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Niagara 2812 User Guide



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Index

INDEX	2
TABLE OF FIGURES	4
OVERVIEW	5
1. HARDWARE INTERFACE	6
1.1 FOR DEVICE MANAGEMENT:.....	6
1.2 FOR ETHERNET SWITCH INTERFACE:	6
2. THEORY OF OPERATION	7
2.1 BYPASS SWITCHING MODE AND ACTIVE SWITCHING MODE.....	7
3. HEARTBEAT FOR NIAGARA 2812	9
3.1 HEARTBEAT MODE 1: INTERNAL HEARTBEAT FRAME LOOP-BACK MODE	9
3.2 HEARTBEAT MODE 2: EXTERNAL HEARTBEAT FRAME MODE	9
3.3 HEARTBEAT MODE 3: LINK STATUS HEARTBEAT MODE.....	9
4. NIAGARA 2812 OPERATION MODES	10
4.1 MODE 0: NORMAL_ACTIVE_BYPASS	10
4.2 MODE 1: NORMAL INLINE	10
4.3 MODE 2: ALWAYS INLINE.....	10
4.4 MODE 4: ALWAYS ACTIVE BYPASS	10
4.5 MODE 5: PASSIVE BYPASS.....	10
5. NIAGARA 2812 POWER FAIL PROTECTION	11
6. REMOTE MANAGEMENT FEATURES	12
6.1 SERIAL TERMINAL SETTING	12
6.2 SSH SETTING.....	12
6.2.1 User account.....	12
6.2.2 Password	12
6.3 CLI COMMAND USAGE	12
6.4 SNMP DEFINITIONS	14
7. PARAMETER LIST FOR CLI	15
8. SECURE WEB MANAGEMENT	17
8.1 CONNECTING TO WEB MANAGEMENT	17
8.2 LOGIN PAGE	18
8.3 STATUS PAGE.....	18
8.4 BYPASS MODULE SETTING.....	19
8.5 MANAGEMENT PORT	19
8.6 EMAIL NOTIFICATION	20
8.7 SNMP	21
8.8 USER ACCOUNT SETTINGS	22
8.9 RESTORE SETTING	22
8.10 FIRMWARE UPDATE.....	23

Interface Masters

◀ TECHNOLOGIES ▶

Innovative Network Solutions

8.11 SYSTEM REBOOT	23
APPENDIX 1 HEARTBEAT FRAME FORMAT AND SAMPLE HEARTBEAT FRAME.....	24
APPENDIX 2 IM-MIB.TXT.....	25
APPENDIX 3 -- BLUE ELMECH CONSOLE-CABLE DRAWING	28
CAT5E CABLE TOP VIEW.....	29
CAT5E CABLE BOTTOM VIEW.....	29

Interface Masters

TECHNOLOGIES

Innovative Network Solutions

Table of Figures

<i>Figure 1 Connectivity example</i>	5
<i>Figure 2, Front Panel of Niagara 2812</i>	6
<i>Figure 3, Niagara 2812 Bypass Switching Mode and Active Switching Mode.</i>	7
<i>Figure 4 “cli get” output</i>	13
<i>Figure 5 Table of CLI commands</i>	16
<i>Figure 6, Certificate Error Page</i>	17
<i>Figure 7, User Login page</i>	18
<i>Figure 8, Niagara 2812 Status Page</i>	18
<i>Figure 9, Bypass Module Setting</i>	19
<i>Figure 10, Management Port Page</i>	19
<i>Figure 11, Email Notification Page</i>	20
<i>Figure 12, SNMP Settings</i>	21
<i>Figure 13, User Account Settings</i>	22
<i>Figure 14, Restore Settings Page</i>	22
<i>Figure 15, Firmware Update Page</i>	23
<i>Figure 16 Reboot screen</i>	23
<i>Figure 17 DB9 Connector Front View</i>	28
<i>Figure 18, DB9 connector pin description</i>	28
<i>Figure 19, Cat5e Cable Wire Colors(Top view)</i>	29
<i>Figure 20, Cat5e Cable Wire Colors (bottomview)</i>	29

Interface Masters

TECHNOLOGIES

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Overview

Niagara 2812 is Interface Master's new generation 10Gbps intelligent external Active Bypass Switch. The external active bypass enables plug and play connectivity, includes an auto heartbeat and requires no additional drivers to be installed on any connected appliance. Niagara 2812 has one I/O channel, supports one appliance and provides the following features:

- 10G SR and 10G LR active Bypass Switching
- Comprehensive management tools:
 - Secure Web management Interface (SSL),
 - SNMP,
 - CLI by serial console
 - SSH
- Customizable Heartbeat Modes that monitor appliance system health without appliance driver, including: Internal Loop-back Heartbeat Frame Mode, External Heartbeat Frame Mode and Link Status Mode
- Email Notification for appliance status changes
- Media conversion from Network to appliance Ethernet ports
- Power Outage Network Bypass Protection
- Field Programmability over Ethernet or Serial Console Port

