comnet
Communication Networks

INSTALLATION AND OPERATION MANUAL

CNGEMC4+2[POE][HO]/M

10/100/1000 MBPS INTELLIGENT MEDIA CONVERTER WITH OPTIONAL POE+

This manual serves the following ComNet Model Numbers:

CNGEMC4+2/M
CNGEMC4+2POE/M
CNGEMC4+2POEHO/M

The ComNet CNGEMC4+2[POE][HO]/M is a four port intelligent Media Converter. It provides four 10/100/1000Base-T(X) copper ports and two 100/1000Base-FX SFP ports. The CNGEMC4+2[POE][HO]/M provides exclusive functionality for easy field deployment including DIP media converter based operation of RSFP (redundant SFP) for creating redundant fiber connections and MUX feature for port isolation preventing network video flooding of multicast traffic. Copper ports 1 through 4 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 copper ports 1 through 4. This product is fully compatible with the ComNet exclusive CopperLine® SFP modules for operation over extended distance UTP or Coax cable. The ComNet exclusive Port Guardian feature provides additional cybersecurity protection by enabling physical port lockout in the event that an existing cable is disconnected and prevents a potential network incursion using common spoofing techniques.

Contents

Regulatory Compliance Statement 4
Warranty 4
Disclaimer 4
Safety Indications 4

Overview 5
Introduction 5
Software Features 5
Hardware Features 5

Hardware Overview 6
Side Panels 6
Indicating LEDs 9

Cables 10
Ethernet Cables 10
10/100/1000BASE-T(X) Pin Assignments 10
SFP Transceivers 12
Console Cable 12
DIP Switches 13

Graphical User Interface 15
Web Based Configuration 15

System Information 17

Port Configuration 18

Port Statistics 18

Authentication 19

Upgrade Firmware 20

Factory Defaults Reset 21

System Reset 22

Network Interface Configuration 23

PoE-PSE Status 24

Contact Configuration 25

Static MAC Lock 26
Port Guardian 27
Port Guardian – CLI Reset 28
Jumbo Frame Port Configuration 29
Command Line Interface Management 30
How to access the Command Line Interface (CLI) 30
Technical Specifications 33

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

Information in this publication is intended to be accurate. ComNet shall not be responsible for its use or infringements on third-parties as a result of its use. There may occasionally be unintentional errors on this publication. ComNet reserves the right to revise the contents of this publication without notice.

Safety Indications

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

» This equipment should be installed in secured location.

Overview

Introduction

The CNGEMC4+2 is an intelligent Media Converter that contains many features. The media converter will work under a wide variety of temperature, dirty and humid conditions. Some advanced features are configurable using DIP media converters on the device.

Software Features

» Web-based GUI and USB Console CLI configuration
» Enable/disable ports
» PoE status monitoring and health check
» Jumbo Frame support (10240 MTU)
» Static MAC lock (per port)
» Field firmware upgrade capable
» Port Guardian physical port lockout feature

Hardware Features

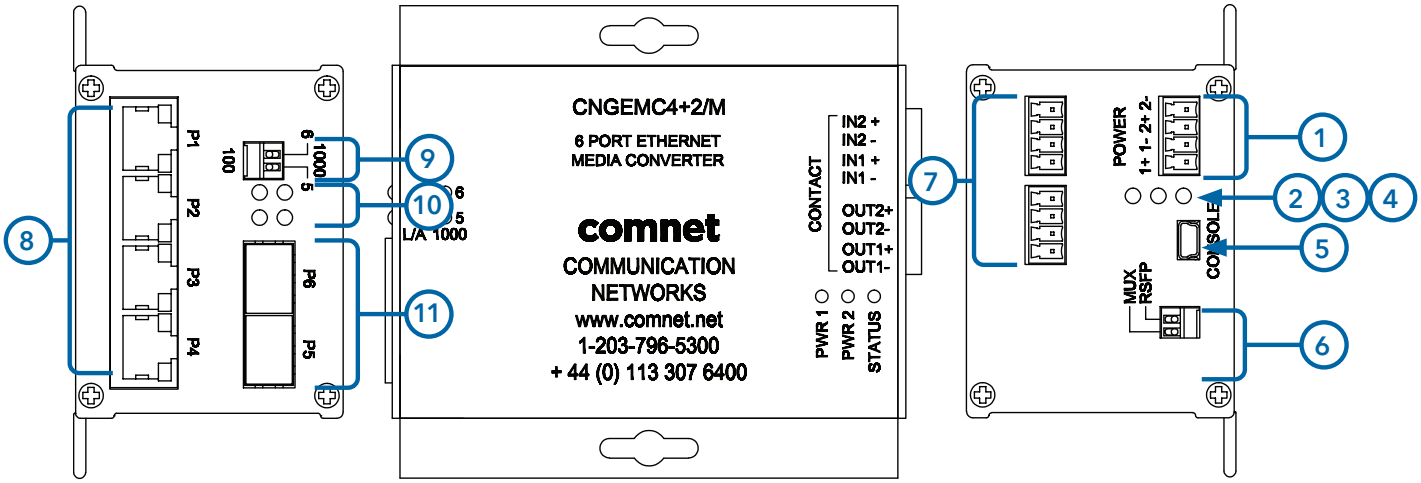
» 2 × DIP media converters for quick feature selection
» 2 × Redundant DC power inputs
» Operating Temperature: -40 – 75°C
» Storage Temperature: -40 – 85°C
» Operating Humidity: 5% – 95%, non-condensing
» 4 × 10/100/1000Base-TX Gigabit Ethernet port
» 2 × 100/1000Base-X SFP
» 2 × Dry Contact Inputs
» 2 × Form A Relays
» USB Console Port
» Dimensions: 4.1 × 3.7 × 2.2 in (10.4 × 9.4 × 5.6 cm)

Hardware Overview

Side Panels

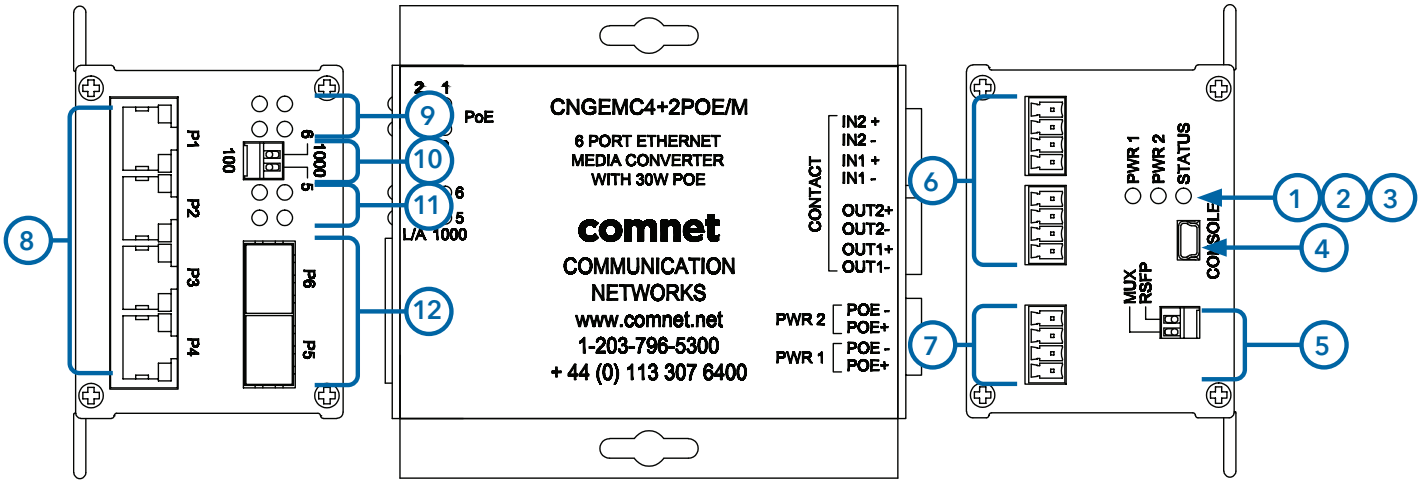
The following table describes the ports that are on the sides of the CNGEMC4+2[POE][HO]/M.

