Installation Guide

Liberator™ 44xx

LIB-4400 Carrier Ethernet NID

LIB-4424 Aggregation Switch

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Revision History

Rev	Date	Description
A	09/04/13	Initial release for LIB-4400 software version v 1.6.
B	11/25/13	Revised for LIB-4400 software version v 1.7 and adds and LIB-4424.
C	01/02/14	Add DoC (Declaration of Conformity).
D	05/27/14	Updated PS fuse, marking, and mounting information.
E	03/05/15	Revised for software v 1.9. Adds ZTP Auto Discovery Mode, Performance Monitoring, and Link Fail-over.
F	12/05/2017	Re-Branded Manual

Cautions and Warnings

Definitions

Cautions indicate that there is the possibility of poor equipment performance or potential damage to the equipment. Warnings indicate that there is the possibility of injury to a person.

Cautions and Warnings appear here and may appear throughout this manual where appropriate. Failure to read and understand the information identified by this symbol could result in poor equipment performance, damage to the equipment, or injury to persons.
Cautions

Do not ship or store devices near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

Caution: When handling the LIB-4400 observe electrostatic discharge precautions. This requires proper grounding (i.e., wear a wrist strap).

Caution: Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building *(inside plant)* link segments that are not subject to lightening transients or power faults. They are **not** to be connected to inter-building *(outside plant)* link segments that are subject to lightening.

Caution: **Do not** install the LIB-4xxx in areas where strong electromagnetic fields (EMF) exist. Failure to observe this caution could result in poor LIB-4xxx performance.

Caution: Read the installation instructions before connecting the chassis to a power source. Failure to observe this caution could result in poor performance or damage to the equipment.

Caution: Only trained and qualified personnel should install or perform maintenance on the LIB-4xxx. Failure to observe this caution could result in poor performance or damage to the equipment.

Caution: Do not let optical fibers come into physical contact with any bare part of the body since they are fragile, and difficult to detect and remove from the body.

Caution: Do not bend any part of an optical fiber/cable to a diameter that is smaller than the minimum permitted according to the manufacturer's specification (usually about 65 mm or 2.5 in)!

Warnings

Warning: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Warning: Visible and invisible laser radiation when open. **Do not** look into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

Warning: DO NOT connect the power supply module to external power before installing it into the chassis. Failure to observe this warning could result in an electrical shock or death.

Warning: Select mounting bracket locations on the chassis that will keep the chassis balanced when mounted in the rack. Failure to observe this warning could allow the chassis to fall, resulting in equipment damage and/or possible injury to persons.

Warning: Do not work on the chassis, connect, or disconnect cables during a storm with lightning. Failure to observe this warning could result in an electrical shock or death.

Warning: Shock hazard exists if power supply is ejected while powered on.

See "Electrical Safety Warnings" on page 62 for Electrical Safety Warnings translated into multiple languages.

Table of Contents

Figures

Tables

1. Introduction

Net2Edge Ltd.'s LIB-4400 and LIB-4424 products are designed to support a wide range of MEF-based Carrier Ethernet services for Mobile Backhaul, Business Ethernet, Cloud Assurance and Carrier Exchange E-Access Services.

Net2Edge's Carrier Ethernet portfolio meets the demand for highly scalable, on-demand, dynamic bandwidth, differentiated services (E-Line E-LAN, E-Access), and integration of Cloud services in a fully automated service centric management platform, to ensure robust performance SLA reporting and end-to-end pro-active fault management.

Net2Edge Ltd.' Carrier Ethernet optimized demarcation devices, access switches, and Converge™ service management platform are designed to automate the entire service lifecycle, accelerate the rollout of MEF CE 2.0 services and support stringent performance SLAs.

Document Overview
The purpose of this manual is to provide the information needed to install the LIB-4400//LIB-4424 to the point of operation. This manual documents all of these models, and notes differences where they apply. This manual includes four chapters, two appendixes, a table of contents, and an Index.

Standards

IEEE Standards

IEEE 802.3™, IEEE 802.3u
IEEE 802.3z, IEEE 802.3x
IEEE 802.3ad, IEEE 802.1D
IEEE 802.1w, IEEE802.1s
IEEE 802.1Q, IEEE 802.1p
IEEE 802.1ad, IEEE 80.1AB
IEEE 802.3ah, IEEE 802.1ag
IEEE 1588-2008 (v2) Precision Time Protocol (PTP)
ITU G.8261 Synchronous Ethernet, ITU Y.1731 PM
ITU G.8031, ITU G.8032

Optical Module Standards

SFP MSA, ftp://ftp.seagate.com/sff/INF-8074.PDF
SFP+ MSA, ftp://ftp.seagate.com/sff/SFF-8431.PDF

Models

The LIB-4xxx models are defined below:

Table 1: LIB-4xxx Model Numbers

Model	Description
LIB-4400	Four 1Gbps/10GE SFP+ ports; includes IEEE 1588v2, SyncE & Service Activation Test generation (includes 19" Rack Mount ears). Does not include Power Supply; need to order separately (see Table 2 below).
	Twelve 100/1000Mbps SFP ports with two 10G SFP+ ports; includes IEEE 1588v2, SyncE & Service Activation Test generation (includes 19" Rack Mount ears). Does not include Power Supply, need to order separately (see Table 2 below).
LIB-4424	Twenty-four 100/1000Mbps SFP ports with four10G SFP+ ports; includes IEEE 1588v2, SyncE & Service Activation Test generation (includes 19" Rack Mount ears). Does not include Power Supply, need to order separately (see Table 2 below).

Physical Specifications

The LIB-4xxx platforms meet the following operating specifications:

Table 3a: LIB-4xxx Operating Specifications

Specification	Description
Switch Specifications	Fully non-blocking wire-speed switching performance for all frame sizes. Maximum frame size = 10,056 bytes Maximum MAC addresses = 32768 Shared buffer memory = 32Mbit
Data Rate	IEEE 1588 Input = 1 PPS, 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz. IEEE 1588 Output = 1 to 25 KHz. Sync-E = 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz.
Regulatory Compliance for Emission	EN55022 Class A
Regulatory Compliance for Immunity	EN55024
Safety Compliance	UL listed, CE mark
Power Consumption	24W (no SFP modules)
Power Source	See Table 2.
Size (Dimensions)	1.75" h x 17.375" w x 10" d
Weight	DC supply: 10 oz. AC supply: 15 oz. Unit without power supplies: 8.5 lbs
Operating Temperature	0 to 50 deg. C
Storage Temperature	-40 to +70°C
Altitude	0-10,000 feet (with de-rating)
Operating Humidity	5% to 95% or 10 % to 95 % relative humidity, non condensing

Table 3b: Operating Specifications

Specification	Description
Switch Specifications	Fully non-blocking wire-speed switching performance for all frame sizes. Maximum frame size = 10,056 bytes Maximum MAC addresses = 32768 Shared buffer memory = 4Mbit
Data Rate	IEEE 1588 Input = 1 PPS, 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz. IEEE 1588 Output = 1 to 25 KHz. Sync-E = 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz.
Regulatory Compliance for Emission	EN55022 Class A
Regulatory Compliance for Immunity	EN55024, CE

Safety Compliance	UL listed, CE mark
Power Consumption	60W max
Power Source	See Table 2.
Size (Dimensions)	1.75" h x 17.375" w x 10" d
Weight	3.0 Kg
Operating Temperature	-20°C to +50°C
Storage Temperature	-40°C to +70°C
Altitude	0 to 10,000 feet (with de-rating)
Operating Humidity	5% to 95% (non-condensing)

Note: Operating temperature is at 900 ft.; therefore product must be de-rated above this. Multiply by 0.57 for maximum temperature at 10,000 ft.

Features List

Port Control
Port speed, duplex mode
Port frame size (jumbo frames)
Port state (administrative status)
Port status (link monitoring)
Port statistics (MIB counters)
Port VeriPHY (cable diagnostics for TP ports only)
On-the-fly SFP detection
QoS
Traffic classes (8 active priorities)
Port default priority
User priority
Input priority mapping
Scheduler mode
QoS control list (QCL mode)
Storm control for UC, BC, and unknown
Weighted Random Early Discard (WRED)
Policers: port, service, queue, and global (ACL)
Port and queue egress shaper
DiffServ (RFC 2474) remarking
Tag remarking
L2 Switching
IEEE 802.1D Bridge, static auto MAC address learning/aging and MAC addresses
IEEE 802.1Q static VLAN
VLAN translation
Private static VLAN
Port isolation (static)
MAC-based and protocol-based VLAN
Multiple Registration Protocol (MRP)
Multiple VLAN Registration Protocol (MVRP)
Multiple VLAN Registration (MVR)
IEEE 802.10ad Provider Bridge (native or translated VLAN)
E-LINE (EPL, EVPL)
E-LAN (EP-LAN, EVP-LAN)

Multiple spanning tree (MSTP, RSTP, STP)

Loop guard

IEEE 802.30ad link aggregation, static and LACP

BPDU guard and restricted role

IGMPv2 and IGMPv3 snooping

MLDv1 and MLDv2 snooping

IPMC throttling, filtering, and leave proxy

Voice VLAN

DHCP client, DHCP snooping

DNS client, proxy

Port mirroring

Protection: 1+1 port protection, 1:1 port protection, 1:N port protection, port protection with services, G.8032 ring protection v.1 and v.2

L3 Switching

DHCP option 82 relay

IP MAC binding

Security

Network Access Server (NAS)

Port-based IEEE 802.1X

Single and multiple IEEE 802.1X

MAC-based authentication

VLAN and QoS assignment

Guest VLAN

RADIUS accounting

MAC address limit

TACACS+

Web and CLI Authentication

Authorization (15 user levels)

ACLs for filtering, policing, and port copy

IP source guard

Synchronization

Synchronous Ethernet with SSM

1588v2 PTP with two-step clock

1588v2 PTP with one-step clock

Peer-to-peer and end-to-end-transparent clock

Boundary clock

Redundant masters and multiple timing domains

ITU filtering

PTP over IPv4

Unicast/multicast

NTPv4 client

OAM

IEEE 802.3ah Ethernet OAM with dying gasp

IEEE 802.1ag MEP/MP

MEP Up/Down and MIP Support

ITU-T Y.1731 Support: LM/DM

ITU-T Y.1731 PM Time Stamping hardware supported with IEEE 1588 timestamping HW

Third party Ethernet test- set OAM loop up compatibility

Manual IP/MAC Swap Loop-up

RFC 2544 Traffic Generation/Reporting (Throughput Test, Latency Test, Frame Loss Test, and Back-to-back Frames Test)
In-Service Throughput Testing
3rd Party Performance Monitoring Portal Vendor support
Power Savings
ActiPHY
PerfectReach
Adaptive fan control

Management

HTTP server
CLI – console port and Telnet
Management access filtering
HTTPS
SSHv2
IPv6 Management
IPv6 Ready Logo Phase 2
System Syslog
Software upload through Web
SNMP v1, v2c, v3 Agent
RMON Group 1, 2, 3, and 9
IEEE 802.10AB-2005 Link Layer Discovery (LLDP)
Cisco Discovery filtering (CDP)
Loop detection restore to default
MIBs
RFC 1213 MIB II
RFC 1215 TRAPS MIB
RFC 2613 SMON MIB ·
RFC 2819 RMON (Group 1, 2, 3, and 9) RFC 2863 Interface Group MIB Using SMI v2
RFC 3411 SNMP Management Frameworks
RFC 3414 User-based Security Model for SNMPv3
RFC 3415 View-based Access Control Model for SNMP
RFC 3621 LLDP-MED Power (POE)
RFC 3635 Ethernet-like MIB
RFC 3636 IEEE 802.30 MAU MIB
RFC 4133 Entity MIB v3
RFC 4188 Bridge MIB
RFC 4668 RADIUS Authentication Client MIB
RFC 4670 RADIUS Accounting MIB
RFC 5519 Multicast Group Membership Discovery
IEEE 802.1 MSTP MIB
IEEE 802.1AB LLDP MIB (LLDP MIB is included in clause of the standard)
IEEE 802.1X (PAE MIB included in clause of the standard)
IEEE 802.1Q Bridge MIB 2008
IEEE 802.30ad (LACP MIB included in clause of the standard)
Private MIB framework

Feature Descriptions

Key LIB-4xxx features include:

Up to 4096 Service Classification entries; and up to 4096 service-specific egress tagging and QoS entries.

Layer 2 Switching features (802.1Q VLAN switch with 32k MACs and 4k VLANs, Push/pop/translate up to two VLAN tags on ingress and/or egress; Policing with leaky bucket storm control and protection from broadcast, flooding, and multicast. RSTP, MSTP, IVL and hardware- and software-based Learning. Up to 512 QoS, VLAN, and Security Profile Classification entries.

L2 Multicast features (32k Layer 2 Multicast Groups with up to 1k port masks; IGMP v2 and v3 support, and MLD v1 and v2 support).

Quality of Service (Eight QoS class queues per port with Strict or DWRR scheduling; four DP levels per QoS class queue; WRED operation between DP levels within each QoS class queue for intelligent congestion avoidance per QoS class.

Security (content aware filtering engine using ACLs for frame/packet inspection; generic storm control for flooded broadcast, flooded multicast, and flooded unicast traffic. Eight selectable CPU ports for segregation of CPU redirected traffic. Per-port and per-address registration of snooping of reserved IEEE Mac addresses (BPDU, GARP). Port-based and MAC-based access control (IEEE 802.1X). Per-port CPU-based learning with option for secure CPU-based learning. Per-port ingress and egress monitoring.

RMON statistics group (RFC 2819) support and **SNMP** interface group (RFC 2863).

