



PRODUCT DOCUMENTATION

BTI SA-805 Carrier Ethernet Switch Installation and System Configuration Guide

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Preface

Audience

This guide is primarily intended for installers, technicians, and network operation center (NOC) staff.

Equipment compliance

Agency compliance

Agency	Compliance information
FDA	This equipment is classified by the FDA under IEC 60825, parts 1 and 2, as a Class 1 laser product with a Class 1 hazard rating.
FCC	This equipment complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
Industry Canada	This Class A digital apparatus complies with Canadian ICES-003.

The BTI Service Access 800 Series is suitable for installation in a Common Bonding Network.



The BTI Service Access 800 Series is suitable for installation in Network Telecommunication Facilities and in locations where the National Electrical Code (NEC) applies.

The DC power port shall be treated as DC-I (Isolated DC return).

Rating:
+12V $\overline{=}$; 3 A/+24V $\overline{=}$; 1.5 A
-48V $\overline{=}$; 0.75 A

Model Number: SA-805

Mfg Date:

This product complies with FDA-21, CFR Chapter 1, Sub-Chapter J as a Class 1M LASER PRODUCT, Class 1M Hazard Rating.

This product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.




This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la Class A est conforme à la norme NMB-003 du Canada.

Made in Korea / Fabriqué en Corée

Documentation suite

- *BTI SA-805, BTI SA-821, BTI SA-822 Carrier Ethernet Switch Release Notes*
- *BTI SA-805, BTI SA-821, BTI SA-822 Carrier Ethernet Switch Command Line Reference Guide*
- *BTI SA-805 Carrier Ethernet Switch Installation and System Configuration Guide*

Documentation conventions

Convention	Description
Note	Means reader take note. Notes contain helpful suggestions or background information.
 Caution	Means reader be careful. Equipment damage or loss of data can result from your actions.
 Warning	Means reader be careful. Harm to yourself or others can result from your actions.
 Laser Warning	Invisible laser radiation can be emitted from the aperture ports of amplifier circuit packs when no fiber cable is connected. Avoid exposure and do not stare into open apertures to avoid permanent eye damage.

Installation and Power Requirements, Warnings and Cautions



Ordering Requirements for Power Adapters and Cables

BTI SA-805 can be powered from a DC or AC power source.

Cables and accessories to wire the switch to a DC power source can be purchased from any hardware or electrical depot.

If you intend to power the switch from the mains an AC adapter assembly is required. The AC adapter assembly is not shipped with the switch and should be ordered as a separate item :

- Part Number : BT7D52AA(-I02) AC to +12V DC adapter and cord with retainer bracket.

The cord is supplied with a North American 2 pin plug [NEMA 1-15P 120V 60HZ].

The switch is compliant to universal power requirements. Contact Technical Assistance Center if you wish to order an alternative cord with a different plug.

Site Requirements

- The environmental conditions of the site should be with the temperature range -40 to 65 °C | -40 to 149 ° F with up to 85 % non condensing atmosphere

Requirements for Permanently installed switches

Permanently installed switches are switches installed using the mounting brackets and are attached to a rack , wall or cabinet and are wired to a power distribution panel.

- When ordered with a universal rack mounting kit [BT7D51AA] the switch can be installed in a 19 or 23 inch ANSI rack or 19 or 21 inch ETSI rack
- Sufficient rack access for maintenance to work safely and comfortably in front and behind the rack should exist
- It is recommended that 1RU of empty space should exist above and below the switch for ventilation
- Ground the equipment chassis
- the -48V DC and +24V DC power are connected on the switch using a small terminal block with screw fasteners. You must ensure power is switched off at the distribution panel before inserting or removing the power cables.

Requirements for pluggable equipment installed within a rack or wall.

- The socket-outlet shall be installed near the equipment and shall be easily accessible
- Sufficient rack access for maintenance to work safely and comfortably in front and behind the rack should exist
- It is recommended that 1RU of empty space should exist above and below the switch for ventilation
- Ground the equipment chassis
- AC power cables should be unplugged from the switch in the same manner as regular AC power sockets.

Requirements for pluggable equipment not installed within a rack

- The socket-outlet shall be installed near the equipment and shall be easily accessible

- If installed on a shelf, the surface must be flat, even and capable of supporting the switch weight [7 lbs | 3 kg]. The surface area must be greater than the dimensions of the switch [44 mm x 186mm x 187 mm | 1.73 inches x 7.32 inches x 7.32 inches]. The four self adhesive rubber paddings must be attached to the underneath of the switch
- If installed on a wall, the switch must be mounted in the wall mount bracket. The wall mount bracket must be installed in a suitable location and secured appropriately
- Do not block the heat vents on top of the switch
- It is recommended that 1RU of empty space should exist above the switch for ventilation
- The switch should not be located close to any equipment or machinery which may cause electromagnetic interference.
- AC power cables should be unplugged from the switch in the same manner as regular AC power sockets.
- The AC outlet should be surged protected

Electrical and Wiring requirements and considerations

- A readily accessible disconnect device shall be incorporated into the installation wiring. For optimum system power performance, a power distribution panel with line conditioning filtering capabilities should be used
- Surge damage to network equipment can be minimized using proper grounding methods and adhering to electrical wiring codes
- Ground potential differences between buildings should be minimized
- Connect only a DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements inclusive of UL1950, CAN/CSA 22.2 No. 60950, EN60950 or IEC 60950 to a BTI SA-805 DC input power supply unit
- Install DC power supplies used in restricted access areas in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

Cautions and Warnings

- Never touch the wiring terminals when the DC power is ON
- Always perform a visual inspection of the switch and its surrounding installation for electrical damage, arcing or poor cable connections before touching the switch or operating the reset button
- Ensure all DC cables are de-energized before handling or connecting to equipment
- Always wear an ESD strap when handling or performing maintenance on the switch.
- Always follow electrical safety precautions, use the appropriate tools and follow the health and safety guidelines for safety protection clothing when working in areas with electricity or installation

Optical and Laser precautions

- All BTI SA-805 switches are classified by the FDA as class 1 laser products with a class 1 hazard rating. A caution label appears on BTI SA-805 equipment. Read and understand all caution labels before working with the equipment
- Terminate all laser and SFP transceiver outputs properly before connecting laser inputs.
- Disconnect the input end of an optical fiber jumper cable before disconnecting the output end.
- System equipment should be used in a controlled access area. Limit the number of personnel that have access to the optical transmission systems.

- Handle glass fiber with care. Glass fiber can be broken if mishandled
 - Protect skin from exposed glass fiber. It can penetrate the skin
 - Measure optical power levels to ensure that they are within expected limits. Attenuate optical power levels as needed before connecting laser inputs.
 - Limit the use of laser test equipment to authorized, trained personnel during installation and service. This precaution includes using optical loss test (OLT) set, optical spectrum analyzer (OSA), and optical time domain reflectometer (OTDR) equipment.
 - Exclude any unauthorized personnel from the immediate laser radiation area during service and installation when there is a possibility that the system may become energized. Consider the immediate service area to be a temporary laser-controlled area.
 - The system functions in the 850-nm to 1620-nm wavelength window that is considered invisible radiation. Laser light being emitted by a fiber, a pigtail, or a bulkhead connector cannot be seen by the naked eye. Use appropriate eye protection during fiber-optic system installation or maintenance whenever there is potential for laser radiation exposure, as recommended by the company's health and safety procedures. Observe this precaution whether or not warning labels have been posted.
 - During installation or service, a broken optical fiber or non-terminated connector should only be viewed with an indirect image converter or with a filtered optical instrument of optical density sufficient to reduce the exposure levels below the appropriate maximum permissible exposure, unless it has been verified that all optical transmitters are turned off and will remain off during the installation or service operation.
 - During all splicing operations that require viewing the end of a fiber of an SG3a, SG3b or SG4 Optical Fiber Communication Systems (OFCS) or equivalent, the laser source on the fiber involved shall be de-energized or viewing the systems incorporating personal protection shall be employed. A responsible person(s) shall verify that the system is de-energized before splicing proceeds. Where applicable, ensure compliance with lockout/tagout requirements of OSHA Standard 29 CFR Part 1910.147.
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1.0 BTI SA-805 Carrier Ethernet Switch Hardware and Software Description

This section details the following topics:

- 1.1, “ BTI SA-805 Carrier Ethernet Switch Product Overview”
- 1.2, “ BTI SA-805 Carrier Ethernet Switch Interfaces, Connectors and LED indicators”
- 1.3, “BTI SA-805 Carrier Ethernet Switch Management Interfaces”
- 1.4, “ BTI SA-805 Carrier Ethernet Switch Software Feature Summary”
- 1.5, “BTI SA-805 Carrier Ethernet Switch Quick Start Up Guide”
- 1.6, “ Alarms”

1.1 BTI SA-805 Carrier Ethernet Switch Product Overview

BTI SA-805 Carrier Ethernet Switch is a cost effective, multi service, carrier-grade compact Ethernet access unit, designed to deliver Ethernet services support to enterprise business and wireless mobile backhaul service applications.

Its compact form, low power and temperature resilient no fan architecture, means it is ideally suited for installation at wireless towers or in customer premises. BTI SA-805 4 port Ethernet switch provides a solution to space and power challenges, it delivers high performance, scalable services and can reduce operational costs.

It provides Ethernet services demarcation, classification, traffic management, prioritization, aggregation and service inter-working in up to 40 Gbps switching fabrics.

BTI SA-805 also provides the following features :

- Wide Ethernet services support that provides affordable and seamless path to high capacity business Ethernet and wireless 4G services
- Synchronization source derived from SyncE Ethernet interfaces or 1588v2 slave clock
- System clock which meets the accuracy, stability, and holdover specifications required for stratum 3 timing (G.813)
- Carrier grade platform with low latency and highly reliable service delivery with 50ms ring protection G.8032v2
- Fault and performance management with Y.1731 loopback, link trace, delay, jitter and loss measurement with customer SLA Portal access

Hardware Description

Feature	Specification
Dimension	44h x 186w x 187d(mm)
1GbE SFP Interface	4 (Share with 10G SFP+)
10GbE SFP+ Interface	4 (Share with 1G SFP)
Console interface (RJ-45) Management Interface	1 RS-232C Console [cable supplied] 1 RJ-45
AC Power Supply	12V AC Adapter
DC Power Supply	Integrated -48VDC /+24VDC [nominal]
Power Consumption	Typical 20W / Maximum 30W
Fan	No
Operating Temperature	-40°C to +65°C
Storage Temperature	-40°C to +70°C
Time Synchronization	SyncE, 1588v2

With a 1 RU height and only 186 mm wide and 187 mm depth, the switch is very compact and portable. It is supplied with a wall mounting bracket but can also be installed onto a 19, 21 or 23

inch rack if ordered with the universal mounting bracket for ETSI | ANSI racks. It can also be installed on a shelf or outdoors in a cabinet.

The switch does not require a fan and therefore can function in a quiet and non obtrusive operation. Heat vents on top surface allow for heat dissipation.

The switch can be powered from a +24VDC or -48V DC power supply. It can also be powered from the mains electricity if ordered with the AC to 12V DC adapter kit assembly.

On the front panel, a series of red LEDs indicate if a minor, major or critical alarm has occurred. A green RUN LED indicates if the switch has booted up and running in operational mode. A green ON/OFF LED is located on the rear panel.

The switch has 4 ports which support 1GE, 10GE and copper SFPs . The transceivers use LC fiber optic connectors which use a push to engage/pull to disengage technology. The SFPs transceiver modules should be ordered in addition to the switch and are available for long reach, intermediate reach and short reach, DWDM [32 channels], DWDM [channel E1-E8] and 10/100/1000BT copper. Multi mode and single mode fiber are supported.

By default the ports will auto detect the media type [i.e. whether a RJ45 or SFP module is inserted] and will auto detect 10, 100 or 1000 mbits/s, half or full duplex on the copper interfaces. 1GE or 10GE are autosensed. However you will need to configure the port speed as 1G or 10G for the port to function correctly.

The base switch unit comes with 4 x 1GE enabled ports. RTU licences are required to be purchased for 10GE ports. The system will prompt the user to order additional RTU licences. The switch ports can be provisioned as all SFP, SFP+ or SFP copper or any combination of SFP, SFP+ or copper SFP.

The switch also has a reset button. Pressing the reset button will reboot the switch. Pressing and holding the reset button down for more than 3 seconds will return the switch to factory defaults. The switch will lose any configuration or provisioning changes when the factory defaults are restored.

The switch has a RJ-45 RS232 serial console port on the rear panel which provides a local connection from a PC or laptop directly to the switch. The console port provides quick access to the local node for minor configuration changes or to set up other management access options.

The switch also has an RJ-45 management port on the front panel for Out of Band or In Band management. The default IP address of the management Ethernet port is 192.168.5.100/24. If telneting to the switch use the standard TCP telnet port 23. The switch supports only one default gateway. It is recommended that if In-Band and Out-of Band [OOB] management is configured the default gateway should be specified for the In-Band. The OOB management IP address must be unique and must be on a different IP subnet from the in band IP address. If a default gateway is not specified all stations connected to the management Ethernet port must be on the same subnet. If you make this change while logged into the management port you will be logged out of the session. Before accessing the CLI again you must remember to change the IP and subnet on your PC.

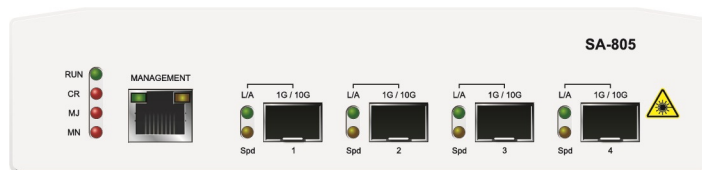
The default login credentials to access the CLI are username <admin > and password <btiadmin> .

Once the switch is provisioned in the network, the user can also telnet from the switch to other network elements. A maximum of three telnet sessions are permitted.

Two SMB connectors [BITS and 1 P.P.S. for phase synchronization] are located on the rear panel. The console port is also shared with the Time of Day [ToD] interface output.

It is recommended to set the system clock to use NTP protocol.

The switch is also supplied the software [image.img file] and details of supported MIBs. You may choose to download the latest software, should a version be available.



Hardware and software

PEC	QTY	ITEM
BT7D05AA	1	BTI SA-805 base system
	1	Console Cable Wall mount brackets [right & left]
	4	Self-adhesive pads, rubber
Additional Optional Items	QTY	ITEM
BT7D52AA(-I02)	1	120V AC TO 12v DC Adapter kit with AC cord retainer
BT7D51AA	1	Rack mount kit with single and dual mount brackets [screws, washers and lugs included]
Transceiver Modules	N/A	1GE SFP, 10GE SFP+

1.2 BTI SA-805 Carrier Ethernet Switch Interfaces, Connectors and LED indicators

Interfaces, connectors and LED indicators located on the front panel of the switch

The following interfaces, connectors and LEDs are located on the front panel of the switch :

- One green LED [RUN] and 3 red alarm LEDs [minor, major and critical]
- One RJ-45 management interface for In Band and Out of Band management
- Four port interfaces - which can be provisioned as 4 x 1 GbE fiber ports, 4 x 10GbE fiber ports, 4 X 10/100/1000BT copper or a combination of 1GbE fiber, 10GbE fiber and 10/100/1000BT copper ports.

The switch name, BTI SA-805 is situated in the top right corner. The switch PEC, serial number and MAC address are labelled on the rear of the switch .

A laser radiation warning label is positioned at the Ethernet port.

Figure 1-1 Front Panel



Table 1-1 LED Indicators on the Front Panel of the switch

LED	Activity	Description
RUN	Green Blink	: During boot up : Booting success
	Green ON	: Normal operation
	Green ON, then changes state to OFF	: Booting success but there is abnormal operation
CR	Red ON	: During boot up
	Red OFF	: Booting success and no critical alarm
	Red Blink	: Booting success and critical alarm
MJ	Red ON	: During boot up
	Red OFF	: Booting success and no major alarm
	Red ON	: Booting success and major alarm
MN	Red ON	: During boot up
	Red OFF	: Booting success and no minor alarm
	Red ON	: Booting success and major alarm
L/A	Green ON	: Link up, Ethernet ports
	Green OFF	: Link down, Ethernet ports
	Green Blink	: Activity on Ethernet ports

Table 1-1 LED Indicators on the Front Panel of the switch (Continued)

LED	Activity	Description
SPD	Yellow ON	: 10GbE link-up
	Yellow OFF	: 1GbE link-up
L/A	Green ON	: Link up, Management port
	Yellow ON	: Activity on Management port

Console Port

Default Management IP address	192.168.5.100/24
Telnet Port	23

Table 1-2 Supported Transceiver Modules

Transceiver	Grade	PEC	Supported and Non Supported Temperatures		
			0C to +40C	-5C to +55C	-40C to +65C
SFP: 10/100/1000BT Copper	C-Temp -5C to +70C	BP3AD3ES	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 850nm SX	C-Temp -5C to +70C	BP3AD1SS	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 1310nm SR	C-Temp -5C to +70C	BP3AM1MS	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 1310nm IR	C-Temp -5C to +70C	BP3AM1MI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, SR, bidi 1310tx/1490nm (20km)	C-Temp -5C to +70C	BP3AM5PB	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, SR, bidi 1490tx/1310nm (20km)	C-Temp -5C to +70C	BP3AM5QB	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, IR, bidi 1310T/1490R (40km)	C-Temp -5C to +70C	BP3AM5PI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, IR, bidi 1490T/1310R (40km)	C-Temp -5C to +70C	BP3AM5QI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: CWDM LR Channel xx	C-Temp -5C to +70C	BP3AM1CL-xx xx = [01-16]	Supported Mandatory	Supported Mandatory	Not Supported

Table 1-2 Supported Transceiver Modules (Continued)

Transceiver	Grade	PEC	Supported and Non Supported Temperatures		
			0C to +40C	-5C to +55C	-40C to +65C
SFP: DWDM ER Channel xx	C-Temp -5C to +70C	BP3AM1DE-xx xx = [01-32, E1-E8]	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 10/100/1000BT Copper (I-temp)	I-Temp -40C to +85C	BP3AD7ES	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP: 850nm SX (I-temp)	I-Temp -40C to +85C	BP3AD7SS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP: 1310nm SR (I-temp)	I-Temp -40C to +85C	BP3AD7MS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: 850nm 200m, dual-rate 10.3 and 10.5Gbps	C-Temp -5C to +70C	BP3AD6SS	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: 1310nm 10km, multi-rate 9.9 to 11.1Gbps	C-Temp -5C to +70C	BP3AM6MS	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: DWDM fixed 80km, multi-rate, 9.9 to 11.1Gbps	C-Temp -5C to +70C	BP3AM6DL-xx	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: 850nm 200m, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AD8SS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: 1310nm 10km, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8MS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: 1550nm IR 40km, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8LI	Supported Mandatory	Supported Mandatory	Supported Mandatory
SFP+: DWDM fixed 80km, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8DL-xx	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: Tunable 96 Channel DWDM 80km, 10G Multi-Rate / Multi-Protocol	C-Temp -5 to +75C	BP3AM6TL	Supported Not Mandatory	Not Supported	Not Supported

Note Wait 3 seconds after removing or installing copper SFPs to enable the system to detect and update the interface.

Table 1-3 Media Type, Duplex and Speed configuration and Default Settings

CLI Command	Description	Default Setting
media-type {auto-select rj45 sfp}	auto-select: Enable the switch to dynamically select the type based on which one first links up rj45: Select the RJ-45 interface sfp: Select the small form-factor pluggable (SFP) module interface CLI command: Switch(config-if)# media-type {auto-select rj45 sfp}	auto-select
duplex {auto full half} The command is not permitted to be set on the 10G ports or the optical mode of combo ports	Auto :port automatically detects whether it should run in full- or half-duplex Full: Enable full-duplex mode Half: Enable half-duplex mode (only for interfaces operating at 10 or 100 Mb/s Switch(config-if)# duplex [auto full half]	Auto
speed {10 100 1000 auto}	auto: Port automatically detects the speed it should run 10: Port runs at 10 Mb/s. 100: Port runs at 100 Mb/s. 1000: Port runs at 1000 Mb/s. Switch(config-if)# speed {10 100 1000 auto}	Auto

Table 1-4 BTI SA-805 SFP and SFP+ Interface Modes

SFP Module Specification		1G Fiber	10G Fiber	10/100/1000BT Copper / Auto Enabled		
System	Port	SFP	SFP+	10M	100M	1 G
BTI SA-805	Eth-0-4	Y	Y	Y	Y	Y

Y = Supported

X = Not Supported

Note 1GE and 10GE are autosensed. However, in addition, you will need to configure the port speed as 1G or 10G for the port to function correctly. Auto negotiation is a requirement for using 1000BASE-T, therefore auto cannot be disabled on interfaces provisioned as 1000BASE-T.

Interfaces, connectors and LED indicators located on the rear panel of the switch

The following interfaces, connectors and LEDs are located on the rear panel of the switch :

- The +12 V DC input for the AC to +12V DC power adapter

- The RJ-45 RS232 serial console port which provides a local connection to the switch from a laptop or computer
- Two SMB connectors [Sync for carrying either T1 or E1 signals and 1 PPS for phase synchronization]
- One reset button [Pushing the reset button reboots the switch. Holding the reset button for longer than 3 seconds will return the switch to factory defaults]
- One grounding screw terminal
- One interface for the four pin screw terminal, required to wire the switch to the -48V or +24V DC power supply



Table 1-5 BTI SA-805 Back-Panel LEDs

LED	On	Off
System		

Table 1-5 BTI SA-805 Back-Panel LEDs (Continued)

LED	On	Off
PWR (power)	Green OFF Green ON	Power is OFF Power is ON
Console/ToD		
Green (left and right)	The Console LEDs are always off [You can view the connection status via your computer or laptop]	
Console Terminal Emulation Software Parameters		
Session	Connection Type	Serial
	Serial Line	COM1
	Speed	9600
Terminal : Keyboard	Function Keys and Keypad	VT100+
Connection: Serial	Serial Line Baud rate Parity Stop bits Flow Control	COM1 9600bps None None None

Table 1-6 External Clock Interfaces

Connector Label	Specification
1PPS (SMA)	Pulse Width : TBD Amplitude : 3.3 volts LVTTTL On-Time Edge : Rising Impedance : 50ohm
ToD (RJ45)	Protocol : NMEA0183 GPRMC Interface : RS-232
Sync (SMA)	1544KHz : 3.3Vp-p Square wave 50ohm output 2048KHz : 3.3Vp-p Square wave 50ohm output 2048KHz : 3.3Vp-p Square wave 50ohm output

1.3 BTI SA-805 Carrier Ethernet Switch Management Interfaces

BTI SA-805 supports standard communication interfaces over serial and Ethernet connections.

Table 1-7 BTI SA-805 management ports

Type	Description
Console	RS-232 RJ-45 serial port providing CLI connectivity to the system. The console port is also shared with the Time of Day (ToD) interface output.
Management Ethernet	RJ-45 Ethernet port providing IP-level connectivity for SSH, Telnet, and SNMP access to the system
	Default IP : 192.168.5.100/24

Cables required

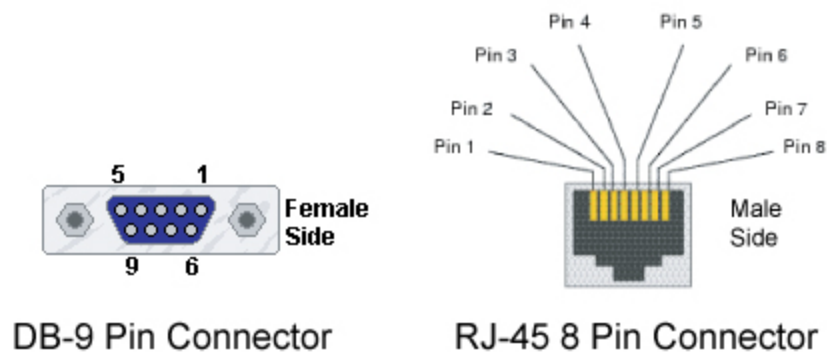
When connecting a PC or laptop to the Console port, use a straight-through RS-232 cable with a DB-9 pin male connector at one end and an RJ-45 connector at the other.

If you anticipate using the RS-232 serial port, determine the length of cable required to connect the switch to your PC, and prepare the cable with the appropriate male connector.

RS-232 pin assignment

The following figure shows the RS-232 DB-9 pin DCE connector as well as the RS-232 RJ-45 8 pin connector and the associated pin numbering schemes.

DB-9 Pin Connector and 8 Pin RJ-45 Connector Numbering Schemes

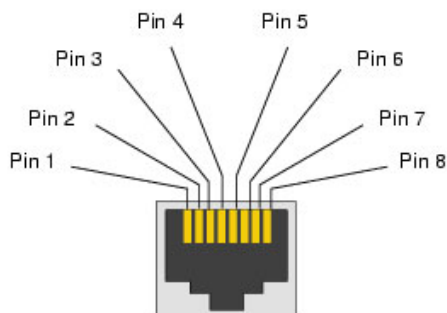


The following table lists the RS-232 pin assignment for the DB-9 pin connector and RJ-45 connector pin numbering schemes.

Table 1-8 Pin Assignments for RS-232 DB-9 Pin Connector and RS-232 RJ-45 Connector

DB-9 Pin Connector	DCE Purpose	RJ-45 Connector	DCE Purpose
1	Data Terminal Ready	1	Not Connected
2	Transmitted Data	2	Time of Day Transmitted Data
3	Received Data	3	Console Transmitted Data
4	DTE Ready	4	Signal Ground
5	Signal Ground	5	Signal Ground
6	DCE Ready	6	Console Received Data
7	Clear to Send	7	Not Connected
8	Request to Send	8	Not Connected
9	Ring Detector		

BTI SA-805 switches have an optional RS-232 DB-9 to RJ-45 console cable. The following figure shows the RS-232 RJ-45 connector and the associated pin numbering scheme.

Figure 1-3 8-Pin RJ-45 connector numbering scheme**Table 1-9 RS-232 RJ-45 connector pin numbering scheme**

RJ-45 Connector	DCE Purpose	RJ-45 Connector	DCE Purpose
1	Not Connected	5	Signal Ground
2	Not Connected	6	Received Data
3	Transmitted Data	7	Not Connected
4	Signal Ground	8	Not Connected

1.4 BTI SA-805 Carrier Ethernet Switch Software Feature Summary

Many of the software features are common to the BTI SA-805 , BTI SA-821 and BTI SA-822 switches. Features marked in *Italic* are specific to the switches.

Ethernet interfaces	BTI SA-805	BTI SA-821	BTI SA-822
<i>Number of Interfaces</i>	<i>total 4 ethernet ports</i>	<i>total 28 ethernet ports</i>	<i>total 12 ethernet ports</i>
<i>1 GigE - optical SFP</i>	<i>4 - all interfaces 1GigE optical SFP</i>	<i>24 - all interfaces 1GigE optical SFP</i>	<i>12 - all interfaces 1GigE optical SFP</i>
<i>10 GigE - optical SFP+</i>	<i>4 - all interfaces 10 GigE optical SFP</i>	<i>4 - all interfaces 10 GigE optical SFP</i>	<i>12 -all interfaces 10 GigE optical SFP</i>
<i>10/100/1000 T Copper SFP</i>	<i>4 - all interfaces 10/100/1000T Copper SFP</i>	<i>24 - all interfaces 10/100/1000T Copper SFP</i> <i>4 - all interfaces 1000T Copper SFP</i>	<i>12 - all interfaces 1000T Copper SFP</i>
<i>Combination optical SFP, optical SFP+, Copper SFP</i>	<i>4 interfaces with combination of 1 GigE SFP, 10 GigE SFP+ and 10/100/1000T copper SFP</i>	<i>24 interfaces with combination of 1 GigE SFP and 10/100/1000 T Copper SFP</i> <i>Additional 4 ports can be set as all 10 GigE SFP+ or a combination of 10 GigE, 1 GigE and 1000T Copper SFP</i>	<i>12 interfaces with combination of 10 GigE SFP+, 1 GigE SFP and 1000T Copper SFP</i>

The following table lists the key features and features introduced in this release:

Note	* = New feature introduced
Note	FS = This feature was introduced in a previous release with limitations. Now it is <i>Fully Supported</i> .

Table 1-10 Key features and features introduced in this release

Features	Additional Information
Bridging	
CVLAN Translation - At UNI only	
SVLAN Translation - At E-NNI only	
802.1ad Provider bridging for E-LINE	
802.1ad Provider bridging for E-LAN	
802.1ad Provider bridging for E-ACCESS	
Forwarding Database	
MAC learning and aging	
Enable / Disable MAC learning per Port	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
Enable / Disable MAC learning per VLAN	
Limit number of MAC addresses learned per VLAN	
Static MAC entries	
Broadcast, Multicast and DLF storm control	
Layer 2 Protocols	
IEEE 802.3ad link aggregation	
IEEE 802.3ad with LACP	
Multi-chassis LAG (MLAG)- static and LACP with active / standby mode and non-revertive opmode	*
Layer 2 Station Loopback	
Loopbacks	
Layer 2 Station Loopback - MAC src dst swap supporting - UNI, NNI and Service Activation Test (SAT)	
Layer 2 Station Loopback - Line rate based loopback with variable frame size including jumbo frames	
Support loopback traffic from centralized test sets (EXFO, JDSU, Accedian loop, etc.)	
Loopback based upon L2 Filter MAC dst, MAC src,VLAN (Outer VLAN, Inner VLAN), Priority, EtherType, Combination of parameters	
Loopback based upon IPv4 Filter IP dst, IP src, L4 ports (TCP or UDP), IP protocol, combination of parameters	
Throughput Test - packetVX interop	
Y.1564 loopback support (interop with EXFO)	
Ethernet Operations, Administration and Maintenance (OAM)	
IEEE 802.3ah Ethernet in the First Mile (EFM)	
Discovery	
Link Performance Monitoring	
Remote Loopback	
Critical Event	
Dying Gasp	
ITU-T Y.1731 (Connectivity Fault Management & Performance Monitoring)	
MEG, MIP and MEP	
Continuity check messages (CCM)	
Rate of CCMs (3.3ms, 10ms, 100ms, 1 Sec, 1 Min, 10 Min)	
Loopback messages (LBM)	
Loopback reply (LBR)	
Linktrace messages (LTM)	
Linktrace replies (LTR)	
Frame Delay (FD) - 2 way measurement	
Frame Delay Variation (FDV) - 2 way measurement	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
Frame Loss Ratio (FLR)	
UP MEP on UNIs	
DOWN MEP on NNIs	
Support for on-demand loopback	
Support for on-demand linktrace	
Support for on-demand FD, FDV and FLR test	
RFC2544 (embedded)	The available RFC2544 sessions are shown by the CLI command <code>show ethernet rfc2544 brief</code> . However when the Y.1564 session is created on the same MEP, the RFC2544 session does not display on the brief list. Remove the Y.1564 session, to enable the RFC2544 session to be displayed.
Throughput Test (Y.1731 Test message)	
Latency Test (Y.1731 DM)	
Frame Loss Rate test (using TST frame)	
Y.1564 Service Activation Test (SAT)	
Up to 4 sessions at the same time	
CIR Configuration Test	
EIR Configuration Test	
Traffic Policing Configuration Test	
Service Performance Test (Aggregation Test)	
Ethernet Service Level Agreement (SLA) Statistics	
Frame Delay	
2-way Frame Delay Minimum	
2-way Frame Delay Maximum	
2-way Frame Delay Average	
2-way Frame Delay Most Recent	
Frame Delay Variation	
2-way Frame Delay Variation Minimum	
2-way Frame Delay Variation Maximum	
2-way Frame Delay Variation Average	
2-way Frame Delay Variation Most Recent	
Frame Loss Ratio	
Near-End Frame Loss Ratio	
Far-End Frame Loss Ratio	
Ethernet SLA Statistics Bins & collection	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
2 x 24 hour interval for all statistics per Service	
32 x 15 minute interval for all statistics per Service (8 Hours)	
96 x 5 minute interval for all statistics per Service(8 Hours)	
120 x 1 minute interval for all statistics per Service(8 Hours)	
Performance monitoring for all statistics collected by SNMP on demand, SNMP scheduled, ftp/sftp on demand and ftp/sftp scheduled.	
Ethernet Service Statistics	
Traffic Statistics per E-Service	
Total Received Packets	
Number of bytes declared RED	
Number of bytes declared YELLOW	
Numer of bytes declared GREEN	
Received Packets Dropped	
Total Transmitted Packets	
Total Transmitted Bytes	
Traffic Rate per E-Service	
Last 5 minutes input rate per EVC Bps	
Last 5 minutes input rate per EVC pps	
Last 5 minutes output rate per EVC Bps	
Last 5 minutes output rate per EVC pps	
Utilization per E-Service	
Last 5 minutes input link utilization rate per committed CIR %	
Last 5 minutes output link utilization rate per committed CIR %	
EVC Statistics Bins & Collection	
2 x 24 hour interval for all EVC statistics per Service	
32 x 15 minute interval for all EVC statistics per Service (8 Hours)	
96 x 5 minute interval for all EVC statistics per Service(8 Hours)	
Ethernet Advanced Features	
IEEE 802.1AB LLDP	
Protection / Rapid restoration	
ITU-T G.8031 1:1 Linear Protection	
ITU-T G.8031-2009 Revertive Mode	
ITU-T G.8031-2009 Non Revertive mode	
ITU-T G.8031 1:1 Ethernet Linear Protection Switching (Supports both software based and hardware assisted working and protection path switching)	
ITU-T G.8031 Switching time is 50ms on hardware supported automatic protection switching platforms	
ITU-T G.8031 Supports lockout, forced and manual protection switches	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
ITU-T G.8031 Supports prioritized protection between Signal Fail (SF) and operator requests	
ITU-T G.8032 v2 Ethernet Ring Protection Switching (ERPS)	
ITU-T G.8032 - Reverative Mode	
ITU-T G.8032 - Non Reverative Option	
ITU-T G.8032 - Interconnected Rings	PVX inter-operability with link-scan only
ITU-T G.8032 - Laddered (Sub) Rings with and without Virtual Channel Mode	
ITU-T G.8032 - Multiple Instances	
Multi Traffic-Channel per Ring Instance	
Multi Ring Instance per Physical Interface	
Protection switching based upon 3.3ms CCMs	
LAG Link Protection	
Active Standby LAG	
Ethernet Fault Propagation Shutdown (EFPD)	
Ethernet Fault Propagation Shutdown (EFPD) on EPLINE services	Interoperability with SA-810 : eth-cc EFPDS must be disabled on the BTI SA-805.
Quality of Service (QoS) and Class of Service (CoS)	
Per-port rate-limiting	
802.1p (Traffic Class)	
Traffic classification based on Port	
Traffic classification based on TOS	
Traffic classification based on DSCP	
Traffic classification based on 802.1P	
Traffic classification based on 802.1Q	
Priority queues per port	
Strict Priority(SP) and Deficit Weighted Round Robin (DWRR) Scheduling	
CIR/CBS bandwidth management	
EIR/EBS bandwidth management	
Bandwidth Profiles per UNI	
Bandwidth Profiles per EVC	
Bandwidth Profiles per CoS	
Ingress Filters	
Egress Filters	
Advanced Filter (and/or for L2 and L3 combined)	
Per port Policers	
Per flow Policers	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
Egress Queuing	
Egress Strict Priority	
MEF Multiple BW Profile (MBWP)	
Security	
Port mirroring - local	
ACL based on MAC Src, MAC Dst, EtherType, IP Src, IP Dst, TCP Port, UDP Port, VLAN ID, 802.1p, Port	
Filters	
UNI defaults -- UNI down, no local switching	
CPU Protection with Filters and ACLs	
Radius Client	
Command Line Interface	
CLI	
CLI via Telnet	
CLI via SSHv2	
Out-of-Band and In-Band Management	
Craft Console Port RJ-45 Serial RS-232	
Network Management Port RJ-45 Ethernet 100Mbps	
Management VLAN (CVLAN and SVLAN)	
IPv4 Management	
In Band IPv4	
Out of Band IPv4	
Time Management	
Time Zone and Daylight Savings Time	
SNMP Interface	
SNMP v2c sets/gets/traps	
Performance Monitoring	
Layer 2 PMs per port - Rx Statistics (octets, packets, unicast, multicast, broadcast)	
Layer 2 PMs per port - Tx Statistics (octets, packets, unicast, multicast, broadcast)	
Layer 2 PMs per port - Error Statistics (fragments, jumbo, FCS errors, collisions, undersize, drop events, Rx Pause, Tx pause, collisions)	
Last 5 minutes input and output rate per port Bps and pps	
Last 5 minutes input and output link utilization rate per port %	
"Report SFP/SFP+ Information and Performance Temperature, Bias-Current, Tx-Power and Rx-Power"	
"Set SFP/SFP+ Alarms and send SNMP traps Temperature, TX Power and Rx Power"	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
RMON Groups 1	
Local Sys Log	
Remote Sys Log	
PM File transfer for Ethernet PM, E-Service PM and OAM PM	
External Clock	
Supports external clock modes t1 and e1.	<p>The default external clock-in mode is t1.</p> <p>BTI SA-821/BTI SA-822 do not support clock-in and clock-out mode simultaneously.</p> <p>BTI SA-805, BTI SA-821 and BTI SA-822 do not support the CLI command <code>no ext clk-out</code>.</p>
SyncE	
ITU-T G.8261: Timing and synchronization aspects in packet network	
ITU-T G.8262: Timing characteristics of Synchronous Ethernet equipment slave clock	
ITU-T G.8264: Distribution of timing through packet networks	
ITU-T G.781: Synchronization layer functions	
SyncE with Ethernet Synchronization Messaging Channel (ESMC) support	
Synchronization Status Messages (SSM)	
Support up to two SyncE reference inputs for primary and secondary	
1588v2	
ITU-T G.8261: Timing and synchronization aspects in packet network	<p>1588v2 Ordinary Clock is supported.</p> <p>Boundary and Transparent Clock are not supported in this release.</p> <p>Sync and delay_req message are supported up to 64 PTP packets per second on the Ordinary Clock Servo.</p>
Best Master Clock Algorithm	
Support single reference input for primary and secondary	Recommended configuration when provisioning 1588v2 is to set 1588v2 as the "primary" clock and set the secondary clock to "none".
Slave Clock OC	
Provides 1PPS	
Provides ToD	
ToD Displayed via CLI	
ToD Retrivable via SNMP	
Software upgrades and file management	

Table 1-10 Key features and features introduced in this release (Continued)

Features	Additional Information
Upgrade Firmware / OS Management	
Upgrade BIOS Management	
TFTP Client (tftp)	
FTP Client (ftp)	
Telnet Client (telnet)	
Telnet Server (telnetd)	
Standard MIBs	
RFC1213 MIB-II	
RFC3418 MIB for SNMP	
RFC2863 Interface Group	
RFC1643 Ethernet-like Interface	
RFC4188 Bridge	
RFC2922 Physical Topology	
LLDP(802.1AB) MIB	
MEF defined E-LINE & E-LAN (MEF 40 UNI/NNI MIBs)	
MEF defined SOAM FM (MEF 31/31.0.1 FM MIBs)	
MEF defined SOAM PM (MEF36 PM MIBs)	
Industry Certifications	
MEF CE 2.0 EPL	
MEF CE 2.0 EVPL	
MEF CE 2.0 EP-LAN	
MEF CE 2.0 EVP-LAN	
Software Image	
Software image	BTI SA-805 and BTI SA-821/BTI SA-822 use different software images. If an incorrect image is used an error message is displayed and the invalid image is removed.

