loosen the ground screw on the bottom of the ES8510.
  - Insert the ground wire.
  - Tighten the ground screw after the ground wire is connected.



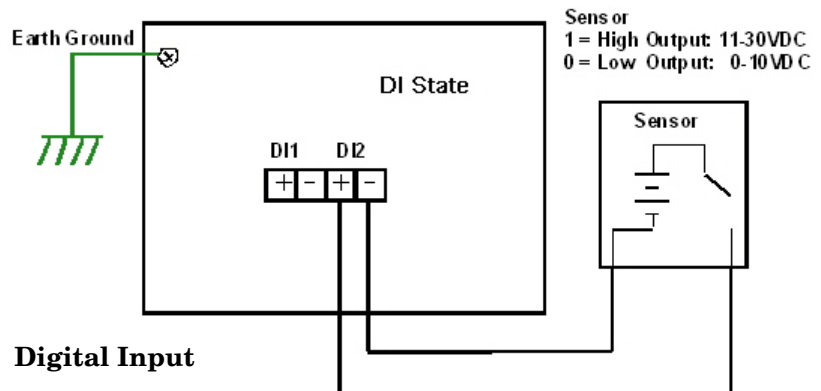
## Connect the Digital Input s and Relay Outputs

The ES8510 provides two digital inputs and two digital outputs (dry relay output) on terminal block connectors on the bottom of the unit. The fault conditions can be configured in the web user interface or Command Line Interface (CLI) and include:

- DI State
- Power failure
- Ethernet port link break
- Dry output
- Ping failure
- Super Ring failure

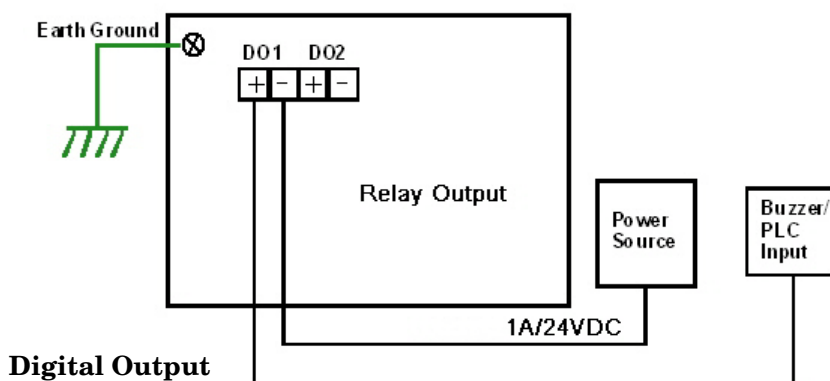
You can configure events using one of the ES8510 user interfaces ([Fault Relay](#) on Page 112) or the Command Line Interface ([Global Configuration Mode](#) on Page 135).

The Digital Input pin can be pulled high or low so that the connected equipment can actively drive these pins. The web user interface allows you to read and set the value to the connected device. The power input voltage of logic low is 0 to 10VDC and logic high is 11 to 30VDC. Do not apply a higher voltage than the specification; it may cause internal circuit damage or a cause an incorrect DI action.



Digital output relay contacts are energized (open) for normal operation and close for fault conditions. The digital output relay contacts support up to 1A at 24VDC. Do not apply voltage and current higher than the specifications.

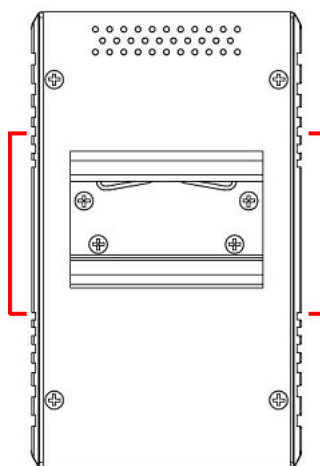
1. Insert the positive and negative wires (12-24 AWG) into V+ and V-.
2. Tighten the wire-clamp screws to prevent the wires from coming loose.



## Mount the ES8510

You can use the following procedure to mount the ES8510 on a DIN rail or on the wall.

The DIN rail clip is already attached to the ES8510. If the DIN rail clip is not screwed onto the ES8510, follow the instructions and the figure below to attach DIN rail clip to the ES8510.



### DIN Rail Mounting

1. If necessary, use the screws to attach DIN rail clip to the rear panel of the ES8510. (To remove DIN rail clip, reverse Step 1.)
2. Insert the upper end of DIN rail clip into the back of DIN rail track from its upper side.
3. Lightly push the bottom of DIN rail clip into the track.
4. Verify that the DIN rail clip is tightly attached on the track.
5. To remove the ES8510 from the track, reverse the steps above.



Follow the steps below to install the ES8510 with the wall mounting plate:

1. To remove the DIN rail clip from the ES8510, loosen the screws from the DIN rail clip.
2. Place the wall mounting plate on the rear panel of the ES8510.
3. Use the screws to attach the wall mounting plate to the ES8510.
4. Use the hook holes at the corners of the wall mounting plate to hang the ES8510 onto the wall.
5. To remove the wall mounting plate, reverse the steps above.

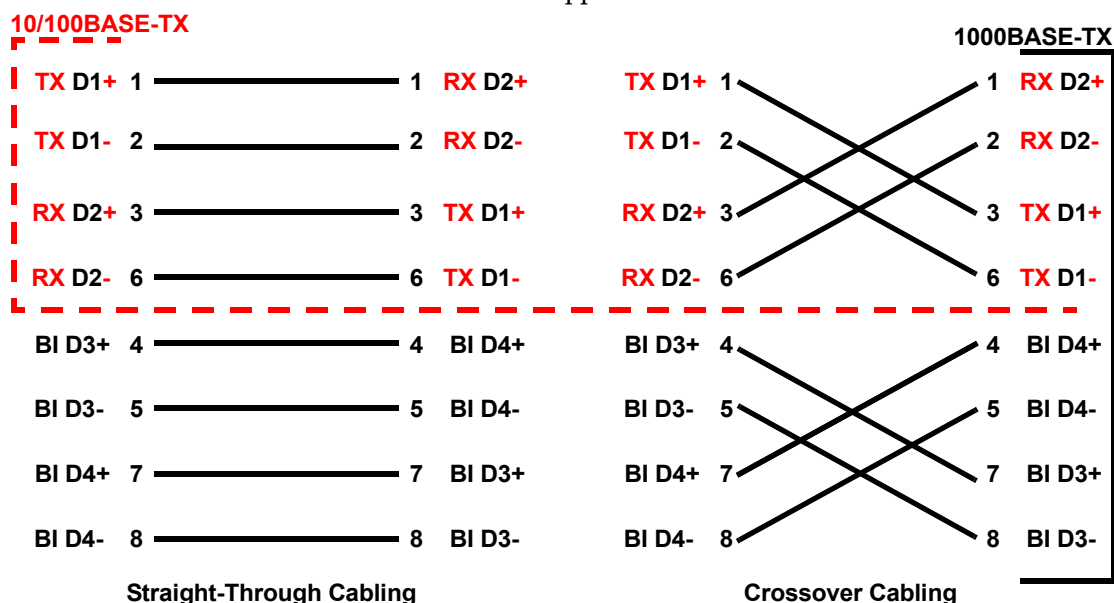
## Connect the Ethernet Ports

You can use the following information to connect standard Ethernet cables between the ES8510 Ethernet ports and the network nodes.

- Ports 1 - 7 are Fast Ethernet ports (10/100BASE-TX)
- Ports 8-10 are RJ45/SFP Combo Gigabit ports that support 10/100/1000BASE-TX, 100BASE-FX, and 1000BASE-X).

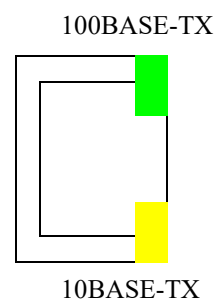
See [Connect SFP Transceivers \(Combo Ports 8-10\)](#) on Page 13 for information about SFP installation.

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 8-10)

The ES8510 equips three SFP ports combined with RJ45 Gigabit Ethernet ports (Ports 8-10). The SFP ports accept standard mini GBIC SFP transceivers that support 100BASE-FX/1000BASE-X.

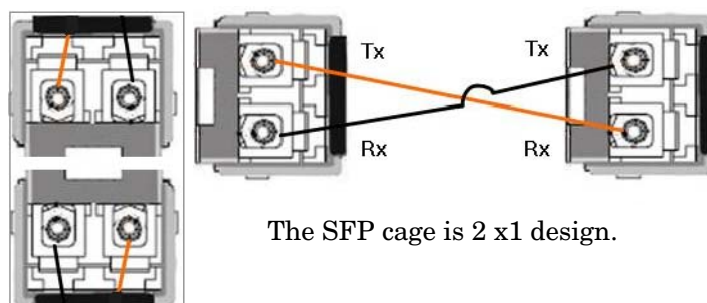
To ensure system reliability, Comtrol recommends using [Comtrol certified SFP Transceivers](#).

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.



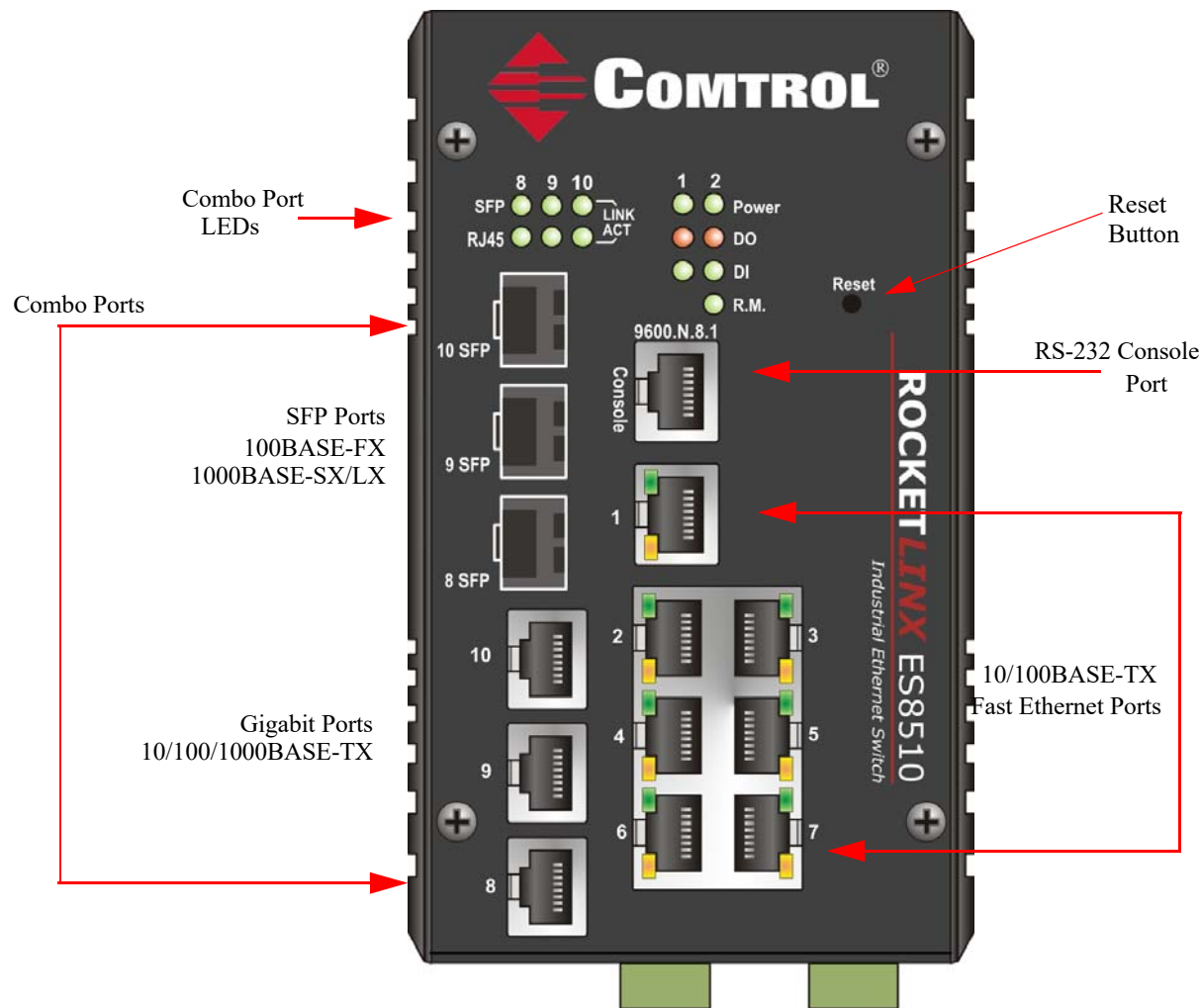
The SFP cage is 2 x1 design.

## LED Descriptions

This subsection provides information about the ES8510 LEDs. You can also refer to [Device Front Panel](#) on Page 123 for information about using the web user interface to remotely view LED information.

LED Name	LED On	LED Blinking	LED Off
Power 1 Power 2	Green: Power available		No power
DO1 (Digital Output) DO2 (Digital Output)	Red: DO activated		DO not activated
DI1 (Digital Input) DI2 (Digital Input)	Green: DI activated		DI not activated
R.M. (ring master)	Green: Working as a Ring Master	Green: Ring failed	Ring function disabled or the ES8510 is on a ring but not the ring master
1 - 7 (Fast Ethernet)  Link/ Speed	Green: Linked to another device  Amber: Full-Duplex	Green: Active traffic	Not connected  Collision
8 - 10 (Gigabit) SFP RJ45	Green: Connected Green: Active connection	Green: Active connection Green: Active connection	Plugged in but not linked up Not connected

Panel Layout



Reset Button

The ES8510 has a reset button that you can use to reboot the ES8510 or reset the configuration to the factory default.

Reset Button	Description
Depress 5 Seconds	This reboots the ES8510 without changing the configuration.
Depress > 10 Seconds	This loads the factory default configuration values into the ES8510 including the IP address.

The **Reset** button is located on the front panel of the ES8510 .



# Using PortVision DX

There are several ways to configure network information. Comtrol Technical Support recommends connecting the ES8510 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 16](#))
- Configure the network address ([Page 18](#))
- Check the firmware and bootloader version on the ES8510 to verify that the latest versions are loaded ([Page 21](#)) before configuration
- Download the latest version firmware and bootloader and upload it to the ES8510 ([Page 22](#))
- Perform other PortVision DX tasks, such as:
  - Uploading firmware to multiple ES8510 switches ([Page 23](#))
  - Adding a new RocketLinx (managed or unmanaged) or a third party device to PortVision DX to maintain device information on your network ([Page 24](#))
  - Using configuration files for use in configuring multiple installations with the same features ([Page 25](#))
  - Using the LED Tracker ([Page 26](#))
- Organize how PortVision DX displays your Comtrol Ethernet attached products ([Page 25](#))
- Access the latest documentation for your Comtrol Ethernet attached product

Optionally, you can use the web user interface or the CLI to perform these tasks on the ES8510 using these subsections:

- [IP Configuration](#) on Page 47
- [Firmware Upgrade](#) on Page 61
- [Basic Settings \(CLI\)](#) on Page 139

## PortVision DX Overview

---

PortVision DX automatically detects Comtrol 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 PRO/DeviceMaster RTS/DeviceMaster Serial Hub
  - DeviceMaster 500
- DeviceMaster UP
- DeviceMaster LT
- IO-Link Master family

In addition to identifying Comtrol 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-Comtrol 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.

**Note:** After initial IP configuration, you may want to disable PortVision DX using the service *netvision* command to secure your switch. See [Securing Interfaces](#) on Page 176 for information about disabling PortVision DX.

## PortVision DX Requirements

Use PortVision DX to identify, configure, update, and manage the ES8510 on Windows XP SP3 through Windows 10 operating systems (at the time of publication).

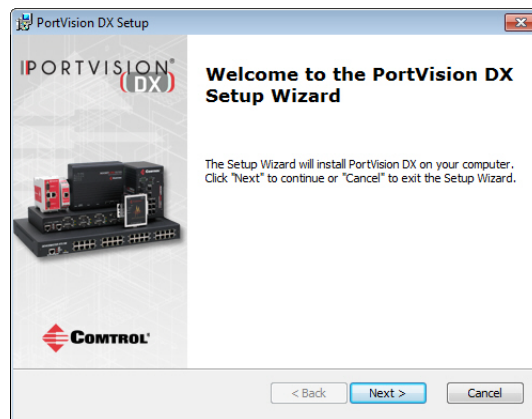
PortVision DX requires that you connect the Comtrol Ethernet attached product to the same network segment as the Windows host system if you want to be able to scan and locate it automatically during the configuration process.

## Installing PortVision DX

During initial configuration, PortVision DX automatically detects and identifies ES8510 switches, if they are in the same network segment.

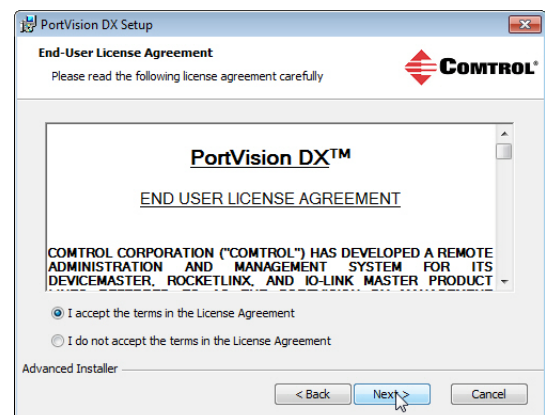
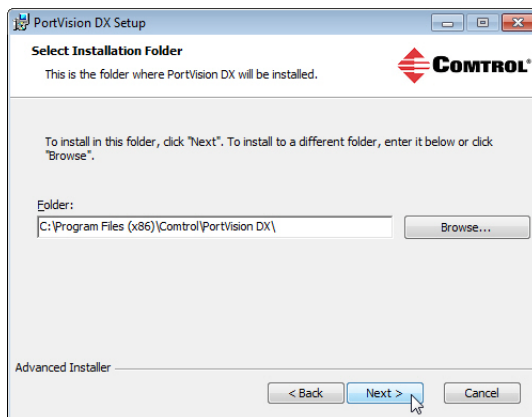
You can download the latest version of PortVision DX from: [http://downloads.comtrol.com/rocketlinx/portvision\\_dx](http://downloads.comtrol.com/rocketlinx/portvision_dx).

1. Execute the **PortVision\_DX[version].msi** file.

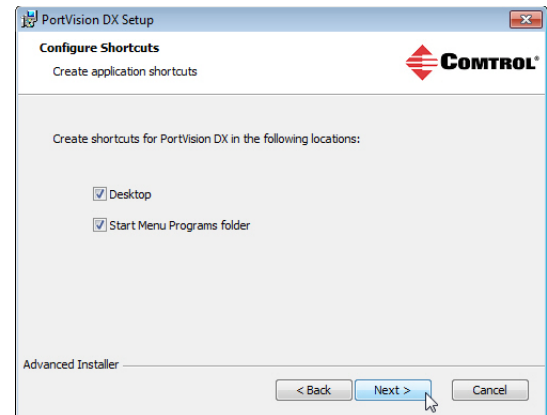
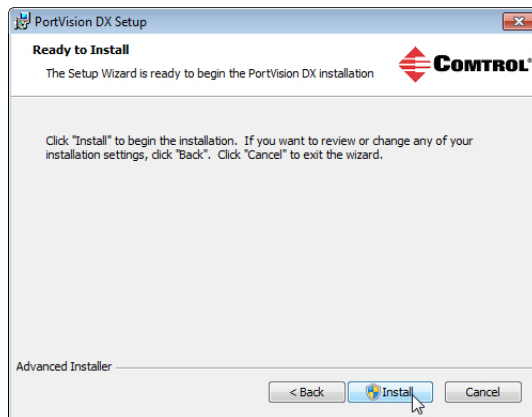


**Note:** Depending on your operating system, you may need to respond to a Security Warning to permit access.

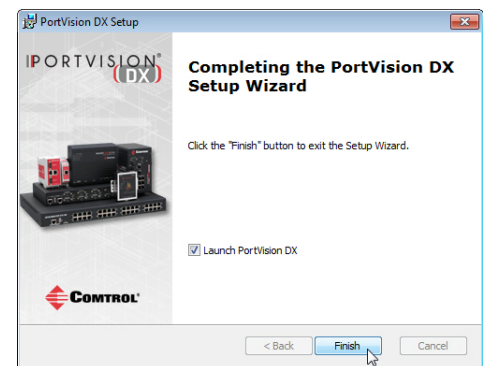
2. Click **Next** on the *Welcome* screen.
3. Click **I accept the terms in the License Agreement** and **Next**.
4. Click **Next** or optionally, browse to a different location and then click **Next**.