Port	Description
10/100/1000Base-T(X) RJ-45 Ethernet ports	4 × 10/100/1000Base-TX 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 device.

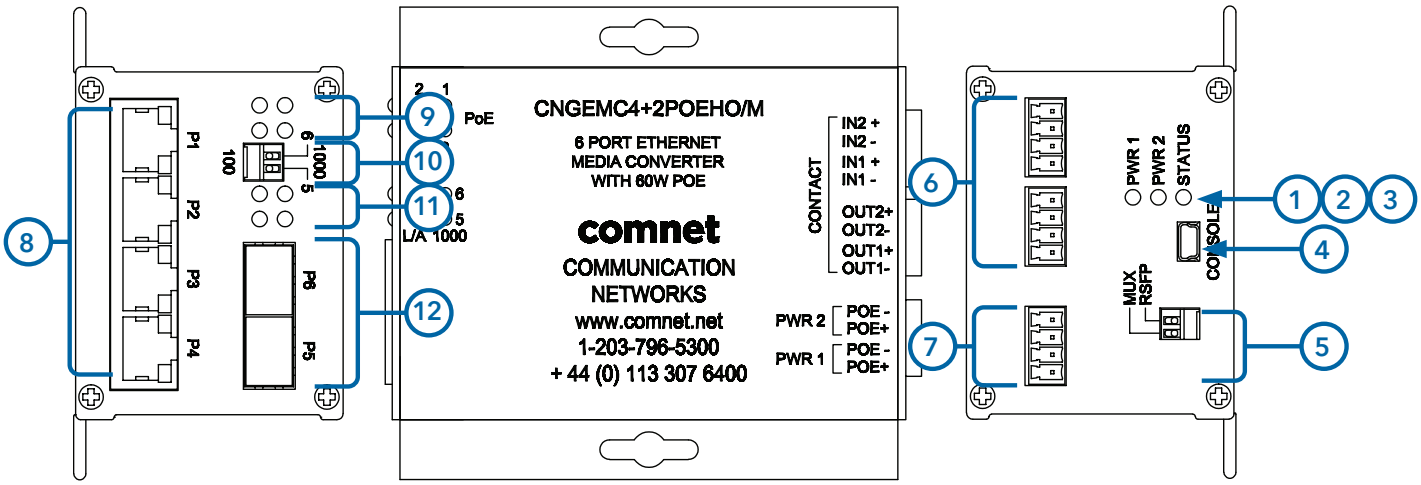


CNGEMC4+2/M

1. Power Connections
2. LED for PWR1
3. LED for PWR2
4. LED for STATUS
5. Console Mini USB
6. Configuration DIP switches
7. Contact Closure terminal block
8. RJ-45 Ethernet Ports 1-4
9. Data Speed DIP switches
10. Link/Activity LEDs for SFP Ports 5 and 6
11. SFP Ports 5 and 6



CNGEMC4+2POE/M



CNGEMC4+2POEHO/M

1. Power Connections
2. LED for PWR1
3. LED for PWR2
4. LED for STATUS
5. Console Mini USB
6. Configuration DIP Switches
7. Contact Closure Terminal Block
8. RJ-45 Ethernet Ports 1 – 4
9. PoE Status LEDs for Ports 1 - 4
10. Data Speed DIP Switches
11. Link/Activity LEDs for SFP Ports 5 and 6
12. SFP Ports 5 and 6

Indicating LEDs

LED	Color	Status	Description
PWR1	Green	On	DC Power Input 1 Good
		Off	No power detected
PWR2	Green	On	DC Power Input 2 Good
		Off	No power detected
STATUS	Green	On	Initialization passed
	Red	On	Failed
10/100/1000Base-T(X) Ethernet ports			
LNK/ACT	Green	On	Port link up
		Blinking	Data transmitting
Gigabit LED	Amber	On	Port speed is 1000 Mbps (Gigabit)
30W	Amber	On	30W PoE power being supplied (POE units only)
60W	Green	On	60W PoE power being supplied (POEHO units only)
SFP			
LNK/ACT	Green	On	Port link up.
		Blinking	Data transmitted.

Cables

Ethernet Cables

The CNGEMC4+2 media converters have standard Ethernet ports. According to the link type, the media converters 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, 5, 5e, 6 100Ω	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5, 5e, 6 100Ω UTP	UTP 100 m (328 ft)	RJ-45
1000BASE-TX	Cat. 5, 5e, 6 100Ω UTP	UTP 100 m (328 ft)	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 CNGEMC4+2[POE][HO]/M media converters support auto MDI/MDI-X operation. You can use a straight-through cable to connect PC to media converter. 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

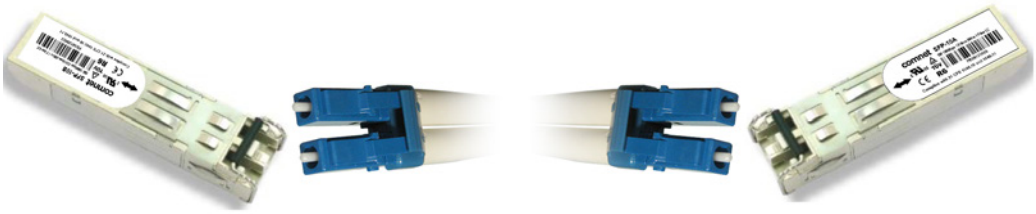
Pin Number	MDI port	MDI-X port
1	TD+ (transmit)	RD+ (receive)
2	TD- (transmit)	RD- (receive)
3	RD+ (receive)	TD+ (transmit)
4	Not used	Not used
5	Not used	Not used
6	RD- (receive)	TD- (transmit)
7	Not used	Not used
8	Not used	Not used

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 Transceivers

The media converter 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 unit A should be connected to the RX port of unit B.



Media Converter A *Fiber Cord* *Media Converter B*

Console Cable

Each CNGEMC4+2 media converter 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 CNGEMC4+2 media converters features DIP switch based operation of MUX and RSFP.

The DIP Switches are located on the back of the units and are numbered from left to right when viewing the side of the media converter with the backplate on the bottom and the power connections on the left. If "Web Management Enabled" is selected in management software under Systems settings, the DIP Switch settings on the media converter will be overridden by any settings made int he browser interface.

