Omnitron Systems

Hierarchical Command Line Interface
for
All *OmniConverter*® and *RuggedNet*®
Managed Switch Products

USER MANUAL

Firmware Release 2.6

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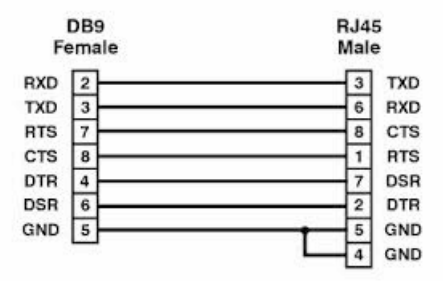
1.0 OVERVIEW

The Hierarchical Command Line Interface (CLI) provides configuration and monitoring for all OmniConverter and RuggedNet managed switch products.

The CLI can be accessed through the serial console port or through the Ethernet ports using Telnet or SSH.

To configure the module using the serial port, attach a DB-9 serial (RS-232) equipped computer with terminal emulation software such as Procomm or Putty to the serial port on the module using a RJ-45 to DB-9 serial cable (not included). Some computers do not come with DB-9 serial port connectors and may require a USB-to-serial port adapter.

The port is a standard RS-232 asynchronous serial interface. The serial ports is configured for 57,600bps, 1 stop, 8 data, parity none. The serial adapter cable pin-outs are illustrated below.



Standard RJ-45 to DB-9 serial cable pin-out

1.1 NEW FEATURES

Firmware 2.6 adds MODBUS functionality

Firmware 2.5 adds the Hierarchical CLI commands.

Firmware 2.4 adds DHCPv6 and DHCPv6 Relay functionality.

Firmware 2.3 adds IPv6, IPv6 Multicast Listener Discovery (MLD) Snooping, Multiple Spanning Tree Protocol (MSTP), PoE power management with LLDP MED and MDI TLV, and PoE Power Multi-Day Scheduler.

2.0 MODULE DEFAULT SETTINGS

Each module is configured with the following defaults:

IPv4

IP Address	192.168.1.220
IP Subnet Mask	255.255.255.0
IP Gateway	192.168.1.1

IPv6

IPv6 Interface	stateless
IPV6 Address	fe80::206:87ff:fe01:ec15
IPV6 Gateway Address	fe80::1

Protocols

IP	enabled
Telnet	enabled
FTP	disabled
DHCP Client	disabled
Flow Control	disabled

Passwords

Serial	public (username: admin)
FTP	public (username: admin)
Telnet	public (username: admin)
SSH	public (default username: admin)

SNMPv1/v2c Communities

Read Community Name	public
Write Community Name	private
SNMPv1/v2c agent	enabled

SNMPv3 Parameters

SNMPv3 agent	enabled
User 1 Type	admin
User 1 Name	admin
User 1 security level	noAuthNoPriv
User 1 privacy password	privateadmin
User 1 privacy encryption	DES
User 1 authentication password	privateadmin
User 1 authentication hashing	MD5

User 2 Type	read-only
User 2 Name	guest
User 2 security level	noAuthNoPriv
User 2 privacy password	publicguest
User 2 privacy encryption	DES
User 2 authentication password	publicguest
User 2 authentication hashing	MD5
User 3 Type	deny
User 3 Name	guest1
User 3 security level	noAuthNoPriv
User 3 privacy password	publicguest
User 3 privacy encryption	DES
User 3 authentication password	publicguest
User 3 authentication hashing	MD5
User 4 Type	deny
User 4 Name	guest2
User 4 security level	noAuthNoPriv
User 4 privacy password	publicguest
User 4 privacy encryption	DES
User 4 authentication password	publicguest
User 4 authentication hashing	MD5

General SNMP Parameters

SNMP trap type	SNMPv2c
SNMP UDP Trap Port Number	162

The switches support a common password per user account for the Serial Console, Telnet, FTP and SSH. The password is configured using the *user* command. Passwords for SNMPv1 are configured using the *snmp* command. It is highly recommended that the passwords be changed in order to prevent unauthorized access to the module.

Once accessed, the ***Password Entry*** screen is displayed. Type the username and password. Press <*ENTER*>.

```
Omnitron Systems Technology, Inc.                          GHPoEBT/Mi
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------------------------------------------------------------------------------

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------------------------------------------------------------------------------

IP address     192.168.1.220
MAC            00-06-87-02-87-50
Serial number  00720087

GHPoEBT/Mi login:
```

Module login screen and prompt will vary depending on the model.

3.0 HIERARCHICAL CLI COMMANDS

The hierarchical CLI is accessed from the standard CLI menu using the *nest* command. For information on the standard CLI, see Command Line Interface OmniConverter and RuggedNet switches User Manual (3xxxUM-01).

Enter *?* to view the options. To access the hierarchical CLI, type *nest*. To return to the standard CLI menu, type *exit*. When in the hierarchical CLI menu (# or cfg#), typing the *exit* command exits the current nesting level.

```
>

Command            Description
?                  command summary (same as help command)
aaa                authentication, authorization, accounting configuration
acl                access control list configuration for management access
bwp                bandwidth profile configuration
..
..
nest               hierarchical CLI session
..
..
user               user configuration
ver                version status
vlan               vlan configuration
x                  exit the CLI session
zone               time zone list

CLI keyboard shortcuts:
Ctrl+A      move the cursor to the beginning of the line
Ctrl+B      move the cursor backward one character
Ctrl+D      delete the character at the cursor
Ctrl+E      move the cursor to the end of the line
Ctrl+F      move the cursor forward one character
Ctrl+K      erase characters from the cursor to the end of the line
Ctrl+L      redisplay the current line on the console
Ctrl+N      or down arrow, display the next command in the commands history buffer
Ctrl+P      or up arrow, display the previous command in the commands history buffer
Ctrl+R      starts a new line with the same command previously shown
Ctrl+U      delete the whole line
Ctrl+W      delete the word to the left of the cursor
Ctrl+X      erase character from the cursor to the beginning of the line
Esc+F       move the cursor forward one word, skipping white space
Esc+B       move the cursor backward one word, skipping white space
Backspace   remove the character to the left of the cursor
```

The command prompt will change depending on the level of the hierarchical command structure. The standard CLI has a “>” prompt, the nest command has a “#” prompt and the configuration mode has a “<cfg>#” prompt. There are multiple prompts under the configuration mode.

To exit any level of the hierarchical command structure, enter the *exit* command. When *exit* is entered the next highest level of the hierarchical command structure will be entered. When *exit* is entered at the highest level of the hierarchical command structure “#” the standard CLI structure “>” will be entered.

Auto completion of a specific command is supported using the <tab> key and entering the *?* key. If the cursor is sitting at the end of or in the middle of a command option and the <tab> or the *?* key is entered, auto completion of a command will display: “Auto Completion Applied” if only one matching completion is available; “Possible Completions” if multiple completion options are available, followed by a list of valid options; “No Possible Completions Available” if there are no completion options available.

Hierarchical Command Structure

A command prompt indicates the nesting level. Command can be associated with multiple command prompts and nesting levels.

Commands are followed by user input entries and possible command line syntax values. Command line syntax is listed as [name:format], indicating a user defined configuration item.

name indicates the object name that is used in the command

format indicates the valid format for the object

A valid command line will be a prompt and a sequence of one or more objects.

Example:

(cfg)# aaa ty tacacs+ host [ipHost1:ipAddr]

(cfg)# configuration nesting level prompt

aaa ty tacacs+ host command string

[ipHost1:ipAddr] object name and format

Each command will have a syntax help table to assist with the required values.

General Command Syntax		
Prompt	Base Command	
>	nest	enters the hierarchical command structure
#	?	displays the list of available commands
#	no	negates a command
#	exit	exits current nesting level
#	config	enters the configuration mode
(cfg)#	?	displays the list of available commands
(cfg)#	no	negates a command
(cfg)#	exit	exits configuration mode
(cfg)#	port select <pNum>	enters the port configuration mode
(cfg-if)<pNum>	?	displays the list of available commands
(cfg-if)<pNum>	no	negates a command
(cfg-if)<pNum>	exit	exits port configuration mode

Other nesting levels are available depending on the command options. Each section covers the available nesting levels for that command option.

3.1 NEST

The *nest* command provides the ability to access the hierarchical commands.

```
> nest
Nesting level change accepted

#
```

The command options available using the *nest* command will be displayed by entering a *?* following the nesting prompt (#). Each command option supports a set of specific commands.

Enter a *?* after the command prompt to display the available command option under the # prompt.

```
# ?
Possible next parameters:
    config         enter configuration mode
    exit           exit current nesting level
    fwload         firmware load configuration
    mactable       mac table status
    no             negate a command
    ping           ping a remote device
    restart        restart module
    restore        restore module defaults
    save           save configuration changes into permanent memory
    serupdate      upload firmware update via the serial port
    show           show configured settings
    splash         splash screen user configuration
    time           time of day configuration
    traphost       snmp trap host configuration
    traps          snmp trap configuration

#
```

3.1.1 Configuration Mode (config)

The *config* command sets the module into the configuration mode, allowing access to the configuration command options.

```
# config
Nesting level change accepted

(cfg)#
```

Enter a *?* to display the available configuration command options.

```
(cfg)# ?

Possible next parameters:
    aaa             authentication, authorization, accounting configuration
    acl             access control list configuration for management access
    bwp             bandwidth profile configuration
    contact         contact closure status
    cos             class of service configuration
    ethertype       ethertype tag identification configuration
    exit            exit current nesting level
    igmp            internet group management protocol configuration
    ip              IP configuration
    lag             link aggregation group configuration
    lldp            link layer discovery protocol (LLDP) configuration
    location        location configuration
    lr              link redundancy configuration
    mld             multicast listener discovery configuration
    modbus          modbus tcp server configuration
    module          module global configuration
    mrp             media redundancy protocol (MRP) configuration
    no              negate a command
    port            port attribute configuration
    portaccess      port access configuration
    protocol        protocol configuration
    pse             PoE scheduler index value 1-100
    smtp            smtp configuration
    snmp            simple network management protocol user configuration
    sntp            simple network time protocol (SNTP) configuration
    spantree        spanning tree configuration
    ssh             secure shell (SSH) configuration
    stormcontrol    storm control configuration
    switch          physical DIP switch configuration
    switchport      vlan interface configuration
    syslog          system log message configuration
    user            user configuration
    vlan            vlan configuration

(cfg)#
```

The *exit* command option exits the current nesting level.

Not all commands are available depending on the model. PoE versus Non-PoE, RuggedNet versus OmniConverter.

3.1.1.1 AAA Command

The *aaa* command provides the ability to delete all configured AAA settings and restore to factory defaults, to select the configuration type and authentication method and enable RADIUS, TACACS+ and 802.1X. Use the *show aaa* command from the # prompt to determine the state of the protocol (disabled or enabled).

```
(cfg)# aaa
Possible next parameters:
    <cr>
    802.1x          port based access control (802.1X)
    dall            delete all aaa configured settings and restore defaults
    guestvlan       802.1X guest vlan authentication
    meth            authentication method
    radius          radius protocol
    tacacs+         TACACS+ protocol
    ty              configuration type
(cfg)# aaa


(cfg)# port select 1
Nesting level change accepted

cfg-if)[1]# aaa ty 802.1x
Possible next parameters:
    auth            802.1X reauthorize time
    guestvlan       802.1X guest vlan authentication
    ptype           port authentication mode
    retry           802.1X EAP retry time
    vid             guest VLAN ID
    xmode           802.1X mode

(cfg-if)[1]# aaa ty 802.1x
```

NOTE: Port number selection will vary depending on the model.

The command options available following the *aaa* command are shown below.

The *aaa* command option disables/enables AAA. The *no* command negates the command.

The *802.1x* command option disables/enables port based access control, default is disabled. The *no* command negates the command.

The *dall* command option deletes all AAA configured setting and restores factory defaults.

The *guestvlan* command option disables/enables guest VLAN access, default is disabled. The *no* command negates the command.

The *meth* command option selects the authentication method (*local, tacacs+ or radius*).

The *radius* command option disables/enables RADIUS (RFC 2865, RFC 2866), default is disabled. The *no* command negates the command.

The *tacacs+* command option disables/enables TACACS+, default is disabled. The *no* command negates the command.

The *ty* command option configures the AAA protocol type, TACACS+ or RADIUS.

tacacs+

host configures ip host server address

key configures the secret key for the server

l4 configures the layer 4 port number in the following order: authentication / authorization port (a1) and accounting port (a3)

to configures the server timeout before error declared. The default value is 60 seconds

radius

host configures ip host server address

key configures the secret key for the server

l4 configures the layer 4 port number in the following order: authentication / authorization port (a1) and accounting port (a3)

tran configures the number of RADIUS server request retries. The default is 2

to configures the server timeout before error declared. The default value is 60 seconds

Command options under the *port select <pNum> ty 802.1x* command.

The *auth* command option configures the 802.1X reauthorization timer. A zero value disables the timer.

The *guestvlan* command option enables guest VLAN access via 802.1X.

The *ptype* command option selects the port authentication mode:

auto configures 802.1X authentication on the port.

mac configures 802.1X MAC bypass authentication on the port.

on configures a port to be authorized, disabling 802.1X EAP.

off configures a port to be unauthorized, blocking the port permanently and disabling 802.1X EAP.

The *retry* command option configures the 802.1X retry time (1 to 60 seconds) for new EAP request identify PDU. The default time value is 30 seconds.

The *vid* command configures the guest VLAN ID.

The *xmode* command option configures how the 802.1X frames are handled.

discard when 802.1X is disabled, 802.1X frames are discarded.

peer when 802.1X is enabled and protocol is operating.

tunnel when 802.1X is disabled, 802.1X frames are tunneled.

The following command configures the IP address [ipHost1:ipAddr] of the RADIUS server.

```
(cfg)# aaa ty radius host [ipHost1:ipAddr]
```

The following command enables RADIUS.

```
(cfg)# aaa radius
```

To view the changes or display the AAA configuration settings, use the *show aaa* command from the # prompt.

AAA Command Syntax	
(cfg)# aaa	(cfg)# aaa ty radius key
(cfg)# no aaa	(cfg)# aaa ty radius key [aKey:string0..63]
(cfg)# aaa dall	(cfg)# aaa ty radius l4 [a1:1-65535] [a3:1-65535]
(cfg)# aaa guestvlan	(cfg)# aaa ty radius tran [rNum:0-10]
(cfg)# no aaa guestvlan	(cfg)# aaa ty radius to [toVal:1-60]
(cfg)# aaa radius	(cfg)# aaa meth [authList:authString]
(cfg)# no aaa radius	(cfg)# port select <pNum> (accesses next nesting level)
(cfg)# aaa tacacs+	(cfg-if)>pNum># aaa ty 802.1x ptype auto
(cfg)# no aaa tacacs+	(cfg-if)>pNum># aaa ty 802.1x ptype mac
(cfg)# aaa 802.1x	(cfg-if)>pNum># aaa ty 802.1x ptype on
(cfg)# no aaa 802.1x	(cfg-if)>pNum># aaa ty 802.1x ptype off
(cfg)# aaa ty tacacs+ host	(cfg-if)>pNum># aaa ty 802.1x auth [aTime:0-65535]
(cfg)# aaa ty tacacs+ host [ipHost1:ipAddr]	(cfg-if)>pNum># aaa ty 802.1x retry [rTime:1-60]
(cfg)# aaa ty tacacs+ key [aKey:string0..63]	(cfg-if)>pNum># aaa ty 802.1x vid [gVid:1-4095]
(cfg)# aaa ty tacacs+ key	(cfg-if)>pNum># aaa ty 802.1x xmode discard
(cfg)# aaa ty tacacs+ l4 [a1:1-65535] [a3:1-65535]	(cfg-if)>pNum># aaa ty 802.1x xmode peer
(cfg)# aaa ty tacacs+ to [toVal:1-60]	(cfg-if)>pNum># aaa ty 802.1x xmode tunnel
(cfg)# aaa ty radius host	(cfg-if)>pNum># aaa ty 802.1x guestvlan
(cfg)# aaa ty radius host [ipHost1:ipAddr]	(cfg-if)>pNum># no aaa ty 802.1x guestvlan
(cfg)# aaa ty radius host [ipHost1:ipAddr] [ipHost2:ipAddr]	

Syntax	Name Description	Format Values
[ipHost1:ipAddr]	ip host address 1	ipv4 or ipv6 address
[ipHost2:ipAddr]	ip host address 2	ipv4 or ipv6 address
[aKey:string0..63]	server key	string 0-63 characters
[a1:1-65535]	authentication/authorization port #	1-65535
[a3:1-65535]	accounting port #	1-65535
[toVal:1-60]	server timeout before error declared	1-60 sec
[rNum:0-10]	RADIUS server request retry count	0-10 sec
[authList:authString]	authentication list	local, tacacs, or radius with commas
[aTime:0-65535]	802.1X reauthorize time	0-65535 sec
[rTime:1-60]	802.1X EAP retry time	1-60 sec
[gVid:1-4095]	guest VLAN ID	1-4095

3.1.1.2 ACL Command

The *acl* command provides the ability to enable/disable default ACL behavior, delete all ACL configured settings and restore to factory defaults and add/modify or delete an ACL instance. Use the *show acl* command from the # prompt to determine the state of each command option (disabled or enabled).

```
(cfg)# acl ?
Possible next parameters:
    <cr>
    dflt            default for items not found in ACL list
    dall            delete ACL configured settings, instances, restore defaults
    index           ACL instance

(cfg)# acl


(cfg)# acl index 1
Nesting level change accepted

(cfg-acl)[1]# ?
Possible next parameters:
    dst             TCP/UDP destination port
    exit            exit ACL instance
    ipend           end IP address
    ipsrc           source IP address
    prefix          subnet mask or prefix length
    proto           protocol
    ty              ACL access type

(cfg-acl)[1]#
```

The command options available following the *acl* command are shown below.

The *acl* command option disables/enables ACL. The *no* command negates the command.

The *dall* command option deletes all configured ACL filters and restores factory defaults.

The *dflt* command option selects a default behavior for items not found in the ACL list. The default is permit.

The *index* command option allows the configuration of ACL instances. The *no* command negates the command.

Command options under the *index idx ins* command.

The *dst* command option selects a TCP or UDP destination port number for an ACL filter.

The *exit* command option exits the current nesting level.

The *ipend* command option configures the IP end address for an ACL filter.

The *ipsrc* command option configures the IP source address for an ACL filter. The source IP address for ARP is the Send IP Address.

The *prefix* command option configures the subnet mask of prefix length.

The *proto* command option configures the protocol as *arp*, *icmp*, *ip*, *tcp* or *udp*.

The *ty* command option configures the ACL access type as *deny* or *permit*.

To allow access to a device, the module must be configured to allow (permit) ARP and IP. Since ICMP is part of the IP protocol, it must be explicitly excluded. ACL filters are processed in the order displayed.

```
(cfg)# acl dall

(cfg)# acl index 1
(cfg-acl)[1]# ipsrc 172.16.9.1
(cfg-acl)[1]# ipend 172.16.9.5
(cfg-acl)[1]# proto icmp
(cfg-acl)[1]# ty deny
(cfg-acl)[1]# exit

(cfg)# acl index 2
(cfg-acl)[2]# ipsrc 172.16.9.1
(cfg-acl)[2]# ipend 172.16.9.5
(cfg-acl)[2]# proto ip
(cfg-acl)[2]# ty permit
(cfg-acl)[2]# exit

(cfg)# acl index 3
(cfg-acl)[3]# ipsrc 172.16.9.5
(cfg-acl)[3]# prefix 24
(cfg-acl)[3]# proto arp
(cfg-acl)[3]# ty permit
(cfg-acl)[3]# exit
```

To view the changes or display the ACL configuration settings, use the *show acl* command from the # prompt.

It is recommended that ACL policies be added prior to enabling ACLs to avoid the possible loss of connectivity to the module while accessing the module using the Ethernet interface.

