comnet
Communication Networks

INSTALLATION AND OPERATION MANUAL

CNGE2+2SMS[POE][HO]

10/100/1000 MBPS INTELLIGENT REDUNDANT RING GIGABIT SWITCH WITH OPTIONAL POE+

v1.4 August 17, 2015

The ComNet CNGE2+2SMS[POE][HO] is a four port intelligent switch with light management functionality. It provides two 10/100/1000Base-T(X) copper ports and two 100/1000Base-FX SFP ports. The CNGE2+2SMS[POE][HO] provides exclusive functionality for easy field deployment including DIP switch based operation of RSTP for creating redundant network topologies as well as preventing network video flooding of multicast traffic when used in a linear or star topology. Ports 1 and 2 can optionally supply up to thirty (30) watts of power per port based on the IEEE 802.3at standard. An optional High Output (HO) version is also available that can supply up to sixty (60) watts of PoE from ports 1 and 2. This product is fully compatible with the ComNet exclusive Copperline SFP modules for operation over extended distance UTP or Coax cable.

Contents

Regulatory Compliance Statement

Product(s) associated with this publication complies/comply with all applicable regulations. Please refer to the Technical Specifications section for more details.

Warranty

ComNet warrants that all ComNet products are free from defects in material and workmanship for a specified warranty period from the invoice date for the life of the installation. ComNet will repair or replace products found by ComNet to be defective within this warranty period, with shipment expenses apportioned by ComNet and the distributor. This warranty does not cover product modifications or repairs done by persons other than ComNet-approved personnel, and this warranty does not apply to ComNet products that are misused, abused, improperly installed, or damaged by accidents.

Please refer to the Technical Specifications section for the actual warranty period(s) of the product(s) associated with this publication.

Disclaimer

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Safety Indications

» The equipment can only be accessed by trained ComNet service personnel.

» This equipment should be installed in secured location.

Overview

Introduction

The CNGE2+2SMS is a light managed, hardened Ethernet switch that contains many features. The switch will work under a wide variety of temperature, dirty and humid conditions. It can be managed through WEB, USB Console or other third-party SNMP software. With the easy to use and intuitive web and CLI interfaces, the switch can be easily monitored by a utility called eVision, which is part of the ComNet eConsole software suite.

eConsole is network management software that is very effective. With easy to use and intuitive interface, you can easily monitor the status of the switches.

Software Features

» Supports SNMPv1/v2c
» Event notification by SNMP trap and Relay Output (Relay Output for PoE models only)
» Web-based USB Console CLI configuration
» Enable/disable ports
» LLDP (Link Layer Discovery Protocol) support (802.1AB)
» PoE status monitoring and health check
» RSTP (802.1w)

Hardware Features

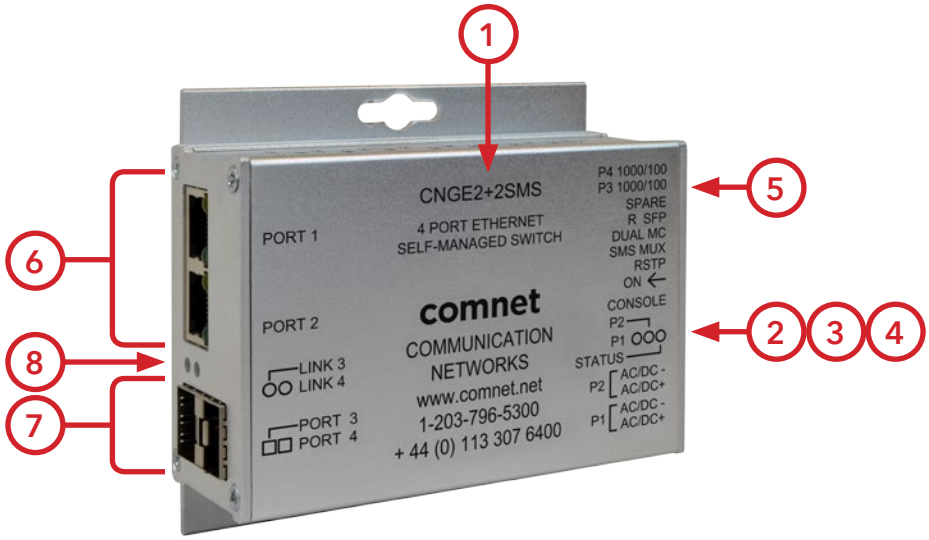
» 7 × DIP Switches for quick feature selection
» 2 × Redundant DC power inputs
» Operating Temperature: -40 – 75°C
» Storage Temperature: -40 – 85°C
» Operating Humidity: 5% – 95%, non-condensing
» 2 × 10/100/1000Base-T(X) Gigabit Ethernet port
» 2 × 100/1000Base-X SFP
» USB Console Port
» Dimensions: 4.1 × 3.7 × 1.46 in (10.4 × 9.4 × 3.7 cm)

Hardware Overview

Side Panels

The following table describes the ports that are on the sides of the CNGE2+2SMS.

Port	Description
10/100/1000Base-T(X) RJ-45 Ethernet ports	2 × 10/100/1000Base-T(X) RJ-45 fast Ethernet ports support auto-negotiation. Default Settings: Speed: auto Duplex: auto Flow control: disable
SFP Ports	2 × 100/1000Base-X SFP
USB Console	Use the included mini USB cable to manage the switch.



CNGE2+2SMS

1. Model name
2. LED for PWR1. When the PWR1 UP, the green LED will be light on
3. LED for PWR2. When the PWR2 UP, the green LED will be light on.
4. LED for STATUS, the green LED will be light on if initialization passed, red for fail.
5. Configuration switches (refer to the switch matrix configuration table on Page 11).
6. 10/100/1000 Base-T(X) Ethernet ports (RJ-45)
7. 100/1000Base-X SFP ports
8. SFP Port Link/Activity LEDs

Indicating LEDs

LED	Color	Status	Description
PWR1	Green	On	DC power module 1 activated
PWR2	Green	On	DC power module 2 activated
STATUS	Green	On	Initialization passed
	Red	On	Failed
10/100/1000Base-T(X) Ethernet ports			
LNK/ACT	Green	On	Port link up.
		Blinking	Data transmitted.
1000 Mbps indicator	Amber	On	Port speed is 1000 Mbps
SFP			
LNK/ACT	Green	On	Port link up.
		Blinking	Data transmitted.

Cables

Ethernet Cables

The CNGE2+2SMS switches have standard Ethernet ports. According to the link type, the switches use CAT 3, 4, 5, & 5e UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100Ω	UTP 100m (328ft)	RJ-45
100BASE-TX	Cat. 5 100Ω UTP	UTP 100m (328ft)	RJ-45
1000BASE-TX	Cat. 5/Cat. 5e 100Ω UTP	UTP 100m (328ft)	RJ-45

10/100/1000BASE-T(X) Pin Assignments

With 100BASE-T(X)/10BASE-T cable, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

10/100 Base-T RJ-45 Pin Assignments

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
4	Not used
5	Not used
6	RD-
7	Not used
8	Not used

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

1000 Base-T RJ-45 Pin Assignments

Pin Number	Assignment
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

The CNGE2+2SMS switches support auto MDI/MDI-X operation. You can use a straight-through cable to connect PC to switch. The following table below shows the 10/100BASE-T(X) MDI and MDI-X port pin-outs:

10/100 Base-T MDI/MDI-X pin assignments

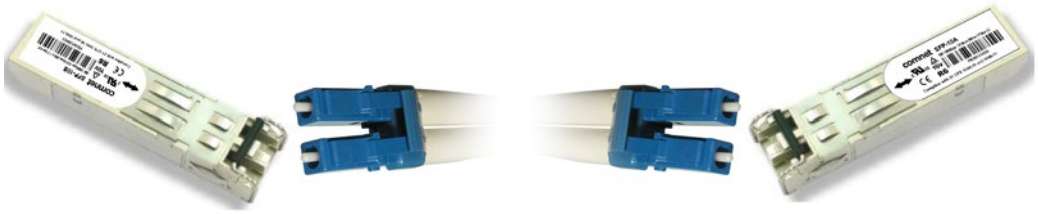
Pin Number	MDI port	MDI-X port
1	TD+ (transmit)	RD+ (receive)
2	TD- (transmit)	RD- (receive)
3	RD+ (receive)	TD+ (transmit)
4	Not used	Not used
5	Not used	Not used
6	RD- (receive)	TD- (transmit)
7	Not used	Not used
8	Not used	Not used

1000 Base-T MDI/MDI-X pin assignments

Pin Number	MDI port	MDI-X port
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

SFP

The Switch has fiber optic ports that utilize SFP connectors. ComNet offers a wide selection of SFP modules that offer different fiber type, connector type and distances. Please remember that the TX port of Switch A should be connected to the RX port of Switch B.