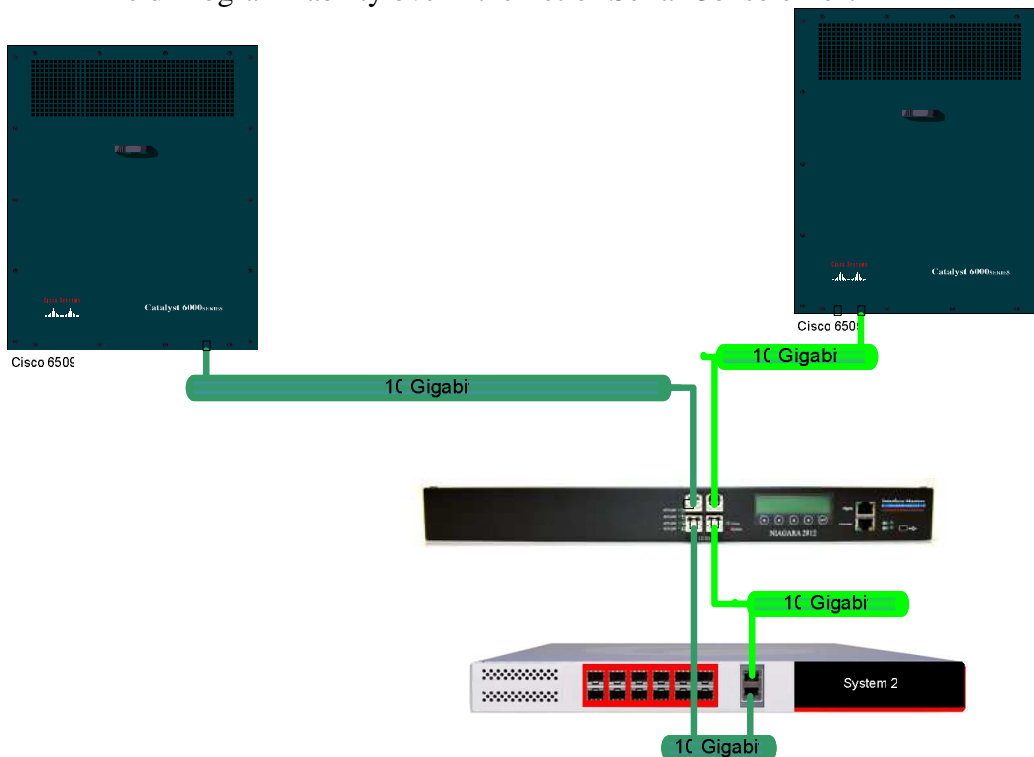


Figure 1 Connectivity example

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1. Hardware interface

Niagara 2812 provides the following interfaces as shown in Figure 2-1:

1.1 For Device Management:

- LCD display to show system name and firmware version
- Ethernet Management Port
- Serial Console Port via Serial Console Cable
- LED Power Indicators and LED Link Indicators

1.2 For Ethernet Switch Interface:

- 10G-SR or 10G-LR N1 and N2 Ports which connect to an Ingress network and Egress network
- 10G-SR or 10G-LR A1 and A2 Ports which connect to a Network Appliance (such as IDS, UTM or Firewall)
- Link/Active LEDs for 10Gb ports
- Red LED for bypass state
- Green LED for Inline state