Table 1-11 proNX Service Manager (PSM) and proNX SLA Portal supported features

Features	Additional Information
PSM Release 6.2.0 - CA	
Nodal Management - FCAPS	
NE discovery & Alarms	Basic discovery and alarming, system settings, inventory, shelf view, scripts, software upgrade, database backup/restore
System info and settings, inventory	
Software upgrades, db backup/restore	
Network Topology	LLDP and network topology, E-Service provisioning (a-z). SLA and Performance Monitoring statistic support.
E-Services (and ERPS Visualization)	

Table 1-11 proNX Service Manager (PSM) and proNX SLA Portal supported features (Continued)

Features	Additional Information
ERPS visualization & details	
A-Z circuit provisionning and bandwidth profile application	
Y.1731 CFM	
CCM Auto-configuration	
SLA Initiator Responder Pair configuration	
Real time PMs (port, soam)	
proNX SLA Portal	
SLA Portal Release 2.3.0 - CA	
Circuit Auto-discovery	
Metric Collection and Reporting	
Dynamic Bandwidth Provisionning	

1.5 BTI SA-805 Carrier Ethernet Switch Quick Start Up Guide

This is a Quick Start Up Guide. For additional information see:

- [Chapter 2, “BTI SA-805 Carrier Ethernet Switch Installation”](#)
- [Chapter 3, “BTI SA-805 Carrier Ethernet Switch Power Connection to an AC or DC Power Source”](#)
- [Chapter 4, “BTI SA-805 Carrier Ethernet Switch Optical and Copper Transceiver Installation”](#)
- [Chapter 5, “BTI SA-805 Carrier Ethernet Switch System Configuration and Turning Up”](#)

Tasks listed in the Quick Start Up Guide must be performed in accordance with the regulations listed [Chapter 3, “BTI SA-805 Carrier Ethernet Switch Power Connection to an AC or DC Power Source”](#)

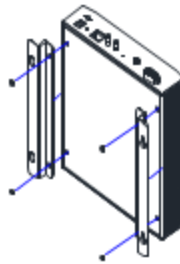
Installing BTI SA-805 Carrier Ethernet Switch on to the wall

Equipment required:

- wall mount bracket [left and right]
- ESD grounding strap
- Screwdrivers
- Additional screws for rack mounting

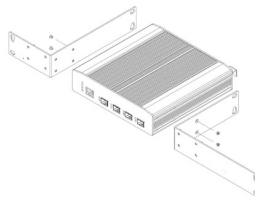
Caution

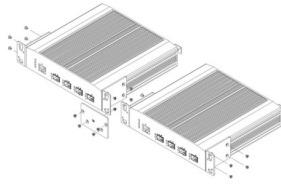
Use an ESD wrist strap whenever you are handling the switch and SFP transceivers.



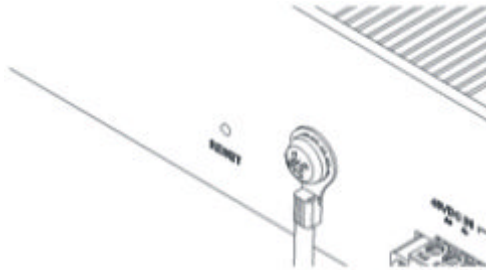
Installing BTI SA-805 Carrier Ethernet Switch on a rack

BTI SA-805 can be installed on a rack using the rack-mount kit BT7D51AA for 19-in, 21-in, and 23-in racks. The rack mount kit can be used to install one or two BTI SA-805 systems





Verify that the circuit breaker in the electrical cabinet is sufficient to handle the power requirements of the switch



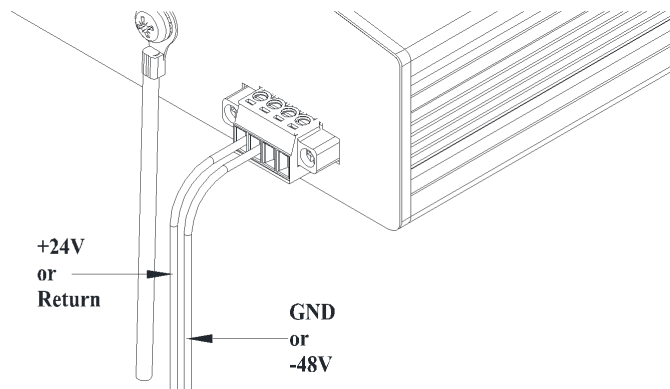
To ground the product, do the following:

- Connect the grounding wire to the grounding point on the rack
- On the rear panel, loosen the grounding screw
- Connect the grounding wire and tighten the grounding screw.

Connecting BTI SA-805 Carrier Ethernet Switch to a +24V DC or -48V DC power supply

If installing the switch with a DC power supply, do not wire two different voltages into the switch. Connect the switch to the distribution panel using either the +24V DC or -48V DC. If you are using 1+1 protected equipment, you may wire one switch to the +24V DC supply and the other to the -48V DC supply.

- Ensure that the power is turned off at the distribution panel



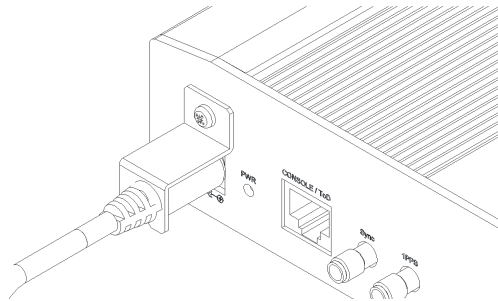
- With a pair of wire strippers, strip the power wire leads by removing the first 5 mm (1/4-inch) of insulation from the DC power wires.

- Insert the stripped end of the -48 V Feed A power feed wire or +24V Feed A GND wire into the opening of the Feed A A- terminal. With the wire held in place, tighten the associated slot-head screw on the top of the power block until the wire is firmly secured
- Insert the stripped end of the -48 V Feed A power return wire or +24V Feed A +24V wire into the opening of the Feed A A+ terminal. With the wire held in place, tighten the associated slot-head screw on the top of the power block until the wire is firmly secure
- Insert the stripped end of the -48 V Feed B power feed wire or +24V Feed B GND wire into the opening of the Feed B B- terminal. With the wire held in place, tighten the associated slot-head screw on the top of the power block until the wire is firmly secured
- . Insert the stripped end of the -48 V Feed B power return wire or +24V Feed B +24V wire into the opening of the Feed B B+ terminal. With the wire held in place, tighten the associated slot-head screw on the top of the terminal block until the wire is firmly secured.

Alternatively you can power the switch from the AC mains supply.

Connecting BTI SA-805 Carrier Ethernet Switch to the AC mains supply.

- Attach the AC cord retainer bracket to the rear of the switch and loosely fasten the screw



- Feed the adapter 12V DC connector through the bracket hole and plug the connector into switch 12V DC in terminal
- When the bracket is aligned correctly fastened the screw securely
 - Connect the BTI SA-805 adapter and AC cord
 - Plug the AC cord into the 120V AC 60Hz mains or distribution panel supply

Verify the power is ON and the switch has booted up correctly.

Verify the green power LED is ON

Go to the front of the switch and verify the switch has booted and is in correct operational mode.
[The RUN LED should be GREEN ON.]

Installing the transceiver modules

Follow all cautions and guide lines while installing the transceiver modules.

Accessing the Command Line Interface (CLI)

Access the CLI using the console serial port [The cable is included with base system]	Access the CLI using the management port
1 Insert the RJ-45 serial cable connector into the console port on the rear panel of the BTI SA-805 system	The default IP address of the management Ethernet port is 192.168.5.100/24
2 Insert the DB-9 end of the cable in the RS-232 connector on the PC	Configure your PC to be on the 192.168.5.0/24 subnet
3 Start the terminal emulation software, and specify the following communication parameters Terminal IP : VT100 Baud rate : 9600bps Data bits : 8 bits Parity : None Stop bits : None Flow control : None	Connect your PC and management Ethernet port either directly with the RJ-45 Ethernet cable or over the LAN
4 Use the terminal emulation software to open a connection to the BTI SA-805	Start the terminal emulation software, and telnet to the telnet to the BTI SA-805 on the standard TCP telnet port 23
Access the CLI by entering your username and password	Access the CLI by entering your username and password
The default username is <code>admin</code> and password is <code>btiadmin</code>	The default username is <code>admin</code> and password is <code>btiadmin</code>

1.6 Alarms

The following alarms may be raised against the switch.

Name	Severity	Description	Clearing
Module Missing	MJ	One of the following situations exists: <ul style="list-style-type: none"> The power module is not in the slot. The fan module is not in the slot. The SFP module is not in the indicated slot and the associated Ethernet port is enabled. 	The alarm clears if the missing module is inserted into the slot. If the missing module is an SFP, the alarm also clears if the SFP module or the associated Ethernet port is disabled.
Module Failure	CR	The DC output voltage of the power module is too low.	The alarm clears when the DC output voltage is back to normal.
High Temperature	CR	One of the following situations exists: <ul style="list-style-type: none"> The system temperature has exceeded the High Alarm Threshold. The temperature of the specified SFP module has exceeded the High Alarm Threshold. 	The alarm clears when the temperature drops below the High Alarm Threshold.
Low Temperature	CR	One of the following situations exists: <ul style="list-style-type: none"> The system temperature has dropped below the Low Alarm Threshold. The temperature of the specified SFP module has dropped below the Low Alarm Threshold. 	The alarm clears when the temperature is higher than the Low Alarm Threshold.
CPU High Usage	CR	CPU utilization has exceeded the threshold.	The alarm clears when the CPU utilization is below the threshold.
Memory High Usage	CR	Memory usage has exceeded the threshold.	The alarm clears when the memory usage is below the threshold.
Fan_High_Over_Flow	MJ	The fan speed has exceeded the High Tolerance threshold.	The alarm clears when the fan speed is below the High Tolerance threshold.
Fan_Low_Under_Flow	MJ	The fan speed has dropped below the Low Tolerance threshold.	The alarm clears when the fan speed is higher than the Low Tolerance threshold.
Module Mismatch	MJ	A transceiver has been inserted into a slot that has been provisioned for a different transceiver.	The alarm clears when the mismatched transceiver is removed or if the provisioning is changed to match the inserted transceiver.

Name	Severity	Description	Clearing
Module Unknown	MJ	An unknown transceiver is inserted.	The alarm clears when the unknown transceiver is removed.
Loss of signal	MJ	No input Ethernet signal is detected on the specified port.	The alarm clears when an input Ethernet signal is detected.
Loss of Sync	MJ	A loss of synchronization has occurred between the local port and the remote port. This can happen if there is a Loss of Signal condition at the remote end.	The alarm clears when the Loss of Signal condition is cleared at the remote end.
LAG Interface Link Down	MJ	The LAG is down.	The alarm clears when the LAG is up.
ERP State Change to Protection	MJ	The ERP ring is in "Protection" state.	The alarm clears when the ERP ring changes out of "Protection" state.
ERP State Change to Pending	MJ	The ERP ring is in "Pending" state.	The alarm clears when the ERP ring changes out of "Pending" state.
ERP State Change to Forced Switch	MJ	The ERP ring is in "FS" state.	The alarm clears when the ERP ring changes out of "FS" state.
ERP State Change to Manual Switch	MJ	The ERP ring is in "MS" state.	The alarm clears when the ERP ring changes out of "MS" state.
Remote Defect Indication	MJ	The local MEP is receiving "RDI-set" CCMs from its peer, indicating that there is a CFM defect at the remote MEP.	The alarm clears when the local MEP receives "RDI-reset" CCMs from its peer to indicate that the remote MEP defect has cleared.
MAC Status Defect	MJ	An interfaceStatus TLV with a value other than isUp has been received from some remote MEP, or a portStatus TLV with a value other than psUp has been received from all remote MEPs.	An interfaceStatus TLV with a value equal to isUp has been received from all remote MEPs, and a portStatus TLV with a value equal to psUp has been received from at least one remote MEP.
Loss of Connectivity	MJ	The local MEP has not received any CCM from its peer for a duration of 3.5 times the CCM interval.	The local MEP has received no fewer than 3 CCMs from its peer within a duration of 3.5 times the CCM interval.
Error of Connectivity	MJ	One of the following situations exist: <ul style="list-style-type: none"> The local MEP is receiving CCMs with an unexpected CCM interval. The local MEP is receiving CCMs with a duplicate MEPID (same MEPID as the local MEP). 	The alarm clears when the local MEP receives expected CCMs (with the correct MEG level, CCM interval, and MEPID).

Name	Severity	Description	Clearing
		<ul style="list-style-type: none"> The local MEP is receiving CCMs with a MEG level lower than that of the MEP. 	
Cross Connected Connectivity	MJ	The local MEP is receiving CCMs with an expected MEG level but with a different MEGID from the peer end.	<p>The local MEP receives expected CCMs (with the correct MEGID).</p> <p>Ensure the MEGID of all nodes in this domain are the same.</p>
Alarm Indication Signal	MJ	A client MEP is receiving AIS frames from a server MEP to indicate a CC fail condition or a LCK condition at the server MEG level.	The client MEP has not received AIS within an interval of 3.5 times the AIS transmission period. This indicates that the CC fail or LCK condition has cleared at the server MEG level.
Switch Sync Holdover	MJ	The system timing is in Holdover state.	The system timing is in Sync state.
Loss of timing Reference	MJ	The timing reference is out of sync.	The system timing is in Sync state.
Optical Power Received	MJ	The Optical Receive Power is higher than "High Alarm Threshold" or lower than "Low Alarm Threshold".	The Optical Receive Power is within the normal level (between High and Low threshold).
Optical Power Transmitted	MJ	The Optical Transmit Power is higher than "High Alarm Threshold" or lower than "Low Alarm Threshold".	The Optical Transmit Power is within the normal level (between High and Low threshold).
Laser Bias Current	MJ	The Transceiver Bias Current is higher than "High Alarm Threshold" or lower than "Low Alarm Threshold"	The Transceiver Bias Current is within the normal level (between High and Low threshold).
Supply Voltage	MJ	The Transceiver Supply Voltage is higher than "High Alarm Threshold" or lower than "Low Alarm Threshold"	The Transceiver Supply Voltage is within the normal level (between High and Low threshold)
Temperature	MJ	The Transceiver Temperature is higher than "High Alarm Threshold" or lower than "Low Alarm Threshold"	The Transceiver Temperature is within the normal level (between High and Low threshold).
Code Violations	MJ	The count of CV exceeds the threshold in the current 15-min bin.	The count of CV is less than the threshold in the next 15-min bin.
Errored Seconds	MJ	The count of ES exceeds the threshold in the current 15-min bin.	The count of ES is less than the threshold in the next 15-min bin.
Severely Errored Seconds	MJ	The count of SES exceeds the threshold in the current 15-min bin.	The count of SES is less than the threshold in the next 15-min bin.

Name	Severity	Description	Clearing
E-Service TX CIR OverFlow	MJ	The utilization of egress CIR exceeds the threshold.	The utilization of egress CIR is lower than the threshold.
E-Service TX EIR OverFlow	MJ	The utilization of egress EIR exceeds the threshold.	The utilization of egress EIR is lower than the threshold.
E-Service RX CIR OverFlow	MJ	The utilization of ingress CIR exceeds the threshold.	The utilization of ingress CIR is lower than the threshold.
E-Service RX EIR OverFlow	MJ	The utilization of ingress EIR exceeds the threshold.	The utilization of ingress EIR is lower than the threshold.
Optical Power Received High	MJ	The Optical Receive Power is higher than "High Alarm Threshold".	The Optical Receive Power is lower than "High Alarm Threshold".
Optical Power Received Low	MJ	The Optical Receive Power is lower than "Low Alarm Threshold".	The Optical Receive Power is higher than "Low Alarm Threshold".
Optical Power Transmitted High	MJ	The Optical Transmit Power is higher than "High Alarm Threshold".	The Optical Transmit Power is lower than "High Alarm Threshold".
Optical Power Transmitted Low	MJ	The Optical Transmit Power is lower than "Low Alarm Threshold".	The Optical Transmit Power is higher than "Low Alarm Threshold".

2.0 BTI SA-805 Carrier Ethernet Switch Installation

This section details the following topics:

- [2.1, “BTI SA-805 Carrier Ethernet Switch Unpacking”](#)
- [2.2, “BTI SA-805 Carrier Ethernet Switch Installation onto a Wall”](#)
- [2.3, “BTI SA-805 Carrier Ethernet Switch Installation on to a 19, 21 or 23 Inch Rack”](#)

2.1 BTI SA-805 Carrier Ethernet Switch Unpacking

Pre-requisites:

- Leave the equipment packed until it is needed for immediate installation.
- After unpacking the equipment, save and store the packaging material in case the equipment must be returned.

Caution When opening the container, use caution to avoid damaging the contents.



Caution

Static electricity can damage electro-optical equipment. While unpacking and handling a switch, wear an electrostatic discharge (ESD) wrist strap to discharge the static buildup.

Step 1 Open the top of the shipping container.

Step 2 Remove any information sheets from the shipping container.

Step 3 Carefully remove the protective packing material from the switch and other equipment shipped with it.

Step 4 Remove the switch and other equipment from the container and place them on a secure horizontal surface.

Step 5 Remove the antistatic packaging from the switch and other equipment, and place the packaging on an ESD-safe surface. An ESD-safe surface is a conductive surface connected directly to an earth ground.

Step 6 Do the following:

- a) Verify all parts received against the packing slip or sales order.
- b) Visually inspect the switch and other equipment received to ensure that they were not physically damaged during transport.

Note If the packaging is damaged and possible equipment damage is present, preserve as much of the packaging as possible to allow Customer Service and the shipper to analyze any possible equipment damage. Contact Technical Support if you require additional or replacement equipment.

2.2 BTI SA-805 Carrier Ethernet Switch Installation onto a Wall

The BTI SA-805 must be installed on the wall using the wall mount bracket supplied with the switch. The wall switch must be installed in a dry location and secured appropriately.

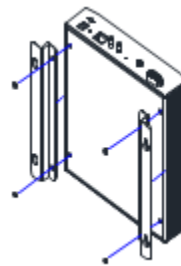
Requirements for pluggable equipment installed on a wall.

- The socket-outlet shall be installed near the equipment and shall be easily accessible
- Sufficient rack access for maintenance to work safely and comfortably in front of the wall should exist.
- It is recommended that 1RU of empty space should exist above the switch for ventilation
- The switch should not be located close to any equipment or machinery which may cause electromagnetic interference.
- Ground the equipment chassis
- Do not install in a location which may cause injury or damage to the switch

Equipment Required :

- BTI SA-805
- Wall mount bracket [left and right] with 4 M4 screws and associated washers
- Screwdriver [not supplied]
- ESD grounding strap [not supplied]
- Pencil [not supplied]
- 4 screws to mount the switch to the wall and optional wall plugs for screws [not supplied]

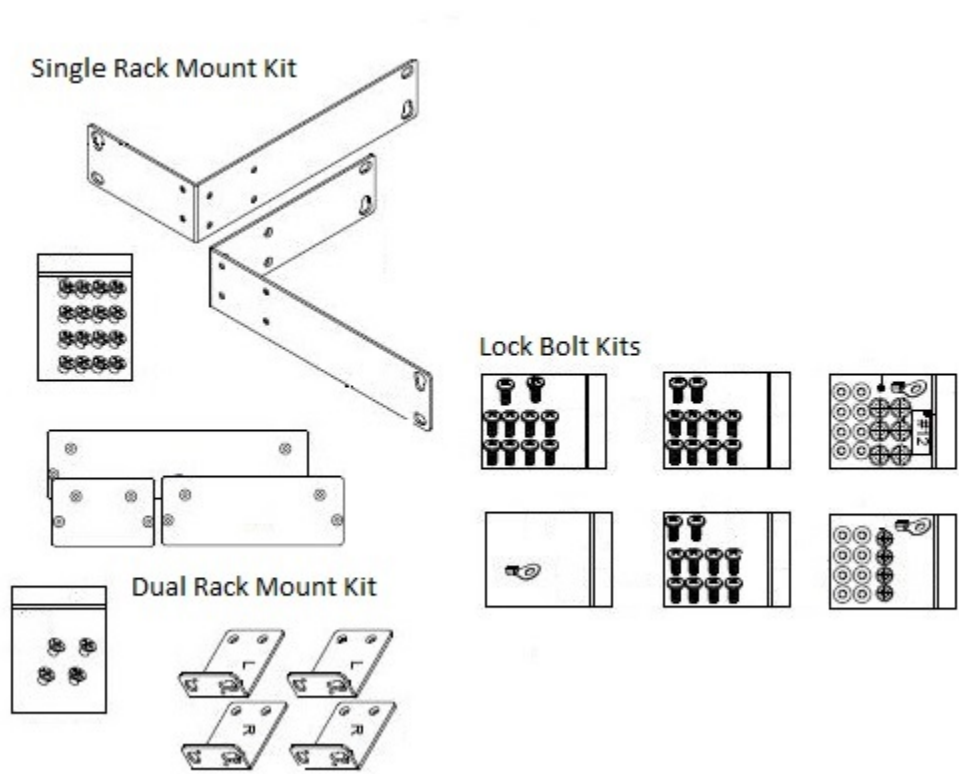
Step 1 Attach the two right and left brackets to the switch as shown below, using the screws and associated washers provided in the kit.



Step 2 Use the brackets as a template to mark the drill holes :Hold the switch with attached bracket against the installation wall and mark the position of the screw holes with a pencil. Depending on the wall type you may want to add four wall plugs and then attach the switch securely to the wall using mounting screws.

2.3 BTI SA-805 Carrier Ethernet Switch Installation on to a 19, 21 or 23 Inch Rack

Equipment



PEC	QTY	ITEM
BT7D51AA	1	Single rack mount Kit [right, left L brackets]
	1	Dual Rack Mount Kit [4 L brackets, 3 connector plates]
	1	Bag of 16 M3 X 8 flat head screws Phillips SS
	1	Bag of 4 M3 X 8 flat head screws Phillips SS
	1	Lock Bolt kit ETSI :10 M5 X 12 Pan head Phillips MS M4 lug insulated 10-12 AWG
	1	Telecom:10 #12-24 0.6 in lg Pan Phillips MS 8 washers # 12 flat 6 washers # 12 ext lock tooth 1 lug #12 insulated 10-12 AWG
	1	Standard:10 #10-32 0.6 in lg pan hd MS SS 8 washers #10 flat 4 washers #10 ext lock tooth 1 lug # 10 insulated 10-14 AWG

Additional Equipment [not supplied]

- Screw driver
- Philips Loctite 243 color Blue

PEC	QTY	ITEM
ESD strap		

Site Requirements

- The environmental conditions of the site should be with the temperature range -40 to 65 °C | -40 to 149 ° F with up to 85 % non-condensing atmosphere
- Sufficient rack access for maintenance to work safely and comfortably in front and behind the rack should exist
- It is recommended that 1RU of empty space should exist above and below the switch for ventilation
- Ground the equipment chassis
- The socket-outlet shall be installed near the equipment and shall be easily accessible
- Never install the mounting brackets when the switch power is ON
- The switch is compact. However when installing dual mount switches onto a rack you may need to support the switches or you may require an additional person to assist with the task.
- If you are using the AC adapter cable ensure the cable retainer is attached before attaching the switch to the rack
- If you are installing multiple switches try to install the switches in the lowest position first
- The single and dual mount rack kit is packaged in one box
- Stow the switch in the ESD bag until it is ready to be installed
- The screws and washers are packaged in bags labeled with the screw size
- The mounting brackets and connecting plates all use the same screw type [M3 x 8 flat head Phillips screw]
- Visually inspect the switch and mounting brackets before installing the switch.

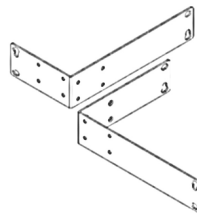


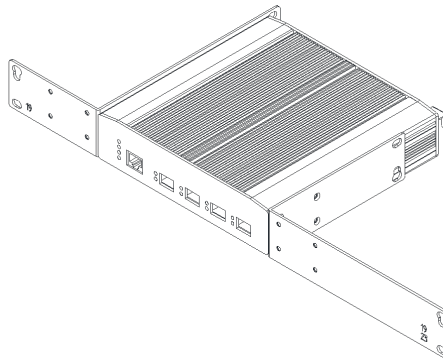
Caution

Use an ESD wrist strap whenever you open the equipment, particularly when you are handling modules as well as SFP and XFP transceivers. To work properly, the wrist strap must make good contact at both ends (that is, with your skin at one end and with the chassis at the other).

Single mount option for installation on a 19| 21|23 inch rack

The single rack mount bracket kit consists of two L brackets

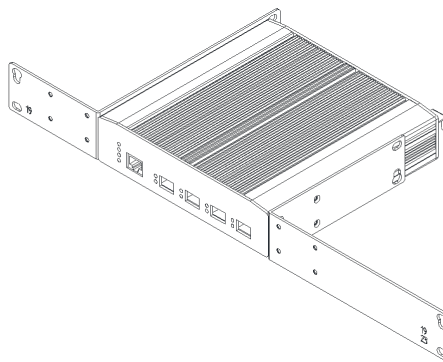


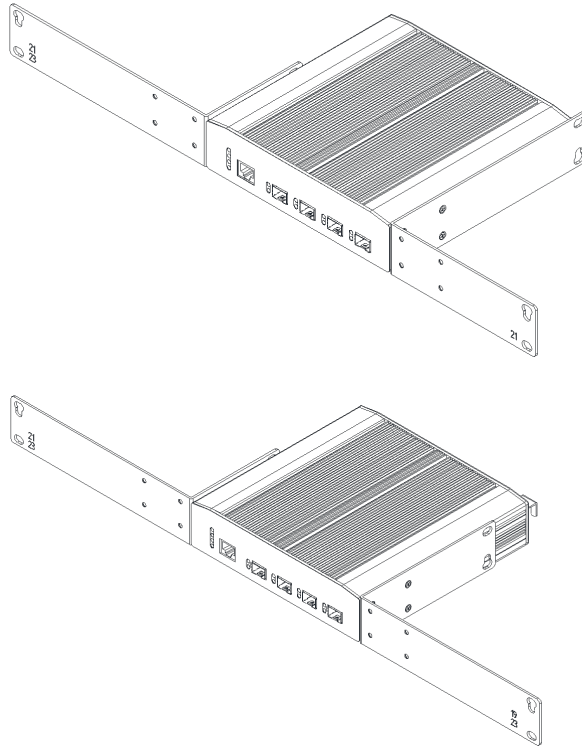


The L brackets are installed in different orientations to allow the BTI SA-805 to be mounted onto a 19, 21 or 23 inch rack. The printed sizes on the metal are oriented towards the front for proper mounting.

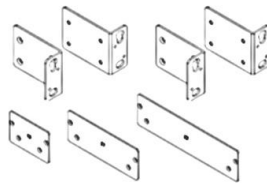
The left and right rack sizes are printed on the brackets.

- **Step 1** : Choose either the 19, 21 or 23 inch rack single mount option and orient the L brackets as shown in the figures
- **Step 2** : The 4 screw inserts at each front side of the switch are intended to mount the side L brackets. Using the Loctite, attach the right and left L brackets using the 8 M3x8 screws
- **Step 3** : Ensure all screws are fastened securely
- **Step 4** : Use the appropriate lock bolt kit to attach the end front plates of the bracket to the rack
- **Step 5** : Ensure the insulated lug is attached and the mounting plated is connected to ground.



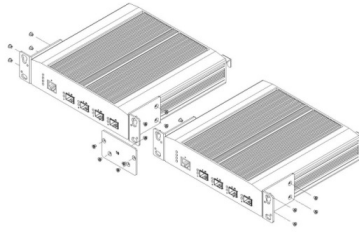


Dual mount option for installation on a 19| 21|23 inch rack

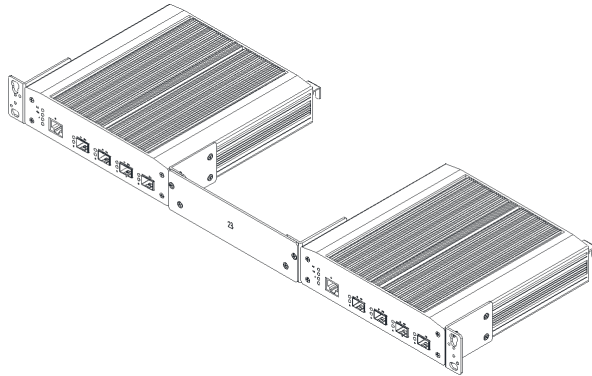
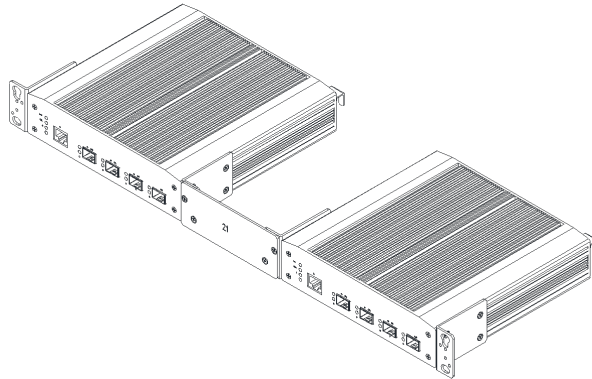
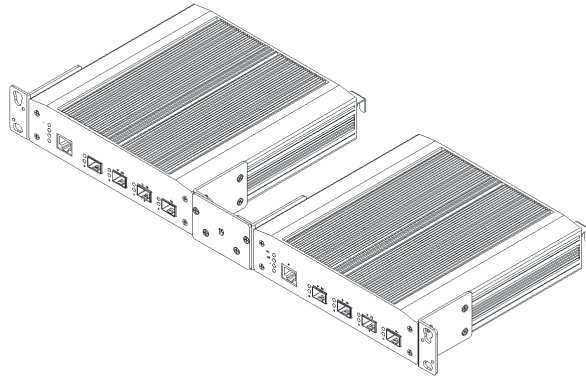


The dual mount kit consists of

- 4 L brackets [2 right and 2 left]
- 1 flat connector plate for 19 in. rack
- 1 flat connector plate for 21 in. rack
- 1 flat connector plate for 23 in. rack
- Step 1 : Using Loctite attach the left and right L bracket to each side of each BTI SA-805 using the 16 M3 x 8 screws
- Step 2 : Select the correct connector plate
- Step 3 : Using Loctite, attach the connector plate using 4 M3 x 8 screws.



- Step 4 : Ensure all screws are fastened securely.



3.0 BTI SA-805 Carrier Ethernet Switch Power Connection to an AC or DC Power Source

This section details the following topics:

- [3.1, “BTI SA-805 Carrier Ethernet Switch Connecting to a Power Source”](#)
- [3.2, “BTI SA-805 Carrier Ethernet Switch Connecting to an AC Mains Supply”](#)
- [3.3, “ BTI SA-805 Carrier Ethernet Switch Connecting to a DC Power Source”](#)

3.1 BTI SA-805 Carrier Ethernet Switch Connecting to a Power Source

With a typical power consumption of only 20 Watts the BTI SA-805 with ultra compact form, low power and temperature resilient no fan architecture, is ideally suited for installation at wireless towers or in customer premises.

BTI SA-805 can be either cabled into a DC power source (permanent installation) or can be plugged into an AC outlet.

Before connecting the power, the switch should be installed in the mounting brackets and securely attached in a rack or mounted in a wall or outdoor cabinet.

If using an AC power source the cord retainer bracket should be fastened at the +12V DC input of the switch.

Since the switch is compact it can also be placed on a shelf within a rack, or used in field diagnostics or in a temporary switch setup. In these instances, the switch should be secure on a level surface with the four self adhesive rubber paddings attached to the underneath, before plugging the switch into the mains supply.

Power Specifications

Power Specifications	
AC Power Supply	External AC / DC Adapter 12V IN
DC Power Supply	Dual Integrated -48VDC or 24V Input
Nominal Heat Dissipation BTUs per hour	68.2 (approx 20W)
Maximum Heat Dissipation BTUs per hour	102.4 (approx 30W)

- Connecting BTI SA-805 to the 120V / 240V AC Mains Supply [using the 12V adapter]
- Connecting BTI SA-805 to a +24VDC or -48VDC power source



Ordering Requirements for Power Adapters and Cables

BTI SA-805 can be powered from a DC or AC power source.

Cables and accessories to power the switch to a DC source can be purchased from any hardware or electrical depot.

If you intend to power the switch from the mains an AC-DC adapter kit is required. The AC-DC adapter kit is not shipped with the switch and should be ordered as a separate item :

- Part Number : BT7D52AA(-I02) to +12V DC adapter and cable assembly with support bracket

The adapter and assembly kits are supplied with 2 pin North American plugs [NEMA 1-15P 120V 60HZ].