5. Click **Next** to configure the shortcuts.
6. Click **Install**.



7. 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.
8. Click **Launch PortVision DX** and **Finish** in the last installation screen.
9. 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.
10. Go the next subsection to use PortVision DX to program the network information.



## Configuring the Network Settings

---

The ES8510 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 ES8510 for your network.

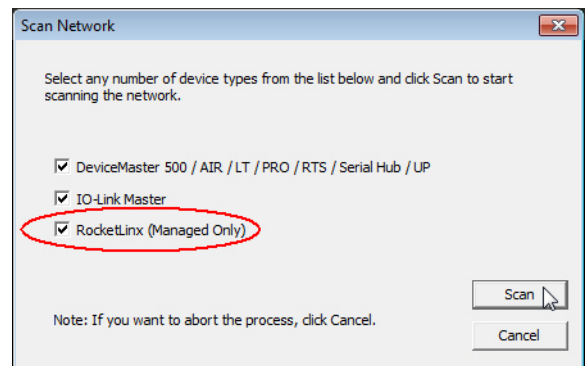
1. If necessary, start PortVision DX using the **PortVision DX** desktop shortcut or from the **Start** button, click **All Programs > Control > PortVision DX > PortVision DX**.

**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 ES8510 for which you want to program network information and open the **Properties** screen using one of these methods.
  - Double-click the ES8510 in the *Device Tree* or *Device List* pane.
  - Highlight the ES8510 in the *Device Tree* or *Device List* pane and click the **Properties** button.
  - Right-click the ES8510 in the *Device Tree* or *Device List* pane and click **Properties** in the popup menu



- Highlight the ES8510, click the **Manage** menu and then **Properties**.

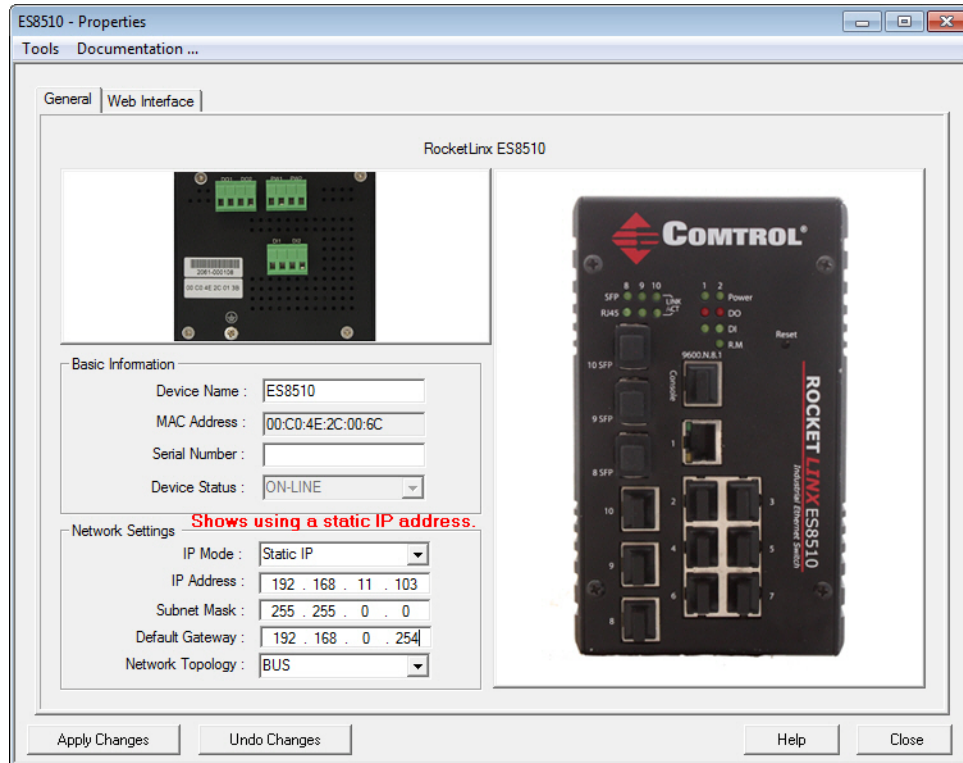
**Device Tree Pane**

**Device List Pane**

Device Name	Model	IP Addr...	MAC Address	Software Version	Status
Device 3C:00:02	ES8508F-MM	192.168.0.164	00:0C:45:3C:00:02	b1.6.1.5	ON-LINE
Device 2D:00:08	ES7506	192.168.0.165	00:0C:45:3C:00:03	b1.6.4.5	ON-LINE
Device 32:00:00	ES7528	192.168.0.166	00:0C:45:3C:00:04	b0.3.0.10	ON-LINE
Device 35:00:09	ES8509-XT	192.168.0.167	00:0C:45:3C:00:05	b1.3.1.5	ON-LINE
Device 2C:00:6C	ES8510	192.168.0.168	00:0C:45:3C:00:06	beta2 (b1.6.2.12)	ON-LINE
Device 34:00:08	ES7510	192.168.0.169	00:0C:45:3C:00:07	beta4 (b1.2.1.6)	ON-LINE
Device 36:00:02	ES9528-XT	192.168.0.170	00:0C:45:3C:00:08	b1.1.0.4	ON-LINE
Device 30:00:10	ES8510-XTE	192.168.0.171	00:0C:45:3C:00:09	beta2 (b1.6.2.12)	ON-LINE
Device 38:00:02	ES7510-XT	192.168.0.172	00:0C:45:3C:00:0A	beta7 (b1.4.1.6)	ON-LINE
Device 3A:00:0D	ES8508	192.168.0.173	00:0C:45:3C:00:0B	b1.5.1.5	ON-LINE
Device 2F:03:1D	ES8510-XT	192.168.0.174	00:0C:45:3C:00:0C	beta2 (b1.6.2.12)	ON-LINE
Device 1C:FF:5D	ES8510-XT	192.168.0.175	00:0C:45:3C:00:0D	k 9.28	ON-LINE
Device 5C:FF:5D	ES8510-XT	192.168.0.176	00:0C:45:3C:00:0E	et/IP 1.2.0	ON-LINE
Device 17:FF:FB	PRO-8P (DB9)	192.168.0.177	00:0C:45:3C:00:0F	k 9.18	ON-LINE
Device 07:FF:FC	RTS-4P (DB9)	192.168.0.178	00:0C:45:3C:00:10	Server 9.30	ON-LINE
Device 42:FF:F8	RTS-1P (5-30V)	192.168.0.179	00:0C:45:3C:00:11	Server 9.35	ON-LINE
Device 29:FF:F5	RTS-2P (2E)	192.168.0.180	00:0C:45:3C:00:12	k 9.34	ON-LINE
Device 15:04:7A	UP-1P (5V)	192.168.0.181	00:0C:45:3C:00:13	et/IP 4.10	ON-LINE



5. *Optionally*, rename the ES8510 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 ES8510.
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 ES8510.

**Note:** If you are deploying multiple ES8510 switches that share common values, you can save the configuration file and load that configuration onto other ES8510 switches. See [Using Configuration Files](#) on Page 25 for more information.

10. Click **Close** to exit the *Properties* window.
11. You should verify that you have the latest firmware loaded on the ES8510 because a newer version typically includes feature enhancements and bug fixes. Refer to [Checking the Firmware Version](#) on Page 21 and if necessary, [Uploading the Latest Firmware or Bootloader](#) on Page 22.
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 31
  - [Configuration Using the Command Line Interface \(CLI\)](#) on Page 126
  - Right-click the ES8510 in the *Device List* pane and click **Webpage** in the popup menu.

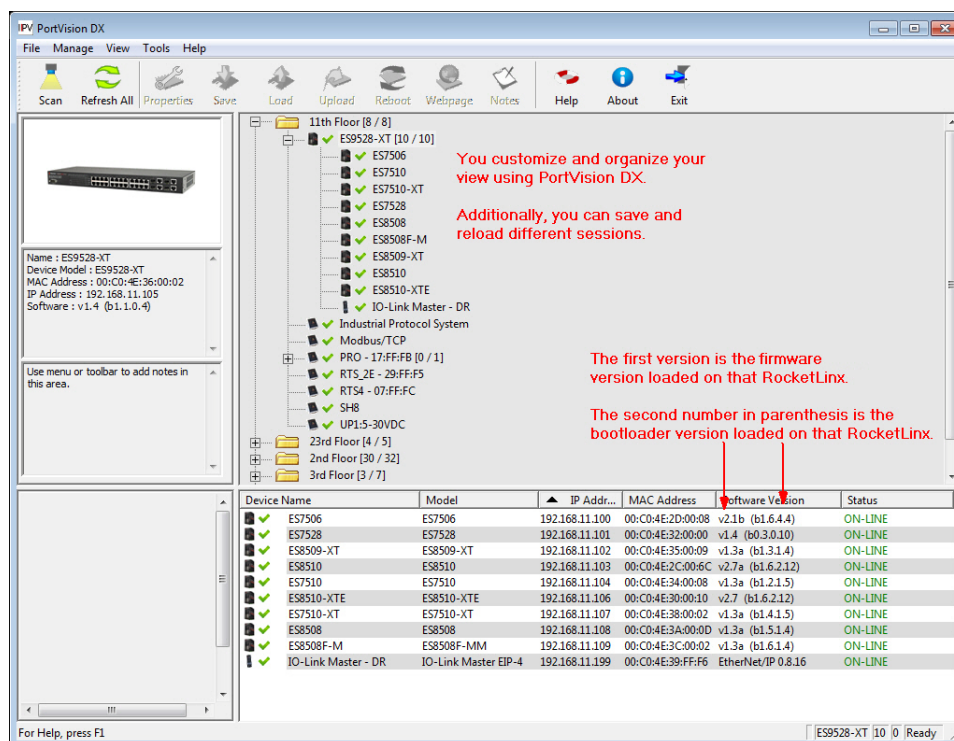
**Note:** The default User Name and Password are both **admin**.

## 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 ES8510 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 ES8510 in the *Device List* pane. Under *Software Version*: The first number reflects the firmware version and the second number displays the bootloader version.



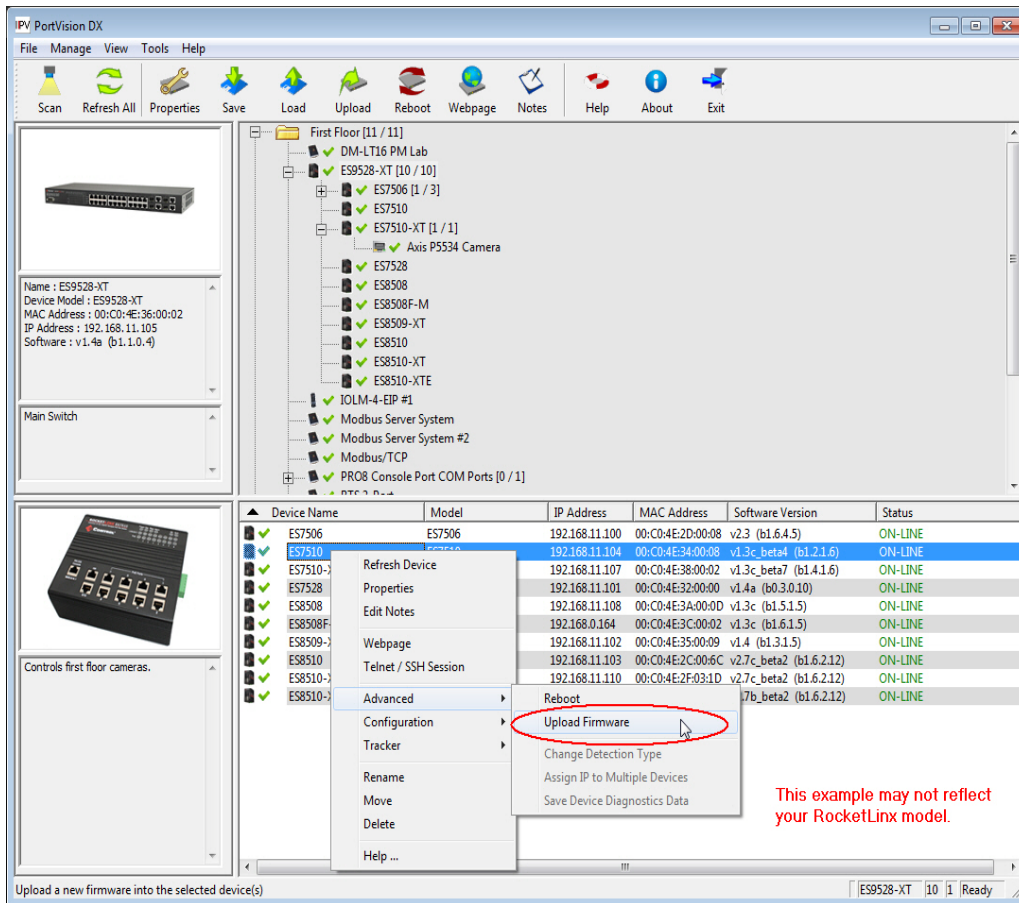
4. Check the [Control download](#) site for the latest firmware and bootloader. Simply, click your product type and click the **Software** link and check the latest version against the version on the ES8510.

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

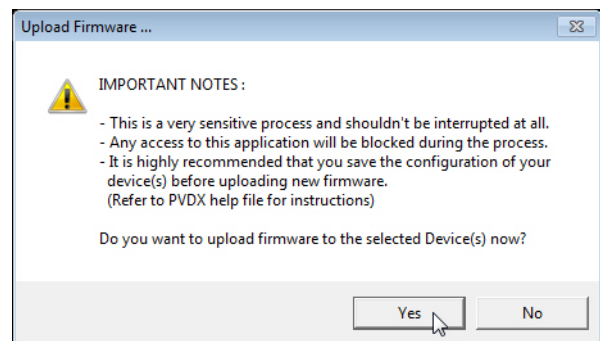
## Uploading the Latest Firmware or Bootloader

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 ES8510 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 ES8510 when the status returns to ON-LINE.
6. Right-click the ES8510 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*.

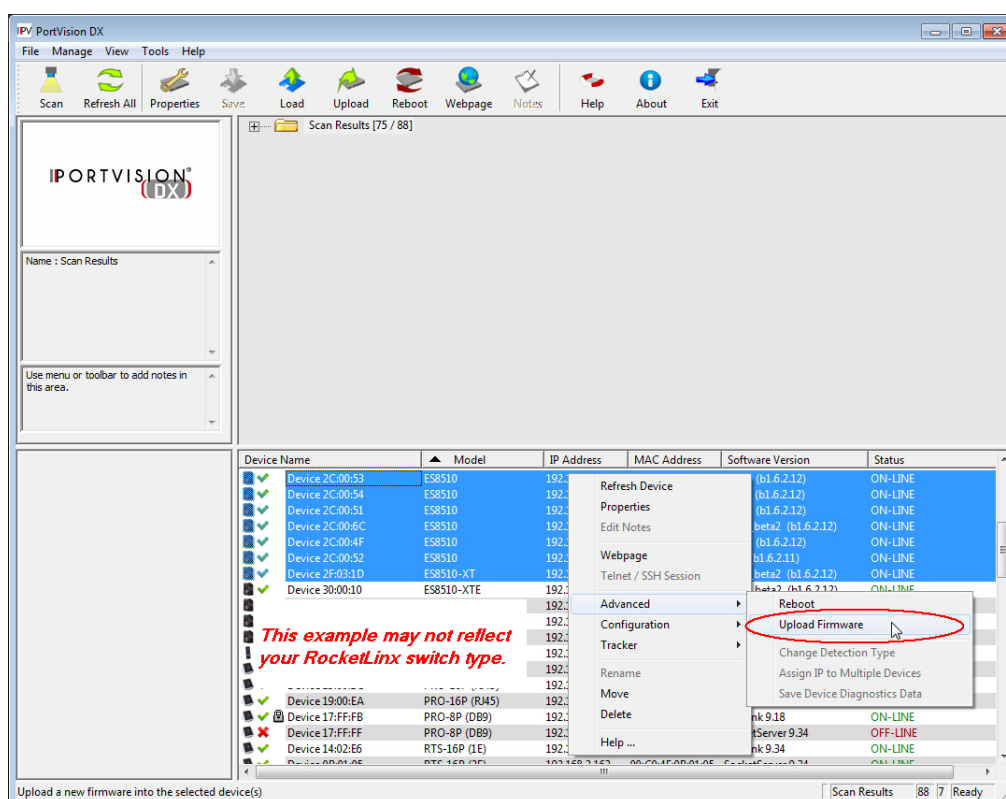


## Uploading Firmware to Multiple ES8510 Switches

You can use this procedure if your ES8510 is connected to the host PC, laptop, or if the ES8510 resides on the local network segment.

**Note:** Technical support does not advise uploading bootloader to multiple ES8510 switches. Remember that uploading firmware reboots the ES8510, which depending on your network connections may cause firmware uploading to fail on another ES8510.

1. If the ES8510 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 ES8510 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 ES8510 switches. The ES8510 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.

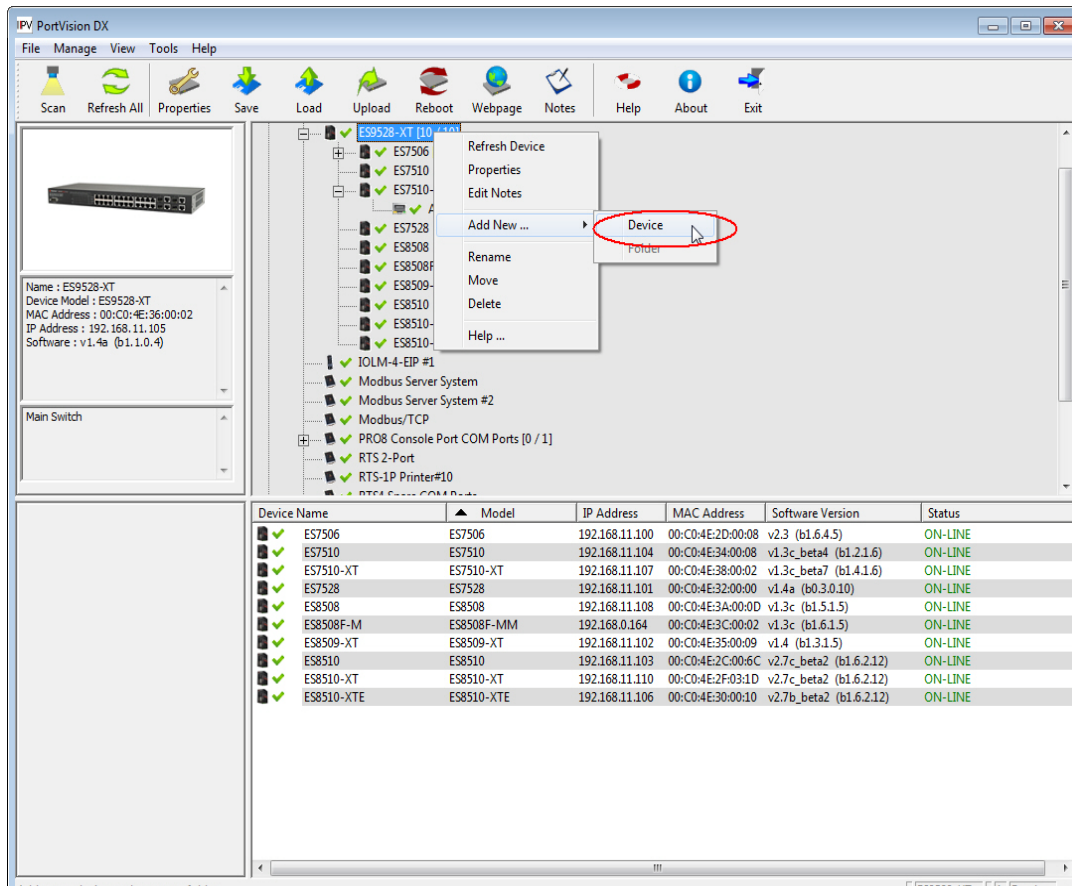
## Adding a New Device in PortVision DX

You can add a new ES8510 manually, if you do not want to scan the network to locate it or you want to pre-configure an ES8510 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 ES8510 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 ES8510. 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 ES8510.
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 ES8510 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 ES8510 switches.

