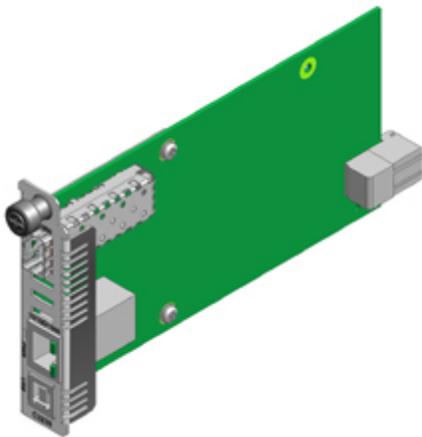# ION System

x222x / x32xx Remotely Managed Network Interface Device (NID)

Install Guide

33433 Rev. C

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ION System x222x / x32xx Remotely Managed NID Install Guide 33433 Rev. C

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Revision History

Rev	Date	Description
A	09/01/10	Initial manual release.
B	11/13/15	Change format and add S3221-1040-T and Power Supply.
C	11/28/16	Update contact information and install information; add MTBF information.

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 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 chassis Network Interface Devices (NIDs) 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 NIDs in areas where strong electromagnetic fields (EMF) exist. Failure to observe this caution could result in poor NID 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 ION NID. 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** stare 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.

See Appendix A on page 42 for Electrical Safety Warnings translated into multiple languages.

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Section 1: Introduction

Document Overview

The purpose of this manual is to provide the user with an understanding of the Transition Networks x222x / x32xx network interface devices (NIDs). This manual documents the following models:

- **C2220** LOAM/IP-Based Remotely-Managed NID

- **C3220** LOAM/IP-Based Remotely-Managed NID

- **C3221** LOAM/IP-Based Remotely-Managed NID (2 open SFP slots)

- **S2220** LOAM/IP-Based Remotely-Managed NID

- **S3220** LOAM/IP-Based Remotely-Managed NID

- **S3221** LOAM/IP-Based Remotely-Managed NID (2 open SFP slots)

- **S3221**Extended Temperature NID

Product Overview

The x222x / x32xx are a group of Ethernet Network Interface Devices (NIDs) that are designed as either a standalone module (S222x / S32xx) or a slide-in module (C222x / S32xx) that installs in an ION system chassis. In either configuration, these devices are designed to manage devices remotely through the copper and fiber ports.

The ION x222x / x32xx Network Interface Devices (NIDs) are 2- or 3-port Ethernet Demarcation Devices capable of media conversion—one port connects to the network of the provider and the other port connects to the subscriber. These NIDs are chassis/IP-based managed devices that are designed as slide-in cards (SICs) for installation in an ION system chassis or as stand-alone modules.

These devices can be managed via Command Line Interface (CLI), Web Interface, or Telnet.

The x222x / x32xx NIDs support Link layer OAM (LOAM, per IEEE 802.3–2005 Clause 57). LOAM is a group of network management functions that provide network fault indications, performance information, data, and diagnosis. These devices implement remote management via LOAM per the IEEE 802.3ah standard.

Features

See the x222x / x32xx Web User Guide for features.

NID Models

The various models of the x222x / x32xx NIDs (Standard / Single Fiber Models and Chassis / Standalone Models) are described below.

Standard Models and Single Fiber Models

ION products are available in chassis and stand alone models. The models can include both standard and single-fiber models, as well as specific models that support the DMI option. **Note:** the -D after the model number indicates DMI option support.

Single fiber technology offers a 50% savings in fiber utilization. It is an attractive solution to maximize the usage of a limited number of fiber runs. In a traditional optical link, a fiber pair consists of two uni-directional strands. The single fiber technology multiplexes two optical wavelengths into a single strand fiber, so these devices are usually used in pairs. *It is recommended these Single Fiber Models be used in pairs.

Chassis Models (*Cxxxx*) and Standalone Models (*Sxxxx*)

The ION Chassis models (also called slide-in-cards or SICs, or slide-in-modules) and managed NIDs (Network Interface Devices) have specific features and functions that are controlled via the ION Management Module. A network administrator can configure, monitor and troubleshoot ION slide-in-modules remotely via the ION Management Module.

ION Standalone models include remotely-managed NIDs (Network Interface Devices). An end-to-end fiber integration solution can be achieve by pairing the modules in a high density ION chassis with the modules in another ION chassis, an ION stand-alone, or a Transition Networks' Point System™ stand-alone device.

The various x222x / x32xx NID models are described in detail in the following tables.

Table 1: Chassis Models (*Cxxxx*) and Descriptions

C2220 Series (10/100Base-TX to 100base-FX 802.3ah NIDs)

#	Product Number	Port One	Port Two
1.	C2220-1011-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm TX/1310nm RX single fiber single mode (SC)
2.	C2220-1013	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm multimode (ST) [2 km/1.2 mi.]
3.	C2220-1013-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm multimode (ST) [2 km/1.2 mi.]
4.	C2220-1014	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [40 km/24.9 mi.]
5.	C2220-1014-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [40 km/24.9 mi.]
6.	C2220-1015	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [40 km/24.9 mi.]
7.	C2220-1015-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [40 km/24.9 mi.]
8.	C2220-1016	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [60 km/37.3 mi.]
9.	C2220-1017	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm single mode (SC) [80 km/49.7 mi.]
10.	C2220-1029-A1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
11.	C2220-1029-A2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-D 1550nm TX/1310nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
12.	C2220-1029-B1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
13.	C2220-1029-B2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-D 1550nm TX/1310nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
14.	C2220-1029-DA1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
15.	C2220-1029-DA2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
16.	C2220-1035	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1550nm single mode (SC) [120 km/74.6 mi.]
17.	C2220-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-X SFP Slot (empty)

C3220 Series (10/100/1000Base-T to 1000base-FX 802.3ah NIDs)

#	Product Number	Port One	Port Two
18.	C3220-1013	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-SX 850nm multimode (SC) [62.5/125 µm: 220 m/722 ft.; 50/125 µm: 550 m/1804 ft.]
19.	C3220-1013-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-SX 850nm multimode (SC) [62.5/125 µm: 220 m/722 ft.; 50/125 µm: 550 m/1804 ft.]
20.	C3220-1014	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [10 km/6.2 mi.]
21.	C3220-1014-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [10 km/6.2 mi.]
22.	C3220-1015	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [30 km/18.6 mi.]
23.	C3220-1015-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [30 km/18.6 mi.]
24.	C3220-1017	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1550nm single mode (SC) [80 km/49.7 mi.]
25.	C3220-1029-A1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-U 1310nm TX/1490nm RX single fiber single mode (SC) [20 km/12.4 mi.]
26.	C3220-1029-A2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-D 1490nm TX/1310nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
27.	C3220-1029-B1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-U 1310nm TX/1490nm RX single fiber single mode (SC) [40 km/24.9 mi.]
28.	C3220-1029-B2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-D 1490nm TX/1310nm RX single fiber single mode (SC) [40 km/24.9 mi.]
29.	C3220-1029-DA1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm TX/1490nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
30.	C3220-1029-DA2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1490nm TX/1310nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
31.	C3220-1035	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1550nm single mode (SC) [120 km/74.6 mi.]
32.	C3220-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100/1000BASE-X SFP Slot (empty)
33.	C3221-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	(2) 100/1000BASE-X SFP Slot (empty)

Table 2: Standalone Models (*Sxxxx*) and Descriptions

S2220 Series (10/100Base-TX to 100base-FX 802.3ah NIDs)

#	Product Number	Port One	Port Two
34.	S2220-1011	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm multimode (ST) [2 km/1.2 mi.]
35.	S2220-1011-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm multimode (ST) [2 km/1.2 mi.]
36.	S2220-1013	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm MM (SC) [2 km/1.2 mi.]
37.	S2220-1013-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm MM (SC) [2 km/1.2 mi.]
38.	S2220-1014	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-LX 1310nm SM (SC) [10 km/6.2 mi.]
39.	S2220-1014-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-LX 1310nm SM (SC) [10 km/6.2 mi.]
40.	S2220-1015	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm SM (SC) [40 km/24.8 mi.]
41.	S2220-1015-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1310nm SM (SC) [40 km/24.8 mi.]
42.	S2220-1016	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1550nm SM (SC) [60 km/37.3 mi.]
43.	S2220-1017	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1550nm SM (SC) [80 km/49.7 mi.]
44.	S2220-1029-A1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di SM (SC) [20 km/12.4 mi.]
45.	S2220-1029-A2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-D 1550nm TX/1310nm RX Bi-Di SM (SC) [20 km/12.4 mi.]
46.	S2220-1029-B1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di SM (SC) [40 km/24.8 mi.]
47.	S2220-1029-B2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-D 1550nm TX/1310nm RX Bi-Di SM (SC) [40 km/24.8mi.]
48.	S2220-1029-DA1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-U 1310nm TX/1550nm RX Bi-Di SM (SC) [20 km/12.4mi.]
49.	S2220-1029-DA2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-BX-D 1550nm TX/1310nm RX Bi-Di SM (SC) [20 km/12.4 mi.]
50.	S2220-1035	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100BASE-FX 1550nm SM (SC) [120 km/77.7 mi.]
51.	S2220-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100Base-X Open SFP Slot

S3220 Series (10/100/1000Base-T to 1000base-FX 802.3ah NIDs)

#	Product Number	Port One	Port Two
52.	S3220-1013	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-SX 850nm multimode (SC) [62.5/125 µm: 220 m/722 ft.; 50/125 µm: 550 m/1804 ft.]
53.	S3220-1013-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-SX 850nm multimode (SC) [62.5/125 µm: 220 m/722 ft.; 50/125 µm: 550 m/1804 ft.]
54.	S3220-1014	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [10 km/6.2 mi.]
55.	S3220-1014-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [10 km/6.2 mi.]
56.	S3220-1015	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [30 km/18.6 mi.]
57.	S3220-1015-D	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-LX 1310nm single mode (SC) [30 km/18.6 mi.]
58.	S3220-1017	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-ZX 1550nm single mode (SC) [80 km/49.7 mi.]
59.	S3220-1029-A1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-U 1310nm TX/1490nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
60.	S3220-1029-A2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-D 1490nm TX/1310nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
61.	S3220-1029-B1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-U 1310nm TX/1490nm RX Bi-Di single mode (SC) [40 km/24.8 mi.]
62.	S3220-1029-B2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-D 1490nm TX/1310nm RX Bi-Di single mode (SC) [40 km/24.8 mi.]
63.	S3220-1029-DA1	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-U 1310nm TX/1490nm RX Bi-Di single mode (SC) [20 km/12.4 mi.]
64.	S3220-1029-DA2	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-BX-D 1550nm TX/1310 m RX Bi-Di single fiber single mode (SC) [20 km/12.4 mi.]
65.	S3220-1035	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	1000BASE-ZX 1550nm single mode (SC) [120 km/77.7 mi.]
66.	S3220-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100/1000BASE-X SFP Slot (empty)
67.	S3221-1040	10/100/1000BASE-T (RJ-45) [100 m/328 ft.]	100/1000BASE-X SFP Slot (empty)

Physical Specifications

The physical specifications for the chassis slide-in modules are described in Table 3 below.