BTI SA-805 is compliant to universal power requirements. Contact Technical Support if you wish to order an alternative adapter.

Site Requirements

- The environmental conditions of the site should be with the temperature range -40 to 65 °C | -40 TO 149 ° C with up to 85 % non condensing atmosphere

Requirements for Permanently installed switches

Permanently installed switches are switches installed using the mounting brackets and are attached to a rack , wall or cabinet and are wired to a power distribution panel.

- When ordered with a universal rack mounting kit BT7D51AA the switch can be installed in a 19 or 23 inch ANSI rack or 19 or 21 inch ETSI rack
- Sufficient rack access for maintenance to work safely and comfortably in front and behind the rack should exist
- It is recommended that 1RU of empty space should exist above and below the switch for ventilation
- Ground the equipment chassis
- the -48V DC and +24V DC power are connected on the switch using a small terminal block with screw fasteners. You must ensure power is switched off at the distribution panel before inserting or removing the power cables.

Requirements for pluggable equipment installed within a rack or wall.

- The socket-outlet shall be installed near the equipment and shall be easily accessible
- Sufficient rack access for maintenance to work safely and comfortably in front and behind the rack should exist
- It is recommended that 1RU of empty space should exist above and below the switch for ventilation
- Ground the equipment chassis
- AC power cables should be unplugged from the switch in the same manner as regular AC power sockets.

Requirements for pluggable equipment not installed within a rack

- The socket-outlet shall be installed near the equipment and shall be easily accessible
- If installed on a shelf, the surface must be flat, even and capable of supporting the switch weight [7 lbs | 3 kg]. The surface area must be greater than the dimensions of the switch [44 mm x 186mm x 187 mm | 1.73 inches x 7.32 inches x 7.32 inches]. The four self adhesive rubber paddings must be attached to the underneath of the switch
- If installed on a wall, the switch must be mounted in the wall mount bracket. The wall mount bracket must be installed in a suitable location and secured appropriately
- Do not block the heat vents on top of the switch
- It is recommended that 1RU of empty space should exist above the switch for ventilation
- The switch should not be located close to any equipment or machinery which may cause electromagnetic interference.
- AC power cables should be unplugged from the switch in the same manner as regular AC power sockets.
- The AC outlet should be surged protected



Electrical and Wiring requirements and considerations

- A readily accessible disconnect device shall be incorporated into the installation wiring. For optimum system power performance, a power distribution panel with line conditioning filtering capabilities should be used
- Surge damage to network equipment can be minimized using proper grounding methods and adhering to electrical wiring codes

- Ground potential differences between buildings should be minimized
- Connect only a DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements inclusive of UL1950, CAN/CSA 22.2 No. 60950, EN60950 or IEC 60950 to a DC input power supply unit
- Install DC power supplies used in restricted access areas in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

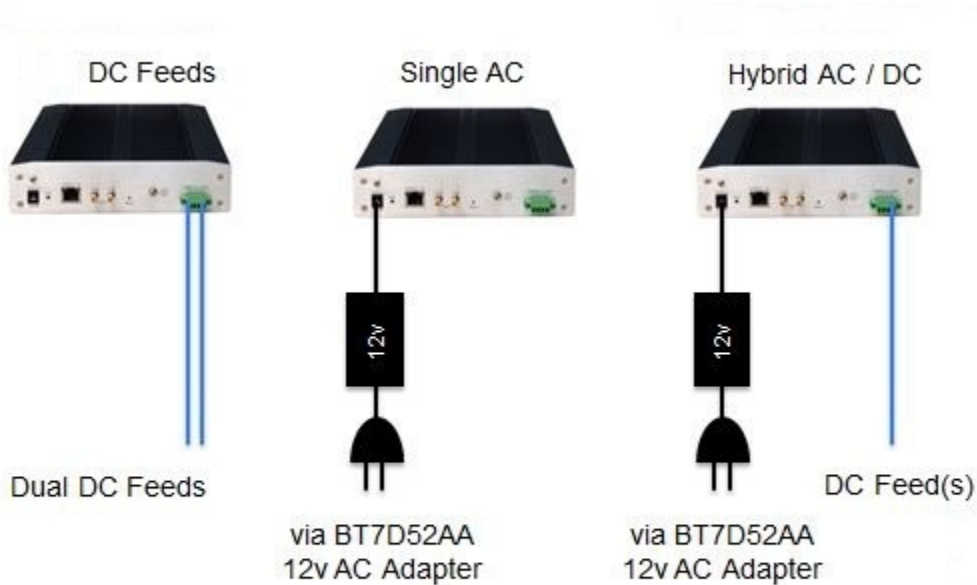
Cautions and Warnings

- Never touch the wiring terminals when the DC power is ON
 - Always perform a visual inspection of the switch and its surrounding installation for electrical damage, arcing or poor cable connections before touching the switch or operating the reset button
 - Ensure all DC cables are de-energized before handling or connecting to equipment
 - Always wear an ESD strap when handling or performing maintenance on the switch
 - Always follow electrical safety precautions, use the appropriate tools and follow the health and safety guidelines for safety protection clothing when working in areas with electricity or installation
-

<p>Rating: +12V$\overline{\text{---}}$; 3 A/+24V$\overline{\text{---}}$; 1.5 A -48V$\overline{\text{---}}$; 0.75 A</p> <p>Model Number: SA-805</p> <p>Mfg Date:</p>	 	<p>This product complies with FDA-21, CFR Chapter 1, Sub-Chapter J as a Class 1M LASER PRODUCT, Class 1M Hazard Rating.</p> <p>This product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.</p> <p>This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la Class A est conforme à la norme NMB-003 du Canada.</p> <p>Made in Korea / Fabriqué en Corée</p>
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Power Configurations

The switch supports the following power configurations

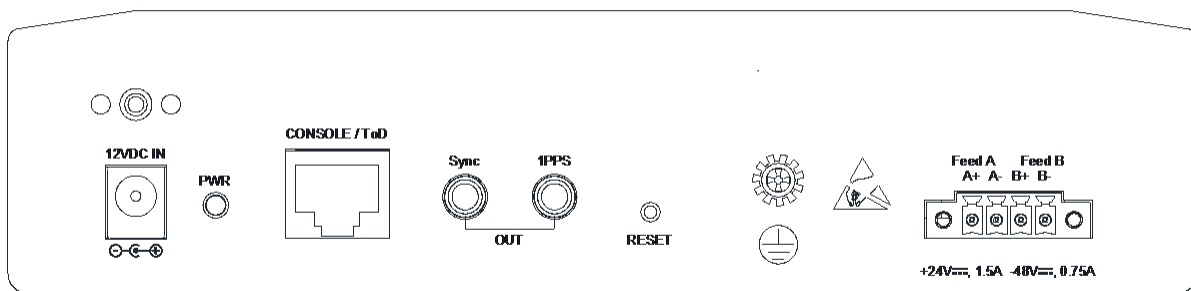
Figure 3-1 Power Configurations

Before powering the switch you should first choose the power configuration and then use one, or a combination of the following procedures:

Voltage	Connector Type on switch	Adapter and Cabling	Power Source
+ 12V DC	+12V DC input	+12V DC adapter 100-240V AC (50/60Hz) 10A BT7D52AA(-I02)	AC socket outlet [connecting cable to AC outlet is supplied]
+24V DC	4 pin screw terminal block:	16 copper wire Gauge AWG Supply A : +24V terminal A+/ B+ Supply B : Return terminal A-/ B-	DC distribution panel with 5A fuse and 21V DC min input voltage tolerance
-48V DC	4 pin screw terminal block:	16 copper wire Gauge AWG Supply A : Return terminal A+/ B+ Supply B : -48V A-/ B-	DC distribution panel with 5A fuse and -60V DC max input voltage tolerance
Ground	Ground screw	16 Gauge AWG with 16-14 AWG 1/4 ring terminal	Chassis / rack ground point

- Note**
- The switch must be connected to ground in **all** of the above power modes.
 - A green Power LED on the back panel of the switch will indicate the ON/OFF power status
 - The Reset button, resets the power and will reboot the switch. If held for than 3 seconds the rest button will restore the switch to the factory default state.
 - The 12V DC in, power ON/OFF green LED, reset, ground screw (identified by its corresponding ground symbol), +24VDC and -48VDC are all located on the rear panel of the switch

Figure 3-2 +12VDC in, Power ON/OFF LED , Reset, Ground and +24VDC/-48VDC are located in the rear panel



3.2 BTI SA-805 Carrier Ethernet Switch Connecting to an AC Mains Supply

- Follow the Cautions and Safety Warnings and Electrical recommendations listed in 3.1, “BTI SA-805 Carrier Ethernet Switch Connecting to a Power Source”
- Ensure the AC cord retainer is attached to the switch before mounting the switch on the wall or on a rack
- Visually inspect the switch and adapter assembly for damage before powering the switch
- If required, you can also power up the switch and verify the switch boot up before mounting the switch on a rack or wall.
- Always wear an ESD strap when handling or operating the switch.

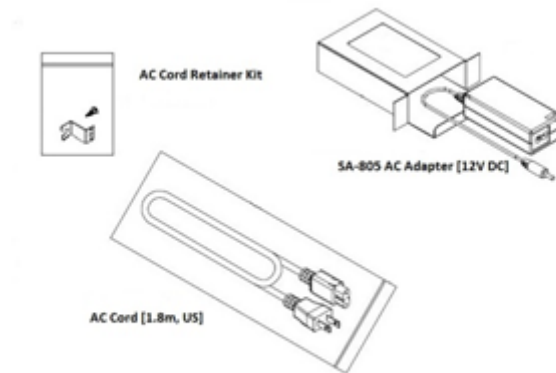
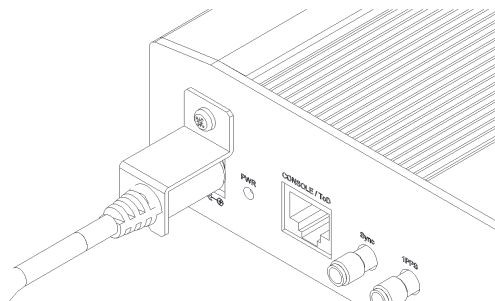


Table 3-3 Equipment required to power the switch from the AC mains

PEC	QTY	ITEM
BT7D52AA(-I02)	1	Adapter [120V 240V AC to +12V DC]
	1	AC Cord [120V AC 1.8m, US]
	1	AC Cord Retainer Kit [Bracket and screw]
		Screw Driver

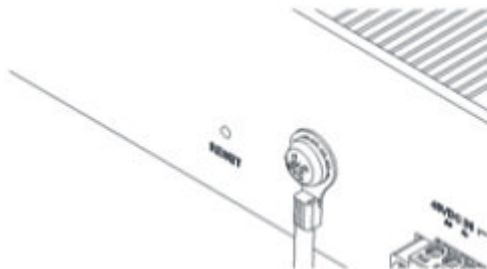
Step 1 Attach the AC cord retainer bracket to the rear of the switch and loosely fasten the screw



Step 2 Use the adapter connector to align the bracket

- a) Feed the adapter 12V DC connector through the bracket hole and plug the connector into switch 12V DC in terminal
- b) When the bracket is aligned correctly fastened the screw securely

Step 3 Install the switch on the rack, wall or shelf and ensure the switch is grounded



Step 4 Connect the BTI SA-805 adapter and AC cord

Step 5 Plug the AC cord into the 120V AC 60Hz mains or distribution panel supply

Step 6 Verify the green power LED is ON

Step 7 Go to the front of the switch and verify the switch has booted and is in correct operational mode. [The RUN LED should be GREEN ON.]

3.2.1 What to do if BTI SA-805 Carrier Ethernet Switch does not power up

Step 1 Turn the power OFF at the source

Step 2 Verify the power source is operational

Step 3 Verify the cable connections from the power source to the switch are correct

Step 4 Turn on the power again

Step 5 If the switch does not power up contact BTI Support.

3.3 BTI SA-805 Carrier Ethernet Switch Connecting to a DC Power Source

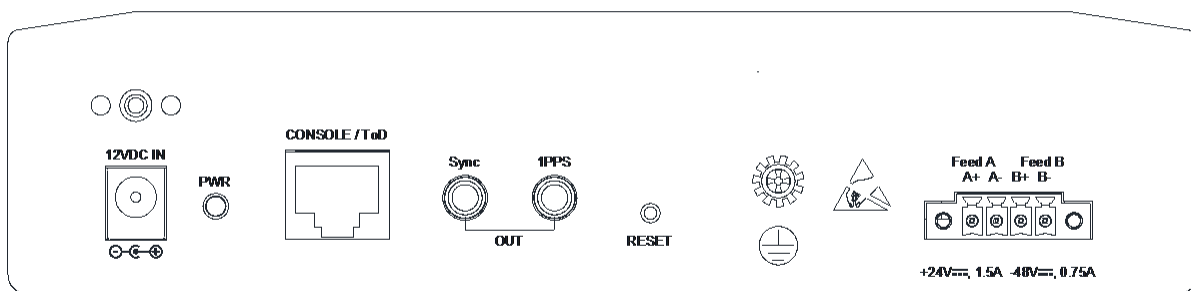
- Follow the Cautions and Safety Warnings and Electrical recommendations listed in 3.1, “BTI SA-805 Carrier Ethernet Switch Connecting to a Power Source”
- Visually inspect and verify the wiring before powering the switch
- Always wear an ESD strap when handling or operating the switch.

Feed Voltage	Connector Type on switch	Adapter and Cabling	Source
+24V DC	4 pin screw terminal block:	16 copper wire Gauge AWG cable : +24V Supply A / terminal A+ Return Supply A / terminal A- +24V Supply B / terminal B+ Return Supply B / terminal B-	DC distribution panel with 5A fuse and 21V dc min input voltage tolerance
-48V DC	4 pin screw terminal block:	16 copper wire Gauge AWG cable : -48V Supply A / terminal A- Return Supply A / terminal A- -48V Supply B / terminal B- Return Supply B / terminal B+	DC distribution panel with 5A fuse and -60V dc max input voltage tolerance
Ground	Ground Screw	16 Gauge AWG with 16-14 AWG 1/4 ring terminal	Chassis / rack ground point

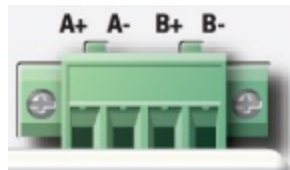
Note The 4 pin screw terminal is supplied with the switch kit. The power and ground cables and lugs are not supplied.

Note The 4 pin screw terminal is supplied with the switch. The power and ground cables and lugs are not supplied.

Figure 3-3 Power ON/OFF LED , Reset, Ground and +24VDC/-48VDC are located in the rear panel



Before you begin you should ensure that the screw terminal block is connected the power interface of the unit using two screws.



You will require the following equipment and tools:

Part Number	QTY	Description
N/A	4	16 gauge copper wire AWG : one end of the cable stripped by removing the first 5 mm (1/4-inch) of insulation and the other end having a ring lug (14-16 AWG 1/4 insulated) attached
N/A	1	16 gauge copper wire AWG ground cable with 16-14 AWG 1/4 ring terminal
N/A	1	Ring lug, 14-16 AWG 1/4 stud insulated
N/A	4	4 Fork crimp terminal 14-16 AWG M3 lug
N/A	1	Insulated precision screw driver for terminal blocks size
N/A	1	Wire cutters and strippers for 16 gauge cable
N/A	1	Insulated slotted precision screw driver #0
N/A	1	Insulated voltage meter

Step 1 Ensure that the power is turned off at the distribution panel and that the switch is correctly and securely installed

Step 2 Connect the switch to the ground point of the chassis or rack:

- a) Connect the grounding wire to the grounding point on the rack.
- b) On the back of the BTI SA-805 , loosen and remove the grounding screw.



c) Place grounding screw through the lug of the ground cable and re-insert and fasten the screw

Step 3 Verify the distribution panel is fitted with a 5 AMP fuse at both supply feed A + B then perform one of the following DC power connections

- **Connect the power input of the BTI SA-805 to +24VDC power supply:**
 - Loosen the 4 screws on the terminal block
 - Insert the stripped end of the cable into terminal block A+ and fastened with screw . Attach the other end of the cable to 24V Supply Feed A at the distribution panel
 - Insert the stripped end of the cable into terminal block A- and fastened with screw . Attach the other end of the cable to 0V Feed A at the distribution panel
- **Connect the power input of the BTI SA-805 to the -48V DC power supply**
 - Loosen the 4 screws on the terminal block
 - Insert the stripped end of the cable into terminal block A+ and fastened with screw . Attach the other end of the cable to 0V Supply Feed B at the distribution panel
 - Insert the stripped end of the cable into terminal block A- and fastened with screw . Attach the other end of the cable to -48V Supply Feed B at the distribution panel

Step 4 Turn the power on at the distribution panel, and then verify that the switch power LED is green.

Step 5 Verify the system has boot up successfully and is in normal operation mode
Go to the front panel of the switch and verify the RUN LED is GREEN.

3.3.1 What to do if BTI SA-805 Carrier Ethernet Switch does not power up

- Step 1** Turn the power OFF at the source
- Step 2** Verify the cable connections from the power source to the switch are correct
- Step 3** Verify the wiring at the screw block terminals are secure and have clamped the stripped cable securely
- Step 4** Turn ON the power
- Step 5** Using an insulated voltage meter, verify the -48V or +24 V DC power source are correct
- Step 6** Using an insulated voltage meter, verify the -48V DC or +24 VDC are correct on the appropriate screws on the terminal block
- Step 7** Use the Reset button to repower the switch
- If the switch does not power up, you could swap the switch or contact BTI Support.

3.3.1.1 What to do if BTI SA-805 Carrier Ethernet Switch does not boot up

- Step 1** Verify the cable connections from the power source to the switch are correct
- Step 2** Verify the wiring at the screw block terminals are secure and have clamped the stripped cable securely
- Step 3** Turn ON the power
- Step 4** Using an insulated voltage meter, Verify the -48V or +24 V DC power source are correct
- Step 5** Using an insulated voltage meter, verify the -48V DC or +24 VDC are correct on the appropriate screws on the terminal block
- Step 6** Use the Reset button to reboot the switch
- Step 7** Try to Telnet into the switch, download the image file and reboot the switch.

Note For a quick step, perform the following

- Turn the power ON
- Access the Command Line Interface (CLI) of the switch using one of the following methods
-

Access the CLI using the console serial port [The cable is included with base system]

1 Insert the RJ-45 serial cable connector into the console port on the rear panel of the BTI SA-805 system

Access the CLI using the management port

The default IP address of the management Ethernet port is 192.168.5.100/24

2 Insert the DB-9 end of the cable in the RS-232 connector on the PC	Configure your PC to be on the 192.168.5.0/24 subnet
3 Start the terminal emulation software, and specify the following communication parameters Terminal IP : VT100 Baud rate : 9600bps Data bits : 8 bits Parity : None Stop bits : None Flow control : None	Connect your PC and management Ethernet port either directly with the RJ-45 Ethernet cable or over the LAN
4 Use the terminal emulation software to open a connection to the BTI SA-805	Start the terminal emulation software, and telnet to the telnet to the BTI SA-805 on the standard TCP telnet port 23
Access the CLI by entering your username and password	Access the CLI by entering your username and password
The default username is admin and password is btiadmin	The default username is admin and password is btiadmin

Download the image file and reboot using the following commands

- Download the image file and reboot the switch
- BTI-SA-805 # update ftp image [mgmt-if] <ftp_server_ip_addr> <ftp_server_userid> <ftp_server_password> <image_file_name>
Example : BTI-SA-805 # update ftp image [mgmt-if] 10.1.1.30 userid password ha805_v1.1Build9.img
- BTI-SA-805 # upgrade image
BTI-SA-805 # image set pri
BTI-SA-805 # write mem
BTI-SA-805 # reboot

Type "y" to reboot the switch

If the switch does not boot up in the operational mode, replace the switch or contact BTI Support

4.0 BTI SA-805 Carrier Ethernet Switch Optical and Copper Transceiver Installation

This section details the following topics:

- [4.1, “ BTI SA-805 Carrier Ethernet Switch Optical Transceivers Installation and Removal”](#)
- [4.2, “ BTI SA-805 Carrier Ethernet Switch Copper SFPs Installation and Removal”](#)
- [4.3, “ BTI SA-805 Carrier Ethernet Switch Fiber Optic Connectors Maintenance”](#)
- [4.4, “ BTI SA-805 Carrier Ethernet Switch Tranceiver Maintenance”](#)

4.1 BTI SA-805 Carrier Ethernet Switch Optical Transceivers Installation and Removal

- Caution**
- All optical transceivers should perform within the calibrated thresholds for temperature, voltage, current and power alarms. The power received on the transceiver must be within the limits of the receiver sensitivity and below the receiver damage threshold. The transceivers are internally calibrated to fixed alarm / warning thresholds. Fixed thresholds are not provisionable. Use the CLI command `show transceiver detail` to view the:
 - Transceiver auto provisioning settings
 - Transceiver calibrated thresholds for temperature, voltage, current and power alarms
 - Transceiver hardware, output wavelength and supported link type and length information.
 - Do not connect the fiber into the transceiver until the local and remote transmit and receive signals are tested and the fibers attenuated with pads accordingly. Failure to test the power levels before connecting the fibers to the transceiver may result in permanent damage to the receiver, cause the laser to shutdown during provisioning or create excessive bit errors in the signal.
 - Clean all cable and attenuator connectors using the appropriate fiber optic cleaning kits and to the manufactures cleaning process, before connecting the cables for test and for installation.
 - Tunable DWDM transceiver modules and transceivers tuned to a specific wavelength should be provisioned in a bookend manner with the local and the remote transceiver provisioned to the same channel, frequency and wavelength. Changing the wavelength, frequency or channel, on tunable transceivers does not require the optical power budget / optical link budget to be re-calculated. There is no requirement to replace the transceiver. Changing the wavelength, frequency or channel may disrupt traffic, re-route traffic if required.
 - Follow the Optical and Laser precautions listed in [“Installation and Power Requirements, Warnings and Cautions”](#).

What you need:

- Optical transceivers
- Optical power meter and if required wavelength testing capabilities for singlemode and multimode fiber testing
- Singlemode 9/12 or Multimode 50/125 or Multimode 62.5/125 fiber
- Fiber optic attenuators for singlemode 9/12 or multimode 50/125 or multimode 62.5/125 applications.

- Electrostatic discharge (ESD) wrist strap
- Fiber optic cleaning equipment
- Protective optical connector covers
- Transceiver protective covers

To prevent potential damage from electrostatic discharge, observe the following when handling transceivers:

- Do not remove a transceiver from its packaging until you are ready to install it
- Do not touch any of the pins, connections, or components of a transceiver
- Always store or transport a transceiver in anti-static packaging.



Invisible laser radiation can be emitted from the aperture ports of various modules when no fiber cable is connected. Avoid exposure and do not stare into open apertures to avoid permanent eye damage.



Use an ESD wrist strap whenever you open the equipment, particularly when you are handling modules as well as transceivers. To work properly, the wrist strap must make good contact at both ends (that is, with your skin at one end and with the chassis at the other).

Physical Features of an Optical Transceiver

Optical transceivers, typically contain a transmit (Tx) and Receive (Rx) port which are marked on the transceiver casing. They are locked into the switch interface using a bail latch. The bail latch must be closed in order for fiber connector to be installed or removed.

The name of the SFP(+) and the Product Equipment Code (PEC) is located on the transceiver labels. After installation the transceiver can be identified by the color of the bail latch. For example BP3AM6TL has a green bail latch.

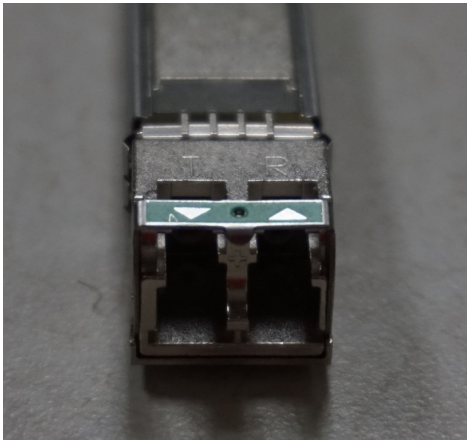
The following diagrams shows an example of the top, bottom and front facing (bail latch open and bail latch closed) of the transceiver.



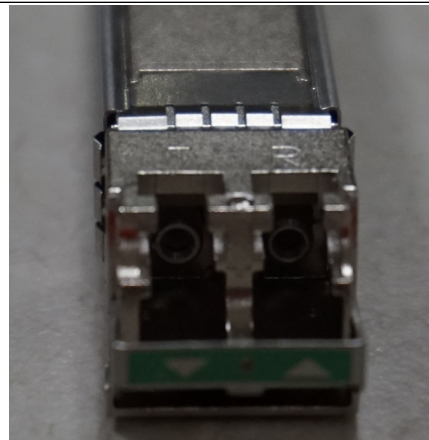
Top view of optical transceiver



Bottom view of optical transceiver



Front facing view of optical transceiver
Bail latch closed (installed state in the interface)



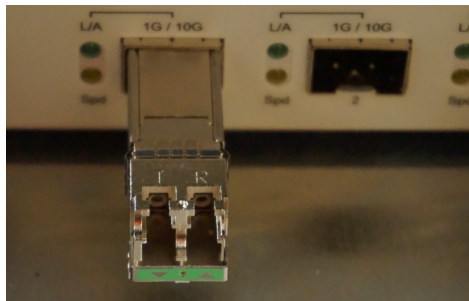
Front facing view of optical transceiver
Bail latch open (installing into or removing from the interface state)

Step 1 Do one of the following:

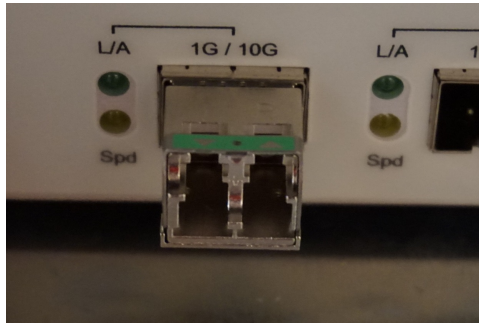
- To install a transceiver, proceed to [Step 2](#)
- To remove a transceiver proceed to [Step 3](#).

Step 2 Perform the following steps to install an optical transceiver :

- a) Perform the power level tests and adjust the attenuation on the fiber accordingly.
- b) If required, admin down the interface.
- c) If required, remove the protective cover from the transceiver connector
- d) Hold the transceiver in the upright position, ensure the bail latch is open and install as shown below.



- e) Slide the transceiver straight into the interface until it clicks, then close the bail lock.



The port LEDs will not activate until the fiber is connected and the link is UP.

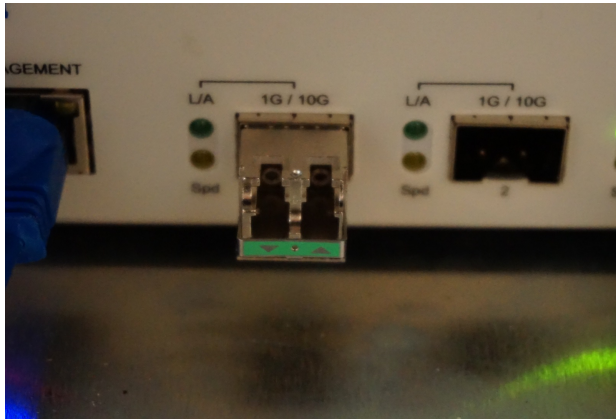
- f) Ensure the following before connecting the optical cables to the transceiver:
- Verify power levels are within specifications before connecting the Tx and Rx optical cables to the transceiver
 - Verify that both the optical cable connectors and the optical surfaces are clean and that there is no residue on the optical surfaces
- g) After the optical cables are connected perform the following:
- Verify that the interface ports are defaulted to disabled until they are provisioned. This can be done manually, or by restoring the last saved configuration
 - If any cables were moved, return them to their original locations.
- h) After provisioning, if required perform tests to verify the channel frequency and power levels are correct.

Step 3 Perform the following steps to remove a transceiver:

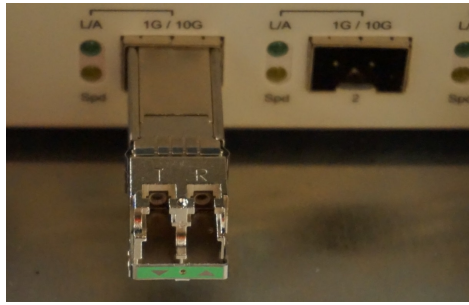
- a) If required, reroute traffic.

Caution Failure to reroute traffic can result in lost data. Select an alternate route for the traffic that passes through the switch. Transfer traffic to this alternate route before proceeding with this procedure.

- b) If required, move aside cables to access the transceiver.
- c) Perform the following to disconnect the optical cables:
- If required admin down the interface
 - If required label the receive optical cable Rx and the transmit optical cable Tx
 - Disconnect the optical cables from the optical ports of the transceiver
 - Ensure the optical ports on the transceiver and the optical cables are protected with protective caps when not connected.
- d) Open the bail latch.



- e) Pull the transceiver from the interface. Use the bail latch as an extraction handle if required.



- f) Ensure the following:
- Verify that the interface ports are defaulted to disabled until they are provisioned. This can be done manually, or by restoring the last saved configuration
 - Verify that both the optical cable connectors and the optical surfaces are clean and that there is no residue on the optical surfaces
 - Verify the transceiver and optical connectors connectors are fitted with protective covers
 - Place the transceiver into anti-static packaging for storage.

4.2 BTI SA-805 Carrier Ethernet Switch Copper SFPs Installation and Removal

What you need

- Electrostatic discharge (ESD) wrist strap
- Copper SFPs to be installed

Prerequisites

Observe the following when installing, removing and handling transceivers:

- Do not remove an SFP from its packaging until you are ready to install it.
- Do not touch any of the pins, connections, or components of an SFP.
- Always store or transport an SFP in anti-static packaging.

Caution Wait 3 seconds after removing or installing copper SFPs to enable the system to detect and update the interface change. Failure to observe the wait time may result in no transmitted or received traffic on that interface. To correct the fault the user may be required to perform the CLI commands to `shutdown` and `no shutdown` the interface to restore traffic.

Important Never insert a copper SFP that is connected to a Cat 5. Always fully insert the SFP first, and then connect the Cat 5 cable to it.



Caution

Use an ESD wrist strap whenever you open the equipment, particularly when you are handling modules as well as SFPs. To work properly, the wrist strap must make good contact at both ends (that is, with your skin at one end and with the chassis at the other).

Step 1 Do one of the following:

- To replace an SFP, proceed to [Step 2](#).
- To install an SFP, proceed to [Step 3](#).

Step 2 Do the following to remove an SFP to be replaced, and then proceed to [Step 3](#):

a) If required, reroute traffic.

Caution Failure to reroute traffic can result in lost data. Select an alternate route for the traffic that passes through the switch. Transfer traffic to this alternate route before proceeding with this procedure.

- b) If required, move aside cables to get clear access to the SFP to be replaced.
- c) Disconnect the UTP cable from the electrical (RJ-45) port of the copper SFP.
- d) Facing the front of the switch, locate the latch handle on the SFP. For a bale-clasp latch, pull the latch handle down until it is at a 90-degree angle to the SFP.

- e) Grasp the latch handle on the transceiver and firmly pull the SFP straight out.
- f) Remember to wait 3 seconds to enable system interface update recognition before installing a different SFP or re-inserting the same SFP.
- g) Place the SFP into anti-static packaging and then lay it on a flat work surface.

Step 3 Hold the copper SFP to be installed so that the electrical RJ-45 connector faces you (i.e., the product label is visible).

Step 4 Ensure that the latch is in the closed position.

Step 5 Align the SFP to the port in which it is being inserted.

Step 6 Carefully slide the copper SFP straight into the port until it clicks.

Step 7 Remove the plastic protective cover, if fitted.

Step 8 To connect an UTP cable to the copper SFP, push the RJ-45 connector into the SFP until a distinctive click is heard.

Step 9 Remember to wait 3 seconds to enable system interface update recognition.

Step 10 If any cables were moved, return them to their original locations.

All interface ports default to disabled until they are provisioned. This can be done manually, or by restoring the last saved configuration.

4.3 BTI SA-805 Carrier Ethernet Switch Fiber Optic Connectors Maintenance

Protective dust plugs should be left on connectors when they are not in use. The fiber used on the optical components of the modules has a light carrying core that is less than 10 millionths of a meter in diameter. Therefore, a single microscopic piece of dust on a connector end-face can significantly block the light traveling through the fiber. Accurate and repeatable measurements require clean connections.



Invisible laser radiation can be emitted from the aperture ports of various modules when no fiber cable is connected. Avoid exposure and do not stare into open apertures to avoid permanent eye damage.

Inspecting a fiber connector

Using an optical fiber scope, visually inspect all fiber optic interconnects prior to use. A minimum of 200x magnification is required for proper inspection.

Use the following procedure to inspect a fiber connector.

Guidelines

Use the following guidelines to achieve the best possible performance:

- Using an optical fiber scope, visually inspect fiber ends for signs of damage.
- Use dry connections whenever possible.
- Keep connectors covered when not in use.
- Use care in handling all fiber optic connectors.

The primary hazard of exposure to laser radiation from an optical fiber communications system is damage to the eye by accidental exposure to the beam emitted by a laser source, or from viewing a connector attached to an energized fiber.

Before using an optical scope to examine the fiber, ensure that optical power is not emitted from the fiber. Use of a handheld optical fiber scope (that is, where the output is sent to a video display) prevents accidental exposure to the beam emitted by a laser source.

Keep all interconnects as clean as possible. When cleaning fiber connectors, be sure to use appropriate cleaning methods.

Cleaning procedure

Important Improper cleaning can result in high attenuation due to dirt or dust, or can cause mechanical damage to the fiber end face, resulting in decreased performance.

Use the following procedure to clean a fiber connector.

Step 1 Verify that the opposite end of the fiber is disconnected from its laser source.

- Step 2** Using an optical fiber scope, inspect the end of the fiber face.
- Step 3** If the fiber end-face condition is ideal, no further action is required.
If you need to clean or polish the fiber end-face, use the instructions in the cleaning procedure that follows.
- Step 4** Use a new, lint-free, nonabrasive cleaning pad, lens paper, or swab to clean the fiber end. Move the cleaning pad back and forth across the fiber end several times. If using a swab, gently rotate the swab as you wipe across the end-face. When done, discard the used pad or paper.
- Step 5** Obtain a filtered, dry, compressed air dust remover. Aim the duster at a shallow angle to the fiber end-face and blow across the connector end face from a distance of 6 to 8 inches.
- Step 6** Verify that the opposite end of the fiber is still disconnected from its laser source.
- Step 7** Verify that the fiber optic connector is free from dirt and dust. To inspect the connector, use an optical fiber scope that uses an indirect image converter or a filtered optical instrument of optical density (OD) sufficient to reduce the exposure levels below the appropriate maximum permissible exposure.
- Step 8** Do one of the following:
- If the fiber optic connector is clean, cover the connector with a protective dust cover until ready for use.
 - If the fiber-optic connector is not completely clean, continue with the next step.
- Step 9** Clean the fiber end by moving the cleaning pad back and forth across the fiber end several times. If using a swab, gently rotate the swab as you wipe across the end face.
- Step 10** Immediately dry the fiber end with a clean, dry, lint-free cleaning pad or lens paper.
- Step 11** Discard the optical cleaning pads and lens paper.
- Step 12** Use a filtered, dry, compressed air dust remover. Aim the duster at a shallow angle to the fiber end face and blow across the connector end-face from a distance of 6 to 8 inches.
- Step 13** Verify that the fiber optic connector is free from dirt and dust. To inspect the connector, use an optical fiber scope that uses an indirect image converter or a filtered optical instrument of optical density (OD) sufficient to reduce the exposure levels below the appropriate maximum permissible exposure.
- Step 14** Once the fiber is clean, cover the connector with a protective dust cover until ready for use.