Switch A *Fiber Cord* *Switch B*

Console Cable

Each CNGE2+2SMS switch can have the initial network settings configured by the management console port. You can connect them to a PC with USB Ports using the supplied USB to USB Mini B male plug cable.

DIP Switches

The CNGE2+2SMS's dip switches configure switch features. The DIP Switches are numbered from left to right when viewing the side of the Switch with the backplate on the bottom and the power connections on the left. If "Web Management Enable" is selected in the management software under System Settings, the DIP switch settings will be overridden by any settings made in the browser interface.

DIP Switch Position	Description
1	RSTP enable (down = disabled, up enabled)
2	Port SMS Mux
3	Dual Media Converter
4	Redundant SFP mode
5	Reserved for Future Use
6	SFP Port 3 speed. Up: 1000M/Down: 100M
7	SFP Port 4 speed. Up: 1000M/Down: 100M

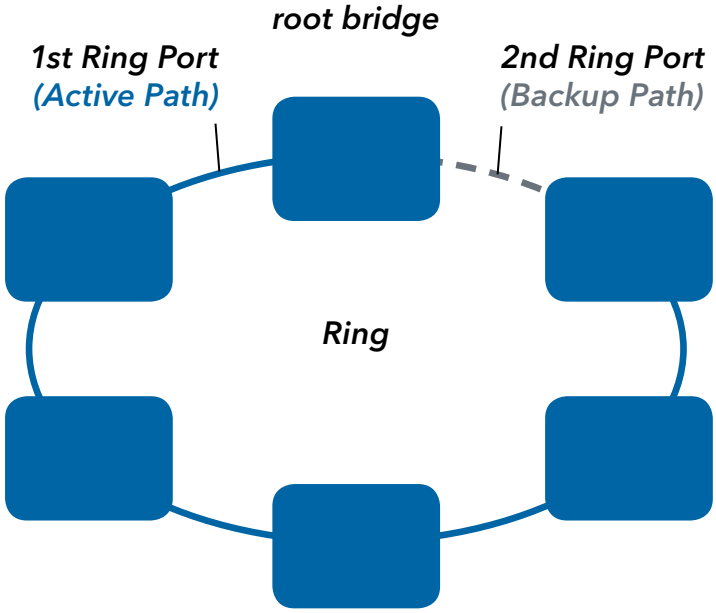
Switch Function Listing

The switch functions may be set individually or may be combined in the following order to perform enhanced functions above the individual operation. The table below describes the operation of the switch functions. This same table is also available in the help menu of the system webpage.

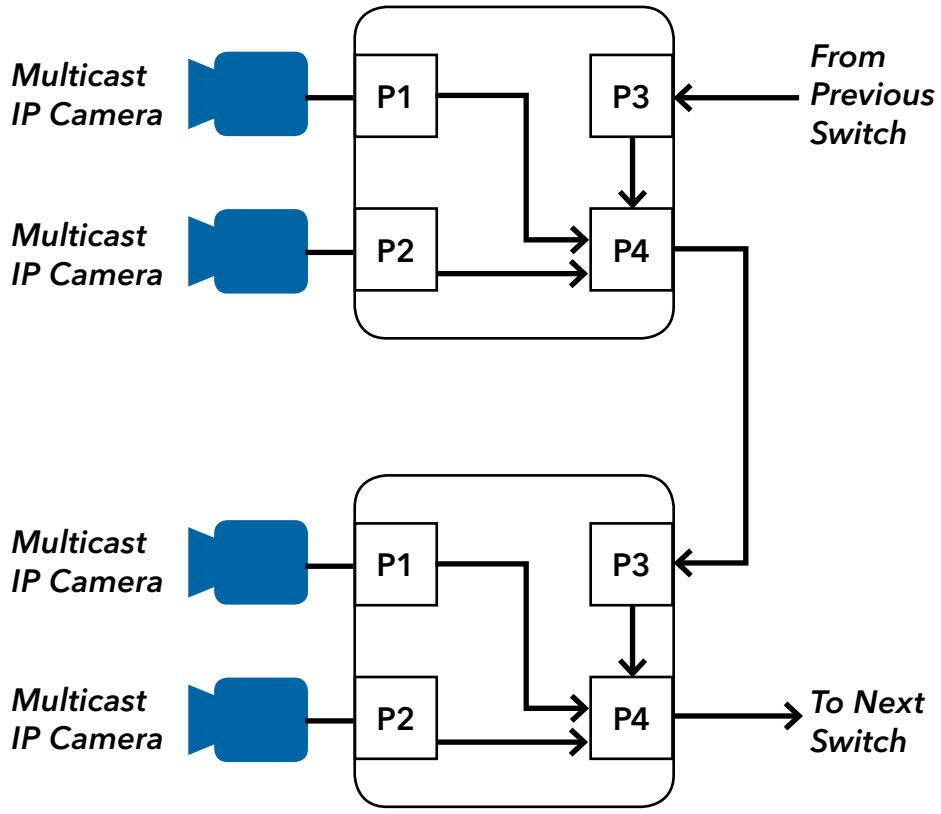
Summary of the switch configurations (in order of switch priority)

RSTP (Switch 1)	SMS MUX (Switch 2)	DUAL MC (Switch 3)	R SFP (Switch 4)	Resulting Mode	Comment
ON	OFF	OFF	OFF	RSTP	All ring configurations
OFF	ON	OFF	OFF	SMS	Port4 is uplink (traffic from ports 1-3 is sent only to port 4)
OFF	ON	OFF	ON	SMS with Redundant SFP	Fiber fail over with Port1 and Port2 isolation
OFF	OFF	ON	OFF	Dual Media Converter	Port1->Port3; Port2->Port4
OFF	OFF	ON	ON	Dual Media Converter w/ Redundant SFP	Port1->Port3; Port2->Port4 (with fiber fail over)
OFF	OFF	OFF	ON	Redundant SFP	Fiber fail over Port 4 is primary port

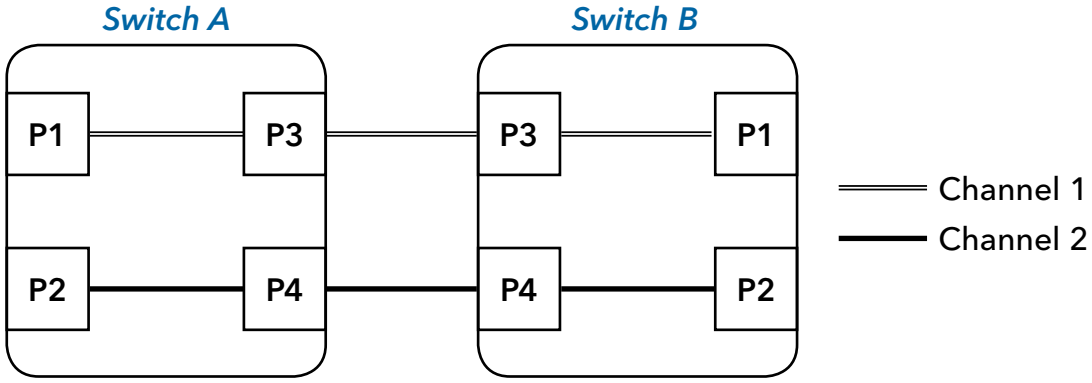
Typical network configuration with RSTP enabled via DIP Switch 1



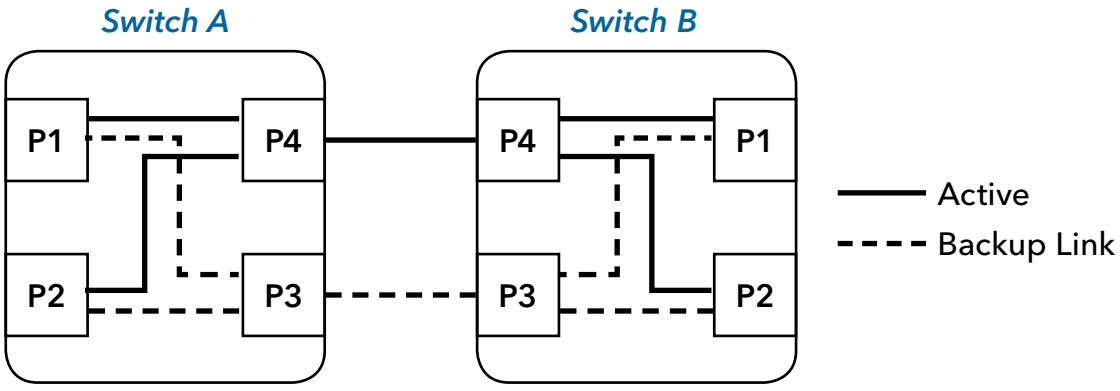
Typical network configuration with SMS Mux enabled via DIP Switch 2