Table 3: Chassis Slide-in Module Specifications

All Model x222x / x32xx

Dimensions	SIC: 3.4" x 0.86" x 6.5" (86 mm x 22 mm x 165 mm)
	Standalone: 3.25" x 1.0" x 6.5" (82 mm x 25 mm x 165 mm)
MAC Filtering	8K MAC addresses
Power Input	Standalone: 12VDC @ 375mA
	SIC: Powered by the Chassis
Environment	0 to 50°C (32 to 122°F) operating;
	5% - 95% humidity (non-condensing)
	0 to 10,000 ft. altitude
Storage Temp	-40 to 85°C (-40 to 185°F)

C2220 Series

Standards	IEEE Std. 802.3, IEE std. 802.3ah, IEE Std. 802.1P, IEEE std. 802.1Q
Data Rate	Copper: 10/100/1000Mbps
	Fiber: 100Mbps
Filtering Address	8K MAC Addresses
Power Consumption	4.5 Watts
Shipping Weight	1 lb. [.45 kg]
Regulatory Compliance	EN55022 Class A, EN55024, CE Mark

C322x Series

Standards	IEEE Std. 802.3, IEEE Std. 802.3ah, IEEE Std 802.1P, IEEE Std 802.1Q
Data Rate	Copper: 10/100/1000Mbps
	Fiber: 1000Mbps
Max Frame Size	10,240 bytes
Power Consumption	4.5 Watts
Shipping Weight	1 lb. [.45 kg]
Regulatory Compliance	EN55022 class A, EN55024, CE Mark

The physical specifications for the chassis slide-in modules are described in Table 4 below.

Table 4: Stand Alone Module Specifications

S322x Series

Standards	IEEE Std. 802.3, IEEE Std. 802.3ah, IEEE Std 802.1P, IEEE Std. 802.1Q
Data Rate	Copper: 10/100/1000Mbps
	Fiber: 1000Mbps
Max Frame Size	10,240 bytes
Dimensions	Width: 3.25" [82 mm]
	Depth: 6.5" [165 mm]
	Height:1.0" [25 mm]
Power Input:	100-240VAC, 1A
Output:	12VDC, 1.25A
Shipping Weight	2.0 lbs. [0.90 kg]
Regulatory Compliance	EN55022 Class A, EN55024, UL60950, CE Mark

Fiber Specifications

For the latest information go to the online Product Page.

Table 5: Fiber Specifications

Model	Min TX PWR	Max TX PWR	RX Sensitivity	Max In PWR	Link Budget
S2220-1011	-19.0 dBm	-14.0 dBm	-30.0 dBm	-14.0 dBm	11.0 dB
S2220-1011-D	-19.0 dBm	-12.0 dBm	-31.0 dBm	-8.0 dBm	12.0 dB
S2220-1013	-19.0 dBm	-14.0 dBm	-30.0 dBm	-14.0 dBm	11.0 dB
S2220-1013-D	-19.0 dBm	-12.0 dBm	-31.0 dBm	-8.0 dBm	12.0 dB
S2220-1014	-15.0 dBm	-8.0 dBm	-31.0 dBm	-8.0 dBm	16.0 dB
S2220-1014-D	-14.0 dBm	-8.0 dBm	-32.0 dBm	-8.0 dBm	18.0 dB
S2220-1015	-5.0 dBm	-2.0 dBm	-34.0 dBm	-7.0 dBm	29.0 dB
S2220-1015-D	-10.0 dBm	-4.0 dBm	-34.0 dBm	-8.0 dBm	24.0 dB
S2220-1016	-5.0 dBm	0.0 dBm	-34.0 dBm	-7.0 dBm	29.0 dB
S2220-1017	-5.0 dBm	0.0 dBm	-34.0 dBm	-7.0 dBm	29.0 dB
S2220-1035	0.0 dBm	5.0 dBm	-36.0 dBm	-3.0 dBm	36.0 dB
S2220-1029-A1	-14.0 dBm	-8.0 dBm	-33.0 dBm	-3.0 dBm	19.0 dB
S2220-1029-A2 -	14.0 dBm	-8.0 dBm	-33.0 dBm	-3.0 dBm	19.0 dB
S2220-1029-DA1	-14.0 dBm	-8.0 dBm	-33.0 dBm	-8.0 dBm	19.0 dB
S2220-1029-DA2	-14.0 dBm	-8.0 dBm	-33.0 dBm	-8.0 dBm	19.0 dB
S2220-1029-B1	-8.0 dBm	-3.0 dBm	-33.0 dBm	-3.0 dBm	25.0 dB
S2220-1029-B2	-8.0 dBm	-3.0 dBm	-33.0 dBm	-3.0 dBm	25.0 dB
S3220-1013	-9.5 dBm	-4.0 dBm	-18.0 dBm	0.0 dBm	8.5 dB
S3220-1013-D	-9.0 dBm	-4.0 dBm	-18.0 dBm	0.0 dBm	9.0 dB
S3220-1014	-9.5 dBm	-3.0 dBm	-20.0 dBm	-3.0 dBm	10.5 dB
S3220-1014-D	-9.0 dBm	-3.0 dBm	-21.0 dBm	-3.0 dBm	12.0 dB
S3220-1015	-0.0 dBm	0.0 dBm	-20.0 dBm	-3.0 dBm	15.0 dB
S3220-1015-D	-0.0 dBm	0.0 dBm	-24.0 dBm	-3.0 dBm	19.0 dB
S3220-1017	-3.0 dBm	2.0 dBm	-24.0 dBm	-3.0 dBm	21.0 dB
S3220-1029-A1	-8.0 dBm	-3.0 dBm	-22.0 dBm	-3.0 dBm	14.0 dB
S3220-1029-A2	-8.0 dBm	-3.0 dBm	-22.0 dBm	-3.0 dBm	14.0 dB
S3220-1029-DA1	-9.0 dBm	-3.0 dBm	-20.0 dBm	-3.0 dBm	11.0 dB
S3220-1029-DA2	-9.0 dBm	-3.0 dBm	-20.0 dBm	-3.0 dBm	11.0 dB
S3220-1029-B1	-3.0 dBm	2.0 dBm	-23.0 dBm	-3.0 dBm	20.0 dB
S3220-1029-B2	-3.0 dBm	2.0 dBm	-23.0 dBm	-3.0 dBm	20.0 dB
S3220-1035	0.0 dBm	5.0 dBm	-27.0 dBm	-3.0 dBm	27.0 dB

MTBF Specification

The Transition Networks the x322x-10xx MTBF is provided below:

With Power Supply:
MTBF to be greater than 65,000 MIL-HDBK-217F Hours.
MTBF to be greater than 178,000 Bellcore Hours.

Without Power Supply:
MTBF to greater than 250,000 MIL-HDBK-217F Hours.
MTBF to be greater than 687,500 Bellcore Hours

Related Manuals and Online Helps

A printed documentation card is shipped with each x222x / x32xx device. Context-sensitive Help screens, as well as cursor-over-help (COH) facilities are built into the Web interface.

For Transition Networks Drivers, Firmware, Manual, etc. go to the Product Support webpage (no logon required). For Transition Networks Application Notes, Brochures, Data Sheets, Specifications, etc. go to the Support Library (no registration required).

The ION system and related device manuals are listed below.

1. ION x222x / x32xx NID Install Guide, 33433 (this manual)
2. ION x222x / x32xx NID User Guide, 33472
3. ION Management Module (IONMM) User Guide, 33457
4. ION Systems CLI Reference Manual, 33473
5. ION219-A 19-Slot Chassis Installation Guide, 33412
6. ION C3210 User Guide, 33496
7. ION C3210 CLI Reference Manual, 33497
8. Converge EMS Install Guide - Ubuntu (33543), Install Guide - Windows (33548), EMS Admin Procedures(33544)
9. SFP manuals (product specific - see the SFP landing page)
10. Release Notes (software version specific)
11. Product Documentation Postcard, 33504

This manual may provide links to third part web sites for which Transition Networks is not responsible. Information in this document is subject to change without notice. All information was deemed accurate and complete at the time of publication. This manual documents the latest software/firmware version. While all screen examples may not display the latest version number, all of the descriptions and procedures reflect the latest software/firmware version, noted in the Revision History on page 2.

Section 2: Installation and System Setup

General

This section describes how to install the x222x / x32xx NID and the procedures to access and initially set up the NID through either a local serial interface (USB) or a remote Ethernet connection (Telnet session or Web interface).