### Saving a Configuration File

Use this procedure to save a configuration file.

1. Highlight the ES8510 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 ES8510 configuration file. Load a configuration file and apply it to a selected ES8510 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 ES8510 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.

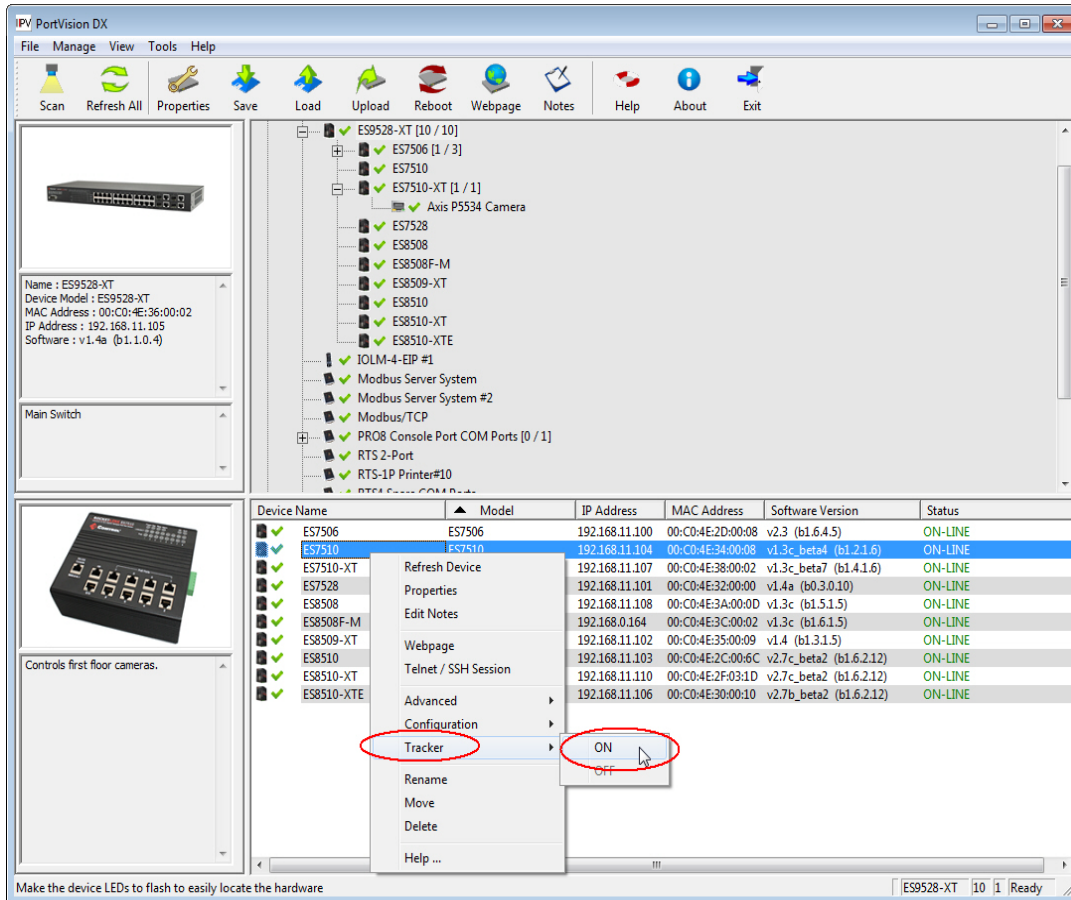
## Using the LED Tracker

RocketLinux 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 RocketLinux switches.

1. Right-click the ES8510 in the *Device List* pane, click **Tracker**, and then click **ON**.

The ES8510 **SYS** LED will flash for five seconds.

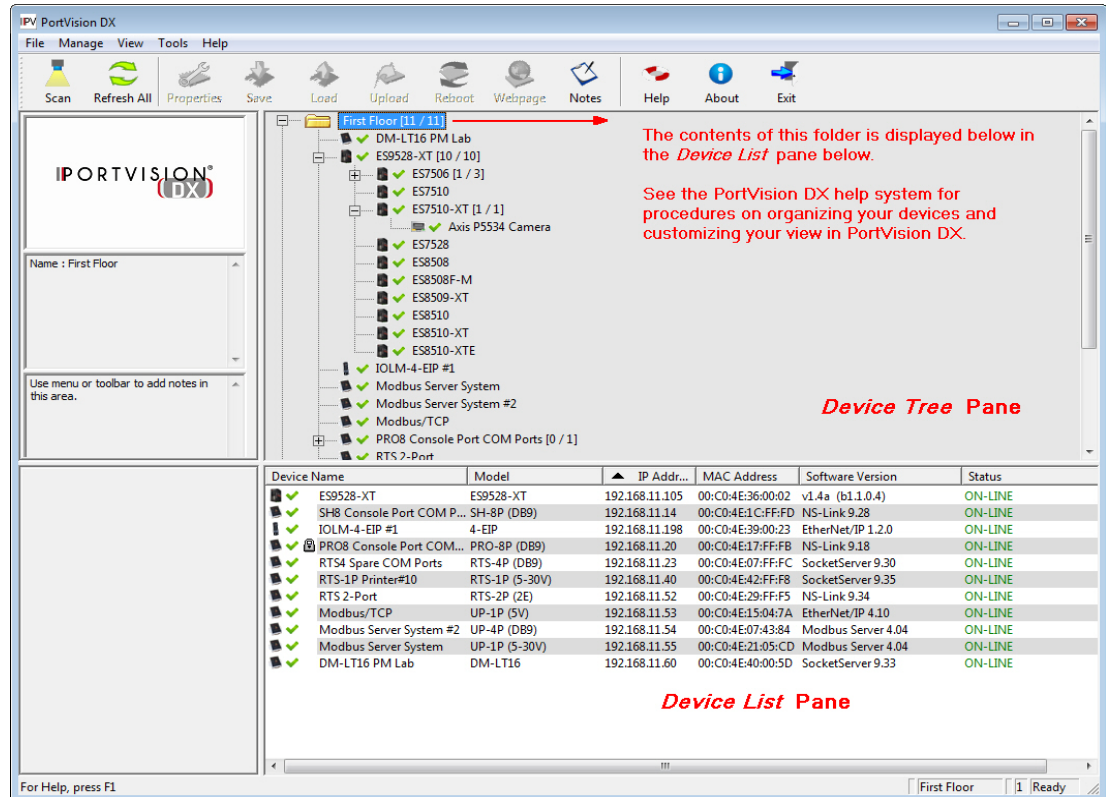


2. If necessary, you may need to click **Tracker** and **ON** several times to catch the flashing **SYS** LED.

## 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.



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

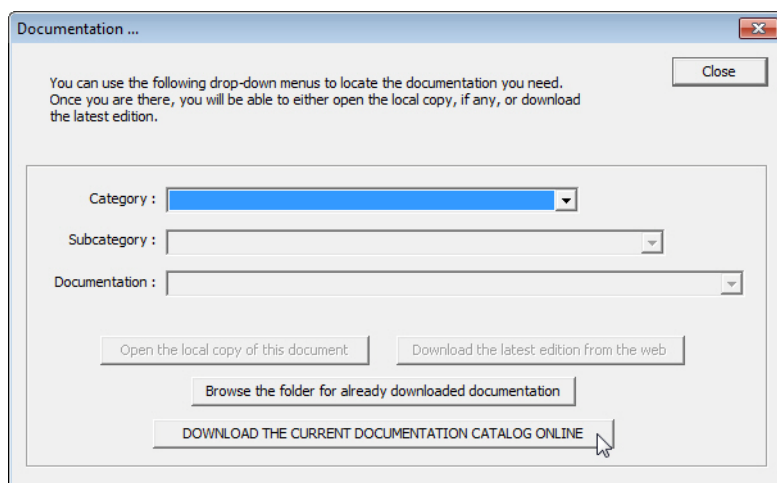
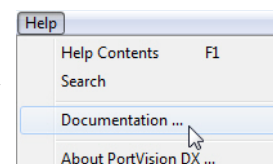
## Accessing RocketLinux Documentation from PortVision DX

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

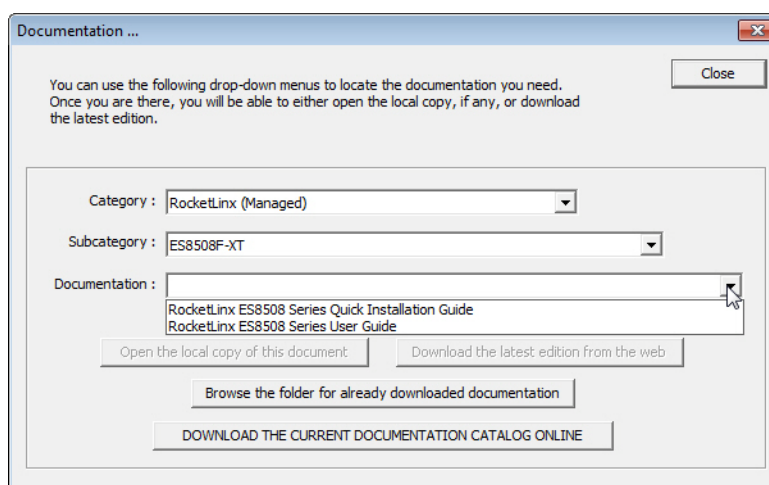
### How to Download Documentation

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 RocketLinux.

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.

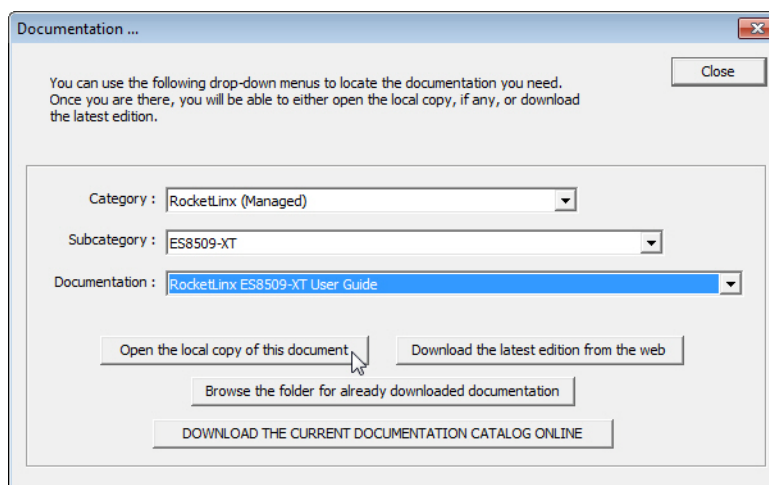
## How to Open Previously Downloaded Documents

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 *RocketLinux*.



**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 ES8510 provides in-band and out-band configuration methods:

- Out-band management means that you configure the ES8510 using the RS-232 console cable and the Command Line Interface (CLI) to access the ES8510 without attaching an admin PC to the network. You can use out-band management if you lose the network connection to the ES8510. The CLI and Telnet are discussed in [Configuration Using the Command Line Interface \(CLI\)](#) on Page 126.
- In-band management means that you connect remotely using the ES8510 IP address through the network. You can remotely connect with the ES8510 web user interface or a Telnet console and the CLI. The ES8510 provides HTTP web user interface ([Page 32](#)) and secure HTTPS web user interface ([Page 33](#)) for web management.

## Configuration Overview

---

This subsection discusses a minimum level of configuration required to operate the ES8510.

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 ES8510 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 18.
3. Configure other features as desired. You can refer to the [Feature Overview](#) on Page 35 to locate configuration information or use these links:
  - [Basic Settings](#) on Page 44
  - [Port Configuration](#) on Page 64
  - [Network Redundancy](#) on Page 71
  - [VLAN](#) on Page 85 and [Private VLAN](#) on Page 91
  - [Traffic Prioritization](#) on Page 95
  - [Multicast Filtering](#) on Page 99
  - [SNMP](#) on Page 102
  - [Security](#) on Page 105
  - [Warning](#) on Page 112
  - [Monitor and Diag](#) on Page 116
  - [Device Front Panel](#) on Page 123
  - [Save to Flash](#) on Page 124
  - [Logout](#) on Page 124

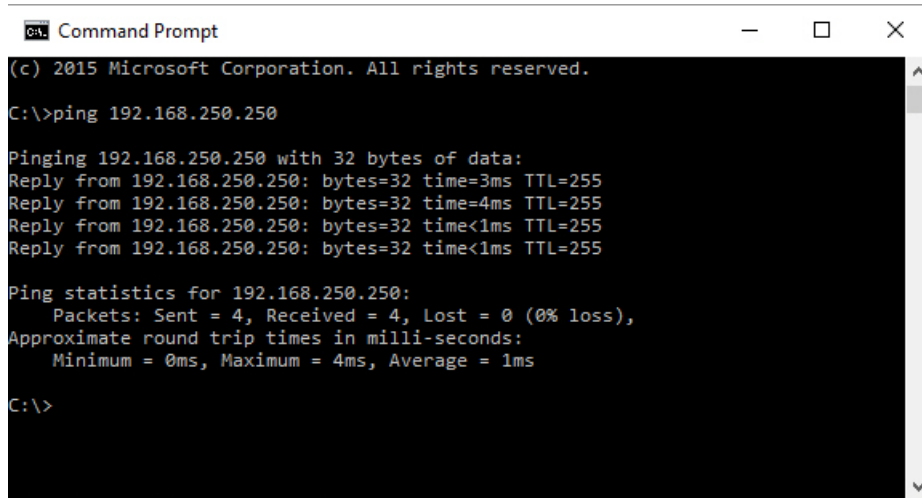
## Web User Interface

---

You can use any standard web browser to configure and communicate with the ES8510 from anywhere on the network.

The default IP address for the ES8510 is **192.168.250.250**.

1. Open a command prompt window and ping the IP address for the ES8510 to verify a normal response time.



```
(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

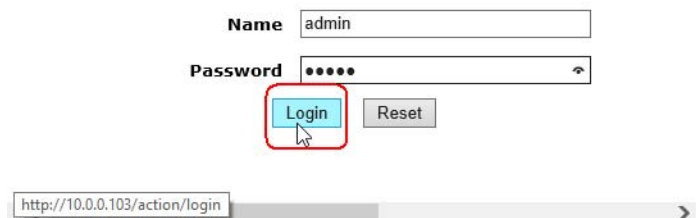
C:\>
```

**Note:** If you did not program the IP address for your network using PortVision DX ([Configuring the Network Settings](#) on Page 18), 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 ES8510 in PortVision DX and click **Webpage**.
  - Open your browser, enter the IP address of the switch, and then press **Enter**. For example: **http://10.0.0.114**.
3. Enter the user name, the password, and click **OK**. The default user name and password are both **admin**. The *Welcome* page of the web interface then appears.



### Welcome to the ES8510



The screenshot shows the login page of the ES8510 web interface. It features a 'Name' field with 'admin' entered, a 'Password' field with masked characters (dots), and two buttons: 'Login' (highlighted with a red box and a mouse cursor) and 'Reset'. At the bottom, a browser address bar shows the URL 'http://10.0.0.103/action/login'.



4. If you have not done so, you can change the ES8510 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**.

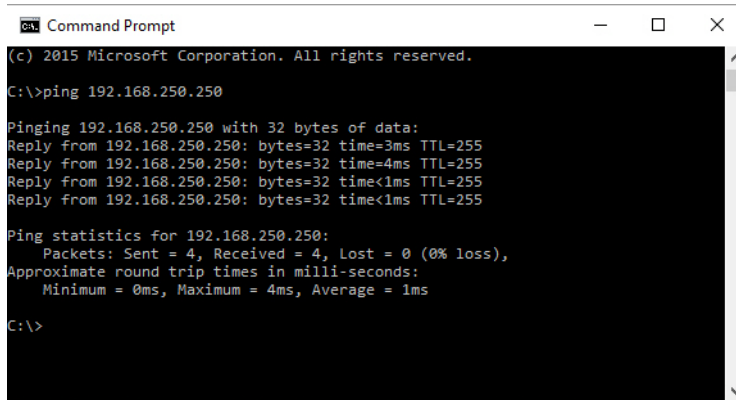
You can use the [Feature Overview](#) on Page 35 to locate other features that you may want to configure.

## Secure Web User Interface

The ES8510 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 18), 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 ES8510 is **192.168.250.250**.

1. Open a command prompt window and ping the IP address for the ES8510 to verify a normal response time.



```

Command Prompt
(c) 2015 Microsoft Corporation. All rights reserved.

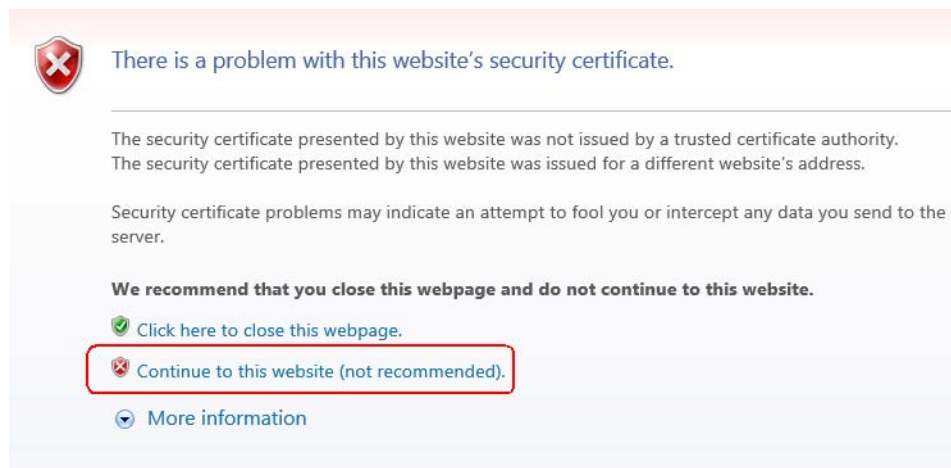
C:\>ping 192.168.250.250

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

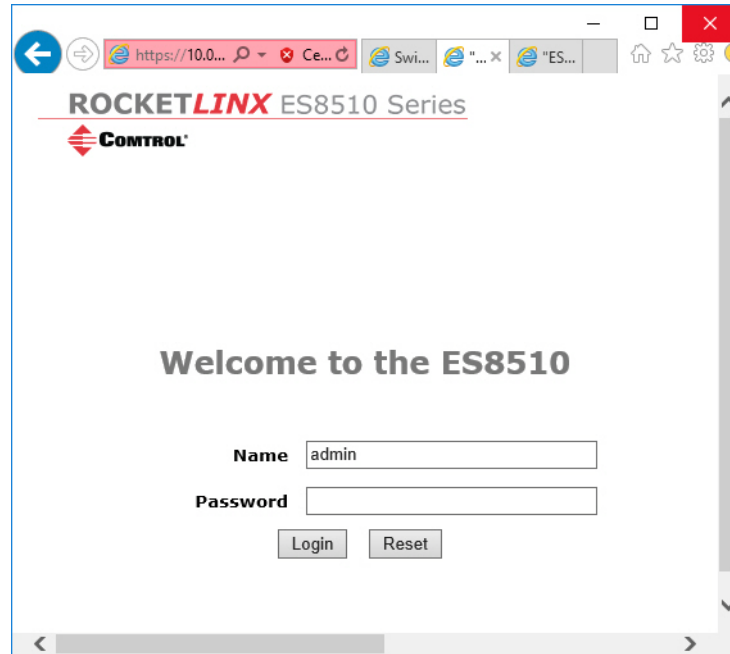
C:\>
  
```

2. Launch the web browser and type **https://192.168.250.250** (or the IP address of the ES8510).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 user name and password are both **admin**.

The *Welcome* page of the web management interface then appears.



