



GarrettCom[®]

Industrial Networking at Its BestSM

Magnum DX1000

Industrial Router

Installation Guide

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Declarations

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FCC Part 15

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

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/her own expense.

In order to maintain compliance with FCC regulations shielded cables must be used for electrical I/O with this equipment. Operation with non-approved equipment or unshielded cables may result in interference to radio and television reception.

Changes or modifications could void the user's authority to operate the equipment. The user is cautioned not to change or modify this product.

FCC Part 68

This device complies with part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

Note: REN (Ringer Equivalence Number) does not apply to this equipment.

IC CS03 (Industry Canada)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment entitled “Digital Apparatus”, ICES-003 of the department of Communications (Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques”, NMB-003 édictée par le ministre des Communications).

This product meets the applicable Industry Canada technical specifications/Le présent matériel est conforme aux spécifications techniques applicables d’Industrie Canada.

EN55022

Warning: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

SAFETY

WARNING: Service to this unit can be made only by factory authorized personnel. Failure to observe this caution can result in malfunction to the unit as well as electrocution to personnel.

Avertissement: Cet appareil ne peut être examiné ou réparé que par un employé autorisé du fabricant. Si cette consigne n’est pas respectée, il y a risque de panne et d’électrocution.

Vorsicht: Dieses Gerät darf nur durch das bevollmächtigte Kundendienstpersonal der fabrik instandgehalten werden. Die Nichtbeachtung dieser Vorschrift kann zu Fehlfunktionen des Gerätes führen und das Personal durch Stromschläge gefährden.

Industry Canada Warnings	Avis d’Industrie Canada
<p>Notice:</p> <p>Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.</p> <p>Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.</p>	<p>Avis:</p> <p>Avant d’installer ce matériel, l’utilisateur doit s’assurer qu’il est permis de le raccorder aux installations de l’entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L’abonné ne doit pas oublier qu’il est possible que la conformité aux conditions énoncées ci-dessus n’empêche pas la dégradation du service dans certaines situations.</p> <p>Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L’entreprise de télécommunications peut demander à l’utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l’utilisateur ou à cause de mauvais fonctionnement.</p>
<p>Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. The precaution may be particularly important in rural areas.</p>	<p>Pour sa propre protection, l’utilisateur doit s’assurer que tous les fils de mise à la terre de la source d’énergie électrique, des lignes téléphoniques et des canalisations d’eau métalliques, s’il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.</p>

Service Personnel Warning

The DX devices may be AC or DC powered. Remove all power connections at the circuit panel before removing the unit.

The installation of this product must comply with all applicable codes and practices specified by the country, city, and operating company in which it is installed.

Grounding

All units requiring grounding. Use a grounding wire with a minimum size of 14 AWG at a maximum length of five feet.

The DX1000 is equipped with an external grounding bolt (#10/32 UNF-2B). The ground lug bolt should be torqued to 32 inch pounds (3.6 Nm).

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TABLE OF CONTENTS

Preface

About This Manual	ix
Conventions	ix
Related Documents	x
Web Access	x
Your Comments	x

CHAPTER 1: OVERVIEW

1.1 Overview	1
1.2 Configuration	1
1.2.1 Connectivity	1
1.2.2 Power and Ground	2
1.2.3 Indicators	2
1.2.4 Mounting	2
1.3 Specifications	3
1.3.1 Physical	3
1.3.2 Environmental	3
1.3.3 Optical	4
1.3.4 Compliance	4
1.3.5 Power Requirements	5
1.3.6 Ports and External Connectors	5
1.3.7 Indicators	6
1.4 Pinouts	7
1.4.1 RJ48 DDS Connection	7
1.4.2 RJ48 T1/E1 Connection	7
1.4.3 RJ45	8
1.4.4 SFP	8
1.4.5 DB9 (Female) – RS232 Serial Ports and Console Port	9
1.4.6 DB9 (Female) – Alarm Port	9
1.4.7 DB9 (Female) – RS485 Serial Ports	10