ACL Command Syntax	
(cfg)# acl	(cfg-acl)# ipend [ipAddr:ipAddr]
(cfg)# no acl	(cfg-acl)# ipend [ipAddr:ipAddr]
(cfg)# acl dflt permit	(cfg-acl)# prefix [plen:1-128]
(cfg)# acl dflt deny	(cfg-acl)# ty permit
(cfg)# acl dall	(cfg-acl)# ty deny
(cfg)# no acl index [idx:1-200]	(cfg-acl)# proto arp
(cfg)# acl index [idx:1-200]	(cfg-acl)# proto icmp
(cfg)# acl index [idx] (accesses next nesting level)	(cfg-acl)# proto ip
(cfg-acl)# acl index [idx:1-200]	(cfg-acl)# proto tcp
(cfg-acl)# acl index [idx:1-200] ins	(cfg-acl)# proto udp
(cfg-acl)# ipsrc [ipAddr:ipAddr]	(cfg-acl)# dst [ipPort:_1-65535]
(cfg-acl)# ipend	(cfg-acl)# exit

Syntax	**Name Description**	**Format Values**
[idx:1-200]	ACL add/modify/delete instance #	ipv4 address
[ipAddr:ipAddr]	source or end IP address value	ipv4 address
[plen:1-128]	subnet mask or prefix length value	1-128
[ipPort:-1-65535]	TCP/UDP destination port value or #	1-65535

3.1.1.3 BWP Command

The *bwp* command provides the ability to configure bandwidth profiles associated with each port. Bandwidth profiles control the amount of bandwidth allowed to each port.

```
(cfg)# bwp ?
Possible next parameters:
    dall          delete bandwidth configured settings, restore defaults
    fwmix         port queue global fairweight mixture

(cfg)# bwp


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# bwp
Possible next parameters:
    cbs           committed burst size in KB
    cir           committed ingress information rate in kb/sec
    cn            class of service name
    ecir          committed egress information rate
    epol          egress policing type, L1, L2, or L3
    perf          traffic performance monitoring
    pol           ingress policing count type
    que           type of egress queue

(cfg-if)[1]# bwp
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *bwp* command are shown below.

The *dall* command option deletes all configured bandwidth profiles.

The *fxmix* command option configures the global fairweight mix for queues 7 - 0 and is used when *que fairweight fw* or *que qlist fw* is selected. All eight egress queue must be defined by the command q7,q6,q5,q4,q3,q2,q1,q0 where qx indicates the weight for the specific queue (0-100 are valid entries. The sum of all weighed values is 128 or less). The queues are separated by a comma (,).

Command options under the *port select <pNum>* command.

The *cbs* command option sets the Committed Burst Size (maximum number of bytes allowed) of the ingress frames.

The *cir* command option sets the Committed Information Rate of the ingress frames.

The *cn* command option associates a configured Class of Service profile to the select port. The *no* command negates the command.

The *ecir* command option configures the Committed Information Rate of the egress frames.

The *epol* command option configures the egress policing type used. The options are 11, l2 or l3. The default is L2.

The *perf* command option disables/enables traffic performance monitoring. The *no* command negates the command. Use the *show bwp* command from the # prompt to determine the state of the command option (disabled or enabled).

The *pol* command option configures the policing count as layer 1 (frame + interframe gap + preamble), layer 2 or layer 3 frame types on a per port basis.

The *que* command option configures the type of egress queueing used (fairweight, starving or individually configured).

fairweight all queues are setup for weighted fair queuing using the *fwmix* setting

starving all queues are set up to starving (strict) priority

qlist each of the eight queues are set up individually: q7,q6,q5,q4, q3, q2, q1,q0 where qx can be one of two values (sp or fw):

sp queue is set to strict priority. The listing of strict priority queues starts at highest priority queue (queue 7) and can only be selected from the highest queue sequentially without mixtures of weighted values between strict priority queues

fw queue is set to fairweight priority

the following are some legal combinations:

fw,fw,fw,fw,fw,fw,fw,fw (default fairweight)

sp,sp,sp,sp,sp,sp,sp,sp (default starving)

sp,sp,fw,fw,fw,fw,fw,fw

sp,sp,sp,sp,fw,fw,fw,fw

the following are not a legal combinations:

sp,fw,fw,sp,fw,fw,fw,fw

fw,sp,sp,sp,sp,sp,sp

sp,fw,fw,fw,fw,fw,fw,sp

the actual weight for a queue type of *fw* is from the respective queue weight from the *fwmix* setting

To configure a bandwidth profile with performance monitoring on Port 1 for 500Mbps, use the following commands.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# bwp cir 5000

(cfg-if)[1]# bwp perf

(cfg-if)[1]#
```

Performance monitoring provides information on in and out of profile traffic based on the bandwidth profile.

To view the changes or display the BWP configuration settings, use the *show bwp* command from the # prompt.

BWP Command Syntax	
(cfg)# bwp dall	(cfg-if)<pNum># bwp epol l2
(cfg)# bwp fwmix [mVal:mx,mx,mx,mx,mx,mx,mx,mx]	(cfg-if)<pNum># bwp epol l3
(cfg)# port select <pNum> (accesses next nesting level)	(cfg-if)<pNum># bwp cir [cirRate:64-10000000]
(cfg-if)<pNum># bwp cn [cName:string0..45]	(cfg-if)<pNum># bwp cbs [cbsSize:2-256]
(cfg-if)<pNum># no bwp cn	(cfg-if)<pNum># bwp pol l1
(cfg-if)<pNum># bwp que fairweight	(cfg-if)<pNum># bwp pol l2
(cfg-if)<pNum># bwp que starving	(cfg-if)<pNum># bwp pol l3
(cfg-if)<pNum># bwp que qlist [qval:qx,qx,qx,qx,qx,qx,qx,qx]	(cfg-if)<pNum># bwp perf
(cfg-if)<pNum># bwp ecir [cirRate:0,64-10000000]	(cfg-if)<pNum># no bwp perf
(cfg-if)<pNum># bwp ecir [cirRate:0,64-10000000] [equeue:0-7]	(cfg-if)<pNum># exit
(cfg-if)<pNum># bwp epol l1	

Syntax	Name Description	Format Values
[mVal:mx,mx,mx,mx,mx,mx,mx,mx]	Eight global queue	0-100, separated by commas
[cName:string0..45]	class of service name	string 0-45 characters
[qval:qx,qx,qx,qx,qx,qx, qx,qx]	Eight queues q7-q0	fw or sp, separated by commas
[cirRate:0-10000000]	committed egress information rate	0-10000000 kb/sec
[equeue:0-7]	egress queue selection	0-7
[cirRate:64-10000000]	committed ingress information rate	64-10000000 kb/sec
[cbsSize:2-256]	committed burst size	2-256 KB

3.1.1.4 CONTACT Command

Only supported on the RuggedNet switch products.

The *contact* command provides the ability to assign a failure types and names to the contact closure and digital input.

```
(cfg)# contact
Possible next parameters:
    dall          delete 'contact' configured settings, restore defaults
    mode          contact closure alarm output mode
    nmc           name of the normally closed relay
    nmi           name of the digital input sense
    nmo           name of the normally open relay

(cfg)# contact
```

The command options available using the *contact* command are shown below.

The *dall* command option deletes all contact configured settings and restores factory defaults.

The *mode* command option selects the type of error that will cause the output relay to close; force, input, none, power, temp. Multiple selections can be entered.

forced	manually close the relay
input	an error condition is declared when the alarm input is detected as closed
none	function is disabled
power	an error condition is declared when the internal power is greater or less than 5% of nominal input voltage
temp	an error condition is declared when a temperature violation is detected

The *nmc* command option configures the name of the normally closed relay contacts.

The *nmi* command option configures the name for the alarm input.

The *nmo* command option configures the name for the normally opened relay contacts.

To name the alarm input, use the following command.

```
(cfg)# contact nmi "open door alarm"
```

To configure the alarm relay to activate on the alarm input detection, use the following command.

```
(cfg)# contact mode input
```

To view the changes or display the CONTACT configuration settings, use the *show contact* command from the # prompt.

Contact Command Syntax	
(cfg)# contact dall	(cfg)# contact mode power temp
(cfg)# contact mode none	(cfg)# contact mode temp
(cfg)# contact mode force	(cfg)# contact nmc
(cfg)# contact mode input	(cfg)# contact nmc [cName:string0..64]
(cfg)# contact mode input power	(cfg)# contact nmi
(cfg)# contact mode input temp	(cfg)# contact nmi [cName:string0..64]
(cfg)# contact mode input power temp	(cfg)# contact nmo
(cfg)# contact mode power	(cfg)# contact nmo [cName:string0..64]

Syntax	Name Description	Format Values
[cName:string0..64]	name of the relay or alarm input	string 0-64 characters

3.1.1.5 COS Command

The *cos* command provides the ability to configure Class of Service profiles that can be associated with a configured bandwidth profile.

```
(cfg)# cos ?
Possible next parameters:
    dall          delete CoS configured settings, instances, restore defaults
    name          class of service identier

(cfg)# cos


(cfg)# cos name voice
Nesting level change accepted

(cfg-cos)[voice]# ?
Possible next parameters:
    dflt          default class classification
    dscp          layer 3 IP priority
    exit          exit CoS instance
    mode          mode classification mode
    pcp           layer 2 priority bits

(cfg-cos)[voice]#
```

The command options available using the *cos* command are shown below.

The *dall* command option deletes all configured CoS profiles and restores factory defaults.

The *name* command option configures the name of the class of service profile. The *no* command negates the command.

Command options under the *name <cName>* command.

The *dflt* command option modifies the default class classification. Ingress frames not meeting any configured CoS profile is assigned the default class classification.

The *dscp* command option sets the profile based on the IP priority bits of the ingress frame.

The *exit* command option exits the current nesting level.

The *mode* command option configures the ingress classification mode.

ip	selects IP only classification (DSCP), layer 2 classification is ignored
ipoverl2	selects IP classification (DSCP) priority over layer 2 classification (PCP) if both are present
l2	selects layer 2 classification (PCP) only, IP classification is ignored
l2overip	select layer 2 classification (PCP) over IP classification (DSCP), if both are present
none	neither layer 2 or IP classification are used

On an access port, only untagged frames are accepted with the following format: Data.

On a tunnel port, zero or one tag is allowed for DSCP selection with the following formats: Data Only or Ethertype (8100) and Data.

On a trunk port, zero, one, or two layers of tags are allowed for DSCP selection with the following formats: Data Only or Ethertype (8100) and Data or Ethertype (88a8) and Data or Ethertype (88a8) and Ethertype (8100) and Data or Ethertype (8100) and Ethertype (8100) and Data.

The default CoS classification of Layer2 over IP classification indicates mapping Layer 2 PCP to their respective queues, i.e. PCP 0 to queue 0, PCP 1 to queue 1, etc. and if not tagged then IP DSCP 0x00-0x07 is mapped to queue 0, 0x08-0x0f to queue 1, etc.

If a CoS is assigned to a port those associations that are defined are mapped to the explicit egress queue defined. Received traffic that does not match one of the defined associations is mapped to the default queue.

If no CoS is assigned to a port, the egress frame will use the default CoS classification value of 1. The *pcp* command option sets the profile based on the PCP bit of the ingress frame.

The *pcp* command option sets the priority and class of the PCP bit of the ingress frame.

Multiple CoS profile filters with the same name can be configured and applied to a single port by associating the CoS profile with a Bandwidth profile. If the ingress frame does not meet any of the configured CoS profiles, the ingress traffic will use the default class classification.

To configure a class of service profile, use the following commands.

```
(cfg)# cos name data
Nesting level change accepted

(cfg-cos)[data]# pcp 0..1 class 0
(cfg-cos)[data]# pcp 2..3 class 2
(cfg-cos)[data]# pcp 4..6 class 4
(cfg-cos)[data]# pcp 7 class 7

(cfg-cos)[data]#
```

To view the changes or display the COS configuration settings, use the *show cos* command from the # prompt.

COS Command Syntax	
(cfg)# cos dall	(cfg-cos)<cName># mode ipoverl2
(cfg)# no cos name [cName:string1..45]	(cfg-cos)<cName># mode l2
(cfg)# cos name [cName] (accesses next nesting level)	(cfg-cos)<cName># mode l2overip
(cfg-cos)<cName># pcp [pcpList:0..7|none] class [cClass:0-7]	(cfg-cos)<cName># mode none
(cfg-cos)<cName># pcp [pcpList:0..7|none] class [cClass:0-7]	(cfg-cos)<cName># dflt [class:0-7]
(cfg-cos)<cName># dscp [dList:0..63|none] class [cClass:0-7]	(cfg-cos)<cName># exit
(cfg-cos)<cName># mode ip	

Syntax	**Name Description**	**Format Values**
[cName:string1..45]	class of service name	string 1-45 characters
[pcpList:0..7|none]	layer 2 priority bits	0-7,none
[dList:0..63|none]	layer 3 IP priority	0-63, none
[class:0-7] or [cClass:0-7]	CoS classification	0-7

3.1.1.6 ETHERTYPE Command

The *ethertype* command provides the ability to configure the protocol used to encapsulate a VLAN tagged frame. Ethertype is a two-octet field in an Ethernet frame indicating which protocol is used to encapsulate tag information in the frame data.

```
(cfg)# ethertype ?
Possible next parameters:
    dall          delete ethertype configured settings, restore defaults
    trunk         provider network Ethertype

(cfg)# ethertype
```

The options available using the *ethertype* command are shown below.

The *dall* command option deletes all configured ethertype settings and restores to factory defaults.

The *trunk* command option configures the Ethertype for provider tagged frames. The default is 8100.

Use the following commands to configure the provider tag for a Ethertype value of 88a8.

```
(cfg)# ethertype trunk 88a8
```

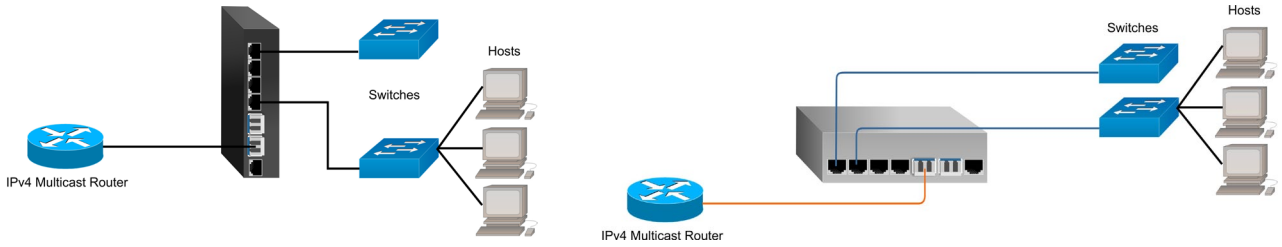
To view the changes or display the ETHERTYPE configuration settings, use the *show ethertype* command from the # prompt.

Ethertype Command Syntax	
(cfg)# ethertype dall	(cfg)# ethertype trunk [ethertypeVal:hex16]

Syntax	**Name Description**	**Format Values**
[ethertypeVal:hex16]	provider network Ethertype	4 ascii hex characters

3.1.1.7 IGMP Command

The module supports IGMPv1, v2, or v3 IPv4 snooping based upon RFC 4541, which defines the basic operation of an IGMP snooping switch. IGMP is used to modify the default router behavior for IPv4 Multicast Packets which are flooded to all ports. IGMP provides a method for forwarding IPv4 Multicast Packets to only the ports with hosts that want to receive the packets. IGMP communications occur between IPv4 Multicast Routers and Hosts.



IPv4 Multicast Packets have an address range of 224.0.0.0 to 239.255.255.255.

The *igmp* command provides the ability to configure IGMP on the module. Use the *show igmp* command from the # prompt to determine the state of each command option (disabled or enabled).

```
(cfg)# igmp ?
Possible next parameters:
    dall            delete IGMP settings, instances, restore defaults
    flood           flooding of all unrecognized IGMP groups
    snooping        IGMP snooping
    to              IGMP route aging in seconds
    vid             VLAN ID

(cfg)# igmp


(cfg)# igmp vid 1 grp 224.0.0.1
Nesting level change accepted

(cfg-igmp) [vid 1, 224.0.0.1]# ?
Possible next parameters:
    aging           IGMP route subject to aging out
    exit            exit IGMP instance
    no              negate a command
    ph              host port
    pr              router port

(cfg-igmp) [vid 1, 224.0.0.1]#
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *igmp* command are shown below.

The *dall* command option deletes all IGMP configured settings and restore factory defaults.

The *flood* command option disables/enables flooding of unrecognized IGMP routes. The *no* command negates the command.

The *snooping* command option disables/enables IGMP snooping. The *no* command negates the command.

The *to* command option selects the timeout value in seconds to automatically remove a route from the forwarding database. The timeout never expires with a value of 0.

The *vid* command option selects the VLAN ID. The *no* command negates the command.

Command options under the *vid <vVid> grp <ipAddr>* command.

The *aging* command option selects the timeout value in seconds to automatically remove a route from the forwarding database. The timeout never expires with a value of 0. The *no* command negates the command.

The *exit* command option exits the current nesting level.

The *no* command option negates a command.

The *ph* command option selects the host port(s) on the module for a defined route.

The *pr* command option selects the router port(s) on the module for a defined route.

To automatically enable IGMP snooping on a VLAN ID, use the following commands.

```
(cfg)# igmp vid 1
(cfg)# igmp snooping
```

To manually configure a IGMP route with the multicast IP address of 255.100.100.1 and the multicast router and host ports.

```
(cfg)# igmp vid 1 grp 225.100.100.1
(cfg-igmp) [vid 1, 225.100.100.1]# pr 1
(cfg-igmp) [vid 1, 225.100.100.1]# ph 3
(cfg-igmp) [vid 1, 225.100.100.1]# exit

(cfg-igmp)#exit

(cfg)#
```

To view the changes or display the IGMP configuration settings, use the *show igmp* command from the # prompt.

There are common variables that are shared between the IGMP and MLD protocols. The variables are Snooping (enable / disable), Flooding Unrecognized Groups (enable / disabled) and Route Aging timer. If either protocol changes the shared variables, they will be changed under both protocols (IGMP and MLD). Example: If Snooping is enabled under MLD, Snooping will be enabled under IGMP.

IGMP Command Syntax	
(cfg)# igmp dall	(cfg)# igmp vid [vVid:1-4095] grp [ipAddr:ipAddrv4]
(cfg)# igmp flood	(cfg)# no igmp vid [vVid:1-4095] grp [ipAddr:ipAddrv4]
(cfg)# no igmp flood	(cfg)# igmp vid [vVid] grp [ipAddr] (accesses next nesting level)
(cfg)# igmp snooping	(cfg-igmp)# ph [hNum:f1,f2,1..8|all]
(cfg)# no igmp snooping	(cfg-igmp)# pr [rNum:f1,f2,1..8|all]
(cfg)# igmp to [toVal:0-65535]	(cfg-igmp)# aging
(cfg)# igmp vid [vVid:1-4095]	(cfg-igmp)# no aging
(cfg)# no igmp vid [vVid:1-4095]	(cfg-igmp)# exit

Syntax	Name Description	Format Values
[toVal:0-65535]	IGMP route aging	0-65535 sec
[vVid:1-4095]	VLAN ID	1-4095
[ipAddr:ipAddrv4]	IGMP group IPv4 address	ipv4 address
[hNum:f1,f2,1..8|all]	host port number (on module)	f1,f2,1..8, or all
[rNum:f1,f2,1..8|all]	router port number (on module)	f1,f2,1..8, or all

3.1.1.8 IP Command

The *ip* command provides the ability to configure the IPv4 and IPv6 parameters on the module. Also, specific protocol options can be disabled or enabled. Use the *show ip* command from the # prompt to determine the state of each command option (disabled or enabled).