Installing the Chassis Model (C222x / C32xx)

The Cx2xx NID is a slide-in module that can only be installed in a Transition Networks ION chassis (ION001-x and ION219-x). For a complete list of ION platform products, go to the Transit Networks website at: https://www.transition.com.

This section describes how to install the Cx2xx in the ION chassis.

⚠️

Caution: Failure to wear a grounding device and observe electrostatic discharge precautions when installing the C222x / C32xx could result in damage or failure of the module.
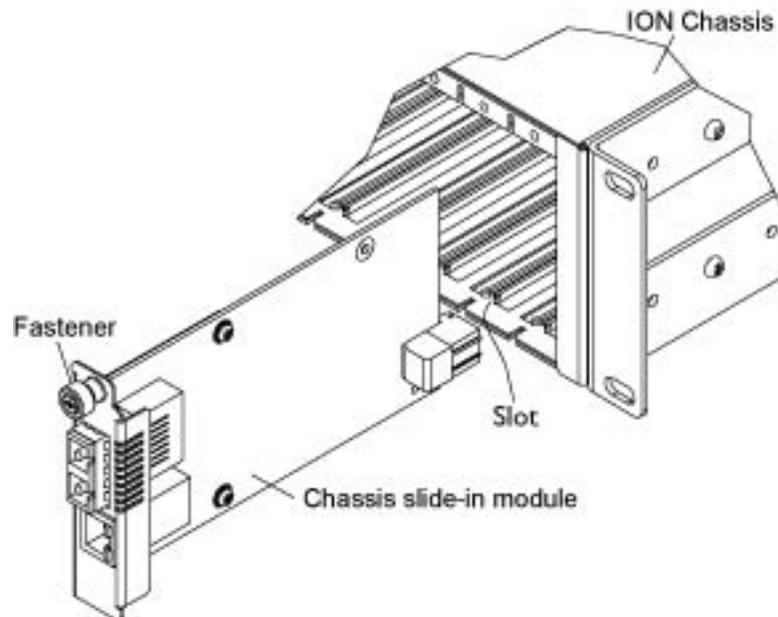

Figure 1: Chassis Installation

IMPORTANT

The Cx2xx slide-in cards are "hot swappable" devices, and can be installed with chassis power on.

1. Locate an empty slot in the ION System chassis.

2. Grasp the edges of the card by its front panel.

3. Align the card with the upper and lower slot guides, and carefully insert the card into the installation slot.

4. Firmly seat the card against the chassis back panel.

5. Push in and rotate clockwise the panel fastener screw to secure the card to the chassis (see "Figure 1: Chassis Installation" on the previous page).

6. Note that the card's Power LED lights. See "Accessing the NIDs" on page 19.

Installing the Standalone Model (S222x / S32xx)

The standalone model can be installed in any of the following ways.

- Rack mounted
- Table top
- Wall mounted

Rack Mount Installation

The S222x / S32xx standalone module can be mounted into a Transition Networks E-MCR-05 media converter rack, which can be installed on a tabletop or in a standard site rack. For installation details, see the *E-MCR-05 Media Converter Rack User Guide, 33297*.

Tabletop Installation

The S222x / S32xx is shipped with four rubber feet for optional installation on a table or other flat, stable surface in a well-ventilated area.

1. Remove the rubber feet from the card.

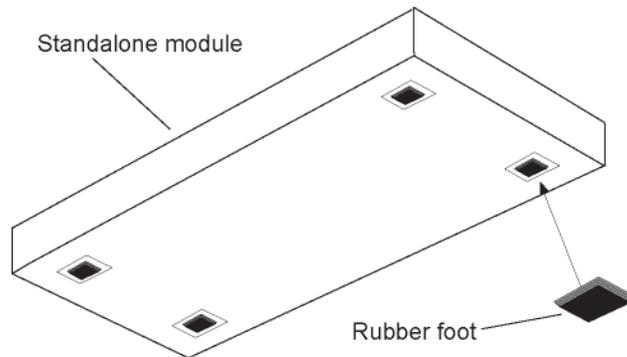2. On the bottom of the NID, place one foot in each corner of the device.

Figure 2: Tabletop Installation

3. Set the NID in place and connect the AC power adapter (see "Connecting to AC Power" on page 18).

Wall Mount Installation

1. Remove the four #4 Philips head screws securing the cover to the device and orient the device as shown in the figure below.
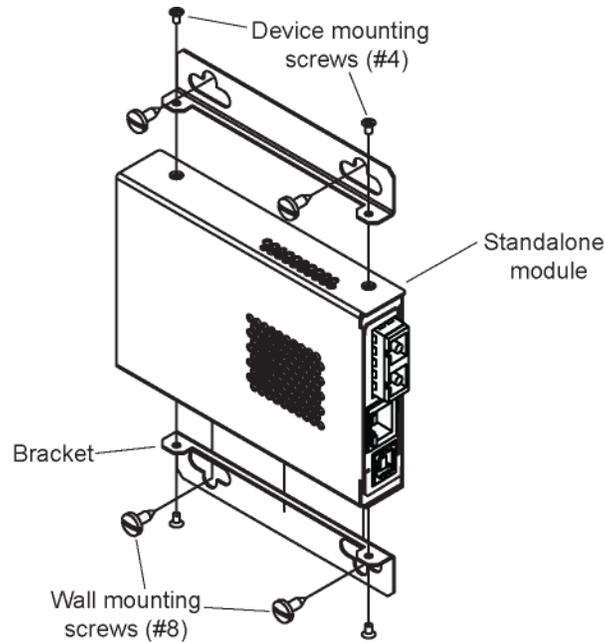

Figure 3: Wall Mount Installation

2. Mount one of the bracket assemblies to the device using two of the #4 Philips head screws.

3. Mount the other bracket assembly to the other side of the device using the other two #4 Philips head screws.

4. Position the device on the mounting surface.

5. Use the four #8 screws to mount the bracket to the mounting surface.

6. Connect the AC power adapter (see Connecting to AC Power on page 18).

Connecting to AC Power

After the standalone NID has been installed, connect it to the AC-DC power adapter. Use the AC power adapter shipped with the NID.

 Warning: Risk of electrical shock.

1. Insert the barrel connector of the AC power adapter to the power inlet on the back of the standalone NID.
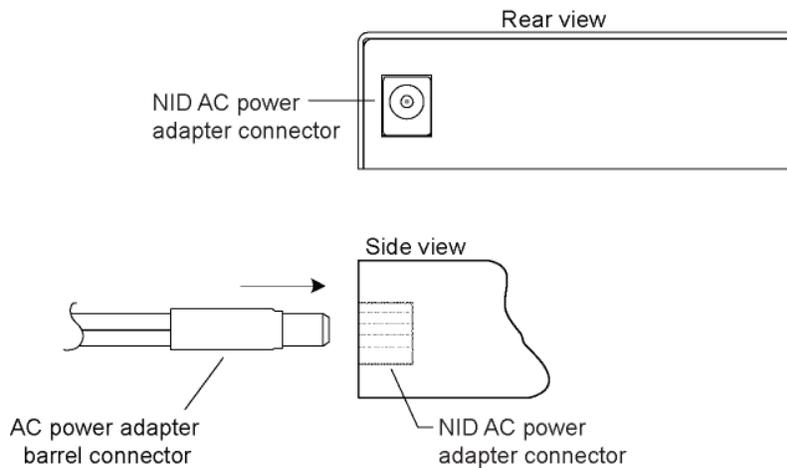

Figure 4: AC Power Connection

2. Plug the Power adapter plug into AC power at an appropriate AC outlet. Note that the standalone NID's front Power (**PWR**) LED lights.

Connections and LEDs

The connections and LEDs resident on the various models are described on the following pages.

Model x2220-1040

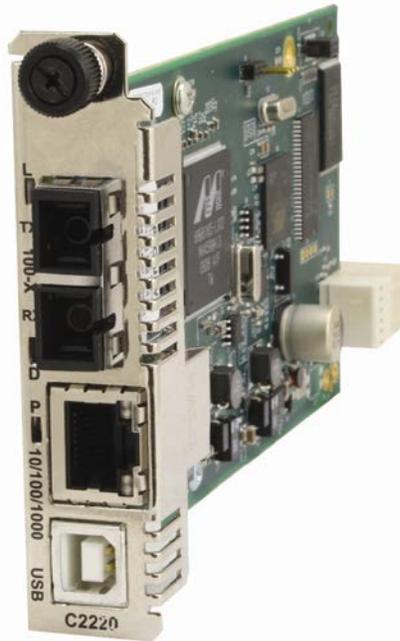The x2220-1040 connectors and LEDs are shown in the two figures below, and described in Table 6.

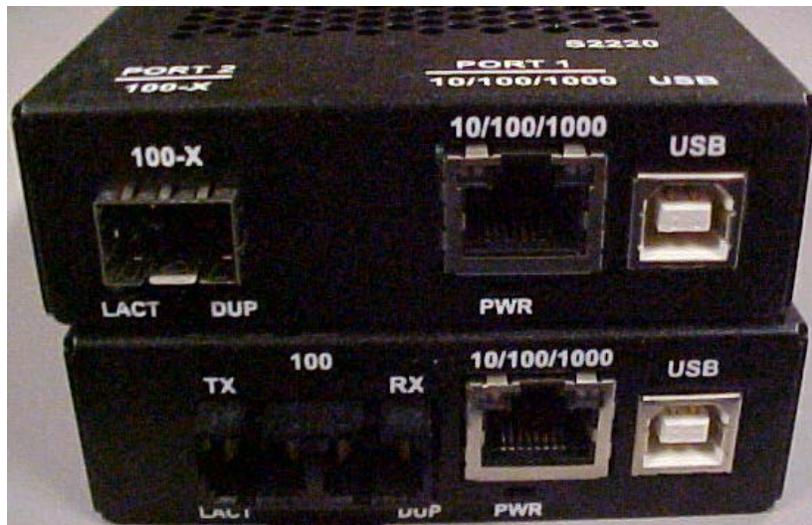**Figure 5: Model C2220-1040 Connectors and LEDs**

Figure 6: Model S2220-1040 Connectors and LEDs

The x2220-1040 connectors and LEDs are described in the table below.