CHAPTER 2: INSTALLATION

2.1 Preparing for Installation	11
2.1.1 Tools	11
2.1.2 Site Suitability	11
2.1.3 Wiring and Grounding Guidelines	12
2.1.4 Fiber Optic Safety	12
2.1.5 Fiber Optic Handling	13
2.1.6 External Connections	13
2.2 Unpacking	13
2.2.1 Attaching Optional Ethernet Fiber Optic SFPs	14
2.3 Installation of the DX1000 Unit	14
2.3.1 Mounting	15
2.3.1.1 Mounting Options	15

CONTENTS

2.3.2	Connecting to Ground and Power	16
2.3.2.1	Making the Ground and Power Connections	16
2.3.3	Connecting to the Console Port and the Alarm Port	18
2.3.3.1	Console Port	18
2.3.3.2	Alarm Port	18
2.3.4	Connecting Network Cables	18
2.3.4.1	Connecting Serial Cables	18
2.3.4.2	Connecting Ethernet Copper Cables	19
2.3.4.3	Connecting Fiber Ethernet Cables	19
2.3.4.4	Connecting the WAN Cable	20
2.4	Maintenance	20
2.4.1	Removing the DX1000	20
2.4.1.1	Disconnecting Network Cables	20
2.4.1.2	Disconnecting Power and Ground Lines	21
2.4.1.3	Packing the DX1000 for Shipment	21
2.4.2	Cleaning Fiber Optic Devices	22
2.4.2.1	Cleaning Connectors	22
2.4.2.2	Cleaning Optical Ports	22

Preface

ABOUT THIS MANUAL

This document provides instructions for installing the Magnum DX1000 hardware. This document gives product descriptions, specifications, detailed information on ports and pinouts, all site preparation required to install the product, complete installation procedures, power up instructions, and instructions for removing and maintaining the product. This document is inclusive with respect to the features of the DX1000 product line so that it serves to document the DX1000 in both its IR and its TS versions. This document is arranged as follows:

Chapter 1, “Overview” - Contains a brief product description, a list of applicable specifications, and a description of all controls and indicators and pinouts for connectors.

Chapter 2, “Installation” - Contains all site preparation that must be accomplished prior to installing the DX1000, installation in a rack, panel, or DIN rail system, powering the unit up, and making all external connections. This chapter also includes maintenance procedures.

CONVENTIONS

Graphically distinctive alerts labeled either “Note” or “Caution” (illustrated below) are interspersed throughout this manual. These alerts call your attention to useful information related to the text immediately following the alert. Notes provide supplemental information or provide a point of emphasis. Cautions warn you of the risk of poor system performance or of system failure.



NOTE: Notes provide you with helpful information about an upcoming step or action. If you do not use the information contained in a Note there is no risk of harm to the system, but using the information will improve performance and/or increase your understanding.



CAUTION: A caution warns you that you should take some action to avoid poor system performance or system failure.



LASER WARNING: This Warning is used to call attention to the fact that Laser output can cause serious damage to the eye.



ELECTRICAL WARNING: This format is used for Electrical Warnings. Callouts of this format are used to notify that a potential of electrocution exists and that a defined action could cause personal injury or death to occur.

RELATED DOCUMENTS

- *Magnum Network Software – DX Administrator’s Guide*

WEB ACCESS

All of the DX1000 manuals are also available in .pdf format on the GarrettCom website, www.garrettcom.com.

YOUR COMMENTS

If you find an error or have a helpful tip on the layout or informational content of this or any other GarrettCom manual please feel free to contact us via email with any problems or helpful information. All enquiries will be responded to with a correction or whatever resolution is required. Please make all comments to support@garrettcom.com or phone a support engineer at 978.688-8807.