Typical network configuration with Dual Media Converter Mode enabled via DIP Switch 3

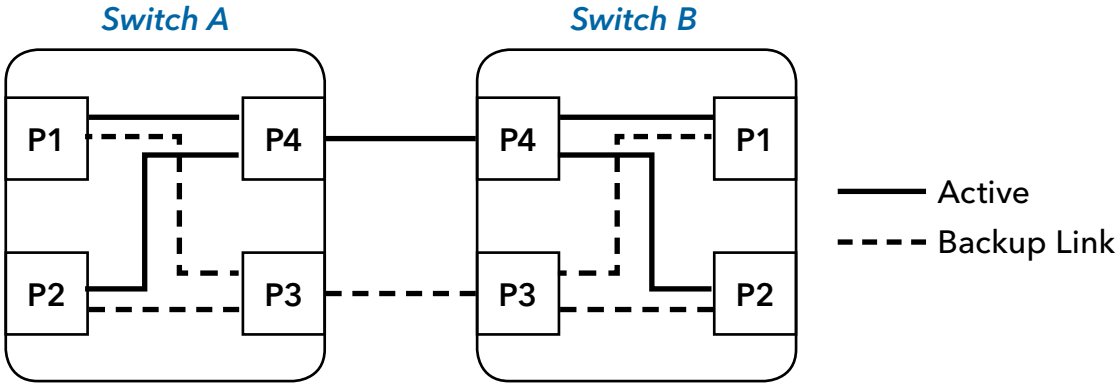


Typical network configuration with Redundant SFP Mode enabled via DIP Switch 4



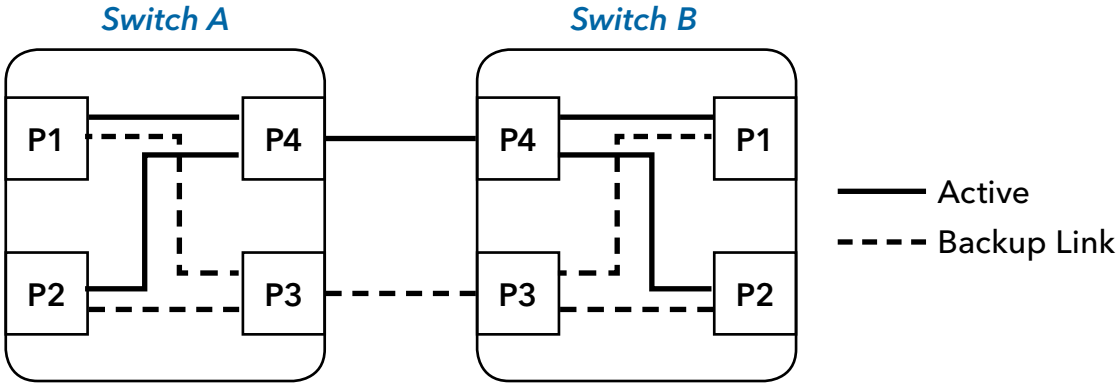
Traffic always forwards to the link that's active.

Typical network configuration with Redundant SMS SFP Mode enabled via DIP Switches 2 & 4



Traffic always forwards to the link that's active.

Typical network configuration with Redundant Dual Media Converter Mode enabled via DIP Switches 3 & 4



Traffic always forwards to the link that's active.

WEB Management

Attention: While installing and upgrading firmware, please remove physical loop connection first. DO NOT power off equipment while the firmware is upgrading!

Configuration by Web Browser

This section provides instruction on configuration through the Web browser.

About Web-based Management

An embedded HTML web site resides in the flash memory on the CPU board. It contains advanced management features and allows you to manage the switch from anywhere on the network through a standard web browser such as Microsoft Internet Explorer.

The Web-Based Management function supports Internet Explorer 5.0 or later. It utilizes Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

Note: By default, IE5.0 or later version does not allow Java Applets to open sockets. You need to explicitly modify the browser setting in order to enable Java Applets to use network ports.

Preparing for Web Management

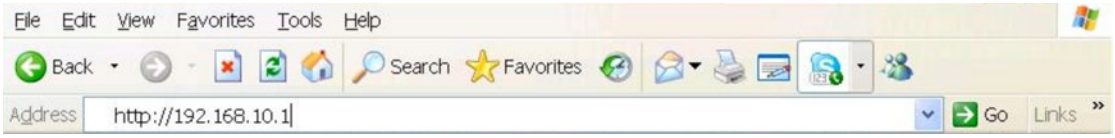
The default value is as below:

IP Address: 192.168.10.1
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.10.254
User Name: admin
Password: admin

System Login

1. Launch your Web Browser.

2. Type http:// and the IP address of the switch. Press **Enter**.



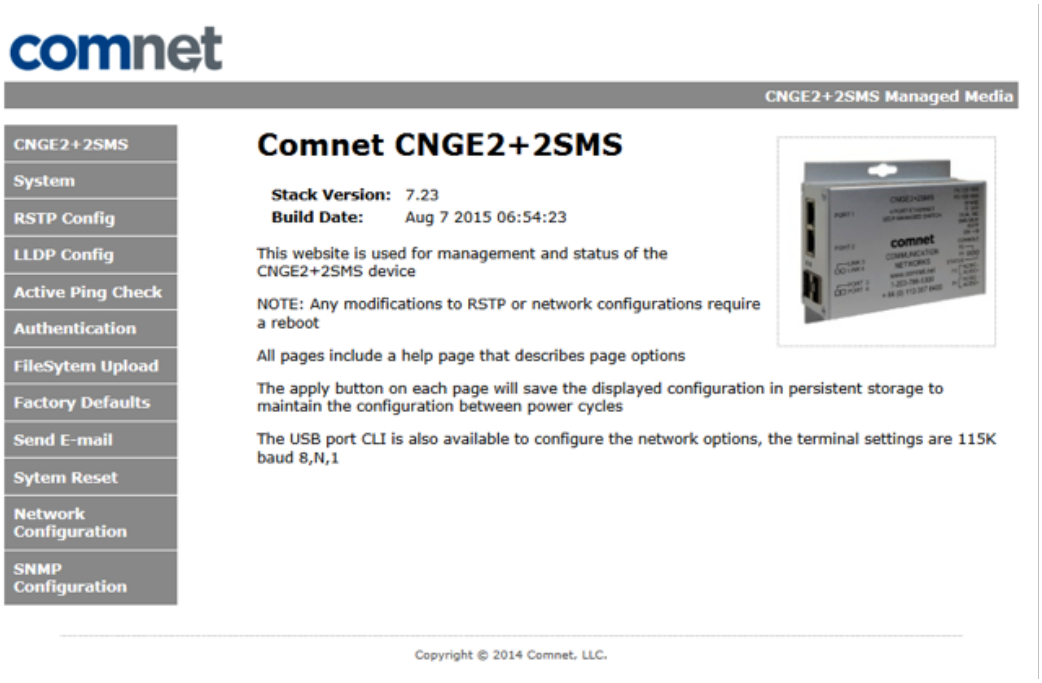
3. The login screen appears.