Table 6: Model x2220-1040 Connectors and LED Descriptions

Connector/LED	Description
100/1000 SFP port connector	Lets you install a Small Form-Factor Pluggable (SFP) device of your choice in order to make a fiber connection.
USB connector	Used to connect the NID to a PC for a direct serial interface. Through this connection, a system administrator can access and control the NID using CLI commands.
10/100/1000 (Copper port) connector	One connector for Ethernet 10/100/1000 Base-T. The RJ-45 connectors allow the network administrator to manage the chassis through a remote computer using either remote Telnet session or the Web interface.
PWR (Power) LED	When lit, indicates that there is power to the NID.
LACT (Link active) LED	Yellow – operation is 10 MBps (10Base-T). Green – operation is 100 MBps, 100Base-T.
DUP (Duplex) LED	When lit, indicates duplex mode: • Yellow – half-duplex • Green – full duplex Blinking indicates link activity.

Model x3221-1040

The x3221-1040 connectors and LEDs are shown in the two figures below, and described in Table 7.
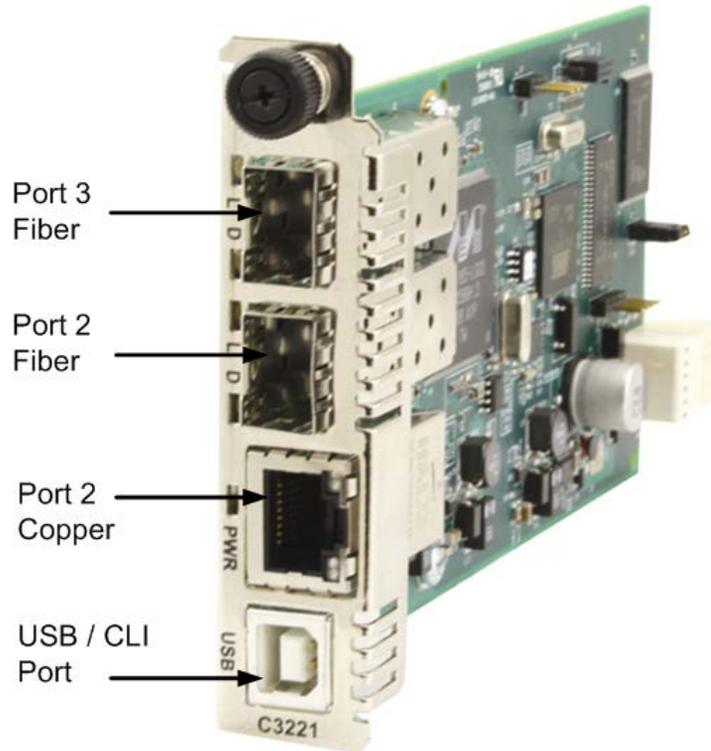

Figure 7: Model C3221-1040 Connectors and LEDs

Figure 8: Model S3220-1040 Connectors and LEDs

The x3221-1040 connectors and LEDs are described in the table below.

Table 7: Model x3221-1040 Connectors and LED Descriptions

Connector/LED	Description
100/1000 SFP port connector	Lets you install a Small Form-Factor Pluggable (SFP) device of your choice in order to make a fiber connection.
USB connector	Used to connect the NID to a PC for a direct serial interface. Through this connection a system administrator can access and control the NID using CLI commands.
10/100/1000 (Copper port) Network connectors	One connector for Ethernet 10/100Base-T. The RJ-45 connectors allow the network administrator to manage the chassis through a remote computer using either remote Telnet session or the Web interface.
PWR (Power) LED	When lit, indicates that there is power to the NID.
LACT (Link active) LED	Yellow – operation is 10 MBps, 10Base-T. Green – operation is 100 MBps, 100Base-T.
DUP (Duplex) LED	When lit, indicates duplex mode: • Yellow – half-duplex • Green – full duplex Blinking indicates link activity.

Model x32x0-10xx

The x32x0-1040 connectors and LEDs are shown in the two figures below and described in Table 7.

Figure 9: Model C32x0-10xx Connectors and LEDs

Figure 10: Model S32x0-10xx Connectors and LEDs

Model S3221-1040-T

The S3221-1040-T is a version of the S3221-1040 "hardened" to support an extended operating temperature range for environments that are not temperature controlled. It has an operating temperature of-40̊ C to +65̊ C. The bundled external AC/DC power supply adapter is also "hardened" to meet the operating temperature range of the S3221-1040-T.

SFPs used with the S3221-1040-T require an extended operating temperature range to match the S3221-1040-T. See the Transition Networks SFP landing page for SFP details.

The S3221-1040-T external AC/DC Power Supply Adapter (TN PN 25138) is a +12VDC, 10 Watts, Universal IEC Input, Industrial Power Supply. The 25138 is UL 94V-1, RoHS, and CEC and Energy Star Level V compliant. It meets FCC Part-15 class B and CISPR-22 class B emission limits. It also meets new CE requirements and has UL/cUL (UL 60950-1: 2nd edition) and TUV/GS (EN 60950-1: 2nd edition) safety approvals. The 25138 has AC inlets type IEC-320-C14 (Type "A").

The S3221-1040-T and bundled Power Supply are shown below.

Figure 11: Model S3221-1040-T

Operating Systems Supported

The USB drivers are available at https://www.transition.com/products/media-converters/c3230-series/.

- Windows® 7, Windows 8, and Windows 10
- Windows Server 2012 R2
- Windows XP 32 & 64 bit
- Windows 2000
- Windows 2003 32 bit
- Windows Vista and Vista x64

Virtual COM port (VCP) drivers make the USB device appear as another COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.

The x222x/x32xx provides a USB Type B connector that can be used as a virtual COM port for accessing the x222x/x32xx command line interface (CLI).

Installing the USB Driver - Windows XP

IMPORTANT

The following driver installation instructions are for the *Windows XP* operating system only. Installing the USB driver using another operating system is similar, but not necessarily identical to the following procedure.

To install the USB driver on a computer running *Windows XP*, do the following.

1. Download the USB driver.ZIP file from the website and place it in an accessible folder on the local drive of the PC.
2. Connect the NID to the USB port on the PC. **Note:** for slide-in modules installed in an ION Chassis, the USB connection will be made to the ION Management Module if one is installed in the chassis. The *Welcome to the Found New Hardware Wizard* window displays.
3. Select **No, not this time**.
4. Click **Next**. The installation options window displays.
5. Select **Install from a list or specific location (Advanced)**.
6. Click **Next**. The driver search installation options window displays.
7. Click **Browse**.
8. Locate and select the USB driver downloaded in step 1 above.
9. Click **Next**. Driver installation begins.
10. When the finished installing screen displays, click **Finish**. The USB driver installation is complete. You must now configure the COM port to be used by the terminal emulator.

Installing the USB Driver - Windows 8

IMPORTANT

The following driver installation instructions are for the *Windows 8* operating system only. Installing the USB driver using another operating system is similar, but not necessarily identical to this procedure.

To install the USB driver on a computer with the *Windows 8* operating system, do the following.

1.   Press the Windows key and type "startup". Choose "Change advanced startup options".
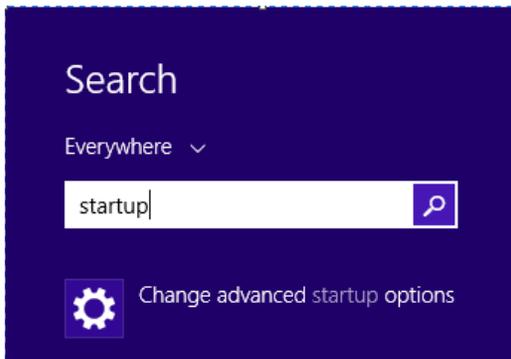
2.   On the right side click on the "Restart now" button under Advanced startup.

3.   Your PC will reboot and display the "Choose an Option" screen; choose "Troubleshoot".
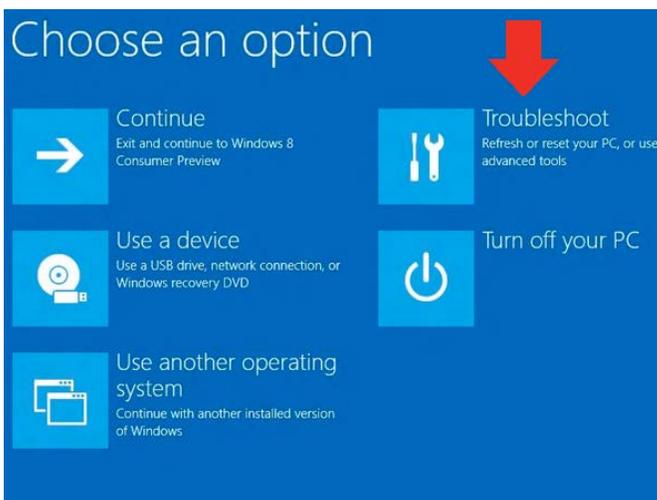
4.   At the Troubleshoot screen choose "Advanced options".