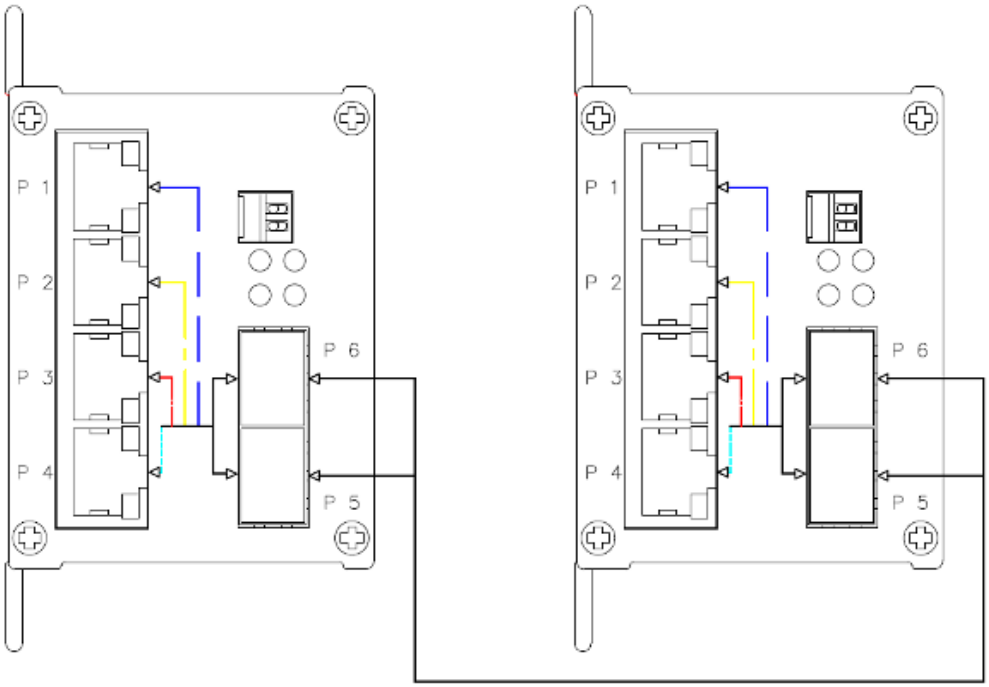
DIP Switch Position	Description
1	MUX
2	RSFP

Dip Switch Feature Summary

MUX (switch 1)	Resulting Mode	Comment
Off	No Port Isolation	All Ports Communicating
On	MUX Enabled	Ports 1-4 are isolated and only transmit out the fiber ports

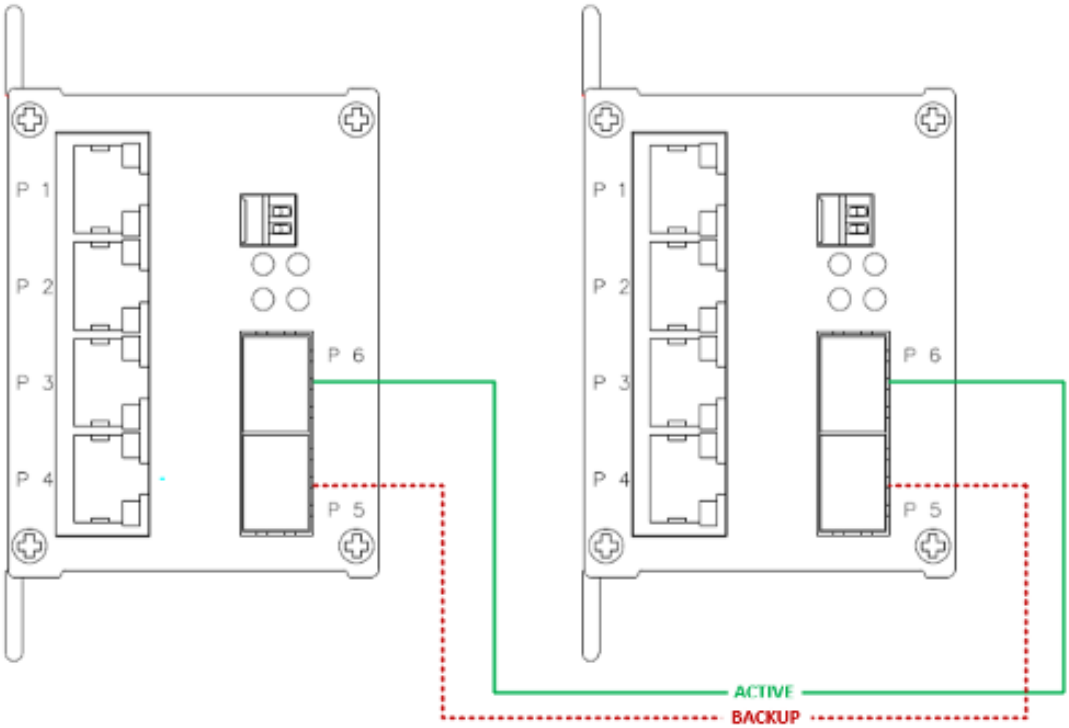
RSFP (switch 2)	Resulting Mode	Comment
Off	Fiber Ports are independent	All Ports Communicating
On	Fiber Ports 5 and 6 are Trunked	Port 6 is primary, Port 5 is failover

MUX Enabled (DIP switch 1 in ON Position)



RSFP Enabled (DIP switch 2 in On Position)

With RSFP (Switch 2) Enabled, the fiber ports will trunk and port 6 will be primary. Port 5 will be failover.



Graphical User Interface

This section provides instruction on accessing the HTML Web Site on the Media Converter.

Web Based Configuration

An embedded HTML Web Site resides in the flash memory on the CPU Board.

It contains HTML code that allows you to view and toggle settings on the Media Converter through a standard web browser.

Preparing for GUI Access

The default values are below:

IP Address: 192.168.10.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.10.254

Username: admin

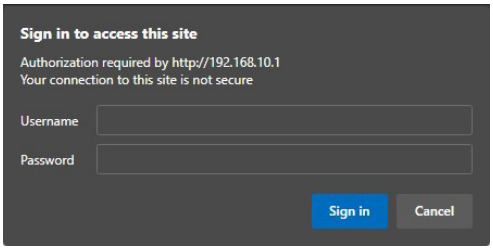
Password: admin

GUI Login

With a PC on the same subnet as the Media Converter, do the following to access the GUI.

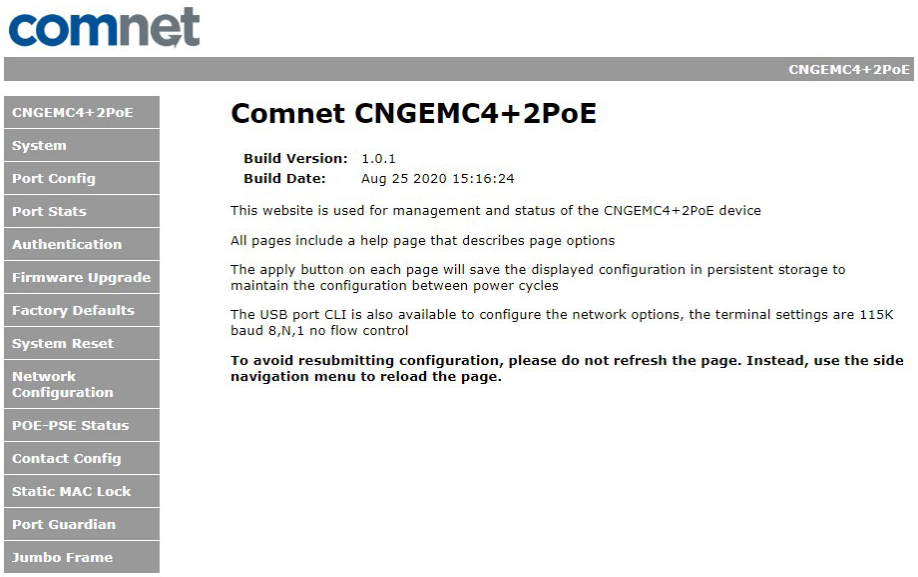
1. Launch your Web Browser.
2. Type HTTP:// and the IP address of the Media Converter, press enter.