5. If you have not done so, you can change the ES8510 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 ES8510 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> <li>RADIUS Server (RADIUS Server IP, Shared Key, and Server Port)</li> <li>Secondary RADIUS Server (RADIUS Server IP, Shared Key, and Server Port)</li> </ul>
Backup and Restore	<a href="#">Backup and Restore</a> on Page 60	Local or TFTP

Type	Category	Details
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>
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>• Power 1 Failure</li> <li>• Power 2 Failure</li> <li>• Fault Relay</li> <li>• DI1 Change</li> <li>• DI2 Change</li> <li>• Ring Event</li> <li>• Loop Protection</li> <li>• Ring Event</li> <li>• SFP Failure</li> <li>• Port by Port Event Selection</li> </ul>
Fault Relay	<a href="#">Fault Relay</a> on Page 114	Relay 1- Multi-event <ul style="list-style-type: none"> <li>• DI - State (DI number and High or Low)</li> <li>• Dry Output - On Period (Sec) and Off Period (Sec)</li> <li>• Power Failure - Power 1 or Power 2</li> <li>• Link Failure (Port or Ports)</li> <li>• Ping Failure, IP Address, Reset Time (Sec), and Hold Time (Sec)</li> <li>• Super Ring Failure</li> </ul>

Type	Category	Details
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>
IP Security	<a href="#">IP Security</a> on Page 109	<ul style="list-style-type: none"> <li>• Enable/Disable</li> <li>• Security IP</li> <li>• Security IP List - Index and Security IP</li> </ul>
Loop Protection	<a href="#">Loop Protection</a> on Page 87	<ul style="list-style-type: none"> <li>• Transmit Interval</li> <li>• Enable/Disable port by port</li> <li>• Status</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>

Type	Category	Details
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
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/Half (Ports 8-10)</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 Security	<a href="#">Port Security</a> on Page 108	<ul style="list-style-type: none"> <li>Port Security State - Port by Port</li> <li>Add Port Security Entry - Port, VID, and MAC Address</li> <li>Port Security Entry List - Port VID, and MAC Address</li> </ul>

Type	Category	Details
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> <li>SFP Vendor, Wavelength, and Distance</li> <li>SFP DDM - Temperature, Tx Power, and Rx Power</li> </ul>
Port Trunk	<a href="#">Aggregation Setting</a> on Page 72 <a href="#">Aggregation Status</a> on Page 73	Aggregation Settings <ul style="list-style-type: none"> <li>Group ID - Trunk 1-5</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>
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>

Type	Category	Details
QoS Setting	<a href="#">QoS Setting</a> on Page 98	<p>Queue scheduling</p> <ul style="list-style-type: none"> <li>• Use 8.4.2.1 Weighted Fair Queuing Scheme</li> <li>• Use A Strict Priority Scheme</li> </ul> <p>Port Setting</p> <ul style="list-style-type: none"> <li>• CoS - 0 through 7</li> <li>• Trust Mode - COS Only, DSCP Only, COS First, or DSCP First</li> </ul>
Rate Control	<a href="#">Rate Control</a> on Page 71	<ul style="list-style-type: none"> <li>• Ingress Packet Types - Broadcast Only, Broadcast/Multicast, Broadcast/Multicast/Unknown Unicast, and All</li> <li>• Ingress Rate (1 Mbps to 100Mbps)</li> <li>• Egress Packet Type</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 four 100M rings and one Gigabit ring per switch</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>
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>• System Reset Button</li> <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>



Type	Category	Details
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
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>
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>

Type	Category	Details
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>• 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>
Upgrade Firmware	<a href="#">that contains the configuration file 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>• 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>

Type	Category	Details
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 44
- [Admin Password](#) on Page 46
- [IP Configuration](#) on Page 47
- [Time Setting](#) on Page 49
- [DHCP Server Configuration](#) on Page 52
  - [DHCP Leased Entries](#) on Page 54
  - [DHCP Option82 Relay Information](#) on Page 55
- [Backup and Restore](#) on Page 57
- [Firmware Upgrade](#) on Page 61
- [Load Default](#) on Page 62
- [System Reboot](#) on Page 63

Optionally, you can use the CLI for configuration, see [Basic Settings \(CLI\)](#) on Page 139.

## Switch Setting

---

You can assign the **System Name**, **Location**, **Contact** and view ES8510 information.

Welcome to the ES8510 Industrial Managed Switch Help

System Name	ES8510-Second Shelf
System Location	11th Floor - South End
System Contact	DLR
System OID	1.3.6.1.4.1.2882.1.1
System Description	ES8510 Industrial Managed Ethernet Switch
Firmware Version	3.0_b3-20160930-17:25:48
Device Mac	00C04E2C006C

Apply

Switch Setting Page	
System Name	You can assign a name to the ES8510 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 ES8510 physical location with up to 64 characters.
System Contact	You can specify contact people with up to 64 characters by typing the Administer's name, mail address or other information.
System OID	The SNMP Object ID of the ES8510. You can follow the path to find its private MIB in an MIB browser. <b>Note:</b> When you attempt to view private MIB, you should first compile private MIB files into your MIB browser.
Firmware Version	Displays the firmware version installed in this ES8510.
Device MAC	Displays a unique hardware address (MAC address) assigned at the factory.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## Admin Password

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

**Admin Password**
Help

---

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

Apply
Cancel

---

**RADIUS Server**

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

**Secondary Radius Server**

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

Apply

Admin Password Page	
Administrator	
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.
RADIUS Server	
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.
Secondary RADIUS Server	
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 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## IP Configuration

This web page allows you to configure the ES8510'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
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

[Reload](#)

IP Configuration Page	
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 ES8510. If the DHCP Client function is enabled, you do not need to assign an IP address to the ES8510, 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 ES8510. 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 ES8510 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.
IPv6 Neighbor Table	
Neighbor	The <i>IPv6 Neighbor Table</i> lists neighbors of the ES8510.
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 124</a>), if you want to maintain these settings if the ES8510 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 ES8510 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 ▼
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