5.   In the Advanced options screen choose "Startup Settings".

6.   A list of Windows Startu Settings displays; click the "Restart" button. Your PC will reboot.

7.   Your PC will boot into a Startup Settings screen. Select "7) Disable driver signature enforcement".
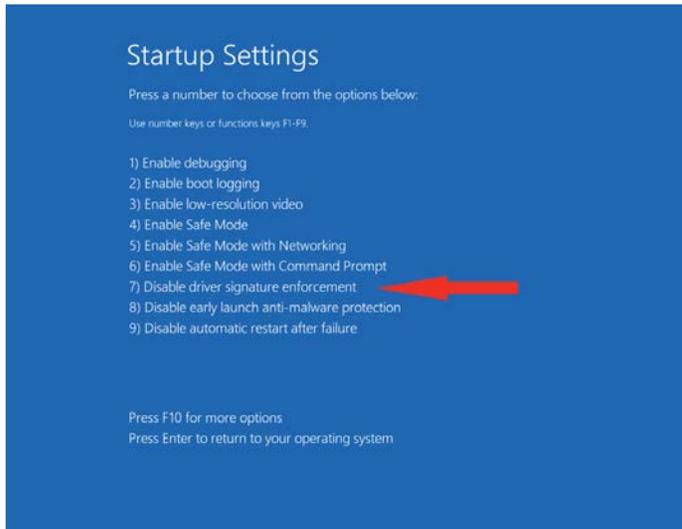
8.   Your PC will reboot one more time and will not load normally.
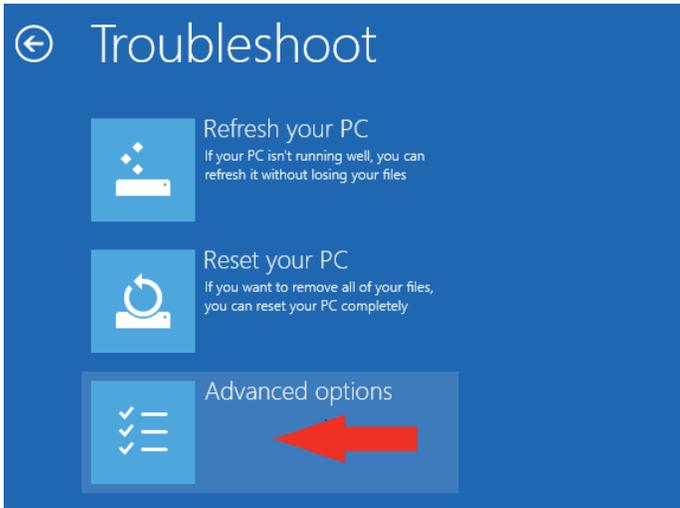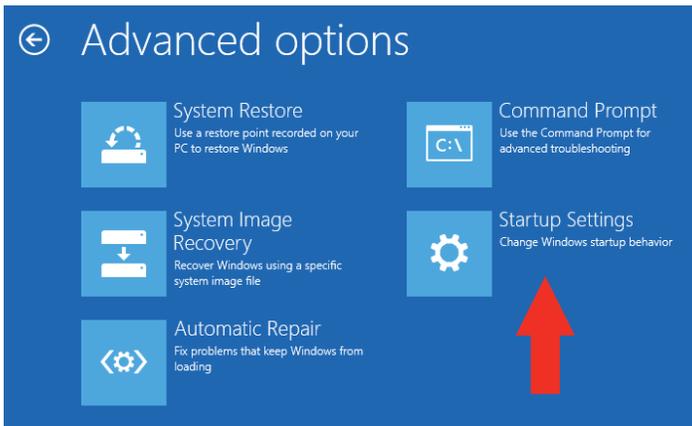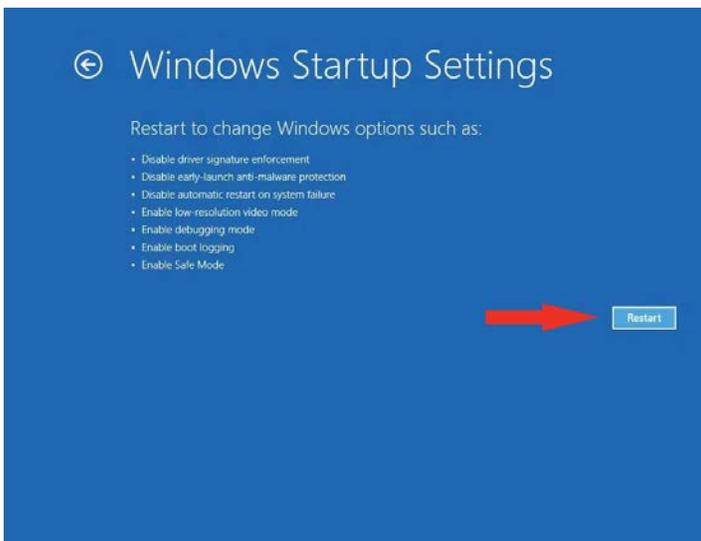9.   Plug the USB into the PC and IONMM card and have the USB driver saved locally to the PC.
10.   The install will fail again; right click on "My computer" and click "Manage" to get to "Device Manager".
11.   In Device Manager, expand "Ports (COM& LPT)" to view your connection with an error on the driver.
12.   Right click on the driver and choose "Update driver software".
13.   You will get a pop up with two options; choose "Browse my PC for driver".
14.   Point to the folder location where you have the driver installed and click "install".
15.   You will receive another Windows Security pop up; choose "Install this driver software anyway".

16.   The driver will install correctly and you will no longer see the error on the connection in Device Manager.
17.   You will now be able to connect via USB to the device and log in. On a stand-alone device, be sure to set it to "Remote" so you can remotely manage the device.

Configuring HyperTerminal

After the USB driver has been installed, you must set up the terminal emulator software (e.g., HyperTerminal) to use the USB COM port.

1. On the desktop, right-click on **My Computer**.
2. Select **Manage**. The **Computer Management** window displays.
3. Click on **Device Manager** to open the Device Manager panel. (If a Device Manager message displays, click **OK** and continue.)
4. In the right panel, expand the list for **Ports (COM & LPT)**.
    Write down the USB COM port number for the "*TNI CDC USB to UART*" listing (COM 5 in the example above). You will need to provide this COM port number in step 8 below.
5. Launch the HyperTerminal software.
    a) Click **Start**.
    b) Select: **All Programs > Accessories > Communications**
    c) Click **HyperTerminal**.
    The Connection Description window displays.
6. Type in a name and select an icon that will be used for this connection.
7. Click **OK**. The **Connect To** window displays.
8. From the drop-down list in the **Connect using** field, select the COM port noted in step 4.
9. Click **OK**. The **Port Settings** window displays.
10. Set the COM port properties as follows:
    *   Bits per second: **115200**
    *   Data bits: **8**
    *   Parity: **None**
    *   Stop bits: **1**
    *   Flow control: **None**
11. Click **OK**. A blank HyperTerm window displays.
12. In the HyperTerm window, select **File > Properties**. The Properties window displays the **Connect To** tab.
13. Click the **Settings** tab.
14. In the **Emulation** field, select **VT100**.
15. Click the **ASCII Setup…** button.
16. Verify that **Wrap lines that exceed terminal width** is selected.
17. Click **OK** and then click **OK** again.
18. Login (see Starting a USB Session below).

Starting a USB Session in HyperTerminal

The procedure below describes how to access the x222x/x32xx via a USB connection. The x222x/x32xx can be controlled from a remote management station via a HyperTerminal session over an Ethernet connection. The x222x/x32xx is controlled and configured through CLI commands. Use the following procedure to connect to and access the x222x/x32xx via a HyperTerminal (HT) session.

1. Click Windows **Start**.
2. Select **All Programs > Accessories > Communications > HyperTerminal**.
3. Create a new HT connection (select **File** > **New**) or select an existing connection (**File** > **Open**).
4. Press the **Enter** key. The Password prompt displays. If "*Login incorrect*" displays, ignore it.
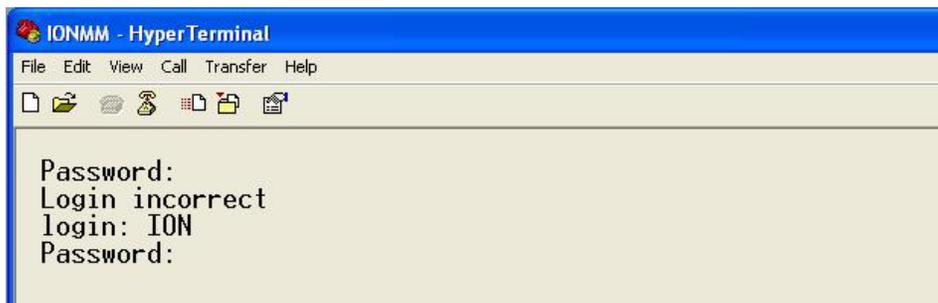
   If the login prompt does not display, try unplugging and re-plugging the USB cable at the IONMM.

   If your system uses a security protocol (e.g., RADIUS, SSH, etc.), you must enter the login and password required by that protocol.