3. The login screen appears.
4. Enter username and password, Default is “admin” for both.



5. Select Sign in or Enter, then the main interface of the web-based GUI appears.

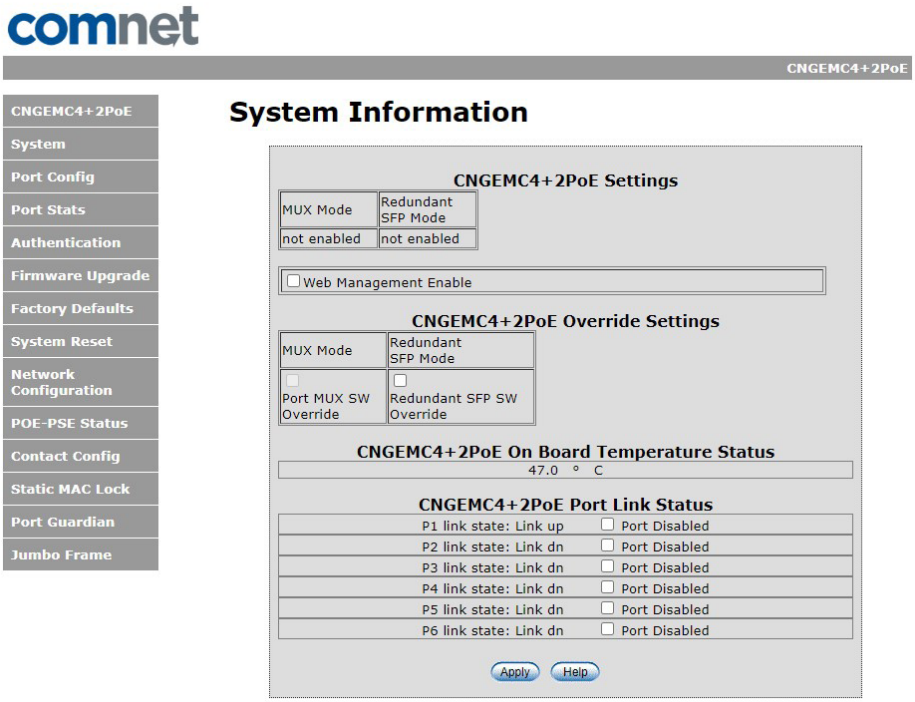
Main Interface



Main interface

System Information

The media converter system information is provided here.



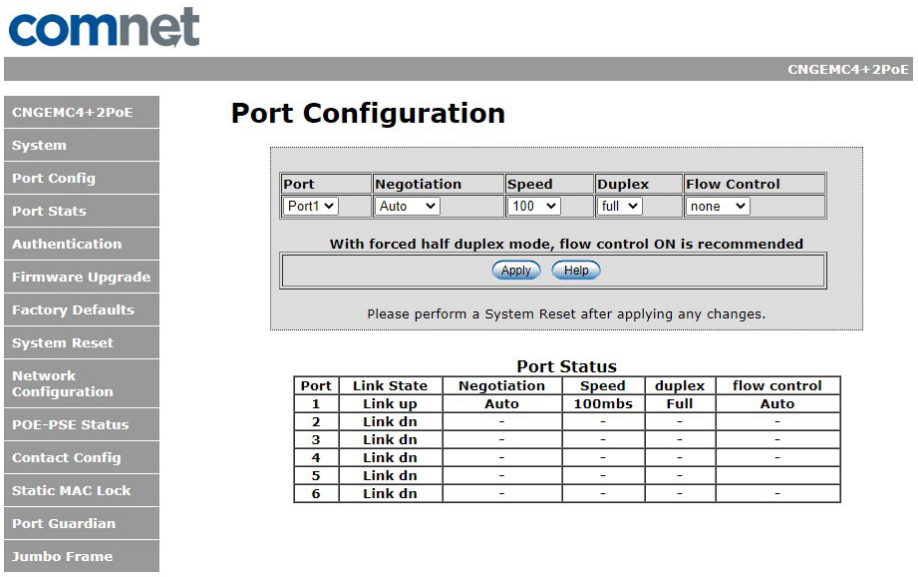
System Information interface

Label	Description
Settings	Summery MUX and Redundant SFP Mode States
Web Management Enable	Override of the DIP Switch Settings
Override Settings	With Web MGMT Enabled, these options will override MUX and RSFP
Temperature Status	Device internal board temperature reading
Port Link Status	Link status and port disable

Port Configuration

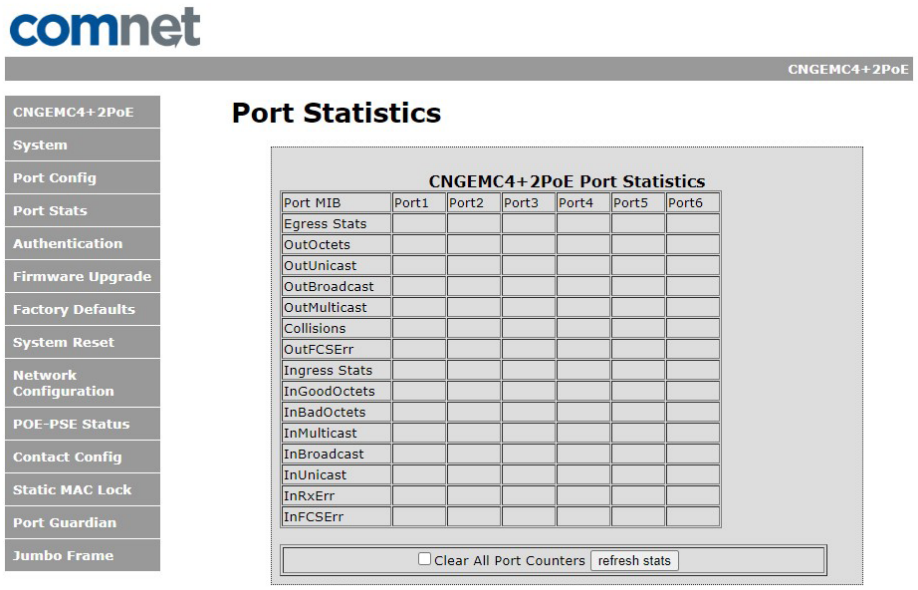
The Port Configuration page shows you current link state and settings.

By default, the Media Converter ports are set to auto negotiation, the user may force negotiation so they can select port speed, duplex, and flow control.



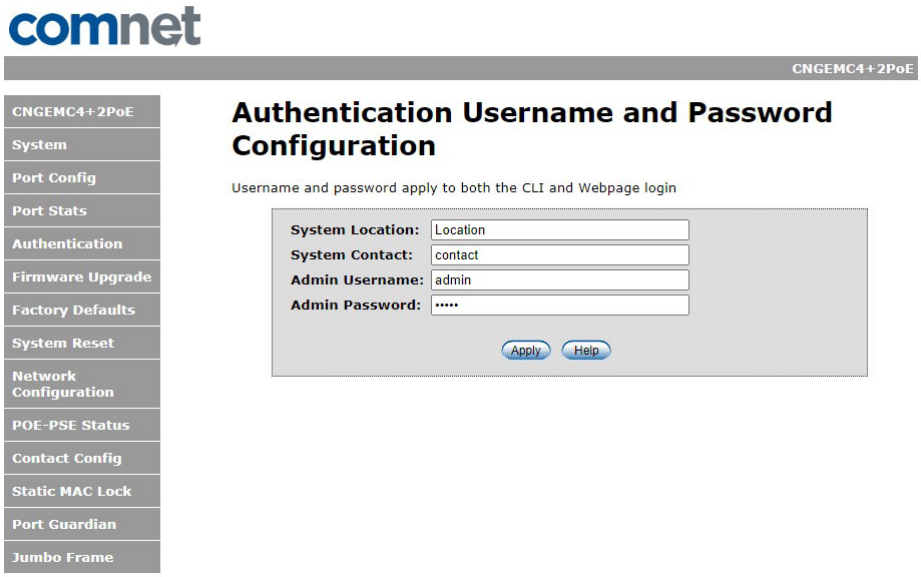
Port Statistics

Port Statistics displays packet counts per port. Refresh the screen to update statistics.