4. Enter username and password. The default username and password is **admin**.

5. Select **Enter** or **OK** button, then the main interface of the Web-based management appears.

Login screen

Main Interface

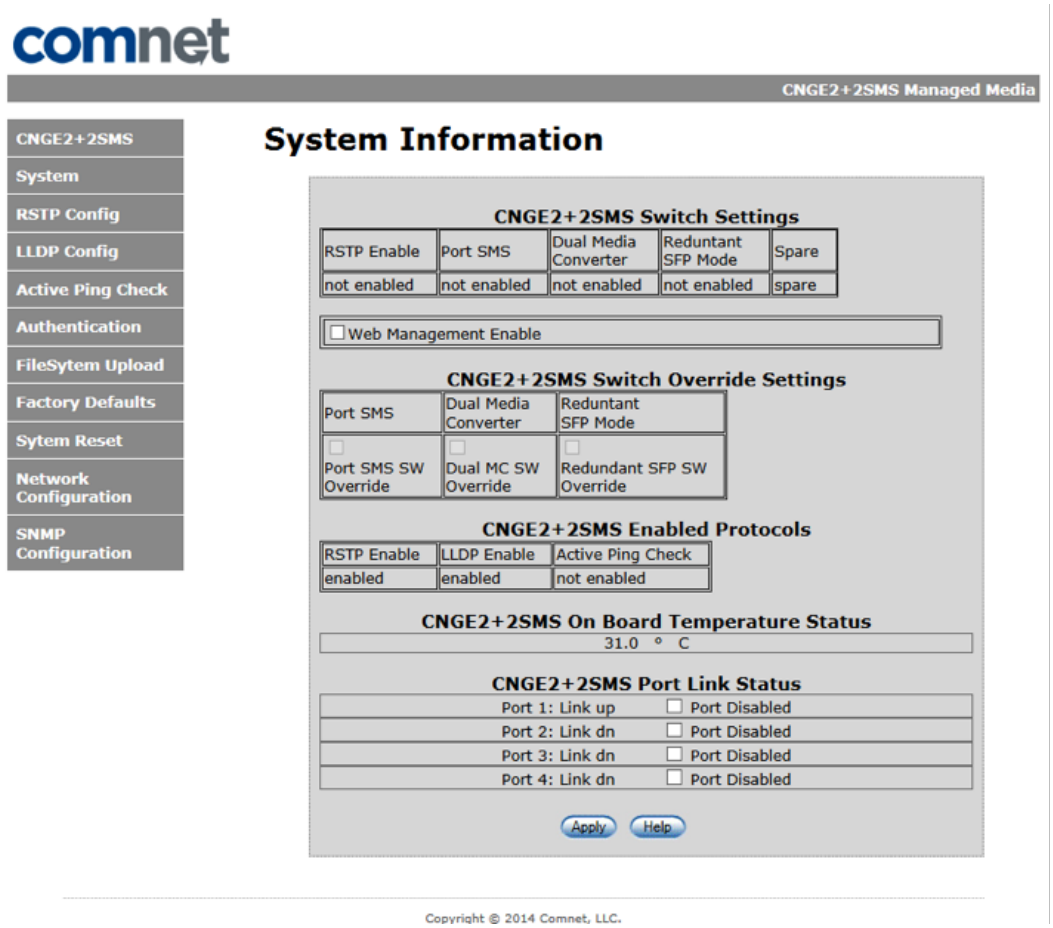


Main interface

Basic Settings

System Information

The switch system information is provided here.

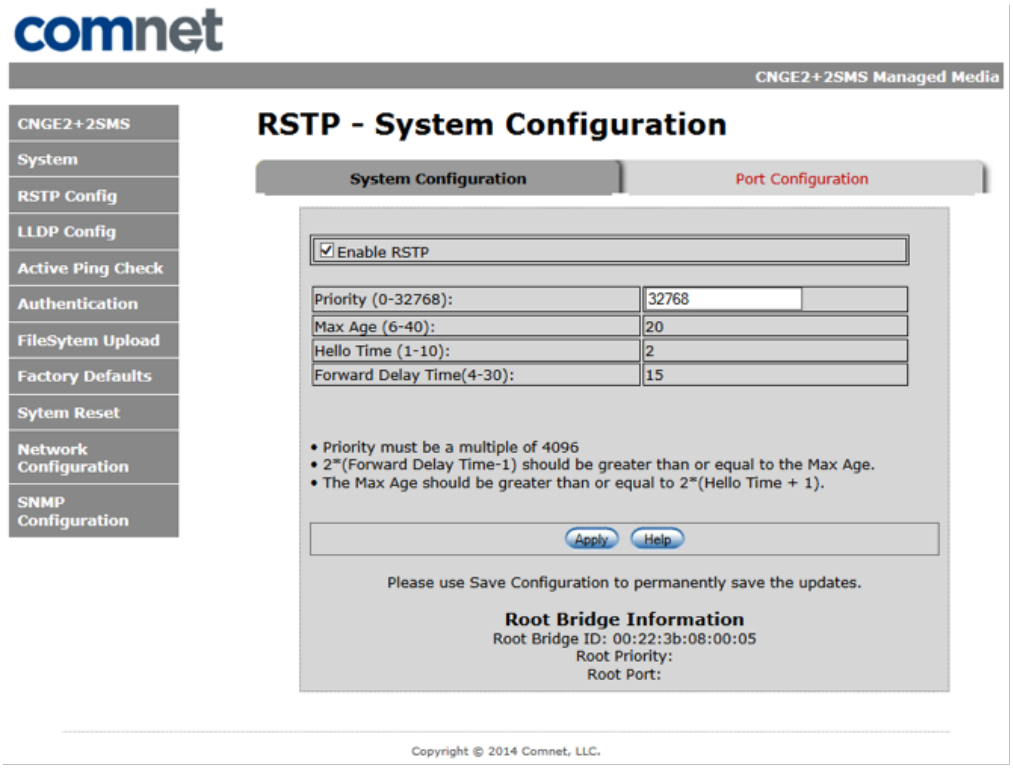


System Information interface

Label	Description
Switch Settings	Summary table of external switch settings
Web Management Enable	Override the side panel switches setting to use the webpage settings instead.
Switch override	Override individual switch functions
Enabled protocols	Summary table of enabled protocols
Temperature	Unit's internal board temperature reading
Port link status	Link status and port disable

RSTP System Configuration

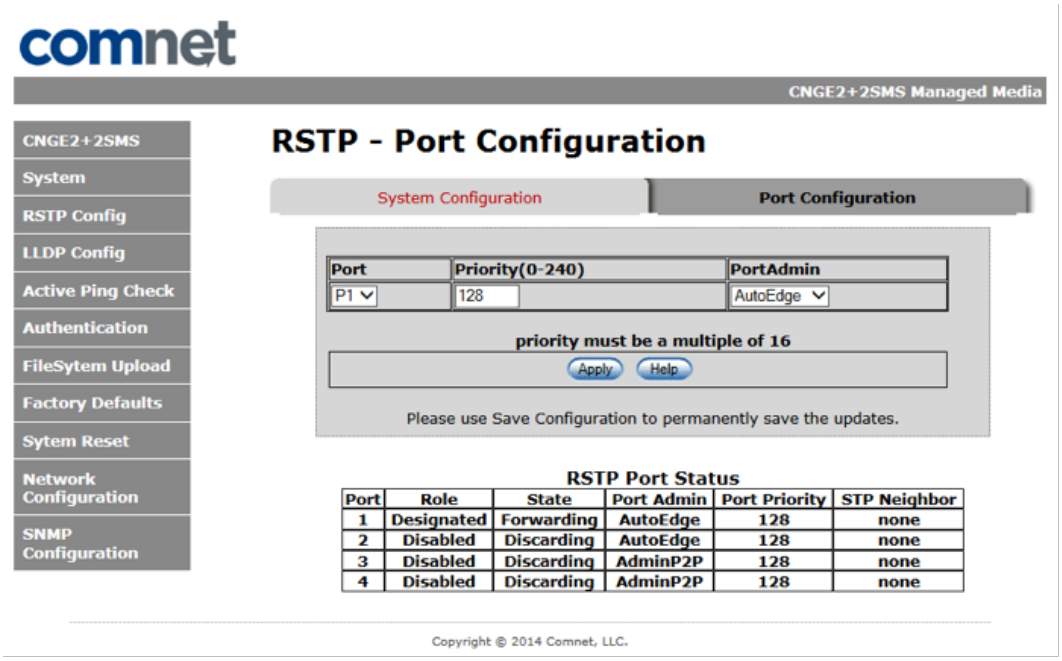
The Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol. It provides faster spanning tree convergence after a topology change. The system also supports STP and the system will auto detect the connected device that is running STP or RSTP protocol.



RSTP System configuration interface

Label	Description
Enable RSTP	Select to enable RSTP (only available when the DIP switch settings have been overridden by web management mode. See Page 11.)
Priority	Configure Bridge priority, must be a multiple of 4096
Root Bridge ID	MAC address of the root bridge