4.4 BTI SA-805 Carrier Ethernet Switch Transceiver Maintenance

When cleaning transceivers, use a 1.25 mm cotton-tipped swab to insert into the receptacle. The swabs can be used to clean the optical surface and to clean debris from the inner sleeve. Use extreme care as it is easy to scratch the optical plane.

5.0 BTI SA-805 Carrier Ethernet Switch System Configuration and Turning Up

This section details the basic setup procedures needed to bring a BTI SA-805 Carrier Ethernet Switch Ethernet switch up into a state where you can manage it remotely and begin service creation and/or more elaborate provisioning.

Because there are many approaches to turning up a node and a network, use these procedures as guidelines only.

- [5.1, “Configuring Access to the Command Line Prompt”](#)
- [5.2, “Configuring In-Band Management ”](#)
- [5.3, “Configuring Out-Of-Band Management IP Address”](#)
- [5.4, “Common System Commands”](#)
- [5.5, “Configuring Date and Time”](#)
- [5.6, “Configuring User Profiles”](#)
- [5.7, “Configuring RADIUS Client”](#)
- [5.8, “Configuring Secure Shell \(SSH\)”](#)
- [5.9, “Configuring SNMP Community Strings”](#)
- [5.10, “Configuring Syslog Server”](#)

5.1 Configuring Access to the Command Line Prompt

BTI SA-805 Carrier Ethernet Switch supports the following options to access the Command Line Prompt (CLI):

- Local connection via the console port
- In-band management
- Out-of-band management
- Combination of the above

With the console port, you have direct access to the CLI once you are physically connected. With in-band or out-of-band management, you telnet or SSH-1/SSH-2 into the node to access the CLI.

Local connection via the console port

The switches are equipped with an RJ-45 console port that provides craft serial port connectivity.

The console port allows you to connect a PC or a laptop directly to the switch to provide CLI access using a terminal emulation program, for example PuTTY.

Table 5-1 Default parameters for the console port

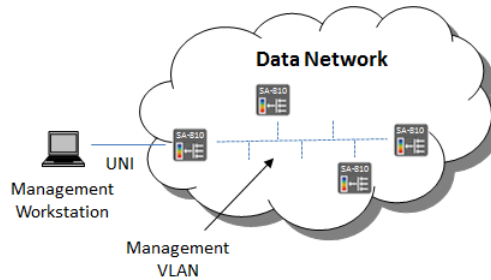
Parameter	Value
Rate	9600 bps
Data Bits	8 bit
Parity	None
Stop Bits	1 bit
Flow Control	None

The console port provides you with quick access to the local node for minor configuration changes or to set up other management access options.

If in-band management has been set up, you can use the CLI to telnet to other nodes from the console port.

In-band management

The switches support a management VLAN that allows access to the management plane. Management traffic is carried in-band with regular data traffic on the UNIs and NNIs that comprise the management VLAN. In-band, in this context, refers to management traffic sharing the same physical network as regular data traffic.

Figure 5-1 In-band management

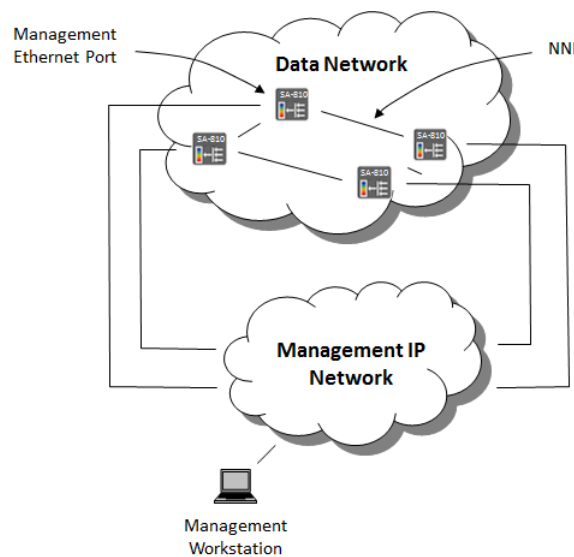
The management VLAN is a well-defined Ethernet service (S-VLAN). Packets received on the management VLAN are forwarded to the system management plane if their destination MAC address matches the MAC address of the system or if they are sent to the broadcast address (e.g. ARP messages). The packets are received on either a Network-to-Network interface (NNI) in the management VLAN or on a User-Network Interface (UNI) that is mapped to the management VLAN. All NNIs in the managed network should belong to the management VLAN, as should all UNIs that lead to management workstations.

From the management workstation, you can telnet or SSH-1/SSH-2 directly to any node in the managed network.

Out-of-band management

The network management port on the switch can be connected to a dedicated management network that is distinct and out-of-band with the regular data network. Out-of-band, in this context, refers to management traffic being carried on its own physical network, separate from the regular data traffic network.

Once the management ports are set up, you can telnet or SSH-1/SSH-2 directly to any node from the management workstation.

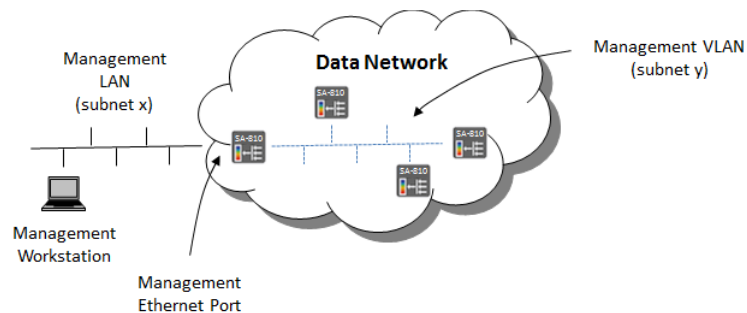
Figure 5-2 Out-of-band management

In-band and out-of-band management

A combined approach can be adopted where connectivity to the local node is through an out-of-band management LAN while connectivity to remote nodes is through the in-band management VLAN. In this way, the local node acts as a gateway to other nodes. This setup requires the management LAN to be on a different subnet from the management VLAN.

To access remote nodes, you first telnet or SSH-1/SSH-2 to the local node, and then use the CLI to telnet to remote nodes.

Figure 5-3 In-band and out-of-band management



Using a default gateway

The switches support only one default gateway system-wide. Therefore, a default gateway can be specified for either in-band management or out-of-band management, but not for both.

BTI recommends that when both in-band management and out-of-band management are configured, the default gateway be specified for in-band management. Since in-band management is connected on the network side, users can connect directly to the switch via an NNI.

The implication with having no default gateway for out-of-band management is that access to the out-of-band management interface must be from the subnet local to the management Ethernet port.

Log in to the local node using one of the following options:

- [5.1.1, “Accessing the Command Line Prompt using the Console Serial Port”](#)
- [5.1.2, “Accessing the Command Line Prompt using the Management Ethernet Port”](#)

5.1.1 Accessing the Command Line Prompt using the Console Serial Port

Prerequisites

- You will need a serial cable that is fitted with an RS-232 DB-9 connector at one end and an RJ-45 connector at the other end. This cable is available from BTI .

Step 1 Insert the RJ-45 end of the cable in the CONSOLE port and then insert the DB-9 end of the cable in the RS-232 connector on the PC.

Step 2 Start the terminal emulation software, and specify the following communication parameters:

- Terminal type = VT100
- Baud rate = 9600 bps
- Data bits = 8 bits
- Parity = None
- Stop bits = 1 bit
- Flow control = None

Step 3 Use the terminal emulation software to open a connection to the switch.

Step 4 At the login prompt, log in to the CLI by entering your username and password.
The default username is `admin`, and the default password is `btiaadmin`.

Step 5 Change the default password using the CLI.

5.1.2 Accessing the Command Line Prompt using the Management Ethernet Port

Prerequisites

- An RJ-45 Ethernet cable

Step 1 Configure your PC (and LAN if you are connecting over a LAN) to be on the 192.168.5.0/24 subnet.

Step 2 Connect your PC and the Management Ethernet port either directly with the RJ-45 Ethernet cable or over the LAN.

Step 3 Start the terminal emulation software (e.g., PuTTY), and telnet to the switch on the standard TCP telnet port:

For example:

```
telnet 192.168.5.100 23
```

Note The default IP address of the management Ethernet port is 192.168.5.100/24.

Step 4 At the login prompt, log in to the CLI by entering your username and password.
The default username is `admin` and the default password is `btiaadmin`.

Step 5 Change the default `admin` password using the CLI.

5.2 Configuring In-Band Management

Use this procedure to configure in-band management (that is, the management VLAN).

In-band management allows you to manage remote nodes without requiring a physically separate management network. Management traffic is carried on a management VLAN on the regular data network.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Provision an SVLAN:

a) Enter the VLAN configure mode.

```
BTI-SA-805(config)# vlan database
```

b) Create the VLAN ID and name.

```
BTI-SA-805(config-vlan)# vlan <VLAN-ID> name <VLAN-Name>
```

where:

- *VLAN-ID* = VLAN interface name (1-4094)
- *VLAN-Name* = ASCII name of the VLAN (1-16 characters)

For example:

```
BTI-SA-805(config-vlan)# vlan 2000 name MGMT_VLAN
```

c) Exit the VLAN configure mode.

```
BTI-SA-805(config-vlan)# exit
```

Step 3 Provision an Eservice for remote management:

Note	You are creating a regular multipoint-to-multipoint Eservice that you will use for management connectivity.
-------------	---

a) Enter the VLAN configure mode and create the EVC.

```
BTI-SA-805(config)# ethernet evc add <EVC-ID>
```

Note	The EVC ID is an arbitrary string administered by the Service Provider that is used to identify an EVC within the MEN. The EVC ID MUST be unique across all EVCs in the MEN. It is intended for management and control purposes. The EVC ID is not carried in any field in the Service Frame.
-------------	---

For example:

```
BTI-SA-805(config)# ethernet evc add MGMT
```

b) Set the service type to EVPLAN.

```
BTI-SA-805(config-evc)# service type evplan
```


c) Set the SVLAN ID of the EVC.

```
BTI-SA-805(config-evc)# svlan <VLAN-ID>
```

For example:

```
BTI-SA-805(config-evc)# svlan 2000
```

d) Exit the EVC configure mode.

```
(BTI-SA-805config-evc)# exit
```

Note Unlike a regular Eservice that connects two or more UNIs, the Eservice used for management connects the local management plane to the management VLAN. You do not need to associate the management Eservice to UNIs, except on those nodes with UNIs that lead to management workstations.

For more information on creating Eservices, see the *Technical Product Guide*.

Step 4 Provision a unique management VLAN IP address:**a) Enter the interface configuration mode for the management VLAN.**

```
BTI-SA-805(config)# interface vlan <VLAN-ID>
```

For example:

```
BTI-SA-805(config)# interface vlan 2000
```

b) Set the IP address for the management VLAN.

Note The management VLAN IP address must be unique and must be on a different IP subnet than the out-of-band IP address.

```
BTI-SA-805(config-if)# ip address < A.B.C.D | A.B.C.D/M >
```

For example:

```
BTI-SA-805(config-if)# ip address 10.1.71.222/24
```

c) Enable the management VLAN.

```
BTI-SA-805(config-if)# no shut
```

d) Return to the EXEC mode.

```
BTI-SA-805(config-if)# end
```

Note The switch supports only one default gateway system-wide. Therefore, a default gateway can be specified for either in-band management or out-of-band management, but not for both. If both in-band and out-of-band management are used, then specify the default gateway here.

Step 5 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 6 Associate the SVLAN to the local management plane, and set the priority for the management traffic.

Note By default, the local management plane is associated with VLAN 1, so this association must be changed to match the new SVLAN.

Note In general, the management traffic priority should be set higher than the regular customer traffic priority. Priority values are 0 to 7 (default = 7, best practice = 6).

```
BTI-SA-805(config)# system cpu-vlan outer <VLAN-ID> <priority>
```

For example:

```
BTI-SA-805(config)# system cpu-vlan outer 2000 5
```

Step 7 Return to the EXEC mode.

```
BTI-SA-805(config)# end
```

Step 8 Verify the management VLAN IP address.

```
BTI-SA-805# show interface vlan <VLAN-ID>
```

For example:

```
BTI-SA-805# show interface vlan 2000
```

```
Interface vlan2000
```

```
Interface current state: DOWN
```

```
Hardware is VLAN, address is 0014.d060.01a6 (bia 0014.d060.01a6)
```

```
Bandwidth 1000000 kbits
```

```
Index 6096 , Metric 1 , Encapsulation ARPA
```

```
The maximum transmit unit (MTU) is 1500 bytes
```

```
VRF binding: not bound
```

```
Label switching is disabled
```

```
No Virtual private Wire service configured
```

```
VRRP master of : VRRP is not configured on this interface
```

```
ARP timeout 01:00:00, ARP retry interval 1s
```

```
Internet primary address:
```

```
10.1.71.222/24 broadcast 10.1.71.255
```

Step 9 Verify the VLAN provisioning.

```
BTI-SA-805# show system
```

For example:

```
BTI-SA-805# show system
```

```
-----
                        Information
-----
ContactInfo           : BTI
Location              : BTI
-----
                        Product
-----
Product Name          : 805-22
```

```

System Name           :           805-22
-----
                        Release
-----
SW Release Version    :           1.1Build11
SW Release Date & Time : Oct   3 2014 21:46:30
-----
                        MAC_&_IP
-----
IP Address(In-Band)   :           10.1.71.222
Netmask(In-Band)      :           255.255.255.0
Network Address(In-Band) :           10.1.71.0
MAC Address(In-Band)   :           00:14:d0:60:01:a6
Mgmt VLAN ID(pri)     :           2000(5)
Mgmt Inner VLAN ID    :           untagged
IP Address(OOB)        :           192.168.20.22
Netmask(OOB)           :           255.255.255.0
Network Address(OOB)   :           192.168.20.0
MAC Address(OOB)       :           00:14:d0:60:01:a6
Default Gateway        :           -
-----
                        Time
-----
Auto Logout Time (Min) :           15
System up Time          : Up 0(days) 0(h) 19(m) 52(s)
Last Save Time          :
-----

```

Attention Now that the MVLAN has been provisioned, it must be associated with an NNI port. This step is covered in the next procedure.

5.3 Configuring Out-Of-Band Management IP Address

Use this procedure to configure the management Ethernet port IP address.

If the default out-of-band management IP address (192.168.0.237/24) can be used in your network, then you can skip this procedure.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Provision a unique management IP address and specify the default gateway if necessary.

For example:

```
BTI-SA-805(config)# management ip address 192.168.100.100/24
```

Note	This IP address must be unique and must be on a different IP subnet from the in-band management IP address.
-------------	---

Note	The switch supports only one default gateway system-wide. Therefore, a default gateway can be specified for either in-band management or out-of-band management, but not for both. If you are planning on using in-band management as well, then do not specify the default gateway here.
-------------	---

Note	If you do not specify a default gateway, all stations connected to the management Ethernet port must be on the same subnet.
-------------	---

Note	If you are making this change while logged in to the management Ethernet port, you will lose connectivity. Before you can log in again, you may need to change the IP address and subnet on your PC (and LAN if applicable) to be compatible with the new settings.
-------------	---

5.4 Common System Commands

In general, the BTI SA-805 CLI has a hierarchical structure.

Task	Enter this command
Configures system features and environments interactively.	<code>configure</code>
Exits the current terminal session.	<code>exit</code>
Sends ICMP (Request) packet to the remote device to check the network connection. If the connection is OK, ICMP (Reply) packet is received.	<code>ping</code>
Restart the system.	<code>reboot</code>
Saves the current configuration to the system memory.	<code>write</code>
Sets the feature and system environments individually.	<code>set</code>
Shows the current system configuration.	<code>show</code>
Open a TELNET Client. TELNET is limited by 3 sessions.	<code>telnet</code>
Opens a tftp connection to get file.	<code>tftp</code>
Replaces the old system image with the new system image on the system memory. Uploads a current configuration or downloads a configuration file.	<code>update</code>

Note For more information about supported commands, see the *CLI Reference Guide*.

5.5 Configuring Date and Time

Records of alarms and other events that occur on the include information about the date and time the alarm or event occurred. Configuring the system date and time settings on a switch ensures that the date and time recorded are accurate.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Do one of the following:

- To configure the system date and time manually, proceed to the next step.
- To configure the system date and time using NTP, proceed to Step 4 .

Note Using NTP is recommended.

Step 3 Enter the system date and time, and then proceed to Step 5 .

```
BTI-SA-805(config)# clock set datetime <Hour>:<Minute>:<second>  
<Month> <day> <Year>
```

For example:

```
BTI-SA-805(config)# clock set datetime 05:13:00 10 16 2014
```

Step 4 Do the following:

a) Specify the IP address of an NTP server.

If this is the preferred NTP server, then specify the `prefer` option.

```
BTI-SA-805(config)# ntp server <ip_address> [prefer]
```

For example:

```
BTI-SA-805(config)# ntp server 192.168.0.1 prefer
```

b) Enable the NTP client.

```
BTI-SA-805(config)# ptp time-source ntp
```

Step 5 Specify the time zone.

```
BTI-SA-805(config)# clock set timezone <time_zone>
```

Valid time zones are:

act - Australia Central Time(GMT+9:00)	hst - Hawaii Standard Time(GMT-10:00)
aet - Australia Eastern Time(GMT+10:00)	iet - Indiana Eastern Standard Time(GMT-5:00)
agt - Argentina Standard Time(GMT-3:00)	ist - India Standard Time(GMT+5:00)
art - (Arabic) Egypt Standard Time(GMT+2:00)	jst - Japan Standard Time(GMT+9:00)
ast - Alaska Standard Time(GMT-9:00)	kst - Korea Standard Time(GMT+9:00)
bet - Brazil Eastern Time(GMT-3:00)	met - Middle East Time(GMT+3:00)
bst - Bangladesh Standard Time(GMT+6:00)	mit - Midway Islands Time(GMT-11:00)
cat - Central African Time(GMT-1:00)	mst - Mountain Standard Time(GMT-7:00)
cnt - Canada Newfoundland Time(GMT-3:00)	net - Near East Time(GMT+4:00)
cst - Central Standard Time(GMT-6:00)	nst - New Zealand Standard Time(GMT+12:00)
ctt - China Taiwan Time(GMT+8:00)	plt - Pakistan Lahore Time(GMT+5:00)
eat - (Arabic) Egypt Standard Time(GMT+3:00)	pnt - Phoenix Standard Time(GMT-7:00)
ect - European Central Time(GMT+1:00)	prt - Puerto Rico and US Virgin Islands Time(GMT-4:00)
edt - Eastern Daylight Time(GMT-4:00)	pst - Pacific Standard Time(GMT-8:00)
eet - Eastern European Tim(GMT+2:00)	sst - Solomon Standard Time(GMT+11:00)
est - Eastern Standard Time(GMT-5:00)	utc - Universal Coordinated Time
gmt - Greenwich Mean Time	vst - Vietnam Standard Time(GMT+7:00)

For example:

```
BTI-SA-805(config)# clock set timezone est
```

Step 6 Verify that the date and time settings were provisioned correctly.

```
BTI-SA-805# show clock
```

For example:

```
BTI-SA-805# show clock
05:13:25 EST Thu Oct 16 2014
```

5.6 Configuring User Profiles

User profiles are required to access a BTI Service Access 800 Series Ethernet Switch. Each profile added to the system requires a user name, a password, and a security authorization level that governs the access rights available to the user profile.

Table 5-2 Security authorization levels

Authorization Level	Access Rights
ROOT ¹	Full access to all system operations including operations for configuring users. Default session time-out is 30 minutes.
operator or admin	Full access to all system operations except operations for configuring users. Default session time-out is 30 minutes.
viewer	Read-only access. Default session time-out is 30 minutes.
¹ Only the user named admin can have an authorization level of ROOT .	

You cannot explicitly configure a user to have an authorization level of **ROOT**. The **ROOT** level is automatically and permanently given to the user named **admin**. This cannot be changed.

To change the session time-out value, use the `configure line autologout` command. This command changes the session time-out for all users.

User names can contain 3 to 8 alphanumeric characters. Passwords can contain from 5 to 10 characters, including a combination of alphanumeric and special characters. All special characters are supported for passwords except the characters : - = ; : ' " , ?.

Note User names and passwords are case-sensitive.

The BTI Service Access 800 Series supports up to 10 user profiles and 10 concurrent CLI sessions. However, only one login per user profile is supported on the system. When a user profile is no longer required, it can be deleted.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Configure the username, password, and privilege level for the new user.

```
BTI-SA-805(config)# username <username> privilege <privilege_level>
password <password>
```

where:

- *<username>* is a 6-digit username.
- *<privilege_level>* is user privilege level 1, 2, or 3:
 - 1 = viewer
 - 2 = operator
 - 3 = admin
- *<password>* is a password consisting of 1 to 64 characters.

For example:

```
BTI-SA-805(config)# username DMarie privilege 2 password catof9lives
```

Step 3 Return to the EXEC mode.

```
BTI-SA-805(config)# end
```

Step 4 Verify that the user was provisioned correctly.

```
BTI-SA-805# show usernames
```

For example:

```
BTI-SA-805# show usernames
```

Number	User name	Privilege	Password	Rsa Key
1	admin	3	*	
2	DMarie	2	*	

Related tasks

Task	Command
Show users currently logged in	show users

5.7 Configuring RADIUS Client

Use this procedure to configure the RADIUS client.

Prerequisites:

- The RADIUS server has been set up and configured.

You can configure the switch to authenticate its users with RADIUS. When a user tries to log in, the switch acts as a RADIUS client and sends the login request to the RADIUS server for authentication.

Step 1 Access Configuration mode

```
BTI-SA-805# configure terminal
```

Step 2 Enable the RADIUS authentication type.

```
BTI-SA-805(config)# radius-server enable
```

Step 3 Specify the primary RADIUS server to use, along with the shared key string that has been configured on the RADIUS server.

```
BTI-SA-805(config)# radius-server host <authserver_IP> key <keystring>
```

For example:

```
BTI-SA-805(config)# radius-server host 192.168.5.250 key bigsecret123
```

Step 4 Add a secondary RADIUS server as desired.

```
BTI-SA-805(config)# radius-server host <authserver_IP> key <keystring>  
mgmt
```

For example:

```
BTI-SA-805(config)# radius-server host 192.168.0.253 key bigsecret123  
mgmt
```

Step 5 If desired, you can configure the switch to fall back to local authentication if the RADIUS server authentication fails.

```
BTI-SA-805(config)# radius-server fallback disable
```

If you enable this setting (and authentication with the primary server fails), the switch tries to authenticate with the secondary server. If that authentication also fails, then the switch authenticates with the local database.

If you disable this setting (and authentication with *either* the primary or the secondary server fails), the switch denies access to the user.

Note This setting does not apply in the situation where a RADIUS server is reachable. If the primary server is unreachable, the switch tries to authenticate with the secondary server. If the secondary server is also unreachable, then the switch authenticates with the local database. This behavior is provided to prevent inadvertent lockout due to network connectivity or server problems.

Step 6 Configure the maximum timeout value (in seconds) for receiving the response packet.

```
BTI-SA-805(config)# radius-server timeout <seconds>
```

where: <seconds> = 1-1000 (default = 5)

For example:

```
BTI-SA-805(config)# radius-server timeout 10
```

Step 7 Configure the retransmit count. ‘Retransmit’ means the maximum send count of authentication request packets.

```
BTI-SA-805(config)# rads-server retransmit <retries>
```

where: <retries> = 1-100 (default = 3)

For example:

```
BTI-SA-805(config)# radius-server retransmit 10
```

Step 8 Configure the order of authentication. You can specify whether you want to authenticate the login using the RADIUS server first or the local database first.

```
BTI-SA-805(config)# radius-server auth-order <radius|local>
```

For example, if you want to specify RADIUS authentication before local authentication, enter:

```
BTI-SA-805(config)# radius-server auth-order radius
```

Step 9 Return to the EXEC mode.

```
BTI-SA-805(config)# end
```

Step 10 Confirm that the RADIUS client was configured correctly and is enabled.

```
BTI-SA-805# show radius-server
```

For example:

```
BTI-SA-805# show radius-server
```

```
=====
RADIUS : Enable
=====
First      RADIUS Auth Server IP :
           RADIUS Auth port      : 1812
           RADIUS Auth Path      : ib-ip
           RADIUS Auth Secret    :
Second     RADIUS Auth Server IP :
           RADIUS Auth port      : 1812
           RADIUS Auth Path      : ib-ip
```

```

        RADIUS Auth Secret      :
RADIUS Auth Order               : RADIUS
RADIUS retrial number           : 10
RADIUS timeout(sec)             : 10
RADIUS fallback                  : enable
=====
```

5.8 Configuring Secure Shell (SSH)

Secure Shell (SSH) is an industry-standard network protocol that allows data to be exchanged using a secure channel between two networked devices. The encryption used by SSH provides confidentiality and integrity of data over an insecure network, such as the Internet. The switch support SSH-1 and SSH-2.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Enable the SSH service.

```
BTI-SA-805(config)# ip ssh server enable
```

Step 3 Return to the EXEC mode.

```
BTI-SA-805(config)# end
```

Step 4 To confirm the configuration settings, display the IP SSH server version and configuration data.

```
BTI-SA-805# show ip ssh server status
```

For example:

```
BTI-SA-805# show ip ssh server status
SSH server enabled
Version: 2.0
Authentication timeout: 120 second(s)
Authentication retries: 6 time(s)
Server key lifetime: 60 minute(s)
Authentication type: password, public-key
```

Step 5 To verify that the SSH server is running, display the IP SSH server session information.

```
BTI-SA-805# show ip ssh server session
```

For example:

```
BTI-SA-805# show ip ssh server session
```

```
Version Encryption Hmac      User IP              State
=====2.0          aes128-
cbc  hmac-md5 abc   10.10.29.22  Session started
```

5.9 Configuring SNMP Community Strings

Use this procedure to configure SNMP community strings and enable SNMP on the switch. Up to four community strings can be created for each type.

The Simple Network Management Protocol (SNMP) is a messaging protocol used by the switch to communicate configuration and status information with a network management system. Ethernet Switches support SNMPv2c.

SNMP messages are exchanged within an SNMP community, which consists of one or more switches and one or more management workstations. Membership in a community is controlled by community strings, which function as passwords for the community. The community strings are embedded in every SNMP packet exchanged between the members of the community to authenticate access to the Management Information Base (MIB) on the switch.

You can configure multiple SNMP communities on the switch. For example, you can create a community that provides full read-write access to the MIBs, one that provides read-only access to the MIBs, and a third that provides access to a limited set of objects (OIDs) in the MIBs. Access is further controlled by configuring users and groups.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Enable SNMP service.

```
BTI-SA-805(config)# snmp-server enable
```

Step 3 Configure the SNMP Read-only community string on the switch.

```
BTI-SA-805(config)# snmp-server community <community_name> read-only
```

For example:

```
BTI-SA-805(config)# snmp-server community public read-only
```

Step 4 Configure the SNMP Read/Write community string on the switch.

```
BTI-SA-805(config)# snmp-server community <community_name> read-write
```

For example:

```
BTI-SA-805(config)# snmp-server community private read-write
```

Step 5 Specify the management workstation IP address and port to which SNMP traps will be sent.

```
BTI-SA-805(config)# snmp-server trap target-address [mgmt-if] <ip-address> community <community_name> [udpport <number>]
```

For example:

```
BTI-SA-805(config)# snmp-server trap target-address mgmt-if 192.168.1.100 community public udpport 6000
```

Step 6 Enable all SNMP trap notifications.

```
BTI-SA-805(config)# snmp-server trap enable <notification-type>
```

where *notification-type* indicates the type of notification to enable:

- event
- alarm
- v2 all
- v2 coldstart
- v2 linkup
- v2 linkdown
- v2 authentication

For example:

```
BTI-SA-805(config)# snmp-server trap enable event
```

Related tasks

Task	Command
Show the current SNMP configuration	<code>show snmp</code>
Disable SNMP	<code>configure snmp disable</code>
Delete an SNMP get-community	<code>configure snmp get-community clear {<1-4> all}</code>
Delete an SNMP set-community	<code>configure snmp set-community clear {<1-4> all}</code>
Delete an SNMP trap-community	<code>configure snmp trap-community clear {<1-4> all}</code>
Show the SNMP PEN (Private Enterprise Number & Product & Model oid) code	<code>show snmp pen</code>
Configure the SNMP PEN code	<code>configure snmp pen PEN_STR</code>

5.10 Configuring Syslog Server

BTI SA-805 support the Syslog protocol. When enabled on the BTI SA-805, this feature allows log messages to be sent to a local console or to a remote Syslog server for monitoring or processing. Message levels (for example, critical, major, minor) can be specified so that only messages up to a particular level are forwarded. When the Syslog protocol is disabled, log information is stored in the local file system, and is accessible using the `show syslog` command.

Step 1 Access Configuration mode.

```
BTI-SA-805# configure terminal
```

Step 2 Specify the IP address of the Syslog server. To use the management port, specify the `mgmt-if` option.

```
BTI-SA-805(config)# syslog remote address [mgmt-if]
<remote_Syslog_IP_address>
```

For example:

```
BTI-SA-805(config)# syslog remote address mgmt-if 192.168.5.31
```

Step 3 Enable the transmission of trap information to the Syslog server.

```
BTI-SA-805(config)# syslog output { console | remote } enable
```

For example:

```
BTI-SA-805(config)# syslog output remote enable
```

Step 4 Specify the Syslog severity.

```
BTI-SA-805(config)# syslog severity { critical | major | minor |
notice | info | all } enable
```

For example:

```
BTI-SA-805(config)# syslog severity minor enable
```

Step 5 Enable Syslog.

```
BTI-SA-805(config)# syslog enable
```


6.0 BTI SA-805 Carrier Ethernet Switch Provisioning

This section details the basic procedures required to provision the BTI SA-805 Carrier Ethernet Switch .

- 6.1, “Creating an NNI Port”
- 6.2, “Provisioning the Wavelength on the 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver”
- 6.3, “Configuring Ethernet Ring Protection Switching (G.8032)”
- 6.4, “Configuring Ethernet Protection Switching (G.8031)”
- 6.5, “Provisioning MEF E-Service”

6.1 Creating an NNI Port

Use this procedure to configure and associate an NNI with one or more SVLANs.

Prerequisites

- Ensure the addition of this NNI does not create a loop in the network. If it does, then be sure to leave this NNI disabled.

Restrictions and limitations

- All interface ports default to disabled.
- The interface must not be a member of a LAG.

Only a subset of the interface configuration attributes is shown.

Step 1 Provision the NNI port:

a) Access Configuration mode.

```
BTI-SA-805# configure terminal
```

b) Enter the Ethernet NNI configuration mode, and create the NNI.

```
BTI-SA-805(config)# ethernet nni add <NNI-ID>
```

For example:

```
BTI-SA-805(config)# ethernet nni add NNI-3
```

c) Associate the NNI with the Ethernet interface.

```
BTI-SA-805(config-nni)# map interface <physical-interface>
```

For example:

```
BTI-SA-805(config-nni)# map interface eth-0-4
```

d) Set the maximum transmission unit (MTU) value (in bytes) for the interface.

```
BTI-SA-805(config-nni)# mtu <1526-9608>
```

For example:

```
BTI-SA-805(config-nni)# mtu 9600
```

e) Add a description.

```
BTI-SA-805(config-nni)# description <character_string>
```

For example:

```
BTI-SA-805(config-nni)# description NNI-3
```

f) Return to the EXEC mode.

```
BTI-SA-805(config-nni)# end
```

Step 2 Verify that the NNI port was provisioned correctly.

```
BTI-SA-805# show ethernet nni <NNI-ID>
```

For example:

```
BTI-SA-805# show ethernet nni NNI-3
```

```
-----
NNI NNI-3
  Description           : NNI-3
  Mapped Interface      : eth-0-4
  TPID Value            : 0x88a8
  MTU Size              : 9600
  Number of VC          : 0
-----
```

Step 3 Associate the NNI port with the desired SVLAN(s), including the management VLAN (if it exists).

a) Access Configuration mode.

```
BTI-SA-805# configure terminal
```

b) Enter the EVC configuration mode for the EVC.

```
BTI-SA-805(config)# ethernet evc <EVC-ID>
```

For example:

```
BTI-SA-805(config)# ethernet evc MGMT
```

c) Associate the EVC with the NNI.

```
BTI-SA-805(config-evc)# add nni <NNI-NAME>
```

For example:

```
BTI-SA-805(config-evc)# add nni NNI-3
```

d) If necessary, associate the EVC with the UNI.

```
BTI-SA-805(config-evc)# add uni <UNI-ID>
```

For example:

```
BTI-SA-805(config-evc)# add uni UNI-3
```

e) Return to the EXEC mode.

```
BTI-SA-805(config-evc)# end
```

Step 4 Verify that the EVC was provisioned correctly.

```
BTI-SA-805# show ethernet evc
```

For example:

```
BTI-SA-805# show ethernet evc
```

```
-----
EVC EVC1
  Service Type           : epline
  VC Type                : Point-to-Point
-----
```

```

SVLAN ID                : 10
VLAN Preservation       : Yes
CoS Preservation        : Yes
Maximum Number of UNI   : 1
Number of UNI           : 0
Number of RUNI          : 0
NNI List
NNI-1, NNI-2, NNI-3,
-----

```

Step 5 Enable the NNI port.

Important Before you enable this NNI port, ensure the addition of this port does not create routing loops in the network.

a) Access Configuration mode.

```
BTI-SA-805# configure terminal
```

b) Enter the interface configuration mode for the NNI port.

```
BTI-SA-805(config)# interface <physical-interface>
```

For example:

```
BTI-SA-805(config)# interface eth-0-4
```

c) Enable the NNI port.

```
BTI-SA-805(config-if)# no shutdown
```

d) Return to the EXEC mode.

```
BTI-SA-805(config-if)# end
```

Step 6 Save the current configuration to system memory.

```
BTI-SA-805# write mem
```

Step 7 Display the summary information for the interface.

```
BTI-SA-805# show interface status
```

```
BTI-SA-805# show ethernet nni <NNI-ID>
```

For example:

```
BTI-SA-805# show interface status
```

Port	Status	Duplex	Speed	Mode	Type	Description
eth-0-1	down	auto	auto	TRUNK	Unknown	NNI-1
eth-0-2	down	auto	auto	TRUNK	Unknown	NNI-2
eth-0-3	admin down	auto	auto	ACCESS	Unknown	
eth-0-4	admin down	auto	auto	ACCESS	Unknown	
eth-0-5	admin down	auto	auto	ACCESS	Unknown	

```
BTI-SA-805# show ethernet nni NNI-3
```

```
-----  
NNI NNI-3  
Description           : NNI-3  
Mapped Interface      : eth-0-4  
TPID Value            : 0x88a8  
MTU Size              : 9600  
Number of VC          : 1  
EVC List  
EVC1,  
-----
```

6.2 Provisioning the Wavelength on the 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver

The BP3AM6TL transceiver is mainly used on line interfaces and supports 10GE LAN on 96 channels.

The following link type and span is supported:

- Link Length for 9/125um single mode fiber: 80 km

The transceiver is provisioned automatically when installed on the interface. It cannot be manually provisioned. When installed, the transceiver wavelength, frequency or channel can be configured. You must remember to set the interface speed to 10G using the CLI interface command `speed`.

When the transceiver is provisioned with either the wavelength, frequency or channel value, the system will automatically select the associated values. For example, if the user provisions the transceiver ITU wavelength to 1556.50 nm, the system will automatically set the transmit and receive tunable channel number to 26 and the frequency to 192.60 THz.

The wavelength can be tuned up or down by 0.05nm. The tunable SFP+ will automatically align to the closest wavelength in the wavelength grid.

- Caution**
- The BP3AM6TL tunable DWDM SFP+ transceiver module should be provisioned in a bookend manner with the local and the remote transceiver being provisioned with the same channel, frequency and wavelength. The remote transceiver may be another BP3AM6TL or a tunable or fixed C-band transceiver
 - All optical transceivers should perform within the calibrated thresholds for temperature, voltage, current and power alarms
 - The power transmitted from the transceiver must be within the high and low transmit ranges. The power received on the transceiver must be within the high and low receive threshold and below the +3dBm maximum receiver input power.
 - Do not admin up or transmit or receive traffic on the transceiver until the local and remote transmit and receive signals are tested and the fibers attenuated with pads accordingly. Failure to test the power levels before installing the transceiver on the remote and local interfaces may result in permanent damage to the receiver or cause the laser to shutdown during provisioning.