Carrier Ethernet features (Provider bridge switch for 32K MACs and 4K VLANs).

Timing and testing features
Service-aware architecture.
IEEE 1588 and Sync-E network timing.
Ethernet OAM and protection switching.

IEEE 1588 interfaces
Input: 1 PPS, 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz.
Output: 1 to 25 KHz.
1500VAC isolated.
SMB coaxial INPUT: TTL, minimum 100ns high pulse, 50-75-High-Z termination.
SMB coaxial OUTPUT: 2.0V into 50 ohm, 4V into High-Z.

Sync-E interfaces
8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz and 25 MHz.
1500VAC isolated.
SMB coaxial INPUT: 1Vpp to 5Vpp, Sine or square wave, minimum 40/60 duty cycle, 50-75-High-Z termination.
SMB coaxial OUTPUT: 2.0V into 50 ohm, 4V into High-Z.

Loopbacks
MAC SA-DA swap, swap the source and destination before sending back out source port.
Per EVC.
Per VLAN.

Synchronous Ethernet (Sync-E)

Recommendation ITU-T G.8262/Y.1362 outlines requirements for timing devices used in synchronizing network equipment using synchronous Ethernet. This Recommendation defines the requirements for clocks (e.g., bandwidth, frequency accuracy, pull-in, hold-in, and pull-out ranges, noise generation, noise tolerance, noise transfer, transient response, holdover performance, etc.). Synchronous Ethernet (Sync-E) as defined by ITU-T G.8261 allows for the transfer of high-quality network timing from a traceable reference, to all network elements. Because this is a physical layer process, the timing quality does not vary due to network load. Sync-E builds on the existing Ethernet standards and is backward compatible with IEEE 802.3.

IEEE 1588 PTP

IEEE 1588 Precision Time Protocol (PTP) support can be used simultaneously with Sync-E in hybrid networks.

Note: 1588 PTP is not supported when a port is operating in 1000X or SGMII mode.

Loopback Features

These Loopbacks are available:
Ethernet port loopback - this would be service impacting
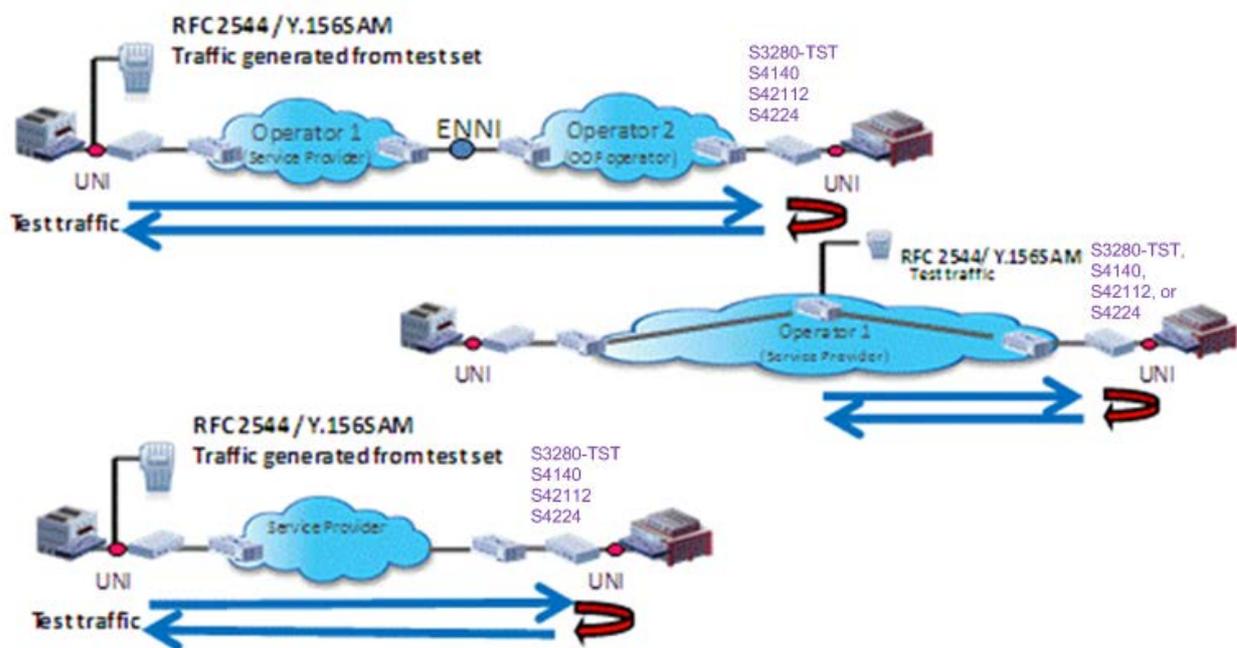Per EVC loopback
Per VLAN loopback

Figure 1: Loopback Types

Packet Generator and Checker

The RFC2544 Packet Generator / Checker provides Throughput, Latency, Back-to-Back and Frame loss tests. RFC 2544 is the de facto methodology that outlines the tests required to measure and to prove performance criteria for carrier Ethernet networks. It provides an out-of-service benchmarking methodology to evaluate the performance of network devices using throughput, back-to-back, frame loss and latency tests. Each standard test validates a specific part of a SLA.

See http://www.ietf.org/rfc/rfc2544 for specifics.

Ethernet SAT (Service Activation Testing) Loopback

The MEF SAT (Service Activation Testing) is implemented early in the Ethernet Service lifecycle; when a new customer order is received, MEF SAT (along with MEF LLB) can be used to provision and turn up the circuit in order to verify the performance to the SLA (via FM and PM). Ethernet Service Activation Test (EtherSAT) methodology involves:

- Verify a new service after provisioning is complete, but before it is turned over to the customer.
- Check that the configuration is correct.
- Verify performance meets the Service Acceptance Criteria (SAC) to ensure CoS Performance Objectives are attained.

The EtherSAT loopback test can be run via the Web interface or the CLI. See the related manual for detailed information.

Typical Applications

The LIB-4xxx can be used to implement the access and first-level aggregation functions between CPE (Customer Premise Equipment) and PE (Provider Edge) boxes. Environments can include:

- Metro Ethernet transport (MSPP/MSTP)
- Carrier Ethernet switch/router (CESR)
- Mobile wireless backhaul

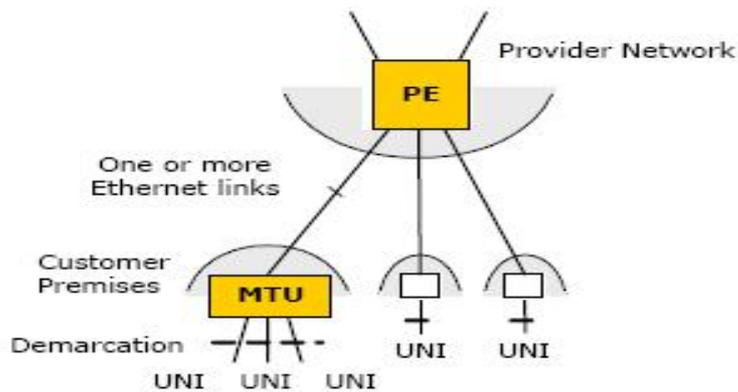The figure below shows CPE and PE equipment placed in a 'typical' network.

Figure 2: LIB-4400 Deployment

In this application, the LIB-4xxx forms the demarcation between the customer network and the provider network, providing the full set of UNI features in a cost-effective manner.

- Map customer frame formats into provider frame formats. Classify frames and map to appropriate QoS profiles.
- Meter the customer traffic and ensure that the customer SLA is met. Police using MEF-compliant dual leaky-bucket algorithm. Mark frames as either Committed (green) or Discard Eligible (yellow). Provide correct QoS treatment (traffic management). Provide traffic statistics per customer in a manner consistent with the SLA.
- Enable end-to-end SOAM (Service OAM), if allowed.
- Implement the service defined by the SLA (E-LINE for point-to-point or backhaul service; E-LAN for multipoint/bridged services; E-TREE for video distribution or backhaul services).
- Enable management and protection schemes as required by the provider. Link aggregation or other port schemes if used for access. OAM at the operator and service provider level for remote management, fault diagnosis, and protection switching.
- Support network timing and synchronization requirements as required. Synchronous Ethernet (Sync-E) and IEEE 1588 (PTP) functionality.

2.   Installation

This section describes how to install the LIB-4xxx hardware and software, and the procedures to access and initially set up the LIB-4xxx through either a local serial interface or a remote Ethernet connection (Telnet session or Web interface).

2.1   Safety

Before installing the LIB-4xxx, read the "Safety Cautions and Warnings" on pages 3-4 of this manual and ensure that the requirements noted are met. During installation and maintenance, avoid direct exposure to laser beams. Specifically, do not look into laser ports. Ensure that each SFP port at which laser beams are (or will be) present is occupied by an SFP that is locked in position. See the related SFP manual for details. See "Electrical Safety Warnings" on page 62 for Electrical Safety Warnings translated into multiple languages.

2.2   Unpacking

Carefully unpack all LIB-4xxx contents.
Verify receipt of all LIB-4xxx components; see "Ship Kit Contents" on page 19.
Place the LIB-4xxx and related materials in the desired install location (e.g., Rack-mount or Table top). See "Installing LIB-4xxx Hardware" on page 33.

Figure 3: LIB-4xxx Unpacking

Save the LIB-4xxx shipping carton and packing materials for future use.

Ship Kit Contents

The LIB-4xxx is shipped with several standard components. Make sure you have received the following:

- One LIB-4400 NID or one /LIB-4424 switch
- One CONSOLE Cable, DB9 Fem-to-RJ45 Male, 6Ft. (TN PN 27232) (CISCO 72-3383-01)
- One printed Product Documentation postcard
- Rubber feet
- One cardboard insert
- Two foam endcaps

Other / Optional Items

Additional items used during installation may include one or more SFPs, SGMII device(s), a USB cable, Ethernet CAT 6 or CAT 6E cable(s) and/or Fiber cable(s), and rack mount brackets.

Tools Required

Installation may require a #4 Phillips screwdriver.

Additional tools and equipment required for cleaning connectors may include dust caps, isopropyl alcohol (solvent for contaminants), and tissues (soft multi-layered fabric made from non-recycled cellulose).

Use industry standard procedures for cleaning connectors. If applicable, follow your organizations process and procedure for copper and fiber cable cleaning and maintenance.

Installation Overview

☐ Review the Safety section above (see 2.1　　Safety on page 18).

☐ Unpack the LIB-4xxx (see 2.2　　　Unpacking on page 18).

☐ Perform desktop install (see Desktop / Tabletop Installation on page 24) or perform rack mount install procedure (see Rack Mount Installation on page 24).

☐ Connect PORT 1 - PORT 4 (see Front Panel Connectors and LEDs on page 20).

☐ Install SFPs (see Installing SFPs on page 25).

☐ Connect the MGMT port to a PC's Ethernet NIC port.

☐ Connect the CONSOLE PORT (see Front Panel Connectors and LEDs on page 20).

☐ Perform grounding (see Grounding the LIB-4xxx (Rack Mount) on page 29).

☐ Install the Power Suppy (ies) (see "

Installing the DC Power **Supply**" on page 27
or "
Installing the AC Power **Supply**" on page 28).

☐ Connect Power (see "Connecting to the DC Power Supply" on page 29 or "Connecting to the DC Power Supply" on page 31).

☐ Monitor the LEDs (see Front Panel Connectors and LEDs on page 20).

☐ Install the Software (see Software Install Process on page 32).

If the install was <u>successful</u>, continue with the related *Web User Guide* or *CLI Reference* manual.

If the install was <u>unsuccessful</u>, refer to the Troubleshooting section in the online *Web User Guide*.

Front Panel Connectors and LEDs

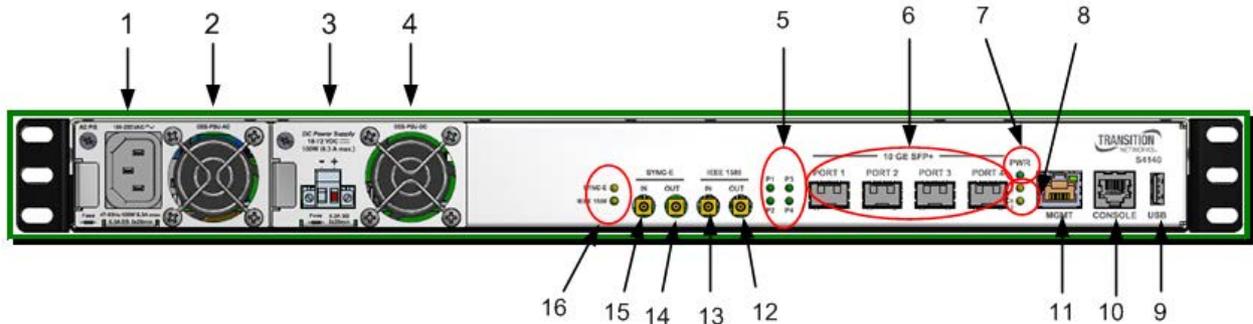The LIB-4400 front panel connectors and LEDs are shown and described below:

Figure 4a: LIB-4400 Front Panel Connectors and LEDs

Front Panel

1. Power input for Power Supply 1.
2. Fan for Power Supply 1.
3. Power input for Power Supply 2.
4. Fan for Power Supply 2.
5. LEDs **P1** - **P4**: One LED per port, bi-color (Green/Yellow)

Green = ON green when linked at 10GE, OFF when not linked, BLINK when activity.
Yellow = ON yellow when linked at 1GE, OFF when not linked, BLINK when activity.
When first connected, the Port 1-4 LEDS turn yellow while a link is established. After about 15 seconds, the LED turns green when the LIB-4400 and the target device have established a fibre link. If this LED remains off after cable is connected, check 1) remote power, 2) cabling, and 3) interface modes of both the local and remote devices (speed, duplex, auto negotiation, etc. See the Troubleshooting section of the related online *User Guide* manual for more information.
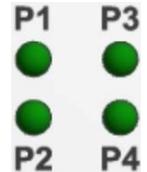
6. **PORT 1** - **PORT 4**: Four Ethernet 10 GE SFP+ ports. The LIB-4400 supports 1Gbps, but the behaviour is different than a normal 1G SFP port (no SFP detect).
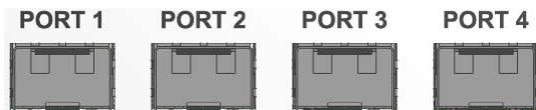
7. PWR (Power) LED: Green ON = power on to device;
Primary   Green
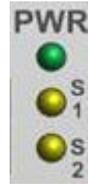Secondary   Green

8. **S1** LED (System Status LED) and **S2** LED - Power Source LED.