### Time Setting Page

Current Time	<p><b>Manual Setting:</b></p> <p>Click the <b>Get PC Time</b> button to get PC's time setting for the ES8510 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 ES8510 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>
Time Zone	Select the time zone where the ES8510 is located. The following table lists the time zones for different locations for your reference. The default time zone is (GMT) Greenwich Mean Time.
NTP	Click this check box to enable NTP (Network Time Protocol).
Primary/Secondary Server	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.
Daylight Saving Time	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 ES8510 time is one hour earlier than the actual time.
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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

```
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

## DHCP Server Configuration

---

Use this page to configure DHCP server services.

Server Configuration
Help

---

Global Setting
Disable

Apply

---

Address Pool Setting

Network	0.0.0.0
Mask	0.0.0.0
Default Gateway	0.0.0.0
Lease Time	604800 (60-31536000 seconds)

Apply

---

Excluded Address List

Excluded IP

Add

Index	Address

Remove
Reload

---

Static Port/IP Binding List

Port	
IP Address	

Add

Index	Port	Address

Remove
Reload

---

Static MAC/IP Binding List

MAC Address	
IP Address	

Add

Index	MAC	Address

Remove
Reload

---

Option32/IP Binding List

Circuit ID	
Remote ID	
IP Address	

Add

Index	Circuit ID	Remote ID	Address

Remove
Reload

---

DHCP Server Configuration Page	
Global Setting	You can select to <b>Enable</b> or <b>Disable</b> the DHCP Server function. The ES8510 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 124</a> ), if you want to maintain these settings if the ES8510 is powered off.
Address Pool Setting	
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.
Excluded Address List	
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.
Static Port/IP Binding List	
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.
Static MAC/IP Binding List	
IP Address	The ES8510 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 ES8510 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, 00C0.4E2C.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 ES8510 provides a table that displays assigned IP addresses.

Leased Entries			
<a href="#">Help</a>			
Index	IP Address	MAC Address	Leased Time Remains
<a href="#">Reload</a>			

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 124](#)), if you want to maintain these settings if the ES8510 is powered off.

Option82 Information

Help

---

DHCP Relay Agent

Disable ▾

Apply

---

Helper Address

Helper Address

Add

<input type="checkbox"/>	Helper Address 1	
<input type="checkbox"/>	Helper Address 2	
<input type="checkbox"/>	Helper Address 3	
<input type="checkbox"/>	Helper Address 4	

Remove

---

Relay Policy

☐ Replace
 ☐ Keep
 ☐ Drop

Apply

---

### DHCP Option82 Relay Information Page

Relay Agent	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>	
Helper Address	Enter the DHCP Server address for the Relay Agent and click <b>Add</b> . The Helper Addresses appear in the table below.
Helper Address 1-4	DHCP Server addresses for the Relay Agent.
<b>Relay Policy</b>	
Relay policy replace	Replaces the existing option 82 field and adds new option 82 field. This is the default when the DHCP Relay Agent is enabled.
Relay policy keep	Keeps the original option 82 field and forwards to server.
Relay policy drop	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	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>
6	<input type="text"/>	<input type="text"/>
7	<input type="text"/>	<input type="text"/>
8	<input type="text"/>	<input type="text"/>
9	<input type="text"/>	<input type="text"/>
10	<input type="text"/>	<input type="text"/>

DHCP Option82 Relay Information Page	
Circuit ID	
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>
Remote ID	
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

Apply

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 ES8510 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 ES8510 or load the same settings to another ES8510. Before you can restore a configuration file, you must first save the backup configuration file to a local system or your TFTP server.

The ES8510 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 ES8510.

Backup and Restore

Help

---

Local Files

Load Settings from File

Browse...

Upload

Save Settings to File

Save...

---

TFTP

IP

File Name

ES8520-XT-00C04E5F0C

Load/Save Settings

Load

Submit

This example file name may not reflect the name of your firmware file.

**Note:** Optionally, you can use PortVision DX to back up and restore configuration files.

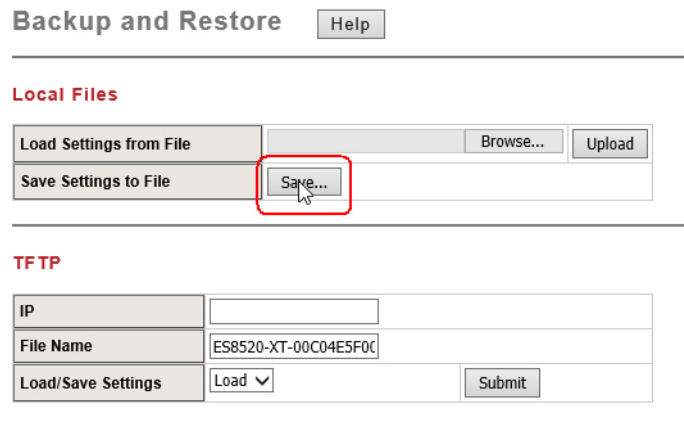
Backup & Restore Page	
Backup Configuration	<ul style="list-style-type: none"> <li><b>Local File:</b> The ES8510 acts as a file server and you can save the file to a local location, see <a href="#">Backup the Configuration - Local File Method</a> on Page 58.</li> <li><b>TFTP Server:</b> The ES8510 acts as a TFTP client, see <a href="#">Backup the Configuration - TFTP Server Method</a> on Page 59.</li> </ul> <p><b>Note:</b> Pointing to the wrong file causes the entire configuration to be skipped.</p> <ul style="list-style-type: none"> <li>The ES8510 provides a default configuration file in the ES8510. 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 62</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 ES8510. 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> <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 ES8510 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.)



The screenshot shows the 'Backup and Restore' page with a 'Help' button. Under the 'Local Files' section, there are two main options: 'Load Settings from File' and 'Save Settings to File'. The 'Save Settings to File' option is selected, and its 'Save...' button is highlighted with a red box. To the right of these options are 'Browse...' and 'Upload' buttons. Below this, the 'TFTP' section contains fields for 'IP', 'File Name' (with the default 'ES8520-XT-00C04E5F0C'), and a 'Load/Save Settings' dropdown set to 'Load', along with a 'Submit' button.

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 ES8510 with a dash, followed by the MAC address of the ES8510.

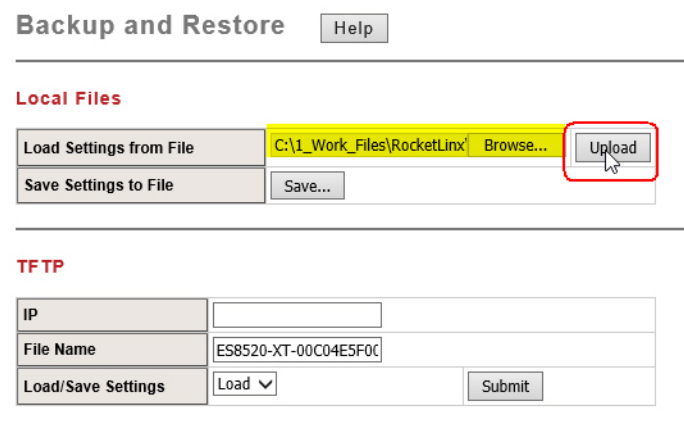
**Note:** You cannot use spaces in the path to the target file.

### *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 ES8510 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' page with a 'Help' button. Under the 'Local Files' section, the 'Load Settings from File' option is selected, and its 'Upload' button is highlighted with a red box. The 'File Name' field is populated with 'C:\I\_Work\_Files\RocketLinx'. To the right of these options are 'Browse...' and 'Save...' buttons. Below this, the 'TFTP' section contains fields for 'IP', 'File Name' (with the default 'ES8520-XT-00C04E5F0C'), and a 'Load/Save Settings' dropdown set to 'Load', along with 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.

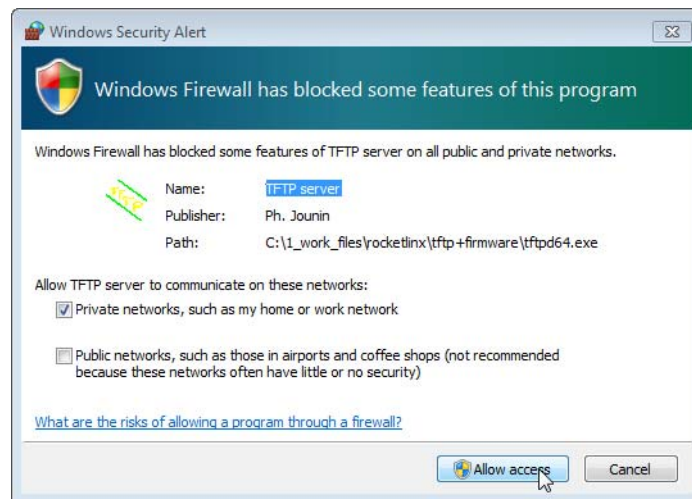
### *Backup the Configuration - TFTP Server Method*

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.



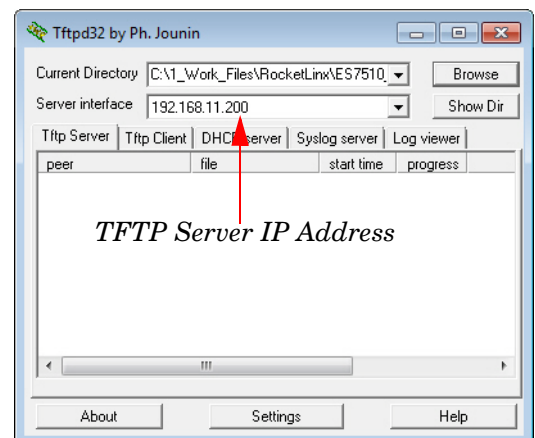
3. Leave the TFTP server open and go to [Create a Backup File](#) on Page 59.

**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 ES8510 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 ES8510 with a dash, followed by the MAC address of the ES8510.
4. Select **Save** from the **Load/Save Settings** drop list.



- Click the **Submit** button.

The screenshot shows the 'Backup and Restore' web interface. At the top, there is a 'Help' button. Below it, the 'Local Files' section contains two rows: 'Load Settings from File' with a text input 'C:\1\_Work\_Files\RocketLinx', a 'Browse...' button, and an 'Upload' button; and 'Save Settings to File' with a 'Save...' button. The 'TFTP' section below has three rows: 'IP' with a text input '10.0.0.202'; 'File Name' with a text input 'ES8520-XT-00C04E5F0C'; and 'Load/Save Settings' with a 'Save' dropdown menu. The 'Submit' button is highlighted with a red rectangle and a mouse cursor.

**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 59.

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

- Open the ES8510 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.

This screenshot shows the 'Backup and Restore' web interface with the 'Load/Save Settings' dropdown menu set to 'Load'. The 'Submit' button is also highlighted with a red rectangle and a mouse cursor. The 'IP' field is highlighted in yellow. The 'File Name' field contains the same text as the previous screenshot.

- Click **Ok** to *The settings were successfully changed* message.
- Open the **Reboot** page.

## Firmware Upgrade

Use this section to update the ES8510 with the latest firmware. Comtrol provides the latest firmware on the Comtrol [download site](#). Updated firmware may include new features, bug fixes, or other software changes. Comtrol Technical Support suggests you use the latest firmware before installing the ES8510 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.

### 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 ES8510 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.

**Firmware Upgrade** Help

---

**Local file**

Select File C:\1\_Work\_Files\RocketLinx\TFTP+Firmware\ES8520- Browse...

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.*

### 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 59.
2. Place the ES8510 .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**

---

**Local file**

---

**TFTP**

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 ES8510 configuration values to default settings, excluding the network information. Optionally, you can use the [Reset Button](#) on Page 14, which also resets the IP address with the default configuration values.

**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 ES8510 to reset all configurations to factory default settings.

**Load default**

---

**Reset settings to default?**

The system displays a popup message window after finishing. The default settings work after rebooting the ES8510.

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 ES8510 is powered off.

Click the **Yes** button to reboot your ES8510.

### 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 66
- [Rate Control](#) on Page 68
- [Port Trunking](#) on Page 69

Optionally, you can use the CLI for configuration, see [Port Configuration \(CLI\)](#) on Page 145.

### 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

[Help](#)

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 ▾	

[Apply](#)
[Cancel](#)

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 ES8510.
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~ 7 (fa1~fa7) <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 8~ 10: (gi8~gi10) <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> <li>- 1000M half-duplex (1000 Half)</li> </ul> </li> </ul>
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>
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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

## Port Status

---

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.

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.
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	You can choose from these options: <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> .

## 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	---	---	---

## SFP DDM

Port	SFP Scan/Eject	SFP DDM	Temperature (degree)		Tx Power (dBm)		Rx Power (dBm)	
			Current	Range	Current	Range	Current	Range
8	---	Enable	---	---	---	---	---	---
9	---	Enable	---	---	---	---	---	---
10	---	Enable	---	---	---	---	---	---

Reload

Apply

Scan All

Eject All

**Note:** Most of the SFP transceivers provide vendor information that allows the ES8510 to read it. The web interface can display vendor name, wave length, and distance of all Comtrol SFP transceiver models. If you see Unknown info, it may mean that the vendor does not provide their information or that the information of their transceiver cannot be read. If the plugged DDM SFP transceiver is not certified by Comtrol, the DDM function is not supported, but the communication is not disabled.

## 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.

### Rate Control

[Help](#)

Port	Ingress Rule		Egress Rule	
	Packet Type	Rate (Kbps)	Packet Type	Rate (Kbps)
1	Broadcast Only	8000	All	0
2	Broadcast Only	8000	All	0
3	Broadcast Only	8000	All	0
4	Broadcast Only	8000	All	0
5	Broadcast Only	8000	All	0
6	Broadcast Only	8000	All	0
7	Broadcast Only	8000	All	0
8	Broadcast Only	8000	All	0
9	Broadcast Only	8000	All	0
10	Broadcast Only	8000	All	0

[Apply](#)

### Rate Control Page

Ingress Packet Type	<p>You can select the packet type that you want to filter. The Ingress packet types supported are:</p> <ul style="list-style-type: none"> <li>Broadcast/Multicast/Unknown Unicast</li> <li>Broadcast/Multicast</li> <li>Broadcast</li> <li>All</li> </ul> <p>The Egress rate supports all types of packets.</p>
Bandwidth	<p>All ports support port Ingress and Egress rate control. For example, assume Port 1 is 10Mbps, you can set it's effective Egress rate at 2Mbps, Ingress rate at 1Mbps. The ES8510 performs the Ingress rate by packet counter to meet the specified rate.</p> <ul style="list-style-type: none"> <li>Ingress Ingress rate in Mbps, the rate range is from 1 Mbps to 100 Mbps and zero means no limit. The default value is 8Mbps</li> <li>Egress The default value is <b>no-limit</b>. Egress rate limiting has an effect on all types of packets, including Unicast, Multicast and Broadcast packets.</li> </ul>
Ingress Rule (Kbps)	Ingress rate in Kbps, the rate range is from Kbps to 256000 Kbps and zero means no limit. The default value is 8000Kbps.
Egress Rule (Kbps)	Egress rate in Kbps, the rate range is from Kbps to 256000 Kbps and zero means no limit. The default value is 8000Kbps. Egress rate limiting has an effect on all types of packet types, including Unknown Unicast, Multicast, and Broadcast.
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 124</a>), if you want to maintain these settings if the ES8510 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 Setting](#) on Page 69 and [Aggregation Information](#) on Page 70.

### Aggregation Setting

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

**Port Trunk - Aggregation Setting**
Help

---

**Aggregation Setting**

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 ▼	▼

Apply
Reload

#### Aggregation Setting Page

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.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 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 Help

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			

Reload

Aggregation Status Page	
Group ID	Displays Trunk 1 to Trunk 5 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

---

It is critical for industrial applications that the network remains running at all times. The ES8510 supports:

- *Standard Rapid Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP)*  
The ES8510 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 5 ms for fail over for copper.
- *Rapid Dual Homing (RDH)*  
Advanced RDH technology allows the ES8510 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 72
- [STP Port Configuration](#) on Page 73
- [STP Information](#) on Page 74
- [MSTP Configuration](#) on Page 76
- [MSTP Port Configuration](#) on Page 78
- [MSTP Information](#) on Page 79
- [Redundant Ring](#) on Page 81
- [Redundant Ring Information](#) on Page 83
- [Loop Protection](#) on Page 84

Optionally, you can use the CLI to configure these features, see [Network Redundancy \(CLI\)](#) on Page 148.



## 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

STP Configuration Page	
STP Mode	Select the spanning tree protocol: STP, RSTP or MSTP or disable STP.
Bridge Configuration	
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 124</a> ), if you want to maintain these settings if the ES8510 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 ▾

Apply Cancel

STP Port Configuration Page	
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.
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 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.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

STP Information

The *STP Information* page allows you to see the ES8510 root information and port status.

STP Information Help

Root Information

Root Address	00c0.4e2c.006c
Root Priority	32768
Root Port	10
Root Path Cost	220000
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	Disabled	Disabled	200000	128	P2P	Edge	/
2	Disabled	Disabled	200000	128	P2P	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	Disabled	Disabled	200000	128	P2P	Edge	/
8	Disabled	Disabled	200000	128	P2P	Edge	/
9	Disabled	Disabled	20000	128	P2P	Edge	/
10	Root	Forwarding	20000	128	P2P	Non-Edge	/

Reload

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.
Forward Delay	The number of seconds a port waits before changing from its Spanning-Tree Protocol learning and listening states to the forwarding state.

STP Information Page (Continued)	
Port Information	
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.

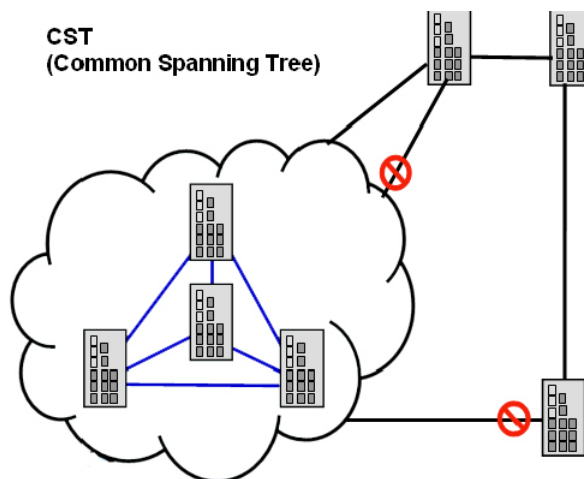
One VLAN can be mapped to a Multiple Spanning Tree Instance (MSTI). The maximum number of instances that the ES8510 supports is 16, with a range from 0-15. The MSTP builds a separate Multiple Spanning Tree (MST) for each instance to maintain connectivity among each of the assigned VLAN groups. An Internal 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**

---

**MSTP Region Configuration**

Region Name	<input type="text"/>
Revision	<input type="text"/>

---

**Add MSTP Instance**

Instance ID	<input type="text"/>
VLAN Group	<input type="text"/>
Instance Priority	<input type="text"/>

---

**MSTP Instance Configuration**

Instance ID	VLAN Group	Instance Priority
<input type="text"/>	<input type="text"/>	<input type="text"/>

<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> . <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## 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		▼	▼	▼
2		▼	▼	▼
3		▼	▼	▼
4		▼	▼	▼
5		▼	▼	▼
6		▼	▼	▼
7		▼	▼	▼
8		▼	▼	▼
9		▼	▼	▼
10		▼	▼	▼

Apply

Cancel

MSTP Port Configuration Page	
Instance ID	Select an Instance ID to display and modify MSTP instance setting.
Port Configuration	
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.
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. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## 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

[Help](#)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						

[Reload](#)



<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

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

[Help](#)

#### Add Ring

Ring ID	0
Name	

#### Ring Configuration

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




#### Rapid Dual Homing Port Configuration

Ring ID	Auto Detect	1	2	3	4	5	6	7	8	9	10



### Redundant Ring Page

Ring ID/Name	<p>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.</p> <p><b>Note:</b> Once a ring is created, you cannot change it.</p>
<b>Ring Configuration</b>	
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> .
Version	The version of Ring can be changed here, the choices are <b>Rapid Super Ring</b> or <b>Super Ring</b> .
Device Priority	The switch with highest priority (highest value) is automatically selected as the <b>Ring Master</b> (RM). 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.

Redundant Ring Page (Continued)	
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>
Ring status	To <b>Enable/Disable</b> the Ring, remember to enable the Ring after you add it.
Rapid Dual Homing Port Configuration	
Ring ID	The Ring Identifier referring to this Ring.
Auto Detect	Enable Rapid Dual Homing (RDH) auto detect RDH port mode.
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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

## Redundant Ring Information

This page shows Redundant Ring information.

### Redundant Ring Information

[Help](#)

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

[Reload](#)

### Redundant Ring Information Page

Ring ID	The Ring ID.
Version	Displays the ring version, this field could be Super Ring or Rapid Super Ring.
Role	This ES8510 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 ES8510 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.

Loop Protection

Loop protection prevents broadcast loops in Layer 2 switching configurations.

Loop Protection

Help

Transmit Interval

1

Port	Loop Protection	Status
1	Disable	
2	Disable	
3	Disable	
4	Disable	
5	Disable	
6	Disable	
7	Disable	
8	Disable	
9	Disable	
10	Disable	

Apply

Cancel

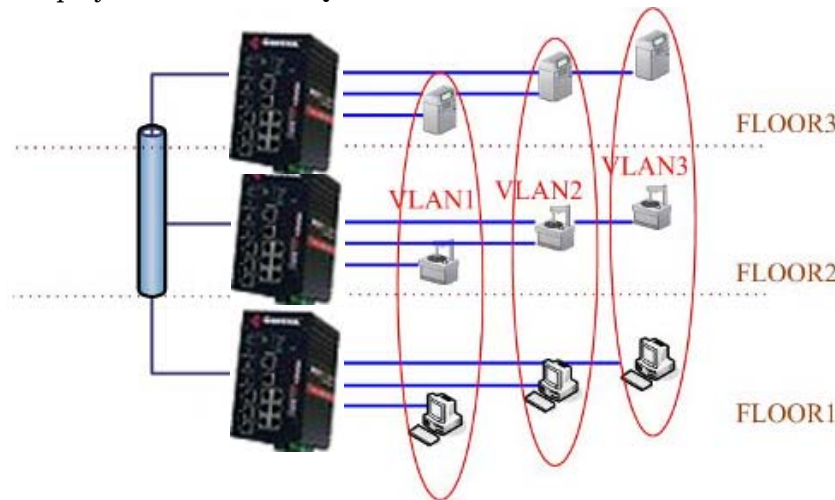
Loop Protection Page	
Transmit Interval	Loop protection mechanism detection packet transmitting interval 1 ~ 10 seconds (default is 1).
Port	The port ID.
Loop Protection	Enable/Disable loop protection mechanism on port.
Status	The status of loop protection.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.
Enable/Disable All	Click the <b>Enable/Disable All</b> button to enable or disable all ports and then click <b>Apply</b> button to apply.
Reload	Click the <b>Reload</b> button to reload loop protection information.

## 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 ES8510 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 ES8510.

The following figure displays an IEEE 802.1Q VLAN.



The ES8510 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 ES8510 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 86
- [VLAN Configuration](#) on Page 86
- [VLAN Information](#) on Page 90
- [Private VLAN](#) on Page 91
- [PVLAN Configuration](#) on Page 91

- [PVLAN Port Configuration](#) on Page 92
  - [PVLAN Information](#) on Page 93
  - [GVRP Configuration](#) on Page 94
- Optionally, you can use the CLI for configuration, see [VLAN \(CLI\)](#) on Page 156.

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

Help

Management VLAN ID

1

Apply

Static VLAN

VLAN ID	NAME
<div></div>	<div></div>

Add

Static VLAN Configuration

VLAN ID	Name	1	2	3	4	5	6	7	8	9	10
<div><input type="checkbox"/> 1</div>	<div>VLAN1</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>	<div>U ▾</div>

Apply

Remove Selected

Reload

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 ES8510 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 - 10:** 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 124](#)), if you want to maintain these settings if the ES8510 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
<input type="checkbox"/> 1	VLAN1	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼
<input type="checkbox"/> 2	VLAN2	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼
<input type="checkbox"/> 3	Test	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼

Apply

Remove Selected

Reload

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
<input type="checkbox"/> 1	VLAN1	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼	U ▼
<input type="checkbox"/> 2	VLAN2	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼
<input type="checkbox"/> 3	Test	-- ▼	U ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼	-- ▼

Apply

Remove Selected

Reload

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**
Help

---

Port	PVID	Tunnel Mode	Accept Frame Type	Ingress Filtering
1	1	None ▼	Admit All ▼	Disable ▼
2	1	None ▼	Admit All ▼	Disable ▼
3	1	None ▼	Admit All ▼	Disable ▼
4	1	None ▼	Admit All ▼	Disable ▼
5	1	None ▼	Admit All ▼	Disable ▼
6	1	None ▼	Admit All ▼	Disable ▼
7	1	None ▼	Admit All ▼	Disable ▼
8	1	None ▼	Admit All ▼	Disable ▼
9	1	None ▼	Admit All ▼	Disable ▼
10	1	None ▼	Admit All ▼	Disable ▼

Apply

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 default Port VID, the VLAN ID assigned to an untagged frame or a Priority-Tagged frame received on the port. The valid range is from 1 to 4094. Enter the PVID you want to configure.
Tunnel Mode	<p><b>None</b> - 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 86</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 Static VLAN Configuration table (<a href="#">Page 86</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>
Accept Frame Type	<p>This defines the accepted frame type of the port. There are two modes you can select:</p> <ul style="list-style-type: none"> <li><b>Admit All</b> mode means that the port can accept both tagged and untagged packets. 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 Super Ring, STP, GVRP and LACP. It does affect VLAN dependent BPDU frames, such as GMRP.</li> <li><b>Tag Only</b> mode means that the port can only accept tagged packets. When you select <b>Tag Only</b> the ES8510 discards untagged frames or Priority-Tagged only frames received on this port.</li> </ul>

VLAN Port Configuration Page (Continued)	
Ingress Filtering	<p>Ingress filtering instructs the VLAN engine to filter out undesired traffic on a port.</p> <ul style="list-style-type: none"><li>• When you <b>Enable Ingress Filtering</b>, the port checks whether the incoming frames belong to the VLAN they claimed or not. The port then determines if the frames can be processed or not. For example, if a tagged frame from <i>TEST VLAN</i> is received, and Ingress Filtering is enabled, the ES8510 determines if the port is on the <i>TEST VLAN</i>'s Egress list. If it is, the frame can be processed. If it is not, the frame is dropped.</li><li>• When you select <b>Disable</b>, the port accepts all incoming frames regardless of its VLAN classification. This control does not affect VLAN independent BPDU frames, such as Super Ring, STP, GVRP and LACP. It does affect VLAN dependent BPDU frames, such as GMRP.</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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

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 Help

VLAN ID	Name	Status	1	2	3	4	5	6	7	8	9	10
1	VLAN1	Static	U	U	U	U	U	U	U	U	U	U

Reload

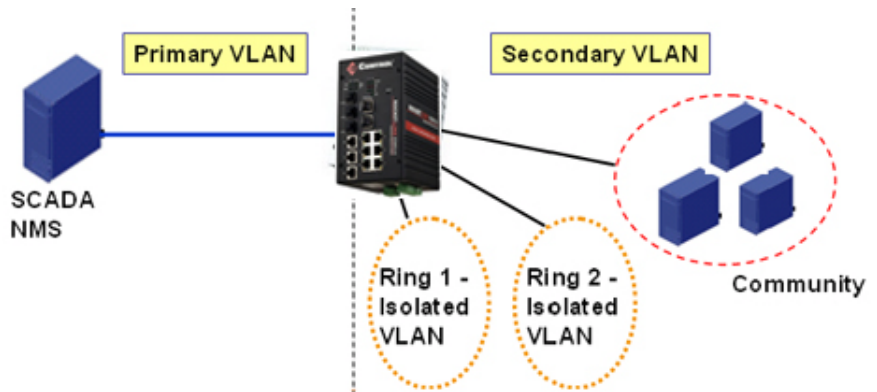
VLAN Information Page	
VLAN ID	The ID of the VLAN.
Name	The name of the VLAN.
Status	<p><b>Static</b> means that this is a manually configured static VLAN.</p> <p><b>Unused</b> means this VLAN is created by web user interface/CLI and has no member ports and the VLAN is not workable yet.</p> <p><b>Dynamic</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 159.

## 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 86 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>
---------	---

**Private VLAN Configuration Page (Continued)**

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 124</a> ), if you want to maintain these settings if the ES8510 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 ▼

[Apply](#)**Private VLAN Association**

Secondary VLAN	Primary VLAN
3	None ▼

**Private VLAN Port Configuration Page**

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

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

[Help](#)
**GVRP Protocol** Disable ▾

Port	State	Join Timer	Leave Timer	Leave All Timer
1	Disable ▾	20	60	1000
2	Disable ▾	20	60	1000
3	Disable ▾	20	60	1000
4	Disable ▾	20	60	1000
5	Disable ▾	20	60	1000
6	Disable ▾	20	60	1000
7	Disable ▾	20	60	1000
8	Disable ▾	20	60	1000
9	Disable ▾	20	60	1000
10	Disable ▾	20	60	1000

Note: Timer unit is centisecond.

[Apply](#)

GVRP Configuration Page	