```
(cfg)# ip ?
Possible next parameters:
    addr           IPv4 or IPv6 address
    circuitid      DHCPv4 Relay Agent Circuit ID
    dall           delete IP configured settings, restore defaults
    dhcp           DHCPv4 protocol
    dhcpv6         DHCPv6 protocol
    dns            Domain Name System
    dnsaddr        domain name system ip address
    gw             gateway address
    ipv4           IPv4 enable/disable address
    ipv6           IPv6 enable/disable address
    net            IPv4 subnet mask
    relay          DHCPv4 relay agent (option 82)
    remoteid       Relay Agent Remote ID
    rserv          DHCP Relay Server
    rtype          DHCP Relay client type
    stateless      IPv6 stateless
    v6circuitid    DHCPv6 Relay Interface-ID
    v6relay        DHCPv6 relay agent
    v6remoteid     DHCPv6 Relay Agent Remote-ID

(cfg)# ip
```

The commands options available using the *ip* command are shown below.

The *addr* command option configures the IPv4 and IPv6 addresses of the module.

The *circuitid* command option disables/enables the Agent Circuit ID for DHCP Option 82 on the module. The *no* command negates the command.

The *dall* command option deletes all IP configured settings and restores factory defaults.

The *dhcp* command option disables/enables DHCPv4 protocol on the module. The *no* command negates the command.

The *dhcpv6* command option disables/enables DHCPv6 protocol on the module. The *no* command negates the command.

The *dns* command option disables/enables DNS protocol on the module. The *no* command negates the command.

The *dnsaddr* command option configures the DNS IP address of the module.

The *gw* command option configures the gateway IP address of the module.

The *ipv4* command option disables/enables IPv4 protocol on the module. The *no* command negates the command.

The *ipv6* command option disables/enables IPv6 protocol on the module. The *no* command negates the command.

The *net* command option configures the subnet mask of the module.

The *relay* command option disables/enables DHCPv4 Relay function (option 82) on the module. The *no* command negates the command.

The *remoteid* command option disables/enables DHCPv4 Relay Agent Remote ID. The *no* command negates the command.

The *rserv* command option configures the IPv4/IPv6 address of the DHCP Relay Server.

The *rtype* command option configures the DHCPv4 Relay Client type; *drop*, *keep* or *replace*.

The *stateless* command option disables/enables Stateless operation on the module. The *no* command negates the command.

The *v6circuitid* command option disables/enables DHCPv6 Relay Interface-ID, dflt enabled. The *no* command negates the command.

The *v6relay* command option disables/enables DHCPv6 relay agent, dflt disabled. The *no* command negates the command.

The *v6remoteid* command option disables/enables DHCPv6 Relay Agent Remote-ID, dflt enabled. The *no* command negates the command.

Stateful configuration requires a IPv6 service to provide the IPv6 address to the client (module) and requires both client and server to maintain the "state" of the address. Stateless provides auto configuration of IPv6, allowing the client (module) to self configure the IPv6 address. The advantage is that the IPv6 service is not required to store any dynamic state information about any individual clients. A network can use both stateful and stateless auto configuration at the same time.

To configure the IPv4 address on the module, use the following command.

```
(cfg)# ip addr 192.168.1.100
```

To configure the IPv6 address on the module, use the following commands.

```
(cfg)# no ip stateless
(cfg)# ip addr 2001::a0a:652 prefix 64
```

To enable the DHCPv6 address on the module, use the following command.

```
(cfg)# ip dhcpv6
```

To view the changes or display the IP configuration settings, use the *show ip* command from the # prompt.

IP Command Syntax	
(cfg)# ip dall	(cfg)# no ip ipv6
(cfg)# ip addr [ipAddr:ipAddr]	(cfg)# ip relay
(cfg)# ip addr [ipAddr:ipAddr] link	(cfg)# no ip relay
(cfg)# ip addr [ipAddr:ipAddr] prefix [plen:1-128]	(cfg)# ip remoteid
(cfg)# ip net [subnet:ipAddrv4]	(cfg)# no ip remoteid
(cfg)# ip gw [gateway:ipAddr]	(cfg)# ip stateless
(cfg)# ip dnsaddr [ipAddr:ipAddr]	(cfg)# no ip stateless
(cfg)# ip circuitid	(cfg)# ip v6circuitid
(cfg)# no ip circuitid	(cfg)# no ip v6circuitid
(cfg)# ip dhcp	(cfg)# ip v6relay
(cfg)# no ip dhcp	(cfg)# no ip v6relay
(cfg)# ip dhcpv6	(cfg)# ip v6remoteid
(cfg)# no ip dhcpv6	(cfg)# no ip v6remoteid
(cfg)# ip dns	(cfg)# ip rserv [ipAddr:ipAddr]
(cfg)# no ip dns	(cfg)# ip rtype drop
(cfg)# ip ipv4	(cfg)# ip rtype keep
(cfg)# no ip ipv4	(cfg)# ip rtype replace
(cfg)# ip ipv6	

Syntax	Name Description	Format Values
[ipAddr:ipAddr]	IPv4 or IPv6 address	ipv4 or ipv6 address
[plen:1-128]	subnet mask or prefix length	1-128
[subnet:ipAddrv4]	IPv4 subnet mask	subnet mask address
[gateway:ipAddr]	gateway address	gateway ip address

DHCPv4 Relay Process

The DHCP Relay Agent relays DHCP messages between DHCP clients and DHCP servers. A DHCP relay agent receives any DHCP broadcasts and forwards them to the specified DHCP server IP address.

1. The DHCP client generates a DHCP request.
2. The DHCP relay agent receives the broadcast DHCP request packet and inserts the relay agent information option (option 82) into the packet. The relay agent information option contains related sub options (Circuit ID and Remote ID).
3. The DHCP relay agent sends the DHCP packet to the DHCP server.
4. The DHCP server receives the packet, uses the sub options to assign IP addresses and other configuration parameters to the packet, and forwards the packet back to the client.
5. The sub option fields are removed by the relay agent and the IP address information is forwarded to the client.

If DHCP Relay Agent Circuit ID is enabled and the DHCP Relay Client Type is set to Replace, the Circuit ID will be set as "br0" instead of the associated port number.

If the module is configured as the 2nd DHCP Relay agent in a network, the unicast DHCP packets from the first DHCP Relay agent are forwarded to the DHCP Server.

DHCPv6 Relay Process

DHCPv6 client obtains an IPv6 address and other network configuration parameters from a DHCPv6 server through a DHCPv6 relay agent.

1. The DHCPv6 client sends a Solicit message to the multicast address FF02::1:2 of all the DHCPv6 servers and relay agents.
2. After the Solicit message is received, the DHCPv6 relay agent encapsulates the message into a Relay-forward message, and sends the message to the DHCPv6 server.
3. When the DHCPv6 server receives the Relay-forward message, the DHCPv6 server:

   Provides an IPv6 address and other required parameters.

   Adds them to the Relay-reply message.

   Sends the Relay-reply message to the DHCPv6 relay agent.
4. Once the DHCPv6 relay agent receives the Relay-reply message, the DHCPv6 relay agent will send the reply to the DHCPv6 client.
5. The DHCPv6 client uses the IPv6 address and other network parameters to complete the network configuration.

3.1.1.9 LAG Command

The *lag* command provides the ability to configure the ports on the module to support Link Aggregation Group and Link Aggregation Control Protocol. Use the *show lag* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# lag ?
Possible next parameters:
    <cr>
    dall           delete LAG configured settings, restore defaults
    fwd            frame forwarding algorithm
    lp             aggregator logical port number
    spri           system priority

(cfg)# lag


(cfg)# lag lp l2
Nesting level change accepted

(cfg-lag)[l2]#
Possible next parameters:
    act            maximum number of active ports in a LAG
    active         LAG active mode
    aggrk          aggregator admin key
    exit           exit LAG instance
    fast           port fast timeout
    key            port auto key adjust
    lag            LAG module/aggregator
    no             negate a LAG option

(cfg-lag)[12]#


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# lag ?
Possible next parameters:
    clr            clear statistic counters
    lp             aggregator logical port number
    ppri           port priority
    proto          LACP protocol configuration

(cfg-if)[1]# lag
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *lag* command are shown below.

The *lag* command option disables/enables LAG protocol. The *no* command negates the command.

The *dall* command option deletes all LAG configured settings and restores to factory defaults.

The *fwd* command option configures the frame forwarding algorithm: std or xor.

The *lp* command option sets the logical port number for LAG.

The *spri* command option configures the system priority.

Command options under the *lp <lNum>* command.

The *act* command option selects the maximum number of active ports in a Link Aggregation Group.

The *active* command option disables/enables port active mode and enables/disables port passive mode. The *no* command negates the command.

The *aggrk* command option sets the link aggregation group key.

The *exit* command option exits the current nesting level.

The *fast* command option disables/enables LACP fast transmission mode and enables/disables slow transmission mode. The *no* command negates the command.

The *key* command option disables/enables automatic key adjustment and enables/disables manual key usage. The *no* command negates the command.

The *lag* command option disables/enables LAG on the module. The *no* command negates the command.

The *no* command option negates a command.

Command options under the *port select <pNum>* command.

The *clr* command option allows the port statistic counters to be cleared to zero.

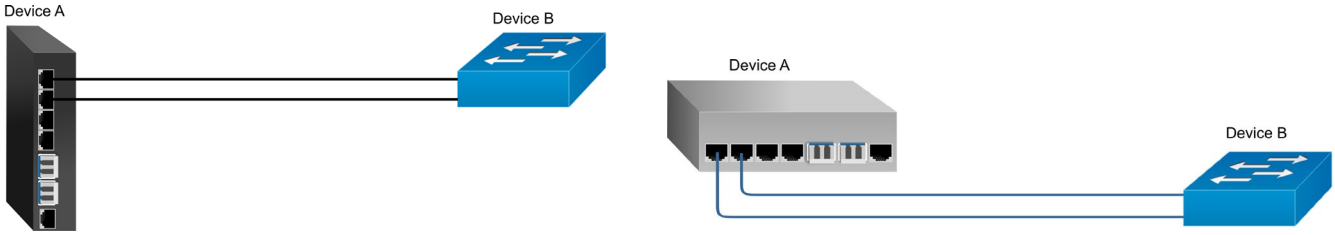
The *lp* command option sets the logical port number for LAG.

The *ppri* command option configures the port priority.

The *proto* command option configures how the LAG protocol will be handled.

discard	LACP is disabled, LACP frames are discarded
peer	LACP is enabled, LAG is enabled
static	LACP is disabled, LAG is enabled
tunnel	LACP is disabled, LACP frames are tunneled, LAG is disabled

The following example configures LACP/LAG on Port 1 and Port 2.




```
# config
Nesting level change accepted

(cfg)# port select f1
Nesting level change accepted

(cfg-if)[f1]# lldp proto tunnel
(cfg-if)[f1]#exit

(cfg)# port select f2
Nesting level change accepted

(cfg-if)[f2]# lldp proto tunnel
(cfg-if)[f1]#exit

(cfg)# lag lp L3
Nesting level change accepted

(cfg-lag)[l3]#
(cfg-lag)[l3]# act 2
(cfg-lag)[l3]# lag
(cfg-lag)[l3]# exit

(cfg)# lag

(cfg)#
```

To view the changes or display the LAG configuration settings, use the *show lag* command from the # prompt.

LAG Command Syntax	
(cfg)# lag	(cfg-lag)# lag
(cfg)# no lag	(cfg-lag)# no lag
(cfg)# lag dall	(cfg-lag)# aggrk [kVal:0-65535]
(cfg)# lag spri [sNum:0-65535]	(cfg-lag)# act [aNum:1-4]
(cfg)# lag fwd std	(cfg-lag)# exit
(cfg)# lag fwd xor	(cfg)# port select <pNum> (accesses next nesting level)
(cfg)# lag lp [lNum:l1..l8] (accesses next nesting level)	(cfg-if)#<pNum> lag ppri [priNum:0-65535]
(cfg-lag)# lag lp [lNum:l1..l8]	(cfg-if)#<pNum> lag proto discard
(cfg-lag)# active	(cfg-if)#<pNum> lag proto peer
(cfg-lag)# no active	(cfg-if)#<pNum> lag proto static
(cfg-lag)# fast	(cfg-if)#<pNum> lag proto tunnel
(cfg-lag)# no fast	(cfg-if)#<pNum> lag lp [lNum:l1..l8]
(cfg-lag)# key	(cfg-if) <pNum> lag clr
(cfg-lag)# no key	(cfg-if)# exit

Syntax	Name Description	Format Values
[sNum:0-65535]	system priority	0-65535
[lNum:l1..l8]	aggregator logical port number	l1-l8
[kVal:0-65535]	aggregator admin key	0-65535
[aNum:1-4]	max number of active ports in a LAG	1-4
[priNum:0-65535]	port priority	0-65535

3.1.1.10 LLDP Command

The IEEE 802.1ab Link Layer Discovery Protocol defines a standard way for Ethernet devices to advertise information about themselves to their neighbors and store information they discover from other device.

The *lldp* command provides the ability to configure the LLDP agent on the module.

```
(cfg)# lldp ?
Possible next parameters:
    dall          delete LLDP configuration settings, restore defaults
    txfin         fast message transmission interval
    txhld         multiplier of txrate for TTL value in PDU
    txrt          lldp normal transmission interval

(cfg)# lldp


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# lldp
Possible next parameters:
    mode          lldp mode
    proto         protocol configuration
    tlv           optional LLDP TLVs to send

(cfg-if)[1]# lldp
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *lldp* command are shown below.

The *dall* command option deletes all LLDP configuration settings.

The *txfin* command option specifies the time interval between transmissions during fast transmission periods. The range is 1 to 3,600 seconds and the default value is 1 second.

The *txhld* command option configures the variable used as a multiplier of the Normal Transmission Interval to determine the time remaining before information in the outgoing LLDP PDU is no longer valid. The range is 1 to 10 and the default is 4.

The *txrt* command option configures the transmission frequency of LLDP updates in seconds. The range is 5 to 65,534 seconds and the default is 30 seconds.

Command options under the *port select <pNum>* command.

The *mode* command option configures the port to *receive*, *transmit*, or *transmit/receive* LLDP Protocol Data Units (PDUs).

The *proto* command option configures how LLDP PDUs are processed.

discard	LLDP is disabled, LLDP frames are discarded
peer	LLDP is enabled and protocol is operating
tunnel	LLDP is disabled, LLDP frames are tunneled

The *tlv* command option selects which optional TLVs to include in the transmit LLDP PDUs. The *no* command negates the command.

mgt	management address
pdes	port description, same as port name

sysname system name, same as sysName object

sysdes system description, same as sysDescr object

syscap system capabilities

To tunnel LLDP on ports 1 and 2, use the following commands.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# lldp proto tunnel
(cfg-if)[1]#exit

(cfg)# port select 2
Nesting level change accepted

(cfg-if)[2]# lldp proto tunnel
(cfg-if)[2]#exit

(cfg)#
```

To view the changes or display the LLDP configuration settings, use the *show lldp* command from the # prompt.

LLDP parameters that are not supported are *reinitDelay*, *txFastInit* and and *txCredit*.

The *reinitDelay* sets the time from port disable to reinitialization. This parameter is not set.

The *txFastInit* configures the the number of LLDP PDUs that are transmitted during a fast transmission period. This parameter is set to 4.

The *txCredit* sets the maximum number of consecutive LLDP PDUs that can be transmitted at any time. This parameter is not set.

LLDP Command Syntax	
(cfg)# lldp dall	(cfg-if)#<pNum> lldp tlv pdes
(cfg)# lldp txfin [tSec:1-3600]	(cfg-if)#<pNum> no lldp tlv pdes
(cfg)# lldp txhld [tVal:2-10]	(cfg-if)#<pNum> lldp tlv sysname
(cfg)# lldp txrt [tSec:5-32768]	(cfg-if)#<pNum> no lldp tlv sysname
(cfg)# port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> lldp tlv sysdes
(cfg-if)#<pNum> lldp mode rxtx	(cfg-if)#<pNum> no lldp tlv sysdes
(cfg-if)#<pNum> lldp mode txonly	(cfg-if)#<pNum> lldp tlv syscap
(cfg-if)#<pNum> lldp mode rxonly	(cfg-if)#<pNum> no lldp tlv syscap
(cfg-if)#<pNum> lldp mode none	(cfg-if)#<pNum> lldp proto discard
(cfg-if)#<pNum> lldp tlv mgt	(cfg-if)#<pNum> lldp proto peer
(cfg-if)#<pNum> no lldp tlv mgt	(cfg-if)#<pNum> lldp proto tunnel

Syntax	Name Description	Format Values
[tSec:1-3600]	fast message transmission interval	1-3600 sec
[tVal:2-10]	multiplier of txrate for TTL value	2-10
[tSec:5-32768]	lldp normal transmission interval	5-32768 sec

3.1.1.11 LOCATION Command

The *location* command provides the ability to configure the physical location of the module including address, city, state, zip code, altitude, latitude and longitude.

```
(cfg)# location ?
Possible next parameters:
    addr          address and street
    alt           altitude
    city          city
    dall          delete 'location' configured settings, restore defaults
    lat           latitude
    long          longitude
    post          postal code/zipcode
    state         state/province name

(cfg)# location
```

The command options available using the *location* command are shown below.

The *addr* command option configures the physical module address.

The *alt* command option configures the module altitude for above or below sea level.

The *city* command option configures the city.

The *dall* command option deletes all location settings and restores factory defaults.

The *lat* command option configures the module latitude from -90.000000 degrees to +90.000000.

The *long* command option configures the module longitude from -180.000000 degrees to +180.000000.

The *post* command option configures the postal zone or zip code.

The *state* command option configures the state.

To configure the location for the module, use the following commands.

```
(cfg)# location addr "38 Telsa"
(cfg)# location city "Irvine"
(cfg)# location state "Ca"
(cfg)# location post 92618

(cfg)#
```

When configuring text based names, such as 38 Tesla, the text name much be in " " for the command to be valid (*location addr "38 Tesla*"). If the text based name does not have any spaces between the words, then " " are not necessary (*location addr* 38_Tesla).

To view the changes or display the LOCATION configuration settings, use the *show location* command from the # prompt.

LOCATION Command Syntax	
(cfg)# location dall	(cfg)# location post [mPost:string0..16]
(cfg)# location addr	(cfg)# location lat
(cfg)# location addr [mAddr:string0..32]	(cfg)# location lat [mLat:_90-90]
(cfg)# location city	(cfg)# location long
(cfg)# location city [mCity:string0..32]	(cfg)# location long [mLong:_180-180]
(cfg)# location state	(cfg)# location alt
(cfg)# location state [mState:string0..32]	(cfg)# location alt [mAlt:_1000000-10000000]
(cfg)# location post	

Syntax	Name Description	Format Values
[mAddr:string0..32]	address and street names	string 0-32 characters
[mCity:string0..32]	city name	string 0-32 characters
[mState:string0..32]	state name	string 0-32 characters
[mPost:string0..16]	postal code or zip code	string 0-16 characters
[mLat:_90-90]	latitude	-90.000000 - 90.000000 degrees
[mLong:_180-180]	longitude	-180.000000 - 180.000000 degrees
[mAlt:_1000000-10000000]	altitude	-1,000,000 - 10,000,000 meters

3.1.1.12 LR Command

Link Redundancy is only supported on models with 2 fiber or copper uplink ports.

The *lr* command configures the module for link redundancy. When configured for link redundancy, the module will transmit and receive traffic on the primary port (F1) and no traffic on the backup port (F2). When a fiber failure occurs on the primary port, the module will switch over to the backup port within 50msec.

Use the *show lr* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# lr ?
Possible next parameters:
    <cr>
    dall          delete redundancy configured settings, restore defaults
    ret           return to working port

(cfg)# lr
```

The command options available using the *lr* command are shown below.

The *lr* command option disables/enables link redundancy. The *no* command negates the command.

The *dall* command option deletes all link redundancy configuration settings and restores factory defaults.

The *ret* command option disables/enables the return to the primary link when the link failure has been resolved. The *no* command negates the command.

To enable link redundancy and configure the link not to return to the primary link when the link failure has been fixed, use the following command.

```
(cfg) lr
```

To enable link redundancy and configure the link to return to the primary link when the link failure has been fixed, use the following command.

```
(cfg) lr ret
(cfg) lr
```

To enable link redundancy, the on-board DIP switches (hardware controlled) must be disabled. Use the *no module dipsw* command from the <cfg># prompt to disable the DIP-switches. Verify the configuration by using the *show switch* command from the # prompt.

To view the changes or display the LR configuration settings, use the *show lr* command from the # prompt.

LR Command Syntax	
(cfg)# lr	(cfg)# lr ret
(cfg)# no lr	(cfg)# no lr ret
(cfg)# lr dall	

3.1.1.13 MLD Command

Multicast Listener Discovery (MLD) snooping allows the switch to view MLD packets and make decisions based on their content. MLD uses source-based filtering, which enables hosts and routers to specify which multicast sources should be allowed or blocked for a specific multicast group.