S1 - System Status LED. During normal boot up this LED will be amber.
Once the device is fully booted it will turn green.
During firmware upgrade this LED will flash green.
When a fatal condition is logged, S1 flashes amber.

S1 LED Color	S1 LED Description
Yellow	During boot up
Green	Normal operation
Flashing Green	Firmware upgrade
Flashing Amber	Fatal condition logged

S2 - Power Source LED.

Green: Primary power source active. *Amber*: Secondary Power Source active.

There is a primary and secondary power source slot. The left slot is primary and the right is secondary.

If primary is present and powered, all power is supplied by the primary supply; the secondary is in 'standby' mode.

S2 LED Color	S2 LED Description
Green	Primary Power input
Yellow	Secondary Power Input

9. USB port (not currently programmed to recognize USB devices).

10. **CONSOLE** Port: One Ethernet RJ-45 female connector for connection to a computer for console control / administration (shown below). The CONSOLE port can be used for accessing the LIB-4xxx CLI for out-of-band management. The COM port can be connected at 115k baud with 8/N/1/None connection setting. See the "Software Install Process" on page 32 for more information.

11. MGMT 10/100/1000 Port: One Ethernet RJ-45 connection for out-of-band management over the IP network the RJ-45 port is provided to keep management traffic totally isolated from data traffic. Connect the MGMT port to a PC's Ethernet NIC port to use this management function.

11. MGMT port LED:
Left LED: ON=Link, BLINK=Activity, Green=Full duplex, Yellow=Half duplex
Right LED: When linked, Green=1G Yellow=100M OFF=10M

2. IEEE 1588 OUT: SMB connection for Sync-E timing output 1 to 25 KHz (2.0V into 50 ohm, 4V into High-Z.

13. **IEEE 1588 IN**: SMB connection for Sync-E timing input (TTL, minimum 100ns high pulse, 50-75-High-Z termination). Input: 1 PPS, 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz, and 25 MHz.

14. Sync-E Out: SMB connection for PTP timing output. Sync-E interfaces (2 KHz to 25 MHz; 1500VAC isolated. SMB coaxial OUTPUT: 2.0V into 50 ohm, 4V into High-Z.

15. **Sync-E In**: SMB connection for PTP timing input. SMB coaxial INPUT: 1Vpp to 5Vpp, Sine or square wave, minimum 40/60 duty cycle, 50-75-High-Z termination. IN: 8 KHz, 64 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 19.44 MHz and 25 MHz. 1500VAC isolated.
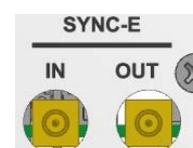
16. **IEEE 1588 PTP LED**:

Off = Input Disabled;

Flashing Amber = No signal detected;

Yellow = Signal detected, but incorrect frequency or unstable.

Flashing Green -- N/A;

Green = Valid signal detected.
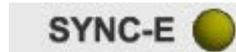
17. **SYNC-E LED**:

Off = Disabled;

Flashing Amber = No signal detected;

Yellow = Signal detected, but incorrect frequency or unstable.

Flashing Green = Locked;

Green = Selected, and using as primary clock source.
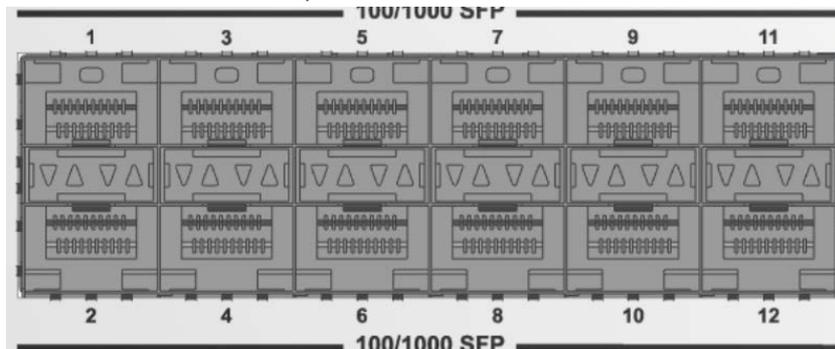
The front panel connectors and LEDs are shown and described below:

Figure 4b: Front Panel

P1-**P12** LEDs

Two LEDs for each port, one Green and one Yellow:

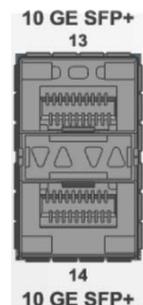Green LED = ON when linked, OFF when not linked, BLINK when activity.

Yellow LED = Indicates speed when linked, ON=1GE, OFF=100FX.

P13-**P14** LEDs

Two LEDs for each port, one Green and one Yellow:

Green LED = ON when linked, OFF when not linked, BLINK when activity.

Yellow LED = Indicates speed when linked, ON=10GE, OFF=1GE.

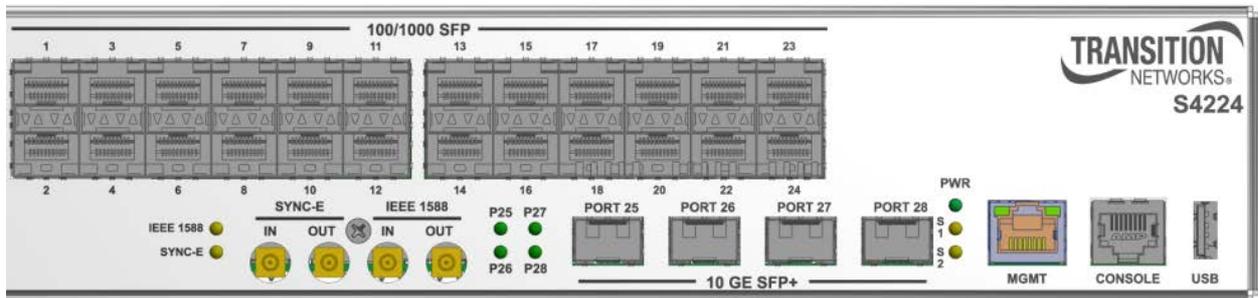The **LIB-4424** front panel connectors and LEDs are shown and described below:
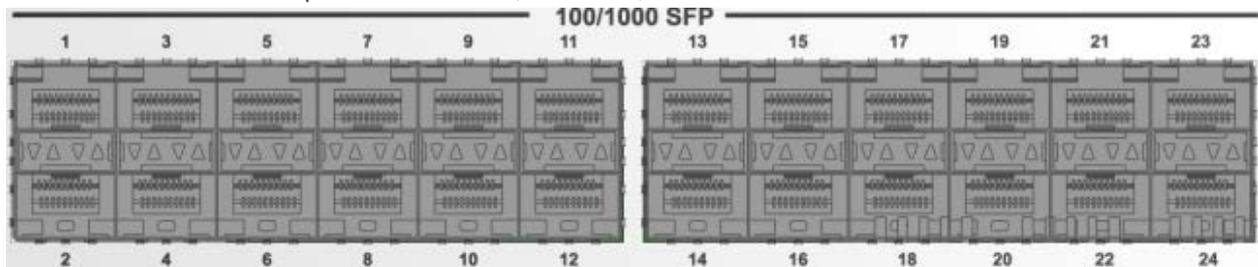

Figure 4c: LIB-4424 Front Panel

LIB-4424:

P1-**P24** LEDs

Two LEDs for each port, one Green and one Yellow:

Green LED = ON when linked, OFF when not linked, BLINK when activity.

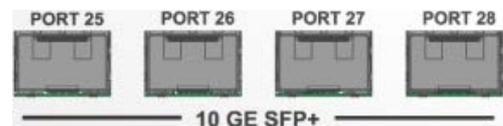Yellow LED = Indicates speed when linked, ON=1GE, OFF=100FX.

P25-**P8** LEDs

One LED per port, bi-color (Green/Yellow):

Green = ON green when linked at 10GE, OFF when not linked, BLINK when activity.

Yellow = ON yellow when linked at 1GE, OFF when not linked, BLINK when activity.

Installing LIB-4xxx Hardware

The LIB-4xxx can be installed via rack mount or via desktop / table top. Desktop mount is standard.
Rack Mount Installation
The LIB-4xxx enclosure has three holes on each side for rack mounting. Rack mount uses SKU # LIB-4400-19RM - 19" Rack Mount Kit for LIB-4xxx mounted in 1RU of a 19" rack.
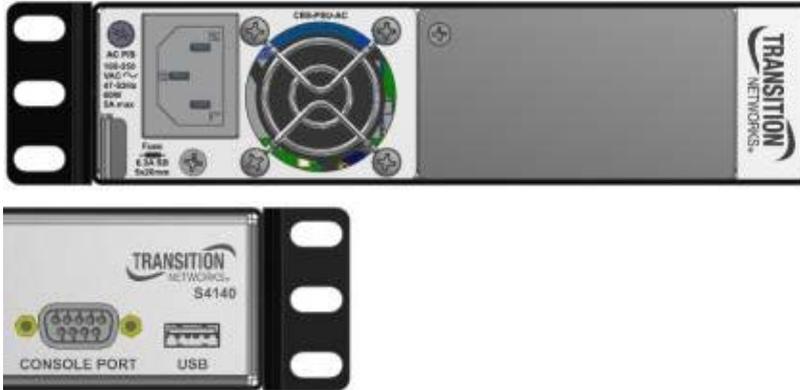

....

Figure 5: Rack Mount Installation

Desktop / Tabletop Installation

The LIB-4xxx is shipped with four rubber feet for optional installation on a table or other flat, stable surface in a well-ventilated area.

Remove the rubber feet from the card.
On the bottom of the LIB-4xxx, place one foot in each corner of the device.

Figure 6: Tabletop Installation

Set the NID in place and connect the power adapter (see "Power Supply Installation" on page 26).
SFP / XFP / GBIC Optical Transceivers

Net2Edge SFPs and XFPs are Small Form-Factor Pluggable (SFP) hot-pluggable transceivers that allow a single network device to be connected to a multitude of interfaces, protocols, and transmission media via the SFP/XFP port. Our SFPs offer a cost effective, flexible way to accommodate network modifications and growth, while still using existing network devices. All

Net2Edge SFPs and XFPs are compliant with the Multi-Sourcing Agreement (MSA) ensuring interoperability with all other MSA compliant networking devices.

Note: DMI option support requires an SFP that supports DMI.

Installing SFPs

The LIB-4xxx lets you install one to four SFP devices of your choice in order to make a fiber connection.
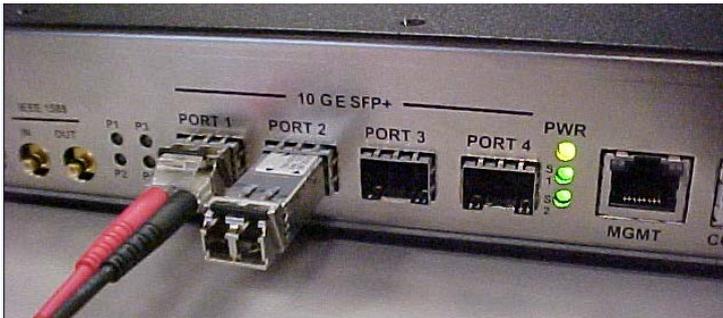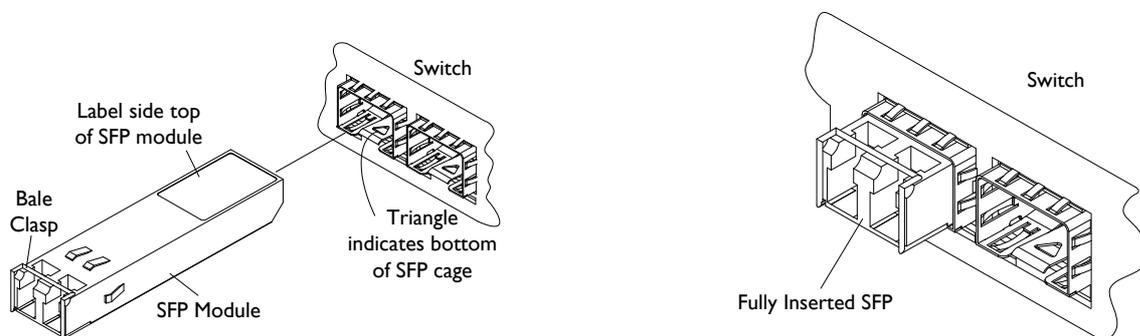

Figure 7a: LIB-4400 SFP Installation

Position the SFP device at either installation slot, with the label facing up.
Carefully slide the SFP device into the slot, aligning it with the internal installation guides.