The network optical power budget and the optical link budget should be calculated before beginning this procedure. The transceiver should be provisioned to meet the specifications defined in the network design.

If you are changing the wavelength, frequency or channel, the optical power budget / optical link budget does not require to be re-calculated. The attenuator/pad requirement should remain unchanged. There is no requirement to replace the transceiver when changing the wavelength, frequency or channel. However changing the wavelength, frequency or channel will disrupt traffic until the configuration is enabled. If required, re-route traffic when possible.

For additional information see

- 8.2.1, “BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver Specifications”
- Appendix B, “ITU Wavelength Plan for C Band Tunable DWDM Transceiver”

6.2.1 Example : Provisioning the Wavelength frequency on the 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver

This example shows how to provision the 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver to 191.85 THz. See [Appendix C, “Wavelength Compatibility Table”](#).

Step 1 Install the transceiver local and remote modules. See 4.1, “BTI SA-805 Carrier Ethernet Switch Optical Transceivers Installation and Removal”

The following example shows the auto provisioning settings of the local transceiver when installed in eth-0-1.

```
BTI-SA-805191.85local # show transceiver detail
Port eth-0-1 transceiver info:
Transceiver Type: 10G Base-ER
  Transceiver Vendor Name : JDSU
  Transceiver PN          : JST01TMAC1CY5BTI
  Transceiver S/N         : FD4055780070
  Transceiver PEC Code    : BP3AM6TL
Transceiver Output Wavelength: N/A
Supported Link Type and Length:
  Link Length for 9/125um single mode fiber: 80 km
  Link Length for 9/125um single mode fiber: 25500 m
Transceiver Set for Tunable DWDM:
  Transceiver Lasers First Frequency : 191.350000
  Transceiver Lasers Last Frequency  : 196.100000
  Transceiver Lasers grid spacing    : 0.050000
    Tunable Wavelength Set : 1528.80 nm
    Tunable Channel No. Set : 96
      Wavelength           : 1528.77 nm
      Frequency            : 196.10 THz
-----
Transceiver is internally calibrated.
mA: milliamperes, dBm: decibels (milliwatts), NA or N/A: not applicable.
++ : high alarm, + : high warning, - : low warning, -- : low alarm.
The threshold values are calibrated.
-----
```

Port	Temperature (Celsius)	High Alarm Threshold (Celsius)	High Warn Threshold (Celsius)	Low Warn Threshold (Celsius)	Low Alarm Threshold (Celsius)
eth-0-1	41.77	72.00	70.00	-5.00	-7.00

```
-----
      Voltage           High Alarm High Warn Low Warn Low Alarm
                        Threshold Threshold Threshold Threshold
```

Port	(Volts)		(Volts)	(Volts)	(Volts)	(Volts)
eth-0-1	3.30		3.63	3.46	3.13	2.97

	Current		High Alarm	High Warn	Low Warn	Low Alarm
	(milliamperes)		Threshold	Threshold	Threshold	Threshold
Port			(mA)	(mA)	(mA)	(mA)
eth-0-1	0.00	--	110.00	95.00	25.00	15.00

	Optical		High Alarm	High Warn	Low Warn	Low Alarm
	Transmit Power		Threshold	Threshold	Threshold	Threshold
Port	(dBm)		(dBm)	(dBm)	(dBm)	(dBm)
eth-0-1	-40.00	--	3.00	2.00	-2.00	-3.00

	Optical		High Alarm	High Warn	Low Warn	Low Alarm
	Receive Power		Threshold	Threshold	Threshold	Threshold
Port	(dBm)		(dBm)	(dBm)	(dBm)	(dBm)
eth-0-1	-40.00	--	-4.00	-6.00	-27.21	-29.21

Port eth-0-3 transceiver info:

Transceiver Type: 1000BASE-LX

Transceiver Vendor Name : Optech

Transceiver PN : OP6E-S05-13-CM

Transceiver S/N : 8225259042

Transceiver PEC Code : EMELY COMPATIBLE

Transceiver Output Wavelength: 1310 nm

Supported Link Type and Length:

Link Length for 9/125um single mode fiber: 80 km

Link Length for 9/125um single mode fiber: 25500 m

The following example shows the auto provisioning settings of the remote transceiver when installed in eth-0-1.

BTI-SA-805191.85remote # show transceiver detail

Port eth-0-1 transceiver info:

Transceiver Type: 10G Base-ER

Transceiver Vendor Name : JDSU

Transceiver PN : JST01TMAC1CY5BTI

Transceiver S/N : FD4055780070

Transceiver PEC Code : BP3AM6TL

Transceiver Output Wavelength: N/A

Supported Link Type and Length:

Link Length for 9/125um single mode fiber: 80 km

Link Length for 9/125um single mode fiber: 25500 m

Transceiver Set for Tunable DWDM:

Transceiver Lasers First Frequency : 191.350000

Transceiver Lasers Last Frequency : 196.100000

Transceiver Lasers grid spacing : 0.050000

Tunable Wavelength Set : 1528.80 nm


```

Tunable Channel No. Set : 96
Wavelength       : 1528.77 nm
Frequency        : 196.10 THz

```

Transceiver is internally calibrated.

mA: milliamperes, dBm: decibels (milliwatts), NA or N/A: not applicable.

++ : high alarm, + : high warning, - : low warning, -- : low alarm.

The threshold values are calibrated.

```

-----
Port      Temperature      High Alarm  High Warn  Low Warn  Low Alarm
          (Celsius)      Threshold  Threshold  Threshold Threshold
          (Celsius)      (Celsius) (Celsius) (Celsius) (Celsius)
-----
eth-0-1   41.77             72.00      70.00      -5.00     -7.00

```

```

-----
Port      Voltage      High Alarm  High Warn  Low Warn  Low Alarm
          (Volts)      Threshold  Threshold  Threshold Threshold
          (Volts)      (Volts)   (Volts)   (Volts)   (Volts)
-----
eth-0-1   3.30             3.63       3.46       3.13      2.97

```

```

-----
Port      Current      High Alarm  High Warn  Low Warn  Low Alarm
          (milliamperes) Threshold  Threshold  Threshold Threshold
          (mA)         (mA)       (mA)       (mA)       (mA)
-----
eth-0-1   0.00      --    110.00    95.00     25.00     15.00

```

```

-----
Port      Optical      High Alarm  High Warn  Low Warn  Low Alarm
          Transmit Power Threshold  Threshold  Threshold Threshold
          (dBm)        (dBm)       (dBm)       (dBm)       (dBm)
-----
eth-0-1   -40.00      --    3.00      2.00      -2.00     -3.00

```

```

-----
Port      Optical      High Alarm  High Warn  Low Warn  Low Alarm
          Receive Power Threshold  Threshold  Threshold Threshold
          (dBm)        (dBm)       (dBm)       (dBm)       (dBm)
-----
eth-0-1   -40.00      --    -4.00     -6.00     -27.21    -29.21

```

Port eth-0-3 transceiver info:

Transceiver Type: 1000BASE-LX

Transceiver Vendor Name : Optech

Transceiver PN : OP6E-S05-13-CM

Transceiver S/N : 8225259042

Transceiver PEC Code : EMELY COMPATIBLE

Transceiver Output Wavelength: 1310 nm

Supported Link Type and Length:

Link Length for 9/125um single mode fiber: 80 km

Link Length for 9/125um single mode fiber: 25500 m

Step 2 Verify transceiver interfaces are admin down during the provisioning procedure.

```
BTI-SA-805191.85local(config)# interface eth-0-1
BTI-SA-805191.85local(config-if)#shutdown
BTI-SA-805191.85remote(config)# interface eth-0-1
BTI-SA-805191.85local(config-if)#shutdown
```

Step 3 Provision the speed of the local and remote transceiver interface.

The following example shows how to set the speed to 10G. (The media type will be auto provisioned if the default **auto** setting is provisioned in the interface media-type command.)

```
BTI-SA-805191.85local(config)# interface eth-0-1
BTI-SA-805191.85local(config-if)# speed 10G
BTI-SA-805191.85local(config-if)#exit
BTI-SA-805191.85local # show interface eth-0-1
```

```
Interface current state: down
  Hardware is Ethernet, address is 0014.d060.0012 (bia 0014.d060.0012)
  Description: UNI-0-1
  Bandwidth 10000000 kbits
  Index 1 , Metric 1 , Encapsulation ARPA
  Speed - 10Gb/s , Duplex - Full , Media type is 10GBASE_ER
  Link speed type is force link, Link duplex type is force link
  Admin input flow-control is off, output flow-control is off
  Oper input flow-control is off, output flow-control is off
  The Maximum Frame Size is 1522 bytes
  VRF binding: not bound
  Label switching is disabled
  No Virtual private Wire service configured
  ARP timeout 01:00:00, ARP retry interval 1s
    0 packets input, 0 bytes
    Received 0 unicast, 0 broadcast, 0 multicast
    0 runs, 0 giants, 0 input errors, 0 CRC
    0 frame, 0 overrun, 0 pause input
    0 input packets with dribble condition detected
    0 packets output, 0 bytes
    Transmitted 0 unicast, 0 broadcast, 0 multicast
    0 underruns, 0 output errors, 0 pause output

BTI-SA-805191.85remote(config)# interface eth-0-1
BTI-SA-805191.85remote(config-if)# speed 10G
BTI-SA-805191.85remote(config-if)#exit
BTI-SA-805191.85remote # show interface eth-0-1
```

```
Interface current state: down
  Hardware is Ethernet, address is 0014.d060.0012 (bia 0014.d060.0012)
  Description: UNI-0-1
  Bandwidth 10000000 kbits
  Index 1 , Metric 1 , Encapsulation ARPA
  Speed - 10Gb/s , Duplex - Full , Media type is 10GBASE_ER
  Link speed type is force link, Link duplex type is force link
  Admin input flow-control is off, output flow-control is off
  Oper input flow-control is off, output flow-control is off
```

```

The Maximum Frame Size is 1522 bytes
VRF binding: not bound
Label switching is disabled
No Virtual private Wire service configured
ARP timeout 01:00:00, ARP retry interval 1s
  0 packets input, 0 bytes
  Received 0 unicast, 0 broadcast, 0 multicast
  0 runs, 0 giants, 0 input errors, 0 CRC
  0 frame, 0 overrun, 0 pause input
  0 input packets with dribble condition detected
  0 packets output, 0 bytes
  Transmitted 0 unicast, 0 broadcast, 0 multicast
  0 underruns, 0 output errors, 0 pause output

```

Step 4 Provision the frequency on the local and remote transceivers.

This example shows how to set the tunable SFP+ module to frequency 191.85. See also [Appendix C, “Wavelength Compatibility Table”](#).

```

BTI-SA-805191.85local(config)# interface eth-0-1
BTI-SA-805191.85local(config-if)# transceiver itu frequency 191.85
BTI-SA-805191.85local(config-if)# end
BTI-SA-805191.85local # show transceiver eth-0-1
Port eth-0-1 transceiver info:
Transceiver Type: 10G Base-ER
  Transceiver Vendor Name : JDSU
  Transceiver PN          : JST01TMAC1CY5BTI
  Transceiver S/N         : FD405578008F
  Transceiver PEC Code    : BP3AM6TL
Transceiver Output Wavelength: N/A
Supported Link Type and Length:
  Link Length for 9/125um single mode fiber: 80 km
  Link Length for 9/125um single mode fiber: 25500 m
Transceiver Set for Tunable DWDM:
  Transceiver Lasers First Frequency : 191.350000
  Transceiver Lasers Last Frequency  : 196.100000
  Transceiver Lasers grid spacing    : 0.050000
    Tunable Wavelength Set : wavelength 1562.64
    Tunable Channel No. Set : 11
      Wavelength           : 1562.64 nm
      Frequency            : 191.85 THz

```

Step 5 At the remote transceiver admin up the transceiver interface. A Loss of Sync (LOS) alarm may be raised.

```

BTI-SA-805191.85remote(config)# interface eth-0-1
BTI-SA-805191.85remote(config-if)# no shutdown

```

Step 6 At the local transceiver site perform the following checks. Use an optical power meter to test the fiber. Follow safety precautions when working with lasers. Clean all cable and attenuator connectors using the appropriate fiber optic cleaning kits and to the manufactures cleaning process, before connecting the cables for test and for installation.

- Verify the power levels from the remote Tx transceiver port perform within the high and low transmit power specifications. The power received on the transceiver Rx port must be within the limits of the receiver sensitivity and below the +3 dBm receiver damage threshold
- If required attenuated optical fiber cables with pads accordingly
- If required test the signal from remote Tx transceiver port to verify the wavelength, frequency and channel are correct
- Connect optical cables on the transceiver.

Step 7 At the local transceiver admin up the transceiver interface. A Loss of Sync (LOS) alarm may be raised.

```
BTI-SA-805191.85local(config)# interface eth-0-1
BTI-SA-805191.85local(config-if)# no shutdown
```

Step 8 At the remote transceiver perform the following checks. Use an optical power meter to test the fiber. Follow safety precautions when working with lasers. Clean all cable and attenuator connectors using the appropriate fiber optic cleaning kits and to the manufactures cleaning process, before connecting the cables for test and for installation.

- Verify the power levels from the local Tx transceiver port perform within the high and low transmit power specifications. The power received on the remote Rx transceiver port must be within the limits of the receiver sensitivity and below the +3 dBm receiver damage threshold
- If required attenuated optical fiber cables with pads accordingly
- If required test the signal from the local transceiver to verify the wavelength, frequency and channel are correct.
- If required re-connect optical cables.

Step 9 Verify the local to remote network connections are performing correctly and that the network is alarm free.

6.3 Configuring Ethernet Ring Protection Switching (G.8032)

G.8032 Ethernet Ring Protection Switching (ERPS) is set up between the nodes in a ring. As such, the procedures for doing so vary based on the particular equipment that makes up the individual nodes. For example, the nodes that comprise the ring may be all BTI SA-805 nodes or a mixture of BTI SA-805 and BTI SA-821 nodes. Therefore, use the procedure listed below that most closely matches your ring configuration:

- 6.3.1, “Configuring G.8032 ERPS Between Two BTI SA-805 Nodes Using Linkscan”
- 6.3.2, “Configuring G.8032 ERPS Between Two BTI SA-805 Nodes Using Y.1731”
- 6.3.3, “Configuring G.8032 ERPS Between BTI SA-805 and SA-810 Nodes Using Linkscan”
- 6.3.4, “Configuring G.8032 ERPS Between BTI SA-805 and SA-810 Nodes Using Y.1731”
- 6.3.5, “Configuring G.8032 ERPS Between BTI SA-805 and PVX Nodes Using Linkscan”

Each procedure covers setting up ERPS between two nodes. For rings with three or more nodes, repeat the procedure or use a different procedure for the next node pair.

6.3.1 Configuring G.8032 ERPS Between Two BTI SA-805 Nodes Using Linkscan

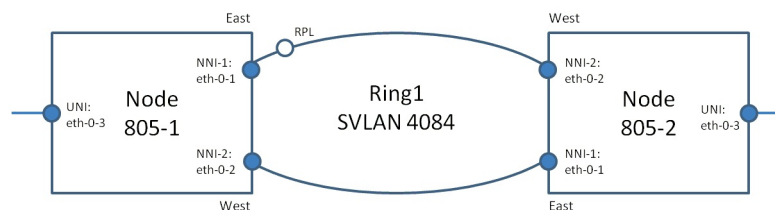
Use this procedure to configure G.8032 ERPS between two BTI SA-805 nodes using linkscan.

Prerequisites

- Before ERPS is provisioned, no loop prevention mechanism should be operating on the network; therefore, the network operator must manually prevent the loop. This is typically performed by administratively disabling the designated RPL (ring protection link) interface in the ring. The nodes may be fibered in a closed loop, but it is imperative that one port be disabled if a loop is to be prevented.

In the steps and examples below, the two BTI SA-805 nodes are designated BTI SA-805-1 and BTI SA-805-2 as shown in the following example topology:

Figure 6-1 Example Topology for ERPS Ring between BTI SA-805 and BTI SA-805 Nodes



Step 1 At node , disable the RPL (ring protection link) interface.

Note In these examples, the RPL interface is shown as part of node BTI SA-805-1 and BTI SA-805-2. In rings with more nodes, the RPL interface could be part of another node.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# shutdown
BTI-SA-805(config-if)# end
```

Step 2 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision a VLAN.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 4084,100
BTI-SA-805(config-vlan)# end
```

Step 3 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 4 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision an EVC service for ERPS.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add Ring1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4084
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# end
```

Step 5 At node BTI SA-805-1, provision the ERPS ring.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
```

```
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 1
BTI-SA-805(config-switch)# rpl-node owner
BTI-SA-805(config-switch)# rpl east-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# timer wait-to-restore 1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 6 At node BTI SA-805-2, provision the ERPS ring. Do not just repeat the previous provisioning steps; they are slightly different for node BTI SA-805-1.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 1
BTI-SA-805(config-switch)# rpl-node neighbor
BTI-SA-805(config-switch)# rpl west-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 7 At node BTI SA-805-1, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 8 At node BTI SA-805-2, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 9 If not already done, enable the RPL interface.

Note In these examples, the RPL interface was already enabled in a previous step.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
```

```
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# end
```

6.3.2 Configuring G.8032 ERPS Between Two BTI SA-805 Nodes Using Y.1731

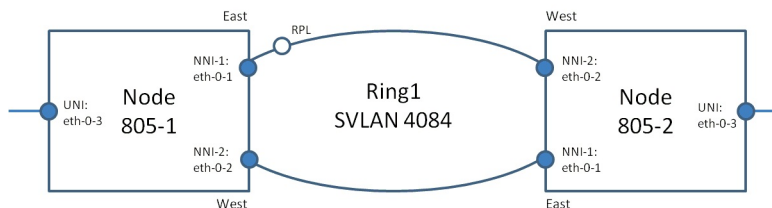
Use this procedure to configure G.8032 ERPS between two BTI SA-805 nodes using Y.1731.

Prerequisites

- Before ERPS is provisioned, no loop prevention mechanism should be operating on the network; therefore, the network operator must manually prevent the loop. This is typically performed by administratively disabling the designated RPL (ring protection link) interface in the ring. The nodes may be fibered in a closed loop, but it is imperative that one port be disabled if a loop is to be prevented.

In the steps and examples below, the two BTI SA-805 nodes are designated BTI SA-805-1 and BTI SA-805-2 as shown in the following example topology:

Figure 6-2 Example Topology for ERPS Ring between Two BTI SA-805 Nodes



Step 1 At node BTI SA-805-1, BTI SA-805-2, disable the RPL (ring protection link) interface.

Note In these examples, the RPL interface is shown as part of node BTI SA-805-1. In rings with more nodes, the RPL interface could be part of another node.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# shutdown
BTI-SA-805(config-if)# end
```

Step 2 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision a VLAN.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 4084,100
BTI-SA-805(config-vlan)# end
```


Step 3 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 4 At both nodes (BTI SA-805-1 and BTI SA-805-2), provision an EVC service for ERPS.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add Ring1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4084
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# end
```

Step 5 At node BTI SA-805-1 , provision the ERPS detection link status.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet soam meg megid domain1 meg-type icc-based
level 1 ccm-interval 300hz vlan 4084
BTI-SA-805(config-soam)# mep mepid 1000 interface eth-0-1 direction
down
BTI-SA-805(config-soam)# mep mepid 2000 interface eth-0-2 direction
down
BTI-SA-805(config-soam)# rmep rmepid 1001 mepid 1000 remote-mac
0014.d060.01a6
BTI-SA-805(config-soam)# rmep rmepid 2001 mepid 2000 remote-mac
0014.d060.01a6
BTI-SA-805(config-soam)# continuity-check enable mepid 1000
BTI-SA-805(config-soam)# continuity-check enable mepid 2000
BTI-SA-805(config-soam)# exit
BTI-SA-805(config)# ethernet soam enable
BTI-SA-805(config)# end
```

Step 6 At node BTI SA-805-2, provision the ERPS detection link status.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet soam meg megid domain1 meg-type icc-based
```

```
level 1 ccm-interval 300hz vlan 4084
BTI-SA-805(config-soam)# mep mepid 1001 interface eth-0-2 direction
down
BTI-SA-805(config-soam)# mep mepid 2001 interface eth-0-1 direction
down
BTI-SA-805(config-soam)# rmep rmepid 1000 mepid 1001 remote-mac
0014.d060.010a
BTI-SA-805(config-soam)# rmep rmepid 2000 mepid 2001 remote-mac
0014.d060.010a
BTI-SA-805(config-soam)# continuity-check enable mepid 1001
BTI-SA-805(config-soam)# continuity-check enable mepid 2001
BTI-SA-805(config-soam)# exit
BTI-SA-805(config)# ethernet soam enable
BTI-SA-805(config)# end
```

Step 7 At node BTI SA-805-1, provision the ERPS ring.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 2
BTI-SA-805(config-switch)# rpl-node owner
BTI-SA-805(config-switch)# rpl east-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# timer wait-to-restore 1
BTI-SA-805(config-switch)# eastmp mepid 1000 megid domain1
BTI-SA-805(config-switch)# westmp mepid 2000 megid domain1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 8 At node BTI SA-805-2, provision the ERPS ring. Do not just repeat the previous provisioning steps; they are slightly different for node BTI SA-805-1.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 2
BTI-SA-805(config-switch)# rpl-node neighbor
BTI-SA-805(config-switch)# rpl west-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# eastmp mepid 2001 megid domain1
BTI-SA-805(config-switch)# westmp mepid 1001 megid domain1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 9 At node BTI SA-805-1, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 10 At node BTI SA-805-2 , enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 11 If not already done, enable the RPL interface.

Note In these examples, the RPL interface was already enabled in a previous step.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# end
```

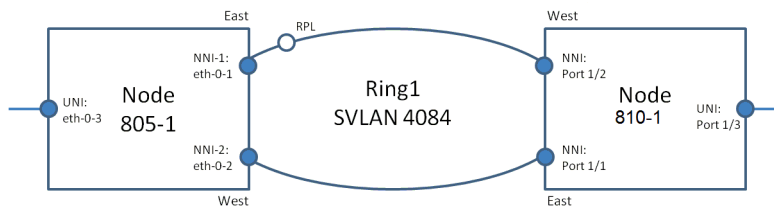
6.3.3 Configuring G.8032 ERPS Between BTI SA-805 and SA-810 Nodes Using Linkscan

Use this procedure to configure G.8032 ERPS between BTI SA-805 and SA-810 nodes using Linkscan.

Prerequisites

- Before ERPS is provisioned, no loop prevention mechanism should be operating on the network; therefore, the network operator must manually prevent the loop. This is typically performed by administratively disabling the designated RPL (ring protection link) interface in the ring. The nodes may be fibered in a closed loop, but it is imperative that one port be disabled if a loop is to be prevented.

In the steps and examples below, the BTI SA-805 node is designated BTI SA-805-1 and the SA-810 node is designated SA-810-1 as shown in the following example topology:

Figure 6-3 Example Topology for ERPS Ring between BTI SA-805 and SA-810 Nodes

Step 1 At node BTI SA-805-1, disable the RPL (ring protection link) interface.

Note In these examples, the RPL interface is shown as part of node BTI SA-805-1. In rings with more nodes, the RPL interface could be part of another node.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# shutdown
BTI-SA-805(config-if)# end
```

Step 2 At node BTI SA-805-1, provision a VLAN.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 4084,100
BTI-SA-805(config-vlan)# end
```

Step 3 At node 810-1, provision the same VLAN provisioned at node BTI SA-805.

For example:

```
BTI-SA-810# configure vlan add 4084,100
```

Step 4 At node BTI SA-805-1, provision two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

- Step 5** At node SA-810, provision two NNI ports identical to those provisioned at node BTI SA-805-1.

Note Setting the interface to NNI sets the TPID to 0x88a8.

For example:

```
BTI-SA-810# configure interface 1/1 network nni
BTI-SA-810# configure interface 1/1 mtu 9600
BTI-SA-810# configure interface 1/2 network nni
BTI-SA-810# configure interface 1/2 mtu 9600
```

- Step 6** At node BTI SA-805-1 , provision an EVC service for ERPS.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add Ring1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4084
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# end
```

- Step 7** At node SA-810, provision an EVC service identical to the EVC service provisioned at node BTI SA-805.

For example:

```
BTI-SA-810# configure evc add Ring1
BTI-SA-810# configure evc Ring1 svlan 4084
BTI-SA-810# configure nni 1/1-1/2 add svlan 4084
```

- Step 8** At node BTI SA-805-1 , provision the ERPS ring.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 1
BTI-SA-805(config-switch)# rpl-node owner
BTI-SA-805(config-switch)# rpl east-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# timer wait-to-restore 1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

- Step 9** At node SA-810, provision the ERPS ring.

For example:

```
BTI-SA-810# configure erp 1 rpl-node neighbor
BTI-SA-810# configure erp 1 rpl west
BTI-SA-810# configure erp 1 raps vlan 4084
BTI-SA-810# configure erp 1 raps mel 1
BTI-SA-810# configure erp 1 east interface 1/1
BTI-SA-810# configure erp 1 west interface 1/2
BTI-SA-810# configure erp 1 start
```

Step 10 At node BTI SA-805-1, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 11 At node SA-810, enable the two NNI ports.

For example:

```
BTI-SA-810# configure interface 1/1 enable
BTI-SA-810# configure interface 1/2 enable
```

Step 12 If not already done, enable the RPL interface.

Note In these examples, the RPL interface was already enabled in a previous step.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# end
```

Related tasks

Task	Commands
Disabling ERP	configure erp disable
Displaying the ERP statistics	show erp <erp ring instance> statistics

6.3.4 Configuring G.8032 ERPS Between BTI SA-805 and SA-810 Nodes Using Y.1731

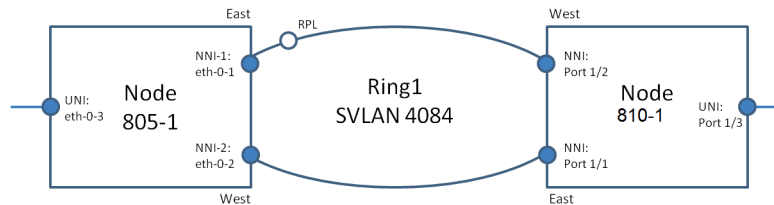
Use this procedure to configure G.8032 ERPS between BTI SA-805 and SA-810 nodes using Y.1731.

Prerequisites

- Before ERPS is provisioned, no loop prevention mechanism should be operating on the network; therefore, the network operator must manually prevent the loop. This is typically performed by administratively disabling the designated RPL (ring protection link) interface in the ring. The nodes may be fibered in a closed loop, but it is imperative that one port be disabled if a loop is to be prevented.

In the steps and examples below, the BTI SA-805 node is designated BTI SA-805-1, and the SA-810 node is designated SA-810-1 as shown in the following example topology:

Figure 6-4 Example Topology for ERPS Ring between BTI SA-805 and SA-810 Nodes



Step 1 At node BTI SA-805-1, disable the RPL (ring protection link) interface.

Note In these examples, the RPL interface is shown as part of node BTI SA-805-1. In rings with more nodes, the RPL interface could be part of another node.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# shutdown
BTI-SA-805(config-if)# end
```

Step 2 At node BTI SA-805-1, provision a VLAN.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 4084,100
BTI-SA-805(config-vlan)# end
```

Step 3 At node SA-810, provision the same VLAN provisioned at node BTI SA-805-1.

For example:

```
BTI-SA-810# configure vlan add 4084,100
```

Step 4 At node BTI SA-805-1, provision two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 5 At node SA-810, provision two NNI ports identical to those provisioned at node BTI SA-805 .

Note Setting the interface to NNI sets the TPID to 0x88a8.

For example:

```
BTI-SA-810# configure interface 1/1 network nni
BTI-SA-810# configure interface 1/1 mtu 9600
BTI-SA-810# configure interface 1/2 network nni
BTI-SA-810# configure interface 1/2 mtu 9600
```

Step 6 At node BTI SA-805-1, provision an EVC service for ERPS.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add Ring1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4084
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# end
```

Step 7 At node SA-810, provision an EVC service identical to the EVC service provisioned at node BTI SA-805.

For example:

```
BTI-SA-810# configure evc add Ring1
BTI-SA-810# configure evc Ring1 svlan 4084
BTI-SA-810# configure nni 1/1-1/2 add svlan 4084
```

Step 8 At node BTI SA-805-1, provision the ERPS detection link status.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet soam meg megid domain1 meg-type icc-based
level 1 ccm-interval 300hz vlan 4084
BTI-SA-805(config-soam)# mep mepid 1000 interface eth-0-1 direction
```



```

down
BTI-SA-805(config-soam)# mep mepid 2000 interface eth-0-2 direction
down
BTI-SA-805(config-soam)# rmep rmepid 1001 mepid 1000 remote-mac
0014.d060.01a6
BTI-SA-805(config-soam)# rmep rmepid 2001 mepid 2000 remote-mac
0014.d060.01a6
BTI-SA-805(config-soam)# continuity-check enable mepid 1000
BTI-SA-805(config-soam)# continuity-check enable mepid 2000
BTI-SA-805(config-soam)# exit
BTI-SA-805(config)# ethernet soam enable
BTI-SA-805(config)# end

```

Step 9 At node SA-810, provision the ERPS detection link status.

For example:

```

BTI-SA-810# configure oam domain link1 ccm-interval 3.3ms
BTI-SA-810# configure oam domain link1 outer-vid 4084
BTI-SA-810# configure oam domain link1 level 1
BTI-SA-810# configure oam domain link1 megid domain 1
BTI-SA-810# configure oam domain link1 enable
BTI-SA-810# configure oam localmp local1 interface 1/1
BTI-SA-810# configure oam localmp local1 mepid 2001
BTI-SA-810# configure oam localmp local1 enable
BTI-SA-810# configure oam eth-cc local1 ccm-db add 2000

BTI-SA-810# configure oam domain link2 ccm-interval 3.3ms
BTI-SA-810# configure oam domain link2 outer-vid 4084
BTI-SA-810# configure oam domain link2 level 1
BTI-SA-810# configure oam domain link2 megid domain 1
BTI-SA-810# configure oam domain link2 enable
BTI-SA-810# configure oam localmp local2 interface 1/2
BTI-SA-810# configure oam localmp local2 mepid 1001
BTI-SA-810# configure oam localmp local2 enable
BTI-SA-810# configure oam eth-cc local2 ccm-db add 1000

```

Step 10 At node BTI SA-805-1, provision the ERPS ring.

For example:

```

BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 2
BTI-SA-805(config-switch)# rpl-node owner
BTI-SA-805(config-switch)# rpl east-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# timer wait-to-restore 1
BTI-SA-805(config-switch)# eastmp mepid 1000 megid domain1
BTI-SA-805(config-switch)# westmp mepid 2000 megid domain1

```

```
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 11 At node SA-810, provision the ERPS ring.

For example:

```
BTI-SA-810# configure erp 1 rpl-node neighbor
BTI-SA-810# configure erp 1 rpl west
BTI-SA-810# configure erp 1 raps vlan 4084
BTI-SA-810# configure erp 1 raps mel 2
BTI-SA-810# configure erp 1 east interface 1/1
BTI-SA-810# configure erp 1 west interface 1/2
BTI-SA-810# configure erp 1 east mp local1
BTI-SA-810# configure erp 1 west mp local2
BTI-SA-810# configure erp 1 start
```

Step 12 At node BTI SA-805-1, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 13 At node SA-810, enable the two NNI ports.

For example:

```
BTI-SA-810# configure interface 1/1 enable
BTI-SA-810# configure interface 1/2 enable
```

Step 14 If not already done, enable the RPL interface.

Note In these examples, the RPL interface was already enabled in a previous step.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# end
```

6.3.5 Configuring G.8032 ERPS Between BTI SA-805 and PVX Nodes Using Linkscan

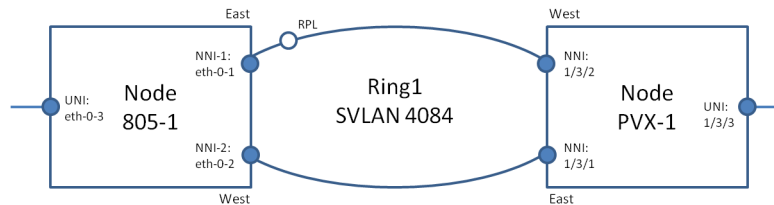
Use this procedure to configure G.8032 ERPS between BTI SA-805 and PVX nodes using Linkscan. The PVX refers to the packetVX, a component of the BTI 7000 Series.

Prerequisites

- Before ERPS is provisioned, no loop prevention mechanism should be operating on the network; therefore, the network operator must manually prevent the loop. This is typically performed by administratively disabling the designated RPL (ring protection link) interface in the ring. The nodes may be fibered in a closed loop, but it is imperative that one port be disabled if a loop is to be prevented.

In the steps and examples below, the BTI SA-805 node is designated BTI SA-805-1 and the PVX node is designated PVX-1 as shown in the following example topology:

Figure 6-5 Example Topology for ERPS Ring between BTI SA-805 and PVX Nodes



Step 1 At node BTI SA-805-1, disable the RPL (ring protection link) interface.

Note In these examples, the RPL interface is shown as part of node BTI SA-805-1. In rings with more nodes, the RPL interface could be part of another node.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# shutdown
BTI-SA-805(config-if)# end
```

Step 2 At node BTI SA-805-1, provision a VLAN.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 4084,100
BTI-SA-805(config-vlan)# end
```

Step 3 At node PVX-1, provision the same VLAN provisioned at node BTI SA-805-1.

For example:

```
BTI7000# configure terminal
BTI7000(config)# equipment 1/3 pec [insert partnumber]
BTI7000(config)# exit
BTI7000(config)# virtual-switch 1 name PVX-1
BTI7000(config)# bridge mode provider
```

```
BTI7000(config)# member 1/3
BTI7000(config)# exit
```

Step 4 At node BTI SA-805-1, provision two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 5 At node PVX-1, provision two NNI ports identical to those provisioned at node BTI SA-805-1.

Note	Ports default to enabled.
-------------	---------------------------

For example:

```
BTI7000(config)# virtual-switch 1
BTI7000(config)# configure terminal
BTI7000(config)# nni gigabitEthernet 1/3/1
BTI7000(config-nni-GigE1/3/1)# exit
BTI7000(config)# nni gigabitEthernet 1/3/2
BTI7000(config-nni-GigE1/3/2)# exit
```

Step 6 At node BTI SA-805-1, provision an EVC service for ERPS.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add Ring1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4084
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# end
```

Step 7 At node BTI SA-805-1, provision the ERPS ring.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# g8032 ring-id 1 east-interface eth-0-1 west-
interface eth-0-2
BTI-SA-805(config-switch)# raps vlan 4084
BTI-SA-805(config-switch)# raps mel 1
```

```
BTI-SA-805(config-switch)# rpl-node owner
BTI-SA-805(config-switch)# rpl east-interface
BTI-SA-805(config-switch)# traffic-channel 1
BTI-SA-805(config-switch)# timer wait-to-restore 1
BTI-SA-805(config-switch)# ring enable
BTI-SA-805(config-switch)# end
```

Step 8 At node PVX-1, provision the ERPS ring.

For example:

```
BTI7000(config)# virtual-switch 1
BTI7000(config)# configure terminal
BTI7000(config e-service)# eservice Ring1 type ERPS
BTI7000(config e-service)# s-vlan 4084
BTI7000(config e-service)# meglevel-up 3
BTI7000(config e-service)# meglevel-down 1
BTI7000(config e-service)# wait-to-restore-timer short
BTI7000(config e-service)# nni gigabitEthernet 1/3/1
BTI7000(config-nni-eservice)# neighbor enable
BTI7000(config-nni-eservice)# ccm disable
BTI7000(config-nni-eservice)# exit
BTI7000(config-eservice)# nni gigabitEthernet 1/3/2
BTI7000(config-nni-eservice)# neighbor enable
BTI7000(config-nni-eservice)# ccm disable
BTI7000(config-nni-eservice)# exit
BTI7000(config-eservice)# no shut
```

Step 9 At node BTI SA-805-1, enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# no shutdown
```

Step 10 If not already done, enable the RPL interface.

Note In these examples, the RPL interface was already enabled in a previous step.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# end
```

6.4 Configuring Ethernet Protection Switching (G.8031)

Ethernet Protection Switching (EPS) provides linear protection switching on a per-VLAN basis for a point-to-point Ethernet path.