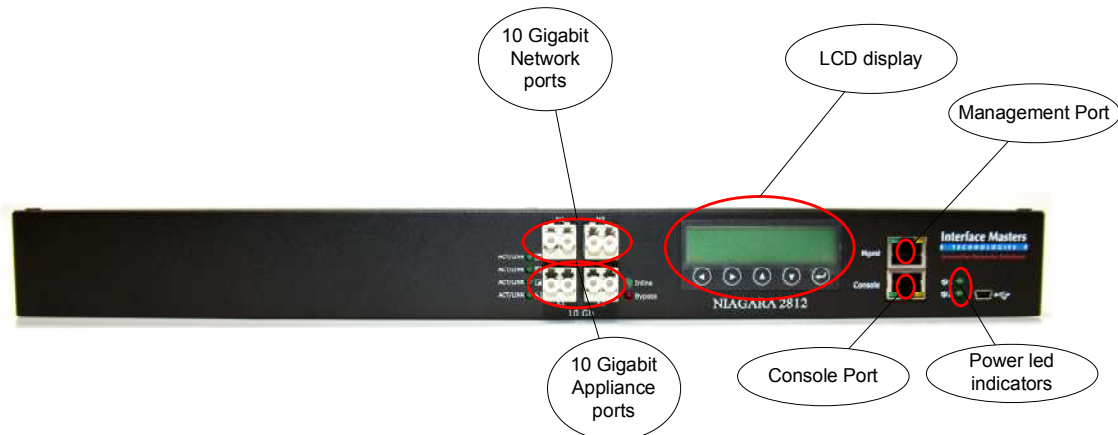


Figure 2, Front Panel of Niagara 2812

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2. THEORY OF OPERATION

2.1 Bypass Switching Mode and Active Switching Mode

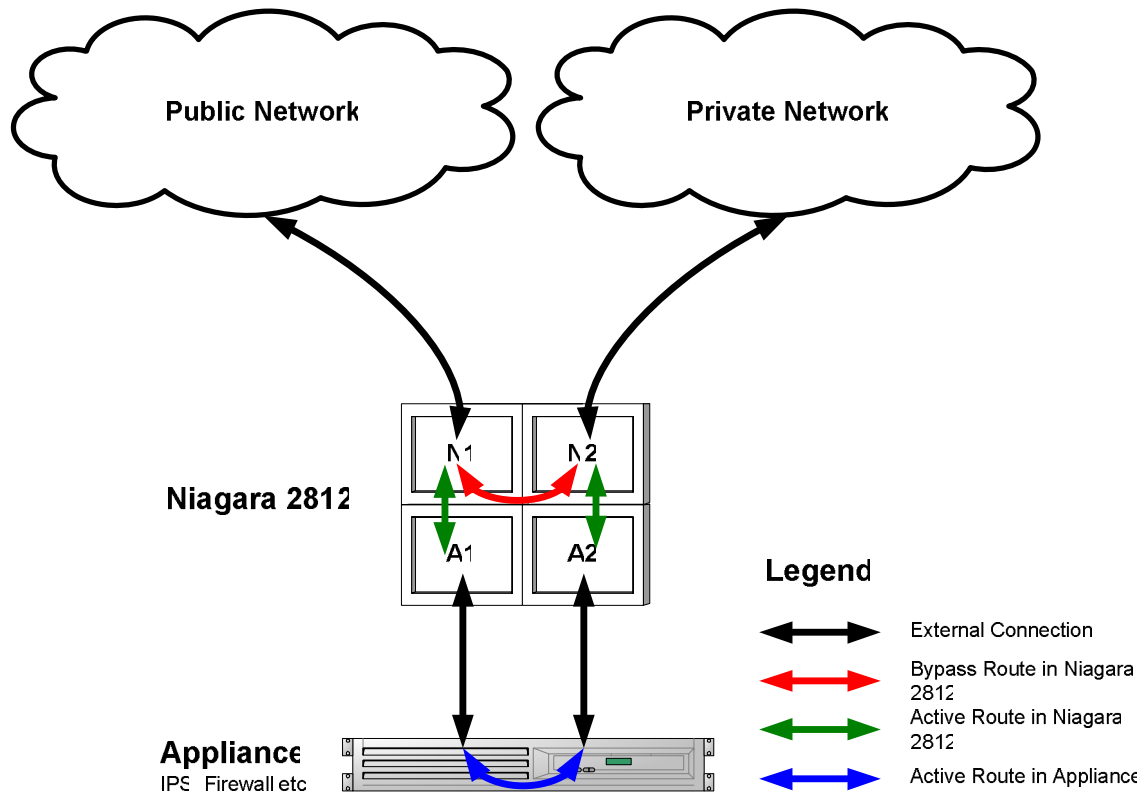


Figure 3, Niagara 2812 Bypass Switching Mode and Active Switching Mode.

Niagara 2812 has two Switching modes: Active Switching Mode and Bypass Switching Mode. Figure 3-1 displays a typical deployment of Niagara 2812. The Bypass system is placed in-line with a standard security appliance (IPS, Firewall, UTM, etc.) and is connected via external wiring to the appliance and the networks. The routes of data transfer are labeled in separate colors, highlighting the associated functionality handled at each stage of bypass switching.

In Active Switching Mode, the Ethernet Frames between the public and private network will be channeled through the security appliance. Typically, data will flow from the Public Network to Port N1 (network in) and will then be actively transferred by the Bypass switch to Port A1 (appliance in) and routed through the in-line appliance to Port A2 (appliance out). Active switching will then route the data through Port N2 and out to the

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Private Network. This Mode can operate in reverse as well, with data routing from a Private to Public Network.

In Bypass Switching Mode, Niagara 2812 will channel Ethernet frames from the Public Network to port N1 (network in). In this scenario, data will be routed through a closed loop from port N1 (network in) to port N2 (network out) and will bypass the appliance so that frames will go directly from the public network to the private network. This Mode can operate in reverse as well, with data routing from a private to public Network.

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3. Heartbeat for Niagara 2812

Niagara 2812 can monitor the continual health of the appliance by sending and receiving Heartbeat pulses. This functionality ensures the real-time safety and accuracy of the datastream. Heartbeat frames are generally configured to be sent from Niagara 2812 on one appliance port and received on the other under a set time limit defined by a customer-configured TIMEOUT value. For more information on TIMEOUT value, please see Table 4.5.

Niagara 2812 provides various heartbeat modes to correspond with different appliance configurations including:

3.1 Heartbeat Mode 1: Internal Heartbeat Frame Loop-back Mode

In Heartbeat Mode 1, the heartbeat signal is a user programmable Ethernet “Heartbeat Frame” and is generated by Niagara 2812 itself. The Heartbeat frames are sent out from Niagara 2812 Ethernet Port A1 every 100ms, and Niagara 2812 Ethernet Port A2 expects to receive the same Heartbeat Frame from the appliance. Heartbeat Mode 1 for the Niagara 2812 is designed for network appliance units that act as a bridge, like IPS or Firewall. The user needs to make sure the Network appliance is properly configured so that the device will not filter out the “Heartbeat Frame”.

In heartbeat Mode 1, no driver is needed for Appliance systems.

3.2 Heartbeat Mode 2: External Heartbeat Frame Mode

In Heartbeat Mode 2, the heartbeat signal is also a user defined Ethernet “Heartbeat Frame”, but the frames are generated by the Appliance itself rather than Niagara 2812. A Linux host daemon provided by Interface Masters needs to be run on the appliance system so that the appliance system can continuously send Heartbeat Frames to Niagara 2812 Ethernet Port A1 and A2.

3.3 Heartbeat Mode 3: Link Status Heartbeat Mode

In Heartbeat Mode 3, the heartbeat signal acts as the link up status indicator of the Niagara 2812 Ethernet Port A1 and A2. If any ports of A1 and A2 lose the link, Niagara 2812 will shut off heartbeat transmission and activate bypass mode.