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 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## Traffic Prioritization

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 ES8510 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 97
- [DSCP-Queue Mapping](#) on Page 98

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

### QoS Setting

Use this subsection to set up QoS settings for the ES8510.

**QoS Setting**
Help

---

**Queue Scheduling**

☒ 8,4,2,1 weighted fair queuing scheme
   
☐ Strict priority scheme

Port	CoS	Trust Mode
1	0	CoS Only
2	0	CoS Only
3	0	CoS Only
4	0	CoS Only
5	0	CoS Only
6	0	CoS Only
7	0	CoS Only
8	0	CoS Only
9	0	CoS Only
10	0	CoS Only

Apply
Cancel



QoS Setting Page	
Queue Scheduling	
Use an 8,4,2,1 weighted fair queuing scheme	This is also known as <b>WRR</b> (Weight Round Robin). The ES8510 follows the 8:4:2:1 rate to process the packets in a queue from the highest priority to the lowest. For example, the system processes 8 packets with the highest priority in the queue, 4 with middle priority, 2 with low priority, and 1 with the lowest priority at the same time.
Use a strict priority scheme	Packets with higher priority in the queue are always processed first, except that there is no packet with higher priority.
Port Setting	
CoS	The CoS column indicates that the default port priority value for untagged or priority-tagged frames. When the ES8510 receives the frames, the ES8510 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.
Trust Mode	<p><b>Trust Mode</b> indicates the Queue Mapping types that you can select.</p> <ul style="list-style-type: none"> <li>• <b>COS Only</b> (default): The port priority follows the CoS-Queue Mapping you have assigned. The ES8510 provides the default CoS-Queue table for which you can refer to for the next command.</li> <li>• <b>DSCP Only</b>: Port priority only follows the DSCP-Queue Mapping you have assigned.</li> <li>• <b>COS first</b>: Port priority follows the CoS-Queue Mapping first, and then the DSCP-Queue Mapping rule.</li> <li>• <b>DSCP first</b>: Port priority follows the DSCP-Queue Mapping first, and then the CoS-Queue Mapping rule.</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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

## CoS-Queue Mapping

Use this page to change the CoS values into a Physical Queue mapping table. Since the switch fabric of the ES8510 supports eight queues, Lowest, Low, Middle and High. You should therefore assign how to map CoS value to the level of the physical queue.

Use this page to change the CoS values into the Physical Queue mapping table. Since the switch fabric of ES8510 supports four queues, Lowest, Low, Middle, and High users should therefore assign how to map the CoS value to the level of the physical queue.

You can assign the mapping table or follow the suggestion of the IEEE 802.1p standard. The ES8510 uses IEEE 802.1p suggestion as default values. CoS Values 1 and 2 are mapped to physical Queue 0, the lowest queue. CoS Values 0 and 3 are mapped to physical Queue 1, the low/normal physical queue. CoS Values 4 and 5 are mapped to physical Queue 2, the middle physical queue. CoS Values 6 and 7 are mapped to physical Queue 3, the high 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

[Help](#)

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

Note : Queue 3 is the highest priority queue in using Strict Priority scheme.

[Apply](#)
[Cancel](#)

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

**Note:** You must **Save** the settings ([Page 124](#)), if you want to maintain these settings if the ES8510 is powered off.

## DSCP-Queue Mapping

Use this page to change DSCP values to Physical Queue mapping table. Since the switch fabric of the ES8510 only supports four 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-Queue Mapping

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

Note : Queue 3 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 124](#)), if you want to maintain these settings if the ES8510 is powered off.

## Multicast Filtering

For multicast filtering, the ES8510 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 100
- [IGMP Snooping](#) on Page 101

Optionally, you can use the CLI for configuration, see [Multicast Filtering \(CLI\)](#) on Page 166.

IGMP Query

Use this page to configure the *IGMP Query* feature. Since the ES8510 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 Help

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

Apply

IGMP Query Page	
Version	<div>Select <b>Version 1</b>, <b>Version 2</b> or <b>Disable</b>.</div> <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	<div>Click <b>Apply</b> to apply the settings.</div> <div><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 124</a>), if you want to maintain these settings if the ES8510 is powered off.</div>

## 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**

---

**IGMP Snooping Global Setting**

---

**IGMP Snooping VLAN Setting**

VLAN	IGMP Snooping	Filtering Mode
1	<input type="button" value="Disable"/>	<input type="button" value="Broadcast Unknown"/>

---

**IGMP Snooping Table**

Multicast Address	VLAN ID	Interface

### IGMP Snooping Page

IGMP Snooping Global Setting	<p>You can select to <b>Enable</b> or <b>Disable</b> IGMP Snooping.</p> <p>After enabling IGMP Snooping, you can then enable IGMP Snooping for specific VLAN using the <i>IGMP Snooping VLAN Setting</i> table.</p>
<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	<p>The available filtering modes are:</p> <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 ES8510 supports 256 multicast groups. Click <b>Reload</b> to refresh the table.

**Note:** You must **Save** the settings ([Page 124](#)), if you want to maintain these settings if the ES8510 is powered off.

# 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 ES8510 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 103
- [SNMP Traps](#) on Page 104

Optionally, you can use the CLI for configuration, see [SNMP \(CLI\)](#) on Page 169.

## 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 ES8510 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 ES8510 and the administrator are encrypted to ensure secure communication.

**SNMP V3 Profile**

---

**SNMP V3**

User Name	<input type="text"/>
Security Level	None ▼
Authentication Level	MD5 ▼
Authentication Password	<input type="password"/>
DES Password	<input type="password"/>

---

**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 ES8510 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 124](#)), if you want to maintain these settings if the ES8510 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. <i><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 124</a>), if you want to maintain these settings if the ES8510 is powered off.</i>
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 124](#)), if you want to maintain these settings if the ES8510 is powered off.*

SNMP Trap Help

SNMP Trap Disable ▼

Apply

SNMP Trap Server

Server IP

Community

Version V1 ▼

Add

Trap Server Profile

Server IP	Version	Community

Remove Reload

## Security

The ES8510 provides several security features for you to secure your connection. The following pages are included in this group:

- [Port Security](#) on Page 105
- [IP Security](#) on Page 106
- [802.1X Configuration](#) on Page 107
- [802.1X Port Configuration](#) on Page 109
- [802.1X Port Information](#) on Page 111

Optionally, you can use the CLI for configuration, see [Security \(CLI\)](#) on Page 170.

### Port Security

The *Port Security* page allows you to stop the MAC address learning for specific port. After stopping MAC learning, only the MAC address listed in Port Security List can access the switch and transmit/receive traffic.

You can restrict what devices can access the ES8510 management features. MAC addresses added to the static MAC address table can be authorized to access specified ports on the switch.

When **Port Security** is enabled on any port, only authorized MAC addresses are able to access the management features of the ES8510 on enabled ports. Ports with security disabled block all attempts to access the ES8510's management features. To globally disable port security you must disable the feature on each individual port.

The *Port Security* page allows you to enable port security and configure a port security entry list.

#### Port Security Help

##### Port Security

Port	State
1	Disable ▾
2	Disable ▾
3	Disable ▾
4	Disable ▾
5	Disable ▾
6	Disable ▾
7	Disable ▾
8	Disable ▾
9	Disable ▾
10	Disable ▾

Apply

##### Add Port Security Entry

Port	VLAN ID	Mac Address
Port 1 ▾	<input type="text"/>	<input type="text"/>

Add

##### Show Port Security List

Port	VLAN ID	Mac Address
<input type="text"/>	<input type="text"/>	<input type="text"/>

Remove

Port Security Page	
Port Security State	Select <b>Enable</b> to change the state of the Port Security State for this port.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.
Add Port Security Entry	Select the port, and enter the VID and MAC address. The format of the MAC address is xxxx.xxxx.xxxx, for example: 00c0.4e2C.0101. The maximum volume of one port is 10. The system can accept a total of 100 Port Security MAC addresses.
Add	Adds a port security entry.
Show Port Security List	This table shows you enabled port security entries.
Remove	Removes the selected port security entry.

IP Security

Use the *Security IP* page to set up specific IP addresses to grant authorization for management access to this ES8510 through a web browser or Telnet.

IP Security Page	
IP Security	Select <b>Enable</b> and <b>Apply</b> to enable the IP security function.
Add Security IP	You can assign specific IP addresses and then click <b>Add</b> . Only these IP addresses can access and manage ES8510 through a web browser or Telnet. The maximum security IP is 10.
Security IP List	This table shows you added the security IP addresses.
Remove	Click <b>Remove</b> to delete a highlighted entry.
Reload	To reload the table.

IP Security Help

IP Security Disable ▾

Apply

Add Secure IP

Security IP

Add

IP Security List

Index	Security IP

Remove

## 802.1X Configuration

IEEE 802.1X is the protocol that performs authentication to obtain access to IEEE 802 LANs. It is port-based network access control. With the function, the ES8510 could control which connection is available or not.

### 802.1X Configuration

[Help](#)

**System Auth Control** Disable ▾

**Authentication Method** RADIUS ▾

#### 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"/>

#### Local RADIUS User

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

#### Local RADIUS User List

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

### 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.
<b>RADIUS Server</b>	
RADIUS Server IP	The IP address of the RADIUS server.
Shared Key	The password used to communicate between the ES8510 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 ES8510 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 ▾

[Apply Selected](#)

[Initialize Selected](#)

[Reauthenticate Selected](#)

[Default Selected](#)

#### 802.1X Timeout Configuration

Port	Re-Auth Period(s)	Quiet Period(s)	Tx period(s)	Supplicant Timeout	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

[Apply](#)

802.1x Port Configuration Page	
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 ES8510 requests the client to re-authenticate. The default time interval is 3600 seconds.
Max Request	This is the maximum times that the ES8510 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.
802.1x Timeout Configuration	
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 ES8510 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 124</a> ), if you want to maintain these settings if the ES8510 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

[Reload](#)



## Warning

The ES8510 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 113
- [SysLog Configuration](#) on Page 114
- [SMTP Configuration](#) on Page 115

Optionally, you can use the CLI for configuration, see [Warnings \(CLI\)](#) on Page 172.

## Fault Relay

The ES8510 provides two digital outputs (also called relay outputs). The relay contacts are energized (open) for normal operation and closes under fault conditions. Fault conditions include **Digital Input (DI) State**, **Dry Output**, **Power Failure**, **Link Failure**, **Ping Failure**, and **Super Ring Failure**. You can configure these settings in this Fault Relay Setting. Each Relay can be assigned one fault condition.

**Fault Relay Setting**
Help

---

<b>Relay 1</b>	
<input type="radio"/> None	Disable
<input type="radio"/> Power	Power ID <span>Any</span> ▼
<input type="radio"/> Port Link	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 checked="" type="checkbox"/> 9 <input type="checkbox"/> 10
<input type="radio"/> Ring	Ring Failure
<input type="radio"/> Ping	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"/>
<input checked="" type="radio"/> DI	DI ID <span>1</span> ▼ DI State <span>Low</span> ▼
<b>Relay 2</b>	
<input checked="" type="radio"/> None	Disable
<input type="radio"/> Power	Power ID <span>1</span> ▼
<input type="radio"/> Port Link	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="radio"/> Ring	Ring Failure
<input type="radio"/> Ping	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"/>
<input type="radio"/> DI	DI ID <span>1</span> ▼ DI State <span>Low</span> ▼

Apply
Cancel
Reload

Once you finish configuring the settings click the **Apply** button to apply your configuration.

## 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  
☐ Power 1 Failure  
☐ Fault Relay  
☐ DI 1 Change  
☐ Ring Event  
☐ SFP Event

☐ Device Warm Start  
☐ Time Synchronization Failure  
☐ Power 2 Failure  
  
☐ DI 2 Change  
☐ Loop Protection

**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 ▼

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.
Power 1 Failure	Select this if you want the ES8510 to send notification of a PW1 failure.
Power 2 Failure	Select this if you want the ES8510 to send notification of a PW2 failure.
Authentication failure	An incorrect password or SNMP Community String is entered.
Time Synchronize Failure	Accessing the NTP Server is failing.
Fault Relay	Fault Relay has occurred.
DI1 Change	The Digital Input#1 status has changed.
DI2 Change	The Digital Input#2 status has changed.
Ring Event	A ring event has occurred.
Loop Protection	A loop protection event has occurred.
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.
Apply	Click <b>Apply</b> to apply the settings. <b>Note:</b> You must <b>Save</b> the settings ( <a href="#">Page 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## SysLog Configuration

The *System Log* page provides the system administrator ES8510 events history. There are two System Log modes provided by the ES8510, **Local** mode and **Remote** mode.

**Syslog Configuration**

---

Syslog Mode

Disable ▾

Remote IP Address

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	<p>There are two system logs available:</p> <ul style="list-style-type: none"> <li><b>Local Mode:</b> The ES8510 prints the events that have been selected in the Event Selection page to the System Log table of the ES8510. 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 ES8510 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	<p>Click <b>Apply</b> to apply the settings.</p> <p><b>Note:</b> You must <b>Save</b> the settings (<a href="#">Page 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

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

## SMTP Configuration

The ES8510 supports an email alert feature. The ES8510 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.

[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

---

SMTP Configuration Page	
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 ES8510.</i>	
Rcpt E-mail Address 1	The first email address to receive an email alert from the ES8510 (maximum 40 characters).
Rcpt E-mail Address 2	The second email address to receive an email alert from the ES8510 (maximum 40 characters).
Rcpt E-mail Address 3	The third email address to receive an email alert from the ES8510 (maximum 40 characters).
Rcpt E-mail Address 4	The fourth email address to receive an email alert from the ES8510 (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 124</a> ), if you want to maintain these settings if the ES8510 is powered off.

## Monitor and Diag

The ES8510 provides several web user interface pages for you to monitor the status of the switch or diagnostics when encountering problems related to the ES8510. 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 116
- [MAC Address Table](#)
- [Port Statistics](#) on Page 120
- [Port Mirroring](#) on Page 121
- [Event Logs](#) on Page 122
- [Ping Utility](#) on Page 122

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

### LLDP Configuration

The ES8510 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

LLDP Configuration Page	
LLDP	Select <b>Enable/Disable</b> to enable/disable LLDP function.
LLDP Configuration	
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.

LLDP Configuration Page (Continued)	
LLDP Port State	
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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</i>

MAC Address Table

The ES8510 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 Help

Aging Time(secs)

300

Apply

Static Unicast MAC Address

MAC Address	VID	Port
		Port 1 ▾

Add

MAC Address Table 

All ▾

MAC Address	Address Type	VID	1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/> 00c0.4e5b.0001	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e54.0079	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e38.0002	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e2c.008c	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e5f.0068	Dynamic Unicast	1	V									
<input type="checkbox"/> 0030.18a7.85c2	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e5b.0000	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e2d.0008	Dynamic Unicast	1	V									
<input type="checkbox"/> 0030.18af.dde3	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e39.010c	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e36.0002	Dynamic Unicast	1	V									
<input type="checkbox"/> 0002.0180.2705	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e38.0067	Dynamic Unicast	1	V									
<input type="checkbox"/> 0040.f4a8.c3e7	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e07.ffff	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e17.ffff	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e35.0009	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e60.0000	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e32.0000	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e1c.ffff	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e2f.031d	Dynamic Unicast	1	V									
<input type="checkbox"/> 0015.7b84.07f2	Dynamic Unicast	1	V									
<input type="checkbox"/> 00c0.4e42.ffff	Dynamic Unicast	1	V									

Remove

Reload

MAC Address Table Page

Aging Time (Sec)

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.

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.

The minimum age time is 15 seconds. The maximum age time is 3825 seconds or almost 64 minutes. The default **Aging Time** is 300 seconds.

If the value is set to 0, the aging function is disabled and all learned addresses remain in the database forever.

MAC Address Table Page (Continued)	
Static Unicast MAC Address	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.
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	Click to remove the static Unicast/Multicast MAC address.
Reload	Click to reload to refresh the table. The new learnt Unicast/Multicast MAC address are updated in the <i>MAC Address Table</i> .
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 124</a>), if you want to maintain these settings if the ES8510 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

[Help](#)

Port	Type	Link	State	Rx Good	Rx Bad	Rx Abort	Tx Good	Tx Bad	Collision
<input type="checkbox"/> 1	100	Connected	Enable	74688819	0	83	24206207	0	0
<input type="checkbox"/> 2	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 3	100	Connected	Enable	8762517	0	70	95746379	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	100	Connected	Enable	3958039	0	1	43485997	0	0
<input type="checkbox"/> 7	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 8	100	Connected	Enable	8116988	0	3	39597410	0	0
<input type="checkbox"/> 9	0	Disconnected	Enable	0	0	0	0	0	0
<input type="checkbox"/> 10	100	Connected	Enable	3868622	0	1	43576618	0	0

[Clear Selected](#)
[Clear All](#)
[Reload](#)

### 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.
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	Rx	Tx
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<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>
Destination Port	<p>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.</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 124</a>), if you want to maintain these settings if the ES8510 is powered off.</p>

### Event Logs

---

The System Log feature was introduced in [SysLog Configuration](#) on Page 114. When **System Log Local** mode is selected, the ES8510 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

Help

Index	Date	Time	Event Log

Clear

Reload

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

Help

Destination

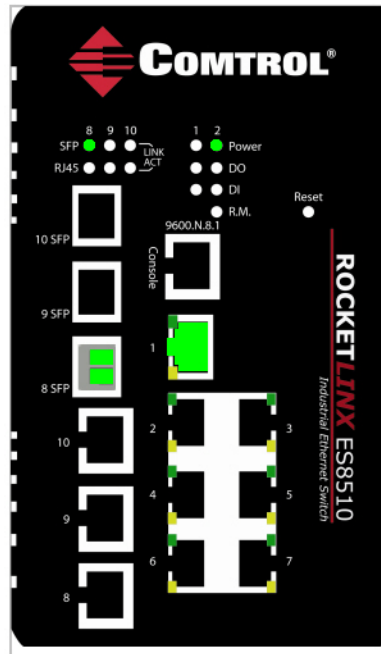
Ping


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 ES8510.

Device Front Panel



LED Name	LED On/Link Up	LED Off/Link Down
Power 1 Power 2	Green	Black: No power
DO1 (Digital Output) DO2 (Digital Output)	Green: DO activated	Black: DO not activated
DI1 (Digital Input) DI2 (Digital Input)	Green: DI activated	Black: DI not activated
R.M. (ring master)	Green: Ring Master	Black: Ring function disabled
1 - 7 	Green: Linked to another device	Black: Not connected
8 - 10 SFP RJ45	Green: Connected 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 13, which provide detailed LED information. If you need to locate your ES8510 in a rack, you can use the LED Tracker feature in PortVision DX.

## Save to Flash

---

---

The **Save Configuration** 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 178.

## 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 ES8510 provides in-band and out-band configuration methods:

- Out-band management means that you configure the ES8510 using the RS-232 console cable and the Command Line Interface (CLI) to access the ES8510 without attaching an admin PC to the network. You can use out-band management if you lose the network connection to the ES8510.
- In-band management means that you connect remotely using the ES8510 IP address through the network. You can remotely connect with the ES8510 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 ES8510 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 18.

If you want to use the web user interface for configuration, see [Configuration Using the Web User Interface](#) on Page 31.

Use the following procedures to access the ES8510 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 139
- [Port Configuration \(CLI\)](#) on Page 145
- [Network Redundancy \(CLI\)](#) on Page 148
- [VLAN \(CLI\)](#) on Page 156 and [Private VLAN \(CLI\)](#) on Page 159
- [Traffic Prioritization \(CLI\)](#) on Page 163
- [Multicast Filtering \(CLI\)](#) on Page 166
- [SNMP \(CLI\)](#) on Page 169
- [Security \(CLI\)](#) on Page 170
- [Warnings \(CLI\)](#) on Page 172
- [Monitor and Diag \(CLI\)](#) on Page 175
- [Saving to Flash \(CLI\)](#) on Page 178
- [Logging Out \(CLI\)](#) on Page 178
- [Service \(CLI\)](#) on Page 178

## Using the Serial Console

Control provides one RS-232 RJ45 console cable with the ES8510.

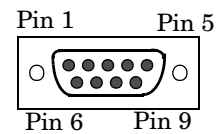
**Note:** A system COM port is required to use a serial console connection. If you do not have an available COM port, use the [Using a Telnet/SSH Console](#) procedure on [Page 130](#).

1. Attach the RS-232 connector (DB9 female) to your PC COM port and connect the other end to the **Console** port of the ES8510. 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.

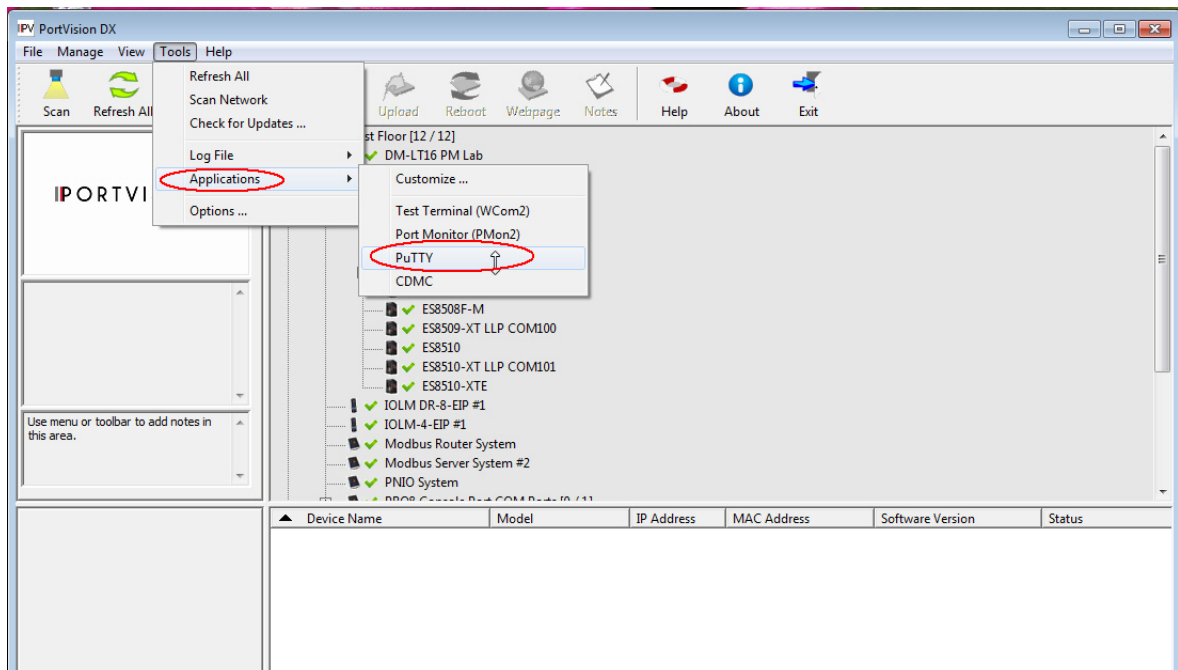
RJ45 Pin	RJ45 Signal
5	DTR
7	Tx
6	Rx
3	DSR
4	Gnd
1	CTS
8	RTS
2	CD

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



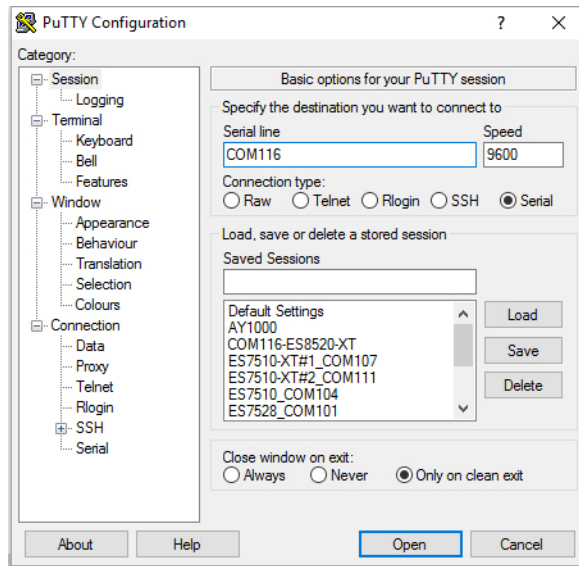
2. Start a terminal program such as HyperTerminal or use PuTTY, which is included with PortVision DX. The following example illustrates using PuTTY.
3. Open PortVision DX, click **Tools | Applications | PuTTY**.



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



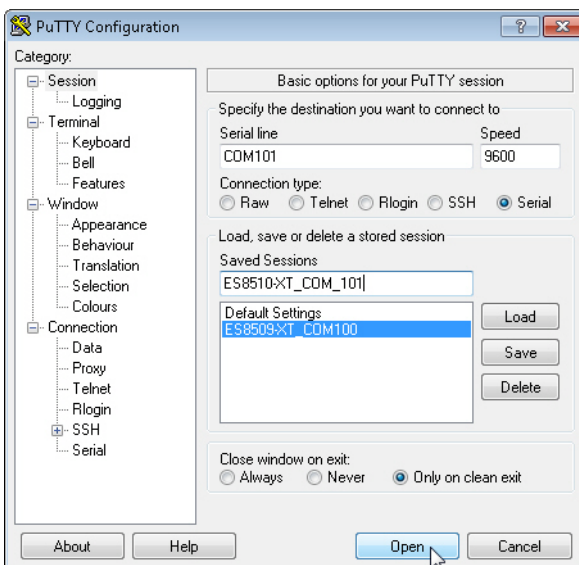
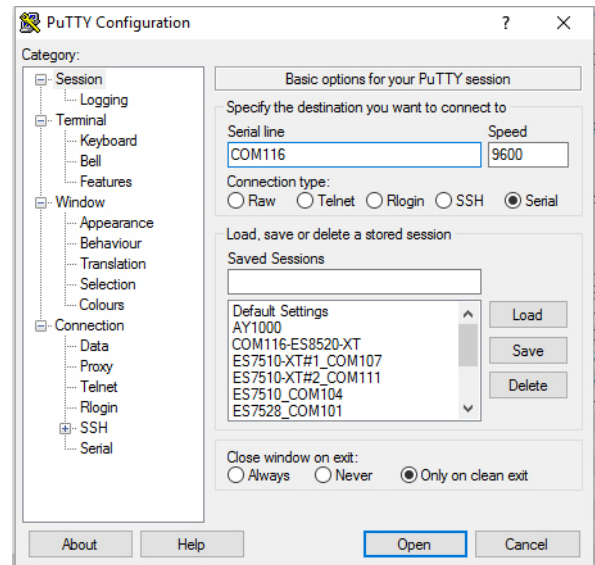
5. Type a **Host Name** to represent the COM port.



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:

Switch (version 2.7c-20140731-09:29:37).

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 131.

## Using a Telnet/SSH Console

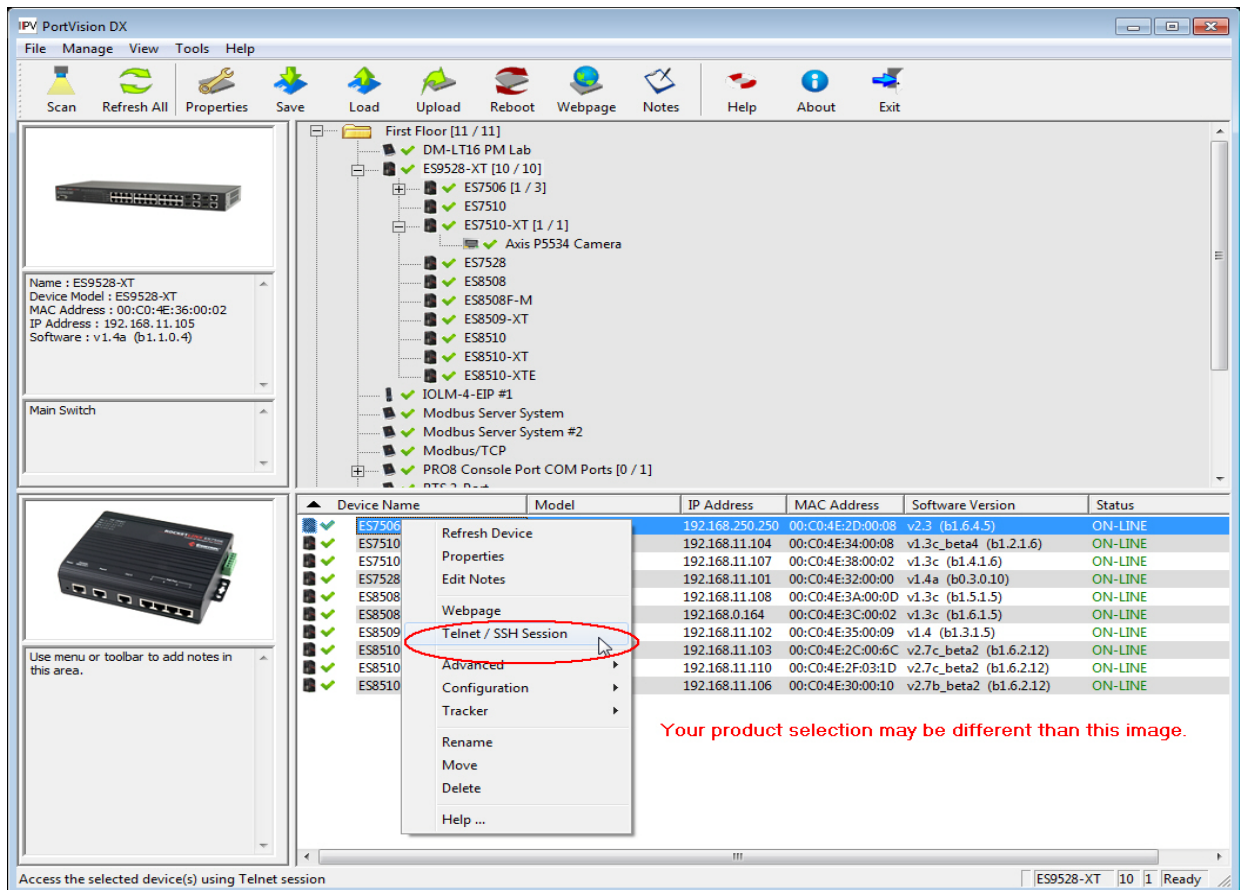
The ES8510 supports a Telnet console or SSH console with the Command Line Interface (CLI), which is the same as what you see using the RS-232 console port. The SSH connection can secure all the configuration commands you send to the ES8510.

SSH is a client/server architecture while the ES8510 is the SSH server. When you want to make SSH connection with the ES8510, you can use PortVision DX or download an SSH client tool.

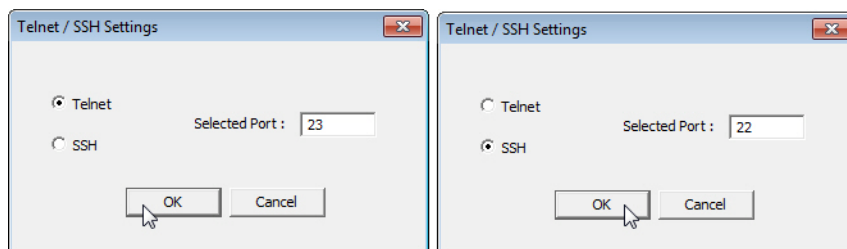
The next discussion provides procedures to use PortVision DX with a Telnet or SSH connection.

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

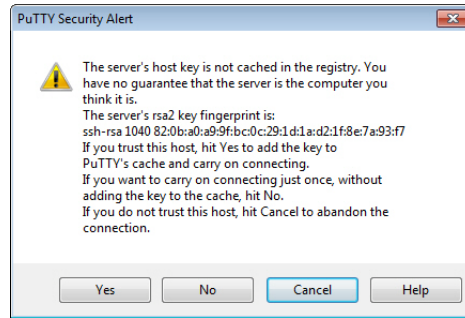
1. If you have not done so, install PortVision DX ([Installing PortVision DX](#) on Page 16).
2. Start PortVision DX.
3. Right-click the ES8510 in the *Device List* pane (lower) and click **Telnet/SSH**.



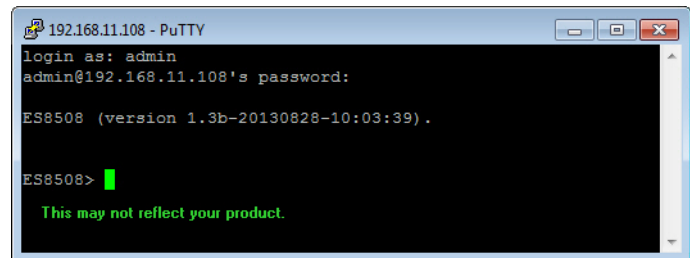
4. Select either Telnet or SSH and leave the default port number.



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

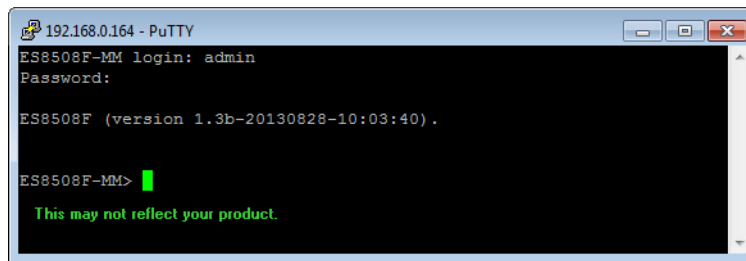


- Enter the user name (default = **admin**).
- Enter the password (default = **admin**).



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 131.

## Command Line Interface Introduction

The Command Line Interface (CLI) is the user interface to the ES8510 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 132, 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 134, 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 135, which you can use configure all ES8510 features and access to one of the *Interface Configuration* modes
- [\(Port\) Interface Configuration](#) on Page 136, which can be used to configure port settings
- [\(VLAN\) Interface Configuration](#) on Page 137, which can be used to configure the settings for a specific VLAN

Refer to [Configuration Using the Command Line Interface \(CLI\)](#) on Page 126 to access the CLI.

## User EXEC Mode

---

When you login to the ES8510 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 134).
- **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 179.

## 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 ES8510 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 *RocketLinux*.

2. If you type **show ?** (with a space between **show** and the **?**; do not press the **Enter** key) the ES8510 provides information about the options for that command.

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

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 ES8510.