Ensure that the SFP device is firmly seated against the internal mating connector.
Make sure the SFP release latch is in the up (closed) position when you insert the cable connector into the SFP at PORT 1 - PORT 4 (LIB-4400). On the /LIB-4424, rotate the SFP 19- degrees (label facing down) and insert for the lower row of ports.
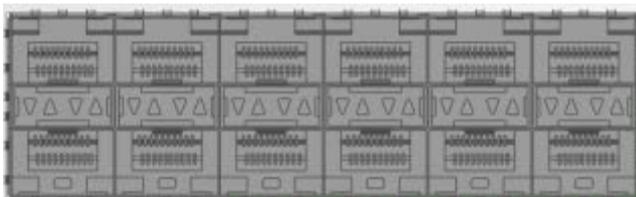

Figure 7b: LIB-4424 SFP Installation

Attach an appropriate cable into the SFP module port.
Attach the other end of the cable into the other device.

Note: Do not remove and replace the SFP modules more often than necessary; excessive SFP removing/replacing can shorten the SFPs useful life.

Back Panel

The LIB-4400 back panel is shown and described below.

Figure 8: Back Panel

Connections

The LIB-4400 back panel connectors are described in the table below:

Table 4: LIB-4xxx Back Panel Connector Descriptions

Connector	Description
	C. GND (Common Ground) screws; two optional threaded common ground connections are provided.

Power Supply Installation

This section covers installing the power supply options. After the LIB-4xxx has been unpacked, install the AC and/or DC Power Supply. Note that this can be done at initial LIB-4xxx installation or as a field upgrade. **Warning**: power supply must not be powered during installation. The unit can be powered while installing or removing a power supply (just the supply being serviced must not be powered).

Table 5: Power Supply Descriptions

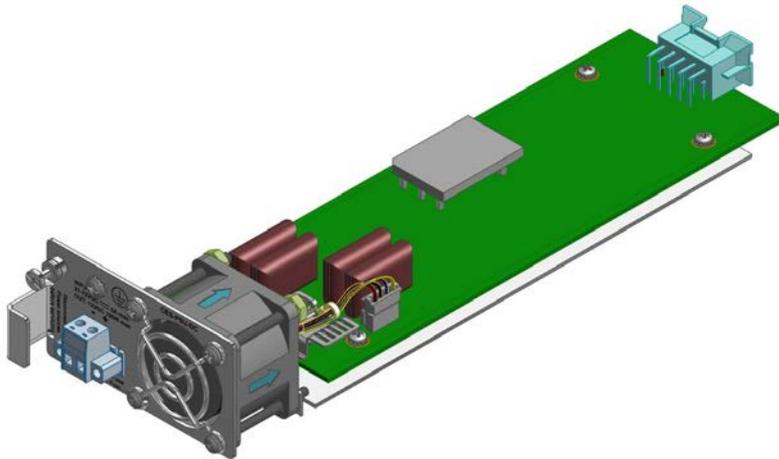| Model	Description
CES-PSU-AC	100-250VAC; 47-63 Hz, 1.2A. 100W, 8.3A max. Hot Swappable AC Power Supply. Fuse: 6.3A 250V SloBlo 5x20 mm.
CES-PSU-DC	Input: 21-72 VDC @ 6A Max. Out: 12 VDC 8.3 A 100W Max. Hot Swappable DC Power Supply. Fuse:12A 250VDC Fast 6 X 32mm.

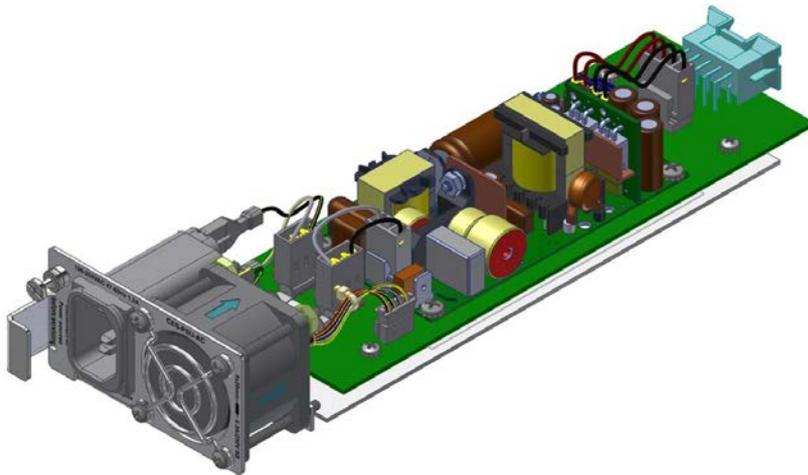Figure 9: CES-PSU-DC Power Supply

Figure 10: CES-PSU-AC Power Supply

Installing the DC Power Supply
After the LIB-4xxx has been unpacked, install the DC Power Supply.

Warning: Risk of electrical shock. **For multiple power sources**: Energy hazard if both power modules are not disconnected. Disconnect both power sources before servicing.
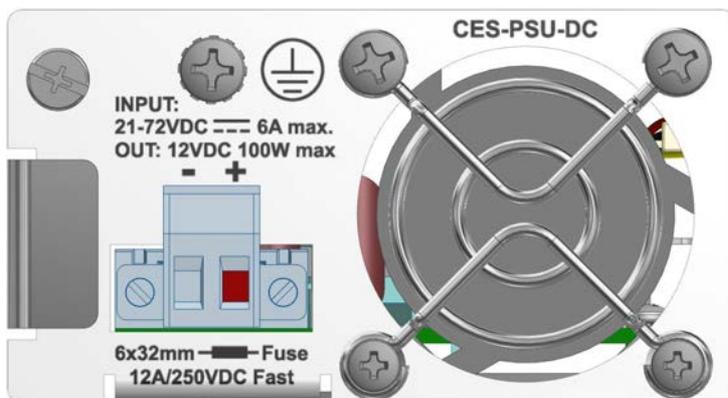

Figure 11: DC Power Connection

⚠️ **Warning**: Shock hazard exists if power supply is ejected while powered on.

Unplug LIB-4xxx POWER, CONSOLE, and PORT connections if desired.
Remove the blank faceplate or use the one open power supply slot.
Insert the DC Power Supply into the open LIB-4xxx slot.

Fasten the DC Power Supply with the slotted retaining screw.
Insert the power plug wires of the DC power adapter into the **-** and **+** power inlets.
Refer to the "Grounding the LIB-4xxx" section below.

Installing the AC Power Supply

After the LIB-4xxx has been unpacked, install the AC Power Supply.

⚠️ **Warning**: Risk of electrical shock. **For multiple power sources**: Energy hazard if both power modules are not disconnected. Disconnect both power sources before servicing.
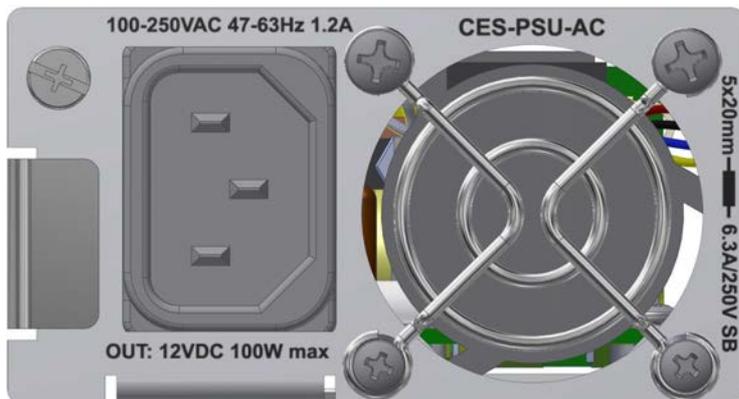

Figure 12: AC Power Connection

⚠️ **Warning**: Shock/damage hazard exists if power supply is installed / removed while powered on.
Unplug LIB-4xxx POWER, CONSOLE, and PORT connections if desired.
Remove the blank faceplate or use the one open power supply slot.

Fasten the AC Power Supply with the slotted retaining screw.

Insert the AC Power plug into the AC Power Block receptacle (power inlet).

Refer to the "Grounding the LIB-4xxx" section below.

Grounding the LIB-4xxx (Rack Mount)

C. GND (Chassis Ground) Note: a device bonded to metallic shelf that houses LIB-4xxx jacks should be bonded directly by either **1)** and independent conductor to the central office ground via rack ground bar, or **2)** connection to the rack itself, or **3)** other metal-to-metal bond to ground. To connect the LIB-4xxx to a ground point on the rack, follow your organization's or IT department's standard procedure or the US NFPA 70®: National Electrical Code.

Connecting to the DC Power Supply

Use the procedure below to connect the LIB-4xxx to the provided DC power supply (see Figure 11 above).

Warning: Risk of electrical shock. **CAUTION:** When connecting DC power wires to the terminal-block plug, pay close attention to the polarity markings shown near the terminal block of the LIB-4xxx. Failure to observe this caution could result in damage to the switch.

Note: It is a good practice to turn OFF input and load power, and unplug the power terminal block before making wire connections. Otherwise, your screwdriver blade can inadvertently short the terminal connections to the grounded enclosure.
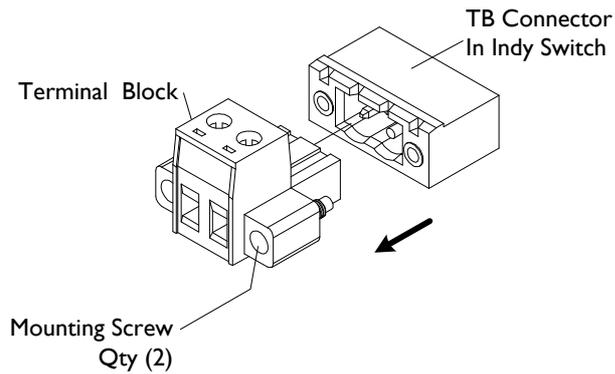
The range of suitable wire for the terminal block is 12 to 26 AWG.

The power source must be safety certified.

Remove the Terminal Block

Turn the external power source OFF.

Loosen the "2" mounting screws, attaching the "primary" Terminal Block to the switch chassis, and then pull it from the chassis connector.

Connect Power Wires to the Terminal Block

Strip the wires to the proper length.

Insert the positive and negative power wires into V+ and V- contacts respectively of the terminal block (note polarity on the chassis of the switch). Make sure the wires are secure.

Insert the positive and negative power wires into V+ and V- contacts respectively into the power source; make sure the wires are secure. Insert the positive and negative power wires into V+ and V- contacts respectively into the power source - make sure the wires are secure.
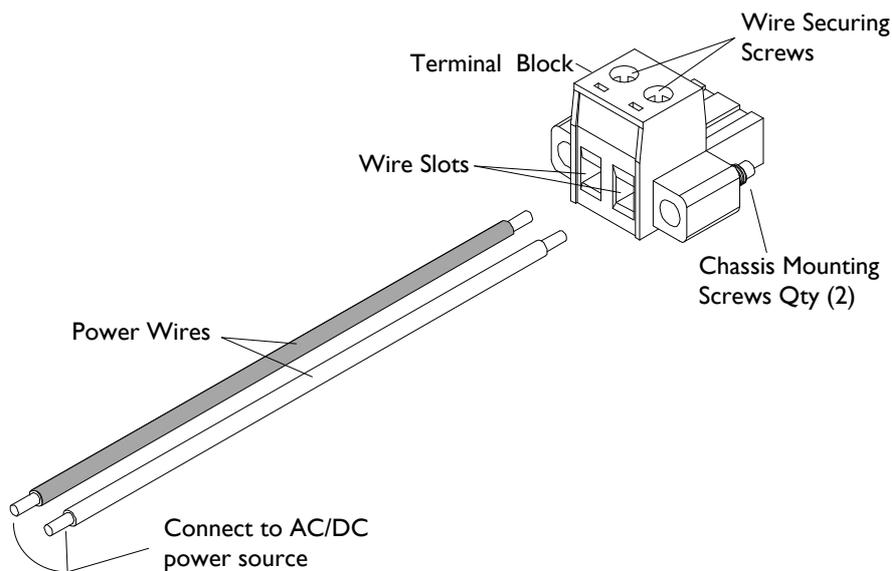
Note that the LIB-4xxx front panel **P** (power) LED lights and a startup sequence of LEDs light momentarily. When the sequence stops, only the **P**ower LED remains lit.

Continue with the "Software Install Process" below.

Connecting to the AC Power Supply

Use the procedure below to connect the LIB-4xxx to the provided AC power supply (see Figure 13 above).

⚠️ **Warning**: Risk of electrical shock.

Insert the installed Power Supply plug into the LIB-4xxx front panel.

Plug the AC power plug into a live AC outlet.

Note that the LIB-4xxx front panel **P** (power) LED lights, and a startup sequence of LEDs light momentarily. When the sequence stops, only the **P**ower LED remains lit.

Continue with the "Software Install Process" below.

Power Supply "Hot Swap" Feature

After the Power Supply module(s) are installed (previous sections), you can replace a Power Supply module without powering down the LIB-4xxx. This allows you to change the configuration or repair a module without interrupting LIB-4xxxoverall operation.

Warning: Shock/damage hazard exists if power supply is installed / removed while powered on.

See the "Power Supply Options" section on page **Error! Bookmark not defined.** for PS module model descriptions.

Checking Power Supply Status

After the Power Supply module(s) are installed (previous sections) and the Software Install Process is done (next section) you can use the CLI or web GUI to verify Power Supply module status.

Via the CLI: use the "**system power**" command to display PS module status. For example:

```
>system power
Power Supply Present Powered Type Fan RPM Temp
------------ ------- ------- ---- ------- ------
1            Yes     Yes     AC   4431    27 C
2            Yes     No      DC   4566    27 C
>
```

See the related *CLI Reference* manual for details.