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4. Niagara 2812 Operation Modes

Niagara 2812 has four Operation Modes with Mode 0 being the default Operation Mode.

4.1 Mode 0: Normal_Active_Bypass

If Niagara 2812 receives heartbeat signals within the TIMEOUT time period, the switching mode remains or is changed to Active Switching Mode. If Niagara 2812 does not receive heartbeat signals within the TIMEOUT time period, it will change to or remain in Bypass Switching Mode. By default (without any heartbeat), Niagara 2812 will remain in Bypass Switching mode.

4.2 Mode 1: Normal Inline

If Niagara 2812 receives heartbeat signals within the TIMEOUT time period, the switching mode remains or is changed to Bypass Switching Mode. If Niagara 2812 does not receive heartbeat signals within the TIMEOUT time period, it will change to or remain in Active Switching Mode. By default (without any heartbeat), Niagara 2812 will remain in Active Switching mode.

4.3 Mode 2: Always Inline

Niagara 2812 is always in Active Switching Mode.

4.4 Mode 4: Always Active Bypass

Niagara 2812 is always in Bypass Switching Mode.

4.5 Mode 5: Passive Bypass

Niagara 2812 is in passive bypass, where the optical switch is close in bypass mode

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5. Niagara 2812 Power Fail Protection

Niagara 2812 provides two redundant power supply inputs to minimize the chance of power loss or failure.

In addition, Niagara 2812 continuously monitors the power supply voltage to detect any instance of power decline or outage. If a power failure is detected, Power Fail Protection Operation is triggered, which initiates a switch to Bypass Switch. During this no power state, the N1 and N2 ports will physically connect to create a passive bypass path without any traffic interruption between port N1 and port N2.

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6. Remote Management Features

Niagara 2812 users can log into and manage the Niagara 2812 through a Command Line Interface Environment via the Console Port (serial terminal emulator) and through a Web based management via a secure “HTTPS” connection via the Management Port (SSH remote shell emulator).

6.1 Serial Terminal Setting

Bits per second:	115200
Data bits:	8
Parity:	None
Stop:	1
Flow Control:	None

6.2 SSH Setting

Niagara 2812 SSH server uses standard port 22.

6.2.1 User account

The “admin” account allows system administrators to configure programmable parameters and monitor unit status.

6.2.2 Password

Default Password for “admin” is “admin”. The password can be changed using the CLI command.

6.3 CLI command usage

Only the “admin” account has permission to configure and check the system parameters.