Chapter 1

Overview

1.1 Overview

The Magnum DX1000 provides connectivity to asynchronous and Ethernet traffic through twelve programmable serial ports, five Ethernet ports, which may be 10/100 BaseT for copper line connections, 100FX multimode (MM) or singlemode (SM) small-format pluggable (SFP) ports for fiber optic connections or some combination of the two types of connections, and up to two DDS or T1/E1 WAN ports.

1.2 Configuration

The following sections describe the features and requirements of the DX1000.

1.2.1 Connectivity

The DX1000 is equipped with some combination of the following:

- 0 or 2 DDS or T1/E1 WAN ports
- 5 ethernet ports. These may be all 10/100 BaseT, RJ45 copper or 3 copper and 2 100FX multi/single mode SFP
- 12 serial programmable RS232/485 ports
- Single or dual power supplies, either high or low

These ports are all located on the front face of the device, along with the MAC address. [Figure 1-1](#) illustrates a configuration including 5 copper serial ports, 2 DDS WAN ports and dual power supplies (high and low).

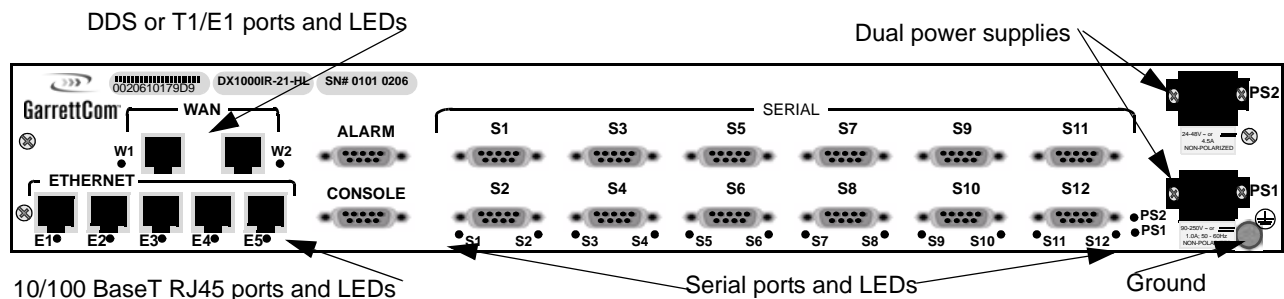


Figure 1-1. Front View (DX1000IR-21-HL)

1.2.2 Power and Ground

The DX1000 can be ordered with single or dual power supplies. These can be high (90 - 250 VAC or VDC) or low (24-48 VDC) voltage. The connection points for the power supplies are located on the front face of the chassis. This face also contains the primary ground stud and labels including serial number, model number, and port and power specifications, as illustrated in [Figure 1-1](#).

For detailed power specifications see [Table 1-5](#).

1.2.3 Indicators

The operational status of the ports of the DX1000 is indicated by LEDs located near the physical ports on the front of the DX1000, as illustrated in [Figure 1-1](#), and by a bank of LEDs on the on the back of the device, as illustrated in [Figure 1-2](#).

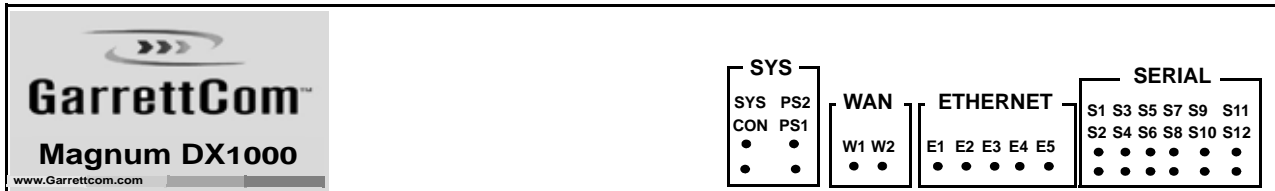


Figure 1-2. Rear View

1.2.4 Mounting

The DX1000 is designed to be mounted in a 19" rack or on a panel. The device is supplied with accessory mounting hardware (see [Figure 2-4](#)). The mounting hardware mates up with sets of screw holes on the sides of the chassis, illustrated in [Figure 1-3](#).