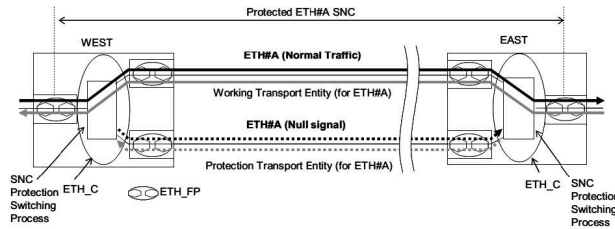
6.4.1 G.8031 Overview

Ethernet Protection Switching (EPS) is applicable to Point-to-Point VLAN-based Ethernet Subnetwork Connections (SNC) that provide connectivity between two Ethernet flow points in a flow domain. VLAN IDs (VIDs) are used to identify Point-to-Point VLAN-based Ethernet SNCs in Ethernet links.

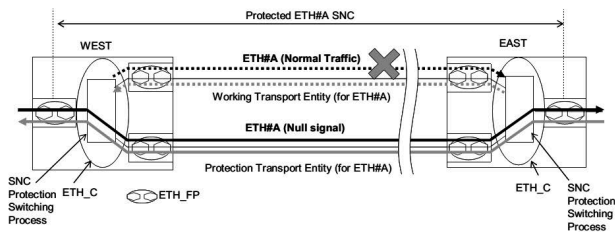
- One hundred percent of the impaired traffic in a protected domain is protected from a failure on a single working entity.
- Periodic monitoring of the Ethernet layer connectivity of the working transport entity and the protection transport entity is managed by the Connectivity Check Messaging (CCM) procedures defined in ITU-T Y.1731.
- Network operator options include revertive and non-revertive switching.
- Mismatches between the bridge or selector positions of the near end and the far end are detected and reported.
- Bridge/selector mismatches for the local network element are detected and reported, and can be cleared by the operator.
- Lockout of Protection (LoP), force switch and manual switch commands and other operator requests are supported.
- Prioritized protection between Signal Fail (SF) and operator requests is supported.
- A provisionable, generic hold-off function is available to delay the beginning of protection-switching actions.
- Protection switching is agnostic to the monitoring method used, as long as it can receive OK or SF information for the transport entity of each point-to-point linear Ethernet link.
- Both software-based and hardware-assisted working and protection path switching are supported.
- Transfer time is less than 50 ms when hardware-assisted APS is supported on the target platform.

6.4.2 1:1 Bidirectional Protection Switching

The following illustrates the 1:1 linear protection switching architecture, with the normal traffic (ETH#A) being transmitted via the working transport entity.

Figure 6-6 Protection Switching Architecture

The figure below illustrates a situation where a protection switch has occurred due to a signal fail condition on the working transport entity.

Figure 6-7 Protection Switching Architecture—Signal fail condition for working transport entity

- At the source node, the normal traffic (ETH#A) is forwarded to the protection transport entity.
- At the sink node, the normal traffic (ETH#A) is received from the protection transport entity.
- During the protection switching operation, transient mismatch between bridge/selector positions at both ends of the protected domain is possible.

However, misconnection between ETH_CI for ETH#A and other ETH_CI is not possible because traffic is always forwarded correctly through the ETH_C, based on the VID. Note that in order to achieve this forwarding behaviour, different VIDs must be configured on the protection transport entity for the protected ETH#A and the non-protected ETH traffic.

The forwarding of traffic according to the VID in the ETH_C function means that, for 1:1 architectures, traffic misconnections are never possible. This greatly simplifies the functionality of the protection switching protocol, enabling a 1-phase protocol to be used, with only a single information exchange being required between both ends to complete a bidirectional switching.

6.4.3 Preparation for Configuring G.8031

To enable G.8031 the following steps are required:

- **Create OAM domain for CCM:** Periodic monitoring of the Ethernet layer connectivity of the working transport entity and the protection transport entity is managed by the Connectivity Check Messaging (CCM) procedures. G.8031 uses CCM in its protection scheme, so CCM should be enabled before provisioning G.8031.
- **Create Traffic-channel:** A VLAN protection group should be enabled before provisioning G.8031.

6.4.4 Example Scenarios

Operation examples of 1-phase APS protocol (revertive, non-revertive, signal fail and forced switched) are described below:

Revertive Mode

The following sequence of events occurs in revertive mode:

- The protected domain is operating without any defect (working entity is selected).
- Signal fail (SF) occurs in the west-to-east direction (switches to protection entity).
- This defect is repaired (enters WTR state, maintains to select protection entity).
- WTR timer expires (switches to working entity).

Non-revertive Mode

The following sequence of events occurs in non-revertive mode:

- The protected domain is operating without any defect (working entity is selected).
- Signal fail (SF) occurs in the west-to-east direction (switches to protection entity).
- This defect is repaired (enters DNR state, maintains to select protection entity).

Signal fail and forced switch

The following sequence of events occurs in :

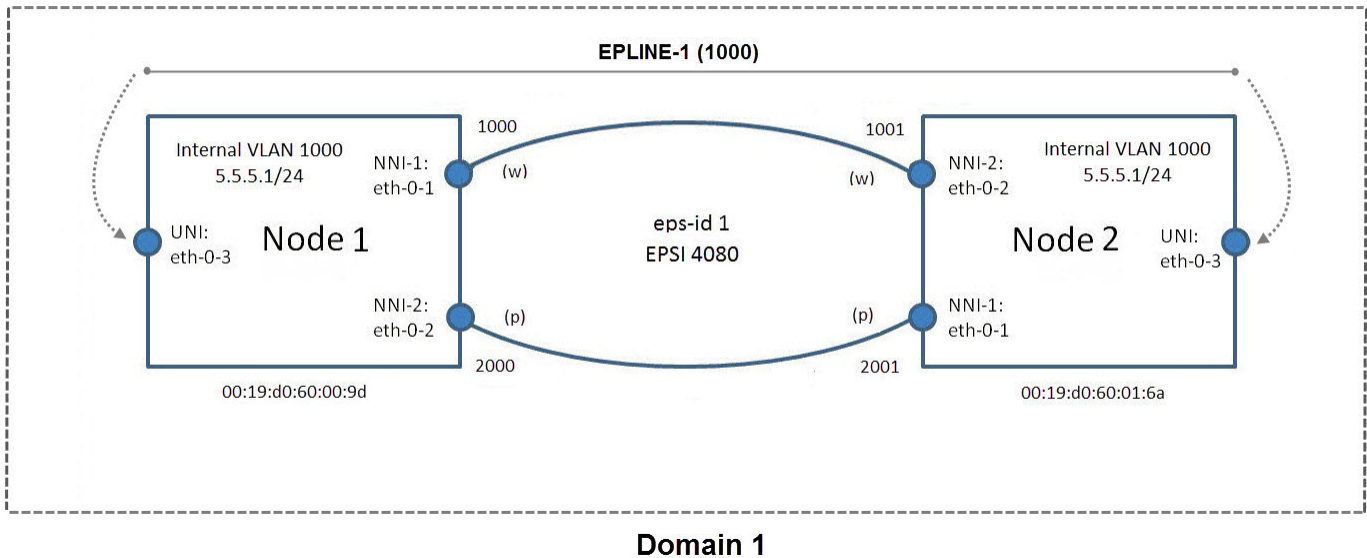
- Signal fail (SF) occurs in the west-to-east direction (switches to protection entity).
- Forced switch (FS) command is accepted at east (enters FS state).
- FS is cleared at east and SF is reasserted at east.

6.4.5 Configuring G.8031 Ethernet Linear Protection Switching Between Two BTI SA-805 Nodes Using Y.1731

Use this procedure to configure G.8031 protection between two BTI SA-805 nodes using Y.1731.

Prerequisites

In the steps and examples below, the two BTI SA-805 nodes are designated Node 1 and Node 2 as shown in the following example topology:

Figure 6-8 Example Topology for G.8031 Protection Between Two BTI SA-805 Nodes

Step 1 At Node 1, configure the vlan for the EPLINE, and for the svlan.

Note This example uses vlan 1000 and vlan 4080. Adjust the commands in the examples according to your configuration.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config)# vlan 4080 name EPS1
BTI-SA-805(config)# vlan 1000 name EPLINE)1
BTI-SA-805(config)# end
```

Step 2 At Node 1, configure the two ports you will use.

Note This example uses port 1 and port 2. Adjust the commands in the examples according to the ports you use.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
```

```
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 3 At Node 1, configure EVC for G.8031

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add EPS1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4080
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config)# end
```

Step 4 At Node 1 , configure SOAM/Y.1731.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet soam enable
BTI-SA-805(config)# ethernet soam meg megid domain1 meg-type icc-based
level 1 ccm-interval 300hz vlan 4080
BTI-SA-805(config-soam-ma)# mep mepid 1000 interface eth-0-1 direction
down
BTI-SA-805(config-soam-ma)# mep mepid 2000 interface eth-0-2 direction
down
BTI-SA-805(config-soam-ma)# continuity-check rmep-learning enable
BTI-SA-805(config-soam-ma)# exit
```

Step 5 At Node 1, configure G.8031 instance

For example:

```
BTI-SA-805(config)# g8031 eps-id 1 working-port eth-0-1 protection-
port eth-0-2
BTI-SA-805(g8031-config-switch)# mode revertive
BTI-SA-805(g8031-config-switch)# timer wait-to-restore 5
BTI-SA-805(g8031-config-switch)# working-path mepid 1000 megid domain1
BTI-SA-805(g8031-config-switch)# protection-path mepid 2000 megid
domain1
BTI-SA-805(g8031-config-switch)# traffic-channel 1
BTI-SA-805(g8031-config-switch)# eps enable
BTI-SA-805(g8031-config-switch)# end
```

Step 6 At Node 1 , enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# speed 1000
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
```

```
BTI-SA-805(config-if)# speed 1000
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
```

Step 7 At Node 1, configure a UNI for the EPLINE service.

For example:

```
BTI-SA-805(config)# ethernet uni add UNI-1
BTI-SA-805(config-uni)# map interface eth-0-3
BTI-SA-805(config-uni)# mtu 1522
BTI-SA-805(config-uni)# all-to-one-bundling enable
BTI-SA-805(config-uni)# multiplex disable
BTI-SA-805(config-uni)# bundling disable
BTI-SA-805(config-uni)# exit
```

Step 8 At Node 1, configure an EVC for the EPLINE service.

For example:

```
BTI-SA-805(config)# ethernet evc add EPLINE_1
BTI-SA-805(config-evc)# service type epline
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# add uni UNI-1
BTI-SA-805(config-evc)# end
```

Step 9 At Node 1, create an interface VLAN for IPLINE_1 to test path.

For example:

```
BTI-SA-805(config)# interface vlan 1
BTI-SA-805(config-if)# no ip address
BTI-SA-805(config-if)# interface vlan 1000
BTI-SA-805(config-if)# ip address 1.1.1.1/24
BTI-SA-805(config-if)# end
```

Step 10 At Node 1, save the configuration.

For example:

```
BTI-SA-805# wr mem
```

Step 11 At Node 2, configure the vlan for the EPLINE, and for the svlan.

Note This example uses vlan 1000 and vlan 4080. Adjust the commands in the examples according to your configuration.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# vlan database
BTI-SA-805(config)# vlan 4080 name EPS1
BTI-SA-805(config)# vlan 1000 name EPLINE)1
BTI-SA-805(config)# end
```

Step 12 At Node 2, configure the two ports you will use.

Note This example uses port 1 and port 2. Adjust the commands in the examples according to the ports you use.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet nni add NNI-1
BTI-SA-805(config-nni)# map interface eth-0-1
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add NNI-2
BTI-SA-805(config-nni)# map interface eth-0-2
BTI-SA-805(config-nni)# tpid 88a8
BTI-SA-805(config-nni)# mtu 9600
BTI-SA-805(config-nni)# end
```

Step 13 At Node 2, configure EVC for G.8031

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet evc add EPS1
BTI-SA-805(config-evc)# service type control-channel
BTI-SA-805(config-evc)# svlan 4080
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config)# end
```

Step 14 At Node 2 , configure SOAM/Y.1731.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# ethernet soam enable
BTI-SA-805(config)# ethernet soam megid domain1 meg-type icc-based
level 1 ccm-interval 300hz vlan 4080
BTI-SA-805(config-soam-ma)# mep mepid 1001 interface eth-0-2 direction
down
BTI-SA-805(config-soam-ma)# mep mepid 2001 interface eth-0-1 direction
down
BTI-SA-805(config-soam-ma)# continuity-check rmep-learning enable
BTI-SA-805(config-soam-ma)# exit
```

Step 15 At Node 2, configure G.8031 instance

For example:

```
BTI-SA-805(config)# g8031 eps-id 1 working-port eth-0-2 protection-
port eth-0-1
BTI-SA-805(g8031-config-switch)# mode revertive
BTI-SA-805(g8031-config-switch)# timer wait-to-restore 5
BTI-SA-805(g8031-config-switch)# working-path mepid 1001 megid domain1
```

```
BTI-SA-805(g8031-config-switch)# protection-path mepid 2001 megid
domain1
BTI-SA-805(g8031-config-switch)# traffic-channel 1
BTI-SA-805(g8031-config-switch)# eps enable
BTI-SA-805(g8031-config-switch)# end
```

Step 16 At Node 2 , enable the two NNI ports.

For example:

```
BTI-SA-805# configure terminal
BTI-SA-805(config)# interface eth-0-1
BTI-SA-805(config-if)# speed 1000
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
BTI-SA-805(config)# interface eth-0-2
BTI-SA-805(config-if)# speed 1000
BTI-SA-805(config-if)# no shutdown
BTI-SA-805(config-if)# exit
```

Step 17 At Node 2, configure a UNI for the EPLINE service.

For example:

```
BTI-SA-805(config)# ethernet uni add UNI-1
BTI-SA-805(config-uni)# map interface eth-0-3
BTI-SA-805(config-uni)# mtu 1522
BTI-SA-805(config-uni)# all-to-one-bundling enable
BTI-SA-805(config-uni)# multiplex disable
BTI-SA-805(config-uni)# bundling disable
BTI-SA-805(config-uni)# exit
```

Step 18 At Node 2, configure an EVC for the EPLINE service.

For example:

```
BTI-SA-805(config)# ethernet evc add EPLINE_1
BTI-SA-805(config-evc)# service type epline
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# add nni NNI-1
BTI-SA-805(config-evc)# add nni NNI-2
BTI-SA-805(config-evc)# add uni UNI-1
BTI-SA-805(config-evc)# end
```

Step 19 At Node 2, create an interface VLAN for IPLINE_1 to test path.

For example:

```
BTI-SA-805(config)# interface vlan 1
BTI-SA-805(config-if)# no ip address
BTI-SA-805(config-if)# interface vlan 1000
BTI-SA-805(config-if)# ip address 1.1.1.2/24
BTI-SA-805(config-if)# end
```

Step 20 At Node 2, save the configuration.

For example:

```
BTI-SA-805# wr mem
```

Step 21 At Node 2, test path by pinging the UNI at the far end.

For example:

```
BTI-SA-805# ping 1.1.1.1
```

Step 22 At Node 1, test path by pinging the UNI at the far end.

For example:

```
BTI-SA-805# ping 1.1.1.1
```

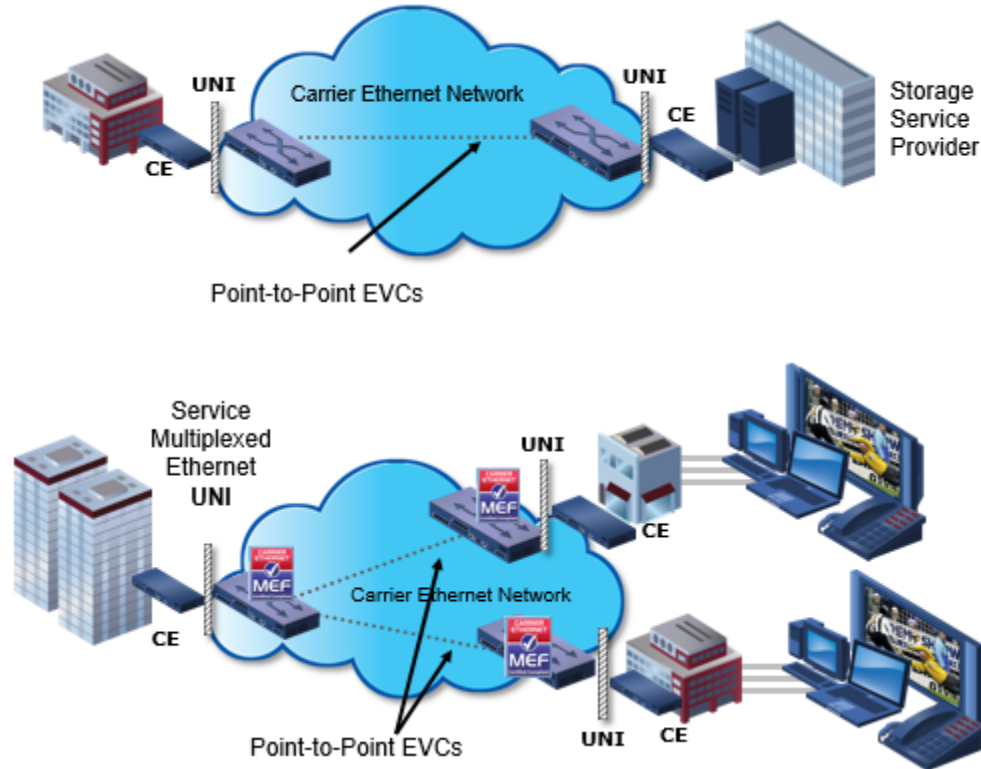
6.5 Provisioning MEF E-Service

Ethernet Service Types can be used to create a broad range of services. Each Ethernet Service Type has a set of Ethernet Service Attributes that define the service characteristics. These Ethernet Service Attributes in turn have a set of parameters associated with them that provide various options for the different Service Attributes.

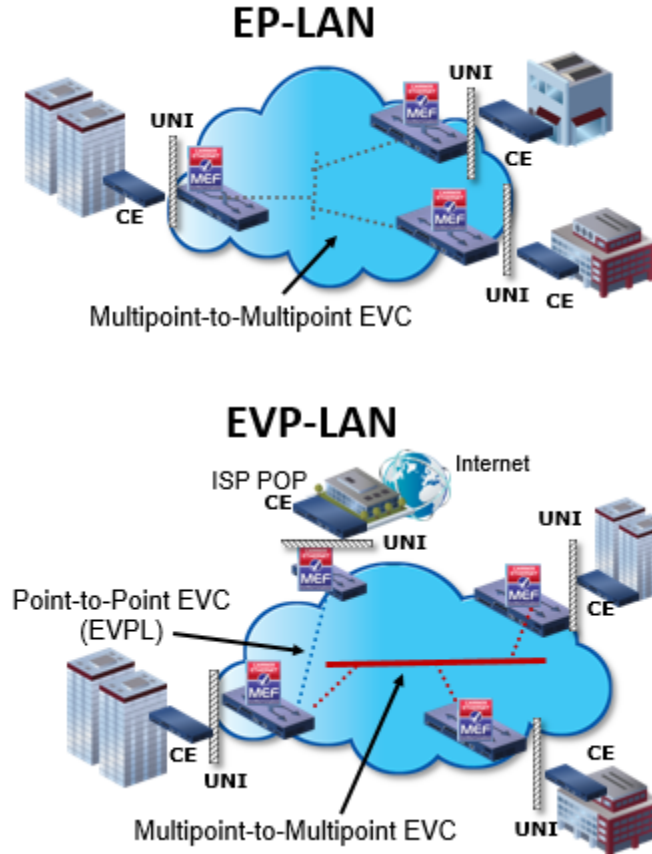
Two Ethernet Service Types have been defined. The first, Ethernet Line Service (E-Line Service), uses a Point-to-Point EVC. The second, Ethernet LAN Service (E-LAN Service), uses a Multipoint-to-Multipoint EVC.

This chapter will detail how to configure the following Ethernet service types

- Ethernet Private Line Service [epline]
- Ethernet Virtual Private Line Service [epvLine]



- Ethernet Private LAN Service [eplan]
- Ethernet Virtual Private LAN Service [evplan]



Ethernet Virtual Connection (EVC)

A fundamental aspect of Ethernet Services is the Ethernet Virtual Connection (EVC). An EVC is an association of two or more UNIs that limit the exchange of Service Frames to UNIs in the Ethernet Virtual Connection. These UNIs are said to be "in the EVC." A given UNI can support more than one EVC via the Service Multiplexing attribute.

An ingress Service Frame that is mapped to the EVC can be delivered to one or more of the UNIs in the EVC other than the ingress UNI. It **MUST NOT** be delivered back to the ingress UNI. It **MUST NOT** be delivered to a UNI not in the EVC. An EVC is always bi-directional in the sense that ingress Service Frames can originate at any UNI in an EVC.

The EVC ID is an arbitrary string administered by the Service Provider that is used to identify an EVC within the MEN. The EVC ID **MUST** be unique across all EVCs in the MEN. It is intended for management and control purposes. The EVC ID is not carried in any field in the Service Frame.

All to One Bundling

When a UNI has the All to One Bundling attribute set to TRUE, all CE-VLAN IDs **MUST** map to a single EVC at the UNI. The All to One Bundling service attribute is independent of the EVCs at the UNI. The EVC at the UNI **MUST** have the CE-VLAN ID Preservation Service

Attribute and the list of CE-VLAN IDs mapped to the EVC **MUST** include all CE-VLAN IDs and be the same at each UNI in the EVC. Therefore a UNI with bundling enabled

- Cannot have Service Multiplexing enabled
- All UNIs in the EVC must have the All to One Bundling Service Attribute

To support E-Service as EP-Line, EVP-Line, EP-LAN or EVP-LAN "all-to-one bundling" attribute should be configured properly. In the case of EP-LINE and EP-LAN service the attribute should be set to "enable" and EVP-LINE and EVP-LAN service should be set to "disable".

Bundling

A UNI attribute in which more than one CE-VLAN ID can be associated with an EVC. When a UNI has the Bundling attribute, it **MUST** be configurable so that more than one CE-VLAN ID can map to a particular EVC at the UNI. The Bundling service attribute is independent of the EVCs at the UNI. An EVC with more than one CE-VLAN ID mapping to it **MUST** have the CE-VLAN ID Preservation Service Attribute and the list of CE-VLAN IDs mapped to the EVC **MUST** be the same at each UNI in the EVC. To support EVC with more than one CE-VLAN ID mapping this "bundling" attribute should be configured properly. In case of more than one CE-VLAN ID mapping should be set to "enable" and one CE-VLAN ID mapping should be set to "disable".

Service Multiplexing

A UNI with the Service Multiplexing attribute **must** be configurable to support multiple EVCs. Point-to-Point EVCs and Multipoint EVCs **MAY** be multiplexed in any combination at a UNI. To support E-Service as EP-Line, EVP-Line, EP-LAN or EVP-LAN this "multiplex" attribute should be configured properly. In the case of EP-LINE and EP-LAN service should be set to "disable" and EVP-LINE and EVP-LAN service should be set to "enable".

CE-VLAN ID Preservation An EVC attribute in which the CE-VLAN ID of an egress Service Frame is identical in value to the CE-VLAN ID of the corresponding ingress Service Frame.

CE-VLAN ID/EVC Map An association of CE-VLAN IDs with EVCs at a UNI

In an EVC with CE-VLAN CoS Preservation, an egress Service Frame resulting from an ingress Service Frame that contains a CE-VLAN CoS **MUST** have the identical CE-VLAN CoS.

Max-uni attribute The Maximum Number of UNIs (MNU) service attribute specifies the maximum number of UNIs allowed in a EVC. max-uni <2-512>" To support E-Service as EP-Line, EVP-Line, EP-LAN or EVP-LAN this "multiplex" attribute should be configured properly. In case of EP-Line or EP-LAN, MNE **MUST** be one and EVP-Line or EVP-LAN, MNE **MUST** be two or greater.

Related Commands EVC Configuration Mode Possible max-uni values by Service Multiplexing of UNI service type (epline|eplan|evpline|evplan) epline, evpline – 2 eplan, evplan – 2 or greater than 2

Max-enc attribute The Maximum Number of EVCs (MNE) service attribute specifies the maximum number of EVCs allowed in the UNI. To support E-Service as EP-Line, EVP-Line, EP-LAN or EVP-LAN this "multiplex" attribute should be configured properly. In case of EP-Line or EP-LAN, MNE **MUST** be one and EVP-Line or EVP-LAN, MNE **MUST** be two or greater.

6.5.1 Provisioning MEF E-Service General

This section describes the general provisioning steps required before provisioning the Ethernet EPLINE, EPVLINE, EPLAN and EVPLAN service .

- **Step 1.** Create a VLAN
- **Step 2.**Provision L2CP [optional]
- **Step 3.** Provision BW profile Provision [optional]

Step 1 Register VLAN to the vlan database.

```
BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)# vlan 1000,2000,3000
```

Step 2 [Optional] Register the L2CP MAC address and create L2CP profile. [Discard this step if L2CP control is not used]

```
BTI-SA-805(config)# l2protocol mac 3 0180.c200.000e
BTI-SA-805(config)# l2protocol mac 4 0180.c200.000b
```

```
BTI-SA-805(config)# ethernet l2cp add uni-epl-option1
BTI-SA-805(config-l2cp)# action 3 pass-to-evc
BTI-SA-805(config-l2cp)# action 4 pass-to-evc
BTI-SA-805(config-l2cp)# exit
BTI-SA-805(config)# ethernet l2cp add evc-epl-option1
BTI-SA-805(config-l2cp)# action 4 tunnel
BTI-SA-805(config-l2cp)# end
BTI-SA-805# show ethernet l2cp
```

```
-----
L2CP Type: uni    Name: uni-epl-option1
```

Index	PDU Address	MASK	Action
3	0180.c200.000e	ffff.ffff.ffff	pass-to-evc
4	0180.c200.000b	ffff.ffff.ffff	pass-to-evc
11	stp	ffff.ffff.ffff	discard
12	slow-proto	ffff.ffff.ffff	discard
13	dot1x	ffff.ffff.ffff	discard
14	cfm	ffff.ffff.ffff	discard

```
-----
L2CP Type: uni    Name: evc-epl-option1
```

Index	PDU Address	MASK	Action
3	0180.c200.000e	ffff.ffff.ffff	discard
4	0180.c200.000b	ffff.ffff.ffff	tunnel
11	stp	ffff.ffff.ffff	discard
12	slow-proto	ffff.ffff.ffff	discard
13	dot1x	ffff.ffff.ffff	discard
14	cfm	ffff.ffff.ffff	discard

Step 3 CoS Profile creation

```
BTI-SA-805(config)# ethernet cos add gold-service
BTI-SA-805(config-cos)# add pcp 5-7
BTI-SA-805(config-cos)# exit
BTI-SA-805(config)# ethernet cos add silver-service
BTI-SA-805(config-cos)# add pcp 2-4
BTI-SA-805(config-cos)# exit
BTI-SA-805(config)# ethernet cos add bronz-service
BTI-SA-805(config-cos)# add pcp 0-1
BTI-SA-805(config-cos)# exit
BTI-SA-805(config)# ethernet cos add iron-service
BTI-SA-805(config-cos)# add pcp 1-2
BTI-SA-805(config-cos)# exit
BTI-SA-805(config)# ethernet cos add platinum-service
BTI-SA-805(config-cos)# add pcp 4-5
BTI-SA-805(config-cos)# end
BTI-SA-805# show ethernet cos
```

Index	Identifier	Type	Identifier-List
1	gold-service	pcp	5-7
2	silver-service	pcp	2-4
3	bronz-service	pcp	0-1
4	iron-service	pcp	1-2
5	platinum-service	pcp	4-5

Step 6. Bandwidth profile creation

```
BTI-SA-805(config)# ethernet bwp add bwp-uni
BTI-SA-805(config-bwp)# cir 35000 cbs 12176 eir 20000 ebs 12176 color
aware
BTI-SA-805(config-bwp)# exit
BTI-SA-805(config)# ethernet bwp add bwp-evc
BTI-SA-805(config-bwp)# cir 25000 cbs 12176 eir 10000 ebs 12176 color
aware
BTI-SA-805(config-bwp)# exit
BTI-SA-805(config)# ethernet bwp add bwp-cos cos gold-service
BTI-SA-805(config-bwp)# cir 25000 cbs 12176 eir 10000 ebs 12176 color
aware
BTI-SA-805(config-bwp)# exit
BTI-SA-805(config)# ethernet bwp add bwp-cos cos silver-service
BTI-SA-805(config-bwp)# cir 15000 cbs 12176 eir 10000 ebs 12176 color
aware
BTI-SA-805(config-bwp)# exit
BTI-SA-805(config)# ethernet bwp add bwp-cos cos bronz-service
BTI-SA-805(config-bwp)# cir 5000 cbs 12176 eir 5000 ebs 12176 color
aware
BTI-SA-805(config-bwp)# end
BTI-SA-805# show ethernet bwp
```

```
-----
Group: 0001, Name: bwp-uni
-- cir----- cbs----- eir----- ebs----- c f CoS-----
```

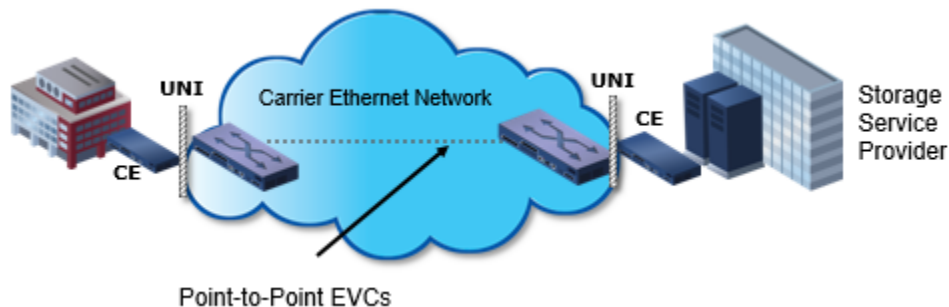
1	35000	12176	20000	12176	A	N	

Group: 0002, Name: bwp-evc							
--	cir-----	cbs-----	eir-----	ebs-----	c	f	CoS-----
1	25000	12176	10000	12176	A	N	

Group: 0003, Name: bwp-cos							
--	cir-----	cbs-----	eir-----	ebs-----	c	f	CoS-----
1	25000	12176	10000	12176	A	N	gold-service
2	15000	12176	10000	12176	A	N	silver-service
3	5000	12176	5000	12176	A	N	bronz-service

6.5.2 Provisioning Ethernet Private Line (EPL) Service

This section describes the steps required to create a Ethernet Private Line (EPL) Service.



Step 1 EVC Creation

```
BTI-SA-805(config)# ethernet evc add EPLINE-TEST1
BTI-SA-805(config-evc)# service type epline
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# end
BTI-SA-805# show ethernet evc
```

```
-----
EVC EPLINE-TEST1:
Service Type           : epline
EVC Type               : None
Outer SVLAN ID         : 100
CE-VLAN Preservation   : Yes
CoS Preservation       : Yes
Maximum Number of UNI  : 2
Number of UNI using this EVC : 0
MEG Level              : 0
-----
```

Step 2 NNI creation and make association with Interface and EVC

```
BTI-SA-805(config)# ethernet nni add nn1
BTI-SA-805(config-nni)# map interface eth-0-3
```

```

BTI-SA-805(config-nni)# add evc EPLINE-TEST1
BTI-SA-805(config-nni)# end
BTI-SA-805# show ethernet nni
-----
NNI nn1:
Mapped Interface           : eth-0-3
Maximum Number of VC      : 400
Number of using this NNI  : 1
EVC List -----
EPLINE-TEST1,
-----

```

Step 3 UNI creation and make association with Interface and EVC.

```

BTI-SA-805(config)# ethernet uni add unil
BTI-SA-805(config-uni)# map interface eth-0-1
BTI-SA-805(config-uni)# add evc EPLINE-TEST1
BTI-SA-805(config-uni)# end
BTI-SA-805# show ethernet uni
-----
UNI unil:
Mapped Interface           : eth-0-1
Default CVLANID           : 0
Default SVLAN Priority     : 0
All-to-One Bundling       : Yes
Bundling                   : No
Service Multiplexing       : No
Maximum Number of EVC     : 1
Number of EVC using this UNI : 1
EVC List
EPLINE-TEST1,
-----
BTI-SA-805# show ethernet epu
-----
E-Service unil-EPLINE-TEST1:
CE-VLAN map : All to One Bundling
-----

```

Step 4 Ensure All-to-One Bundling, Bundling and Service multiplexing are configured correctly.

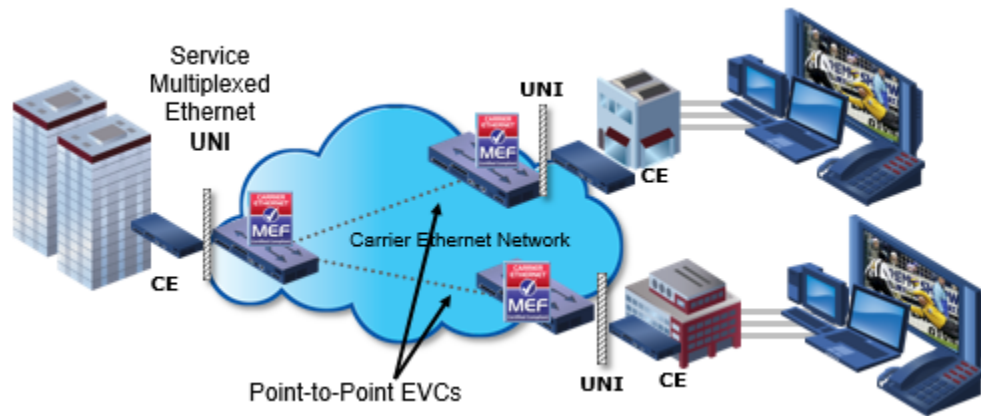
Additional Attributes

all-to-one-bundling (enable disable)	EP-LINE and EP-LAN service should be set to "enable"
BTI-SA-805(config-uni)# all-to-one-bundling enable	EVP-LINE and EVP-LAN service should be set to "disable"
bundling (enable disable)	More than one CE-VLAN ID mapping should be set to "enable"
	One CE-VLAN ID mapping should be set to "disable".