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```
prod_id      Niagara 2812 rev 1
fw           v1.0.388
power_a     0 (Power A: 0=OFF, 1=ON)
power_b     1 (Power B: 0=OFF, 1=ON)
mac         00:0c:bd:00:00:01
ip          192.168.0.111
mask        255.255.255.0
gw          192.168.0.1
dns         192.168.0.1
dns2        0.0.0.0
domain      local
dhcp        static
host        n2812
current_ip   192.168.0.111
email       0 (Email notification: 0=DISABLE, 1=ENABLED)
email_from  xxx
email_security 1 (Email security: 0=DISABLE, 1=ENABLED)
email_username xxx
email_password xxx
email_server xxx
email_port  25
email_subject Niagara 2812 status report
email_to    xxx
username    admin
password    This item can not be displayed
root_password This item can not be displayed
https      1 (HTTPS: 0=DISABLED, 1=ENABLED)
web_theme  1
snmp       1 (SNMP: 0=DISABLED, 1=ENABLED)
snmp_community niagarac
snmp_destination localhost
timeout    1 (Range 1-255 represents 100ms-2.5sec)
force      0 (Debug mode: 2=Inline, 4=Active bypass, 5=Passive by
pass)
op_mode    0 (Operational mode: 0=Normal active bypass, 1=Normal
inline, 2=Always inline, 4=Always active bypass, 5=Passive bypass)
hb_mode    1 (Heartbeat mode: 1=Auto, 2=External, 3=Link)
state      0 (Segment state: 0=Bypass, 1=Inline)
active_hb_cnt 2
bypass_hb_cnt 3
xg_links   Port SEG_A_A1 is down
           Port SEG_A_A2 is down
           Port SEG_A_N1 is down
           Port SEG_A_N2 is down
lfd        1 (Link fault detection: 0=DISABLED, 1=ENABLED)
~ ..
```

Figure 4 “cli get” output

To dump values for all parameters,
“cli get |more”

To display a value for individual parameters,
“cli get <parameter name>”

For example,

“cli get timeout” will display timeout value in decimal form.

To set a value for individual parameters,

“cli set <parameter name> <parameter value>”

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For example, “cli set timeout 20” will set timeout value to 20.

6.4 SNMP Definitions

Niagara 2812 support SNMP traps on predefined events. The Events that will be triggering traps are as follow:

- SNMP trap LFD (Link Fault Detection), will be generated following detection of a network port going down. The usual case will be that first a network port trap will be received following by LFD.
- SNMP trap on link up or down – when any of the links (network link or appliance link) changes state (up or down) a trap will be generated, specifying the link name and the link status (up or down)
- SNMP TRAP- on system state change (bypass or Inline). In this mode the trap will provide the state (bypass or Inline) with the op_mode, defining the operation mode of the system:
 - [0]"Normal_Active_Bypass",
 - [4]"Always_active_bypass",
 - [5]"Manual_Passive_bypass"
- SNMP TRAP- For Cold or Warm power up (when device is powered up):

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7. Parameter List for CLI

Table 4.6: Niagara 2812 parameter value list for CLI get/set command

Parameter Name	Description	Value
Timeout	Timeout values for Niagara bypass unit. Each timeout unit is 100ms. Timeout range is 100ms to 25.5s In default bypass operation mode, if the unit does not detect a heartbeat frame within the set timeout time value, the segment will switch from active to bypass	1-255
Force	Configure force (debug) mode for each I/O unit. Default is 0. Force (debug) mode is disabled. Setting parameter to value 2 will force segment to Active switch mode. Setting parameter to value 4 will force segment to Bypass Switch mode	0,2,4
op_mode	Configure the default operation mode for Niagara bypass unit 0 – Normal active Bypass. If the heartbeat is received the system will be inline 1 – Normal Inline. If the heartbeat is received the system will be in bypass 2 – Always Inline. 4 – Always active Bypass. 5 – The bypass switch will be closed, in bypass mode	0,1,2,4, Dfault =0
hb_mode	Configure the heartbeat mode for Niagara bypass unit Hb_mode 1, system is generating the heartbeat HB_mode 2, HB is generated from an external source HB_mode 3, the system activates bypass depending on link detection on the appliance side	1,2,3, Default=1
State	Show the state of Niagara bypass unit: 0 --- bypass switch state 1 --- active/Inline switch state	Read only
Active_hb_cnt	This value stores the active heartbeat signal count. The segment will switch to active switch mode only if it receives “active_hb_cnt” number for a consecutive heartbeat	Default: 1 1-10
bypass_hb_cnt	This value stores the bypass heartbeat signal count. The segment will switch to bypass switch mode only if it loses “bypass_hb_cnt” heartbeat signal number	Default: 1 1-10
Mac	Shows the MAC address for the Management Ethernet port	Read only
Ip	Static IP address for MGT port	Default: 192.168.0.111
Mask	Subnet Mask for MGT port	Default:

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		255.255.255.0
Gw	Gateway IP address	Default: 192.168.0.1
Dns	DNS server IP address	
dns2	2 nd DNS server IP address	
Domain	Domain name for local host	Default: local
Dhcp	DHCP client enable/disable. Setting this parameter to dhcp will enable dhcp client on Niagara 2812 MGT port. Setting this parameter to static will disable dhcp client on Niagara 2812 MGT port	Default: DHCP is active
Host	Hostname for Niagara 2812	Default: n2810
current_ip	Current IP address for MGT port	
Email	Setting parameter value to 1 will enable mail notification feature	Default: 1
email_from	Email from field for email report	
email_security	Setting parameter to 1 will enable email security feature	Default: 1
email_username	Email account user name	
email_password	Email account password	
email_server	SMTP server address for email report	
email_subject	Email report subject	