5. Type **ION** (all upper case) and press the **Enter** key. The login prompt displays.
6. Type **private** (all lower case) and press the **Enter** key. The ION system command prompt displays. For example:
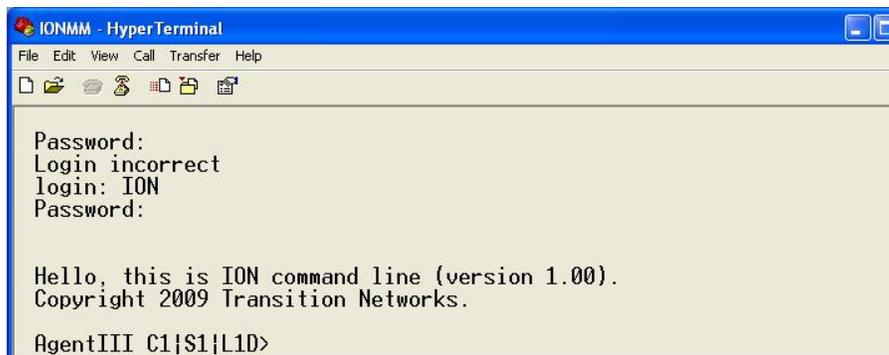

```
Hello, this is ION command line (version 1.00).
Copyright 2009 Transition Networks.

Agent III C1|S1|L1D>
```

7. Continue by entering ION CLI commands to the right of the > symbol. Press the **Enter** key after each command.

8. If the NID controlled by the IONMM, go to step 9. Otherwise continue with step 10.

9. Enter a **go** command to change the location for the command prompt. The **go** command format is:

   go [c=<1-16>] [s=<1-32>] [l1ap=<1-15>] [l2ap=<1-15>] (l1p=<1-5>|l2p=<1-15>|l3p=<1-15>|l1d|l2d|l3d)

   (for a slide in card), or

   go [c=<0-16>] [s=<0-32>] [l1ap=<1-15>] [l2ap=<1-15>] (l1p=<1-5>|l2p=<1-15>|l3p=<1-15>|l1d|l2d|l3d)

   (for a standalone card).

10. Enter commands to set up the various configurations for the NID. For a description of all available CLI commands see the *ION Systems CLI Reference Manual, 33461.*

Note: If required by your organization's security policies and procedures, use the CLI command **set community write=<xx>** to change the default password. See the *ION Systems CLI Reference Manual*, 33461.

Terminating a USB Connection from HyperTerminal

To terminate the USB connection, do the following.

1. At the command prompt, type **q**(uit).
2. Press **Enter**.
3. Click **Call** > **Disconnect**.
4. Click **File** > **Exit**.

Access via an Ethernet Network

The NID can be managed remotely through the Ethernet network via either a Telnet session or the Web interface. Before this is possible, you must set up the IP configuration for the NID.


IMPORTANT

It is recommended that you initially set up the IP configuration through the serial interface (USB connection). See "Initial Setup with a Static IP Address via the CLI" on page 31.

Otherwise, in order to communicate with the NID across the network for the first time, you must change the network settings (IP address, subnet mask and default gateway address) of your PC to coincide with the defaults of the NID (see the related manual). Note the original settings for the PC as you will need to reset them after setting the IP configuration for the NID.

Starting a Telnet Session

The NID can be controlled from a remote management station via a Telnet session over an Ethernet connection. The NID is controlled and configured through CLI commands. Use the following procedure to connect to and access the NID via a Telnet session.

1. Click **Start**.

2. Select **All Programs > Accessories**.

3. Click **Command Prompt**. The command prompt window displays.
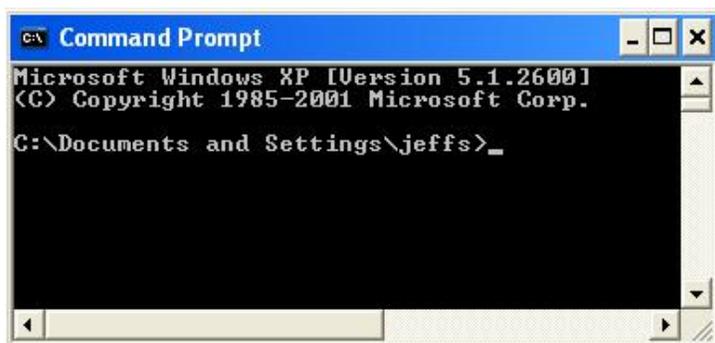
4. At the command line type: **telnet** <xx>   where xx = IP address of the NID

5. Press **Enter**. The login prompt displays.

Note: If your systems uses a security protocol (e.g., RADIUS, SSH, etc.), enter the login and password required by that protocol.

6. Type your login (the default is **ION**). **Note:** the login is case sensitive.

7. Press **Enter**. The password prompt displays.

8. Type your password (the default is **private**). **Note:** the password is case sensitive.

9. Press **Enter**. The command line prompt displays.

```
Telnet 192.168.1.29
login: ION
Password:

Hello, this is ION command line (version 1.00).
Copyright 2009 Transition Networks.

C1|S3|L1D>
```

10. If the NID <u>is</u> controlled by the ION Management Module, go to step 11.
    If the NID is <u>not</u> controlled by the ION Management Module, go to step 12.

11. Enter a **go** command to change the location for the command prompt. The **go** command format is: go [c=<1-16>] [s=<1-32>] [l1ap=<1-15>] [l2ap=<1-15>] (l1p=<1-5>|l2p=<1-15>|l3p=<1-15>|l1d|l2d|l3d)

    for a Slide in card, or

    go [c=<0-16>] [s=<0-32>] [l1ap=<1-15>] [l2ap=<1-15>] (l1p=<1-5>|l2p=<1-15>|l3p=<1-15>|l1d|l2d|l3d)

    for Standalone card.

12. Enter commands to set up the various configurations for the NID. For a description of all available CLI commands see the *ION Systems CLI Reference Manual, 33473*.

Note: If required by your organization's security policies and procedures, use the CLI command **set community write=<xx>** to change the default password. See the *ION Systems CLI Reference Manual*, 33473.

Terminating a Telnet Session

To terminate the Telnet session:

1. Type **quit**.

2. Press the **Enter** key.

Initial Setup with a Static IP Address via the CLI

The x222x/x32xx supports IPv4-based application protocols. The x222x/x32xx can be assigned IP address statically or dynamically using DHCP. The x222x/x32xx supports DNS, which lets you assign it a hostname instead of an IP address. The static IP address assignment is part of the initial x222x/x32xx setup, and at first the CLI (command line interface) is used to configure the IP address settings. Thereafter, remote management and/or DHCP addressing can be configured.

The default values are IP Address = 192.168.0.10, Subnet Mask = 255.255.255.0, Default Gateway = 192.168.0.1, with no DNS address assigned, and no DHCP client enabled. When manually setting the x222x / x32xx NID's IP address, it can only be given a Class A, Class B or Class C address; it can not be given a multicast or reserved IP address. The multicast addresses, loopback addresses, and link local addresses that can be used in a local network include 10.0.0.0~10.255.255.255, 172.16.0.0~172.31.255.255, and 192.168.0.0~192.168.255.255).

The following procedure is for setting a static IP address for the x222x/x32xx NID. When this procedure is completed, you can communicate with the x222x/x32xx across the network via either a Telnet session or the Web interface.

1. Start a USB session (see "Starting a USB Session" on page 27).

2. At the command prompt type **set ip type=ipv4 addr**=<xx> **subnet–mask** =<yy> where:

    xx   =   IP address of the NID

    yy   =   subnet mask

3. Press **Enter**.

4. Set the IP address mode. Type **set ip address mode**=<xx> where:

    xx = the IP addressing mode (bootp, dhcp, or static).

5. Type **set gateway type**=**ipv4 addr**=<xx> where:

    xx   =   default gateway address (note that only one default gateway can be set)

6. Press **Enter**.

7. Verify the setup. Type **show ip-mgmt config** and press **Enter**. The current configuration displays.

    For example:

    ```
    Agent III C1|S9|L1D>set ip type=ipv4 addr=192.168.1.10 subnet–mask=255.255.255.0
    Agent III C1|S9|L1D>set ip address mode=static
    Agent III C1|S9|L1D>set gateway type=ipv4 addr=192.168.0.1
    Agent III C1|S9|L1D>show ip-mgmt config
    IPv4 management configuration:
    ```

```
-------------------------------------------------------------------------
IP management state:          enable
IP address:                   192.168.1.10
IP subnet mask:               255.255.255.0
Gateway IP address:           192.168.0.1
IP address mode :             Static

IPv6 management configuration:
-------------------------------------------------------------------------
Management State:             disable
Link Local Address:           fe80::2c0:f2ff:fe21:177
Global Address Mode:          static
Global Address:               ::
Management Prefix:            0
Duplicate Address Detect:     false
Gateway Mode:                 static
Gateway Address:              ::

server index    addr_type    address
-------------------------------------------------------------------------
DNS server1     ipv4         192.168.1.30
DNS server2     ipv4         0.0.0.0
DNS server3     ipv4         0.0.0.0
DNS server4     ipv6         ::
DNS server5     ipv6         ::
DNS server6     ipv6         ::
Agent III C1|S9|L1D>
```

For more information about IP configurations see "Access via Local Serial Interface (USB)" on page 33.

Accessing the NIDs

The x222x / x32xx NIDs can be accessed through either a local serial interface via a USB connection or through an Ethernet network connection. The network connection can be done via a Telnet session or a Web graphical user interface (GUI).

Access via Local Serial Interface (USB)

The x222x / x32xx NIDs can be connected to a local management station (PC) through a serial interface using a USB connection. The NID is controlled by entering command line interface (CLI) commands at the local management station. To use the serial interface (USB) the following is required:

- Personal computer (PC)
- USB cable (type A male connector on one end and type B male connector on the other)
- Terminal emulator program (e.g., HyperTerminal) on the PC
- USB driver installed on the PC
- Configured COM port

IMPORTANT

In order to control the chassis slide-in module through a USB serial interface, the command line prompt must be showing the location of the module to be managed.

Web Browsers Supported

The ION system supports the current version of most popular web browsers (e.g., Firefox (Mozilla Firefox), Internet Explorer (IE), Google Chrome.

Starting the Web Interface

See the Web User Guide.

Changing Switch Mode (Local / Remote)

Management and configuration control can be switched between local management control (via CLI, Telnet or Web) or remote management control (via the IONMM).

The switch mode can be changed for the NID using only the CLI method.

The CLI command **set switch mode={local | remote}** changes the operating mode of a standalone device.