RSTP Port Configuration

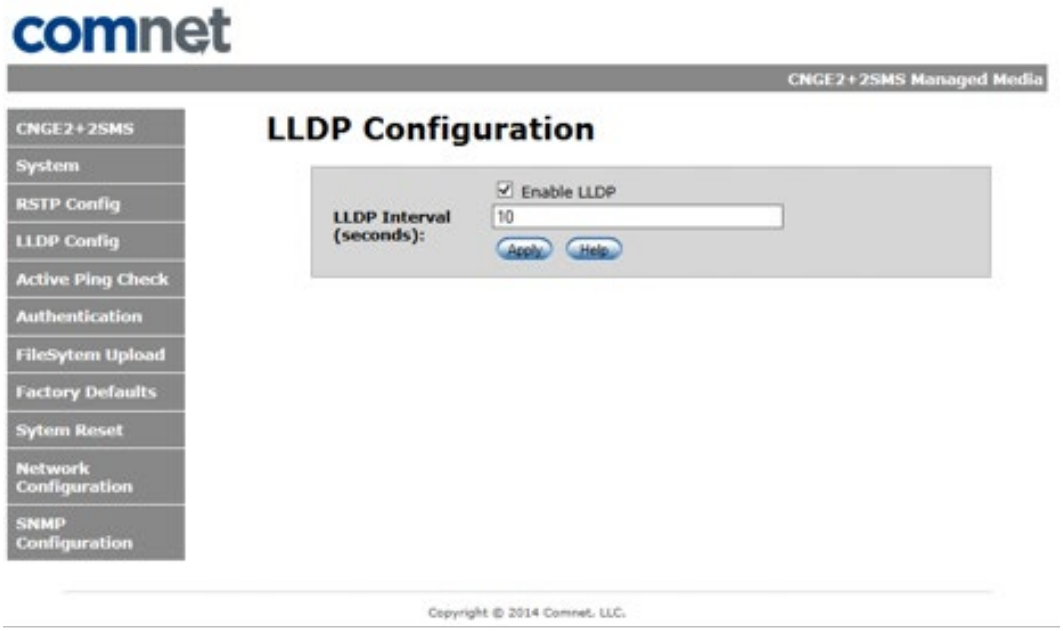


RSTP Port configuration interface

Label	Description
Port Priority	Configure port priority, must be a multiple of 16.
Port Admin	Configure port Admin or Auto Edge status.
Port Status	Summary table of RSTP port status

LLDP

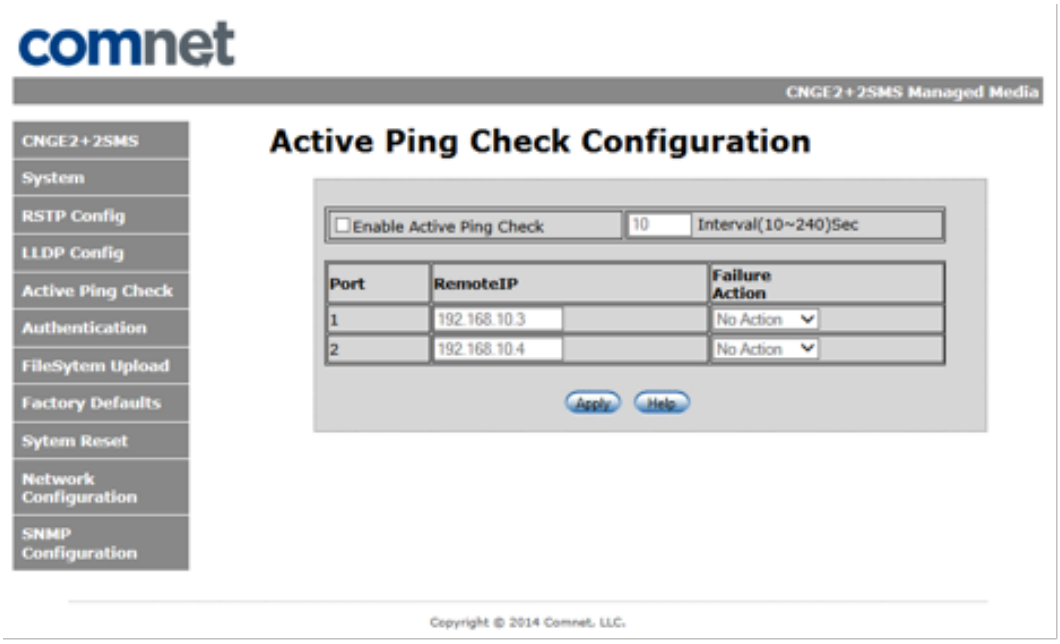
LLDP (Link Layer Discovery Protocol) function allows the switch to advertise its information to other nodes on the network and store the information it discovers.



LLDP configuration interface

Active Ping Check Configuration

The active ping check function allows the switch to check that a configured IP address is alive on each of the RJ45 ports. If the specified IP address becomes unreachable then the switch will perform the action selected in the Failure Action menu.

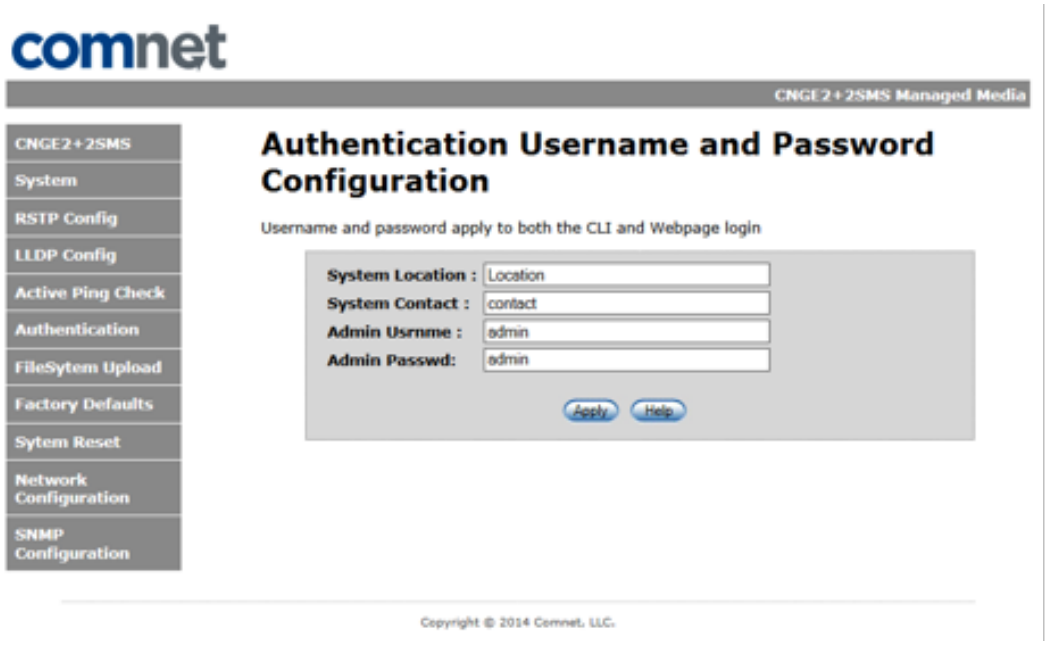


Active Ping Check configuration interface

Label	Description
Enable	Select to enable the active ping check function
Interval	Active ping check interval in seconds
Remote IP	Configure IP addresses of remote device to ping
Failure action	Configure action to take upon failure

Authentication Username and Password Configuration

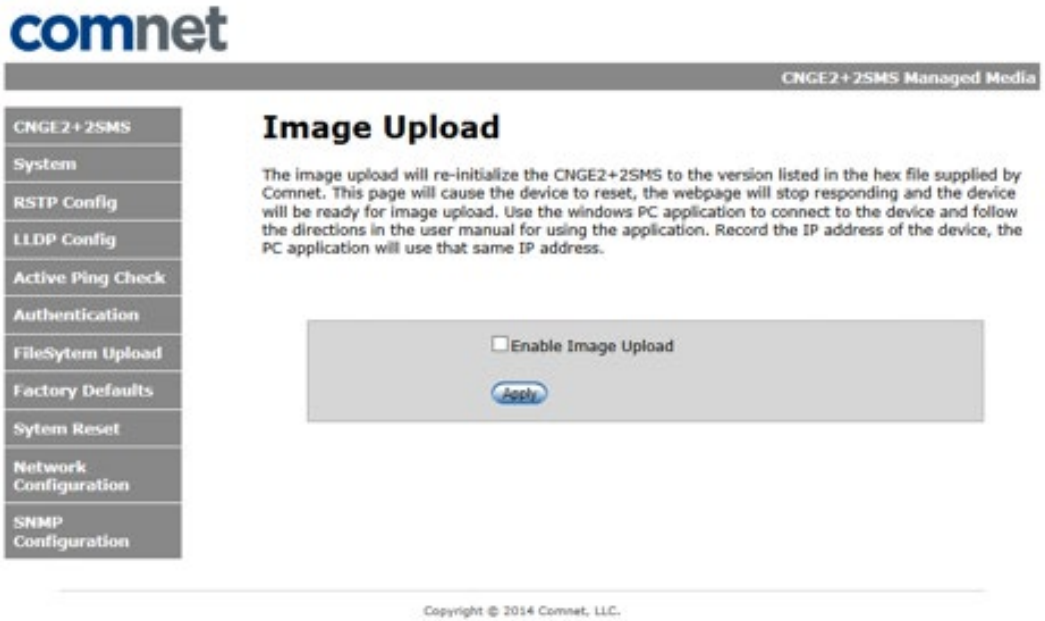
The username and password entered here are also used in the CLI.