<hr/>	
BTI-SA-805(config-uni)# bundling enable	
"multiplex (enable disable)	EP-LINE and EP-LAN service should be set to "disable"
BTI-SA-805(config-uni)# multiplex enable	EVP-LINE and EVP-LAN service should be set to "enable".
max-evc <1-512>	multiplex attribute :maximum number of EVCs allowed in the UNI.
BTI-SA-805(config-uni)# max-evc 10	EP-Line or EP-LAN, MNE MUST be one EVP-Line or EVP-LAN, MNE MUST be two or greater.
default ce-vlan <0-4094>	The Default CE-VLAN ID service attribute specifies the default CE-VLAN ID for untagged packet at the UNI port.
BTI-SA-805(config-uni)# default ce-vlan 10	To support untagged packet at the UNI port this attribute MUST be set to none zero value. This value MUST be the same as one of the CE-VLAN ID mapping list
default priority <0-7>"	The Default Priority service attribute specifies the default priority of S-VLAN tag for untagged packet at the UNI port.
BTI-SA-805(config-uni)# default priority 6	
BTI-SA-805(config-uni)# add evc EPLINE-TEST1	E-Service instance is automatically created by command "add uni UNI-ID" of EVC configuration mode. E-Service instance ID is formed by the concatenation of the UNI ID and the EVC ID.
add vlan (VLAN-ID all-others)	VLAN-ID : 1-4095
BTI-SA-805(config)# ethernet epu CUSTOMER-A-EPLINE-test2-test1	all-others : all VLANs that is not mapped to other EVC in a UNI.
BTI-SA-805(config-epu)# add vlan 10	Except for All-to-One-bundling, E-Service MUST have one or more CE-VLAN ID mapped.
BTI-SA-805(config-epu)# add vlan 20	
BTI-SA-805 show ethernet epu	Show E Service
BTI-SA-805# show ethernet uni CUSTOMER-A	This example will show the following E Service provisioning on the UNI customer A UNI CUSTOMER-A: Mapped Interface : eth-0-2 Default CVLANID : 0 Default SVLAN Priority : 0 All-to-One Bundling : No Bundling : No Service Multiplexing : No Maximum Number of EVC : 1 Number of EVC using this UNI : 1 EVC List EPLINE-INTERNET_SERVICE

6.5.3 Provisioning Ethernet Virtual Private Line (EVPL) Service

Ethernet Virtual Private Line(EVPL) Service



Step 1 Create NNI and make association with interface

```
BTI-SA-805(config)# ethernet nni add Test2-RING-E
BTI-SA-805(config-nni)# map interface eth-0-3
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add Test2-RING-W
BTI-SA-805(config-nni)# map interface eth-0-4
BTI-SA-805(config-nni)# end
BTI-SA-805# show ethernet nni
```

```
-----
NNI Test2-RING-E:
Mapped Interface           : eth-0-3
Maximum Number of VC      : 400
Number of using this NNI  : 0
-----
```

```
-----
NNI Test2-RING-W:
Mapped Interface           : eth-0-4
Maximum Number of VC      : 400
Number of using this NNI  : 0
-----
```

Step 2 Create UNI and make association with interface.

```
BTI-SA-805# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BTI-SA-805(config)# ethernet uni add unil
BTI-SA-805(config-uni)# all-to-one-bundling disable
BTI-SA-805(config-uni)# multiplex enable
BTI-SA-805(config-uni)# max-evc 10
BTI-SA-805(config-uni)# default ce-vlan 10
BTI-SA-805(config-uni)# map interface eth-0-1
BTI-SA-805(config-uni)# exit
```

```
BTI-SA-805(config)# ethernet uni add uni2
BTI-SA-805(config-uni)# all-to-one-bundling disable
BTI-SA-805(config-uni)# multiplex enable
BTI-SA-805(config-uni)# max-evc 10
BTI-SA-805(config-uni)# map interface eth-0-2
BTI-SA-805(config-uni)# end
BTI-SA-805# show ethernet uni
```

```
-----
UNI uni1:
Mapped Interface           : eth-0-1
Default CVLANID           : 10
Default SVLAN Priority     : 0
All-to-One Bundling      : No
Bundling                  : No
Service Multiplexing      : Yes
Maximum Number of EVC     : 10
Number of EVC using this UNI : 0
-----
```

```
UNI uni2:
Mapped Interface           : eth-0-2
Default CVLANID           : 0
Default SVLAN Priority     : 0
All-to-One Bundling      : No
Bundling                  : No
Service Multiplexing      : Yes
Maximum Number of EVC     : 10
Number of EVC using this UNI : 0
-----
```

Step 3 Create EVC and make association with UNI and NNI

```
BTI-SA-805# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BTI-SA-805(config)# ethernet evc add EVPLINE-test1
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# service type evpline
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni uni1
BTI-SA-805(config-evc)# add nni Test2-RING-E
BTI-SA-805(config-evc)# add nni Test2-RING-W
BTI-SA-805(config-evc)# exit
BTI-SA-805(config)# ethernet evc add EVPLINE-test2
BTI-SA-805(config-evc)# svlan 2000
BTI-SA-805(config-evc)# service type evpline
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni uni1
BTI-SA-805(config-evc)# add nni Test2-RING-E
BTI-SA-805(config-evc)# add nni Test2-RING-W
BTI-SA-805(config-evc)# end
BTI-SA-805# show ethernet evc
-----
EVC EVPLINE-test1:
```



```

Service Type           : evpline
EVC Type               : Point-to-Point
Outer SVLAN ID         : 1000
CE-VLAN Preservation   : No
CoS Preservation       : Yes
Maximum Number of UNI   : 2
Number of UNI using this EVC : 1
MEG Level              : 0
UNI List

```

```

-----
    unil,
NNI List
    Test2-RING-E, Test2-RING-W,

```

```

-----
EVC EVPLINE-test2:
Service Type           : evpline
EVC Type               : Point-to-Point
Outer SVLAN ID         : 2000
CE-VLAN Preservation   : No
CoS Preservation       : Yes
Maximum Number of UNI   : 2
Number of UNI using this EVC : 1
MEG Level              : 0
UNI List
    unil,
NNI List
    Test2-RING-E, Test2-RING-W,

```

Step 4 Add CE-VLAN mapping to the service instance

```

BTI-SA-805(config)# ethernet epu unil-EVPLINE-test1
BTI-SA-805(config-epu)# add vlan 10
BTI-SA-805(config-epu)# exit
BTI-SA-805(config)# ethernet epu unil-EVPLINE-test2
BTI-SA-805(config-epu)# add vlan 20
BTI-SA-805(config-epu)# end
BTI-SA-805# show ethernet epu

```

```

-----
E-Service unil-EVPLINE-test1:
  CE-VLAN map : untagged(10),10

```

```

-----
E-Service uni2-EVPLINE-test1:
  CE-VLAN map : 20

```

Step 5 Ensure All-to-One Bundling, Bundling and Service multiplexing are configured correctly.

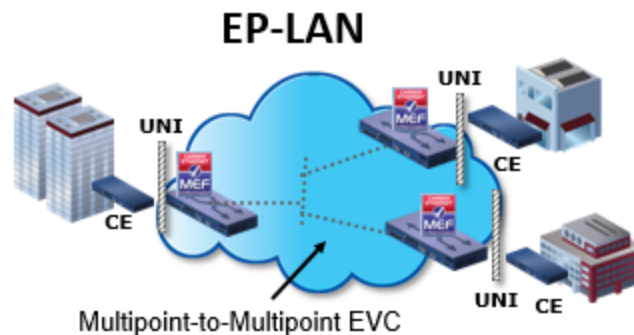
Additional Attributes

all-to-one-bundling (enable disable) BTI-SA-805(config-uni)# all-to-one-bundling enable	EP-LINE and EP-LAN service should be set to "enable" EVP-LINE and EVP-LAN service should be set to "disable"
bundling (enable disable) BTI-SA-805(config-uni)# bundling enable	More than one CE-VLAN ID mapping should be set to "enable" One CE-VLAN ID mapping should be set to "disable".
"multiplex (enable disable) BTI-SA-805(config-uni)# multiplex enable	EP-LINE and EP-LAN service should be set to "disable" EVP-LINE and EVP-LAN service should be set to "enable".
max-evc <1-512> BTI-SA-805(config-uni)# max-evc 10	multiplex attribute :maximum number of EVCs allowed in the UNI. EP-Line or EP-LAN, MNE MUST be one EVP-Line or EVP-LAN, MNE MUST be two or greater.
default ce-vlan <0-4094> BTI-SA-805(config-uni)# default ce-vlan 10	The Default CE-VLAN ID service attribute specifies the default CE-VLAN ID for untagged packet at the UNI port. To support untagged packet at the UNI port this attribute MUST be set to none zero value. This value MUST be the same as one of the CE-VLAN ID mapping list
default priority <0-7> BTI-SA-805(config-uni)# default priority 6	The Default Priority service attribute specifies the default priority of S-VLAN tag for untagged packet at the UNI port.
BTI-SA-805(config-uni)# add evc EPLINE-TEST1	E-Service instance is automatically created by command "add uni UNI-ID" of EVC configuration mode. E-Service instance ID is formed by the concatenation of the UNI ID and the EVC ID.
add vlan (VLAN-ID all-others) BTI-SA-805(config)# ethernet epu CUSTOMER-A-EPLINE-Test2-Test1 BTI-SA-805(config-epu)# add vlan 10 BTI-SA-805(config-epu)# add vlan 20	VLAN-ID : 1-4095 all-others : all VLANs that is not mapped to other EVC in a UNI. Except for All-to-One-bundling, E-Service MUST have one or more CE-VLAN ID mapped.
BTI-SA-805 show ethernet epu	Show E Service
BTI-SA-805# show ethernet uni CUSTOMER-A	This example will show the following E Service provisioning on the UNI customer A UNI CUSTOMER-A: Mapped Interface : eth-0-2 Default CVLANID : 0 Default SVLAN Priority : 0 All-to-One Bundling : No Bundling : No

Service Multiplexing	: No
Maximum Number of EVC	: 1
Number of EVC using this UNI	: 1
EVC List	
EPLINE-INTERNET_SERVICE	

6.5.4 Provisioning Ethernet Private LAN (EPLAN) Service

This section details the steps required to create a Ethernet Private LAN (EPLAN) Service



Step 1 . Create NNI and make association with interface

```
BTI-SA-805(config)# ethernet nni add nni1
BTI-SA-805(config-nni)# map interface eth-0-3
BTI-SA-805(config-nni)# exit
BTI-SA-805(config)# ethernet nni add nni2
BTI-SA-805(config-nni)# map interface eth-0-4
BTI-SA-805(config-nni)# end
BTI-SA-805# show ethernet nni
```

```
-----
NNI nni1:
Mapped Interface           : eth-0-3
Maximum Number of VC      : 400
Number of using this NNI  : 0
-----
```

```
-----
NNI nni2:
Mapped Interface           : eth-0-4
Maximum Number of VC      : 400
Number of using this NNI  : 0
-----
```

Step 2 Create UNI and make association with interface

```
BTI-SA-805# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BTI-SA-805(config)# ethernet uni add uni1
BTI-SA-805(config-uni)# map interface eth-0-1
```

```
BTI-SA-805(config-uni)# exit
BTI-SA-805(config)# ethernet uni add uni2
BTI-SA-805(config-uni)# map interface eth-0-2
BTI-SA-805(config-uni)# end
BTI-SA-805# show ethernet uni
```

```
-----
UNI uni1:
Mapped Interface           : eth-0-1
Default CVLANID           : 0
Default SVLAN Priority     : 0
All-to-One Bundling       : Yes
Bundling                   : No
Service Multiplexing      : No
Maximum Number of EVC     : 1
Number of EVC using this UNI : 0
-----
```

```
UNI uni2:
Mapped Interface           : eth-0-2
Default CVLANID           : 0
Default SVLAN Priority     : 0
All-to-One Bundling       : Yes
Bundling                   : No
Service Multiplexing      : No
Maximum Number of EVC     : 1
Number of EVC using this UNI : 0
```

Step 3 Create EVC and make association with UNI and NNI

```
BTI-SA-805# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BTI-SA-805(config)#
BTI-SA-805(config)# ethernet evc add EPLAN-test1
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# service type eplan
BTI-SA-805(config-evc)# !Make a association with uni1 and uni2
BTI-SA-805(config-evc)# add uni uni1
BTI-SA-805(config-evc)# add uni uni2
BTI-SA-805(config-evc)# !Make a association with nni1 and nni2
BTI-SA-805(config-evc)# add nni nni1
BTI-SA-805(config-evc)# add nni nni2
BTI-SA-805(config-evc)# end
BTI-SA-805# show ethernet epu
```

```
-----
E-Service uni1-EPLAN-test1:
CE-VLAN map : All to One Bundling
-----
```

```
E-Service uni2-EPLAN-test1:
CE-VLAN map : All to One Bundling
-----
```

Step 4 Ensure All-to-One Bundling, Bundling and Service multiplexing are configured correctly.

Additional Attributes

all-to-one-bundling (enable disable) BTI-SA-805(config-uni)# all-to-one-bundling enable	EP-LINE and EP-LAN service should be set to "enable" EVP-LINE and EVP-LAN service should be set to "disable"
bundling (enable disable) BTI-SA-805(config-uni)# bundling enable	More than one CE-VLAN ID mapping should be set to "enable" One CE-VLAN ID mapping should be set to "disable".
"multiplex (enable disable) BTI-SA-805(config-uni)# multiplex enable	EP-LINE and EP-LAN service should be set to "disable" EVP-LINE and EVP-LAN service should be set to "enable".
max-evc <1-512> BTI-SA-805(config-uni)# max-evc 10	multiplex attribute :maximum number of EVCs allowed in the UNI. EP-Line or EP-LAN, MNE MUST be one EVP-Line or EVP-LAN, MNE MUST be two or greater.
default ce-vlan <0-4094> BTI-SA-805(config-uni)# default ce-vlan 10	The Default CE-VLAN ID service attribute specifies the default CE-VLAN ID for untagged packet at the UNI port. To support untagged packet at the UNI port this attribute MUST be set to none zero value. This value MUST be the same as one of the CE-VLAN ID mapping list
default priority <0-7>" BTI-SA-805(config-uni)# default priority 6	The Default Priority service attribute specifies the default priority of S-VLAN tag for untagged packet at the UNI port.
BTI-SA-805 # add evc EPLINE-TEST1	E-Service instance is automatically created by command "add uni UNI-ID" of EVC configuration mode. E-Service instance ID is formed by the concatenation of the UNI ID and the EVC ID.
add vlan (VLAN-ID all-others) BTI-SA-805(config)# ethernet epu CUSTOMER-A-EPLINE-Test2-Test1 BTI-SA-805(config-epu)# add vlan 10 BTI-SA-805(config-epu)# add vlan 20	VLAN-ID : 1-4095 all-others : all VLANs that is not mapped to other EVC in a UNI. Except for All-to-One-bundling, E-Service MUST have one or more CE-VLAN ID mapped.
BTI-SA-805 show ethernet epu	Show E Service
BTI-SA-805# show ethernet uni CUSTOMER-A	This example will show the following E Service provisioning on the UNI customer A UNI CUSTOMER-A: Mapped Interface : eth-0-2 Default CVLANID : 0 Default SVLAN Priority : 0

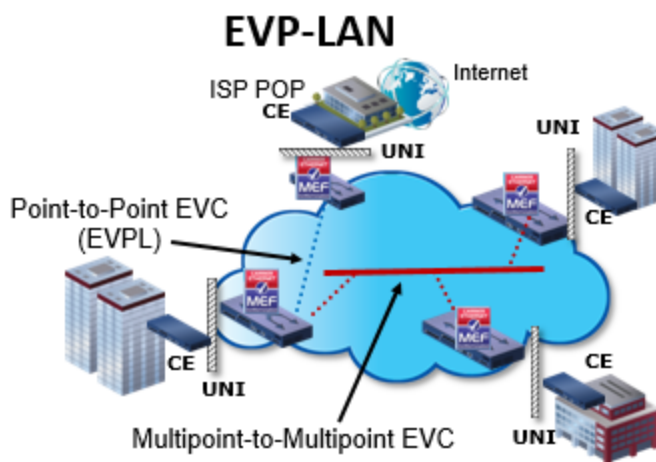
```

All-to-One Bundling      : No
Bundling                  : No
Service Multiplexing     : No
Maximum Number of EVC    : 1
Number of EVC using this UNI : 1
EVC List
EPLINE-INTERNET_SERVICE

```

6.5.5 Provisioning Ethernet Virtual Private LAN (EVPLAN) Service

This section details the steps required to create a Ethernet Virtual Private LAN(EVPLAN) Service



Step 1 VLAN Database configure

```

BTI-SA-805(config)# vlan database
BTI-SA-805(config-vlan)#  vlan 1000,2000,3000
BTI-SA-805(config-vlan)# end
BTI-SA-805# show vlan all

```

VLAN ID	Name	State	STP ID	Member ports (u)-Untagged, (t)-Tagged
1	default	ACTIVE	0	eth-0-1(u) eth-0-2(u) eth-0-3(u) eth-0-4(u)
1000	VLAN1000	ACTIVE	0	
2000	VLAN2000	ACTIVE	0	
3000	VLAN3000	ACTIVE	0	

Step 2 NNI creation and Make association with Interface

```

BTI-SA-805(config)# ethernet nni add Test3-RING-E
BTI-SA-805(config-nni)#  map interface eth-0-1
BTI-SA-805(config-nni)#  exit
BTI-SA-805(config)# ethernet nni add Test3-RING-W
BTI-SA-805(config-nni)#  map interface eth-0-2

```

```
BTI-SA-805(config-nni)# end
BTI-SA-805# show ethernet nni
```

```
-----
NNI Test3-RING-E:
  Mapped Interface           : eth-0-1
  Maximum Number of VC       : 400
  Number of using this NNI   : 0
-----
```

```
NNI Test3-RING-W:
  Mapped Interface           : eth-0-2
  Maximum Number of VC       : 400
  Number of using this NNI   : 0
```

Step 3 . UNI Creation and make association with Interface

```
BTI-SA-805(config)# ethernet uni add 6F-618
BTI-SA-805(config-uni)# all-to-one-bundling disable
BTI-SA-805(config-uni)# multiplex enable
BTI-SA-805(config-uni)# max-evc 10
BTI-SA-805(config-uni)# default ce-vlan 10
BTI-SA-805(config-uni)# map interface eth-0-3
BTI-SA-805(config-uni)# exit
BTI-SA-805(config)# ethernet uni add 7F-719
BTI-SA-805(config-uni)# all-to-one-bundling disable
BTI-SA-805(config-uni)# multiplex enable
BTI-SA-805(config-uni)# max-evc 10
BTI-SA-805(config-uni)# map interface eth-0-4
BTI-SA-805(config-uni)# end
BTI-SA-805# show ethernet uni
```

```
-----
UNI 6F-618:
  Mapped Interface           : eth-0-3
  Default CVLANID            : 10
  Default SVLAN Priority      : 0
  All-to-One Bundling        : No
  Bundling                   : No
  Service Multiplexing        : Yes
  Maximum Number of EVC      : 10
  Number of EVC using this UNI : 0
-----
```

```
UNI 7F-719:
  Mapped Interface           : eth-0-4
  Default CVLANID            : 0
  Default SVLAN Priority      : 0
  All-to-One Bundling        : No
  Bundling                   : No
  Service Multiplexing        : Yes
  Maximum Number of EVC      : 10
  Number of EVC using this UNI : 0
```

Step 4 Create EVC and Make association with UNI and NNI

```
BTI-SA-805(config)# ethernet evc add EVPLAN-Test1
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# service type evplan
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni 6F-618
BTI-SA-805(config-evc)# add uni 7F-719
BTI-SA-805(config-evc)# add nni Test3-RING-E
BTI-SA-805(config-evc)# add nni Test3-RING-W
BTI-SA-805(config-evc)# exit
BTI-SA-805(config)# ethernet evc add EVPLAN-Test2
BTI-SA-805(config-evc)# svlan 2000
BTI-SA-805(config-evc)# service type evplan
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni 6F-618
BTI-SA-805(config-evc)# add uni 7F-719
BTI-SA-805(config-evc)# add nni Test3-RING-E
BTI-SA-805(config-evc)# add nni Test3-RING-W
BTI-SA-805(config-evc)# end
BTI-SA-805# show ethernet evc
-----
EVC EVPLAN-Test1:
  Service Type           : evplan
  EVC Type               : Multipoint-to-Multipoint
  Outer SVLAN ID        : 1000
  CE-VLAN Preservation   : No
  CoS Preservation      : Yes
  Maximum Number of UNI  : 2
  Number of UNI using this EVC : 2
  MEG Level             : 0
  Associated NNI List    : Test3-RING-E, Test3-RING-W,
  Associated UNI list    : 6F-618, 7F-719,
-----
EVC EVPLAN-Test2:
  Service Type           : evplan
  EVC Type               : Multipoint-to-Multipoint
  Outer SVLAN ID        : 2000
  CE-VLAN Preservation   : No
  CoS Preservation      : Yes
  Maximum Number of UNI  : 2
  Number of UNI using this EVC : 2
  MEG Level             : 0
  Associated NNI List    : Test3-RING-E, Test3-RING-W,
  Associated UNI list    : 6F-618, 7F-719,
```

Step 5 Add CE-VLAN mapping and BWP information to the Service Instance

```
BTI-SA-805(config)# ethernet evc add EVPLAN-Test1
BTI-SA-805(config-evc)# svlan 1000
BTI-SA-805(config-evc)# service type evplan
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni 6F-618
BTI-SA-805(config-evc)# add uni 7F-719
```



```

BTI-SA-805(config-evc)# add nni Test3-RING-E
BTI-SA-805(config-evc)# add nni Test3-RING-W
BTI-SA-805(config-evc)# exit
BTI-SA-805(config)# ethernet evc add EVPLAN-Test2
BTI-SA-805(config-evc)# svlan 2000
BTI-SA-805(config-evc)# service type evplan
BTI-SA-805(config-evc)# vlan-preservation disable
BTI-SA-805(config-evc)# add uni 6F-618
BTI-SA-805(config-evc)# add uni 7F-719
BTI-SA-805(config-evc)# add nni Test3-RING-E
BTI-SA-805(config-evc)# add nni Test3-RING-W
BTI-SA-805(config-evc)# end
BTI-SA-805# show ethernet evc
-----
EVC EVPLAN-Test1:
  Service Type           : evplan
  EVC Type               : Multipoint-to-Multipoint
  Outer SVLAN ID        : 1000
  CE-VLAN Preservation   : No
  CoS Preservation       : Yes
  Maximum Number of UNI  : 2
  Number of UNI using this EVC : 2
  MEG Level              : 0
  Associated NNI List     : Test3-RING-E, Test3-RING-W,
  Associated UNI list     : 6F-618, 7F-719,
-----
EVC EVPLAN-Test2:
  Service Type           : evplan
  EVC Type               : Multipoint-to-Multipoint
  Outer SVLAN ID        : 2000
  CE-VLAN Preservation   : No
  CoS Preservation       : Yes
  Maximum Number of UNI  : 2
  Number of UNI using this EVC : 2
  MEG Level              : 0
  Associated NNI List     : Test3-RING-E, Test3-RING-W,
  Associated UNI list     : 6F-618, 7F-719,
-----

```

Step 5. Add CE-VLAN mapping and BWP information to the Service Instance

```

BTI-SA-805(config)# ethernet epu 6F-618-EVPLAN-Test1
BTI-SA-805(config-epu)# add vlan 10
BTI-SA-805(config-epu)# ethernet epu 6F-618-EVPLAN-Test2
BTI-SA-805(config-epu)# add vlan 20
BTI-SA-805(config-epu)# exit
BTI-SA-805(config)# ethernet epu 7F-719-EVPLAN-Test1
BTI-SA-805(config-epu)# bandwidth-profile ingress bwp-cos
BTI-SA-805(config-epu)# add vlan 10
BTI-SA-805(config-epu)# exit
BTI-SA-805(config)# ethernet epu 7F-719-EVPLAN-Test2
BTI-SA-805(config-epu)# bandwidth-profile ingress bwp-evc

```

```
BTI-SA-805(config-epu)# add vlan 20
BTI-SA-805(config-epu)# end
BTI-SA-805# show ethernet epu
```

```
-----
E-Service 6F-618-EVPLAN-Test1:
CE-VLAN map : untagged(10),10
-----
```

```
-----
E-Service 7F-719-EVPLAN-Test1:
Ingress BWP : bwp-cos
CE-VLAN map : 10
-----
```

```
-----
E-Service 6F-618-EVPLAN-Test2:
CE-VLAN map : 20
-----
```

```
-----
E-Service 7F-719-EVPLAN-Test2:
Ingress BWP : bwp-evc
CE-VLAN map : 20
-----
```

Step 6 Ensure All-to-One Bundling, Bundling and Service multiplexing are configured correctly.

Additional Attributes

all-to-one-bundling (enable disable) BTI-SA-805(config-uni)# all-to-one-bundling enable	EP-LINE and EP-LAN service should be set to "enable" EVP-LINE and EVP-LAN service should be set to "disable"
bundling (enable disable) BTI-SA-805(config-uni)# bundling enable	More than one CE-VLAN ID mapping should be set to "enable" One CE-VLAN ID mapping should be set to "disable".
"multiplex (enable disable) BTI-SA-805(config-uni)# multiplex enable	EP-LINE and EP-LAN service should be set to "disable" EVP-LINE and EVP-LAN service should be set to "enable".
max-evc <1-512> BTI-SA-805(config-uni)# max-evc 10	multiplex attribute :maximum number of EVCs allowed in the UNI. EP-Line or EP-LAN, MNE MUST be one EVP-Line or EVP-LAN, MNE MUST be two or greater.
default ce-vlan <0-4094> BTI-SA-805(config-uni)# default ce-vlan 10	The Default CE-VLAN ID service attribute specifies the default CE-VLAN ID for untagged packet at the UNI port. To support untagged packet at the UNI port this attribute MUST be set to none zero value. This value MUST be the same as one of the CE-VLAN ID mapping list
default priority <0-7>	The Default Priority service attribute specifies the default priority of S-VLAN tag for untagged packet at the UNI port.

```
BTI-SA-805(config-uni)# default
priority 6
```

```
BTI-SA-805(config-uni)# add evc
EPLINE-TEST1
```

E-Service instance is automatically created by command "add uni UNI-ID" of EVC configuration mode. E-Service instance ID is formed by the concatenation of the UNI ID and the EVC ID.

```
add vlan (VLAN-ID|all-others)
```

VLAN-ID : 1-4095

```
BTI-SA-805(config)# ethernet epu
CUSTOMER-A-EPLINE-test2-test1
BTI-SA-805(config-epu)# add vlan 10
BTI-SA-805(config-epu)# add vlan 20
```

all-others : all VLANs that is not mapped to other EVC in a UNI.

Except for All-to-One-bundling, E-Service MUST have one or more CE-VLAN ID mapped.

```
BTI-SA-805 show ethernet epu
```

Show E Service

```
BTI-SA-805# show ethernet uni
CUSTOMER-A
```

This example will show the following E Service provisioning on the UNI customer A

```
UNI CUSTOMER-A:
  Mapped Interface           :
eth-0-2
  Default CVLANID            : 0
  Default SVLAN Priority      : 0
  All-to-One Bundling        : No
  Bundling                    : No
  Service Multiplexing        : No
  Maximum Number of EVC      : 1
  Number of EVC using this UNI : 1
  EVC List
    EPLINE-INTERNET_SERVICE
```

7.0 BTI SA-805 Carrier Ethernet Switch System Software Upgrade, Configuration File Restoration

This section details the following topics:

- [7.1, “Uploading a Configuration File”](#)
- [7.2, “Restoring a Configuration File”](#)
- [7.3, “Upgrading the System Software”](#)

7.1 Uploading a Configuration File

Use this procedure to back up a configuration file from the BTI SA-805 Ethernet switch to a server.

Prerequisites:

- You must have access to the FTP/SFTP/TFTP server where the configuration file is to be uploaded.

The configuration is stored in one file (tarred and gzipped with a `.tar.gz` file extension).

Step 1 Save the current configuration to system memory.

```
BTI-SA-805# write memory
```

Step 2 Upload the configuration file to the server.

Out-Of-Band upload command is :

- ```
BTI-SA-805# update ftp config mgmt-if <ftp_server_ip_addr>
<ftp_server_userid> <ftp_server_password> <configuration_file_name>
upload
```

In-Band upload command is :

- ```
BTI-SA-805# update ftp config <ftp_server_ip_addr>  
<ftp_server_userid> <ftp_server_password> <configuration_file_name>  
upload
```

For example: This command uploads the saved configuration to server 132.25.7.23 and stores it with file name ConfigBackup. The server username is Server1 and the Server password is ntw3.

```
BTI-SA-805# update ftp config 132.25.7.23 Server1 ntw3 ConfigBackup  
upload
```

Send file to `ftp://132.25.7.23/ConfigBackup.tar.gz`

```
Sent 466 bytes in 0.1 seconds  
UPGRADE FTP Config upload Success.
```

7.2 Restoring a Configuration File

Use this procedure to restore a configuration file from a server to the BTI SA-805 .

Prerequisites:

- You must have access to the FTP/SFTP/TFTP server where the configuration file resides.
- The configuration file must be tarred and gzipped, and have a file extension `.tar.gz` (not `.tgz`).

Configuration for the main system, slot1, and slot2 is stored in one file (tarred and gzipped with a `.tar.gz` file extension).

Note You do not need to specify file extensions when referring to the filename in the commands. The update command assumes the package has a file extension of `.tar.gz`.

Step 1 Download and restore the configuration file from the server.

Out-Of-Band download command is :

- BTI-SA-805# update ftp config mgmt-if <ftp_server_ip_addr>
<ftp_server_userid> <ftp_server_password> <configuration_file_name>
download

In-Band download command is :

- BTI-SA-805# update ftp config <ftp_server_ip_addr>
<ftp_server_userid> <ftp_server_password> <configuration_file_name>
download

This downloads the specified configuration file from the specified server. For example :
Using FTP in the OOB, this commands downloads a file named ConfigBackup from server 132.25.7.23 to the switch. The server username is Server1 and the Server password is ntw3.

```
BTI-SA-805# update ftp config mgmt-if 132.25.7.23 Server1 ntw3
ConfigBackup download
```

Download from URL to temporary file.

```
Get file from tftp://132.25.7.23/ConfigBackup.tar.gz
```

```
.
```

```
Received 466 bytes in 0.1 seconds
```

```
Copy the temporary file to its destination.
```

```
.
```

```
466 bytes in 0.0 seconds, inf kbytes/second
```

```
UPGRADE FTP Config download Success.
```

Step 2 Reboot the system to load the downloaded configuration file.

```
BTI-SA-805# reboot
```

7.3 Upgrading the System Software

The BTI SA-805 upgrade software is contained in an image file. The file name will contain the version and the build number and will have a .img extension.

For example : The following example shows the BTI SA-805 upgrade image file for version 1.1.1, Build 9.

```
ha805_v1.1.1Build9.img
```

Image files are downloaded and stored on the BTI SA-805 . The new software version is initialized only when the switch is rebooted.

The image files are stored in a partitioned flash memory, known as the primary image bank and the secondary image bank. The **show image** command displays the status of the primary and secondary image banks.

For example : The following screen displays the status before a new software file has been downloaded .

It shows that version 1.1.1 Build 8 is stored in the primary image bank and version 1.1.1 Build 7 is stored in the secondary image bank.

The Current Image tells us that the switch was last booted from primary image bank and the Next Image tells us that on the next reboot, the switch will boot up using software loaded in the primary bank. The **image set <pri | sec >** is used to set the Next Image field.

The created field shows the date the software file was created. (It does not show the date the software was installed on the switch.)

The Data _Size shows the size of the software file.

```
BTI-SA-805# show image
```

```
-----  
                        Image Information  
-----  
                        Primary Image  
-----  
Image_Version  : HA80x v1.1.1Build8  
Created       : Tue Sep  2 15:51:22 2014  
Data_Size     : 13542321 Bytes = 13224.92 kB = 12.91 MB  
-----  
                        Secondary Image  
-----  
Image_Version  : HA80x v1.1.1Build7  
Created       : Tue May 20 20:05:50 2014  
Data_Size     : 12936093 Bytes = 12632.90 kB = 12.34 MB  
-----  
Current Image  : Primary  
-----  
Next Image    : Primary  
-----
```


After a new software load is downloaded (and before a reboot) the files stored in each bank will show the software stored in the banks.

For Example : The following screen now shows that software version 1.1.1 Build 8 is stored in the secondary image bank and a new software version 1.1.1 Build 9 is now stored in the primary image bank. The system has not been rebooted and the upgrade has not been initialized. Therefore the software running on the system is version 1.1.1 build 8. The **show version** command displays the software running on the switch.

```
BTI-SA-805# show image
```

```
-----  
                        Image Information  
-----  
                        Primary Image  
-----  
Image_Version  : HA80x v1.1.1Build9  
Created       : Tue Sep  2 15:51:22 2014  
Data_Size    : 13542321 Bytes = 13224.92 kB = 12.91 MB  
-----  
                        Secondary Image  
-----  
Image_Version  : HA80x v1.1.1Build8  
Created       : Tue May 20 20:05:50 2014  
Data_Size    : 12936093 Bytes = 12632.90 kB = 12.34 MB  
-----  
Current Image : Primary  
-----  
Next Image    : Primary  
-----
```

```
BTI-SA-805# show version
```

The current running image is 1.1.1Build8BTI-SA-805 uptime is 30 days, 11 hours, 21 minutes

```
Hardware Type is Standalone NID/EAD  
Hardware Version is 1.0  
SDRAM size 512M  
Flash size 128M  
EPLD Version is 2.3  
BootRom Version is 0.7
```

After the switch has been rebooted, the show image display shows that the switch has rebooted using the new software stored in the primary image bank . The system will be therefore be running on software version 1.1.1 Build 9. The **show version** command will verify this.

```
BTI-SA-805# show image
```

```
-----  
                        Image Information  
-----  
                        Primary Image  
-----  
Image_Version  : HA80x v1.1.1Build9  
-----
```

```
Created       : Tue Sep  2 15:51:22 2014
Data_Size     : 13542321 Bytes = 13224.92 kB = 12.91 MB
```

Secondary Image

```
Image_Version : HA80x v1.1.1Build8
Created       : Tue May 20 20:05:50 2014
Data_Size     : 12936093 Bytes = 12632.90 kB = 12.34 MB
```

```
Current Image : Primary
```

```
Next Image    : Primary
```

BTI-SA-805# show version

The current running image is 1.1.1Build9BTI SA-805 uptime is 0 days, 0 hours, 21 minutes

Hardware Type is Standalone NID/EAD
Hardware Version is 1.0
SDRAM size 512M
Flash size 128M
EPLD Version is 2.3
BootRom Version is 0.7

BTI SA-805 Supported Upgrade Methods

The BTI SA-805 can be upgraded using either of the following methods :

- **Upgrade method 1: The user specifies which bank to download the image file :** The user backs up the running image to the secondary bank using the command **image backup** and then downloads the new image file to the primary bank. To initialize the new upgrade the user sets the **next image** to primary using the **image set pri** command and then reboots the switch. The switch will reboot using the image file stored in the primary bank.
- **Upgrade method 2: The user does not specify which bank to download the image file :** The user downloads the new image file and the system stores it to a local temporary file location. The user performs the **upgrade image** command. The upgrade image command copies the image file stored in the primary bank and transfers it to the secondary bank and then copies the image file from the temporary file to the primary image bank. The user then sets the next image to primary, using the **image set pri** command and reboots the switch. When the switch reboots the new image file stored in the temporary file is automatically copied into the primary bank.

7.3.1 Upgrade Method One: The User Specifies Which Bank to Download the Image File

Note This is a general upgrade procedure to store the latest version of software in the primary image bank and the older software version in the secondary image bank as a back up. There are various methods to store and back up software. For instance both banks may contain the latest software load. You should use this procedure to familiarize yourself with the upgrade process then customize it to your upgrade policy.



- Failure to re-route traffic, when replacing the BTI SA-805 can result in loss of data.
- You should not turn the BTI SA-805 power OFF/ON during an upgrade procedure
- Although in theory you can provision / configure the switch between downloading the software file and the reboot, it is best practice to perform the upgrade procedure as a standalone procedure.
- While the switch is rebooting, traffic on the switch will be down for approximately 4 minutes.

Prerequisites:

- You must have access to the FTP/SFTP/TFTP server where the software package resides
- you must know the FTP/SFTP/TFTP server username and password
- You must use the correct image file name with the correct version and build number and .img extension
- The upgrade procedure includes an option which will allow you to reboot on the old software version should you change you mind about rebooting with the new version
- The Out Of Band (OOB) command to download the software file and the In Band command to download software are different. The OOB command will contain the additional text shown in bold **update ftp image < mgmt-if**
- If you are in a telnet or SSH session, the session will terminate after you use the **reboot** command. You cannot telnet or SSH into the switch while it is rebooting.
 - Therefore it is recommended, you wait until the telnet / SSH pop message informs you that the session has ended and then log back into the switch. Alternatively you can open use the use the **ping [switch ip address] -t** command in the ms dos command of your computer before you use the CLI reboot command. This will ping the switch continuously and let you see when the switch comes back on line.
- If you can see the switch you can verify the boot has completed by looking at the status of the **RUN LED** on the front panel of the switch

RUN LED	Description
LED OFF	The switch did not boot
Green ON	The switch is booting

Green Blinking	Booting Success and the switch is in normal operation mode
Green ON then changes state to OFF	Booting success but the switch is not in normal operation mode

Step 1 Show the current image on the system.