Via the GUI: navigate to the **Monitor** > **System** > **Information** page to verify that the PS modules (PS 1 and/or PS 2) are Present, Powered, the Type (AC or DC), whether Active, the current Fan RPM, and the current fan Temperature). See the related *Web User Guide* manual for details.

Power Supplies	PS 1	PS 2
Present	Yes	Yes
Powered	Yes	No
Type	AC	DC
Fan RPM	4421	4566
Temperature	27 C	27 C

Software Install Process

The next sections cover the LIB-4xxx software installation process, which includes:

- Configure and login in to the LIB-4xxx via Telnet (page 26), PuTTY (page 27) or HT (page 29).
- Log in to the LIB-4xxx via the Web Interface (page 31).
- Register at My TN Access (page 32).
- Take our TN Customer Satisfaction Survey (page 32).

Operating System Support
The LIB-4xxx has no OS requirements.

Web Browser Support
The LIB-4xxx is compatible with any browser supporting Java (e.g., Firefox (Mozilla Firefox), Internet Explorer, Google Chrome).

Telnet Client Support
The LIB-4xxx CLI is compatible with any Telnet program supporting SSH.

Terminal Emulation Package Support
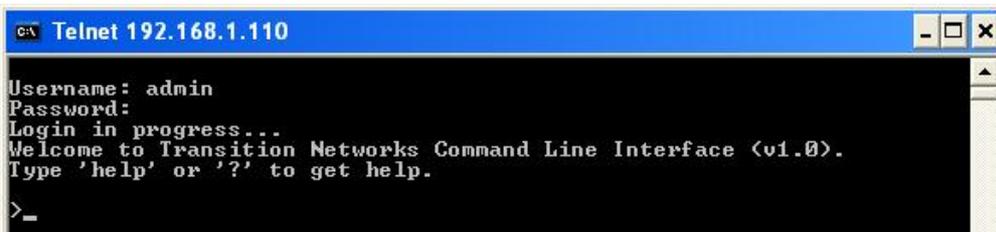The LIB-4xxx CLI is compatible with any terminal program supporting ANSI/VT100 emulation.

Login In to the LIB-4xxx via Telnet
Use the Windows Start > Command Prompt menu path to open a command prompt.
At the prompt type **telnet 192.168.0.1** and press the **Enter** key.
Enter the LIB-4xxx Username (the default is **admin** in lowercase letters) and press the **Enter** key.
Enter the LIB-4xxx password (no default - just press the **Enter** key.

At the command prompt, enter a command and press the Enter key. For example, type Help (or ?) and press Enter to display the LIB-4xxx Help screen:

Continue to enter LIB-4xxx CLI commands. See the LIB-4xxx CLI Reference manual for more information.

Log In to the LIB-4xxx via PuTTY
Start PuTTY. If the PuTTY "Open File - Security Warning: dialog displays, click the Run button.
At the PuTTY Configuration dialog box, in the "Host Name [or IP Address]" field, enter the LIB-4xxx IP address (the default is 192.168.0.1).
In the Port field, enter 22.
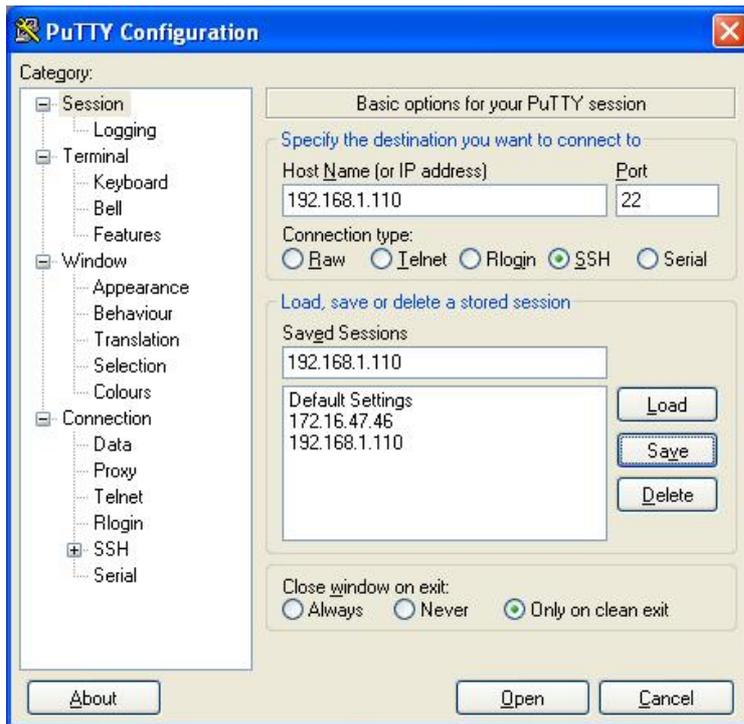
Save and Load the saved session as desired.
Click the **Open** button. The LIB-4xxx PuTTY login screen displays.

Enter the LIB-4xxx Username (the default is **admin** in lowercase letters) and press the **Enter** key.
Enter the LIB-4xxx password (no default - just press the **Enter** key).

At the PuTTY command prompt, enter a command and press the Enter key. For example, type **Help** or **?** a space, and press Enter to display the LIB-4xxx Help screen:

9. Continue to enter LIB-4xxx CLI commands. See the related *CLI Reference* manual for more information.

Log In to the LIB-4xxx via HyperTerminal (HT)
Open the HyperTerminal (HT) program.
Create a new connection by selecting File > New Connection.
Enter a name for the session, choose an icon, and click the OK button.
At the Connect To dropdown select "COM7" and click the **OK** button.
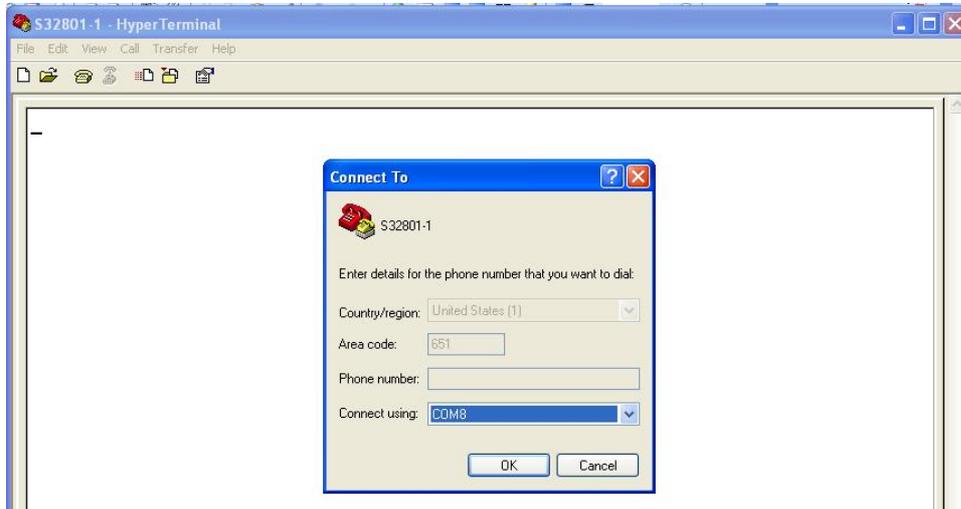
At the COM 7 Properties > Port Settings tab, select:
Bits per second: 115,200
Data bits: 8
Parity: None
Stop bits: 1
Flow Control: None
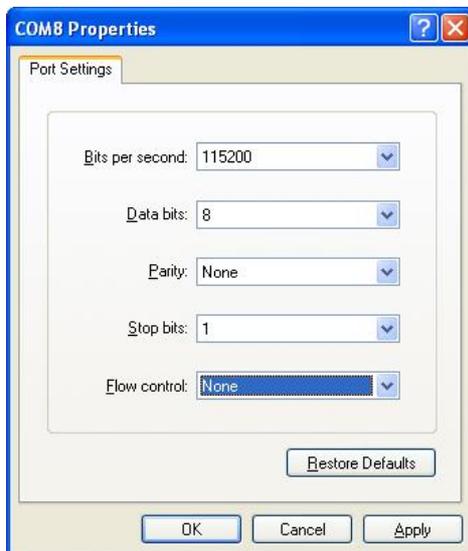
Click the **OK** button.
Press the Enter key twice.
At the Username prompt enter **admin** and press the Enter key. The TN CLI Welcome screen displays.
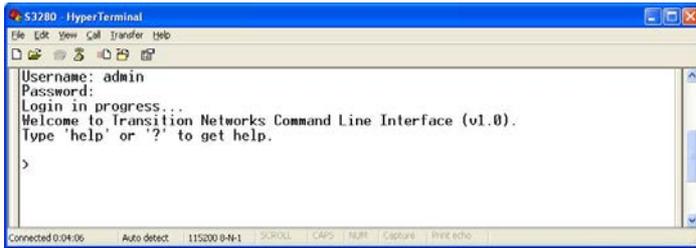
At the HT command prompt, enter a command and press the Enter key. For example, type **Help** (or **?**) and press Enter to display the LIB-4xxx Help screen:

Continue to enter LIB-4xxx CLI commands. See the related *CLI Reference* manual for more information.

Log In to the LIB-4xxx via the Web Interface
This procedure assumes that the previous steps are successfully completed.

Open a supported web browser.
Type in the default URL (e.g., 192.251.144.129) and press the **Enter** key. The 'Connect to' screen displays in IE (or the 'Authentication Required' screen in Google Chrome or Mozilla Firefox).

At the User Name field / dropdown enter or select your user name (e.g., *admin*).
In the Password field enter your password or just click **OK**.

At the "Remember my password" checkbox, follow your organizations policy on password protection.

Click the **OK** button. The LIB-4xxx Web interface main screen displays.

We recommend registering your LIB-4xxx online, and ask you to take the TN customer survey.
Continue to Section 3 below for more information on the LIB-4xxx Web interface menu system.

When you access the web interface, by default, the DHCP client is enabled and the static IP address is 192.168.0.1.

If a DHCP server is available on the network, the following steps are recommended:
Setup the system name using the "system name" command, e.g. "system name my-switch".
Delete the static IP address using the "i**p setup 0.0.0.0**" command.
Renew the DHCP address using the "**ip dhcp enable**" command.
The DHCP client will include the system name as host name in the DHCP request.
Web access to the switch can then be done using the system name, e.g. "my-switch".

If a DHCP server is not available, the following steps are recommended:
Disable DHCP using the "**ip dhcp disable**" command.
Setup the IP configuration using the "**ip setup**" command.
The default web login is "admin" and password is an empty string "".

Log Out of the LIB-4xxx Web Interface

1. Click the logout ( ) button located in the top right corner of each web interface screen.
The message "*Do you want to logout the web site?*" displays.

2. Click the **OK** button to clear the webpage message, or click the **Cancel** button to continue.

3. If you click the **OK** button, the *Connect to ...* dialog displays again to let you log back in if you want.
The web interface also displays the message "*Authorization required to access this URL.*"
You can either log back in or click the **Cancel** button to clear the **Connect to** ... dialog.

Display LIB-4xxx Web Interface Help
Click the Help (**?**) button from any web interface menu to display the related online Help.

Register at My TN Access
Register your TN product at http://www.transition.com/TransitionNetworks/MyTNAccess/.
Registering for an account is free and will unlock product installation manuals, software upgrades, drivers and various support files related to specific products.

TN Customer Satisfaction Survey
You are invited to participate in our Customer Satisfaction Survey at http://www.transition.com/TransitionNetworks/Landing/customer/customerweb.aspx.

3. Web Interface and CLI

When the previous steps are successfully completed, you can continue with the LIB-4xxx web interface menu system and/or the CLI (Command Line Interface. Refer to the related manual below for additional information:

LIB-4xxx Web Interface User Guide
LIB-4xxx Command Line Interface (CLI) Reference

Web Interface Menu System

The LIB-4xxx web interface is available from a PC connected to a network port or management port. Ensure that the PC and the LIB-4xxx are on the same subnet, start the PC's browser, point the browser at the switch's IP address (default is 192.168.0.1), enter login credentials (default username "**admin**" - no quotes), default password blank (i.e., empty), and the LIB-4xxx startup screen shown below displays.
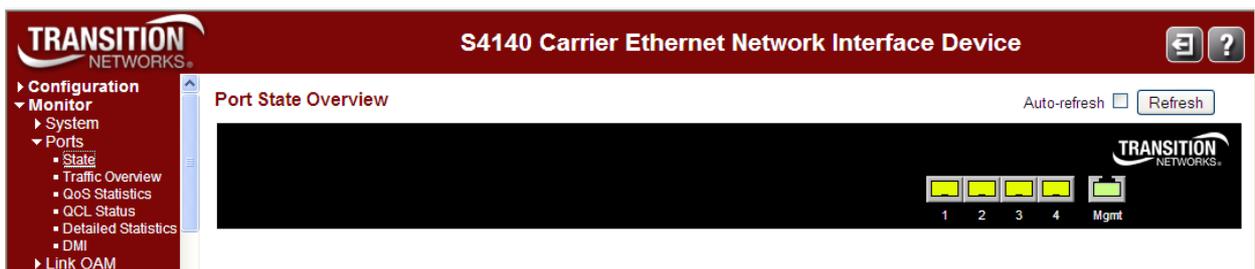
Figure 13: Default (Startup) Web GUI Screen

The default (startup) screen above is at the **Monitor** > **Ports** > **State** menu path. Help screens are available via the question mark button in the top right corner.

The LIB-4xxx Web interface menu system is shown below in terms of its sub-menus and functions.