email_to	Email recipient lists	
Username	Administrator account name.	Default :admin
Password	Administrator password	Default: admin
https	HTTPS server allows: a value 0 to disable the secure WEB MGT interface. a value 1 to enable access to secure WEB MGT interface.	Default: 1 enable
Web_theme	Web themes enable.	Default: 1 enable
Snmp	SNMP function allows: a value 1 to enable SNMP function. a value 0 to disable SNMP function.	Default: 1 enable
snmp_community	Snmp_community name	Niagarac
snmp_destination	Snmp_destination name	Localhost
LFD	1 – enabled, the system will detect and activate the LFD 0 – disabled, the system will not detect LFD	Default: LFD enabled

Figure 5 Table of CLI commands

8. SECURE WEB MANAGEMENT

8.1 Connecting to Web Management

Niagara 2812 provides a Secure Web Management Interface for system administrators to manage and monitor Niagara 2812 via any web browser. To access the management web page, the Ethernet Management port needs to be connected to the local network or host computer.

The URL to access the Web Management interface, “https://<Mgmt Port IP>”, can be found through “CLI interface” or LCD interface. The default Mgmt Port IP is 192.168.1.188 .

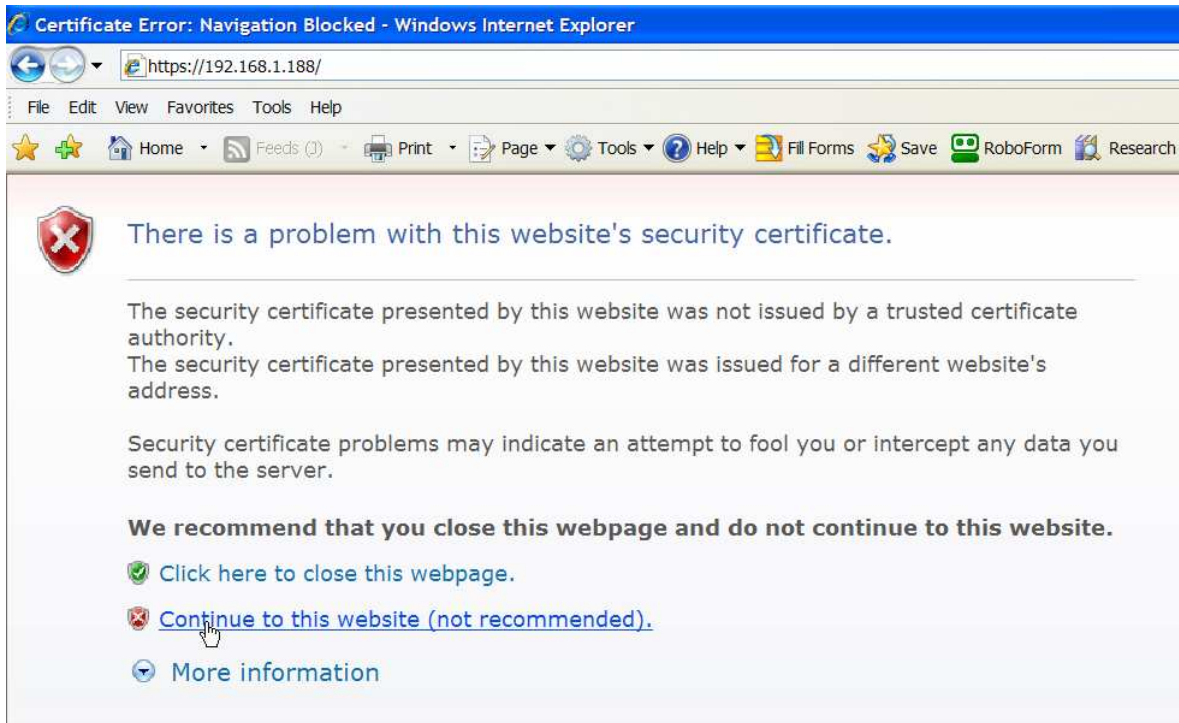


Figure 6, Certificate Error Page

Figure 6, **Certificate Error Page**, shows the first page that appears on the web browser after entering the URL. Currently, Niagara 2812’s website security certification is in the process of being approved. Therefore, the user needs to click “Continue to this website (not recommended)” to go to the login page

Interface Masters

8.2 Login Page



Figure 7, User Login page.

Figure 7, User Login page., shows the User Login Page where the default user name is “admin” and the password is “admin”

8.3 Status Page



Figure 8, Niagara 2812 Status Page

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Figure 8, **Niagara 2812 Status Page**, shows the Status page provides the system information including: revision information, power supply status, unit link status and the operation mode.

8.4 Bypass Module Setting

The screenshot shows the web interface for the Niagara 2812 switch. The page title is "Interface Masters" and "Niagara 2812". The navigation menu on the left includes: Home, Status, Management (Bypass Module, Management Port, Email Notifications, SNMP Settings), and Advanced (Users, Backup/Restore, Firmware Update, Reboot). The main content area is titled "Bypass Module Setting" and contains the following fields:

Bypass Module Setting	
Max time allowed between heartbeat acceptance (100 ms - 25500 ms):	1 00 ms
Number of HB lost to activate bypass (1-10):	3
Number of accepted HB to get into active mode (1-10):	2
Operation Mode:	Normal active bypass
Link fault detection:	Enabled

Buttons for "Save" and "Cancel" are located at the bottom of the form.

Figure 9, Bypass Module Setting

Figure 9, **Bypass Module Setting** shows the Bypass module parameters and allows the user to set and tune them according to the site requirements

8.5 Management Port

The screenshot shows the web interface for the Niagara 2812 switch. The page title is "Interface Masters" and "Niagara 2812". The navigation menu on the left includes: Home, Status, Management (Bypass Module, Management Port, Email Notifications, SNMP Settings), and Advanced (Users, Backup/Restore, Firmware Update, Reboot). The main content area is titled "Management Port" and contains the following fields:

Management Port	
IP Address:	192.168.0.111
Network Mask:	255.255.255.0
Gateway:	192.168.0.1
DNS 1:	192.168.0.1
DNS 2:	0.0.0.0

Buttons for "Save" and "Cancel" are located at the bottom of the form.

Figure 10, Management Port Page

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Figure 10, **Management Port Page** shows the Management Port parameters which can configure IP settings of the management port.

8.6 Email Notification

Niagara 2812 provides an Email Notification function which initiates an email notification upon switching mode of an I/O segment.

The mail server and email account settings can be configured through the Web management or CLI interface.

The screenshot shows the web interface for 'Interface Masters' on a 'Niagara 2812' device. The page title is 'Email Settings'. On the left is a navigation menu with options: Home, Status, Management (Bypass Module, Management Port, Email Notifications, SNMP Settings), and Advanced (Users, Backup/Restore, Firmware Update, Reboot). The 'Email Notifications' option is highlighted. The main content area contains the following fields:

Email Settings	
Email Notification:	Disable (Don't Send) ▼
Outgoing Mail Server(SMTP):	xxx
Outgoing Mail Server(SMTP) Port:	25
SMTP Username:	xxx
SMTP Password:	
Outgoing Server(SMTP) Security:	Enable (Secured) ▼
From (Sender's Email Address):	xxx
To (List of receipts, comma separated):	xxx
Subject:	Niagara 2812 status report

At the bottom of the form are three buttons: 'Save', 'Send Test Email', and 'Cancel'.

Figure 11, Email Notification Page

Figure 11, **Email Notification Page** shows the email notification parameters which need to be filled up properly by the system administrator to enable or disable the email notification function and configure the email servers and accounts.

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8.7 SNMP

Niagara 2812 provides SNMP Trap function which can send messages to a destination IP when the I/O segment status or Power Supply status is changed.

A typical SNMP agent setting is as follows:

- A “net-snmp” software package needs to be installed on a Linux platform.
- Set the snmp trap daemon community parameter in file “/etc/snmp/snmptrapd.conf” and add one line at the end of the file