MLD snooping constrains IPv6 multicast traffic at Layer 2 by configuring Layer 2 LAN ports to forward IPv6 multicast traffic only to those ports that want to receive it.

The *mld* command provides the ability to configure MLD on the module. Use the *show mld* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# mld ?
Possible next parameters:
    dall           delete MLD configured, instances, restore defaults
    flood          MLD route subject to aging out
    snooping       MLD snooping
    to             MLD route aging
    vid            VLAN ID

(cfg)# mld


(cfg)# mld vid 1 grp ff02::1:ff4b:521
Nesting level change accepted

(cfg-mld) [vid 1, ff02::1:ff4b:521]#
Possible next parameters:
    aging          route subject to aging out
    exit           exit MLD instance
    no             negate a MLD option
    ph             host port
    pr             router port

(cfg-mld) [vid 1, ff02::1:ff4b:521]#
```

The command options available using the *mld* command are shown below.

The *dall* command option deletes all MLD configured settings and restores factory defaults.

The *flood* command option disables/enables the flooding all unrecognized MLD groups. Use the *no* command to negate the command.

The *snooping* command option disables/enables snooping. Use the *no* command to negate the command.

The *to* command option configures the MLD route aging time in seconds. The default value is 60 seconds.

The *vid* command option configures the VLAN ID associated with the MLD group.

grp configures the IP address of the MLD group.

Command options under the *vid <vVid> grp <ipAddr>* command.

The *aging* command option selects the timeout value in seconds to automatically remove a route from the forwarding database. The timeout never expires with a value of 0.

The *exit* command option exits the current nesting level.

The *no* command option negates a command.

The *ph* command option configures the port number that is connected to the MLD host. This can be a single or multiple ports.

The *pr* command option configures the port number that is connected to the MLD router. This can be a single or multiple ports.

To enable MLD snooping and flood with snooping timeout value to 45 seconds, use the following commands.

```
(cfg)# mld snooping
(cfg)# mld flood
(cfg)# mld to 45

(cfg)#
```

To configure a VLAN ID to the MLD interface, use the following commands.

```
(cfg)# mld vid 1

(cfg)#
```

To configure a manual MLD multicast group for "ff02::1:ff4b:531" on VLAN ID 1 with router port on Port 2 and host port on Port 4, use the following commands.

```
(cfg)# mld vid 1 grp ff02::1:ff4b:531
Nesting level change accepted

(cfg-mld) [vid 1, ff02::1:ff4b:531]# pr 2
(cfg-mld) [vid 1, ff02::1:ff4b:531]# ph 4
(cfg-mld) [vid 1, ff02::1:ff4b:531]# aging
(cfg-mld) [vid 1, ff02::1:ff4b:531]# exit

(cfg)#
```

To view the changes or display the MLD configuration settings, use the *show mld* command from the # prompt.

There are common variables that are shared between the IGMP and MLD protocols. The variables are Snooping (enable / disable), Flooding Unrecognized Groups (enable / disabled) and Route Aging timer. If either protocol changes the shared variables, they will be changed under both protocols (IGMP and MLD). Example: If Snooping is enabled under MLD, Snooping will be enabled under IGMP.

MLD Command Syntax	
(cfg)# mld dall	(cfg)# mld vid [vVid:1-4095] grp [ipAddr:ipAddrv6] (accesses next nesting level)
(cfg)# mld flood	(cfg-mld)# ph [hNum:f1,f2,1..8|all]
(cfg)# no mld flood	(cfg-mld)# pr [rNum:f1,f2,1..8|all]
(cfg)# mld snooping	(cfg-mld)# aging
(cfg)# no mld snooping	(cfg-mld)# no aging
(cfg)# mld to [toVal:0-65535]	(cfg-mld)# exit
(cfg)# mld vid [vVid:1-4095]	(cfg)# exit
(cfg)# no mld vid [vVid:1-4095]	
(cfg)# no mld vid [vVid:1-4095] grp [ipAddr:ipAddrv6]	

Syntax	Name Description	Format Values
[toVal:0-65535]	MLD route aging	0-65535 sec
[vVid:1-4095]	VLAN ID	1-4095
[ipAddr:ipAddrv6]	MLD group address IPv6	ipv6 address
[hNum:f1,f2,1..8|all]	host port number (on module)	f1,f2,1..8, or all
[rNum:f1,f2,1..8|all]	router port number (on module)	f1,f2,1..8, or all

3.1.1.14 MODBUS Command

MODBUS is commonly used in industrial environments to monitor, gather, process, and transfer real-time data between devices. Many devices such as PLCs, intelligent devices, sensors, and instruments use MODBUS for SCADA (Supervisory Control And Data Acquisition Systems). SCADA is a system of software and hardware elements that allows industrial organizations to control industrial processes locally or at remote locations.

The MODBUS protocol is a request-response protocol between the Client and Server. A client can request the MODBUS server to act, and the server will respond with that action.

MODBUS awareness on the OmniConverter and RuggedNet products is MODBUS-TCP Server functionality.

The *modbus* command provides the ability to configure the Modbus-TCP server on the module. Use the *show modbus* command from the # prompt to display the configuration.

```
(cfg)# modbus ?
Possible next parameters:
    dall          delete all configured settings and restore defaults
    sto           session timeout value 0-900
    tcpserver      enable/disable tcpserver
    tsport         tcpserver port value 1-65535

(cfg)# modbus
```

The options available using the *modbus* command are shown below.

The *dall* command deletes all Modbus configured settings and restores factory defaults.

The *sto* command configures the session timeout for Mobus-TCP client connections.

The *tcpserver* command disables/enables the Modbus-TCP Server.

The *tsport* command configures the TCP port for the Modbus-TCP server function.

To enable MODBUS server, use the following commands.

```
(cfg)# modbus tcpserver

(cfg)#
```

To view the changes or display the MODBUS configuration settings, use the *show modbus* command from the # prompt.

MODBUS Command Syntax	
(cfg)# modbus dall	(cfg)# modbus tcpserver
(cfg)# modbus tsport [pNum:1-65535]	(cfg)# no modbus tcpserver
(cfg)# modbus sto [sTim:0-900]	

Syntax	**Name Description**	**Format Values**
[pNum:1-65535]	tcp server port number	1-65535 characters
[sTim:0-900]	tcp server session time out	0-900 seconds

The following Modbus function codes are recognized by the module.

Function Codes	
Function Code	**Function Description**
1 (0x01)	Read Coils; read up to 2000 contiguous coils
2 (0x02)	Read Discrete Inputs; read up to 2000 contiguous discrete inputs
3 (0x03)	Read Holding Registers; read up to 125 consecutive holding registers
4 (0x04)	Read Input Registers; read up to 125 consecutive input registers
5 (0x05)	Write Single Coil
6 (0x06)	Write Single Register
15 (0x0F)	Write Multiple Coils; write a sequence of up to 1968 coils at once.
16 (0x10)	Write Multiple Registers; write 1 to 123 registers in one command
22 (0x16)	Mask Write Register; result = (current AND And_Mask) OR (Or_Mask AND (NOT And_Mask))
23 (0x17)	Read/Write Multiple Registers; perform one read operation and one write operation in a single transaction.

Modbus defines a data model consisting of a set of registers which can be read and written using the Modbus-TCP protocol.

Data Model		
Block Address Range	**Block Name**	**Block Contents**
000001 - 065536	Coils	read-write booleans
100001 - 165536	Discrete Inputs	read-only booleans
300001 - 365536	Input Registers	read-only 16-bit integers (int16_t or uint16_t)
400001 - 465536	Holding Registers	read-write 16-bit integers (int16_t or uint16_t)

Modbus-TCP client applications register mapping.

Aggregate Data Types	
New Data Type Description	**Modbus Mapping**
read-only 32-bit integer (int32_t or uint32_t)	2 Consecutive Input Registers (MSB at offset 3, LSB at offset 0)
read-write 32-bit integer (int32_t or uint32_t)	2 Consecutive Holding Registers (MSB at offset 3, LSB at offset 0)
read-only 64-bit integer (int64_t or uint64_t)	4 Consecutive Input Registers (MSB at offset 3, LSB at offset 0)
read-write 64-bit integer (int64_t or uint64_t)	4 Consecutive Holding Registers (MSB at offset 3, LSB at offset 0)
read-only string (NULL terminated)	((LEN + 1) / 2) Input Register(s)
read-write string (NULL terminated)	((LEN + 1) / 2) Holding Register(s)

Modbus Discrete Input represents a single-bit of read-only state information. This data type is used to report read-only boolean status information from the module.

Discrete Input					
Start Address	**Item Size**	**Num Items**	**Description**	**ON**	**OFF**
1	1	32	Fiber Port 1..32 Linked	Linked	Not Linked
33	1	32	RJ-45 Port 1..32 Linked	Linked	Not Linked
65	1	32	RJ-45 Port 1..32 Full Duplex	FDX	HDX
97	1	32	RJ-45 Port 1..32 Flow Control Enabled	Enabled	Disabled
300	1	1	Alarm relay activation state; RuggedNet Only	Relay Energized	Relay De-energized
301	1	1	Alarm input state; RuggedNet Only	Open	Closed
400	1	32	PoE Port Powered Status for Port 1..32 PoE Models only	Powering	Not Powering

A Modbus Coil represents a single-bit of read-write state information.

Coil Assignments					
Start Address	**Item Size**	**Num Items**	**Description**	**ON**	**OFF**
1	1	32	Fiber Port 1..32 Enabled	Port Enabled	Port Disabled
33	1	32	RJ-45 Port 1..32 Enabled	Port Enabled	Port Disabled
100	1	1	Reboot Module	Reboot	NA
101	1	1	Reboot Module to Backup Image	Swap+ Reboot	NA
102	1	1	Restore Defaults and Reboot	Restore+ Reboot	NA
103	1	1	Restore Defaults and Reboot with -keep option	RestoreKeep+ Reboot	NA
200	1	1	Clear portstats for all ports	Clear All Counts	NA
201	1	32	Clear portstats for Fiber Port 1..32	Clear Per-Port Counts	NA
233	1	32	Clear portstats for RJ-45 Port 1..32	Clear Per-Port Counts	NA
300	1	1	Save current settings	Save current settings	NA

A Modbus Input Register represents a sixteen-bit word of read-only state information.

Input Register Assignments				
Start Address	**Item Size**	**Num Items**	**Description**	**Data Type**
1	1	1	Magic/Vendor	uint16_t (0x0687)
2	1	1	Format Code	uint16_t (0x100)
100	33	1	Model Name	string(0..64+NULL)
133	33	1	Serial Number	string(0..64+NULL)
166	33	1	Base MAC	string(0..64+NULL)
199	33	1	Model Family	string (0..64+NULL)
232	33	1	Model Number	string (0..64+NULL)
265	5	1	Mfg Date YYYYMMDD	string (0..8+NULL)
270	1	1	Number of Fiber Ports	uint16_t
271	1	1	Number of Copper Ports	uint16_t
272	1	1	Number of PoE Capable Ports	uint16_t
300	64	1	Firmware Version	string(0..127+NULL)
364	64	1	Backup Firmware Version	string(0..127+NULL)
428	64	1	Bootloader Firmware Version	string(0..127+NULL)
600	1	1	Input Voltage A	uint16_t, mV
601	1	1	Input Voltage B (RuggedNet dual input only)	uint16_t, mV
602	1	1	Current Usage	uint16_t, A * 10
603	1	1	Temperature in Celsius	int16_t, C * 10, -3276.8 to 3276.7
700	1	1	CPU Utilization	uint16_t, 0..100%
701	1	1	RAM Utilization	uint16_t, 0..100%
702	1	1	Code Flash Utilization	uint16_t, 0..100%
703	2	1	Uptime (seconds)	uint32_t, 0..2^32-1
800	1	32	PoE Port Power Usage for Port 1..32 (PoE Models Only)	uint16_t (W * 10)
832	1	32	PoE Port Power Class for Port 1..32 (PoE Models Only)	uint16_t
900	1	32	Fiber Port Type 1..32 (1=SFP, 2=FF, 3=LC, 4=UTP)	enum
932	1	32	Fiber Port Speed 1..32 (1=10, 2=100, 3=1000, 4=10000, 5=2500, 6=5000)	enum
964	1	32	Copper Port Speed 1..32 (1=10, 2=100, 3=1000, 4=10000, 5=2500, 6=5000)	enum

Input Register Assignments				
Start Address	**Item Size**	**Num Items**	**Description**	**Data Type**
1000	4	32	Rx Bytes On Fiber Port 1..32	uint64_t
1128	4	32	Tx Bytes On Fiber Port 1..32	uint64_t
1256	4	32	Rx Frames On Fiber Port 1..32	uint64_t
1384	4	32	Tx Frames On Fiber Port 1..32	uint64_t
1512	4	32	CRC Errors On Fiber Port 1..32	uint64_t
1640	4	32	Tx Pause Frames On Fiber Port 1..32	uint64_t
1768	4	32	Rx Pause Frames On Fiber Port 1..32	uint64_t
1896	4	32	Rx Bytes On RJ-45 Port 1..32	uint64_t
2024	4	32	Tx Bytes On RJ-45 Port 1..32	uint64_t
2152	4	32	Rx Frames On RJ-45 Port 1..32	uint64_t
2280	4	32	Tx Frames On RJ-45 Port 1..32	uint64_t
2408	4	32	CRC Errors On RJ-45 Port 1..32	uint64_t
2536	4	32	Tx Pause Frames On RJ-45 Port 1..32	uint64_t
2664	4	32	Rx Pause Frames On RJ-45 Port 1..32	uint64_t

A Modbus Holding Register represents a sixteen-bit word of read-write state information.

Holding Register Assignments				
Start Address	**Item Size**	**Num Items**	**Description**	**Data Type**
1	128	1	Chassis Name	string(0..255+NULL)
129	128	1	Module ID	string (0..255+NULL)
257	128	1	System Contact	string(0..255+NULL)
385	128	1	System Location	string(0..255+NULL)
600	33	1	Alarm Digital Input Name (RuggedNet Only)	string (0..64+NULL)
633	33	1	Alarm Relay Normally Open Name (RuggedNet Only)	string (0..64+NULL)
666	33	1	Alarm Relay Normally Close Name (RuggedNet Only)	string (0..64+NULL)
1000	23	32	Fiber Port Name 1..32	string (0..45+NULL)
1736	23	32	Copper Port Name 1..32	string (0..45+NULL)
2500	33	1	Time of Day (24hr): MM/DD/YYYY HH:MM:SS	string(0..64+NULL)
2533	3	1	Time Zone Abbreviation	string(0..5+NULL) - see User Manual or run 'zone -h' for list of valid time zone abbreviations

3.1.1.15 MODULE Command

The *module* command provides the ability to configure the serial interface baud rate, chassis name, module identifier and enable/disable hardware DIP-switches. Use the *show module* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# module ?
Possible next parameters:
    baud           serial port baudrate
    dall           delete module configured settings,restore defaults
    dipsw          global DIP switch configuration
    id             module identification
    nm             location name
    prmpt          CLI prompt

(cfg)# module
```

The command options available using the *module* command are shown below.

The *baud* command option configures the baud rate of the serial interface. The default rate is 57,600bps.

The *dall* command option restores the factory defaults of all module settings.

The *dipsw* command option disables/enables the hardware DIP-switches and prevents the CLI commands from overriding the functions. Use the *no* command to allow the hardware DIP-switches and allows CLI commands to override the functions.

The *id* command option configures the module identifier. The module identifier can be any 0-255 alphanumeric character string.

The *nm* command option configures the chassis name. The chassis name can be any 0-255 alphanumeric character string.

The *prmpt* command option configures the name associated with the module prompt.

To change the baud rate of the serial port, use the following command.

```
(cfg)# module baud 115200

(cfg)#
```

To view the changes or display the MODULE configuration settings, use the *show module* command from the # prompt.

MODULE Command Syntax	
(cfg)# module dall	(cfg)# module nm [locationName:string0..255]
(cfg)# module baud [baudRate:300..115200]	(cfg)# module prmpt
(cfg)# module id	(cfg)# module prmpt [pName:string0..32]
(cfg)# module id [modId:string0..255]	(cfg)# module dipsw
(cfg)# module nm	(cfg)# no module dipsw

Syntax	**Name Description**	**Format Values**
[baudRate:300..115200]	serial port baud rate	300,1200,4800,9600,19200,...115200
[modId:string0..255]	module identification	0-255 characters
[locationName:string0..255]	location name	0-255 characters
[pName:string0..32]	CLI prompt	0-32 characters

3.1.1.16 MRP Command

IEC 62439-2 defines Media Redundancy Protocol (MRP) as a ring protocol that is used in high availability industrial networks.

In an MRP ring, the ring manager is named Media Redundancy Manager (MRM) and the ring clients are named Media Redundancy Clients (MRCs).

MRM and MRC ring ports support three status: disabled, blocked, and forwarding. Disabled ring ports drop all the received frames. Blocked ring ports drop all the received frames except the MRP control frames. Forwarding ring ports forward all the received frames.

During normal operation, the network works in the Ring-Closed status. In this status, one of the MRM ring ports is blocked, while the other is forwarding. Conversely, both ring ports of all MRCs are forwarding. Loops are avoided because the physical ring topology is reduced to a logical stub topology.

In case of failure, the network works in the Ring-Open status. For instance, in case of failure of a link connecting two MRCs, both ring ports of the MRM are forwarding; the MRCs adjacent to the failure have a blocked and a forwarding ring port; the other MRCs have both ring ports forwarding. Also, in the Ring-Open status, the network logical topology is a stub.

The *mrp* command provides the ability to configure MRP on the module. Use the *show mrp* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# mrp ?
Possible next parameters:
    <cr>
    dall          delete MRP settings, instances, restore defaults
    pn            MRP profile name

(cfg)# mrp


(cfg)# mrp pn protect
Nesting level change accepted

(cfg-mrp)[protect]#
Possible next parameters:
    dom           ring domain id
    exit          exit MRP instance
    pri           ring priority
    rec           recovery time
    role          MRP role
    rp1           ring port 1
    vid           MRP vlan id

(cfg-mrp)[protect]#


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# mrp ?
Possible next parameters:
    <cr>
    port          forwarding MRP

(cfg-if)[1]# mrp
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *mrp* command are shown below.

The *mrp* command option disables/enables MRP on the module. The *no* command negates the command.

The *dall* command option deletes all MRP settings, instances and restore factory default settings.

The *pn* command option configures the MRP profile instance name.

Command options under the *pn <pName>* command.

The *dom* command option sets the MRP domain identification number (UUID) via 32 hexadecimal characters. The default value is "FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFF".

The *exit* command option exits the current nesting level.

The *pri* command option configures the MRP instance priority.

The *rec* command option configures the MRP maximum recovery time.

The *role* command option configures the MRP role for the module: MRC or MRM.

mrc configures media redundancy client.

mrm configure media redundancy manager.

The *rp1* command option configures the port number for Ring Port 1.

rp2 configures the port number for Ring Port 2.

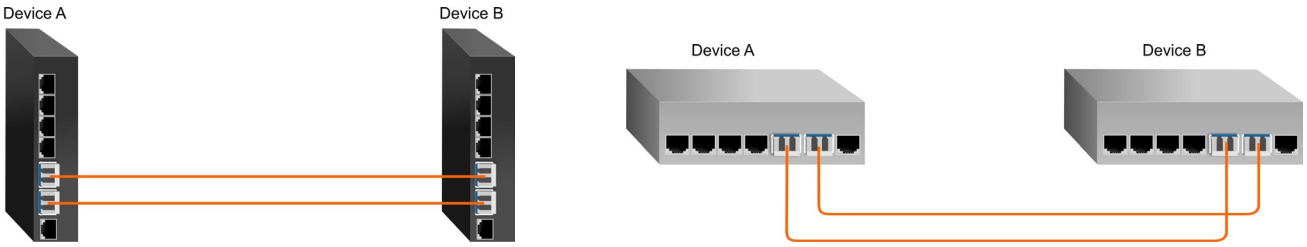
The *vid* command option selects the VLAN MRP protocol Identification.

Command options under the *port select <pNum>* command.