Authentication Username and Password configuration interface

Upgrade Firmware

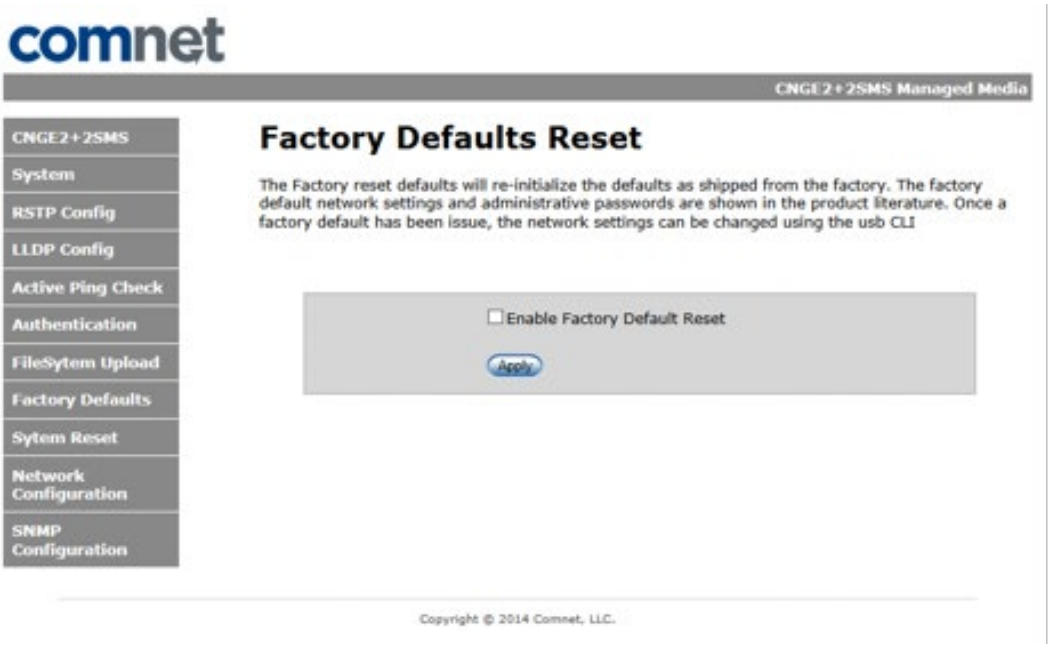
Upgrade Firmware allows you to update the firmware of the switch. Before updating, have your Windows boot loader application ready and the firmware image is available. RSTP is not available in the Ethernet push bootloader, observe the network topology before upgrading.



Update Firmware interface

Details on how to upload the new image is located in Firmware Upgrade section on Page 32.

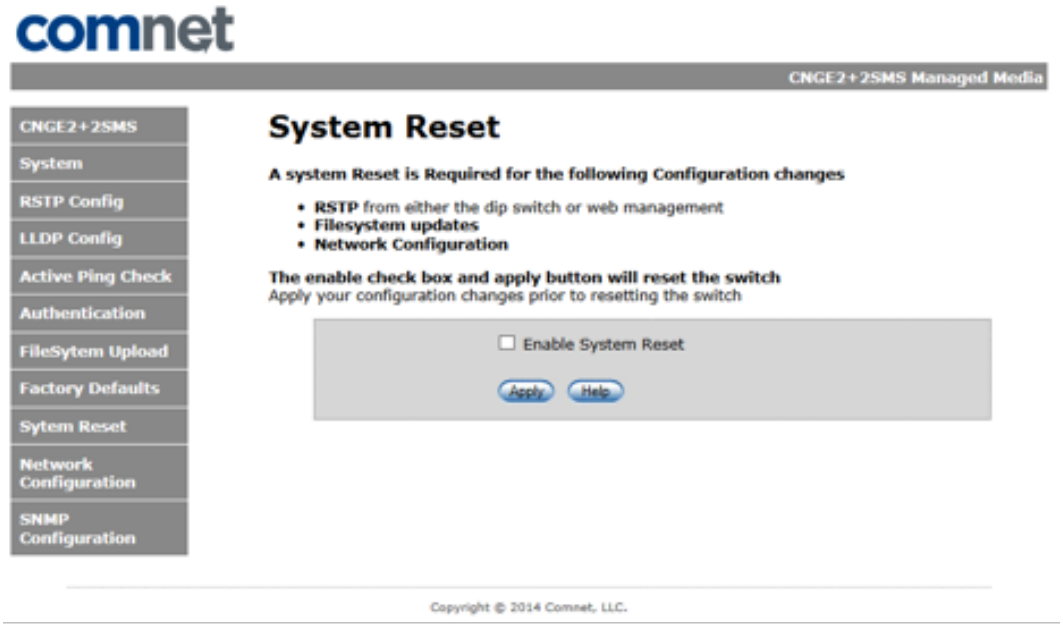
Factory Defaults



Factory Defaults Reset interface

This function restores the system configuration back to the factory default values. All parameters will revert back to the original factory default values except the network configuration settings.

System Reset



System Reset interface

This feature will perform a system reset.

Some system configuration changes require a system reset to take effect:

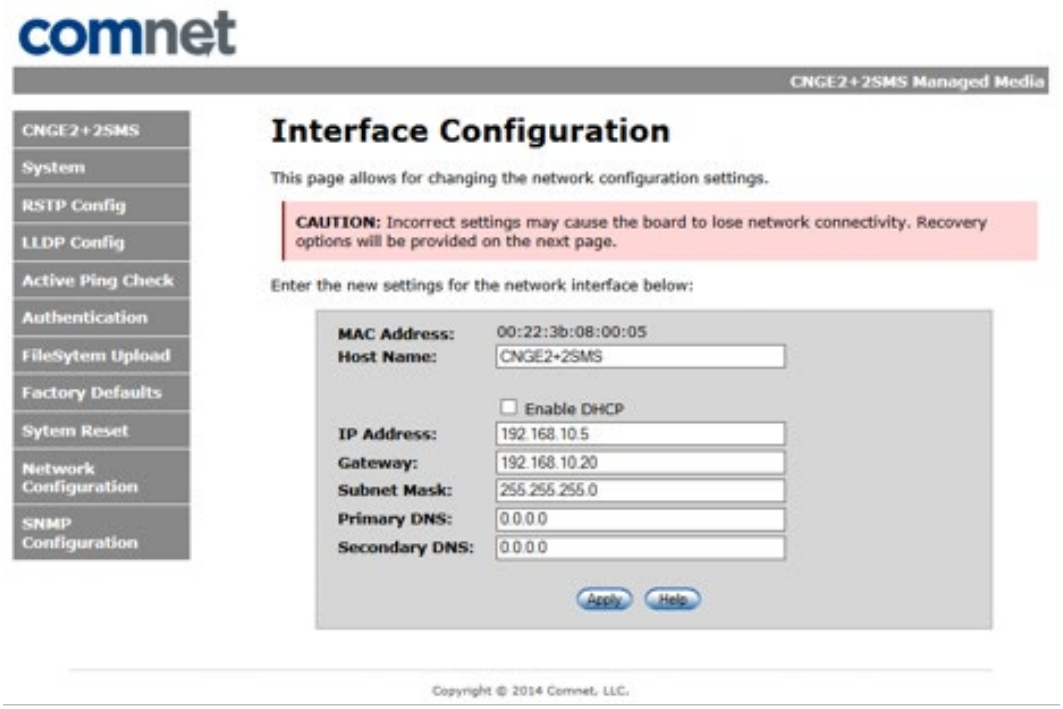
-RSTP changes

-File System updates

-Network configuration changes

After a system reset there may be a delay of up to 15 seconds before the device becomes responsive again.