Main Menu	Configuration sub-menu	Monitor sub-menu	Diagnostics sub-menu	Maintenance sub-menu
▸ Configuration ▸ Monitor ▸ Diagnostics ▸ Maintenance	▾ Configuration ▸ System ▸ Ports ▸ Security ▸ Aggregation ▸ Link OAM ▪ Loop Protection ▸ Spanning Tree ▪ MVR ▸ IPMC ▸ LLDP ▪ SyncE ▪ EPS ▪ MEP ▪ ERPS ▪ MAC Table ▸ VLAN Translation ▸ VLANs ▸ Private VLANs ▸ VCL ▸ Ethernet Services ▸ Performance Monitor ▸ QoS ▪ Mirroring ▪ PTP ▸ Service Activation	▾ Monitor ▸ System ▸ Ports ▸ Link OAM ▸ Security ▸ LACP ▪ Loop Protection ▸ Spanning Tree ▸ MVR ▸ IPMC ▸ LLDP ▸ Ethernet Services ▸ Performance Monitor ▪ PTP ▪ MAC Table ▸ VLANs ▸ VCL	▾ Diagnostics ▪ Ping ▸ Link OAM ▪ Ping6 ▪ VeriPHY ▸ Service Activation	▾ Maintenance ▪ Restart Device ▪ Factory Defaults ▾ Software ▪ Upload ▪ Image Select ▪ Peripheral Device Upload ▾ Configuration ▪ Backup Binary ▪ Restore Binary

The four Main Menu selections are:

Configuration - lets you define system operating parameters for the available LIB-4xxx features.
Monitor - lets you view and track the LIB-4xxx operating functions. See the related *Web User Guide* manual.
Diagnostics - provides access to the full set of LIB-4xxx tests and verification functions. See the related *User Guide*.
Maintenance - supports the LIB-4xxx troubleshooting and software / configuration functions. See the related *Web User Guide* for more information.

Each of these sub-menus and their functions are described in the related *Web User Guide* manual.

Command Line Interface (CLI)

This LIB-4xxx CLI is for experienced network administrators who are responsible for configuring and maintaining the LIB-4xxx. The CLI offers a comprehensive set of management features for use during initial setup (set IPs, etc.) and troubleshooting, as well as for day-to-day management (device management, firmware upgrades, managing security features, etc.).

The LIB-4xxxoffers a rich set of commands through its CLI for performing configuration and status monitoring. The CLI is accessible through the RS-232 serial console, telnet and SSH, or Telnet/SSH. The CLI incorporates user authentication for security purposes.

The LIB-4xxx can be managed either locally through an RS232 serial port using the command line interface (CLI) or remotely using the browser-based graphical user interface (web GUI), or remotely using Telnet/SSH.

The LIB-4xxx uses a Cisco blue cable to connect.

Set the terminal's serial port to 115200 baud, 8 data bits, no parity, 1 stop bit, no flow control.

All of the CLI commands and their functions are described in the related *CLI Reference* manual.

Figure 14: CLI Screen (HyperTerminal)

The default username is "**admin**" (no quotes) and the default password is blank (i.e. empty). Help screens are available through the "?" or "help" commands. One important use of the CLI is to determine the IP address of a switch through the "ip configuration" command - this is the IP address the web GUI is available through. An example of the output during boot and of the entering of the "ip configuration" command is available in Figure 14 above (in HyperTerminal) and Figure 15 below ((in Telnet).

Figure 15: CLI Screen (Telnet)

4. Messages and Troubleshooting

This section provides general and specific LIB-4xxx problem solving suggestions, general error recovery steps, and specific web interface messages, meanings, examples, and possible recovery steps.

LIB-4xxx Troubleshooting

Check the LIB-4xxx Back Panel Connections (see page 30)

Verify the Installation. Check the Operating System, Web Browser, Telnet Client, and/or Terminal Emulation package support (see page 32).

Make sure your particular model supports the function attempted.

Check the LIB-4xxx Front Panel Connectors (see page 24) and LEDs (see page 25).

Respond to any LIB-4xxx error messages (see " Error Recovery" below).

Run the LIB-4xxx Diagnostics tests and verification functions (e.g., Ping, Link OAM Mib Retrieve, Ping6, VeriPHY). See the "Diagnostics" section of the related *Web User Guide* manual.

Perform the LIB-4xxx troubleshooting and service functions (e.g., Restart Device, reset to Factory Defaults, Software Upload, Image Select). See "4. Messages and Troubleshooting" on page 44.

Check the LIB-4xxx operating parameters (e.g., Information, CPU Load, Log, Detailed Log). See the "Operation" section of the related *Web User Guide* manual.

If you can access the LIB-4xxx via PuTTY or HyperTerminal but not via the web interface, enter the **restore default keep_ip** CLI command and try accessing the Sxxx web interface again.

If you have problems displaying the LIB-4xxx web interface in IE, try displaying in Compatibility View from the IE **Tools** > **Compatibility View** menu path.

LIB-4xxx Error Recovery

The LIB-4xxx displays error and information messages from the CLI and Web interface. This section lists the messages, provides an example, and discusses the message meaning of and possible recovery steps.

As a general troubleshooting step for problems encountered using the LIB-4xxx web interface, try the related CLI command. For many messages, recovery involves reviewing the command/function description and verifying the entry selection/syntax. For example, for many CLI messages, the first recovery step would be to refer to the related *CLI Reference* manual.

For any error condition, you can check the TN Tech Support web site for possible solutions. For any problem that persists, contact TN Tech Support in the US or Canada at 1-800-260-1312, International at 00-1-952-941-7600; via fax at +1 952-941-2322; or via Email at techsupport@transition.com.

Generic Message Recovery (e.g., you tried a function, but the operation failed or is still in process):

Wait for a few moments for the operation to complete.

Use the **Help** or **?** command to get assistance (help) on a group of commands or on a specific command.

Make sure this is the function you want and that the device/port/configuration supports this function.

Verify the parameters entered and re-try the function. See the related section of this manual for specifics.

Try using the CLI to perform the function. See the related *CLI Reference* manual.

If the "*continue y(es) n(o) prompt*" displays, type **y** and press **Enter** to continue.

Use the Monitor sub-menu functions (System, Ports, Link OAM, MAC Table, VLANS) to view related status, statistics, events, etc. related to a specific function.

Use the Diagnostics sub-menu functions (Ping, Link OAM MIB Retrieval, VeriPHY) to test a general functionality.

Use the Maintenance sub-menu functions (Restart the LIB-4xxx, Reset the LIB-4xxx to factory defaults, Upgrade the LIB-4xxx firmware).

If the problem persists, contact TN Tech Support. US/Canada: 1-800-260-1312, International: 00-1-952-941-7600; TN Tech Support web; fax: +1 952-941-2322; Email: techsupport@transition.com.

Specific Messages Recovery:

1. For messages (e.g., ACL messages) that are the result of a switch memory shortage:

a. Reduce other system activity to ease memory demands.

b. Use a less complicated configuration that requires less memory.

c. Modify the ACL configuration to use fewer resources, or rename the ACL with a name or number that alphanumerically precedes the other ACL names or numbers.

d Reduce the number of IP or MAC access lists to be applied to interfaces.

e. Reduce other system activity to ease memory demands (e.g., remove ACLs that are defined but not used; use simpler ACLs with fewer ACEs; use fewer VLANs / remove unneeded VLANs from the VLAN database).

2. For messages that indicate the configuration is too complicated for the ACL code to support, there is likely too many separate access lists in a single VLAN map or policy map. Reduce the number of IP or MAC access lists separately) in any one VLAN or policy map to fewer than the number of levels. Or try to use the same ACLs on multiple interfaces if possible.

3. For messages that indicate an illegal configuration, reconfigure the port / device, removing the illegal configuration.

4. For messages that indicate the temperature is high reduce the temperature in the room.

5. For messages that indicate that the number of MAC address entries for the VLAN exceeds the maximum number allowed, have your system administrator configure an action.

6. For messages that indicate that an unauthorized device attempted to connect on a secure port, identify the device that attempted to connect on the secure port and notify your network system administrator of the condition.

7. For messages that indicate that the amount of traffic detected on the interface has exceeded the configured threshold values, determine and fix the root cause of the excessive traffic on the interface.

8. For messages that indicate an unrecoverable software error has occurred, copy the message exactly as it appears on the console or in the system log and contact TN Support.

See "LIB-4xxx Error Recovery" on page 44 for specific messages and the recommended recovery steps.

For More Error Message Information

For specific messages resulting from web interface operation, see the "Web Interface Messages" section of the related *Web Web User Guide*.

For specific messages resulting from CLI operation, see the "CLI Messages" section of the related *CLI Reference*.

LIB-4400 and LIB-4424 PCB Configuration

The PCB has configurable components that can only be altered by or at the direction of a TN Tech Support specialist.

J28 (Hardware / Software Jumper)

Contact TN Technical Support. See "Service" on page 56.

PCB Configuration

The PCB has configurable components that can only be altered by or at the direction of a TN Tech Support specialist.
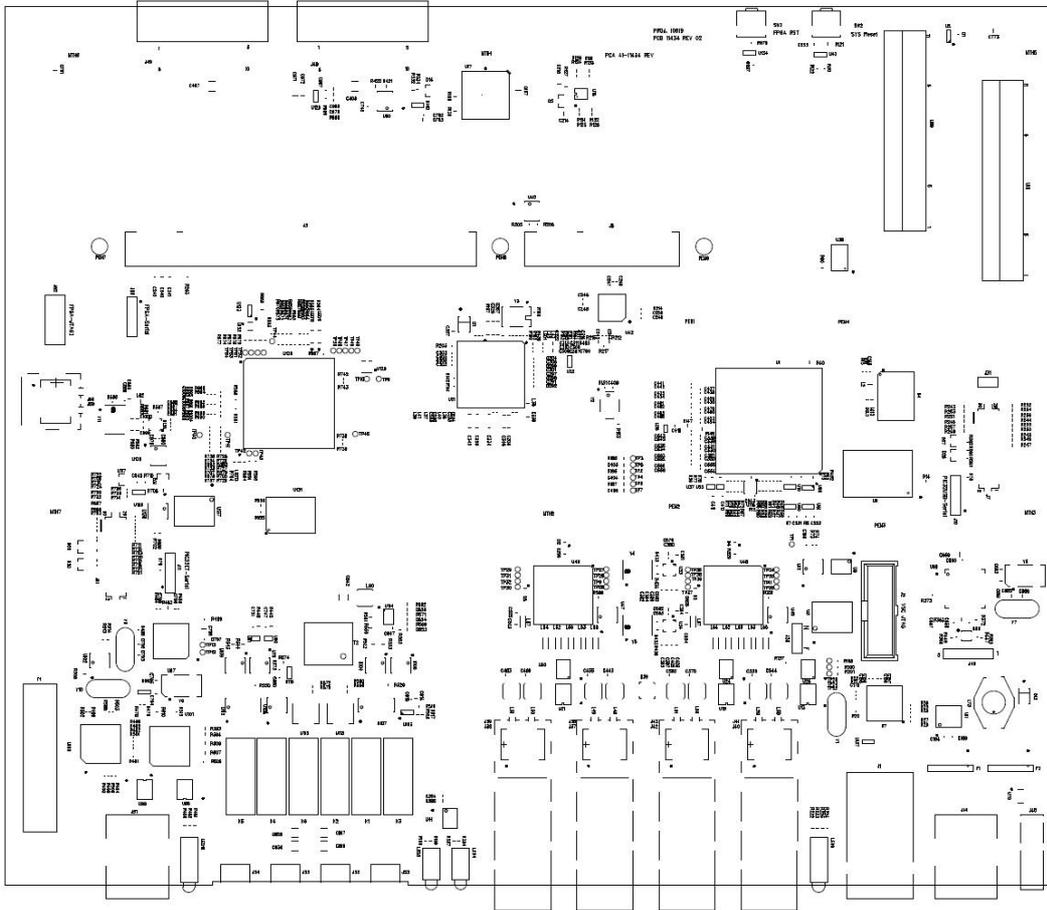
J5 (Factory Reset Jumper)

Contact TN Technical Support. See "Service" on page 56.

Appendix A - Cables and Connectors

Connector Types

The SFP connector type indicates the external optical or electrical cable connector provided as the interface. The information below is from SFF-8472 Rev 11.0. For additional information see the latest SFF-8472 Specification at ftp://ftp.seagate.com/sff/SFF-8472.PDF.

Table 6: Connector Descriptions

Value	Description of connector
00h	Unknown or unspecified
01h	**SC**
02h	Fibre Channel Style 1 copper connector
03h	Fibre Channel Style 2 copper connector
04h	BNC/TNC
05h	Fibre Channel coaxial headers
06h	FiberJack
07h	**LC**
08h	MT-RJ
09h	MU
0Ah	SG
0Bh	Optical pigtail
0Ch	MPO Parallel Optic
0D-1Fh	Unallocated
20h	HSSDC II
21h	Copper pigtail
22h	**RJ45**
23h-7Fh	Unallocated
80-FFh	Vendor specific

The LC and SC connector types (jacks) are shown below.

Figure 16: Connector Types

Cable Types

The cabling specifications are provided for troubleshooting purposes.

RJ-45 to DB-9 Cisco Blue Serial Cable

Use this cable from the PC to the LIB-4xxx.