```
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 ES8510 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.

```
ES8510> list
enable
exit
list
ping A.B.C.D
ping X:X::X:X
quit
show arp
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 12_interface [IFNAME]
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 ES8510 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 135).
- **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 180.

```
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
  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
  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
  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 ES8510 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 185..

Switch# configure terminal	Optionally, type config term
Switch(config)#	
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
ethertype	Ethertype
exit	Exit current mode and down to previous mode
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
loop-protect	Ethernet loop protection
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
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 fa7. The port interface names for Gigabit Ethernet port are gi8 through gi10.

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 190.

```
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
  exit            Exit current mode and down to previous mode
  flowcontrol      Set flow-control value for an interface
  garp            General Attribute Registration Protocol
  ingress         IEEE 802.1Q ingress filtering features
  lacp            Link Aggregation Control Protocol
  list            Print command list
  loopback        Specify loopback mode of operation for a port
  mdix            Enable mdix state of a given port
  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
  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 192.

```
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 ES8510 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
<b>VLAN Interface Configuration:</b> 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?
arp          Set a static ARP entry
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 44.

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

Switch Setting	
System Name	<pre>Switch(config)# hostname     DWORD   Network name of this system Switch(config)# hostname ES8510 Switch(config)#</pre>
System Location	<pre>Switch(config)# snmp-server location Minnesota</pre>
System Contact	<pre>Switch(config)# snmp-server contact support@comtrol.com</pre>
Display	<pre>Switch# show snmp-server name ES8510 Switch# show snmp-server location Minnesota Switch# show snmp-server contact support@comtrol.com Switch&gt; show version Hardware Information : ES8510 Loader Version : 1.6.2.12 Firmware Version : 3.0_b3-20160930-17:25:48 Hardware Version : 1.0 CPLD Version : 1.0 Switch# show hardware mac MAC Address: 00C04E2C0002</pre>
Admin Password	
User Name and Password	<pre>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.</pre>
Display	<pre>Switch# show administrator Administrator account information name: admin password: admin</pre>

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 clock timezone?, you can see the timezone list. Then choose the number of the timezone you want to select.</p>

Time Setting (Continued)	
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</pre>
DHCP Server	
DHCP Server configuration	<pre>Enable DHCP Server on ES8510 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>

DHCP Server (continued)	
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     lease time: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>
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 – Excluded Address	<pre> Switch(config-dhcp)# ip dhcp excluded-address     A.B.C.D IP address Switch(config-dhcp)# ip dhcp excluded-address 192.168.10.123 &lt;cr&gt; </pre>

DHCP Server (continued)	
DHCP Server – Static IP and MAC binding	<pre>Switch(config-dhcp)# ip dhcp static MACADDR MAC address Switch(config-dhcp)# ip dhcp static 00C0.4E2C.0001 A.B.C.D leased IP address Switch(config-dhcp)# ip dhcp static 00C0.4E2C.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 124 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	<pre>Switch# copy tftp: 192.168.250.33/default.conf startup-config</pre>
Show Startup Config	<pre>Switch# show startup-config</pre>
Show Running Config	<pre>Switch# show running-config</pre>



Firmware Upgrade	
Firmware Upgrade	Switch# archive download-sw /overwrite tftp 192.168.11.33 ES8510.bin Firmware upgrading, don't turn off the switch! Tftping file ES8510.bin Firmware upgrading ..... ..... ..... ..... ..... Firmware upgrade success!! Rebooting.....
Load Default	
Load Default	Switch# reload default-config file Reload OK! Switch# reboot
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.

Optionally, you can use the web user interface for configuration, see [Port Configuration](#) on Page 64.

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 Port1 Link Change to DOWN interface fastethernet1 is shutdown now.  Switch(config-if)# no shutdown       -&gt; Enable port state Port1 Link Change to DOWN Port1 Link Change to UP interface fastethernet1 is up now. Switch(config-if)# Port1 Link Change to UP  Switch(config)# sfp     ddm  Digital diagnostic and monitoring Switch(config)# sfp ddm     Eject  Reject DDM SFP Switch(config)# sfp ddm eject  → eject SFP DDM transceiver all      All DDM interface Example: Switch(config)# sfp ddm eject all         DDM SFP on Port 9 normally ejected.         DDM SFP on Port 9 normally ejected.         All DDM SFP normally ejected.  Switch(config)# interface gi9 → eject port 9 SFP DDM transceiver. Switch(config-if)# sfp ddm eject DDM SFP on Port 9 normally ejected.</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 Port1 Link Change to DOWN set the speed mode ok! Switch(config-if)# Port1 Link Change to UP  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   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> <pre> Switch# show sfp ddm →show SFP DDM information Port 8   Temperature:N/A   Tx power:N/A   Rx power:N/A Port 9   Temperature:64.00 C &lt;range :0.0-80.00&gt;   Tx power:-6.0 dBm &lt;range : -9.0 - -4.0&gt;   Rx power:-30.0 dBm &lt;range: -30.0 - -4.0&gt; Port 10   Temperature:67.00 C &lt;range :0.0-80.00&gt;   Tx power:-6.0 dBm &lt;range : -9.0 - -4.0&gt;   Rx power:-2.0 dBm &lt;range: -30.0 - -4.0&gt; </pre> <p><b>Note:</b> <i>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.</i></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 – Filter Packet Type	<pre>Switch(config-if)# rate-limit ingress mode     all                Limit all frames     broadcast          Limit Broadcast frames     flooded-unicast    Limit Broadcast, Multicast and flooded unicast frames     multicast          Limit Broadcast and Multicast frames</pre> <pre>Switch(config-if)# rate-limit ingress mode broadcast Set the ingress limit mode broadcast ok.</pre>
Rate Control – Bandwidth	<pre>Switch(config-if)# rate-limit ingress bandwidth     &lt;0-100&gt; Limit in megabits per second (0 is no limit)</pre> <pre>Switch(config-if)# rate-limit ingress bandwidth 8 Set the ingress rate limit 8Mbps for Port 1.</pre>
Port Trunking	
LACP	<pre>Switch(config)# lacp group 1 gi</pre> <p>Group 1 based on LACP(IEEE 802.3ad) is enabled!</p> <p><b>Note:</b> The interface list is gi8. Ports with a different speeds cannot be aggregated together.</p>
Static Trunk	<pre>Switch(config)# trunk group 2 fa6-7 Trunk group 2 enable ok!</pre>
Display – LACP	<pre>Switch# show lacp internal LACP group 1 is inactive LACP group 2 is inactive LACP group 3 is inactive LACP group 4 is inactive LACP group 5 is inactive</pre>
Display – Trunk	<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 ES8510 supports:

- **Standard Rapid Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP)**  
The ES8510 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 5 ms for fail over for copper.
- **Rapid Dual Homing (RDH)**  
Advanced RDH technology allows the ES8510 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 71.

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 (cont.)	
Display Current MST Configuration	<pre>Switch(config-mst)# show current Current MST configuration Name      [comtrol] 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	Switch# show spanning-tree active Spanning-Tree : Enabled Protocol : MSTP Root Address : 00C0.4E2C.0001 Priority : 32768 Root Path Cost : 0 Root Port : N/A Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address : 00C0.4E2C.0001 Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15 BPDU transmission-limit : 3																																		
	<table><tr><td>Port</td><td>Role</td><td>State</td><td>Cost</td><td>Prio.Nbr</td><td>Type</td><td>Aggregated</td></tr><tr><td colspan="7">-----</td></tr><tr><td>fa1</td><td>Designated</td><td>Forwarding</td><td>200000</td><td>128.1</td><td>P2P(RSTP)</td><td>N/A</td></tr><tr><td>fa2</td><td>Designated</td><td>Forwarding</td><td>200000</td><td>128.2</td><td>P2P(RSTP)</td><td>N/A</td></tr></table>							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
	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																													
RSTP Summary	Switch# show spanning-tree summary Spanning-Tree : Enabled Protocol : MSTP Root Address : 00c0.4e2C.004f Priority : 32768 Root Path Cost : 400000 Root Port : 10 Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address 00c0.4e2C.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																																		
	<table><tr><td>Blocking</td><td>Listening</td><td>Learning</td><td>Forwarding</td><td>Disabled</td></tr><tr><td colspan="5">-----</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>8</td></tr></table>							Blocking	Listening	Learning	Forwarding	Disabled	-----					1	0	0	1	8													
Blocking	Listening	Learning	Forwarding	Disabled																															
-----																																			
1	0	0	1	8																															
Port Link-Type Summary																																			
<table><tr><td>AutoDetected</td><td>PointToPoint</td><td>SharedLink</td><td>EdgePort</td></tr><tr><td colspan="4">-----</td></tr><tr><td>10</td><td>0</td><td>0</td><td>8</td></tr></table>							AutoDetected	PointToPoint	SharedLink	EdgePort	-----				10	0	0	8																	
AutoDetected	PointToPoint	SharedLink	EdgePort																																
-----																																			
10	0	0	8																																

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 00c0.4e2c.004f  priority 32768  cost 200000 Designated bridge   address 00c0.4e2c.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 00C0.4E2C.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 00C0.4E2C.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	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)
MSTP Root Information	Switch# show spanning-tree mst root					
	MST Instance	Root Address	Root Priority	Root Cost	Root Port	Max Hello age Fwd dly
	-----					
	MST00	00C0.4E2C.0001	32768	0	N/A	20 2 15
	MST01	00C0.4E2C.0001	32768	0	N/A	20 2 15
	MST02	00C0.4E2C.0001	32768	0	N/A	20 2 15
MSTP Instance Information	Switch# show spanning-tree mst 1					
	##### MST01 vlans mapped: 2					
	Bridge address 00C0.4E2C.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)
MSTP Port Information	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

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  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 Switch(config-redundant-ring)# super-ring priority 100</pre>
Ring Port	<pre>Switch(config-redundant-ring)# port     IFLIST  Interface list, ex: fa1,fa3-5,gi8-10     cost    path cost 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</pre> <p>Ring ID is optional. If the ring ID is typed, this command only displays the information of the target Ring.</p>

## 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 ES8510 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 85.

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> 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.</p>
Remove VLAN	<pre>Switch(config)# no vlan 2 no vlan success</pre> <p><b>Note:</b> You can only remove the VLAN when the VLAN is in unused mode.</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> Use no name to change the name to default name, VLAN VID.</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,gi82    VLAN2    Unused - 3    test     Static    fa4-7,gi8        fa1-3,fa7,gi8</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	<i>Go to the VLAN you want configure first.</i>
Choose the Types	<pre>Switch(config)# vlan (VID)  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	<pre>Switch(config)# interface fa1</pre>
PVLAN Port Type	<pre>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 fastethernet8   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.

ES8510 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 95. 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       wr    Weighted Round Robin (Use an 8,4,2,1 weight) Switch(config)# qos queue-sched sp &lt;cr&gt;</pre>
Queue Scheduling - WRR	<pre>Switch(config)# qos queue-sched wr</pre>
Port Setting – CoS (Default Port Priority)	<pre>Switch(config)# interface fa1 Switch(config-if)# qos cos       DEFAULT-COS  Assign an priority (7 highest) Switch(config-if)# qos cos 7 The default port CoS value is set 7 ok.</pre> <p><b>Note:</b> When change the port setting, you should select the specific port first. <i>fa1</i> means Fast Ethernet port 1.</p>
Port Setting – Trust Mode- CoS Only	<pre>Switch(config)# interface fa1 Switch(config-if)# qos trust cos The port trust is set CoS only ok.</pre>
Port Setting – Trust Mode- CoS First	<pre>Switch(config)# interface fa1 Switch(config-if)# qos trust cos-first The port trust is set CoS first ok.</pre>
Port Setting – Trust Mode- DSCP Only	<pre>Switch(config)# interface fa1 Switch(config-if)# qos trust dscp The port trust is set DSCP only ok.</pre>
Port Setting – Trust Mode- DSCP First	<pre>Switch(config)# interface fa1 Switch(config-if)# qos trust dscp-first The port trust is set DSCP first ok.</pre>
Display – Queue Scheduling	<pre>Switch# show qos queue-sched QoS queue scheduling scheme : Weighted Round Robin (Use an 8,4,2,1 weight)</pre>

QoS Setting (cont.)	
Display – Port Setting - Trust Mode	<pre>Switch# show qos trust QoS Port Trust Mode : Port  Trust Mode -----+-----  1    DSCP first  2      COS only  3      COS only  4      COS only  5      COS only  6      COS only  7      COS only  8      COS only  9      COS only 10     COS only</pre>
Display – Port Setting – CoS (Port Default Priority)	<pre>Switch# show qos port-cos Port Default Cos : Port  CoS -----+-----  1      7  2      0  3      0  4      0  5      0  6      0  7      0  8      0  9      0 10     0</pre>
CoS-Queue Mapping	
Format	<pre>Switch(config)# qos cos-map     PRIORITY  Assign an priority (7 highest) Switch(config)# qos cos-map 1     QUEUE    Assign an queue (0-3) <b>Format:</b> 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>
Map CoS 5 to Queue 2	<pre>Switch(config)# qos cos-map 5 2 The CoS to queue mapping is set ok.</pre>
Map CoS 6 to Queue 3	<pre>Switch(config)# qos cos-map 6 3 The CoS to queue mapping is set ok.</pre>
Map CoS 7 to Queue 3	<pre>Switch(config)# qos cos-map 7 3 The CoS to queue mapping is set ok.</pre>

CoS-Queue Mapping (cont.)	
Display – CoS-Queue mapping	<pre>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</pre>
DSCP-Queue Mapping	
Format	<pre>Switch(config)# qos dscp-map         PRIORITY Assign an priority (63 highest) Switch(config)# qos dscp-map 0         QUEUE Assign an queue (0-3) <b>Format:</b> qos dscp-map priority_value queue_value.</pre>
Map DSCP 0 to Queue 1	<pre>Switch(config)# qos dscp-map 0 1 The TOS/DSCP to queue mapping is set ok.</pre>
Display – DSCO-Queue mapping	<pre>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</pre>

## Multicast Filtering (CLI)

For multicast filtering, the ES8510 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 99.