The *mrp* command option disables/enables a port as a MRP ring port if associated with a port. The *no* command negates the command.

The *port* command option disables/enables normal MRP operations on a port when associated with an MRP instance. The *no* command negates the command.

The following script is an example of a MRP configuration.



Device A Setup

```
(cfg)# vlan dall
(cfg)# switchport dall

(cfg)# vlan vid 100
(cfg)# vlan vid 111

(cfg)# port select 4

(cfg-if)[4]# switchport mode tunnel
(cfg-if)[4]# switchport vid 100
(cfg-if)[4]# exit

(cfg)# port select f1
(cfg-if)[f1]# switchport mode trunk
(cfg-if)[f1]# switchport vidtrunk 1,100..102
(cfg-if)[f1]# exit

(cfg)# port select f2
(cfg-if)[f2]# switchport mode trunk
(cfg-if)[f2]# switchport vidtrunk 1,100..102
(cfg-if)[f2]# exit

(cfg)# mrp dall
(cfg)# port select f1
(cfg-if)[f1]# mrp
(cfg-if)[f1]# exit

(cfg)# port select f2
(cfg-if)[f2]# mrp
(cfg-if)[f2]# exit

(cfg)# mrp
(cfg)# mrp pn mrm_100
(cfg-mrp)# rp1 F1 rp2 F2
(cfg-mrp)# role mrm
(cfg-mrp)# rec 200
(cfg-mrp)# vid 100
(cfg-mrp)# dom FFFFFFFF-FFFF-F112-2334-455666778899
(cfg-mrp)# pri 200
(cfg-mrp)# exit

(cfg)#
```

Module is configured as the Media Redundancy Manager (MRM)

Device B Setup

```
(cfg)# vlan dall
(cfg)# switchport dall

(cfg)# vlan vid 100
(cfg)# vlan vid 111

(cfg)# port select 4

(cfg-if)[4]# switchport mode tunnel
(cfg-if)[4]# switchport vid 100
(cfg-if)[4]# exit

(cfg)# port select f1
(cfg-if)[f1]# switchport mode trunk
(cfg-if)[f1]# switchport vidtrunk 1,100..102
(cfg-if)[f1]# exit

(cfg)# port select f2
(cfg-if)[f2]# switchport mode trunk
(cfg-if)[f2]# switchport vidtrunk 1,100..102
(cfg-if)[f2]# exit

(cfg)# mrp dall
(cfg)# port select f1
(cfg-if)[f1]# mrp
(cfg-if)[f1]# exit

(cfg)# port select f2
(cfg-if)[f2]# mrp
(cfg-if)[f2]# exit

(cfg)# mrp
(cfg)# mrp pn mrc_100
(cfg-mrp)# rp1 F1 rp2 F2
(cfg-mrp)# role mrc
(cfg-mrp)# rec 200
(cfg-mrp)# vid 100
(cfg-mrp)# dom FFFFFFFF-FFFF-F112-2334-455666778899
(cfg-mrp)# pri 200
(cfg-mrp)# exit

(cfg)#
```

Module is configured as the Media Redundancy Client (MRC)

To view the changes or display the MRP configuration settings, use the *show mrp* command from the # prompt.

MRP Command Syntax	
(cfg)# mrp	(cfg-mrp)# rec [rTime:200,500]
(cfg)# no mrp	(cfg-mrp)# vid [vlanId:1-4095]
(cfg)# mrp dall	(cfg-mrp)# exit
(cfg)# no mrp pn [pName:string1..32]	(cfg)# port select <pNum> (accesses next nesting level)
(cfg)# mrp pn [pName:string1..32] (accesses next nesting level)	(cfg-if)#<pNum> mrp
(cfg-mrp)# rp1 [pNum1] rp2 [pNum2]	(cfg-if)#<pNum> no mrp
(cfg-mrp)# role mrc	(cfg-if)#<pNum> mrp port
(cfg-mrp)# role mrm	(cfg-if)#<pNum> no mrp port
(cfg-mrp)# dom [dId:hex128]	(cfg-if)#v exit
(cfg-mrp)# pri [priNum:0-65535]	

Syntax	Name Description	Format Values
[pName:string1..32]	MRP profile name	1-32 character
[pNum1:f1,f2,1..8|all]	ring port 1	f1,f2,1..8, or all
[pNum2:f1,f2,1..8|all]	ring port 2	f1,f2,1..8, or all
[dId:hex128]	ring domain id	32 ascii hex characters
[priNum:0-65535]	ring priority	0-65535
[rTime:200,500]	recovery time	200, 500 sec
[vlanId:1-4095]	MRP vlan id	1-4095

3.1.1.17 PORT Command

The *port* command provides the ability to configure each port with specific parameters. Use the *show port* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# port ?
Possible next parameters:
    dall          delete configured port settings, restore defaults
    select        port selection

(cfg)# port


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# port
Possible next parameters:
    flow          flow control
    learning      MAC learning
    loop          loop protection
    loopt         loop protection transmit interval
    mirror        mirror source port
    mo            port rate, negotiation, duplex setting
    name          port name
    output        port output
    secure        unknown Multicast/Unicast addresses

(cfg-if)[1]# port
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *port* command are shown below.

The *dall* command option deletes all configured port attributes and restores factory default settings.

The *select* command option selects the port number to be configured.

Command options under the *port select <pNum>* command.

The *flow* command option disables/enables flow control on the selected port. The *no* command negates the command.

The *learning* command option disables/enables MAC learning on the selected port. The *no* command negates the command.

The *loop* command option disables/enables loop protection on the selected port. The *no* command negates the command.

The *loopt* command option configures the loop protection transmit interval from 1-60s.

The *mirror* command option disables/enables port mirroring. The *no* command negates the command.

The *mo* command option configures rate (10/100/1000), mode (an or man) and duplex (fdx or hdx) for the selected RJ-45 copper port.

The *name* command option configures the name for the selected port.

The *output* command option disables/enables the selected port. The *no* command negates the command.

The *secure* command option disables/enables the ability to drop unknown Multicast/Unicast addresses on the selected port. The *no* command negates the command.

To configure Port 3 (RJ-45) for 100M FDX manual operation, use the following commands.

```
(cfg)# port select 3
Nesting level change accepted

(cfg-if)[3]# port mo 100,man,fdx
(cfg-if)[3]# exit

(cfg)#
```

To configure port F1 for manual operation, use the *-mo* command.

```
(cfg)# port select f1
Nesting level change accepted

(cfg-if)[f1]# port mo man
(cfg-if)[f1]# exit

(cfg)#
```

The example below enables port mirroring of Port 1 to Port 2.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# port mirror 2
(cfg-if)[1]# exit

(cfg)#
```

To view the changes or display the PORT configuration settings, use the *show port* command from the # prompt.

The *mo* command option provides configuration of the fixed RJ-45 port. The *mo* command option is a valid command to configure the fiber ports for AN or MAN only. **The module only supports auto-negotiation when configured for 1000. So when the 1000, Man, FDX or 1000, Man, HDX is used, the module still auto-negotiates with its link partner.**

The 1G fiber port will operate AN, 1000, FDX or Man, 1000, FDX.

10G SFP+ ports are set to full duplex, manual operation.

When loop protection is enabled on a port, the port will generate Configuration Test Protocol (CTP) frames. When the module receives its own CTP message either on the generating port or another port, loop prevention will automatically block the port from sending out normal user data until the loop is removed.

When a port is blocked, the port will continue to send out periodic CTP frames in order to determine if the block has been removed. When the module does not receive its own CTP message either on the generating or another port, the port will be unblocked.

When port security is enabled on a port, the port will dropped all unknown Unicast and Multicast addresses. When port security is disabled, frames with unknown Unicast and Multicast addresses will be able to transmitted based on VLAN forwarding and learned MAC address forwarding rules.

PORT Command Syntax	
(cfg)# port dall	(cfg-if)#<pNum> no port output
(cfg)# port select [pNum:f1,f2,1..8|all,mgt1] (accesses next nesting level)	(cfg-if)#<pNum> port secure
(cfg-if)#<pNum> port flow	(cfg-if)#<pNum> no port secure
(cfg-if)#<pNum> no port flow	(cfg-if)#<pNum> port mirror [sourcePort:f1,f2,1..8]
(cfg-if)#<pNum> port learning	(cfg-if)#<pNum> no port mirror
(cfg-if)#<pNum> no port learning	(cfg-if)#<pNum> port name [name:string1..45]
(cfg-if)#<pNum> port loop	(cfg-if)#<pNum> port mo [rate,mode,dup:(10..10000), (an,man),(fdx,hdx)]
(cfg-if)#<pNum> no port loop	(cfg-if)#<pNum> port loopt [lTime:1-60]
(cfg-if)#<pNum> port output	(cfg-if)#<pNum> exit

Syntax	Name Description	Format Values
[pNum1:f1,f2,1..8|all,mgt1]	port selection	f1,f2,1..8, all, mgt1
[sourcePort::f1,f2,1..8]	mirror source port	f1,f2,1..8
[lTime:1-60]	loop protection transmit interval	1-60 sec
[rate,mode,dup:(10..10000),(an,man), (fdx,hdx)]	port rate, negotiation, duplex setting	(10..10000), mode (an,man), dup (fdx,hdx)
[name:string1..45]	port name	1-45 characters

Other *port* command options are available. These commands are covered under the upper level command option (ie. for *aaa*, see the section 3.1.1.1 for additional information). See each specific command for details.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]#
Possible next parameters:
    aaa             authentication, authorization, accounting configuration
    bwp             bandwidth profile configuration port instance
    cabletest       cable instance testing
    exit            exit port interface configuration
    lag             link aggregation group configuration
    lldp            link layer discovery protocol (LLDP) configuration
    mrp             port MRP
    no              negate a command
    port            port instance configuration
    portaccess      port access configuration
    portstat        port statistic configuration
    pse             power source equipment (PSE) configuration
    spantree        spanning tree configuration
    stormcontrol    storm control configuration
    switchport      vlan interface configuration

(cfg-if)[1]#
```

3.1.1.18 PORTACCESS Command

The *portaccess* command provides the ability to control data access to each port on the module. Port Access can be configured to disable user access or enable user access. Port Access enables an administrator to control user access while maintaining port configuration for easy disabling or enabling of customer service.

Use the *show portaccess* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# portaccess ?
Possible next parameters:
    dall          delete port access settings, restore defaults

(cfg)# portaccess


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# portaccess ?
Possible next parameters:
    <cr>

(cfg-if)[1]#
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *portaccess* command are shown below.

The *dall* command option deletes all configured port access settings and restores factory defaults.

Command options under the *port select <pNum>* command.

The *portaccess* command option disables/enables the selected port. The *no* command negates the command.

To disable access to Port 2, use the following commands.

```
(cfg)# port select 2
Nesting level change accepted

(cfg-if)[2]# portaccess
(cfg-if)[2]# exit

(cfg)#
```

To view the changes or display the PORTACCESS configuration settings, use the *show portaccess* command from the # prompt.

PORTACCESS Command Syntax	
(cfg)# portaccess dall	(cfg-if)#<pNum> portaccess
(cfg)# port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> no portaccess

3.1.1.19 PROTOCOL Command

The *protocol* command provides the ability to enable/disable specific protocols available on the module. FTP, HTTP, HTTPS, IP, serial, Telnet and flow control can be configured using the *protocol* command.

Use the *show protocol* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# protocol ?
Possible next parameters:
    cfn             SSL/TLS certificate file name
    dall            delete protocol  settings, restore defaults
    flow            flow control
    ftp             FTP protocol
    http            HTTP protocol (web page)
    https           HTTPS protocol (web page)
    ip              IP protocol
    serial          serial console port
    telnet          Telnet protocol

(cfg)# protocol
```

The command options available using the *protocol* command are shown below.

The *cfn* command option configures the SSL/TLS certificate file name for the module.

The *dall* command option deletes all configured protocol settings and restores factory defaults.

The *flow* command option disables/enables global flow control on the module. The *no* command negates the command.

The *ftp* command option disables/enable FTP protocol on the module. The *no* command negates the command. Use the *show protocol* command from the # prompt to determine the state of each protocol (disabled or enabled).

The *http* command option disables/enables HTTP protocol on the module. The *no* command negates the command.

The *https* command option disables/enables HTTPS protocol on the module. The *no* command negates the command.

The *ip* command option disables/enables IPv4 protocol on the module. The *no* command negates the command.

The *serial* command option disables/enables the serial console port on the module. The *no* command negates the command.

The *telnet* command option disables/enables Telnet protocol on the module. The *no* command negates the command.

To enable FTP, use the following command. By default, FTP is disabled.

```
(cfg)# protocol ftp
```

To disable Telnet, use the following command. By default, Telnet is enabled.

```
(cfg)# protocol telnet
```

To view the changes or display the PROTOCOL configuration settings, use the *show protocol* command from the # prompt.

If HTTPS is enabled and a certificate file is not configured via the *cfn* command, the self-generated certificate is used. If HTTPS is enabled and a certificate file is configured via the *cfn* command the user downloaded certificate is used. If HTTPS is enabled, SSL 2 & 3 and TLS 1.2 are used for web page access.

PROTOCOL Command Syntax	
(cfg)# protocol dall	(cfg)# protocol https
(cfg)# protocol cfn	(cfg)# no protocol https
(cfg)# protocol cfn [fileName:string0..45]	(cfg)# protocol ip
(cfg)# protocol flow	(cfg)# no protocol ip
(cfg)# no protocol flow	(cfg)# protocol serial
(cfg)# protocol ftp	(cfg)# no protocol serial
(cfg)# no protocol ftp	(cfg)# protocol telnet
(cfg)# protocol http	(cfg)# no protocol telnet
(cfg)# no protocol http	

Syntax	**Name Description**	**Format Values**
[fileName:string0..45]	SSL/TLS certificate file name	0-45 characters

3.1.1.20 PSE Command

Only supported on OmniConverter and RuggedNet PoE models.

The *pse* command provides the ability to configure PoE scheduler, heartbeat parameters, LLDP-MED and PoE power settings on each RJ-45 port.

The PoE Scheduler provides the ability to configure the time and day for PoE power to be turned On and Off. Up to 100 scheduling events can be configured.

Use the *show pse* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# pse ?
Possible next parameters:
    dall           delete PSE settings, instances, restore defaults
    idx            PoE scheduler index
    pmax           maximum PSE power (watts)
    pslimit        PoE PSE limit
    sched          enable global pse scheduling

(cfg)# pse


(cfg)# pse idx 1
Nesting level change accepted

(cfg-pse)[1]#
Possible next parameters:
    exit           exit schedule instance
    no             negate a PSE option
    pn             PoE scheduler profile name
    port           port list
    sched          schedule power on and off time
    schedule       enable specific schedule

(cfg-pse)[1]#


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# pse
Possible next parameters:
    hdfr           heartbeat restart defer
    heartbeat      heartbeat ping
    i              heartbeat interval
    lldp-med       LLDP-MED support for PoE PDs
    mdi-tlv        IEEE MDI TLV support for PoE PDs
    mode           pse mode
    pderr          number consecutive lost heartbeats for error
    pdint          number of times to restart PD after error
    pdip           ip address of PD for heartbeat
    pdmo           error mode action for PD error
    reset          restart PoE power

(cfg-if)[1]# pse
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *pse* command are shown below.

The *dall* command option deletes all configured PSE settings and restores factory defaults.

The *idx* command option configures the PoE Scheduling index number (or sequence number). Multiple scheduling indexes can be configured.

The *pmax* command option specifies the maximum PSE power for the module.

The *pslimit* command option disables/enables PSE power limit. When enabled the module will not allow a powered device(PD) to request/draw more than the module is capable of providing. The port will be limited to available PSE power. The *no* command negates the command. **The *pslimit* command option is only available on OmniConverter and RuggedNet HPoE or HPoEBT models.**

The *schedule* command option disables/enables PSE power scheduler. The *no* command negates the command.

Command options under the *idx* command.

The *exit* command option exits the current nesting level.

The *no* command negates the PSE command options.

The *pn* command option configures the name of the scheduling profile for the selected scheduling index.

The *port* command option configures the port numbers associated with the selected scheduling index.

The *sched* command option configures the on time and off time for the selected scheduling index.

The *schedule* command option disables/enables the selected scheduling index. The *no* command negates the command.

Command options under the *port select <pNum>* command.

The *hdfr* command option selects the transmission interval delay before heartbeat pings are restarted after a reset.

The *heartbeat* command option disables/enables the heartbeat signal used to verify connectivity to the PD. *heartbeat* is disabled by default. The *no* command negates the command.

The *i* command option configures the transmission interval of the heartbeat signal. The default value is 1 second.

The *lldp-med* command option disables/enables LLDP-MED support for PoE PDs. The *no* command negates the command.

The *mdi-tlv* command option disables/enables IEEE MDI TLV support for PoE PDs. The *no* command negates the command.

The *mode* command option configures the power sourcing mode for the selected port. PoE power can be 802.3af, 802.3af/at, auto detect, disabled (off) or forced on.

af	selects PSE enabled, advertising 802.3af
at	selects PSE enabled, advertising 802.3af/at
auto	selects PSE enabled, advertising max power possible
off	selects PSE disabled
force	selects PSE enabled and supplying max power

The *pderr* command option configures the number of consecutive lost heartbeats before an error condition is declared. The default value is 3 lost heartbeat signals.

The *pdint* command option configures the number of times a PD is restarted when *pdmode* is set to restart. The default value is 0 indicating no limit to the number of restarts.

The *pdip* command option configures the IP address of the PD. The IP address of the PD is used for the heartbeat signal.

The *pdmo* command option configures what action is taken when a heartbeat error condition is detected.

restart	forces a power down and power up on the PSE ports
ignore	no action when error condition is entered
shutdown	shutdown PSE power for errored port

The *reset* command option removes and reapplies power to the selected port.

To reset the power to Port 1, use the following commands.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# pse reset
(cfg-if)[1]# exit

(cfg)#
```

To schedule a time for PSE power to be turned ON (7:00AM) and OFF (7:00PM) on Port P1, use the following commands.

```
(cfg)# pse idx 1
Nesting level change accepted

(cfg-pse)[1]# port 1
(cfg-pse)[1]# sched 7:00:00 19:00:00
(cfg-pse)[1]# exit

(cfg)#
```

To enable heartbeat on Port 1, use the following command.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# pse heartbeat
(cfg-if)[1]# pse pdip 192.168.1.230
(cfg-if)[1]# exit