Remote Mode: the device can only be managed and configured via the IONMM. Setting the switch mode to remote indicates that the device is managed through the IONMM. The device cannot perform any IP management when in 'remote' mode. Remote mode is the C222x/C32xx default mode for all firmware versions. This is the S222x/S32xx (standalone) default mode at version 1.2 and below.

Local Mode: the device can only be configured and managed directly via CLI, Telnet or Web. Setting the mode to **local** indicates that the device is managed through either a direct USB connection or a direct network connection via Telnet or the Web interface (i.e., the device is no longer managed by the IONMM). This is the S222x/S32xx (standalone) default mode at version 1.3.10 and above. If deployed as a standalone, this must be set to Local.

To change the device switch mode to local, do the following:

1. Start a USB session (see "Starting a USB Session" on page 27).

2. At the command prompt type **set switch mode=local**.

3. Press the **Enter** key.

4. Reboot the card for the changes to take effect. At the command prompt type **reboot**.

 Doing a reboot, restart or upgrade of the IONMM, a power restart of the chassis, or a reset to factory removes temporary files (e.g. configuration backup files, Syslog file). A Factory Reset also removes the permanent settings (e.g. configuration files, HTTPS certification file, SSH key).

5. Press the **Enter** key to reboot the module.

6. At the command prompt type **show switch mode**.

7. Press the **Enter** key. This displays the device's management mode - local or remote - indicating where the device is managed:

   - **local** – device is managed through direct connection to the device.

   - **remote** – device is managed through the IONMM.

Note: The system can not show the switch mode on all card types.

Section 3: Troubleshooting

General

This section provides basic and specific problem determination processes, and a description of problem conditions that may occur or messages that may be displayed. This section also documents ION system tests and x222x / x32xx and jumpers, and describes where and how to get technical support.

IMPORTANT

For each procedure described in this section, do each step sequentially as indicated. If the result of a step causes the problem to be corrected, **do not** continue with the other steps in the procedure.

Basic ION System Troubleshooting

This basic process is intended to provide some high-level techniques that have been found useful in isolating ION problems. This process is not a comprehensive guide to troubleshooting the ION system. The intent here is to 1) avoid missing any important information, 2) simplify analysis of captured information, and 3) improve accuracy in finding and explaining problem causes and solutions.

This basic process applies to these ION system and related components:

- ION Chassis
- ION NIDs (SICs, or slide-in-cards)
- IONMM
- ION software (ION System Web Interface or ION CLI).
- ION power supply
- ION Options (SFPs, ION LG Kit, etc.)
- Data cables, electrical cables, and electrical outlets
- Third party network equipment (circuit protection equipment, battery backup, 3rd party client or server software – RADIUS or TFTP, etc.)

When troubleshooting an ION system / network problem on site:

1. Document the operation taking place when the failure occurred.
2. Capture as much information as possible surrounding the failure (the date and time, current configuration, the operation in process at the time the problem occurred, the step you were on in the process, etc.).
3. Start a log of your ideas and actions, and record where you were in the overall scheme of the system process (i.e., initial installation, initial configuration, operation, re-configuration, upgrading, enabling or disabling a major feature or function, etc.).
4. Write down the error indication (message, LED indicator, etc.). Take a screen capture if the problem displayed in software.
5. Start with the most simple and work towards the more complex possible problem causes (e.g., check the network cables and connections, check the device LEDs, verify the NIDs are seated properly, view the CLI **show** command output, check the Syslog file, verify IP addresses and Gateway IP address, check Windows Event Viewer, ping the interface, run the various tests if functional, etc.).
6. Write down your initial 2-3 guesses as to the cause of the problem.
7. Verify that the TN product supports the function you are attempting to perform. Your particular TN product or firmware version may not support all the features documented for this module. For the latest feature information and caveats, see the release notes for your particular device/system and firmware release.

8. Use the Web interface or command line interface (CLI) to obtain all possible operating status information (log files, test results, **show** command outputs, counters, etc.)
9. If LOAM is configured, check the LOAM Event Log table parameters,. Print the output if possible.
10. Use the ION system manual procedure to retry the failed function or operation.
11. For the failed function or operation, verify that you entered valid parameters using the cursor-over-help (COH) and/or the ION system manual.
12. Based on the symptoms recorded, work back through each step in the process or operation to recall a point at which the problem occurred, and examine for a possible failure point and fixe for each.
13. Document each suspected problem and attempted resolution; eliminate as many potential causes as possible.
14. Isolate on the 1-2 most likely root causes of what went wrong, and gain as much information as you can to prove the suspected cause(s).
15. If you find a sequence of actions that causes the problem to recur, replicate the full sequence several times and document it if possible.
16. Review your logged information and add any other comments that occur to you about what has taken place in terms of system behavior and suspected problem causes and solutions.
17. Review the "Recording Model Information and System Information" section on page 43 before calling TN for support.

Error Indications and Recovery Procedures

The types of indications or messages reported include:

- LED Fault and Activity Displays (page 37)
- Check the PCB configuration. See "Jumper Settings" on page 41.
- Problem Conditions
- CLI Messages
- Web Interface Messages
- Windows Event Viewer Messages
- Config Error Log (config.err) File
- Webpage Messages
- Third Party Troubleshooting Messages

These message types and their recommended recovery procedures are covered in the related manuals.

LED Fault and Activity Displays

Refer to this section if the LEDs indicate a problem. For any LED problem indication, review the "Front Panel Connections and LEDs" section, and then perform the following steps.
1. Check the power cord connections and power outlet.
2. Check the data cables for obvious problems, incorrect cable type, incorrect wiring, etc.
3. Make sure the USB cable is properly connected.
4. Check the power supply voltages (see related documentation).
5. Verify that the ION system devices have the latest firmware versions. Download the latest firmware version and upgrade as necessary.
6. Check if other network devices are working properly.

Power (PWR) LED is off (not lit):
1. Check for a loose power cord.
2. Check for a power supply failure. Replace power supply if failed.
3. Make sure all circuit protection and connection equipment and devices are working.
4. Verify that the ION system power supply is within operating range.
5. Remove the card from the chassis and re-insert it. Replace if failed.
6. Make sure the mode displayed matches the hardware setting on the device. See the "Jumper Settings" section on page 41.

LACT (Link Activity) LED off (not lit):
1. Check the data cables for obvious problems, incorrect type, incorrect wiring, etc.
2. See if the administrator has manually disabled the console device (PC) via the Web interface.
3. Check if other network devices are working properly.
4. Remove the suspect card from the chassis and re-insert it.
5. Check Auto-Negotiation setting.
6. See if the port transmission mode / speed (full or half-duplex, etc.) match those of the attached device.
7. Verify that the ION system devices have the latest firmware versions (see the related manual). Download the latest firmware version and upgrade as necessary.

Fault LED is lit:
1. Check for a problem with the IONMM, software, or configuration.
2. Make sure all circuit protection and connection equipment and devices are working.
3. Verify that the ION system power supply is within operating range.
4. Remove the card from the chassis and re-insert it.
5. Make sure the USB cable is properly connected.
6. Reset the IONMM.

TX or RX LED off (not flashing):
1. Check the data cables for obvious problems, incorrect cable type, incorrect wiring, etc.
2. Check if other network devices are working properly.
3. Verify that the ION system devices have the latest firmware versions.
4. Download the latest firmware version and upgrade as necessary.
5. Remove the card from the chassis and re-insert it.

Jumper Settings

The x222x/x32xx NIDs have on-board components that can be used to configure device operation, typically at the direction of a TN technical support specialist. In most cases, the factory default settings provide optimal configuration settings; however, Jumper setting changes may be required for operating mode changes or troubleshooting purposes.

PCB Identification

This section covers the following PCBs (printed circuit boards):

- **x2220** NID - PCB: 11321 Rev. 04 (this information is silkscreened on the bottom of the PCB).

- **x3220** NID - PCB: 11320 Rev. 04 (this information is silkscreened on the bottom of the PCB).

Each PCB has jumpers and / or DIP switches. Not all of these jumpers / DIP switches are intended for use in the field.

Note: Do not change these configurable items except at the direction of a TN technical support specialist.

PCB Layout

PCB: 11321 Rev. 04 (this information is silkscreened on the bottom of the PCB). This PCB has four jumpers and no DIP switches. Only Jumper J11 is used in the field.
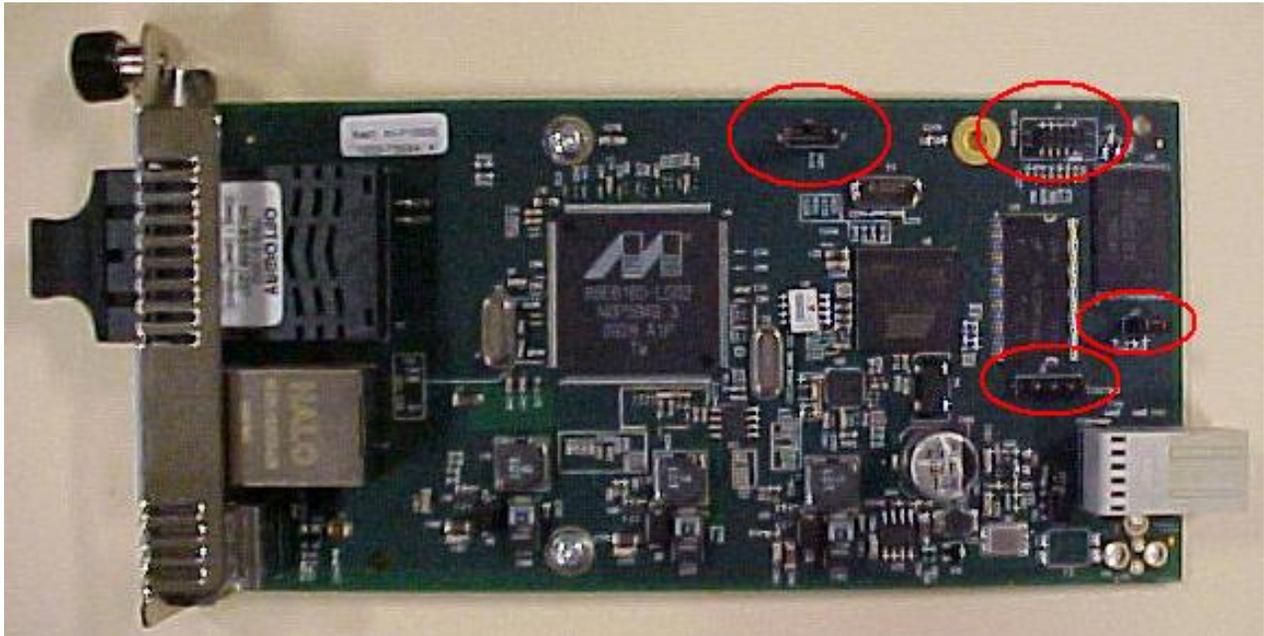
J11 – Reset to Factory Defaults (N/F)

⚠️ Doing a **Reset To Factory Config** resets the NID configuration to the state it was in when it shipped from the factory. This permanently removes all current configuration details and loads the system configuration with the factory default settings. See "Reset To Factory Config" in the related manual.