Table 7: RJ-45 Pinning

Pin	Signal
P3	TXD
P4, P5	GND
P6	RXD
P1, P2, P7, P8	No connection

Copper 10G Ethernet

Copper 10G Ethernet can run over twin-ax cabling, twisted pair cabling, and backplanes. Common forms of 10GbE copper cables include:

10GBASE-CX4 was the first 10G copper standard, published as 802.3ak-2004. It uses the XAUI 4-lane PCS (Clause 48) and copper cabling similar to that used by InfiniBand technology. It is specified to work up to a distance of 15 m (49 ft). Each "lane" carries 3.125 G baud of signalling bandwidth. 10GBASE-CX4 offers the advantages of low power, low cost and low latency, but has a bigger form factor and more bulky cables than the newer single lane SFP+ standard, and a much shorter reach than fibre or 10GBASE-T. This cable is fairly rigid and much more expensive than Category 5 or 6 UTP. Shipments of 10GBASE-CX4 today are very low, although some network vendors offer CX-4 interfaces which can be used for either 10GBase Ethernet or for stacking of switches at (slightly) higher speeds (e.g., Dell PowerConnect PCT6200, PCT7000 and the 1G Powerconnect blade switches PCM6220 and PCM6348).

10GBASE-CR: currently the most common type of copper 10GbE cable is the 10GBase-CR cable that uses an attached SFP+ connector, also known as a Direct Attach Copper (DAC). This fits into the same form factor connector and housing as the fiber-optic cables with SFP+ connectors. Many 10GbE switches accept cables with SFP+ connectors, which support both copper and fiber-optic cables. These cables are available in 1m, 3m, 5m, 7m, 8.5m and longer distances. The most commonly deployed distances are 3m and 5m.

Passive and Active DAC: Passive copper connections are common with many interfaces. The industry is finding that as the transfer rates increase, passive copper does not provide the distance needed and takes up too much physical space. The industry is moving towards an active copper type of interface for higher speed connections.Active copper connections include components that boost the signal, reduce the noise and work with smaller gauge cables, improving signal distance, cable flexibility and airflow.

SFP+ Direct Attach is also known as Direct Attach (DA), 10GSFP+Cu, 10GBase-CR, 10GBase-CX1, SFP+, and 10GbE Cu SFP cabling. Direct Attach uses a passive twin-ax cable assembly and connects directly into an SFP+ housing. SFP+ DA has a fixed-length cable, typically 3, 5, 7 or 10m in length, and is low power, low cost and low latency, with the added advantages of using less bulky cables and of having the (SFP+) small form factor.

Backplane Ethernet (or 802.3ap) is used in backplane applications such as blade servers and routers/switches with upgradable line cards. 802.3ap implementations are required to operate in an environment comprising up to 1 meter (39 in.) of copper PCB with two connectors.

10GBASE-KX4 operates over four backplane "lanes" and uses the same physical layer coding as 10GBASE-CX4 (defined in IEEE 802.3 Clause 48).

10GBASE-KR operates over a single backplane "lane" and uses the same physical layer coding as 10GBASE-LR/ER/SR (defined in IEEE 802.3 Clause 49).

10GBASE-T (or IEEE 802.3an-2006) provides 10 Gbit/s connections over UTP or STP cable, at distances up to 100 metres (330 ft.). Although Category 6a is required to reach the full 100 metres (330 ft.), Category 5e is good for up to 45 metres (148 ft) and Category 6 will reach 55 metres (180 ft). 10GBASE-T cable infrastructure can also be used for 1000BASE-T, allowing a gradual upgrade from 1000BASE-T using auto negotiation to select which speed to use. 10GBASE-T has latency in the range 2 to 4 microseconds, compared with 1 to 12 microseconds on 1000BASE-T. **10GBASE-T** uses the IEC 60603-7 8P8C (RJ45) connectors already widely used with Ethernet. Transmission characteristics are

now specified to 500 MHz. To reach this frequency, Category 6A or better balanced twisted pair cables specified in ISO/IEC 11801 amendment 2 or ANSI/TIA-568-C.2 are needed to carry 10GBASE-T up to distances of 100 m. Category 6 cables can carry 10GBASE-T for shorter distances when qualified according to the guidelines in ISO TR 24750 or TIA-155-A. **10GBASE-T** cables and connectors are similar to, but not the same as the cables used for 1000BASE-T.10GBASE-T cables are Cat6a (Category 6 augmented), also known as Class EA cables. These support the higher frequencies required for 10Gb transmission up to 100 meters (330 feet). Cables must be certified to at least 500MHz to ensure 10GBASE-T compliance. Cat7 (Category 7, Class F) cable is also certified for 10GBASE-T compliance, and is typically deployed in Europe. Cat6 cables may work in 10GBASE-T deployments up to 55m, but should be tested first. Some newer 10GbE switches support 10GBASE-T (RJ45) connectors.

SFP+

10 gigabit Ethernet (10GE or 10GbE or 10 GigE) refers to various technologies for transmitting Ethernet frames at a rate of 10 gigabits per second (10×109 or 10 billion bits per second), first defined by the IEEE 802.3ae-2002 standard. Its adoption has been more gradual than previous revisions of Ethernet: in 2007, one million 10GbE ports were shipped, in 2009 two million ports were shipped, and in 2010 over three million ports were shipped.

Like previous versions of Ethernet, 10GbE supports both copper and fibre cabling. However, due to its higher bandwidth requirements, higher-grade copper cables are required: category 6a or Class F/Category 7 cables for links up to 100m. Unlike previous Ethernet standards, 10 gigabit Ethernet defines only full duplex point-to-point links which are generally connected by network switches. Half duplex operation and hubs do not exist in 10GbE.

The 10 gigabit Ethernet standard encompasses a number of different physical layer (PHY) standards. A networking device may support different PHY types through pluggable PHY modules, such as those based on SFP+. At the time that the 10 gigabit Ethernet standard was developed, interest in 10GbE as a wide area network (WAN) transport led to the introduction of a WAN PHY for 10GbE. The WAN PHY encapsulates Ethernet packets in SONET OC-192c frames and operates at a slightly slower data-rate (9.95328 Gbit/s) than the local area network (LAN) PHY. Both share the same physical medium-dependent sublayers so can use the same optics.

The WAN PHY can support maximum link distances up to 80 km depending on the fibre standard employed.

10 Gb Ethernet Standards

IEEE 10GbE standards are discussed below.

Table 8: IEEE 10GbE standards

Standard	Year	Description
802.3ae	2002	10 Gbit/s Ethernet over fibre for LAN (10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 10GBASE-LX4) and WAN (10GBASE-SW, 10GBASE-LW, 10GBASE-EW).
802.3ak	2004	10GBASE-CX4 10 Gbit/s Ethernet over twin-axial (InfiniBand type) cable.
802.3-2005	2005	A revision of base standard incorporating the prior amendments and errata.
802.3an	2006	10GBASE-T 10 Gbit/s Ethernet over copper twisted pair cable.
802.3ap	2007	Backplane Ethernet (1 and 10 Gbit/s over printed circuit boards).
802.3aq	2006	10GBASE-LRM 10 Gbit/s Ethernet over multimode fibre with enhanced equalization.
802.3-2008	2008	A revision of base standard incorporating the 802.3an/ap/aq/as amendments, two corrigenda and errata. Link aggregation moved to 802.1AX.

To support different 10GbE physical layer standards, many interfaces consist of a standard socket into which different PHY modules may be plugged. Physical layer modules are not specified in an official standards body but by multi-source agreements (MSAs) that can be negotiated more quickly. Relevant MSAs for 10GbE include XENPAK (and related X2 and XPAK), XFP and SFP+. When choosing a PHY module, a designer considers cost, reach, media type, power consumption, and size (form factor). A single point-to-point link can have different MSA pluggable formats on either end (e.g. XPAK and SFP+) as long as the 10GbE optical or copper interface (e.g. 10GBASE-SR) inside the pluggable is identical. The Net2Edge Ltd. (TN) SFP+ modules are hot-pluggable (allows plugging in or unplugging a module while the host board is powered). **Note**: Net2Edge Ltd.' SFP+ modules fully comply with the Multi-Sourcing Agreement (MSA). This compliance allows our SFP+ modules to be used in all other MSA compliant SFP+ platforms. In addition, TN SFP modules are also compatible with all Cisco SFP+ based routers and switches, as well as Cisco's IOS software. TN SFP+ modules ARE NOT Cisco OEM brand modules. For more information see
http://transition.com/TransitionNetworks/Products2/Product.aspx?ID=46893&CategoryName=DAC-10G-SFP-0xM.

Most of the specifications developed by the SFF Committee have either been incorporated into standards or adopted as standards by EIA (Electronic Industries Association), ANSI (American National Standards Institute) and IEC (International Electrotechnical Commission). The SFF Committee activities support the requirements of the storage industry, and it is involved with several standards. If you are interested in participating or wish to follow the activities of the SFF Committee, the signup for membership and/or documentation can be found at:
www.sffcommittee.com/ie/join.html.

The complete list of SFF Specifications which have been completed or are currently being worked on by the SFF Committee are at ftp://ftp.seagate.com/sff/SFF-8000.TXT. See also ftp://ftp.seagate.com/sff/SFF-8431.PDF.

Copper (TP / UTP) CAT 1 – CAT 7 Cabling

ANSI/EIA Standard 568 is one of several standards that specify "categories" (each a "CAT") of twisted pair cabling systems. Assigned by the American National Standards Institute/Electronic Industries Association, these standards categories include CAT 1 – CAT 7, as shown below.

Table 9: Copper Cable Descriptions

Category	Max Data Rate	Typical Application
CAT 5	100 MHz	100 Mbps TPDDI. 155 Mbps ATM. No longer supported; replaced by 5E. 10/100BASE-T.
CAT 5E	100 MHz	100 Mbps TPDDI, 155 Mbps ATM, Gigabit Ethernet. Offers better near-end crosstalk than CAT 5.
CAT 6	Up to 250 MHz	Minimum cabling required for data centers in TIA-942. CAT 6 is quickly replacing CAT 5e.
CAT 6E	Up to 500 MHz	Field-tested to 500 MHz. Supports 10 Gigabit Ethernet (10GBASE-T). May be either shielded (STP, ScTP, S/FTP) or unshielded (UTP). Standard published in Feb. 2008. The minimum requirement for Data Centres in the ISO Data Centre standard.
CAT 7 (ISO Class F)	600 MHz, 1.2 GHz in pairs with Siemon connector	Full-motion video, Teleradiology, Government and manufacturing environments. Fully Shielded (S/FTP) system using non-RJ45 connectors but backwards compatible with hybrid cords. Standard published in 2002. Until Feb. 2008, the only standard to support 10GBASE-T for a full 100m.

CAT 7A/Class FA and Category 6A/Class EA specifications were published in February, 2008.

Cat 6 (Category 6) Copper Cable

Category 6 cable, commonly referred to as Cat 6, is a standardized cable for Gigabit Ethernet and other network physical layers that is backward compatible with the Category 5/5e and Category 3 cable standards. Compared to Cat 5 and Cat 5e, Cat 6 provides more stringent specifications for crosstalk and system noise. The Cat 6 cable standard provides performance of up to 250 MHz and is suitable for 10BASE-T, 100BASE-TX (Fast Ethernet), 1000BASE-T/1000BASE-TX (Gigabit Ethernet) and 10GBASE-T (10-Gigabit Ethernet).

Category 6 cable has a reduced maximum length when used for 10GBASE-T.

Like most of the earlier twisted-pair cables, Category 6 cable contains four twisted wire pairs. Attenuation, Near End crosstalk (NEXT), and PSNEXT (Power Sum NEXT) in Cat 6 cable and connectors are all much lower than Cat 5 or Cat 5e, which uses 24 AWG wire. The increase in performance with Cat 6 comes mainly from increased (22 AWG) wire size. Because the conductor sizes are generally the same, Cat 6 jacks may also be used with Cat 5e cable.

Category 6 cable can be identified by the printing on the side of the cable sheath. Cat 6 patch cables are normally terminated in 8P8C modular connectors. If Cat 6 rated patch cables, jacks, and connectors are not used with Cat 6 wiring, overall performance is degraded to that of the cable or connector.

Connectors use either T568A or T568B pin assignments; although performance is comparable provided both ends of a cable are the same, T568B is a deprecated standard in the US and no longer supported by TIA.

Category 6a Copper Cable (Augmented Category 6)

Category 6a cable, or Augmented Category 6, is characterized to 500 MHz and has improved alien crosstalk characteristics, allowing 10GBASE-T to be run for the same distance as previous protocols. The latest standard from the TIA for enhanced performance standards for twisted pair cable systems was defined in February 2008 in ANSI/TIA/EIA-568-B.2-10. Category 6a is defined at frequencies up to 500 MHz—twice that of Cat. 6.

Category 6a performs at improved specifications, in particular in the area of alien crosstalk, as compared to Cat 6 UTP (unshielded twisted pair), which exhibited high alien noise in high frequencies.

The global cabling standard ISO/IEC 11801 has been extended by the addition of amendment 2, which defines new specifications for Cat 6A components and Class EA permanent links. These new global Cat 6A/Class EA specifications require a new generation of connecting hardware, which offer superior performance compared to existing products based on the American TIA standard.

Note the performance difference between ISO/IEC and EIA/TIA component specifications for the NEXT transmission parameter. At a frequency of 500 MHz, an ISO/IEC Cat 6A connector performs 3 dB better than a Cat 6A connector that conforms to the EIA/TIA specification. The 3 dB represents a 100% increase of near-end crosstalk noise reduction when measured in absolute magnitudes.

Maximum Length

When used for 10/100/1000BASE-T, the maximum allowed length of a Cat 6 cable is 100 meters or 328 feet. This consists of 90 meters (300 ft) of solid "horizontal" cabling between the patch panel and the wall jack, plus 10 meters (33 ft) of stranded patch cable between each jack and the attached device. Since stranded cable has higher attenuation than solid cable, exceeding 10 meters of patch cabling will reduce the permissible length of horizontal cable.