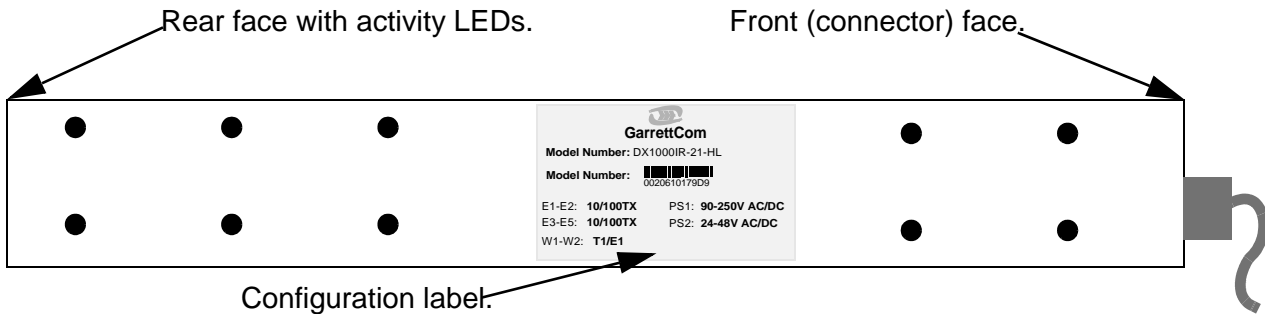


Figure 1-3. Side View, showing locations for mounting brackets

1.3 Specifications

The following sections provide detailed information about the physical, electronic, and industrial specifications of the DX1000.

1.3.1 Physical

The physical dimensions and weight of the DX1000 are defined in [Table 1-1](#).

Table 1-1. Physical Specifications

Height:	2.6 inches (6.6 cm)
Width:	17.25 inches (43.82 cm)
Depth:	11.13 inches (28.45 cm)
Weight:	11.0 lbs (5 kg) – with single power supply 12 lbs (5.44 kg) – with dual power supply

1.3.2 Environmental

The environmental specifications of the DX1000 are defined in [Table 1-2](#).

Table 1-2. Environmental Specifications

Operating Temperature:	-40C to 85C (-40F to 185F) -40 to +80C (-40F to 176F. IAW 60950-1, installations in restricted access locations.) No fans
Storage Temperature:	-40C to 85C (-40F to 185F)
Operating Humidity:	95% non-condensing

1.3.3 Optical

The fiber optical specifications of the DX1000 are defined in [Table 1-3](#)

Table 1-3. Fiber Optic Specifications

Port Type	Conn. Type	Mode	Tx Power (dBm)		Rx Sensitivity (dBm)		Typical Max, Dist.
			Min.	Max.	Min.	Max.	
100FXPluggableSFP	LC	MM, 1310nM	-19	-14	-32.5	-14	2 km
100FXPluggableSFP	LC	SM, 1310nM	-15	-8	-24	-7	15 km
100FXPluggableSFP	LC	SM, 1310nM	-5	0	-34	-7	40 km

“Typical maximum distance” is an estimated projection based on typical fiber installations; actual distance will depend on actual network attenuation. For all MM (multimode) optics, the recommended fiber cable type is 62.5 / 125 μm fiber. For all SM (single mode) optics, the recommended fiber cable type is 9 μm SM fiber.

1.3.4 Compliance

The industry compliance profile of the DX1000 is defined in table [Table 1-4](#).