(cfg)#
```

To view the changes or display the PSE configuration settings, use the *show pse* command from the # prompt.

PSE Command Syntax	
(cfg)# pse dall	(cfg-if)#<pNum> pse mode auto
(cfg)# pse sched	(cfg-if)#<pNum> pse mode off
(cfg)# no pse sched	(cfg-if)#<pNum> pse mode force
(cfg)# pse pslimit	(cfg-if)#<pNum> pse reset
(cfg)# no pse pslimit	(cfg-if)#<pNum> pse heartbeat
(cfg)# pse pmax [pwrMax:1-410]	(cfg-if)#<pNum> no pse heartbeat
(cfg)# no pse idx [idx:1-100]	(cfg-if)#<pNum> pse lldp-med
(cfg)# pse idx [idx:1-100] (accesses next nesting level)	(cfg-if)#<pNum> no pse lldp-med
(cfg-pse)# port [cList:1..8|all]	(cfg-if)#<pNum> pse mdi-tlv
(cfg-pse)# sched [onTime:time|none]	(cfg-if)#<pNum> no pse mdi-tlv
(cfg-pse)# sched [onTime:time|none] [offTime:time|none]	(cfg-if)#<pNum> pse i [iTime:1-300]
(cfg-pse)# sched [onTime:time|none] [offTime:time|none] [sDays:days]	(cfg-if)#<pNum> pse pderr [eNum:1-100]
(cfg-pse)# pn [pName:string0..32]	(cfg-if)#<pNum> pse hdfr [iTime:10-300]
(cfg-pse)# schedule	(cfg-if)#<pNum> pse pdint [initNum:0-16384]
(cfg-pse)# no schedule	(cfg-if)#<pNum> pse pdip [iAddr:ipAddr]
(cfg-pse)# exit	(cfg-if)#<pNum> pse pdmo restart
(cfg) port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> pse pdmo ignore
(cfg-if)#<pNum> pse mode af	(cfg-if)#<pNum> pse pdmo shutdown
(cfg-if)#<pNum> pse mode at	(cfg-if)#<pNum> exit

Syntax	Name Description	Format Values
[pwrMax:1-410]	maximum PSE power (watts)	1-410 watts
[idx:1-100]	PoE scheduler index	1-100
[cList:1..8|all]	port list	1..8, or all
[onTime:time|none]	time of day power enabled	24hr:min:sec or none
[offTime:time|none]	time of day power disabled	24hr:min:sec or none
[sDays:days]	days scheduled	Sun,Mon,Tue,Wed,Thu,Fri,Sat
[pName:string0..32]	PoE scheduler profile name	0-32 characters
[iTime:1-300]	heartbeat interval	1-300 sec
[eNum:1-100]	# consecutive lost heartbeats for error	1-100
[iTime:10-300]	heartbeat restart defer	10-300 sec
[initNum:0-16384]	times to restart PD after error	0-16384
[iAddr:ipAddr]	ip address of PD for heartbeat	ip address

3.1.1.21 SPANTREE Command

Multiple Spanning Tree Protocol (MSTP) is a protocol that creates multiple spanning trees (instances) for each VLAN. This allows each VLAN to be configured with a root bridge and forwarding topology.

The *spantree* command provides the ability to configure Multiple Spanning Tree Protocol (MSTP). Use the *show spantree* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# spantree ?
Possible next parameters:
    bage          bridge aging timeout
    bpri          bridge priority
    dall          delete spantree settings, instances, restore defaults
    fwd           forward delay time
    hello         time between hello messages
    mstp          MSTP instance selection name
    stp           spanning tree

(cfg)# spantree


(cfg)# spantree mstp protect
Nesting level change accepted

(cfg-mstp)#
Possible next parameters:
    exit          exit MSTP instance
    port          port list
    vid           VLAN list


(cfg-mstp)#


(cfg)# spantree
(cfg-if)[1]# spantree
Possible next parameters:
    bpduguard     port is disabled when BPDU received
    pcost         port path cost
    portfast      forwarding immediately & bypass listening
    ppri          port priority
    proto         protocol configuration
    rootguard     port is disabled if designated as root

(cfg-if)[1]# spantree
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *spantree* command are shown below.

The *bage* command option sets the time period before the MAC addresses are removed from the table.

The *bpri* command option sets the bridge priority ID for the port. The root bridge is the port with the

The *dall* command option deletes all configured Spanning Tree settings and restore factory defaults.

The *fwd* command option sets the time before a port transitions to a forwarding state.

The *hello* command option sets the time period between hello-time Bridge Protocol Data Units (BPDUs).

The *mstp* command option configures the name of the MSTP instance.

The *stp* command option disables/enables spanning tree protocol. The *no* command negates the command.

Command options under the *mstp <pname>* command.

The *exit* command option exits the current nesting level.

The *port* command option configures the ports associated with the spanning tree instance

The *vid* command option configures the VLAN associated with the spanning tree instance.

Command options under the *port select <pNum>* command.

The *bpduguard* command option disables/enables the selected port from receiving BPDUs. The *no* command negates the command.

The *pcost* command option sets the cost of the path. The path cost is based on the speed of the physical interface speed.

The *portfast* command option disables/enables forwarding of BPDUs immediately and bypasses listening. The *no* command negates the command.

The *ppri* command option sets the priority of the port. The state of the port is determined by the port cost and port priority values.

The *proto* command option configures the protocols.

discard	RSTP/MSTP are disabled, BPDU frames are discarded
mstp	MSTP is enabled and protocol is operational
rstp	RSTP is enabled and protocol is operating
tunnel	RSTP/MSTP are disabled, BPDU frames are tunneled

The *rootguard* command option disables/enables the selected port if designated as root. The *no* command negates the command.

To configure Port 1 for RSTP with port priority and path cost, use the following commands.

```
(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# spantree proto rstp
(cfg-if)[1]# spantree ppri 96
(cfg-if)[1]# spantree pcost 10000
(cfg-if)[1]# exit

(cfg)#
```

To configure Port 2 for MSTP, use the following commands.

```
(cfg)# port select 2
Nesting level change accepted

(cfg-if)[2]# spantree proto mstp
(cfg-if)[2]# exit

(cfg)# spantree mstp network
Nesting level change accepted

(cfg-mstp)# vid 1
(cfg-mstp)# port 2
(cfg-mstp)# exit

(cfg)#
```

To view the changes or display the SPANTREE configuration settings, use the *show spantree* command from the # prompt.

SPANTREE Command Syntax	
(cfg)# spantree stp	(cfg-if)#<pNum> spantree ppri [pPri:0-240]
(cfg)# no spantree stp	(cfg-if)#<pNum> spantree pcost [pCost:1-200000000]
(cfg)# spantree dall	(cfg-if)#<pNum> spantree proto discard
(cfg)# spantree bage [timeout:6-40]	(cfg-if)#<pNum> spantree proto mstp
(cfg)# spantree hello [htime:1-5]	(cfg-if)#<pNum> spantree proto rstp
(cfg)# spantree fwd [ftime:4-30]	(cfg-if)#<pNum> spantree proto tunnel
(cfg)# spantree bpri [bPri:0-61440]	(cfg-if)#<pNum> spantree bpduguard
(cfg)# no spantree mstp [pname:string1..32]	(cfg-if)#<pNum> no spantree bpduguard
(cfg)# spantree mstp [pname:string1..32] (accesses next nesting level)	(cfg-if)#<pNum> spantree portfast
(cfg-mstp)# vid [vList:vlanlist]	(cfg-if)#<pNum> no spantree portfast
(cfg-mstp)# port [pList:f1,f2,1..8|all]	(cfg-if)#<pNum> spantree rootguard
(cfg-mstp)# exit	(cfg-if)#<pNum> no spantree rootguard
(cfg) port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> exit

Syntax	**Name Description**	**Format Values**
[timeout:6-40]	bridge aging timeout	6-40 sec
[htime:1-5]	time between hello messages	1-5 sec
[ftime:4-30]	forward delay time	4-30 sec
[bPri:0-61440]	bridge priority	0-61440, multiples of 4096
[pname:string1..32]	MSTP instance name	1-32 characters
[vList:vlanlist]	VLAN list	1-4095
[pList:f1,f2,1..8|all]	port list	f1,f2,1..8 or all
[pPri:0-240]	port priority	0-240
[pCost:1-200000000]	port path cost	1-200000000

Bridge Priority (*bpri*):

The bridge with the lowest priority is elected as the root bridge for the domain. The Bridge Priority can be modified in increments of 4096 from 0 to 61,440. The default Bridge Priority is 32,768.

Bridge Age Time:

The amount of time a module saves configuration BPDUs. A value from 6 - 40 seconds is valid. The default Max Age Time is 20 seconds.

Hello Time (*hello*):

The Root sends configuration BPDUs every 2 seconds. A value from 1 - 5 seconds is valid. The default Hello Time is 2 seconds.

Forward Delay (*fwd*):

The time interval for listening and learning states. A value from 4 - 30 seconds is valid. The default Forward Delay is 15 seconds.

MAC Address Aging (*bage*):

The time before the MAC address is removed from the MAC table. A value from 10 - 630 seconds is valid. The default MAC Aging Time is 300 seconds.

Port Priority (*ppri*):

If two paths have the same port cost, the bridges must select a preferred path. Port Priority is used to determine the preferred path. A value from 0 - 240 (in increments of 16), with 240 being the highest priority, is allowed. The default Port Priority is 128.

Path Cost (*pcost*):

The cost of a port is typically based on port speed. The faster the port, the lower the port cost. See table below. A value from 1 - 200,000,000 is valid. The default Path Cost is 20,000.

BPDU Guard (*bpduguard***)**

BPDU Guard is used to protect the Spanning Tree Topology from BPDU related attacks. BPDU Guard must be enabled on a port that should never receive a BPDU from the connected device.

Port Fast (*portfast*)

Port Fast allows ports to enter a forwarding state in four seconds. Port Fast allows faster convergence on ports that are attached to end stations and do not present the potential to cause forwarding loops.

Root Guard (*rootguard*)

Root Guard ensures that the port on which root guard is enabled is the designated port.

Spanning Tree Protocol uses path cost and port priority to determine the best path. The table below shows the recommended path cost based on link speed.

Link Speed	Recommended Value
10Mbps	2,000,000
100Mbps	200,000
1Gbps	20,000
10Gbps	2,000
100Gbps	200

Recommended Port Cost vs Link Speed

The port with the lowest path cost has the highest priority.

By default, Spanning Tree Protocol is tunneled. Use the *-proto* command to change the way the module handles the protocols.

3.1.1.22 SMTP Command

The *smtp* command provides the ability to configure the Simple Mail Transfer Protocol (SMTP) parameters on the module. The SMTP is a communication protocol for electronic mail transmission.

When using Simple Mail Transfer Protocol (SMTP) to send mail, it optionally uses a combination of StartTLS and Transport Layer Security (TLS) or Secure Sockets Layer (SSL) to encrypt the mail. StartTLS is a protocol command used to inform the email server that the email client wants to upgrade from an insecure connection to a secure one using TLS or SSL.

Use the *show smtp* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# smtp ?
Possible next parameters:
    <cr>
    dall           delete SMTP settings, restore defaults
    from           email from-address
    host           mail server IP address or domain
    idx            SMTP email instance index
    name           user name
    port           SMTP destination port
    pw             user password
    starttls       STARTTLS function
    test           SMTP test message
    tls            TLS (Transport Layer Security)

(cfg)# smtp


(cfg)# smtp idx 1
Nesting level change accepted

(cfg-smtp)[1]#
Possible next parameters:
    exit           exit from SMTP recipient instance
    level          minimum level for SMTP entries
    recipient      email recipient

(cfg-smtp)[1]#
```

The command options available using the *smtp* command are shown below.

The *smtp* command option disables/enables SMTP event forwarding. The *no* command negates the command.

The *dall* command option deletes all configured SMTP settings and restores factory defaults.

The *from* command option configures the email address of the person the email is from.

The *host* command option configures the IP address of the SMTP mail server or domain.

The *idx* command option configures the instance index number.

The *name* command option configures the user name to be used to log into the email server.

The *port* command option configures the SMTP port number. The default port number is 25.

The *pw* command option configures the password for the selected email account.

The *starttls* command option disables/enables the STARTTLS function. The *no* command negates the command.

The *test* command option sends a test email to the email server at the specified severity level.

alert	alert SMTP level selection (level 7)
critical	critical SMTP level selection (level 6)
debug	debug SMTP level selection (level 1)
emergency	emergency SMTP level selection (level 8)
error	error SMTP level selection (level 5)
info	info SMTP level selection (level 2)
notice	notice SMTP level selection (level 3)
warning	warning SMTP level selection (level 4)

The *tls* command option disables/enables Transport Layer Security (TLS). The *no* command negates the command.

Command options under the *idx <sIdx>* command.

The *exit* command option exits the current nesting level.

The *level* command option configures the syslog minimum severity error for forwarding events.

alert	alert SMTP level selection (level 1)
critical	critical SMTP level selection (level 2)
debug	debug SMTP level selection (level 7, lowest priority)
emergency	emergency SMTP level selection (level 0, highest priority)
error	error SMTP level selection (level 3)
info	info SMTP level selection (level 6)
notice	notice SMTP level selection (level 5)
warning	warning SMTP level selection (level 4)

The *recipient* command option configures the email address from the selected recipient.

To configure SMTP forwarding, use the following commands.

```
(cfg)# smtp host 192.168.1.1
(cfg)# smtp name abc@xyz.com
(cfg)# pw 123456
(cfg)# smtp from bill@gmail.com

(cfg)# smtp

(cfg)#
```

To view the changes or display the SMTP configuration settings, use the *show smtp* command from the # prompt.

SMTP Command Syntax	
(cfg)# smtp	(cfg)# smtp test error [msg:string1..160]
(cfg)# no smtp	(cfg)# smtp test info [msg:string1..160]
(cfg)# smtp dall	(cfg)# smtp test notice [msg:string1..160]
(cfg)# smtp host [hName:string0..253]	(cfg)# smtp test warning [msg:string1..160]
(cfg)# smtp name [uName:string0..254]	(cfg)# no smtp idx [sIdx:1-25]
(cfg)# smtp pw [uPw:string0..32]	(cfg)# smtp idx [sIdx:1-25] (accesses next nesting level)
(cfg)# smtp from [fAddr:string0..254]	(cfg-smtp)# recipient [eAddr:string1..254]
(cfg)# smtp port [pNum:1-65535]	(cfg-smtp)# level alert
(cfg)# smtp starttls	(cfg-smtp)# level critical
(cfg)# no smtp starttls	(cfg-smtp)# level debug
(cfg)# smtp tls	(cfg-smtp)# level emergency
(cfg)# no smtp tls	(cfg-smtp)# level error
(cfg)# smtp test alert [msg:string1..160]	(cfg-smtp)# level info
(cfg)# smtp test critical [msg:string1..160]	(cfg-smtp)# level notice
(cfg)# smtp test debug [msg:string1..160]	(cfg-smtp)# level warning
(cfg)# smtp test emergency [msg:string1..160]	(cfg-smtp)# exit

Syntax	Name Description	Format Values
[hName:string0..253]	mail server IP address or domain	0-253 characters
[uName:string0..254	user name	0-254 characters
[uPw:string0..32]	user password	0-32 characters
[fAddr:string0..254]	email from-address	0-254 characters
[pNum:1-65535]	SMTP destination port	1-65535
[sIdx:1-25]	SMTP email instance index	1-25
[msg:string1..160]	SMTP message	1-160 characters
[eAddr:string1..254]	email recipient	1-254 characters

3.1.1.23 SNMP Command

The *snmp* command provides the ability to configure the SNMP parameters on the module. Use the *show snmp* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# snmp ?
Possible next parameters:
    dall           delete SNMP settings, restore defaults
    rd             read community name
    snmpv1         SNMPv1/v2c protocol
    snmpv3         SNMPv3 protocol
    user           user number
    wr             write community name

(cfg)# snmp


(cfg-snmp)[1]#
Possible next parameters:
    atype          authentication type
    auth           authentication password
    exit           exit from user instance
    name           user name
    priv           privacy password
    ptype          privacy type
    sec            user security level
    typ            user type

(cfg-snmp)[1]#
```

The command options available using the *snmp* command are shown below.

The *dall* command option deletes all configured SNMP settings and restore factory defaults.

The *rd* command option configures the SNMPv1/2c Read Community Name . The SNMP Read Community Name is necessary for reading (get) data from the module. The name can be any 1-32 alphanumeric character string. The default setting is public.

The *snmpv1* command option disables/enables SNMPv1. The *no* command negates the command.

The *snmpv3* command option disables/enables SNMPv3. The *no* command negates the command.

The *user* command option configures the user number.

The *wr* command option configures the SNMPv1/2c Write Community Name . The SNMP Write Community Name is necessary for writing (set) data to the module. The name can be any 1-32 alphanumeric character string. The default setting is private.

Command options under the *user <uNum>* command.

The *atype* command option configures the authentication hashing method; MD5 or SHA.

The *auth* command option configures the SNMPv3 authentication password for the selected user number. Authentication password can be any 8-32 alphanumeric character string. The default setting is publicguest.

The *exit* command option exits the current nesting level.

The *name* command option configures the user name for the selected user number.

The *priv* command option configures the privacy password for the selected user number.

The *ptype* command option configures the privacy password encryption algorithm; AES or DES.

The *sec* command option configures the security level for the selected user

noAuthNoPriv no authentication or privacy security

authNoPriv authentication with no privacy security

authPriv authentication and privacy security

The *typ* command option configures the SNMP user type for a user account; admin, read-write, read-only or deny.

admin admin user type, read, write, user allowed

deny deny user type (no access via SNMP)

readonly readonly type, no writes allowed

readwrite readwrite type read and write allowed

To change the write community name, use the following command.

```
(cfg)# snmp wr public
```

To change the authentication hashing for user 1, use the following command.

```
(cfg)# snmp user 1
Nesting level change accepted

(cfg-snmp)[1]# atype sha
(cfg-snmp)[1]# exit

(cfg)#
```

To view the changes or display the SNMP configuration settings, use the *show snmp* command from the # prompt.

SNMP Command Syntax	
(cfg)# snmp dall	(cfg-snmp)# name [uName:string1..32]
(cfg)# snmp rd [pw:string1..32]	(cfg-snmp)# auth [aPw:string8..32]
(cfg)# snmp wr [pw:string1..32]	(cfg-snmp)# priv [pPw:string8..32]
(cfg)# snmp snmpv1	(cfg-snmp)# sec noAuthNoPriv
(cfg)# no snmp snmpv1	(cfg-snmp)# sec authNoPriv
(cfg)# snmp snmpv3	(cfg-snmp)# sec authPriv
(cfg)# no snmp snmpv3	(cfg-snmp)# atype md5
(cfg)# snmp user [uNum:1-4] (accesses next nesting level)	(cfg-snmp)# atype sha
(cfg-snmp)# typ admin	(cfg-snmp)# ptype aes
(cfg-snmp)# typ deny	(cfg-snmp)# ptype des
(cfg-snmp)# typ readonly	(cfg-snmp)# exit
(cfg-snmp)# typ readwrite	

Syntax	Name Description	Format Values
[pw:string1..32]	read or write community name	1-32 characters
[uNum:1-4]	user number	1-4
[uName:string1..32]	user name	1-32 characters
[aPw:string8..32]	authentication password	8-32 characters
[pPw:string8..32]	privacy password	8-32 characters

3.1.1.24 SNTP Command

The *sntp* command provides the ability to configure the module to request the time and day from a SNTP server. Use the *show sntp* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# sntp ?
Possible next parameters:
    <cr>
    dall           delete SNTP settings, restore defaults
    interval       time server request interval
    ip1            time server IP address 1
    ip2            time server IP address 2
    ntp            network time protocol (NTP)
    zone           time zone selection

(cfg)# sntp
```

The command options available using the *sntp* command are shown below.

The *sntp* command option disables/enables SNTP. The *no* command negates the command.

The *dall* command option deletes all configured SNTP settings and restores factory defaults.

The *interval* command option configures the time interval between SNTP requests.

The *ip1* command option configures the IP address 1 of the SNTP servers.

The *ip2* command option configures the IP address 2 of the SNTP servers.

The *ntp* command option disables/enables NTP. The *no* command negates the command.

The *zone* command option configures the time zone.

To enable SNTP services and assign the SNTP server IP address, use the *-ena* and *-ip1* commands.

```
(cfg)# sntp ip1 192.168.1.240
(cfg)# sntp

(cfg)#
```

To view the changes or display the SNTP configuration settings, use the *show sntp* command from the # prompt.

SNTP Command Syntax	
(cfg)# sntp	(cfg)# sntp interval [iTime:1-60]
(cfg)# no sntp	(cfg)# sntp zone [zoneVal:timezone]
(cfg)# sntp ntp	(cfg)# sntp ip1 [serverIp:ipAddr]
(cfg)# no sntp ntp	(cfg)# sntp ip2 [serverIp:ipAddr]
(cfg)# sntp dall	

Syntax	**Name Description**	**Format Values**
[iTime:1-60]	time server request interval	1-60
[zoneVal:timezone]	time zone selection	abbreviations
[serverIp:ipAddr]	ime server IP address	ipv4 address for server IP1 and IP2

3.1.1.25 SSH Command

Secure Shell (SSH) protocol provides authentication, encryption, and the integrity of data transmitted over a network. SSH uses public-key cryptography to authenticate the remote devices and allows the remote devices to authenticate the user. The module supports SSH Version 2.