Network Interface Configuration



Interface Configuration interface

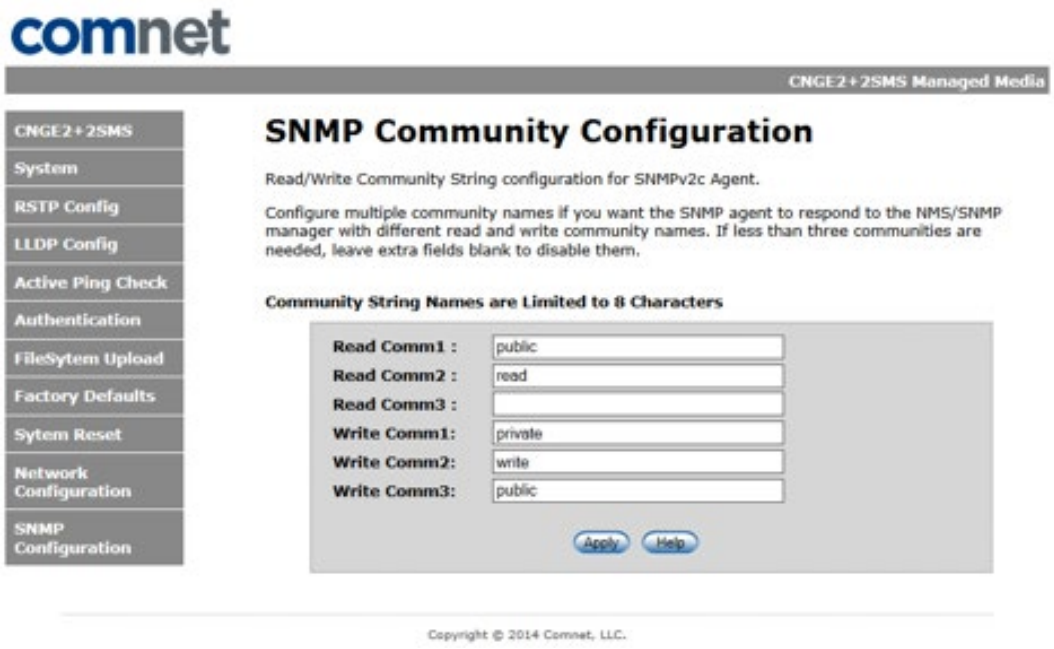
Label	Description
Host Name	Assign a name to the device (this is used for CLI and SNMP functions)
Enable DHCP	To enable or disable the DHCP client function. When DHCP client function is enabled, the switch will be assigned the IP address from the network DHCP server. The default IP address will be replaced by the IP address which the DHCP server has assigned.
IP Address	Assign the IP address that the switch will use. If DHCP client Function is enabled, you do not need to assign the IP address.
Gateway	Assign the network gateway for the switch.
Subnet Mask	Assign the subnet mask for the switch.
Primary DNS	Assign the primary DNS IP address
Secondary DNS	Assign the secondary DNS IP address
Apply	Select Apply to set the configurations. (A system reset will be required)

SNMP

Simple Network Management Protocol (SNMP) is the protocol developed to manage nodes (servers, workstations, routers, switches and hubs etc.) on an IP network. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth. Network management systems learn of problems by receiving traps or change notices from network devices implementing SNMP.

SNMP – Agent Config

You can set SNMP agent related information by Agent Setting Function.



SNMP Community Configuration interface

The following table describes the labels in this screen.

Label	Description
SNMP V1/V2c Community	SNMP Community should be set for SNMP V1/V2c. Three sets of "Community String/Privilege" are supported. Each Community String is maximum 32 characters. Keep empty to remove this Community string.
Apply	Select **Apply** to activate the configurations.
Help	Show help file.

Command Line Interface Management

Configuration by Command Line Interface (CLI).

About CLI Management

Besides WEB-base management, the CNGE2+2SMS also supports CLI management for network configuration. You can use USB console to manage the switch by CLI.

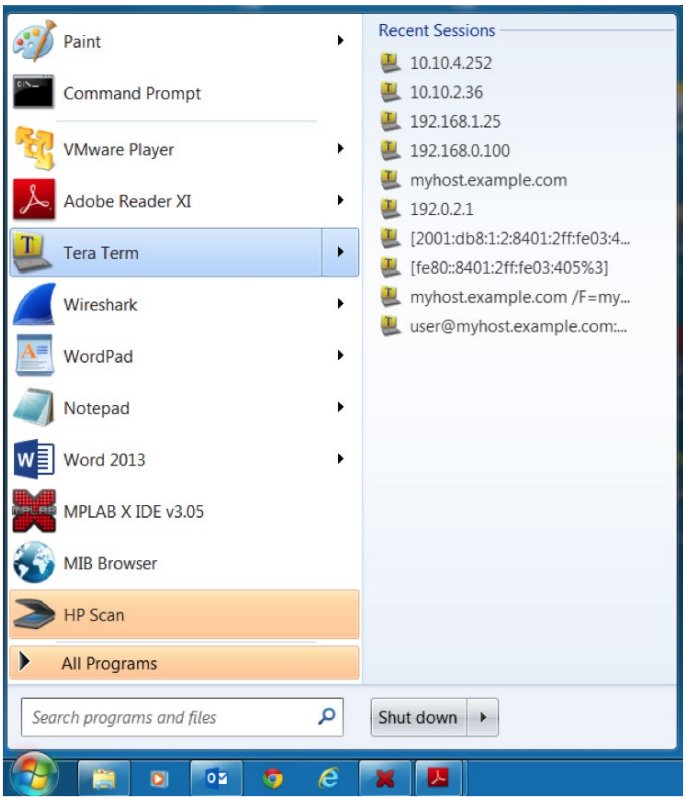
CLI Management by USB Console (115200, 8, none, 1, none)

Before configuring by USB console, use a USB mini B cable to connect the switch's Console port to your PC's USB port.

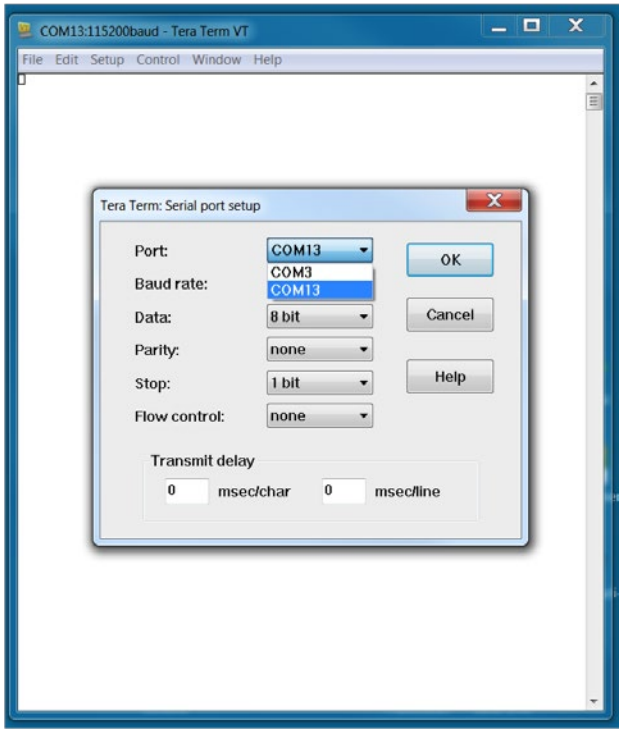
Follow the steps below to access the console via USB mini B cable.

Step 1. Connect the USB cable between the PC and the CNGE2+2SMS. If the device driver is not found, the product CD includes the windows .inf driver.

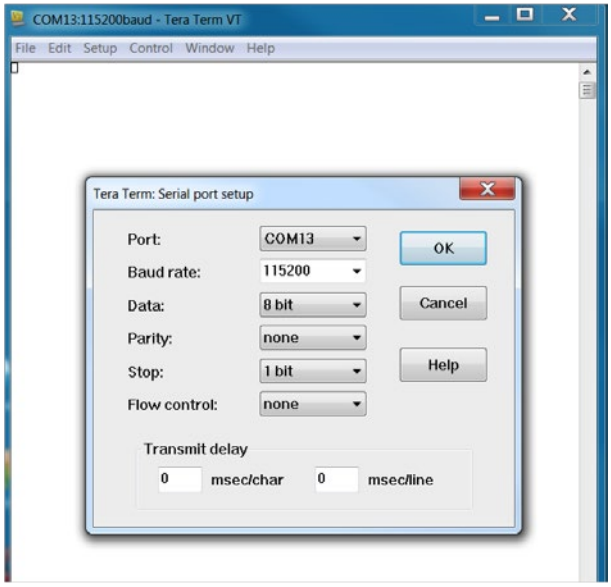
Step 2. From the Windows desktop, select on Start -> Tera Term



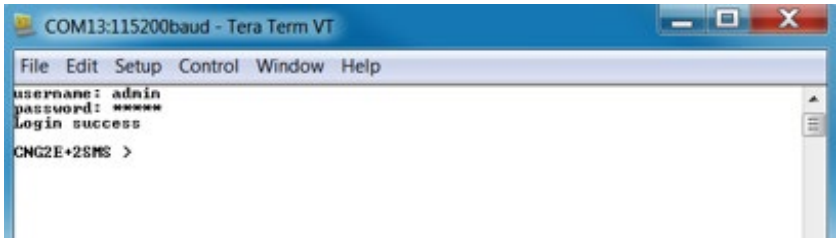
Step 3. Select the COM port number



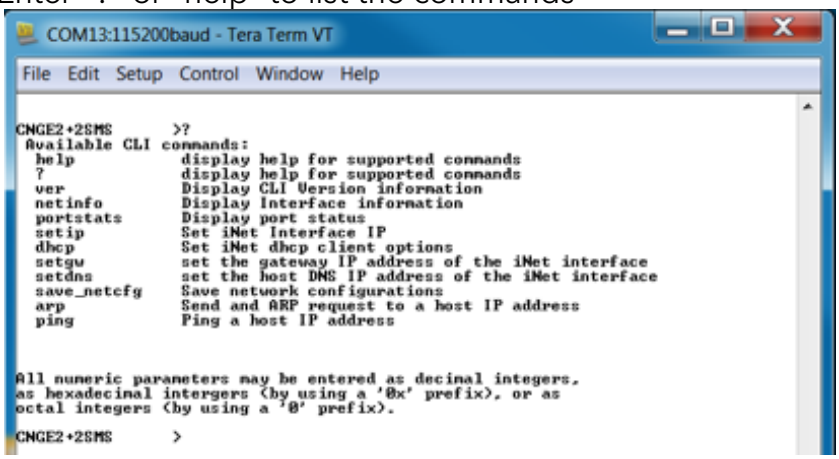
Step 4. The COM port properties setting, 115200 for Bits per second, 8 for Data bits, None for Parity, 1 for Stop bits and none for Flow control.