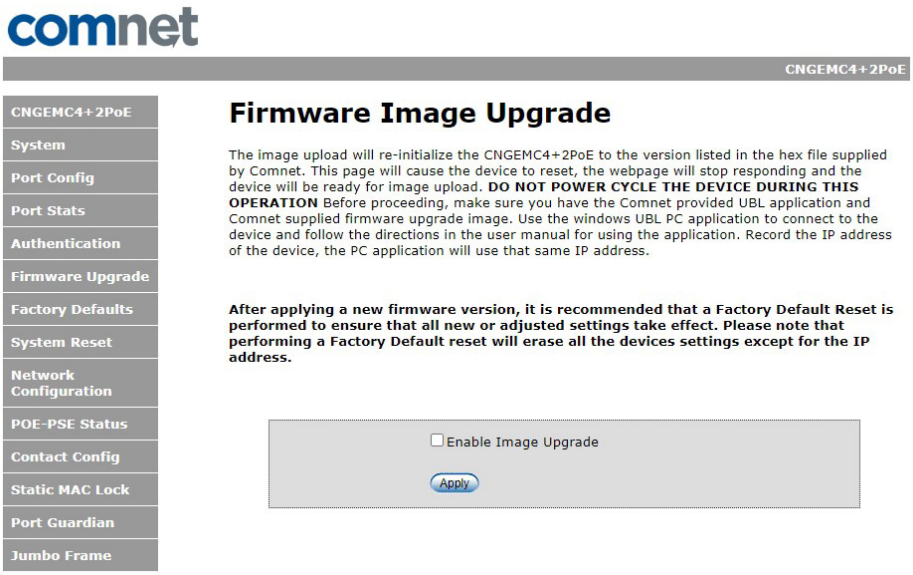
Authentication

The Authentication page allows you to change the username and password. All updates apply to both the GUI Webpage and Command Line Access.



Upgrade Firmware

Enable Image Upgrade allows you to update the firmware of the Media Converter. The firmware is upgraded using a bootloader provided by ComNet. The Enable Image Upgrade button must be enabled before the bootloader will connect to the Media Converter. RSFP is not available during the firmware update process so please observe the network topology before upgrading.



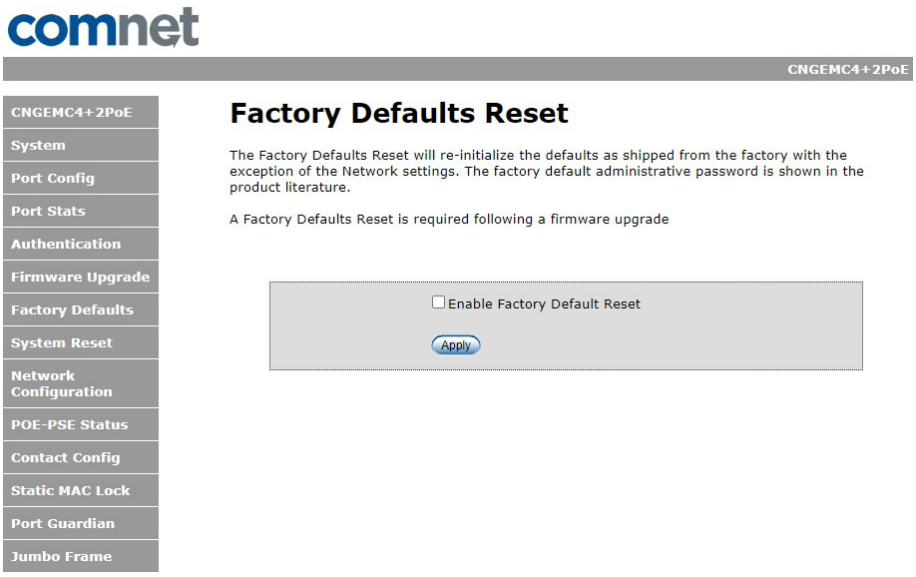
Details on how to use the upgrade bootloader is available in the Firmware Upgrade section.

After applying a new firmware version, it's recommended that a factory default reset is performed to ensure that all the new or adjusted settings take effect. Please note that performing a factory reset will erase all the device settings except for the IP address.

Warning Do not enable the firmware update process unless you have a firmware file available and are ready to upgrade the unit. Once this process is started it cannot be cancelled and if a new firmware is not uploaded to the unit it will be necessary to return the unit to the factory for re-programming.

Factory Defaults Reset

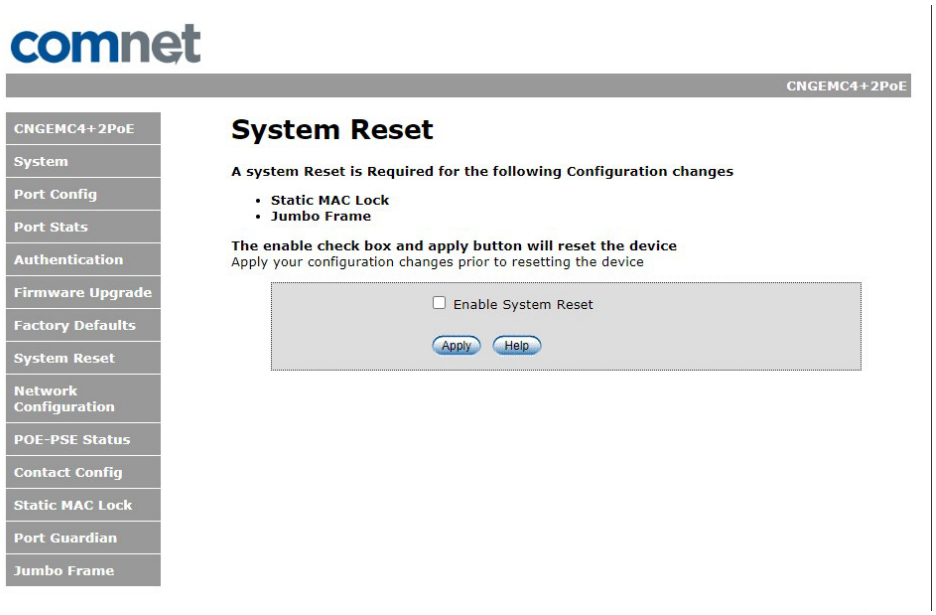
The factory default Reset feature restores the device to the original factory default values except for the network configuration settings.



System Reset

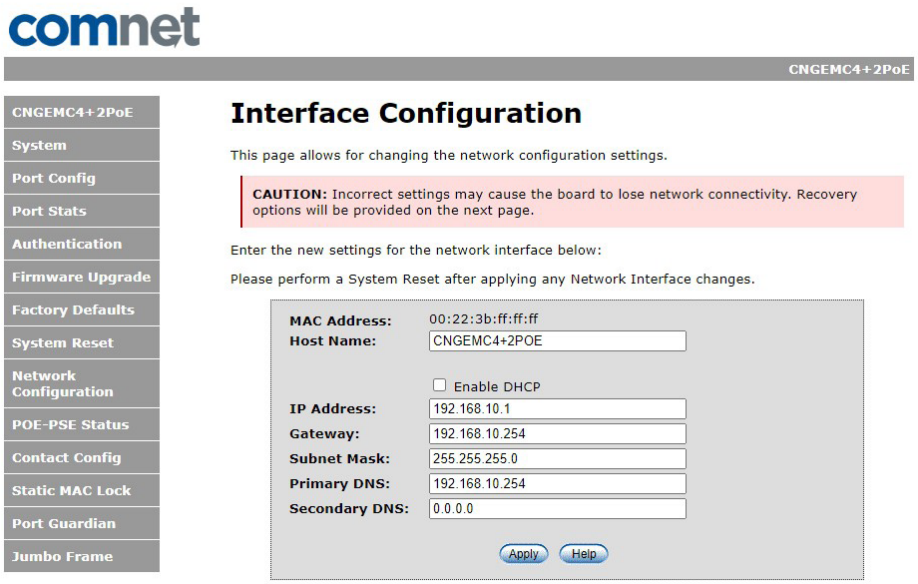
A System Reset is required for configuration of Jumbo Frames and the Static MAC Lock.