The *ssh* command provides the ability to configure SSH on the module. Use the *show ssh* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# ssh ?
Possible next parameters:
    <cr>
    dall          delete SSH settings, restore defaults
    dsa           DSA key authentication
    genk          generate public/private keys
    pwd           plain text password entry authentication
    rsa           RSA key authentication
    sftp          secure file transfer protocol (scp v2)
    tcp           tcp port

(cfg)# ssh
```

The command options available using the *ssh* command are shown below.

The *ssh* command option disables/enables SSH. The *no* command negates the command.

The *dall* command option deletes all configured SSH settings and restores factory defaults.

The *dsa* command option disables/enables DSA key authentication. The *no* command negates the command.

The *genk* command option generates the public/private key pair. It takes time to generate the public and private keys. Please be patient when using this command.

The *pwd* command option disables/enables plain text password entry authentication. The *no* command negates the command.

The *rsa* command option disables/enables RSA key authentication. The *no* command negates the command.

The *sftp* command option disables/enables secure file transfer. The *no* command negates the command.

The *tcp* command option configures the TCP port used for the SSH session.

The SSH function supports password (plain text) and public key authentication methods. Password is plain text entered in the client application. RSA is a public key generated via the Rivest, Shamir and Adleman algorithm and DSA is a public key generated via the Digital Signature Algorithm.

The default username is admin and the default password is public.

To enable SSH, and set TCP Port 23, use the *-ena* and *-tcp* commands.

```
(cfg)# ssh tcp 23
(cfg)# ssh

(cfg)#
```

To view the changes or display the SSH configuration settings, use the *show ssh* command from the # prompt.

SSH Command Syntax	
(cfg)# ssh	(cfg)# ssh rsa
(cfg)# no ssh	(cfg)# no ssh rsa
(cfg)# ssh dall	(cfg)# ssh sftp
(cfg)# ssh dsa	(cfg)# no ssh sftp
(cfg)# no ssh dsa	(cfg)# ssh tcp [tPort:1-65535]
(cfg)# ssh pwd	(cfg)# ssh genk
(cfg)# no ssh pwd	

Syntax	Name Description	Format Values
[tPort:1-65535]	tcp port	1-65535

3.1.1.26 SWITCH Command

The *switch* command provides the ability to configure and display the DIP-switches on the module. Use the *show switch* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# switch ?
Possible next parameters:
    dall          delete DIP switch settings, restore defaults
    hw            hardware DIP switch function
    sw            software DIP switch function

(cfg)# switch
```

The command options available using the *switch* command are shown below.

The *dall* command deletes all configured DIP-switch setting and restores factory defaults.

The *hw* command option disables/enables hardware control over the DIP-switches. The *no* command negates the command.

The *sw* command option disables/enables software control over the DIP-switches. The *no* command negates the command.

To enable DIP-switch 2, use the following command.

```
(cfg)# switch sw 1

(cfg)#
```

To view the changes or display the SWITCH configuration settings, use the *show switch* command from the # prompt.

SWITCH Command Syntax	
(cfg)# switch dall	(cfg)# switch sw [sNum:1..8|all]
(cfg)# switch hw	(cfg)# no switch sw [sNum:1..8|all]
(cfg)# no switch hw	

Syntax	**Name Description**	**Format Values**
[sNum:1..8|all]	software DIP switch number	1-8 or all

3.1.1.27 STORMCONTROL Command

The *stormcontrol* command provides the ability to configure storm prevent for broadcast, multicast and unicast traffic on each port. When configured, traffic will be blocked when the traffic reaches a certain configurable threshold. Use the *show stormcontrol* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# stormcontrol ?
Possible next parameters:
    dall          delete stormcontrol settings, restore defaults

(cfg)# stormcontrol


(cfg-if)[1]# stormcontrol
Possible next parameters:
    <cr>
    bps           interface bits per second level threshold
    broadcast     broadcast frame storm control
    level         interface level threshold percentage
    multicast     multicast frame storm control
    unicast       unicast frame storm control

(cfg-if)[1]# stormcontrol
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *stormcontrol* command are shown below.

The *dall* command option deletes all configured storm control setting and restores factory defaults.

Command options under the *port select <pNum>* command.

The *stormcontrol* command option disables/enables storm control on the selected port. The *no* command negates the command.

The *bps* command option configures the interface high threshold and the optional low threshold values in bits per second.

The *low* value if configured will be less than or equal to the *high* value. If the *low* value is not configured it will be treated as equal to the *high* value.

The *low* value if configured will be less than or equal to the *high* value. If the *low* value is not configured it will be treated as equal to the *high* value.

The *broadcast* command option disables/enables broadcast frame storm control. The *no* command negates the command.

The *level* command option configures the interface high threshold and the optional low threshold values in percentage of the interface maximum speed.

The *multicast* command option disables/enables multicast frame storm control. The *no* command negates the command.

The *unicast* command option disables/enables unicast frame storm control. The *no* command negates the command.

The enable broadcast storm prevention on port F1 at a 50% threshold, use the following command.

```
(cfg)# port select f1
Nesting level change accepted

(cfg-if)[f1]# stormcontrol broadcast
(cfg-if)[f1]# stormcontrol level 50
(cfg-if)[f1]# stormcontrol
(cfg-if)[f1]# exit

(cfg)#
```

To view the changes or display the STORMCONTROL configuration settings, use the *show stormcontrol* command from the # prompt.

STORMCONTROL Command Syntax	
(cfg)# stormcontrol dall	(cfg-if)#<pNum> stormcontrol unicast
(cfg)# port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> no stormcontrol unicast
(cfg-if)#<pNum> stormcontrol	(cfg-if)#<pNum> stormcontrol level [lvlhigh:0.01-100.00]
(cfg-if)#<pNum> no stormcontrol	(cfg-if)#<pNum> stormcontrol level [lvlhigh:0.01-100.00] [lvllow:0.01-100.00]
(cfg-if)#<pNum> stormcontrol broadcast	(cfg-if)#<pNum> stormcontrol bps [bpshigh:100000-10000000000]
(cfg-if)#<pNum> no stormcontrol broadcast	(cfg-if)#<pNum> stormcontrol bps [bpshigh:100000-10000000000] [bpslow:100000-10000000000]
(cfg-if)#<pNum> stormcontrol multicast	(cfg-if)#<pNum> exit
(cfg-if)#<pNum> no stormcontrol multicast	

Syntax	**Name Description**	**Format Values**
[lvlhigh:0-100]	interface level threshold - rising	0.01-100.00 percent
[lvllow:0-100]	interface level threshold - falling	0.01-100.00 percent
[bpshigh:100000-10000000000]	interface bps level threshold - rising	100000-10000000000 bps
[bpslow:100000-10000000000]	interface bps level threshold - falling	100000-10000000000 bps

3.1.1.28 SWITCHPORT Command

The *switchport* command provides the ability to configure VLAN interfaces on the module.

```
(cfg)# switchport ?
Possible next parameters:
    dall           delete switchport settings, restore defaults

(cfg)# switchport


(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# switchport ?
Possible next parameters:
    mode           port mode type
    nvlan          native vlan assignment for trunk port
    vid            vlan id assignment for access/tunnel port
    vidtrunk       vlan list for trunk port

(cfg-if)[1]# switchport
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *switchport* command are shown below.

The *dall* command option deletes all configured switch port settings and restores factory defaults.

Command options under the *port select <pNum>* command.

The *switchport* command option configures VLANs on the selected port. The *no* command negates the command.

The *mode* command option configures the port type for the selected port.

access access port type
- Ingress: Accepts only untagged traffic
- Egress: Traffic follows the assigned VID

tunnel tunnel port type
- Ingress: Untagged and tagged traffic is accepted
- Egress: Traffic follows the assigned VID

trunk trunk port type
- Ingress: The trunk VLAN is removed
- Egress: The trunk VLAN is added

The *nvlan* command option configures the trunk port with native VLAN assignment.

The *vid* command option configures a VLAN ID for an access or tunnel port.

The *vidtrunk* command option configures the VLAN IDs assigned to a trunk port.

By default, traffic is allowed to ingress/egress a trunk port unless it is restricted.

When a native VLAN is configured, all untagged traffic on the trunk port is set to the VLAN ID associated with the native VLAN. Traffic assigned to a native VLAN when transmitted on a trunk port is untagged. Untagged traffic received on a trunk port is assigned to the VLAN associated with the native VLAN.

To configure an access port with a VLAN ID, use the following command.

```
(cfg)# vlan vid 100

(cfg)# port select 1
Nesting level change accepted

(cfg-if)[1]# switchport mode access
(cfg-if)[1]# switchport vid 100
(cfg-if)[1]# exit

(cfg)#
```

VLANs must be added using the *vlan* command before they can be associated with a port.

To configure Fiber Port 1 (F1) as a trunk port allowing only VLAN ID 100, use the following command.

```
(cfg)# port select f1
Nesting level change accepted

(cfg-if)[f1]# switchport mode trunk
(cfg-if)[f1]# switchport vidtrunk 100
(cfg-if)[1]# exit

(cfg)#
```

To view the changes or display the SWITCHPORT configuration settings, use the *show switchport* command from the # prompt.

SWITCHPORT Command Syntax	
(cfg)# switchport dall	(cfg-if)#<pNum> switchport vid [vlanId:1-4095]
(cfg)# port select <pNum> (accesses next nesting level)	(cfg-if)#<pNum> switchport nvlan [vlanId:0-4095]
(cfg-if)#<pNum> switchport mode access	(cfg-if)#<pNum> switchport vidtrunk [vlanList:1-4095|all]
(cfg-if)#<pNum> switchport mode tunnel	(cfg-if)#<pNum> exit
(cfg-if)#<pNum> switchport mode trunk	

Syntax	**Name Description**	**Format Values**
[vlanId:1-4095]	vlan id assignment for access/tunnel port	1-4095
[vlanList:vlanlist]	vlan list for trunk port	0-4095, all

3.1.1.29 SYSLOG Command

Syslog is a standard for message logging per RFC 5424. It is used to manage system logs and alerts.

The *syslog* command provides the ability to configure Syslog on the module. Use the *show syslog* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# syslog
Possible next parameters:
    <cr>
    dall          delete syslog settings, restore defaults
    erase         erase all current syslog local entries
    fac           facility code
    ip            syslog server IP address
    level         minimum level for syslog entries
    test          generate test syslog entry

(cfg)# syslog
```

The command options available using the *syslog* command are shown below.

The *syslog* command option disables/enables syslog functionality. The *no* command negates the command.

The *dall* command option deletes all configured syslog setting and restores factory defaults.

The *erase* command option erases all the entries in the current syslog.

The *fac* command configures the facility code. The default value is 23.

The *ip* command option configures the syslog server IP address.

The *level* command option configures the syslog minimum severity error for forwarding events.

alert	alert syslog level selection (level 7)
critical	critical syslog level selection (level 6)
debug	debug syslog level selection (level 1)
emergency	emergency syslog level selection (level 8)
error	error syslog level selection (level 5)
info	info syslog level selection (level 2)
notice	notice syslog level selection (level 3)
warning	warning syslog level selection (level 4)

The *test* command option generates a test syslog entry at the specified severity level.

alert	alert syslog level selection (level 7)
critical	critical syslog level selection (level 6)
debug	debug syslog level selection (level 1)
emergency	emergency syslog level selection (level 8)
error	error syslog level selection (level 5)
info	info syslog level selection (level 2)
notice	notice syslog level selection (level 3)
warning	warning syslog level selection (level 4)

To configure the IP address of the syslog server and enable syslog, use the following command.

```
(cfg)# syslog ip 192.168.1.100
(cfg)# syslog

(cfg)#
```

To generate a generates a test syslog entry, use the following command.

```
(cfg)# syslog test alert "This is a test message"
```

To view the changes or display the SYSLOG configuration settings, use the *show syslog* command from the # prompt.

SYSLOG Command Syntax	
(cfg)# syslog	(cfg)# syslog level notice
(cfg)# no syslog	(cfg)# syslog level warning
(cfg)# syslog dall	(cfg)# syslog fac [fCode:16-23]
(cfg)# syslog ip [serverNumIp:ipAddr]	(cfg)# syslog test alert [message:string1..127]
(cfg)# syslog erase	(cfg)# syslog test critical [message:string1..127]
(cfg)# syslog level alert	(cfg)# syslog test debug [message:string1..127]
(cfg)# syslog level critical	(cfg)# syslog test emergency [message:string1..127]
(cfg)# syslog level debug	(cfg)# syslog test error [message:string1..127]
(cfg)# syslog level emergency	(cfg)# syslog test info [message:string1..127]
(cfg)# syslog level error	(cfg)# syslog test notice [message:string1..127]
(cfg)# syslog level info	(cfg)# syslog test notice [message:string1..127]

Syntax	**Name Description**	**Format Values**
[serverNumIp:ipAddr]	syslog server IP address	ipv4 address
[fCode:16-23]	facility code	16-2
[message:string1..127]	generate test syslog entry	1-127 characters

3.1.1.30 USER Command

The *user* command provides the ability to create and modify user accounts. Up to sixteen user accounts can be configured. Use the *show user* command from the # prompt to determine the state of the command option (disabled or enabled).

```
(cfg)# user ?
Possible next parameters:
    artry          number of authentication retries
    ato            authentication timeout
    dall           deletes all users except the admin user, restores defaults
    fsto           ftp session timeout
    lto            lockout timeout
    rename         new user name
    select         select user name
    strongpassword strong password is only accepted

(cfg)# user


(cfg)# user select Bob
Nesting level change accepted

(cfg-user)[Bob]#
Possible next parameters:
    exit           exit from user instance
    kfn            SSH key file name
    pw             user password
    sto            session timeout
    type           user type

(cfg-user)[Bob]#
```

The command options available using the *user* command are shown below.

The *artry* command option sets the number of authentication attempts that a client is allowed to make before authentication lockout.

The *ato* command option sets the time allowed for the completion of an authentication attempt.

The *dall* command option deletes all user profiles except the currently logged in user and restores to factory defaults.

The *fsto* command option configures the FTP session timeout value in seconds.

The *lto* command option configures the lockout timer for a specific user. The default timeout is 300 seconds.

The *rename* command option configures the name of a new user.

The *select* command option selects a user name to be configured. The *no* command negates the command.

The *strongpassword* command option disables/enables strong password control. Password strength is based on the password length of a minimum of eight (8) characters, at least one (1) upper case letter, at least one (1) number or special symbol. When enabled the password must be considered strong or very strong. If not, the password will be rejected and a message of "Password rejected because it is not strong enough" will be displayed. The *no* command negates the command.

Command options under the *select <uName>* command.

The *exit* command option exits the current nesting level.

The *kfn* command option configures the username and filename for a specific user.

The *pw* command option configures the password for a new user. This password is used for Serial, FTP, Telnet and SSH.

The *sto* command option configures the session timeout value for a specific user. The default timeout is 300 seconds.

The *type* command option configures the user access type for the user name selected. Each user name can be configured as:

admin	admin user type, read, write, user allowed
deny	deny user type (no access via SNMP)
readonly	readonly type, no writes allowed
readwrite	readwrite type read and write allowed

Username must contain 1-32 characters and may contain a-z, A-Z, 0-9 and the special characters dash (-), underscore (_) and period (.).

Passwords must contain 1-32 printable characters and may contain a-z, A-Z, 0-9 and the special characters ! # $ % & ‘ ( ) * + , / : ; < = > ? @ [\ ] ^ ` { | } ~ and space and the ‘New Password (again)’ must match.

When changing the session timeout value using the *sto* command, the new value will not take effect until the user logs out and logs back in.

To create a new user, use the following commands.

```
(cfg)# user select Doug
Nesting level change accepted

(cfg-user)[Doug]# type readonly
(cfg-user)[Doug]# pw engineeringvp
(cfg-user)[Doug]# exit

(cfg)#
```

To view the changes or display the USER configuration settings, use the *show user* command from the # prompt.

USER Command Syntax	
(cfg)# user dall	(cfg-user)# type admin
(cfg)# user lto [ltimeout:1-300]	(cfg-user)# type deny
(cfg)# user ato [atimeout:0-300]	(cfg-user)# type readonly
(cfg)# user artry [count:1-5]	(cfg-user)# type readwrite
(cfg)# user fsto [ftimeout:0-3600]	(cfg-user)# pw [uPw:string1..32]
(cfg)# user strongpassword	(cfg-user)# sto [stimeout:0-3600]
(cfg)# no user strongpassword	(cfg-user)# kfn
(cfg)# user rename [uName:string1..32] [newName:string1..32]	(cfg-user)# kfn [filename:string0..45]
(cfg)# no user select [uName:string1..32]	(cfg-user)# exit
(cfg)# user select [uName:string1..32] (accesses next nesting level)	

Syntax	Name Description	Format Values
[ltimeout:1-300]	lockout timeout	1-300 sec
[atimeout:0-300]	authentication timeout	0-300 sec
[count:1-5]	number of authentication retries	1-5
[ftimeout:0-3600]	ftp session timeout	0-3600 sec
[uName:string1..32]	user name	1-32 characters
[newName:string1..32]	new user name	1-32 characters
[uPw:string1..32]	user password	1-32 characters
[stimeout:0-3600]	session timeout	0-3600 sec
[filename:string0..45]	SSH key file name	0-45 characters

3.1.1.31 VLAN Command

The *vlan* command adds VLAN IDs on the module. Use the *switchport* command to assign the VLAN IDs to specific port numbers.

```
(cfg)# vlan ?
Possible next parameters:
    dall          delete VLAN settings, instances,  restore defaults
    vid           VLAN ID

(cfg)# vlan
```

The command options available using the *vlan* command are shown below.

The *dall* command option deletes all configured VLAN settings and restores factory defaults.

The *vid* command option configures a VLAN ID and VLAN name. The no command negates the command.

To configure a VLAN instance, use the following command.

```
(cfg)# vlan vid 100 video
(cfg)# vlan vid 200 voice
(cfg)# vlan vid 300 data

(cfg)#
```

To view the changes or display the VLAN configuration settings, use the *show vlan* command from the # prompt.

VLAN Command Syntax	
(cfg)# vlan dall	(cfg)# vlan vid [vlanId:1-4095] [vlanName:string1..64]
(cfg)# vlan vid [vlanId:1-4095]	(cfg)# no vlan vid [vlanId:1-4095]

Syntax	**Name Description**	**Format Values**
[vlanId:1-4095]	VLAN ID	1-4095
[vlanName:string1..64]	VLAN name	1-64 characters

3.1.2 SHOW Command

The *show* command displays the configuration parameters for the select command.

```
# show ?
Possible next parameters:
    aaa             authentication, authorization, accounting configuration
    acl             access control list configuration for management access
    bwp             bandwidth profile configuration
    contact         contact closure status
    cos             class of service configuration
    dir             directory of existing files
    ethertype       ethertype tag identification configuration
    fwload          firmware load configuration
    igmp            internet group management protocol configuration
    ip              IP configuration
    lag             link aggregation group configuration
    lldp            link layer discovery protocol (LLDP) configuration
    location        location configuration
    lr              link redundancy configuration
    mactable        mac table status
    mld             multicast listener discovery configuration
    modbus          modbus protocol configuration
    module          module global configuration
    mrp             media redundancy protocol (MRP) configuration
    port            port attribute configuration
    portaccess      port access configuration
    portstat        port statistic configuration
    protocol        protocol configuration
    pse             power source equipment (PSE) configuration
    restore         restore module defaults
    runningconfig   running config CLI commands
    save            save configuration changes into permanent memory
    serupdate       upload firmware update via the serial port
    sfp             small form pluggable port information
    sms             sms configuration
    smtp            smtp configuration
    snmp            snmp configuration
    sntp            simple network time protocol (SNTP) configuration
    spantree        spanning tree configuration
    splash          splash screen user configuration
    ssh             secure shell (SSH) configuration
    stormcontrol    storm control configuration
    switch          physical DIP switch configuration
    switchport      vlan interface configuration
    syslog          system log message configuration
    time            time of day configuration
    traphost        snmp trap host configuration
    traps           snmp trap configuration
    user            user configuration
    ver             version status
    vlan            vlan configuration
# show
```

Some *show* command have additional options available. Use the ? after to *show* command to see available options for that command (i.e. *show bwp ?*).

```
# show bwp
Possible next parameters:
    <cr>
    pList           port list selection: f1,f2,1..4|all
# show bwp
```

The following show command displays the configuration parameters for the AAA command option.

```
## show aaa

AAA                     disabled

authentication method  local

TACACS+                 disabled
  server(s)
  authentication port  49
  accounting port      49
  key
  timeout (sec)        60s

RADIUS                  disabled
  server(s)
  authentication port  1812
  accounting port      1813
  key
  timeout (sec)        60s
  number of retries    2

802.1X                 disabled (guest VLAN disa
  port F1              tunnel, on
  port F2              tunnel, on
  port 1               tunnel, on
  port 2               tunnel, on
  port 3               tunnel, on
  port 4               tunnel, on

#
```

To show the version of firmware on the module, use the *show ver* command.

```
# show ver

Model number       9526-0-24-1
Firmware           v2.x Sep 16 2022, 21:05:11
Bootstrap          v2.x.x
                   prodRev 10 hwRev 10 pcbRev 00a90100 appAP 0 caps(0xa0000004 mtype 168)

#
```

3.1.3 FWLOAD Command

The *fwload* command downloads the application firmware or bootloader file from a TFTP server.

```
# fwload ?
Possible next parameters:
    file            firmware file selection
    ip              TFTP Server ip address
    ty              firmware file type selection

# fwload
```

The command options available using the *fwload* command are shown below.