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.

IGMP Snooping (Continued)	
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>
IGMP Query	
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>



IGMP Query (Continued)	
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>
Unknown Multicast	
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>
Force Filtering	
Enable	<pre>Switch(config)# mac-address-table force filtering Filtering unknown multicast addresses ok!</pre>
Disable	<pre>Switch(config)# no mac-address-table force filtering Flooding unknown multicast addresses ok!</pre>

## 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 ES8510 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 102.

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 ES8510 provides several security features for you to secure your connection.

Optionally, you can use the web user interface for configuration, see [Security](#) on Page 105.

This table provides information about the command lines for security configuration.

Port Security																
Add MAC	Switch(config)# mac-address-table static 00c0.4e2C.0101 vlan 1 interface fa1 mac-address-table unicast static set ok!															
Port Security	Switch(config)# interface fa1 Switch(config-if)# switchport port-security Disables new MAC addresses learning and aging activities! <b>Rule:</b> <i>Add the static MAC, VLAN and Port binding first, then enable the port security to stop new MAC learning.</i>															
Disable Port Security	Switch(config-if)# no switchport port-security Enable new MAC addresses learning and aging activities!															
Display	Switch# show mac-address-table static <table><thead><tr><th>Destination Address</th><th>Address Type</th><th>Vlan</th><th>Destination Port</th></tr><tr><th>-----</th><th>-----</th><th>-----</th><th>-----</th></tr></thead><tbody><tr><td>00c0.4e2C.0101</td><td>Static</td><td>1</td><td>fa1</td></tr></tbody></table>				Destination Address	Address Type	Vlan	Destination Port	-----	-----	-----	-----	00c0.4e2C.0101	Static	1	fa1
Destination Address	Address Type	Vlan	Destination Port													
-----	-----	-----	-----													
00c0.4e2C.0101	Static	1	fa1													
IP Security																
IP Security	Switch(config)# ip security Set ip security enable ok. Switch(config)# ip security host 192.168.250.33 Add ip security host 192.168.250.33 ok.															
Display	Switch# show ip security ip security is enabled ip security host: 192.168.250.33															
Securing Interfaces																
Display	Switch# show service Telnet : Disabled Http : Disabled NetVision : 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>															

802.1x	
enable	Switch(config)# dot1x system-auth-control Switch(config)#
disable	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 192.168.250.120 key 1234  RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP      : 192.168.250.120 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 192.168.250.250 key 5678  Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) Secondary RADIUS Server IP      : 192.168.250.250 Secondary RADIUS Server Key     : 5678 Secondary RADIUS Server Port    : 1812 Secondary RADIUS Accounting Port : 1813
User name/ password for authentication	Switch(config)# dot1x username chris passwd chris vlan 1

## Warnings (CLI)

The ES8510 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 112.

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

Fault Relay Output	
Relay Output	<pre>Switch(config)# relay 1 di      DI State dry     dry output ping    ping failure port    port link failure power   power failure ring    super ring failure  Select Relay 1 or 2 first and then the event types</pre>
DI State	<pre>Switch(config)# relay 1 di &lt;1-2&gt;  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;0-4294967295&gt; turn on period in second Switch(config)# relay 1 dry 5 &lt;0-4294967295&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;1-2&gt;  power id any     Anyone power failure asserts relay Switch(config)# relay 1 power 1 Switch(config)# relay 1 power 2</pre>
Super Ring Failure	<pre>Switch(config)# relay 1 ring</pre>

Fault Relay Output (cont.)	
Disable Relay	<pre>Switch(config)# no relay &lt;1-2&gt; relay id Switch(config)# no relay 1 (Relay_ID: 1 or 2) &lt;cr&gt;</pre>
Display	<pre>Switch# show relay 1 Relay Output Type : Port Link Port : 1, 2, 3, 4 Switch# show relay 2 Relay Output Type : Super Ring</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 di             Switch di event fault-relay     Switch fault relay event loop-protect   Switch loop protection event power          Switch power failure event sfp            Switch SFP event ring           Switch ring 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: fastethernet1 or gi8 Switch(config)# warning-event linkup fastethernet1 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: Ring: Disabled Fault Relay: Disabled Time synchronize Failure: Disabled SFP DDM: Enabled DI: 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 ES8510 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 116.

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

MAC Address Table	
Aging Time	Switch(config)# mac-address-table aging-time 350 mac-address-table aging-time set ok! <b>Note:</b> The default aging timeout value is 300.
Add Static Unicast MAC address	Switch(config)# mac-address-table static 00c0.4e2C.0101 vlan 1 interface fastethernet5 mac-address-table ucast static set ok! <b>Rule:</b> mac-address-table static MAC_address VLAN VID interface interface_name
Add Multicast MAC address	Switch(config)# mac-address-table multicast 00c0.4e2C.0101 vlan 1 interface fa3-4 Adds an entry in the multicast table ok! <b>Rule:</b> mac-address-table multicast MAC_address VLAN VID interface_list interface_name/range
Show MAC Address Table – All types	Switch# show mac-address-table  ***** UNICAST MAC ADDRESS ***** Destination Address    Address Type        Vlan        Destination Port ----- 00c0.4e2C.ca3b        Dynamic            1            fa1 00c0.4e2C.0386        Dynamic            1            fa2 00c0.4e2C.0101        Static             1            fa3 00c0.4e2C.0102        Static             1            fa3 00c0.4e2C.0100        Management        1 ***** MULTICAST MAC ADDRESS ***** Vlan    Mac Address        COS        Status    Ports ----- 1        00c0.4e2C.0800        0        fa6 1        00c0.4e2C.ffffa        0        fa4,fa6
Show MAC Address Table – Dynamic Learnt MAC addresses	Switch# show mac-address-table dynamic Destination Address    Address Type        Vlan        Destination Port ----- 00c0.4e2C.ca3b        Dynamic            1            fa4 00c0.4e2C.0386        Dynamic            1            fa6
Show MAC Address Table – Multicast MAC addresses	Switch# show mac-address-table multicast Vlan    Mac Address        COS        Status    Ports ----- 1        00c0.4e2C.0800        0        fa5-6 1        00c0.4e2C.ffffa        0        af3,fa5-6



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 ----- 00c0.4e2C.0101      Static            1          fa4 00c0.4e2C.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	SWITCH# write Building Configuration... [OK]  Switch# copy running-config startup-config Building Configuration... [OK]

## 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	SWITCH> exit  SWITCH# exit

## 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	Switch(config)# service http disable Switch(config)#
Enable HTTP	Switch(config)# service http enable Switch(config)#
Disable telnet	Switch(config)# service telnet disable Switch(config)#
Enable telnet	Switch(config)# service telnet enable Switch(config)#

# Complete CLI List

This section provides the complete listing of RocketLinux ES8510 commands with the supporting options:

- [User EXEC Mode](#)
- [Privileged EXEC Mode](#) on Page 180
- [Global Configuration Mode](#) on Page 185
- [Port Interface Configuration Mode](#) on Page 190
- [VLAN Interface Configuration Mode](#) on Page 192

## User EXEC Mode

---

For information about accessing *User EXEC* mode, see [User EXEC Mode](#) on Page 179.

```
Switch> list
enable
exit
list
ping A.B.C.D
ping X:X::X:X
quit
show arp
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 l2_interface [IFNAME]
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 180.

```
Switch# list
archive download-boot /overwrite tftp IPADDRESS IMAGE
archive download-sw /overwrite tftp IPADDRESS IMAGE
clear event-log
clear gvrp statistics [IFNAME]
clear lacp counters
clear mac-address-table address MACADDR
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 mac-address-table interface IFNAME
clear mac-address-table multicast MACADDR vlan VLANID
clear mac-address-table security interface IFNAME
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 tftp: URL (ssh-dss|ssh-rsa)
copy tftp: URL ssl-cert
copy tftp: URL startup-config
debug dot1x all
debug dot1x errors
debug dot1x events
debug dot1x packets
debug dot1x registry
debug dot1x state-machine
debug gvrp (all|rcv|tx|gvrp_event|vlan_event)
debug ip dhcp (all|event)
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 mirror
debug misc [type] [sub]
debug proto pdu
debug qos
debug rate-limit
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 trunk
debug vlan (all|trace|debug)
```

**Privileged EXEC Mode (continued)**

```
disable
dot1x initialize interface IFNAME
dot1x reauthenticate interface IFNAME
end
exit
list
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 gvrp (all|rcv|tx|gvrp_event|vlan_event)
no debug ip dhcp (all|event)
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 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 trunk
no debug vlan (all|trace|debug)
no pager
pager
ping A.B.C.D
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 arp
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 deny host mac-address
```

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

```
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 ethernet-ip
show ethertype
show event-log
show garp timer [IFNAME]
show gvrp configuration [IFNAME]
show gvrp portstate IFNAME VID
show gvrp status
show hardware led
show hardware mac
show ingress filtering [IFNAME]
show interface [IFNAME]
show interface vlan [VLANID]
show ip dhcp relay
show ip dhcp server statistics
show ip forwarding
show ip igmp
show ip igmp group
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 ip security
show ipv6 neighbour
show ipv6 route
show l2_interface [IFNAME]
show lacp counters [GROUPID]
show lacp group [GROUPID]
show lacp internal [GROUPID]
show lacp neighbor [GROUPID]
show lacp port-setting [IFNAME]
show lacp system-id
show lacp system-priority
show lldp
show lldp neighbors
```

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

```
show lldp statistics
show login-limit interface [IFNAME]
show loop-protect
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 security
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 port-security interface [IFNAME]
show qos cos-map
show qos dscp-map
show qos port-cos
show qos queue-sched
show qos trust
show rate-limit egress [IFNAME]
show rate-limit ingress [IFNAME]
show redundant-ring [0-31]
show relay <1-2>
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
```



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

```
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 trunk group [1-5]
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
terminal length <0-512>
terminal no length
traceroute WORD
write
write file
write memory
write terminal
```

## Global Configuration Mode

For information about accessing *Global Configuration mode*, see [Global Configuration Mode](#) on Page 185.

```
Switch(config)# list
administrator NAME PASSWORD
arp A.B.C.D H.H.H
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
ethernet-ip run
ethertype [0x0800-0xFFFF]
exit
gvrp mode (enable|disable)
gvrp mode (enable|disable) IFNAME
hostname .DWORD
interface IFNAME
interface vlan VLAN-ID
ip forwarding
ip igmp snooping
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
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 A.B.C.D (A.B.C.D|INTERFACE) <1-255>
ip route A.B.C.D/M (A.B.C.D|INTERFACE)
ip route A.B.C.D/M (A.B.C.D|INTERFACE) <1-255>
ip security
ip security host A.B.C.D
ipv6 route X:X::X:X/M (X:X::X:X|INTERFACE)
lacp group <1-5> IFLIST
lacp system-priority <1-65535>
list
lldp holdtime <10-255>
lldp run
lldp timer <5-254>
log file FILENAME
```

***Global Configuration Mode (continued)***

```
log stdout
log syslog local
log syslog remote A.B.C.D
loop-protect (enable|disable) IFLIST
loop-protect (enable|disable) all
loop-protect transmit-interval <1-10>
mac-address-table aging-time TIMEVALUE
mac-address-table multicast MACADDR vlan VLANID interface IFLIST
mac-address-table multicast filtering
mac-address-table multicast filtering (flood|discard)
mac-address-table security MACADDR vlan VLANID interface IFNAME
mac-address-table static MACADDR vlan VLANID interface IFNAME
mirror (enable|disable)
mirror destination IFNAME (rx|tx|both)
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 arp A.B.C.D
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 ethernet-ip run
no hostname [HOSTNAME]
no interface IFNAME
no interface vlan VLAN-ID
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
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 ip route A.B.C.D/M (A.B.C.D|INTERFACE) <1-255>
no ip security
no ip security host A.B.C.D
no ipv6 route X:X::X:X/M (X:X::X:X|INTERFACE)
no lacp group <1-5>
no lacp system-priority
```

**Global Configuration Mode (continued)**

```
no lldp run
no log file
no log stdout
no log syslog local
no log syslog remote
no loop-protect transmit-interval
no mac-address-table aging-time
no mac-address-table multicast MACADDR vlan VLANID interface IFLIST
no mac-address-table multicast filtering
no mac-address-table security MACADDR vlan VLANID interface IFNAME
no mac-address-table static MACADDR vlan VLANID interface IFNAME
no mirror destination (rx|tx|both)
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 <1-2>
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
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 trunk group <1-5>
no vlan [VLANID]
no warning-event (coldstart|warmstart)
no warning-event (linkdown|linkup) [IFLIST]
no warning-event authentication
no warning-event di <1-2>
no warning-event fault-relay
```

***Global Configuration Mode (continued)***

```
no warning-event loop-protect
no warning-event port-security [IFLIST]
no warning-event power <1-2>
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 PRIORITY QUEUE
qos queue-sched (wrr|sp)
redundant-ring <0-31>
relay <1-2> di <1-2> (high|low)
relay <1-2> dry <0-4294967295> <0-4294967295>
relay <1-2> ping WORD
relay <1-2> ping WORD reset <1-65535> <0-65535>
relay <1-2> port PORTLIST
relay <1-2> power <1-2>
relay <1-2> power any
relay <1-2> 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
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>
```

**Global Configuration Mode (continued)**

```
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>
trunk group <1-5> IFLIST
vlan <1-4094>
vlan learning (independent|shared)
warning-event (coldstart|warmstart)
warning-event (linkdown|linkup) [IFLIST]
warning-event authentication
warning-event di <1-2>
warning-event fault-relay
warning-event loop-protect
warning-event port-security [IFLIST]
warning-event power <1-2>
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 190.

```
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
    exit
    flowcontrol (off|on)
    garp timer <10-10000> <30-30000> <150-150000>
    ingress filtering (enable|disable)
    lacp port-priority <1-65535>
    lacp timeout (long|short)
    list
    loopback
    mdix
    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 timer
    no lacp port-priority
    no lacp timeout
    no loopback
    no mdix
    no qos cos
    no qos trust
    no rate-limit egress bandwidth
    no rate-limit ingress bandwidth
    no rate-limit ingress mode
    no shutdown
    no spanning-tree bpduguard
    no spanning-tree bpdufilter
    no spanning-tree cost
```

**Port Interface Configuration Mode (continued)**

```

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 switchport access vlan VLANID
no switchport block
no switchport dot1q-tunnel mode (access|uplink)
no switchport login-limit
no switchport mode private-vlan host
no switchport mode private-vlan promiscuous
no switchport port-security
no switchport port-security auto-learn
no switchport port-security shutdown-time
no switchport port-security sticky
no switchport private-vlan host-association
no switchport trunk native vlan
qos cos DEFAULT-COS
qos trust (cos|dscp|cos-first|dscp-first)
quit
rate-limit egress bandwidth <0-100>
rate-limit ingress bandwidth <0-100>
rate-limit ingress mode (all|flooded-unicast|multicast|broadcast)
sfp ddm (enable|disable)
sfp eject
sfp scan
shutdown
spanning-tree bpdufilter
spanning-tree bpduguard
spanning-tree cost <1-2000000000>
spanning-tree edge-port
spanning-tree link-type (auto|point-to-point|shared)
spanning-tree mst MSTMAP cost <1-2000000000>
spanning-tree mst MSTMAP port-priority <0-240>
spanning-tree port-priority <0-240>
spanning-tree stp-state (enable|disable)
speed (10|100|1000)
switchport access vlan VLANID
switchport access vlan add VLANLIST
switchport access vlan remove VLANLIST
switchport block (multicast|unicast|both)
switchport dot1q-tunnel mode (access|uplink)
switchport dot1q-tunnel mode uplink add-pvid
switchport login-limit
switchport login-limit max-times <1-10>
switchport login-limit shutdown-interval <1-65535>
switchport mode private-vlan host
switchport mode private-vlan promiscuous
switchport port-security
switchport port-security auto-learn <0-10>

```



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

```
switchport port-security shutdown-time <0-86400>
switchport port-security sticky
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
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 192.

```
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 v1
ip igmp version (1|2)
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 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 194
- [Error Checking](#) on Page 194
- [Exception Response](#) on Page 195
- [Modbus TCP Register Table](#) on Page 195
- [CLI Commands for Modbus TCP/IP](#) on Page 202

## Overview

---

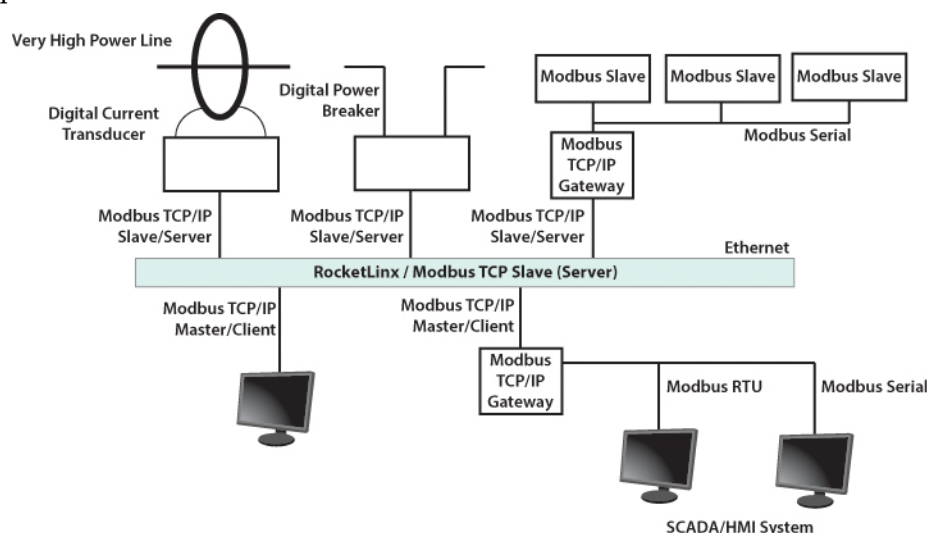
The ES8510 supports Modbus TCP/IP communications through the CLI, which does not support Modbus ASCII or Modbus RTU. This functionality is not available on a web user interface page.

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 ES8510 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 ES8510 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 ES8510 firmware provides Modbus TCP/IP registers that map to the ES8510 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

---

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.
<b>Note:</b> The ES8510 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 ES8510.		

## Error Checking

---

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 = "ES8510"  Word 0 Hi byte = 'E' Word 0 Lo byte = 'S' Word 1 Hi byte = '8' Word 1 Lo byte = '5' Word 2 Hi byte = '1' Word 2 Lo byte = '0' Word 3 Hi byte = '\0' (other words = 0)
0x0010	16 words	Product Name = "ES8510-XT"  Word 0 Hi byte = 'E' Word 0 Lo byte = 'S' Word 1 Hi byte = '8' Word 1 Lo byte = '5' Word 2 Hi byte = '1' Word 2 Lo byte = '0' 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

---

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

---

Control provides a variety of SFP transceivers. These certified SFP transceivers can be identified by the RocketLinx ES8510 and displayed in the web user interface. We recommend using [Control SFP transceivers](#) when configuring your RocketLinx ES8510 and RocketLinx ES8510-XT.

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

## Control Private MIB

---

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

---

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

Contact Method	Web Address or Phone Number
Downloads	<a href="http://downloads.control.com">http://downloads.control.com</a>
Support	<a href="http://www.control.com/support">http://www.control.com/support</a>
Downloads	<a href="ftp://ftp.control.com/html/ES8510_main.htm">ftp://ftp.control.com/html/ES8510_main.htm</a>
Downloads	<a href="ftp://ftp.control.com/html/ES8510-XT_main.htm">ftp://ftp.control.com/html/ES8510-XT_main.htm</a>
Web Site	<a href="http://www.control.com">http://www.control.com</a>
Phone	763.957.6000