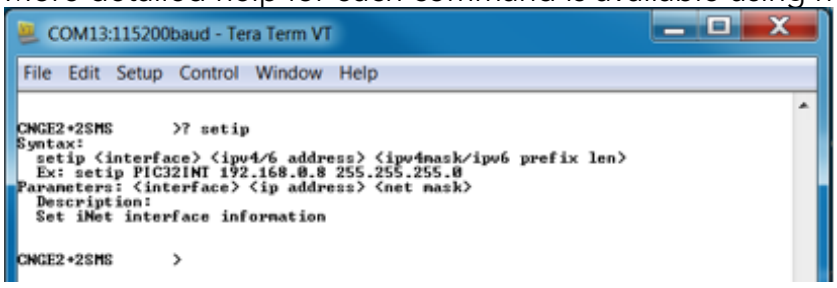
Step 5. Hit enter to initiate the connection and receive the username prompt. After entering the username and password the console will be presented with a CLI prompt.



Enter "?" or "help" to list the commands



More detailed help for each command is available using help in front of the command name.



Issuing a "netinfo" command will display the ip address of the switch

To change the network configuration using the CLI, the following commands must be used:

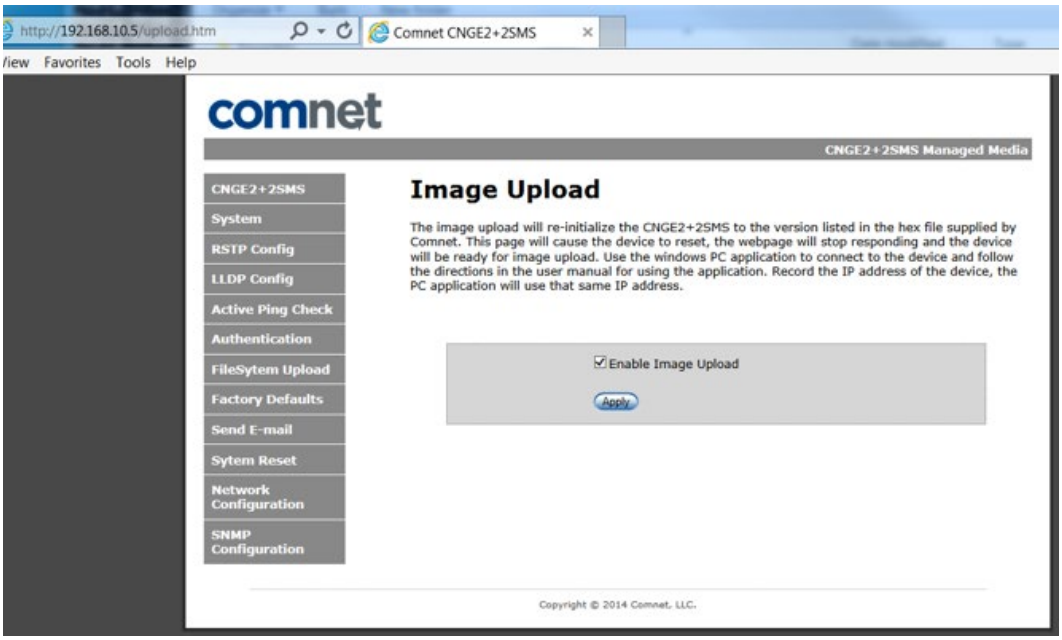
-setip

-setgw

-setdns

Save_netcfg if you want to save these changes in the startup configuration. Not using this command will not save the changes persistently.

Firmware Upgrade Procedure

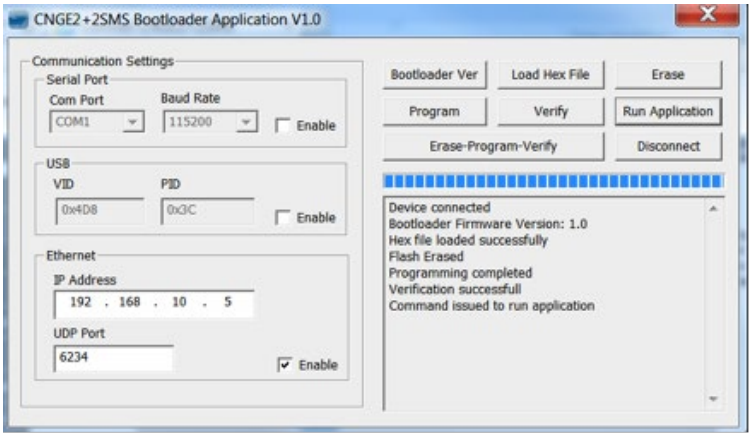


Push Bootloader Image Uploader interface

The steps for upgrading the unit with the push boot loader are as follows;

1. Bring up the web server and open the FileSystem Upload page click the Enable Image upload check box and hit apply.

2. Open the Windows bootloader application, click the enable Ethernet check box and adjust the IP address to the target IP



3. Click the "Load Hex File" and select the new firmware file.
   - Click Erase
   - Click Program
   - Click Verify
   - Click run application

   Note: The "Erase-Program-Verify" button is not supported at this time. Please use the individual buttons.

Technical Specifications

Technology	
Ethernet Standards	IEEE 802.3 for 10BASE-T IEEE 802.3u for 100BASE-TX and 100BASE-FX IEEE 802.3z for 1000BASE-X IEEE 802.3ab for 1000BASE-T IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol) IEEE 802.1AB for LLDP (Link Layer Discovery Protocol) IEEE 802.3at for Power Sourcing Equipment (PSE) and PoE (≤ 30 W per port) IEEE 802.3x Flow Control and Back Pressure
Software Features	RSTP (IEEE 802.1D/w) Port Configuration, Status, Statistics, Security PoE Configuration, Status, Health Check SNMP Enable/Disable Ports, MAC based port security STP / RSTP Network Redundancy
Interface	
SFP	2 × 100/1000Base-X SFP
RJ45 Ports	2 × 10/100/1000Base-T(X), Auto MDI/MDIX
LED Indicators	Per Unit : Power × 2 (Green) RJ45 Ports: Per Port : Link/Activity(Green/Blinking Green), 1000 Mbps indicator (Amber) SFP Ports: Per Port : Link/Activity(Green/Blinking Green)
Power Requirements	
Power Input Voltage	Dual 48 to 57 VDC PoE, 9 to 36 VDC or 24 VAC non PoE
Current Draw	3.5A max, with PoE, 1A w/out PoE
Reverse Polarity Protection	Present (On Terminal Block Only)
Environmental	
Operating Temperature	-40 – +75 °C
Storage Temperature	-40 – +85 °C
Operating Humidity	5% – 95%, non-condensing

Mechanical	
Dimension	4.1 × 3.7 × 1.46 in (10.4 × 9.4 × 3.7 cm)
Casing	Aluminum
Regulatory Approvals	
EMC	EN50130-4:2011 EN55024:2010 EN55022:2010
EMS	EN 55022:2010 Radiated Emissions EN 55022:2010 Conducted Emissions EN 61000-3-2-2006+A2:2009 Harmonic Current Emissions EN 61000-3-3:2013 Voltage Fluctuations EN 61000-4-2:2009 ESD EN 61000-4-3:2006 + A2:2010 Radiated Electromagnetic Field Immunity EN 61000-4-4:2012 EFT EN 61000-4-5:2006 Surge Immunity EN 61000-4-8:2010 Magnetic Field Immunity EN 61000-4-11:2004 Voltage Dips and Fluctuations EN 50130-4:2011 Mains Supply Variations
Safety	EN 60950-1 SELV
Warranty	Lifetime

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