Table 1-4. Compliance With Standards

Industrial:	IEEE 1613, IEC 61850-3														
Emissions:	EN55022A, FCC Part 15A														
Immunity:	<table style="width: 100%; border: none;"> <tbody> <tr> <td>EN55024</td> <td>EN61000-4-6 (CRF)</td> </tr> <tr> <td>EN61000-6-2</td> <td>EN61000-4-10 (MagField)</td> </tr> <tr> <td>EN61000-6-5</td> <td>EN61000-4-11 (VDI)</td> </tr> <tr> <td>EN61000-4-2 (ESD)</td> <td>EN61000-4-12 (Oscillatory)</td> </tr> <tr> <td>EN61000-4-3 (RF)</td> <td>EN61000-4-16 (CCM)</td> </tr> <tr> <td>EN61000-4-4 (EFT)</td> <td>EN61000-4-17 (Ripple)</td> </tr> <tr> <td>EN61000-4-5 (SURGE)</td> <td>EN61000-4-29 (VDI)</td> </tr> </tbody> </table>	EN55024	EN61000-4-6 (CRF)	EN61000-6-2	EN61000-4-10 (MagField)	EN61000-6-5	EN61000-4-11 (VDI)	EN61000-4-2 (ESD)	EN61000-4-12 (Oscillatory)	EN61000-4-3 (RF)	EN61000-4-16 (CCM)	EN61000-4-4 (EFT)	EN61000-4-17 (Ripple)	EN61000-4-5 (SURGE)	EN61000-4-29 (VDI)
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EN61000-4-4 (EFT)	EN61000-4-17 (Ripple)														
EN61000-4-5 (SURGE)	EN61000-4-29 (VDI)														
Safety:	UL60950, EN60950, CSA C22.2														
Telecom:	ACTA TIA/EIA IS-968A (FCC part 68), IC CS03, EN55022:1998 Telco Port Emissions														

1.3.5 Power Requirements

The power requirements of the DX1000 are defined in [Table 1-5](#).

Table 1-5. Power Requirements

	High Voltage AC/DC	Low Voltage DC
Voltage Input Range:	90-250 VAC/VDC	24-48 VDC
Max. Power (Watts):	72	72
Typical Power (Watts):	35	35
Max. Amperage (Amps):	0.6	3.0

1.3.6 Ports and External Connectors

The ports and external connectors of the DX1000 are defined in [Table 1-6](#).

Table 1-6. Ports and External Connectors

Port Name	Connector	Description
WAN, W1 & W2	RJ48	<ul style="list-style-type: none"> • DDS – 56/64 Kbps DDS CSU/DSU WAN connection. • T1/E1 – CSU/DSU WAN connection.
Ethernet, E1 & E2	LC	100FX multi/single mode small-format pluggables (SFP) port for fiber optic Ethernet capable devices or Networks.
Ethernet, E1 – E5	RJ45	10/100 Mbps Ethernet port for connection to copper Ethernet capable devices.
Serial, S1 – S12	DB9, female	Connection to serial async devices. Configurable to 300, 600, 1200, 2400, 4800, 9600, and 19.2, 28.8, 33.6, 38.4, 57.6, 115.2, 230.4 Kbps.
Power Connection	Terminal block	Non-polarized power input.
Facility Ground Point	Lug bolt	Facility ground connection point.
Console	DB9, female	Configured to operate at 38400 Baud, 8 bits, No parity, one stop bit and is configured as a DTE.
Alarm	DB9, female	Carries alarm signals to provide notification of events specified by software configuration.



NOTE: All copper I/O connections must be made with shielded cables and connectors.

1.3.7 Indicators

The status indicators of the DX1000 are described in [Table 1-7](#). There are two sets of LEDs so that you can conveniently monitor activity regardless of the orientation of the device. One set is on front face, where the LEDs are located near the ports and connectors that they report on (see [Figure 1-1](#)), and the other set is on the rear face (see [Figure 1-2](#)).

Table 1-7. Indicators

LED Name	Condition	Indication
W1 & W2 (WAN DDS or T1/E1 Ports)	Green	Indicates an active circuit.
	Off	Indicates circuit is down or not configured properly.
	Flashing	Data is passing through the port.
S1 – S12 (Serial Ports)	Green	Port is connected to an active serial device.
	Off	Port is down.
	Flashing	Data is passing through the port.
E1 – E5 (Ethernet Ports)	Green	Port is connected to an active Ethernet device.
	Off	Port is down.
	Flashing	Data is passing through the port.
Console	Green	Connected to an active local terminal.
	Off	Not connected.
	Flashing	Data is passing through the port.
Alarm	Off	No power is applied to unit.
	Red	Reset state: System is not loaded
	Orange	System is being booted.
	Green	Normal operation.