System reset is a soft reboot, system can take up to 15 seconds to fully power cycle.



System Reset interface

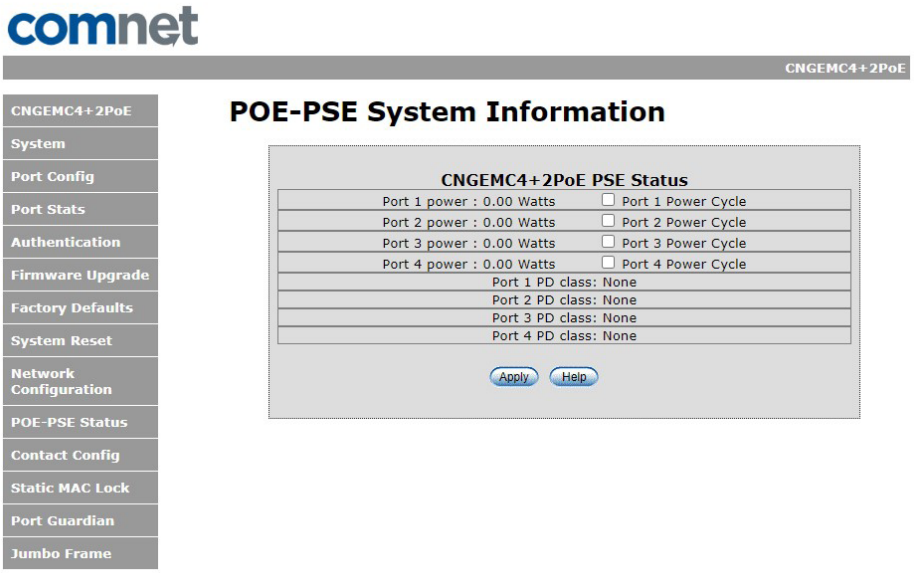
Network Interface Configuration



Label	Description
Host Name	Assign a name to the device
Enable DHCP	When DHCP Client function is enabled, the Media Converter will be assigned an IP Address from the network DHCP Server. The default IP will be replaced by the DHCP Address assigned to it.
IP Address	IP address of the media converter.
Gateway	Gateway Address for network traffic.
Subnet Mask	Subnet mask for the device.
Primary DNS	Assign the primary DNS IP address if needed
Secondary DNS	Backup DNS if needed

PoE-PSE Status

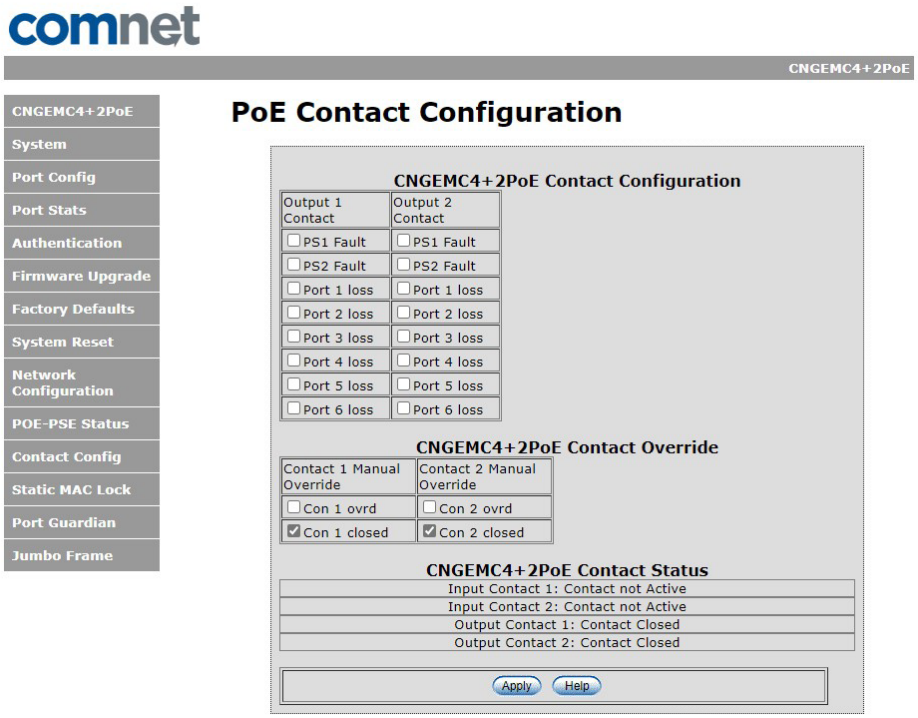
Only applies to the CNGEMC4+2POE[HO].



Label	Description
Port Power	Displays the amount of power being used
Port Power Cycle	Turns off PoE then enables to simulate a power cycle
Port PD Class	Displays the PoE Class being used by the PoE device
Force PoE	Enabled 60W of PoE (HO models only)

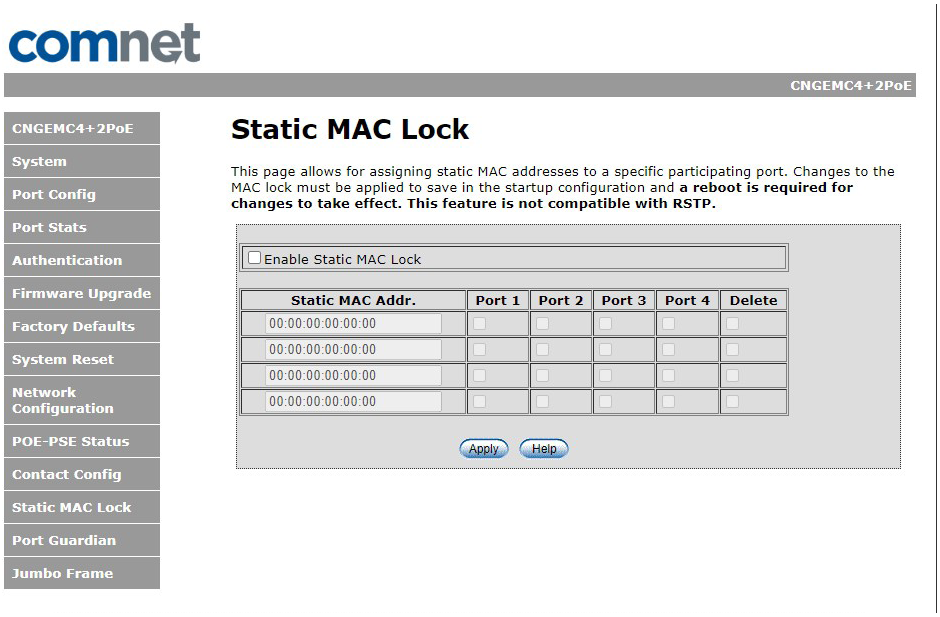
Warning: Please use Force PoE mode with caution and ensure it is only enabled when a 60W PoE Device is attached. It should only be enabled if the 60W devices fail to power up without this option enabled.