J11	
J11 Pins → 1 2 3 N [O O O] F Reset To Factory Config	**J11** **Jumper Pin #s** **Function** 1-2 (N) None. 2-3 (F) Reset the unit to factory defaults.

J9 (Not Used)

Do not use. Jumper J9 is used for manufacturing / debug purposes only.

J12 (Not Used)

Do not use. Jumper J12 is used for manufacturing / debug purposes only.

J8 (Not Used)

Do not use. Jumper J8 is used for manufacturing / debug purposes only.

Firmware: Keep your products up to date by downloading the latest firmware. You must log in or create an account to download firmware. For further assistance contact us at +1.952.358.3601, 1.800.260.1312, or at techsupport@transition.com.

Contact Us

Technical Support: Technical support is available 24-hours a day
US and Canada: 1-800-260-1312
International: 00-1-952-941-7600

Main Office
tel: +1.952.941.7600 | toll free: 1.800.526.9267 | fax: 952.941.2322
sales@transition.com | techsupport@transition.com | customerservice@transition.com

Address
Transition Networks
10900 Red Circle Drive
Minnetonka, MN 55343, U.S.A.

Web: https://www.transition.com

Recording Model Information and System Information

After performing the troubleshooting procedures, and before calling or emailing Technical Support, please record as much information as possible to help the TN Technical Support Specialist.

1. Select the device **MAIN** tab. (From the CLI, use the commands needed to gather the information requested below, such as **show card info**, **show slot info**, **show system info**, **show ether config**, **show ip-mgmt config**, **show loam config**, or others as requested by the TN Support Specialist.)
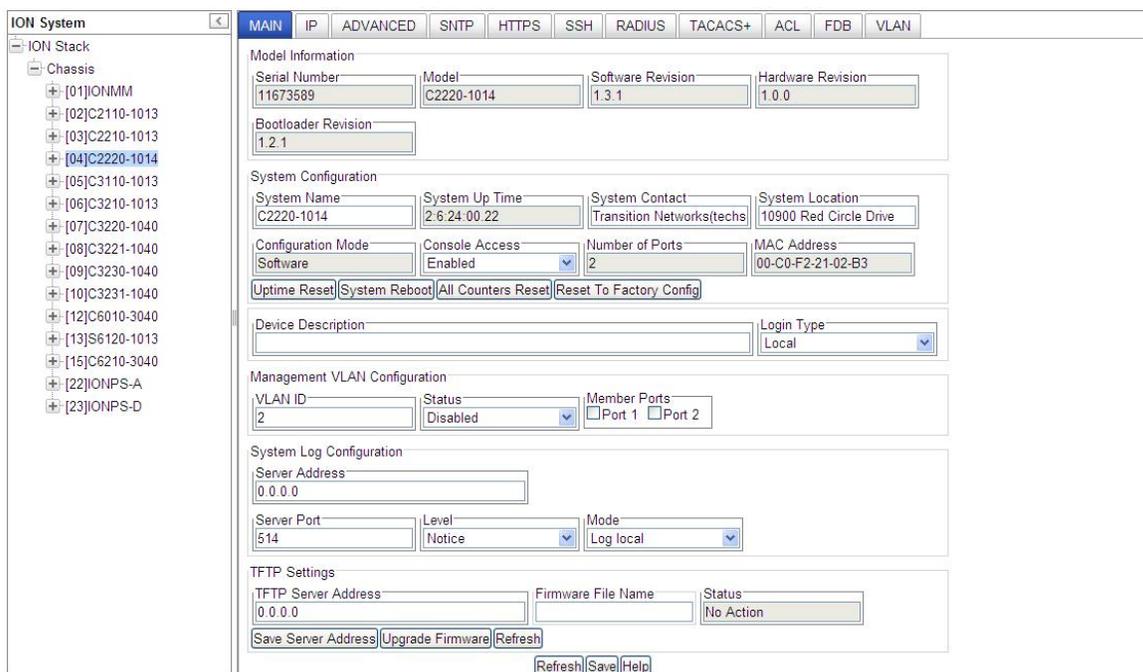
2. Record the **Model Information** for your system.

Serial Number: _____   Model: _____

Software Revision: _____   Hardware Revision: _____

Bootloader Revision: _____   System Up Time: _____ _

3. Record the **System Configuration** information for your system.

Configuration Mode: _____   Console Access: _____

Number of Ports: _____   MAC Address: _____

Device Description: _____   IP Address Mode: _____

4. Provide additional Model and System information to your Technical Support Specialist. See "Basic ION System Troubleshooting" on page 38.

Your Transition Networks service contract number: _____

A description of the failure: _____

_____

_____

A description of any action(s) already taken to resolve the problem (e.g., changing switch mode,
    rebooting, etc.): _____

_____

_____

The serial and revision numbers of all involved Transition Networks products in the network:

_____

_____

A description of your network environment (layout, cable type, etc.): _____

_____

_____

Network load and frame size at the time of trouble (if known): _____

The device history (i.e., have you returned the device before, is this a recurring problem, etc.):

_____

_____

Any previous Return Material Authorization (RMA) numbers: _____

Note: The model number, Serial Number, and Firmware Rev. are on a printed label on the bottom of the
ION NID.

Appendix A: Warranty and Compliance Information

Warranty

This warranty is your only remedy. No other warranties, such as fitness for a particular purpose, are expressed or implied. Transition Networks 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 transition networks' behalf.

Limited Lifetime Warranty

Effective for products shipped May 1, 1999 and after. Every Transition Networks' labeled product purchased after May 1, 1999 will be free from defects in material and workmanship for its lifetime. 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 Transition Networks' 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.

Transition Networks 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 Transition Networks' 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 this address:

Transition Networks, 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 Transition Networks for evaluation of said product(s) for repair or replacement. Transition Networks 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, Transition Networks 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', Transition Networks will retain the $200.00 service charge and return the product to the customer not repaired. Non-warranted products that are repaired by Transition Networks 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.

Transition Networks 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. TRANSITION NETWORKS 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 TRANSITION NETWORKS'S BEHALF.

Customer Pays Non-Compliant Return Costs

The customer must pay the non-compliant product(s) return transportation cost to Transition Networks for evaluation of said product(s) for repair or replacement. Transition Networks 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, Transition Networks 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, Transition Networks will retain the $200 service charge and return the product to the customer not repaired.

Repaired Non-Warranty Products

Non-warranted products repaired by Transition Networks 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. Transition Networks 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.

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 Recognized

Tested and recognized by the Underwriters Laboratories, Inc.

Canadian Regulations

This Class A digital apparatus complies with Canadian ICES-003.

French: Cet appareil numériqué de la classe A est conformé à la norme NMB-003 du Canada.

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, Transition Networks 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.

Decclaration of Conformity

Declaration of Conformity — TRANSITION NETWORKS

Name of Mfg: Transition Networks
                      10900 Red Circle Drive, Minnetonka MN 55343 U.S.A.

Model number(s):   C3230-10 xx, C3231-10xx, C3220-10xx, C3221-10xx
                      S3230-10 xx, S3231-10xx, S3220-10xx, S3221-10xx

ION x222x & x32xx multi-port NIDs conform to the following directive(s) and
standard(s):

EMC Directive 2004/108/EC; EN 55022:2006+A1:2007 Class A;
EN55024:1998+A1:2001+A2:2003; EN6100-2-3; EN6100-3-3; CFR Title 47 Part 15
Subpart B Class A. Low Voltage Directive: 2006/95/EC; IEC 60950-1:2005; CFR Title
21 Section 1040.10 Class I; CE Mark.

I, the undersigned, hereby declare that the model numbers listed in this declaration
of conformity conform to the Directive(s) and Standard(s) herein.

Stephen Anderson, Vice-President of Engineering

June 2010
Date

MEF Certifications

TN has received MEF 9, 14, and 21 certification for the x2220, x3220, x3230 and S3240 products at the time of this publication. The MEF Carrier Ethernet Certification Program is designed to ensure that global equipment and services comply with MEF standards and pave the way for interoperability. The latest list of MEF certified TN products, and the MEF certificates and test reports are available on the TN website.

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 50nstallers 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 50nstallers 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.

Transition Networks

10900 Red Circle Drive

Minnetonka, MN 55343 USA

tel: +1.952.941.7600 | toll free: 1.800.526.9267 | fax: 952.941.2322

sales@transition.com | techsupport@transition.com | customerservice@transition.com

ION x222x / x32xx Remotely Managed NID Install Guide, 33433 Rev. C