```
authCommunity log niagarac
```

“niagarac” is the default community name and can be changed in WEB management page.

- Copy “IM-MIB.txt” (as shown in Appendix 2) to the Linux system.

- Run the following command:

```
snmptrapd -m <full path to IM-MIB.txt file> -Os -Le -f
```

The screenshot shows the web management interface for the Niagara 2812 switch. The main content area is titled "SNMP Setting" and contains a form with the following fields:

- Send SNMP Traps: Enable (dropdown menu)
- SNMP traps destination IP: localhost (text input)
- SNMPv2 community: niagarac (text input)

At the bottom of the form are "Save" and "Cancel" buttons. The left sidebar contains a navigation menu with items: Home, Status, Management, Bypass Module, Management Port, Email Notifications, SNMP Settings (highlighted), and Advanced. The top right of the page shows "Language: English" and "Logout".

Figure 12, SNMP Settings

Figure 12, **SNMP Settings**, shows the SNMP parameters setting which enables or disables the SNMP Trap function and configures the SNMP destination IP and SNMPv2 community name

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8.8 User Account Settings

Interface Masters Niagara 2812
External Active Bypass for 10 Gigabit Ethernet Plug & Play
Language: English | Logout

Home
Status
Management
Bypass Module
Management Port
Email Notifications
SNMP Settings
Advanced
Users
Backup/Restore
Firmware Update
Reboot

Users

Admin

Password:

Confirm Password:

Save Cancel

Figure 13, User Account Settings

Figure 13, User Account Settings shows the User Account parameters which allows for the change of a user name and password via the WEB management page

8.9 Restore Setting

Interface Masters Niagara 2812
External Active Bypass for 10 Gigabit Ethernet Plug & Play
Language: English | Logout

Home
Status
Management
Bypass Module
Management Port
Email Notifications
SNMP Settings
Advanced
Users
Backup/Restore
Firmware Update
Reboot

Configuration Backup/Restore

Backup

Restore From: Browse...

Restore to Factory Default Configuration (the system will reboot)

Figure 14, Restore Settings Page

Figure 13, User Account Settings, shows the back up and restore parameters which can restore the Niagara 2812 to default settings

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8.10 Firmware Update



Figure 15, Firmware Update Page

Figure 15, Firmware Update Page, shows firmware update parameters which enable firmware update of Niagara 2812.

8.11 System Reboot



Figure 16 Reboot screen

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Appendix 1 Heartbeat frame format and sample Heartbeat Frame

Niagara 2810 Heartbeat frame format.

Total Frame Size: 128 Bytes (including CRC Checksum)

Byte : 0 - 11 byte (are Destination and Source Mac address)

=====

Destination MAC : 00:0C:BD:00:00:FF
Source MAC : 00:0C:BD:00:00:<Port Number>

Byte : 12 - 13 byte (are Ether Frame Type : 0x8000)

=====

EtherFrame : 0x80 0x00

Byte : 14 - 63 byte (pattern count from 0x00 - 0x3F)

=====

Payload or Data : 0x00 0x01 0x02 0x03 0x04 0x05 .. 0x3F

Byte : 64 - 123 byte (pattern = 0x55)

=====

Payload or Data : 0x55 0x55 ... 0x55

Byte : 123 - 127 byte (CRC Checksum field)

=====

This field are generate by machine.

<= CRC checksum

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Appendix 2 IM-MIB.TXT

IM-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY,
NOTIFICATION-TYPE,
OBJECT-TYPE,
-- Counter32,
-- Integer32,
Gauge32,
enterprises
FROM SNMPv2-SMI
DisplayString,
TruthValue
FROM SNMPv2-TC
;

imMIB MODULE-IDENTITY

LAST-UPDATED "200712240000Z"
ORGANIZATION "Interface Masters, Inc."
CONTACT-INFO
"Email: sales@interfacemasters.com
Postal: 227 Devcon Drive
San Jose, CA 95112
Phone: 408-456-2545
Fax: 815-364-0888
Web: www.interfacemasters.com"

DESCRIPTION

"The Interface Masters MIB.
Copyright 2007 Interface Masters, Inc.
All rights reserved.

This MIB module specifies the management objects
for Interface Masters products."

REVISION "200712240000Z"

DESCRIPTION

"The initial revision."

::= { enterprises 30324 }

-- MIBs are defined here:

imMgmt OBJECT IDENTIFIER ::= { imMIB 1 }

bypassMgmt OBJECT IDENTIFIER ::= { imMgmt 1 }

linkMgmt OBJECT IDENTIFIER ::= { imMIB 2 }

bypassTraps OBJECT IDENTIFIER ::= { bypassMgmt 1 }

bypassTrapInfo OBJECT IDENTIFIER ::= { bypassMgmt 2 }

bypassSystem OBJECT IDENTIFIER ::= { bypassMgmt 3 }

bypassSystemScalars OBJECT IDENTIFIER ::= { bypassSystem 1 }

bypassSystemTables OBJECT IDENTIFIER ::= { bypassSystem 2 }

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```
linkTraps OBJECT IDENTIFIER ::= { linkMgmt 1 }
linkTrapInfo OBJECT IDENTIFIER ::= { linkMgmt 2 }
```

-- Products are registered here:

```
imProducts OBJECT IDENTIFIER ::= { imMIB 3 }
imNiagara OBJECT IDENTIFIER ::= { imProducts 1 }
```