Contact Configuration



Label	Description
Output Contact	The faults that trigger the output contacts are fully configurable by selecting the source(s) to monitor
Contact Override	The contacts may also be forced to be an opened or closed state, the state box checked will close the contact when override is selected
Contact Status	The input and output contact states are displayed

Static MAC Lock

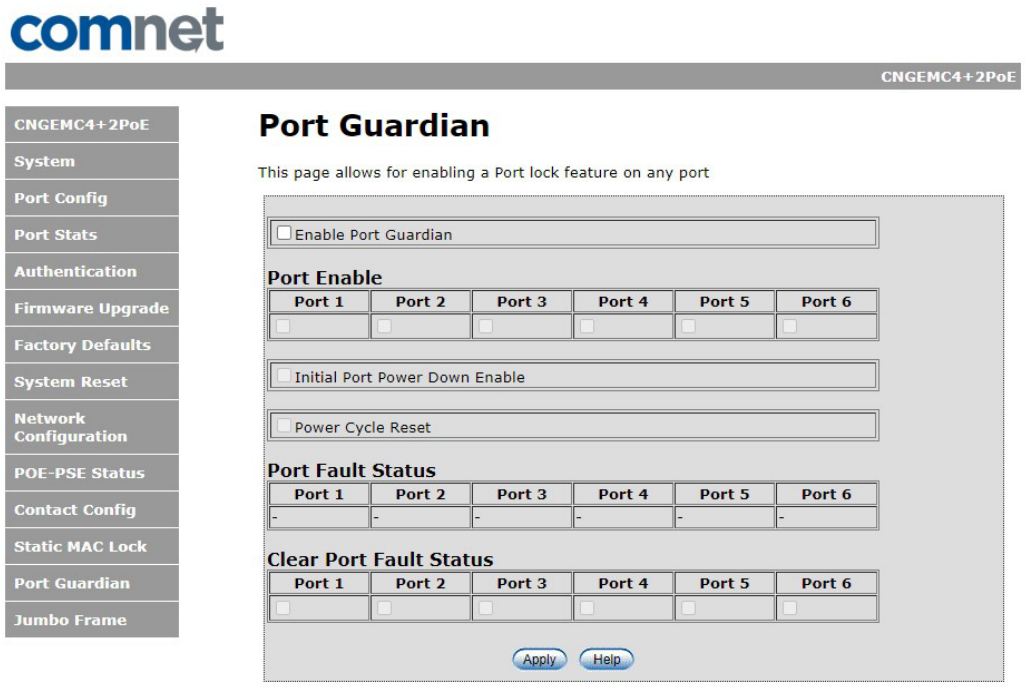


Label	Description
Enable Static MAC Lock	Enables Static MAC Locking
Static MAC Address	MAC Address of the device that is allowed to forward and receive traffic. Packets will be dropped for MAC addresses not listed in the table
Port Number	Ports to be included in the locked list

Port Guardian

The Port Guardian feature provides a high security managed port lock out mode and when enabled will power down the port as soon as a link loss status is detected when a cable is disconnected. This provides high security against network attack by an intruder who accesses the edge device and disconnects it to then try and connect their own intrusion device (laptop, network sniffer etc.).

To reset a port from a lock out state the network administrator can issue an SNMP reset or can reset a port by using the CLI via the USB serial port. In PoE models a reset can also be initiated by using one of the contact inputs.

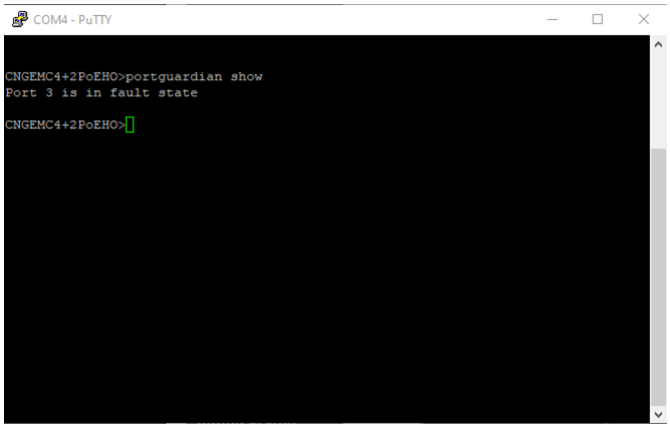


Label	Description
Enable	Enable the Port Guardian feature
Port Enable	Enable the Port Guardian feature on each port
Initial Port Power Down	If enabled, then any ports which are enabled for Port Guardian will be put into lock out state in the event of a power cycle. These ports would then need to be re-enabled by the administrator after a power cycle event.
Power Cycle Reset	If enabled, any ports which were in lock out state will be re-enabled after a power cycle
Port Fault Status	Displays the current port state. A “faulted” message indicates the port is disabled by Port Guardian
Clear Port Fault Status	Check and apply to clear a port faulted on a port

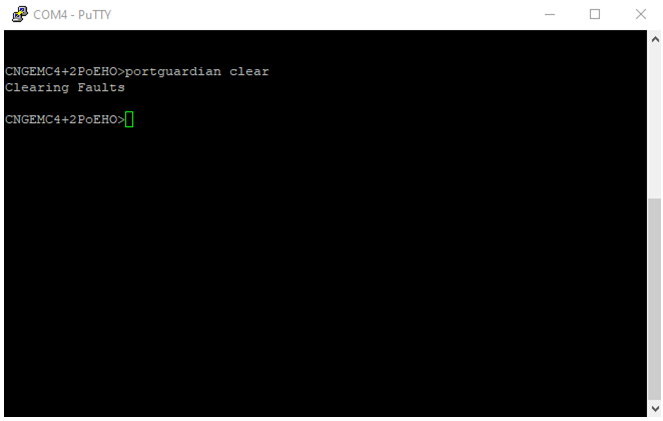
Port Guardian – CLI Reset

The Port Guardian feature can be cleared from the USB serial port connection on the unit through the CLI and also the port status can be displayed to show any ports that are in lock out state.

To access the Port Guardian CLI commands, connect to the CLI using the procedure described in the Command Line Interface Management section on page 48 and then use the commands described below.



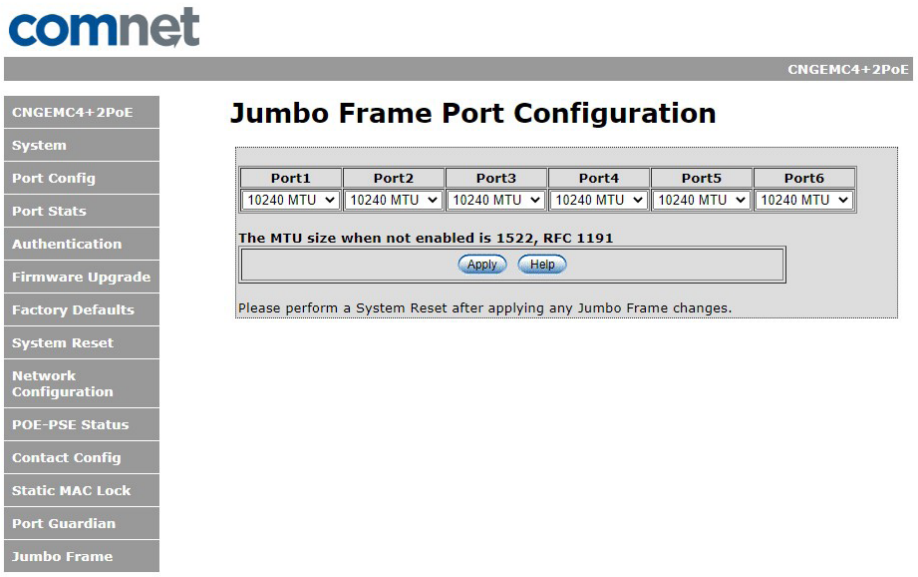
Command	Description
portguardian show	Will display any ports that are currently in port lockout fault state.