The *file* command option selects the firmware file to loaded on the module.

The *ip* command option configures the IP address of the TFTP server used for the upgrading of the firmware on the module.

The *ty* command option selects the firmware type; *app* or *bootloader*.

The filename of the application firmware when using the *fwload* command must be the same as the filename used during the FTP process.

Once the new firmware has been stored on the module, the firmware can be programmed by using the following command:

```
# fwload ty app
# fwload file <filename.dat>

Starting upgrade using file filename.dat
Upgrade complete, reboot pending...
```

To display the available files, use the *show fwload* command from the # prompt.

FWLOAD Command Syntax	
# fwload ty app	# fwload file [fileName:string1..45]
# fwload ty bootloader	# no fwload file [fileName:string1..45]
# fwload ip [tftpServerIp:ipAddr]	

Syntax	**Name Description**	**Format Values**
[tftpServerIp:ipAddr]	TFTP Server ip address	ipv address
[fileName:string0..45]	firmware file name	1-45 characters

3.1.4 MACTABLE Command

The *mactable* command provides the ability to enable/disable MAC learning, add/delete static MAC addresses, clear and display the MAC addresses learned by the module and configure the MAC aging time.Use the *show mactable* command from the # prompt to determine the state of the command option (disabled or enabled).

```
# mactable ?
Possible next parameters:
    aging          mac table aging time
    clr            clear (flushes) the learned MAC addresses
    dall           delete MAC configured settings, instances, restore defaults
    learning       global MAC learning
    mac            MAC address
    port           clear MAC table when any port link down

# mactable
```

NOTE: Port number selection will vary depending on the model.

The command options available using the *mactable* command are shown below.

The *aging* command option sets the time before a MAC address expires. The default value is 300 seconds.

The *clr* command option clears the learned MAC addresses on the module.

The *dall* command option deletes all MAC configured settings, instances and restores factory defaults.

The *learning* command option disables/enables MAC learning globally on the module. The *no* command negates the command.

The *mac* command option configures a static MAC address to the MAC table of a port or a port associated with a VLAN ID.

The *port* command option disables/enables the clearing of the MAC table when any port link is down. The *no* command negates the command.

To display the MACTABLE configuration settings and MAC addresses discovered, use the *show mactable* command from the # prompt.

MACTABLE Command Syntax	
# mactable dall	# mactable port
# mactable clr	# no mactable port
# mactable aging [ageTime:10-600]	# no mactable mac [macAddress:macAddress]
# mactable learning	# mactable mac [macAddress:macAddress] ports [pList:f1,f2,1..8|all]
# no mactable learning	# mactable mac [macAddress:macAddress] ports [pList:f1,f2,1..8|all] vid [vlanId:1-4095]

Syntax	**Name Description**	**Format Values**
[ageTime:10-600]	mac table aging time	10-600 sec
[macAddress:macAddress]	MAC addres	xx-xx-xx-xx-xx-xx, xx = 00-ff hex
[pList:f1,f2,1..8|all]	port list	f1,f2,1..8 or alll
[vlanId:1-4095]	trunk VLAN ID	1-4095

3.1.5 PING Command

The *ping* command provides the ability to ping network devices connected to the module. This provides a convenient way to verify connectivity through the CLI interface.

```
# ping ?
Possible next parameters:
    l               transmit buffer size
    n               number of pings
    t               ping the specified ipAddress
    to              timeout to wait for each ping reply
    ttl             time to live count

# ping
```

The command options available using the *ping* command are shown below.

The *l* command option configures the size of the ping frame.

The *n* command option sets the number of pings frames sent. A value of 0 sends pings until interrupted.

The *t* command option configures the destination IP address.

The *to* command option sets the time to wait for each reply.

The *ttl* command option sets the time to live value.

To ping an IP address, use the following command.

```
# ping t 192.168.1.110

Pinging 192.168.1.110 with 32 bytes of data sourced from IP1 (192.168.1.220):

Reply from 192.168.1.110: bytes=32 time=1ms
Reply from 192.168.1.110: bytes=32 time=1ms
Reply from 192.168.1.110: bytes=32 time=1ms

Ping statistics for 192.168.1.110:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milliseconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

#
```

PING Command Syntax	
# ping t [ipAddress:ipAddr]	# ping to [tCount:1-30]
# ping n [count:0-65536]	# ping ttl [count:1-255]
# ping l [size:0-1472]	

Syntax	Name Description	Format Values
[ipAddress:ipAddr]	destination ipAddress	ipv4 address
[count:0-65536]	number of pings	0-65535
[size:0-1472]	transmit buffer size	0-1472 bytes
[tCount:1-30]	timeout to wait for each ping reply	1-30 sec
[count:1-255]	time to live count	1-255

3.1.6 RESTART Command

The *restart* command provide the ability to restart (warm boot) the module.

```
# restart ?
Possible next parameters:
    boot           warm boot the module

# restart
```

The command options available using the *restart* command are shown below.

The *boot* command option performs a warm boot on the module.

back makes the backup application image active

To restart the module, use the *restart boot* command.

```
# restart boot
```

To swap the backup and current images and restart the module, use the *restart boot back* command.

```
# restart boot back
```

RESTART Command Syntax	
# restart boot	# restart boot back

3.1.7 RESTORE Command

The *restore* command provides the ability to restore the module to factory default settings or a specific file.

```
# restore ?
Possible next parameters:
   file            file name
   ty              restore type

# restore
```

The command options available using the *restore* command are shown below.

The *file* command option creates a new local configuration file. Default name is local. To name the file, add the name after the *file* command. The *no* command negates the command.

The *ty* command option configures the type of restore.

factory restores factory defaults
  keep restores all but keeps IP settings IP address, subnet, gateway
file restores file name
  keep restores file name but keeps IP settings IP address, subnet, gateway
local restores local defaults
  keep restores local defaults but keeps IP settings IP address, subnet, gateway
previous restores previous defaults
  keep restores previous defaults but keeps IP settings IP address, subnet, gateway

To create a local configuration file based on the current module configuration, use the following command.

```
# restore file
```

To restore the module to factory default settings, use the following command.

```
# restore ty factory
```

The module is rebooted and the factory default settings are restored.

To display the files on the module, use the *show restore* command from the # prompt.

RESTORE Command Syntax	
# restore file	# restore ty local
# no restore file	# restore ty previous
# restore file [fName:string0..45]	# restore ty factory keep
# no restore file [fName:string0..45]	# restore ty file [fName:string0..45] keep
# restore ty factory	# restore ty local keep
# restore ty file [fName:string0..45]	# restore ty previous keep

Syntax	**Name Description**	**Format Values**
[fName:string1..45]	file name	0-45 characters

3.1.8 SAVE Command

The *save* command saves the configuration into permanent memory on the module

```
# save ?
Possible next parameters:
    <cr>

# save
```

A <*cr*> after the command, saves the configuration to memory.

3.1.9 SERUPDATE Command

The *serupdate* command allows the firmware to be updated from the serial console port using the xmodem protocol.

```
# serupdate ?
Possible next parameters:
    trans          transfer the selected file

# serupdate
```

The command options available using the *serupdate* command are shown below.

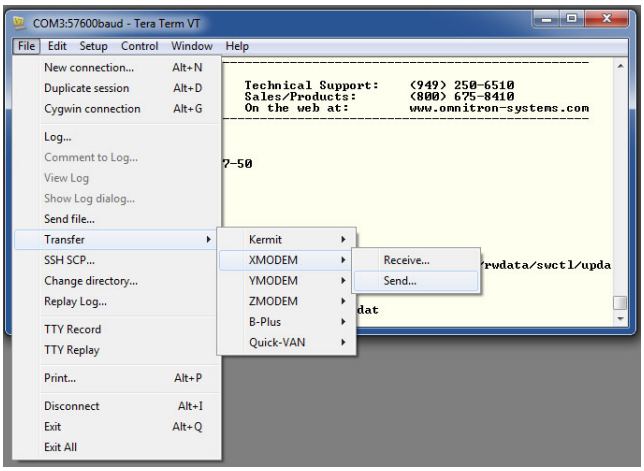
The *trans* command option starts the xmodem process of updating the firmware using the serial console port.

To update the firmware on the module, use the following command.

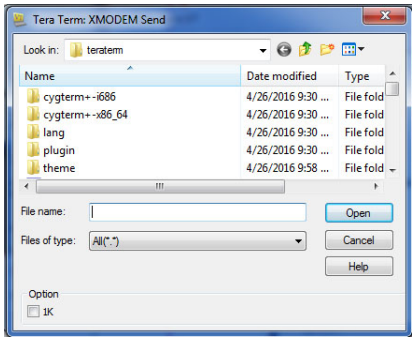
```
# serupdate trans

rc = Firmware download started to destination /usr/bin/rx -bv /rwdata/swctl/updates/fw.dat
rx: ready to receive /rwdata/swctl/updates/fw.dat
```

The module is ready to receive the firmware using xmodem protocol. Using TeraTerm or Procomm, transfer the firmware to the module.



Select the location of the firmware file.



Updating the firmware using the serial console port can take a very long time. Please be patient when updating the firmware using the serial console port.

To display the SERUPDATE settings, use the *show serupdate* command from the # prompt.

3.1.10 SPLASH Command

The *splash* command provides the ability to configure a message that is displayed after the module has been restarted or rebooted. The message is displayed after the Entry screen is displayed.

```
# splash ?
Possible next parameters:
    warn          warning message

# splash
```

The command options available using the *splash* command are shown below.

The *warn* command option configures the message. Enter the message after the command.

To configure a message, use the *splash warn* command.

```
# splash -warn "This product is for the use of authorized users only. Individuals using this
product without authority are subject to monitoring of their activities."
```

```
Omnitron Systems Technology, Inc.                              GHPoE/Mi
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--------------------------------------------------------------------------------

Omnitron Systems Technology   Technical Support:       (949) 250-6510
38 Tesla                      Sales/Products:          (800) 675-8410
Irvine, CA 92618              On the web at:           www.omnitron-systems.com
--------------------------------------------------------------------------------


IP address     192.168.1.220
MAC            00-06-87-02-87-50
Serial number  00720087

This product is for the use of authorized user only.  Individuals using this product without
authority are subject to monitoring of their activities.

GHPoE/Mi login:
```

To display the SPLASH message, use the *show splash* command from the # prompt.

SPLASH Command Syntax	
# splash warn	# splash warn [wMsg:string0..255]

Syntax	Name Description	Format Values
[wMsg:string0..255]	warning message	0-255 characters

3.1.11 TIME Command

The *time* command provides the ability to set or display the time of day on the module.

```
# time ?
Possible next parameters:
    set           set the time of day and date
    zone          time zone selection

# time
```

The command options available using the *time* command are shown below.

The *set* command option sets the date and time of day.

The *zone* command option configures the time zone.

To sets the time of day, use the following command.

```
# time set 01/01/2022 07:55:00
```

To view the changes or display the TIME and system uptime, use the *show time* command from the # prompt.

TIME Command Syntax	
# time zone [zoneVal:timezone]	# time set [dateVal:tDate] [timeVal:time]

Syntax	**Name Description**	**Format Values**
[zoneVal:timezone]	time zone	abbreviation
[dateVal:tDate]	date	mm/dd/yyyy
[timeVal:time]	time	hh:mm:ss, hh=0-23, mm=0-59, ss=0-59

3.1.12 TRAPHOST Command

SNMP traps report events that occur during the operation of a network, and may require the attention of the network administrator. The module is capable of sending SNMP traps to eight different SNMP Trap Hosts (IP addresses).

The *traphost* command provides the ability to configure the IP addresses of the SNMP Trap Hosts.

```
# traphost ?
Possible next parameters:
    dall          delete SNMP trap hosts settings, restore defaults
    host          traphost number

# traphost


# traphost host 1
Nesting level change accepted

(cfg host)[1]#
(cfg host)[1]#
Possible next parameters:
    exit          exit from trap host instance
    ip            trap host IP address
    port          trap UDP port number
(cfg host)[1]#
```

The options available using the *traphost* command are shown below.

The *dall* command option deletes all configured trap hosts and restores to factory default. The default setting is 255.255.255.255.

The *host* command option selects the Trap Host number to be configured. Eight different Traps Hosts can be configured.

Command option under *host <hNum>* command.

The *exit* command option exits the current nesting level.

The *ip* command option configures the IP address for the selected Trap Host.

The *port* command option configures the UDP trap port number.

To configure the IP address for Trap Host 1, use the following command.

```
# traphost host 1
Nesting level change accepted

(cfg-host)[1]# ip 192.168.1.100
(cfg-host)[1]# exit

#
```

To view the changes or display the TRAPHOST configuration settings, use the *show traphost* command from the # prompt.

TRAPHOST Command Syntax	
# traphost dall	(cfg-host)# port [pNum:1-65535]
# traphost host [hNum:1-8] (accesses next nesting level)	(cfg-host)# exit
(cfg-host)# ip [ipAddr:ipAddr]	

Syntax	Name Description	Format Values
[hNum:1-8]	traphost number	1-8
[ipAddr:ipAddr]	trap host IP address	ip address
[pNum:1-65535]	trap UDP port numbe	1-65535

3.1.13 TRAPS Command

The *traps* command provides the ability to enable/disable specific module traps. By default, all traps are enabled. Use the *show traps* command from the # prompt to determine the state of the command option (disabled or enabled).

```
# traps ?
Possible next parameters:
    clear          clear trap log
    dall           delete traps settings, restore defaults
    gen            generate trap
    num            trap number
    type           trap generation type
    user           trap generation SNMP user

# traps
```

The command options available using the *traps* command are shown below.

The *clear* command option clears the current trap log entries.

The *dall* command option deletes all configured trap options and restores to default settings.

The *gen* command option generates a specific trap number.

The *num* command option disables/enables a selected or all traps. The *no* command negates the command.

The *type* command option configures the generation type of the trap; SNMPv2c or SNMPv3.

The *user* command option configures the SNMP user number for the trap generation.

By default, all traps are enabled. Individual traps can be disabled by entering the number of the traps after the *num* command.

The example below disables the link down (#6) trap.

```
# traps num 6
```

To view the changes or display the TRAPS, use the *show traps* command from the # prompt. To view the Trap Log, use the *show traps log* command from the # prompt.

TRAPS Command Syntax	
# traps dall	# traps type snmpv3
# traps num [tNum:1..63|all]	# traps user [uNum:1-4]
# no traps num [tNum:1..63|all]	# traps gen [gNum:1-63]
# traps type snmpv2c	# traps clear

Syntax	**Name Description**	**Format Values**
[tNum:1..63|all]	trap number	1-63 or all
[uNum:1-4]	trap generation SNMP user	1-4
[gNum:1-63]	generate trap	1-63

4.0 APPENDIX A: FIRMWARE UPDATE

4.1 OVERVIEW

Appendix A describes the procedure for updating the firmware using ftp and web interface.

4.2 SAVE CURRENT SETTINGS

Under normal circumstances the current configuration of the module will carry forward to the new version during the update, however, extreme events such as a power outage can lead to settings being lost. Prior to upgrading, it is recommended that the settings be recorded. The settings can be viewed using the Command Line Interface (CLI) over Telnet.

4.3 COPY THE FILES TO YOUR HARD DRIVE

The files should be copied to a convenient location on the hard drive of the workstation. The name of the firmware file is similar to swctl-bsp-prod.dat.

Depending on the operating system of the workstation and/or FTP installation, the name of the files may need to be renamed to the “DOS 8.3 Format”. Rename the swctl-bsp-prod.dat to switch.dat and store the files in the root or c:\ directory.

Renaming the file will allow the new file to overwrite the old file, saving memory allocation space on the module. **Filenames must not contain any spaces**.

4.4 UPDATING THE FIRMWARE USING FTP

FTP can be used to update the firmware over a network. Verify the following parameters:

- IP Protocol is turned On and the module has a valid IP Address
- FTP Protocol turned On and a password has been configured

Access the module using Telnet or Serial Console. The default user name and password is: admin, public

Verify the IP address of the module by using the *show ip* command from the # prompt. If the IP address needs to be configured, use the *ip* command from the <cfg># prompt.

```
# show ip

IPv4                    enabled
IPv6                    enabled

IP 1
  MAC address           00-06-87-02-A5-80
  IPv4 address          192.168.1.126
  IPv4 subnet mask      255.255.255.0
  IPv4 gateway address  192.168.1.1
  DNS                   disabled
  DNS address           *
  DHCP                  disabled
  Relay                 disabled
  Relay Circuit ID      enabled
  Relay Remote ID       enabled
  Relay type            replace
  Relay server IP       0.0.0.0
  v6Relay               disabled
  v6Relay Circuit ID    enabled
  v6Relay Remote ID     enabled
  IPv6 interface        stateless
  IPv6 address          fe80::206:87ff:fe02:a580/64
                        ::/64
  IPv6 gateway address  fe80::1
  DHCPv6                disabled

#
```

Verify FTP is enabled by using the show protocol command from the # prompt.

To enable FTP, use the *protocol ftp* command from the <cfg># prompt.

```
# show protocol

IP protocol       enabled
Telnet protocol   enabled
FTP protocol      disabled
http protocol     enabled
https protocol    enabled
Serial console    enabled
Flow control      disabled

Certificate file    self-generated

#
# config
Nesting level change accepted

(cfg)# protocol ftp

(cfg)# exit
Nesting level change accepted

# show protocol

IP protocol       enabled
Telnet protocol   enabled
FTP protocol      enabled
http protocol     enabled
https protocol    enabled
Serial console    enabled
Flow control      disabled

Certificate file    self-generated

#
```

The default FTP password is public.

To upgrade the application firmware, open a command window and enter the following commands. Bold lettering indicates information to be entered.

> **ftp 192.168.1.220** <enter module's IP address>

Connected to 192.168.1.220

220 FTP server ready

User (192.168.1.220:(none)): **admin** <enter login username>

331 User admin OK. Password required

Password: **public** <enter ftp password>

230 OK. Current directory is /home/admin

ftp> **cd updates**

250 OK. Current directory is /rwdata/swctl/updates

ftp> **bin**

250 OK. Current directory is /rwdata/swctl/updates

ftp> **put <location and filename of the application firmware>** <enter firmware filename>

200 OK

200 PORT command successful

150 Connecting to port 64533

226-File successfully transferred

226 5.030 seconds (measured here), 6.28 Mbytes per second

ftp: 33112213 bytes sent in 4.97Seconds 6658.40Kbytes/sec.

ftp>**quit**

When the file transfer is complete, the module verifies the file, programs the flash memory and automatically restarts with the newly loaded firmware.

NOTE: Do not remove power during the upgrade procedure until the module has rebooted with the new firmware.

Verify the firmware has been upgraded by using the *show ver* command.

```
# show ver

Model number      9526-0-24-1
Firmware          v2.x Sep 16 2022, 21:05:11
Bootstrap         v2.x.x
                  prodRev 10 hwRev 10 pcbRev 00a90100 appAP 0 caps(0xa0000004 mtype 168)

#
```

5.0 COPYRIGHT STATEMENT

General and Copyright Notice

6.0 CUSTOMER SUPPORT INFORMATION

If you encounter problems while installing this product, contact Omnitron Technical Support:

Phone: (949) 250-6510
Fax: (949) 250-6514
Address: Omnitron Systems Technology, Inc.
38 Tesla
Irvine, CA 92618, USA
Email: support@omnitron-systems.com
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