-- bypass traps

```
bypassInOut NOTIFICATION-TYPE
  OBJECTS { bypassTrapModuleId,
            bypassTrapModuleName,
            bypassTrapStateBypass,
            bypassTrapOpMode }
  STATUS current
  DESCRIPTION
    "Trap issued when a module goes in and out of bypass."
  ::= { bypassTraps 1 }
```

```
bypassDiagnostics NOTIFICATION-TYPE
  OBJECTS { bypassTrapDiagnostics }
  STATUS current
  DESCRIPTION
    "Trap issued when an internal hw diagnostics event occurs."
  ::= { bypassTraps 2 }
```

```
linkState NOTIFICATION-TYPE
  OBJECTS { linkTrapLinkName,
            linkTrapLinkState }
  STATUS current
  DESCRIPTION
    "Trap issued when a link goes up and down."
  ::= { linkTraps 1 }
```

-- bypass trap info: varbinds sent with traps

```
bypassTrapModuleId OBJECT-TYPE
  SYNTAX Gauge32
  MAX-ACCESS accessible-for-notify
  STATUS current
  DESCRIPTION
    "This is the ID (starting from 0) of the
    module going in/out of the bypass."
  ::= { bypassTrapInfo 1 }
```

```
bypassTrapModuleName OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS accessible-for-notify
  STATUS current
```

Interface Masters

◀ TECHNOLOGIES ▶

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DESCRIPTION

"This is the name of the
module going in/out of the bypass."
::= { bypassTrapInfo 2 }

bypassTrapStateBypass OBJECT-TYPE

SYNTAX DisplayString
MAX-ACCESS accessible-for-notify
STATUS current
DESCRIPTION
"This is the state (true for bypass, false for active)
of the module going in/out of the bypass."
::= { bypassTrapInfo 3 }

bypassTrapDiagnostics OBJECT-TYPE

SYNTAX DisplayString
MAX-ACCESS accessible-for-notify
STATUS current
DESCRIPTION
"This is the description of a diagnostics event."
::= { bypassTrapInfo 4 }

linkTrapLinkName OBJECT-TYPE

SYNTAX DisplayString
MAX-ACCESS accessible-for-notify
STATUS current
DESCRIPTION
"This is the name of the
link going up/down."
::= { linkTrapInfo 1 }

linkTrapLinkState OBJECT-TYPE

SYNTAX DisplayString
MAX-ACCESS accessible-for-notify
STATUS current
DESCRIPTION
"This is the state of the
link going up/down."
::= { linkTrapInfo 2 }

bypassTrapOpMode OBJECT-TYPE

SYNTAX DisplayString
MAX-ACCESS accessible-for-notify
STATUS current
DESCRIPTION
"This is the OpMode of a module."
::= { bypassTrapInfo 5 }

END

Interface Masters

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Appendix 3 -- Blue Elmech Console-Cable Drawing

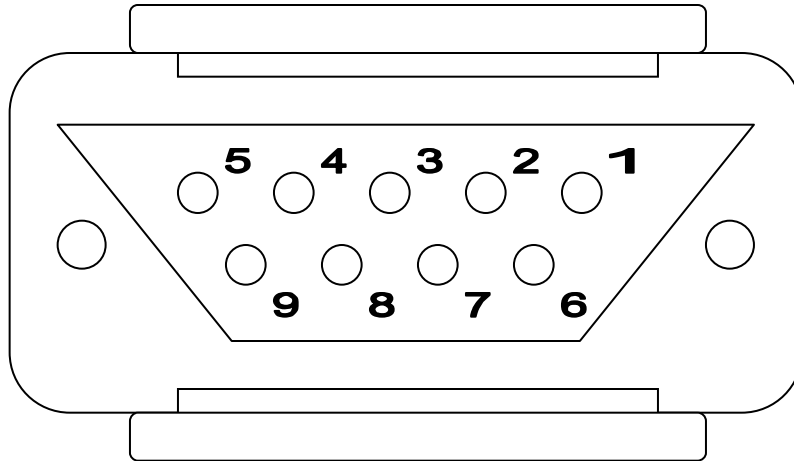


Figure 17 DB9 Connector Front View

DB-9 Connector
Pin 1, Pin 4, Pin 6- are shorted together
Pin 2- Green Striped wire
Pin 3- Solid Green wire
Pin 5- Solid Blue/ Blue Stripe wire
Pin 7, Pin 8- Short
Pin 9- No Connect
Other 2 Sets of Wires: Orange/ Orange Stripe and Brown/ Brown Stripe
Solid Orange and Brown Stripe should be connected together
Stripe Orange and Solid Brown should be connected together

Figure 18, DB9 connector pin description

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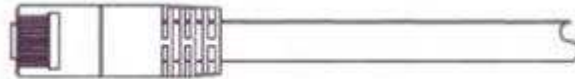
CAT5e Cable Top View



CAT5e Cable Wire Colors Top to Bottom
Orange/ White Stripe wire
Solid Orange wire
Green/ White Stripe wire
Solid Blue wire
Blue/ White Stripe wire
Solid Green wire
Brown/ White Stripe wire
Solid Brown wire

Figure 19, Cat5e Cable Wire Colors(Top view)

CAT5e Cable Bottom View



CAT5e Cable Wire Colors Top to Bottom
Solid Brown wire
Brown/ White Stripe wire
Solid Green wire
Blue/ White Stripe wire
Solid Blue wire
Green/ White Stripe wire
Solid Orange wire
Orange/ White Stripe wire

Figure 20, Cat5e Cable Wire Colors (bottomview)