Command	Description
portguardian clear	Will clear any ports that were previously in port lockout fault state.

Jumbo Frame Port Configuration

Select port frame size (MTU). 10240 is the default for the device. To disable jumbo frame support, select “Not Enabled” on the appropriate port. That will default the MTU size to 1522.



Command Line Interface Management

How to access the Command Line Interface (CLI)

CLI access is provided by connecting a USB cable from a PC to the Media Converter.

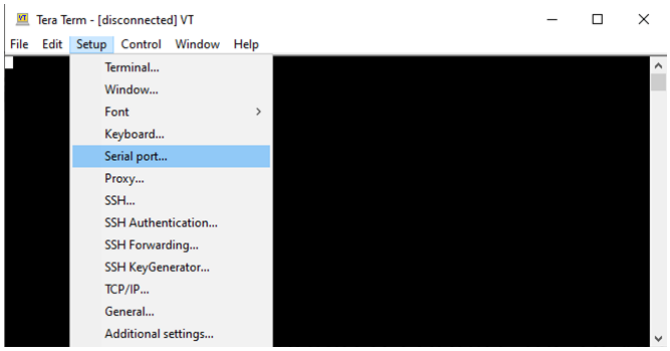
The PC should recognize the device and assign a COM Port to the device. Please refer to your PC documentation to determine which COM port was assigned to the media converter.

CLI Serial Settings (115200 Baud, 8, non, 1, none)

To connect to CLI, you will a terminal emulator application that can communicate using serial protocol. The following example will use Tera Term.

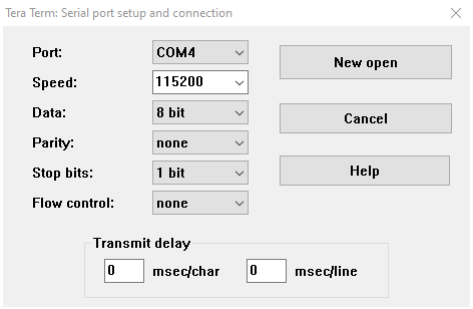
https://ttssh2.osdn.jp/index.html.en

Step 1. Download and install Tera Term.
Step 2. Connect PC to Media Converter, verify that a COM port was assigned to the device.
Step 3. Start Tera Term.
Step 4. Configure Serial Settings by Selecting Setup -> Serial



Step 5. Configure the following Settings.

Note: Select the appropriate COM port for your device.



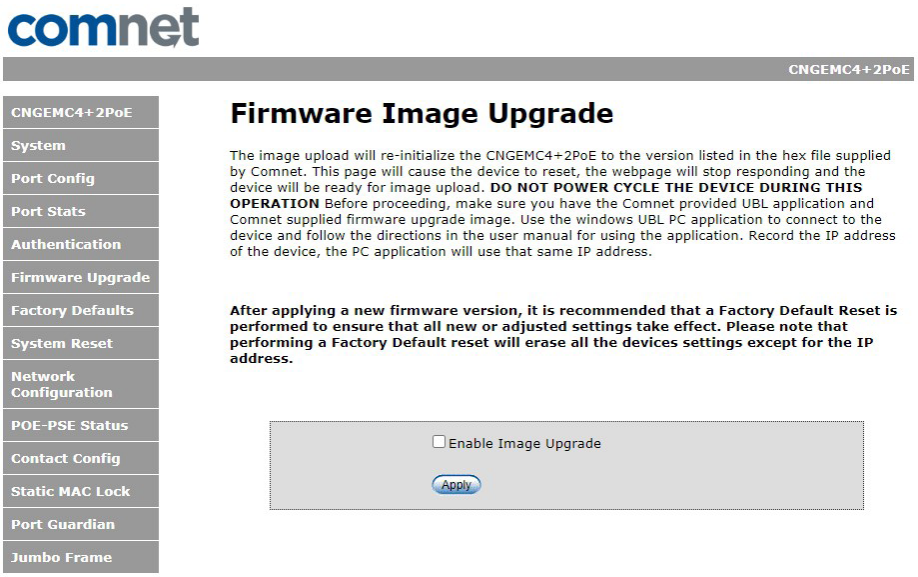
Step 6. Hit enter to initiate the connection and receive the Username prompt. After a successful login, you will be presented with a CLI prompt. Here is a list of some helpful commands:

Command	Description
netinfo	Displays the IP Address of the device
help	Displays a list of available command
setip	Update the IP Address on the device Format: setip <interface> <IP Address> <Subnet Mask> Example format: "setip eth0 10.10.10.10 255.255.255.0"

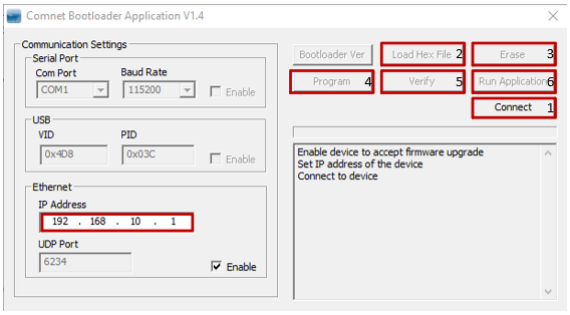
Firmware Upgrade Procedure

The steps for upgrading the unit with the push bootloader are as follows:

1. Bring up the web server and select the Firmware Upgrade tap. Check the "Enable Image Upgrade box.



2. Start the bootloader and verify the IP address listed is the same as your device. Update if needed.



Once IP Address is correct, click on connect (step 1) then follow the next steps:

Click Load Hex File (2)
Click Erase (3)
Click Program (4)
Click Verify (5)
Click Run Application (6)

Warning: Do not enable the firmware update process unless you have a firmware file available and are ready to upgrade the unit. Once the process is started, it cannot be cancelled and if a new firmware is not uploaded to the unit it will be necessary to return the unit to the factory for re-programming.

Technical Specifications

Interface	
SFP	2 × 1000Base-X SFP
RJ-45 Ports	2 × 10/100/1000Base-T(X), Auto MDI/MDIX
LED Indicators	Per Unit: Power x 2 (Green) RJ-45 Per Port: Link/Activity (Green/Blinking), 1000 Mbps Indicator (Amber) SFP Per Port: Link/Activity (Green/Blinking)
Power Requirements	
Input Voltage	Dual 48 – 57 VDC PoE, 9 – 36 VDC or 24 VAC non PoE
Current Draw	3.5A Max, With PoE, 1A w/out PoE
Reverse Polarity	Polarity Protection Present on terminal block on non-PoE Models only
Environmental	
Operating Temperature	-40 to +75 °C
Storage Temperature	-40 to +85 °C
Operating Humidity	5% to 95%, non-condensing
Mechanical	
Dimension	4.1 × 3.7 × 2.2 in (10.4 × 9.4 × 5.6 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

ComNet Customer Service
Customer Care is ComNet Technology's global service center, where our professional staff is ready to answer your questions at any time.

Email ComNet Global Service Center: customercare@comnet.net

comnet
Communication Networks

3 CORPORATE DRIVE | DANBURY, CT 06810 | USA
T: 203.796.5300 | F: 203.796.5303 | TECH SUPPORT: 1.888.678.9427 | INFO@COMNET.NET

8 TURNBERRY PARK ROAD | GILDERSOME | MORLEY | LEEDS, UK LS27 7LE
T: +44 (0)113 307 6400 | F: +44 (0)113 253 7462 | INFO-EUROPE@COMNET.NET

© 2020 Communications Networks Corporation. All Rights Reserved. "ComNet" and the "ComNet Logo" are registered trademarks of Communication Networks, LLC.