Tip The image actually running on the system is identified by the line in the show version command response that says, "The current running image is ____". This line is highlighted in bold in the example below.

For example:

```
BTI-SA-805# show image
```

```
-----
                        Image Information
-----
                        Primary Image
-----
Image_Version : HA80x v1.1.1Build8
Created       : Tue Sep  2 15:51:22 2014
Data_Size    : 13542321 Bytes = 13224.92 kB = 12.91 MB
-----
                        Secondary Image
-----
Image_Version : HA80x v1.1.1Build7
Created       : Tue May 20 20:05:50 2014
Data_Size    : 12936093 Bytes = 12632.90 kB = 12.34 MB
-----
Current Image : Primary
-----
Next Image    : Primary
-----
```

```
BTI-SA-805# show version
```

The current running image is 1.1.1Build8 BTI-SA-805 uptime is 0 days, 0 hours, 21 minutes

```
Hardware Type is Standalone NID/EAD
Hardware Version is 1.0
SDRAM size 512M
Flash size 128M
EPLD Version is 2.3
BootRom Version is 0.7
```

Step 2 Backup the image in the primary image bank to the secondary image bank

```
BTI-SA-805# image back up
```

When the command prompt returns, the backup is complete.

Step 3 Download the software image from the FTP/SFTP/TFTP server to the primary image bank.

```
BTI-SA-805# update ftp image mgmt-if <ftp_server_ip_addr>
<ftp_server_userid> <ftp_server_password> <image_file_name> [pri |
sec]
```

For example:

```
BTI-SA-805# update ftp image mgmt-if 10.1.1.30 userid password
ha8XX_v1.1.1Build9.img pri
```

In response to this command, the BTI SA-805 downloads the image file into the primary image bank

Step 4 Make the next boot up run the software stored in the primary bank

```
BTI-SA-805# image set pri
```

- If you no longer want to upgrade the system, make the next reboot run the software stored in the secondary bank. Remember the new software will be loaded into the primary image bank after reboot.

```
BTI-SA-805# image set sec
```

Step 5 Save the current configuration to system memory.

```
BTI-SA-805# write mem
```

Step 6 Reboot the system.

```
BTI-SA-805# reboot
```

You will be prompted to enter "y" es to reboot.

Step 7 Verify that the software version loaded successfully.

Tip The image actually running on the system is identified by the line in the show version command response that says, "The current running image is ____". This line is highlighted in bold in the example below.

For example:

```
BTI-SA-805# show image
```

```
-----
                        Image Information
-----
                        Primary Image
-----
Image_Version  : HA80x v1.1.1Build9
Created       : Tue Sep  2 15:51:22 2014
Data_Size     : 13542321 Bytes = 13224.92 kB = 12.91 MB
-----
                        Secondary Image
-----
Image_Version  : HA80x v1.1.1Build8
```

```
Created          : Tue May 20 20:05:50 2014
Data_Size       : 12936093 Bytes = 12632.90 kB = 12.34 MB
-----
Current Image   : Primary
-----
Next Image      : Primary
-----
```

```
BTI-SA-805# show version
```

```
The current running image is 1.1.1Build9BTI-SA-805 uptime is 0 days, 0
hours, 4 minutes
```

```
Hardware Type is Standalone NID/EAD
Hardware Version is 1.0
SDRAM size 512M
Flash size 128M
EPLD Version is 2.3
BootRom Version is 0.7
```

7.3.2 Upgrade Method Two : The User Does Not Specify Which Image Bank to Download the Image File

Note This is a general upgrade procedure to store the latest version of software in the primary image bank and the older software version in the secondary image bank as a back up. There are various methods to store and back up software. For instance both banks may contain the latest software load. You should use this procedure to familiarize yourself with the upgrade process then customize to your upgrade policy.



- Failure to re-route traffic, when replacing BTI SA-805 can result in loss of data.
 - You should not turn the BTI SA-805 power OFF/ON during an upgrade procedure
 - Although in theory you can provision / configure the switch between downloading the software file and the reboot, it is best practice to perform the upgrade procedure as a standalone procedure.
 - While the switch is rebooting, traffic on the switch will be down for approximately 4 minutes.
-

Prerequisites:

- You must have access to the FTP/SFTP/TFTP server where the software package resides
- you must know the FTP/SFTP/TFTP server username and password
- You must use the correct image file name with the correct version and build number and .img extension
- The upgrade procedure includes an option which will allow you to reboot on the old software version should you change you mind about rebooting with the new version

- The Out Of Band (OOB) command to download the software file and the In Band command to download software are different. The OOB command will contain the additional text shown in bold **update ftp image < mgmt-if**
- If you are in a telnet or SSH session, the session will terminate after you use the **reboot** command. You cannot telnet or SSH into the switch while it is rebooting.
 - Therefore it is recommended, you wait until the telnet / SSH pop message informs you that the session has ended and then log back into the switch. Alternatively you can open use the use the **ping [switch ip address] -t** command in the ms dos command of your computer before you use the CLI reboot command. This will ping the switch continuously and let you see when the switch comes back on line.
- If you can see the switch you can verify the boot has completed by looking at the status of the **RUN LED** on the front panel of the switch

RUN LED	Description
LED OFF	The switch did not boot
Blue ON	The switch is booting
Blue Blinking	Booting Success and the switch is in normal operation mode
Solid ON/OFF	Booting success but the switch is not in normal operation mode

Step 1 Show the current image on the system.

Tip The image actually running on the system is identified by the line in the show version command response that says, "The current running image is ____". This line is highlighted in bold in the example below.

For example:

```
BTI-SA-805# show image
```

```

-----
                        Image Information
-----
                        Primary Image
-----
Image_Version  : HA80x v1.1.1Build8
Created       : Tue Sep  2 15:51:22 2014
Data_Size     : 13542321 Bytes = 13224.92 kB = 12.91 MB
-----
                        Secondary Image
-----
Image_Version  : HA80x v1.1.1Build7
Created       : Tue May 20 20:05:50 2014
Data_Size     : 12936093 Bytes = 12632.90 kB = 12.34 MB
-----
Current Image  : Primary

```

```
-----  
Next Image      : Primary  
-----
```

```
BTI-SA-805# show version
```

The current running image is 1.1.1Build8BTI SA-805 uptime is 0 days, 0 hours, 21 minutes

```
Hardware Type is Standalone NID/EAD  
Hardware Version is 1.0  
SDRAM size 512M  
Flash size 128M  
EPLD Version is 2.3  
BootRom Version is 0.7
```

Step 2 Download the software image from the FTP/SFTP/TFTP server to the device.

```
BTI-SA-805# update ftp image mgmt-if <ftp_server_ip_addr>  
<ftp_server_userid> <ftp_server_password> <image_file_name>
```

For example:

```
BTI-SA-805# update ftp image mgmt-if 10.1.1.30 userid password  
ha80x_v1.1.1.1Build9.img
```

In response to this command, the BTI SA-805 downloads the image file and stores it in a local temporary file location. You should see a message on the display telling you the file has transferred successfully.

Step 3 Upgrade the image

```
BTI-SA-805# upgrade image
```

In response to this command, the BTI SA-805 transfers the image file stored in the primary image bank to the secondary image bank and copies the file from the temporary file to the primary image bank.

Step 4 Make the next boot up use the software stored in the primary bank

```
BTI-SA-805# image set pri
```

- If you no longer want to upgrade the system, make the next reboot use the software stored in the secondary bank. Remember the new software will be loaded into the primary image bank after reboot.

```
BTI-SA-805# image set sec
```

Step 5 Save the current configuration to system memory.

```
BTI-SA-805# write memory
```

Step 6 Reboot the system.

```
BTI-SA-805# reboot
```

You will be prompted to enter "y" es to reboot.

Step 7 Verify that the software version loaded successfully.

Tip The image actually running on the system is identified by the line in the `show version` command response that says, "The current running image is ____". This line is highlighted in bold in the example below.

For example:

```
BTI-SA-805# show image
```

```
-----
                        Image Information
-----
                        Primary Image
-----
Image_Version  : HA80x v1.1.1Build9
Created       : Tue Sep  2 15:51:22 2014
Data_Size     : 13542321 Bytes = 13224.92 kB = 12.91 MB
-----
                        Secondary Image
-----
Image_Version  : HA80x v1.1.1Build8
Created       : Tue May 20 20:05:50 2014
Data_Size     : 12936093 Bytes = 12632.90 kB = 12.34 MB
-----
Current Image  : Primary
-----
Next Image     : Primary
-----
```

```
BTI-SA-805# show version
```

The current running image is 1.1.1Build9BTI SA-805 uptime is 0 days, 0 hours, 4 minutes

```
Hardware Type is Standalone NID/EAD
Hardware Version is 1.0
SDRAM size 512M
Flash size 128M
EPLD Version is 2.3
BootRom Version is 0.7
```


8.0 BTI SA-805 Carrier Ethernet Switch Specifications

This section covers the following topics:

- 8.1, “BTI SA-805 Carrier Ethernet Switch System Specifications”
- 8.2, “BTI SA-805 Carrier Ethernet Switch Transceiver Specifications”

8.1 BTI SA-805 Carrier Ethernet Switch System Specifications

Power consumption

Table 8-1 Power consumption

Parameter	Power Consumption
Typical	20 W
Maximum	30 W

Physical specifications

Table 8-2 Physical dimensions

Parameter	BTI SA-805 Base System Module
Height x width x depth	RU: 1 Millimeters: 44 x 186 x 187 Inches: 1.73 x 7.32 x 7.32
Mounting options	Rack mount
Density	40 units per 7-foot rack

Table 8-3 Component weights

Component	Weight
Base system module	Pounds (lb): 3.09 Kilograms (kg): 1.4
-48/+24 V DC power supply	Pounds (lb): 1.1 Kilograms (kg): 0.5
12 V AC adapter	Pounds (lb): 1.1 Kilograms (kg): 0.5
1GE/10GE SFP+ module	Pounds (lb): 0.9 Kilograms (kg): 0.4

Table 8-4 Environmental specifications

Parameter	Specification
Storage temperature	-40 to 70 °C -49 to 158 °F
Operating temperature	-40 to 65 °C -40 to 149 °F
Operating humidity (non-condensing)	Up to 85% non-condensing

Table 8-4 Environmental specifications (Continued)

Parameter	Specification
Shock	Earthquake Zone 4
Safety	IEC/UL/CSA 60950-1
RoHS 6/6	Directive 2011/65/EU

Alarm interface

BTI SA-805 does not have an alarm interface.

DC power distribution and protection requirements

Verify that the installation site meets the power distribution and protection requirements of the equipment. Power distribution panels are recommended to ensure that there is proper power filtering for battery noise and sufficient circuit breaker or fuse protection for all installed equipment.

Table 8-5 DC power distribution and power protection requirements

Power Feeds A and B			
Nominal Voltage	Input Voltage Tolerance	Copper Wire Gauge AWG	Circuit Breaker/Fuse
-48 VDC	-60 VDC (max.)	16 recommended - Wire gauge should be determined based on local engineering standards and practices.	5A
24 VDC	21 VDC (min.)	16 recommended - Wire gauge should be determined based on local engineering standards and practices.	5A

Important Each installed switch must be grounded. For information

- Notes**
- All power measurements are taken at the -48 VDC terminal block.
 - The minimum start-up voltage is 19 VDC.
 - BTI Service Access 800 Series devices are to be powered by a Limited Power Source (LPS) per IEC 60950-1 Table 2C.

MAC address allocation

The address offsets represent decimal values that are offset from the OOB MAC. For example, if the OOB MAC address is 00:19:6d:01:22:f0, then the in-band MAC address is 00:19:6d:01:22:f1, and so forth.

Table 8-6 MAC address allocation

Address Offset	Allocated to:
0	OOB MAC / In-band MAC
1	Port 1 (base system)
2	Port 2 (base system)
3	Port 3 (base system)
4	Port 4 (base system)
5	LACP /LAG
6	LACP /LAG
7	Reserved

8.2 BTI SA-805 Carrier Ethernet Switch Transceiver Specifications

Table 8-7 Standard Compliance

RoHS Compliance	RoHS 6/6 compliant per Directive 2011/65/EU
Laser Safety	IEC 60825-2: Class 1
Mechanical, Shock and Vibration	GR-63-CORE (in system qualified to NEBS level 3)
Flammability Rating	UL 94V-0
ESD Immunity	IEC 61000-4-2
Radiated Immunity	IEC 61000-4-3
Electromagnetic Emissions	FCC CFR47 Part15, EN 55022

Table 8-8 SFP Power Consumption

SFP Type	PEC	Power Consumption
SFP: 10/100/1000BT Copper	BP3AD3ES	1.3 W
SFP: 1000BT Copper	BP3AE2ES	1.3 W
SFP: 850nm SX	BP3AD1SS	1.0 W
SFP: 1310nm SR	BP3AM1MS	1.0 W
SFP: 1310nm IR	BP3AM1MI	1.3 W
SFP: 100BX, GE, SR, bidi 1310tx/ 1490nm (20km)	BP3AM5PB	1.3 W
SFP: 100BX, GE, SR, bidi 1490tx/ 1310nm (20km)	BP3AM5QB	1.3 W
SFP: 100BX, GE, IR, bidi 1310T/ 1490R (40km)	BP3AM5PI	1.3 W
SFP: 100BX, GE, IR, bidi 1490T/ 1310R (40km)	BP3AM5QI	1.3 W
SFP: CWDM LR	BP3AM1CL-xx xx = [01-16] [01-08, 09-16]	1.3 W
SFP: DWDM ER	BP3AM1DE-xx xx = [01-32, E1-E8] [01-08, 09-32, E1-E8]	1.3 W

Table 8-9 SFP+ Power Consumption

SFP+ Type	PEC	Power Consumption
SFP+ 850nm 200m dual-rate 10.3 10.5Gbps	BP3AD6SS	1.0 W
SFP+ 1310nm 10km multi-rate 9.9 to 11.1Gbps	BP3AM6MS	1.0 W
SFP+DWDM fixed 80km multi-rate 9.9 to 11.1Gbps	BP3AM6DL-xx [01-32, E1-E8]	1.2 W
SFP+ 1550nm IR 40km 10GE 10.3Gbps (I-temp)	BP3AM8LI	1.5W
SFP+: Tunable 96 Channel DWDM 80km 10G Multi-Rate / Multi-Protocol	BP3AM6TL	1.5 W

Table 8-10 Environmental Conditions

Parameter	Minimum	Maximum	Unit
Operating Case Temperature See Table Supported Transceiver Modules and Operating Temperatures	-05	+70	° C
Storage Temperature	-40	+80	° C
Humidity, Operating	05	85	%RH
Humidity Short Term	05	85	%RH

Table 8-11 Supported Transceiver Modules and Operating Temperatures

Transceiver	Grade	PEC	Supported and Non Supported Temperatures		
			0C to +40C	-5C to +55C	-40C to +65C
SFP: 10/100/1000BT Copper	C-Temp -5C to +70C	BP3AD3ES	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 850nm SX	C-Temp -5C to +70C	BP3AD1SS	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 1310nm SR	C-Temp -5C to +70C	BP3AM1MS	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 1310nm IR	C-Temp -5C to +70C	BP3AM1MI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, SR, bidi	C-Temp -5C to +70C	BP3AM5PB	Supported Mandatory	Supported Mandatory	Not Supported

Table 8-11 Supported Transceiver Modules and Operating Temperatures (Continued)

Transceiver	Grade	PEC	Supported and Non Supported Temperatures		
			0C to +40C	-5C to +55C	-40C to +65C
1310tx/1490nm (20km)					
SFP: 100BX GE, SR, bidi 1490tx/1310nm (20km)	C-Temp -5C to +70C	BP3AM5QB	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, IR, bidi 1310T/1490R (40km)	C-Temp -5C to +70C	BP3AM5PI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 100BX GE, IR, bidi 1490T/1310R (40km)	C-Temp -5C to +70C	BP3AM5QI	Supported Mandatory	Supported Mandatory	Not Supported
SFP: CWDM LR Channel xx	C-Temp -5C to +70C	BP3AM1CL-xx xx = [01-16]	Supported Mandatory	Supported Mandatory	Not Supported
SFP: DWDM ER Channel xx	C-Temp -5C to +70C	BP3AM1DE-xx xx = [01-32, E1-E8]	Supported Mandatory	Supported Mandatory	Not Supported
SFP: 10/100/1000BT Copper (I-temp)	I-Temp -40C to +85C	BP3AD7ES	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP: 850nm SX (I-temp)	I-Temp -40C to +85C	BP3AD7SS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP: 1310nm SR (I-temp)	I-Temp -40C to +85C	BP3AD7MS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: 850nm 200m, dual-rate 10.3 and 10.5Gbps	C-Temp -5C to +70C	BP3AD6SS	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: 1310nm 10km, multi-rate 9.9 to 11.1Gbps	C-Temp -5C to +70C	BP3AM6MS	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: DWDM fixed 80km, multi-rate, 9.9 to 11.1Gbps	C-Temp -5C to +70C	BP3AM6DL-xx	Supported Mandatory	Supported Mandatory	Not Supported
SFP+: 850nm 200m, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AD8SS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory

Table 8-11 Supported Transceiver Modules and Operating Temperatures (Continued)

Transceiver	Grade	PEC	Supported and Non Supported Temperatures		
			0C to +40C	-5C to +55C	-40C to +65C
SFP+: 1310nm 10km, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8MS	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: 1550nm IR 40km, 10GE 10. 3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8LI	Supported Mandatory	Supported Mandatory	Supported Mandatory
SFP+: DWDM fixed 80km, 10GE 10.3Gbps (I-temp)	I-Temp -40C to +85C	BP3AM8DL-xx	Supported Not Mandatory	Supported Not Mandatory	Supported Mandatory
SFP+: Tunable 96 Channel DWDM 80km, 10G Multi-Rate / Multi-Protocol	C-Temp -5 to +75C	BP3AM6TL	Supported Not Mandatory	Not Supported	Not Supported

8.2.1 BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km Transceiver Specifications

Table 8-12 BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km single mode SFP+ transceiver specifications

Parameter	Min	Typical	Max	Units
Wavelength, Channel and Frequency	ITU 96 Channel, Wavelength and Frequency Plan for C Band Tunable DWDM Transceiver. See Appendix B, “ITU Wavelength Plan for C Band Tunable DWDM Transceiver” Wavelength, Channel and Frequency are provisionable using the CLI command <code>transceiver itu</code>			
Bit rates and protocols	9.95/10.3 Gbps 10GE LAN PHY			
Supported Equipment	BTI SA-805 - Line interface			
Connector/Latch type	LC/Bail			
Supported Link Type and Length:	<ul style="list-style-type: none"> Transceiver link Length for 9/125um single mode fiber: 80 km A shorter link/span length may require an in-line attenuator.			
Monitoring	Monitoring and digital diagnostics for all provisioned channels and bit rates. LOS Signaling on Average Received Power Level			
Internally Calibrated Alarm Thresholds	High Alarm	High Warning	Low Warning	Low Alarm
Temperature (°C)	+72.00	+70.00	-05.00	-07.00
Voltage (v)	+03.63	+03.46	+03.13	+02.97
Current (mA)	+110.00	+95.00	+25.00	+15.00
Optical Transmit Power (dBm)	+03.00	+02.00	-02.00	-03.00
Optical Receive Power (dBm)	-04.00	-06.00	-27.21	-29.21
Transmitter	-00.10		+00.30	dBm
Average Output Power Variation			+00.25	dB
Frequency Range	191.35		196.10	THz
Number of Channels	+96.00			
Nominal Channel Spacing	+50.00			GHz
Frequency Deviation Referenced to ITU Grid Frequency (BOL)	-01.50			
Frequency Deviation Referenced to ITU Grid Frequency (EOL)	-02.50		+02.50	GHz
Spectral Width (-20dB)	-		0.3	nm
Side Mode Suppression Ratio	+30.00	-	-	dB
Extinction Ratio	+08.20	-	-	dB
Optical Return Loss Tolerance	-	-	+27.00	dB
SBS Threshold when Dither is on	+16.00	-	-	dBm
SBS Threshold when Dither is off	+10.00	-	-	dBm
Average Launch Power of OFF Transmitter	-	-	-30.00	dBm

Table 8-12 BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km single mode SFP+ transceiver specifications (Continued)

Parameter	Min	Typical	Max	Units
Receiver				
Bit Rate	+09.95	-	+11.09	Gb/s
Rx operating wavelength	+1260	-	+1600	nm
Maximum Receiver Input Power (Damage Threshold)	+03.00	-	-	dBm
Receiver Reflectance	-	-	-27.00	dB
Standard Compliance	IEEE 802.3 Clause 52 (10Gb/s LAN PHY) ITU.T G 709 ITU-T G 8251, G.Sup43			

8.2.1.1 BP3AM6TL Transmission Performance Specifications

The BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM 80 km single mode SFP+ is a line side transmitter and is expected to operate over a diverse range of optical conditions. The table below details the required performance mask that the SFP+ is expected to meet.

The first plane is defined by all points with a fixed power range between -18 dBm to -7 dBm and the second plane is defined by the points with a fixed OSNR at 30dB. For example a link at 1400ps/nm dispersion operation at 9.95Gb/s is expected to perform to 1E-12 with an OSNR \geq 27.5dB and at a power level of -18dBm. When operating at an OSNR \geq 30dB the expected operating power level is -22.5dBm.

All measurements of OSNR are referenced to a 0.1nm resolution bandwidth and assumes that a filter no narrower than 25GHz (@0.5dB) is placed in front of the receiver.

Table 8-13 BP3AM6TL transmission performance specifications

Bit Rate (Gbps)	Dispersion (ps/nm)	OSNR (dB)	BER	Receiver Sensitivity (dBm)	
				Min	Max
9.95/10.3	-0400	≥ 30	1e-12	-24	-7
		≥ 26		-18	-7
	00000	≥ 30		-24	-7
		≥ 26		-18	-7
	+1200	≥ 30		-23	-7
		≥ 27		-18	-7
	+1600	≥ 30		-22	-7
		≥ 28		-18	-7

8.2.1.2 BP3AM6TL Polarization Mode Dispersion Tolerance

There can be a significant amount of Polarization Mode Dispersion (PMD) generated when the transceiver operates over a great distance and through many components. The degradation in the

performance of the receiver caused by the accumulation of PMD is specified in the table below. The PMD penalty is applied applied as an Optical Signal to Noise Ratio (OSNR) penalty.

Table 8-14 BP3AM6TL Polarization Mode Dispersion (PMD) penalty

Differential Group Delay (DGD) (ps)	Maximum Addition Required OSNR Penalty (dB)
≤10	1.0
≤20	1.5
≤30	2.0

Appendix A: Regulatory information

The following sections indicate the primary standards and protocols to which BTI Service Access 800 Series Ethernet Switches have been tested.

- A.1, “Canada and U.S. standards”
- A.2, “Telcordia physical requirements”
- A.3, “European Telecommunications Standards Institute”

A.1 Canada and U.S. standards

BTI Service Access 800 Series equipment is fully compliant to the following Canadian and U.S. standards:

- CSA22.2 No. 60950-00/UL 60950 Third Edition, 2000-12

A.2 Telcordia physical requirements

The following table lists the Telcordia physical specifications to which the BTI Service Access 800 Series Ethernet Switched has been designed to meet.

Table A- 1 Telcordia physical standards

Standard	Description
GR-63-CORE	Physical Protection; identifies minimum generic spatial and environmental criteria
GR-1089-CORE	Electromagnetic Compatibility and Electrical Safety Generic Criteria for Network Telecommunications Equipment; identifies the minimum generic criteria for Electromagnetic Compatibility (EMC) and electrical safety

A.3 European Telecommunications Standards Institute

The following are the European Telecommunications Standards Institute (ETSI) standards to which BTI Service Access 800 Series Ethernet Switches have been tested.

- ETSI EN 300 386 - Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements
- ETSI EN 300 019 - Equipment Engineering (EE); Environmental Conditions and Environmental Tests for Telecommunications Equipment: 2-1, Class T1.2-Storage; 2-2, Class T2.3-Public Storage; 2-3, Class T3.1&3.1E
 - IEC 60068-2-1: Storage, Air Temperature Low - covered by NEBS testing
 - IEC 60068-2-1: Storage, Air Temperature High - covered by NEBS testing
 - IEC 60068-2-56: Storage, Humidity, High - covered by NEBS testing
 - IEC 60068-2-6: Storage, Sinusoidal Vibration - covered by NEBS testing
 - IEC 60068-2-64: Storage, Random Vibration - covered by Public Transportation testing
- ETSI 300 019-2-2:1994 - Transportation (Class T2.3 Public Transportation)
 - IEC 60068-2-1: Public Transportation, Temperature Low
 - IEC 60068-2-2: Public Transportation, Air Temperature High
 - IEC 60068-2-56: Public Transportation, Humidity, High
 - IEC 60068-2-14 - Public Transportation, Air Temperature, Change
 - IEC 60068-2-30: Public Transportation, Rapid Temperature Change
 - IEC 60068-2-64: Public Transportation, Random Vibration
 - IEC 60068-2-29: Public Transportation, Shocks
 - IEC 60068-2-32: Public Transportation, Free Fall
- ETSI 300 019-2-3:1994 - In use Weather Protected (Class T3.IE Temperature Controlled)
 - IEC 60068-2-1: Stationary Use, Air Temperature Low - IEC 60068-2-2: Stationary Use, Air Temperature High
 - IEC 60068-2-14: Stationary Use, Air Temperature Change
 - IEC 60068-2-14: Stationary Use, Air Temperature Change
 - IEC 60068-2-56: Stationary Use, High Humidity
 - IEC 60068-2-27: Stationary Use, Mechanical Tests, Shocks

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。 VCCI-A

The preceding translates as follows:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this product is used near a radio or television receiver in a domestic environment, it might cause radio interference. Install and use the equipment according to the instruction manual. VCCI-A.

Appendix B: ITU Wavelength Plan for C Band Tunable DWDM Transceiver

This wavelength plan is supported on the following:

- BP3AM6TL 10G Multi-Rate / Multi-Protocol Tunable DWDM single mode SFP+ transceiver on BTI SA-805, BTI SA-821, BTI SA-822 systems with the following rates, protocols and link length:
 - 9.95/10.3 Gbps 10GE LAN PHY
 - Link Length for 9/125um single mode fiber: 80 km

Additional information is located at the following:

- `transceiver itu` command in Chapter 3, Command Line Reference Guide.

Table B- 1 ITU Wavelength Plan for C Band Tunable DWDM Transceiver

Wavelength nm	Frequency THz	Channel No.	Wavelength nm	Frequency THz	Channel No.
1528.77	196.10	96	1547.72	193.70	48
1529.16	196.05	95	1548.11	193.65	47
1529.55	196.00	94	1548.51	193.60	46
1529.94	195.95	93	1548.91	193.55	45
1530.33	195.90	92	1549.32	193.50	44
1530.72	195.85	91	1549.72	193.45	43
1531.12	195.80	90	1550.12	193.40	42
1531.51	195.75	89	1550.52	193.35	41
1531.90	195.70	88	1550.92	193.30	40
1532.29	195.65	87	1551.32	193.25	39
1532.68	195.60	86	1551.72	193.20	38
1533.07	195.55	85	1552.12	193.15	37
1533.47	195.50	84	1552.52	193.10	36
1533.86	195.45	83	1552.93	193.05	35
1534.25	195.40	82	1553.33	193.00	34
1534.64	195.35	81	1553.73	192.95	33
1535.04	195.30	80	1554.13	192.90	32
1535.43	195.25	79	1554.54	192.85	31
1535.82	195.20	78	1554.94	192.80	30
1536.22	195.15	77	1555.34	192.75	29
1536.61	195.10	76	1555.75	192.70	28
1537.00	195.05	75	1556.15	192.65	27
1537.40	195.00	74	1556.55	192.60	26
1537.79	194.95	73	1556.96	192.55	25
1538.19	194.90	72	1557.36	192.50	24
1538.58	194.85	71	1557.77	192.45	23
1538.98	194.80	70	1558.17	192.40	22
1539.37	194.75	69	1558.58	192.35	21
1539.77	194.70	68	1558.98	192.30	20
1540.16	194.65	67	1559.39	192.25	19
1540.56	194.60	66	1559.79	192.20	18
1540.95	194.55	65	1560.20	192.15	17
1541.35	194.50	64	1560.61	192.10	16
1541.75	194.45	63	1561.01	192.05	15
1542.14	194.40	62	1561.42	192.00	14
1542.54	194.35	61	1561.83	191.95	13
1542.94	194.30	60	1562.23	191.90	12

Table B- 1 ITU Wavelength Plan for C Band Tunable DWDM Transceiver

Wavelength nm	Frequency THz	Channel No.	Wavelength nm	Frequency THz	Channel No.
1543.33	194.25	59	1562.64	191.85	11
1543.73	194.20	58	1563.05	191.80	10
1544.13	194.15	57	1563.45	191.75	9
1544.53	194.10	56	1563.86	191.70	8
1544.92	194.05	55	1564.27	191.65	7
1545.32	194.00	54	1564.68	191.60	6
1545.72	193.95	53	1565.09	191.55	5
1546.12	193.90	52	1565.50	191.50	4
1546.52	193.85	51	1565.90	191.45	3
1546.92	193.80	50	1566.31	191.40	2
1547.32	193.75	49	1566.72	191.35	1

Appendix C: Wavelength Compatibility Table

Table C- 1 Wavelength Compatibility Table

BTI 7000 - 32+8 Channel	BTI 7000 Legacy 44 Channel	BTI 7000 ROADM 96 Channel	MUX/ DEMUX 96 Channel	BP3AM6TL Transceiver 96 Channel	Wavelength nm	Freq. THz
N/A	N/A	610	C96	96	1528.77	196.10
N/A	N/A	605	C95	95	1529.16	196.05
E8	600	600	C94	94	1529.55	196.00
N/A	N/A	595	C93	93	1529.94	195.95
32	590	590	C92	92	1530.33	195.90
N/A	N/A	585	C91	91	1530.72	195.85
31	580	580	C90	90	1531.12	195.80
N/A	N/A	575	C89	89	1531.51	195.75
30	570	570	C88	88	1531.90	195.70
N/A	N/A	565	C87	87	1532.29	195.65
29	560	560	C86	86	1532.68	195.60
N/A	N/A	555	C85	85	1533.07	195.55
28	550	550	C84	84	1533.47	195.50
N/A	N/A	545	C83	83	1533.86	195.45
27	540	540	C82	82	1534.25	195.40
N/A	N/A	535	C81	81	1534.64	195.35
26	530	530	C80	80	1535.04	195.30
N/A	N/A	525	C79	79	1535.43	195.25
25	520	520	C78	78	1535.82	195.20
N/A	N/A	515	C77	77	1536.22	195.15

Table C- 1 Wavelength Compatibility Table

BTI 7000 - 32+8 Channel	BTI 7000 Legacy 44 Channel	BTI 7000 ROADM 96 Channel	MUX/ DEMUX 96 Channel	BP3AM6TL Transceiver 96 Channel	Wavelength nm	Freq. THz
E7	510	510	C76	76	1536.61	195.10
N/A	N/A	505	C75	75	1537.00	195.05
E6	500	500	C74	74	1537.40	195.00
N/A	N/A	495	C73	73	1537.79	194.95
24	490	490	C72	72	1538.19	194.90
N/A	N/A	485	C71	71	1538.58	194.85
23	480	480	C70	70	1538.98	194.80
N/A	N/A	475	C69	69	1539.37	194.75
22	470	470	C68	68	1539.77	194.70
N/A	N/A	465	C67	67	1540.16	194.65
21	460	460	C66	66	1540.56	194.60
N/A	N/A	455	C65	65	1540.95	194.55
20	450	450	C64	64	1541.35	194.50
N/A	N/A	445	C63	63	1541.75	194.45
19	440	440	C62	62	1542.14	194.40
N/A	N/A	435	C61	61	1542.54	194.35
18	430	430	C60	60	1542.94	194.30
N/A	N/A	425	C59	59	1543.33	194.25
17	420	420	C58	58	1543.73	194.20
17	N/A	415	C57	57	1544.13	194.15
E5	410	410	C56	56	1544.53	194.10
N/A	N/A	405	C55	55	1544.92	194.05
E4	400	400	C54	54	1545.32	194.00
N/A	N/A	395	C53	53	1545.72	193.95
16	390	390	C52	52	1546.12	193.90
N/A	N/A	385	C51	51	1546.52	193.85
15	380	380	C50	50	1546.92	193.80
N/A	N/A	375	C49	49	1547.32	193.75
14	370	370	C48	48	1547.72	193.70
N/A	N/A	365	C47	47	1548.11	193.65
13	360	360	C46	46	1548.51	193.60
N/A	N/A	355	C45	45	1548.91	193.55
12	350	350	C44	44	1549.32	193.50
N/A	N/A	345	C43	43	1549.72	193.45
11	340	340	C42	42	1550.12	193.40
N/A	N/A	335	C41	41	1550.52	193.35

Table C- 1 Wavelength Compatibility Table

BTI 7000 - 32+8 Channel	BTI 7000 Legacy 44 Channel	BTI 7000 ROADM 96 Channel	MUX/ DEMUX 96 Channel	BP3AM6TL Transceiver 96 Channel	Wavelength nm	Freq. THz
10	330	330	C40	40	1550.92	193.30
N/A	N/A	325	C39	39	1551.32	193.25
9	320	320	C38	38	1551.72	193.20
N/A	N/A	315	C37	37	1552.12	193.15
E3	310	310	C36	36	1552.52	193.10
N/A	N/A	305	C35	35	1552.93	193.05
E2	300	300	C34	34	1553.33	193.00
N/A	N/A	295	C33	33	1553.73	192.95
8	290	290	C32	32	1554.13	192.90
N/A	N/A	285	C31	31	1554.54	192.85
7	280	280	C30	30	1554.94	192.80
N/A	N/A	275	C29	29	1555.34	192.75
6	270	270	C28	28	1555.75	192.70
N/A	N/A	265	C27	27	1556.15	192.65
5	260	260	C26	26	1556.55	192.60
N/A	N/A	255	C25	25	1556.96	192.55
4	250	250	C24	24	1557.36	192.50
N/A	N/A	245	C23	23	1557.77	192.45
3	240	240	C22	22	1558.17	192.40
N/A	N/A	235	C21	21	1558.58	192.35
2	230	230	C20	20	1558.98	192.30
N/A	N/A	225	C19	19	1559.39	192.25
1	220	220	C18	18	1559.79	192.20
N/A	N/A	215	C17	17	1560.20	192.15
E1	210	210	C16	16	1560.61	192.10
N/A	N/A	205	C15	15	1561.01	192.05
N/A	N/A	200	C14	14	1561.42	192.00
N/A	N/A	195	C13	13	1561.83	191.95
N/A	N/A	190	C12	12	1562.23	191.90
N/A	N/A	185	C11	11	1562.64	191.85
N/A	N/A	180	C10	10	1563.05	191.80
N/A	N/A	175	C9	9	1563.45	191.75
ROADM	N/A	170 (ext)	C8	8	1563.86	191.70
ROADM	N/A	165 (ext)	C7	7	1564.27	191.65
ROADM	N/A	160 (ext)	C6	6	1564.68	191.60
ROADM	N/A	155 (ext)	C5	5	1565.09	191.55

Table C- 1 Wavelength Compatibility Table

BTI 7000 - 32+8 Channel	BTI 7000 Legacy 44 Channel	BTI 7000 ROADM 96 Channel	MUX/ DEMUX 96 Channel	BP3AM6TL Transceiver 96 Channel	Wavelength nm	Freq. THz
ROADM	N/A	150 (ext)	C4	4	1565.50	191.50
ROADM	N/A	145 (ext)	C3	3	1565.90	191.45
ROADM	N/A	140 (ext)	C2	2	1566.31	191.40
ROADM	N/A	135 (ext)	C1	1	1566.72	191.35



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