When used for 10GBASE-T, Cat 6 cable's maximum length is 55 meters (180 ft) in a favourable alien crosstalk environment, but only 37 meters (121 ft) in a hostile alien crosstalk environment, such as when many cables are bundled together. However, because the effects of alien crosstalk environments on cables are difficult to determine prior to installation, it is highly recommended that all Cat 6 cables being used for 10GBASE-T are electrically tested once installed. With its improved specifications, Cat6 A does not have this limitation and can run 10GBASE-T at 100 meters (330 ft) without electronic testing.

Installation Notes

Category 6 and 6a cable must be properly installed and terminated to meet specifications. The cable must not be kinked or bent too tightly (the bend radius should be at least four times the outer diameter of the cable). The wire pairs must not be untwisted and the outer jacket must not be stripped back more than 1/2 inch (1.27 cm).

All shielded cables must be grounded for safety and effectiveness and a continuous shield connection maintained from end to end. Ground loops develop when there is more than one ground connection and the difference in common mode voltage potential at these ground connections introduces noise into the cabling.

Note that 23 or 24 AWG wire is allowed if the ANSI/TIA-568-B.2-1 performance specifications are met.

The figure below shows the pins on plug face; note that the socket is the reverse of the plug pinout shown below.
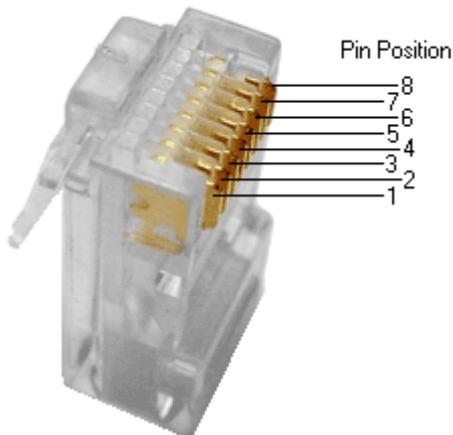
Figure 17: Category 6 Plug Face Pins

For more information, see the TIA web site or the IEEE web site.

Troubleshooting Cat 6 & Cat 6A Structured Copper Cabling Systems

If a Category 6 cabling system does not meet the electrical requirements for supporting 10GBASE-T applications, see the TSB-155 provides guidelines designed to mitigate the alien crosstalk between the target pair and the disturbing pairs of Category 6 channels and permanent links. Annex B of TSB-155 outlines the following mitigation actions most appropriate for individual situations:

Use Category 6 shielded or Category 6A patch cords;

Replace Category 6 connectors with Category 6A connectors;

Use non-adjacent patch panel positions;

Separate equipment cords and patch cords;

Unbundle or more loosely bundle the horizontal cabling; and

Reconfigure the cross-connect as an interconnect.

Fibre (10GbE) Cabling

The two general types of fiber optic cables are SMF (single-mode fiber) andMMF (multi-mode fiber).
SMF has an optical core of approximately 9 μm (microns), and has lower modal dispersion than MMF, and can support distances of at least 10 Km and as high as 80-100 Km (Kilometers) or more, depending on transmission speed, transceivers, etc..
MMF has an optical core of either 50 μm or 62.5 μm, and it supports distances up to 600 meters, depending on transmission speeds and transceivers.

Table 10: Fiber Cable Descriptions

Standard	Cable Type	Core Diameter	IEEE Standard Distance	Wavelength
OM1	Multi-mode (MMF)	62.5/125 μm	33 meters (SR)	850 / 1300 nm
OM2	Multi-mode (MMF)	50/125 μm	82 meters (SR)	850 / 1300 nm
OM3	Multi-mode (MMF)	50/125 μm	300 meters (SR)	850 / 1300 nm
OM4	Multi-mode (MMF)	50/125 μm	550 meters (SR)	850 / 1300 nm
OS1	Single mode (SMF)	9 μm	up to 10,000m	1310 / 1550 nm

OS1 SMF optics are used for distances up to 10,000m (6.2 miles) with standard transceivers and can work at longer distances with special transceivers and switching infrastructure.

SMB (Sub Miniature version B) Cables

There are several differences between 50 and 75 ohm SMB cables. The ohms refer to the impedance or electrical resistance of the cable type.

Typically, **50 ohm** cables are used to transmit information (data) from one piece of equipment to another or, quite often, to an antenna. GPS, Wi-Fi, satellite radio, RFID and other applications use 50 ohm cables.

Generally, **75 ohm** cables are used to transmit video signals. Only about 10% of our customers use 75 ohm cables. Chances are if you need 75 ohm cables you will know it but please e-mail or call first if you are unsure.

SMB 75 OHM   SMB 50 OHM

The 50 ohm low loss cables are older style RG174, RG58, RG8/X and RG8 cables. The available diameters include approx. 1/10th of an inch thick to approx. 4/10th of an inch thick. The thicker the cable, the lower the data loss per foot, but the thicker the cable, the harder it is to bend and the more weight it puts on connections.

RG174 types have approx. 1/10th inch diameter and are suited for 1-10 ft. applications.
RG58 types have approx. 2/10th inch diameter, most suitable for 10-25 ft .applications.
RG8X types are approx. 1/4 inch thick, most suitable for 20-40 ft. applications.
RG8 types are approx. 4/10ths of an inch thick and are mainly used for 50+ ft. applications.

Note that the LIB-4xxx ships with SMB connectors.

Appendix B: Service, Warranty & Compliance Information

Service

Direct Contact Details:

+44-345-0130030, xtn 6810

Email: support@Net2Edge.com

Warranty

This warranty is your only remedy. No other warranties, such as fitness for a particular purpose, are expressed or implied. Net2Edge Ltd. is not liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory. Authorized resellers are not authorized to extend any different warranty on Net2Edge Ltd.' behalf.

1 Year Limited Warranty	Net2Edge Ltd.' labeled LIB-4xxx series products, are warranted to be free from defects in material and workmanship for a period of a year beyond the Net2Edge Ltd. shipment date. This warranty covers the original user only and is not transferable.
What the Warranty Does Not Cover	This warranty does not cover damage from accident, acts of God, neglect, contamination, misuse or abnormal conditions of operation or handling, including over-voltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components. If the user is unsure of the proper means of installing or using the equipment, contact Net2Edge Ltd.' free technical support services.
Establishing Original Ownership	To establish original ownership and provide date of purchase, please complete and return the registration card accompanying the product or register the product on-line on our product registration page. Net2Edge Ltd. will at its option: Repair the defective product to functional specifications at no charge Replace the product with an equivalent functional product Refund the purchase price of a defective product

Who to Contact for Returns

To return a defective product for warranty coverage, contact Net2Edge Ltd.' technical support department for a return authorization number. Transition's technical support department can be reached through any of the following means:
Service Hours
Mon thru Fri 7 AM - 6 PM CST:
Contact Tech Support via telephone at 800-260-1312 or 952-941-7600
Fax 952-941-2322
Email techsupport@transition.com
Live web chat: Transition Now
Any Other Time:
Voice Mail 800-260-1312 x 579 or 952-941-7600 x 579

How and Where to Send Returns

Send the defective product postage and insurance prepaid to the following address:
Net2Edge Ltd., Inc.
10900 Red Circle Drive
Minnetonka, MN 55343 USA
Attn: RETURNS DEPT: CRA/RMA # _____
Failure to properly protect the product during shipping may void this warranty. The return authorization number must be written on the outside of the carton to ensure its acceptance. We cannot accept delivery of any equipment that is sent to us without a CRA or RMA number.
CRA's are valid for 60 days from the date of issuance. An invoice will be generated for payment on any unit(s) not returned within 60 days.
Upon completion of a demo/ evaluation test period, units must be returned or purchased within 30 days. An invoice will be generated for payment on any unit(s) not returned within 30 days after the demo/ evaluation period has expired.
The customer must pay for the non-compliant product(s) return transportation costs to Net2Edge Ltd. for evaluation of said product(s) for repair or replacement. Net2Edge Ltd. will pay for the shipping of the repaired or replaced in-warranty product(s) back to the customer (any and all customs charges, tariffs, or/and taxes are the customer's responsibility). Before making any non-warranty repair, Net2Edge Ltd. requires a $200.00 charge plus actual shipping costs to and from the customer. If the repair is greater than $200.00, an estimate is issued to the customer for authorization of repair. If no authorization is obtained, or the product is deemed 'not repairable', Net2Edge Ltd. will retain the $200.00 service charge and return the product to the customer not repaired. Non-warranted products that are repaired by Net2Edge Ltd. for a fee will carry a 180-day limited warranty. All warranty claims are subject to the restrictions and conventions set forth by this document.
Net2Edge Ltd. reserves the right to charge for all testing and shipping incurred, if after testing, a return is classified as "No Problem Found."
THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED

OR IMPLIED. NET2EDGE LTD. IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE OR THEORY. AUTHORIZED RESELLERS ARE NOT AUTHORIZED TO EXTEND ANY DIFFERENT WARRANTY ON NET2EDGE LTD.'S BEHALF.

Customer Pays Non-Compliant Return Costs	The customer must pay the non-compliant product(s) return transportation cost to Net2Edge Ltd. for evaluation of said product(s) for repair or replacement. Net2Edge Ltd. will pay for shipping the repaired or replaced in-warranty product(s) back to the customer (any and all customs charges, tariffs, or/and taxes are the customer's responsibility).
Non-Warranty Repair Costs	Before making any non-warranty repair, Net2Edge Ltd. requires a $200 charge, plus actual shipping costs to and from the customer. If the repair is greater than $200, an estimate is issued to the customer for authorization before making the repair. If no authorization is obtained, or the product is deemed not repairable, Net2Edge Ltd. will retain the $200 service charge and return the product to the customer not repaired.
Repaired Non-Warranty Products	Non-warranted products repaired by Net2Edge Ltd. for a fee will carry a 180-day limited warranty. All warranty claims are subject to the restrictions and conventions set forth by this document. Net2Edge Ltd. reserves the right to charge for all testing and shipping incurred, if after testing, a return is classified as "No Problem Found."

Compliance Information

Standards: CISPR22/EN55022 Class A, CE Mark

FCC Regulations:
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

CE Marking
This is a Class A product. In a domestic environment, this product could cause radio interference; as a result, the customer may be required to take adequate preventative measures.

UL Listed
Tested and recognized by the Underwriters Laboratories, Inc.

European Regulations
WARNING:
This is a Class A product. In a domestic environment, this product could cause radio interference in which case the user may be required to take adequate measures.
Achtung !
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten. In diesem Fäll ist der Benutzer für Gegenmaßnahmen verantwortlich.
Attention !
Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées.

In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Net2Edge Ltd. will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.

CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Declaration of Conformity

Declaration of Conformity

Transition Networks, Inc.
Manufacture's Name

10900 Red Circle Drive, Minnetonka, Minnesota 55343 U.S.A.
Manufacture's Address

Declares that the products:
S4140, S4212, S4224

Conforms to the following Product Regulations:

EN 55022:2010/AC:2011, EN 55024:2010, IEC /EN 60950-1

Directive 2004/108/EC

FCC Part 15 Subpart B

AS/NZS CISPR 22: 2009 + A1:2010, ICES-003, Issue 5:2012, VCCI V-3/2013.04

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standards(s).

Minnetonka, Minnesota	_Dec 23, 2013_	
Place	Date	Signature
	Stephen Anderson	_Vice President of Engineering_
	Full Name	Position

28141B

Electrical Safety Warnings

Electrical Safety

IMPORTANT: This equipment must be installed in accordance with safety precautions.
Elektrische Sicherheit
WICHTIG: Für die Installation dieses Gerätes ist die Einhaltung von Sicherheitsvorkehrungen erforderlich.
Elektrisk sikkerhed
VIGTIGT: Dette udstyr skal 62nstallers I overensstemmelse med sikkerhedsadvarslerne.
Elektrische veiligheid
BELANGRIJK: Dit apparaat moet in overeenstemming met de veiligheidsvoorschriften worden geïnstalleerd.
Sécurité électrique
IMPORTANT : Cet équipement doit être utilisé conformément aux instructions de sécurité.
Sähköturvallisuus
TÄRKEÄÄ : Tämä laite on asennettava turvaohjeiden mukaisesti.
Sicurezza elettrica
IMPORTANTE: questa apparecchiatura deve essere installata rispettando le norme di sicurezza.
Elektrisk sikkerhet
VIKTIG: Dette utstyret skal 62nstallers I samsvar med sikkerhetsregler.
Segurança eléctrica
IMPORTANTE: Este equipamento tem que ser instalado segundo as medidas de precaução de segurança.
Seguridad eléctrica
IMPORTANTE: La instalación de este equipo deberá llevarse a cabo cumpliendo con las precauciones de seguridad.
Elsäkerhet
OBS! Alla nödvändiga försiktighetsåtgärder måste vidtas när denna utrustning används

Safety Instructions for Rack Mount Installations

The instructions below (or similar) are intended for LIB-4xxx rackmount installation environments:

1. Elevated Operating Ambient: if installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may exceed room ambient. Install the equipment in an environment compatible with the maximum ambient temperature (Tma) specified.

2. Reduced Air Flow: install the equipment in a rack so that the amount of air flow required for safe operation is not compromised.

3. Mechanical Loading: Mount the equipment in the rack so that a hazardous condition does not occur due to uneven mechanical loading (weight distribution/rack balance).

4. Circuit Overloading: give consideration to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Consider all equipment nameplate ratings when addressing this concern.

5. Reliable Earthing: maintain reliable earthing of rack-mounted equipment; pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Index

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