1.4 Pinouts

The following subsections describe the pinouts of the connectors used with the DX1000.

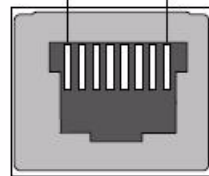
1.4.1 RJ48 DDS Connection

Table 1-8 defines the pinout of the RJ48 connector used on ports W1 and W2 with a DDS connection.

Table 1-8. RJ48 DDS Pinout

Pin	Signal
1	Tx Data - Ring
2	Tx Data - Tip
3	not used
4	not used
5	not used
6	not used
7	Rx Data - Tip
8	Rx Data - Ring

Pin 1 . . . Pin 8



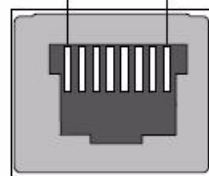
1.4.2 RJ48 T1/E1 Connection

Table 1-9 defines the pinout of the RJ48 connector used on ports W1 and W2 with a T1/E1 connection.

Table 1-9. RJ48 T1/E1 Pinout

Pin	Signal
1	Rx Data - Ring
2	Rx Data - Tip
3	not used
4	Tx Data - Ring
5	Tx Data - Tip
6	not used
7	not used
8	not used

Pin 1 . . . Pin 8



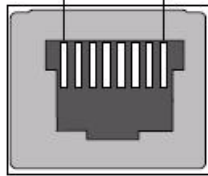
1.4.3 RJ45

Table 1-10 defines the pinout of the RJ45 connector used with the DX1000. RJ45 connectors can be used on ports E1-E5 for 10/100 BaseT connections to copper Ethernet-capable devices.

Table 1-10. RJ45 Pinout

Pin	Signal
1	Tx +
2	Tx -
3	Rx +
4	not used
5	not used
6	Rx -
7	not used
8	not used

Pin 1 . . . Pin 8

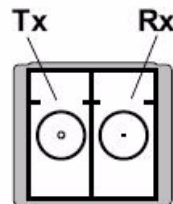


1.4.4 SFP

Table 1-11 defines the pinout of the SFP connector used with the DX1000. SFP connectors can be used on ports E1 and E2 for 100FX multi/single mode for connections to fiber optic Ethernet-capable devices or networks.

Table 1-11. SFP Pinout

Port	Signal
Tx	Transmit
Rx	Receive

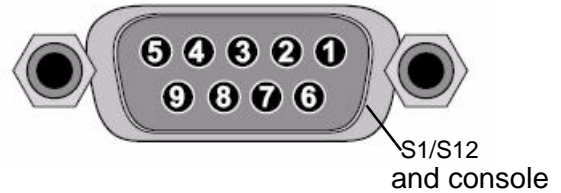


1.4.5 DB9 (Female) – RS232 Serial Ports and Console Port

Table 1-12 defines the pinout of the DB9 female connector for the console port and for serial ports S1 - S12 when they are configured for the RS232 interface. DB9 connectors are used on RS232 serial ports S1 - S12 and the console port, for asynchronous or bit-oriented connections.

Table 1-12. DB9 Pinout

Pin	Name	Dir.	Description
1	DCD	In	Data Carrier Detect from DCE.
2	RXD	In	Receive Data from DCE.
3	TXD	Out	Transmit Data to DCE.
4	DTR	Out	Data Terminal Ready to DCE.
5	GND	Pwr	Signal Ground.
6	DSR	In	Data Set Ready from DCE.
7	RTS	Out	Request To Send.
8	CTS	In	Clear To Send.
9	RI	In	Ring Indicator from DCE.



1.4.6 DB9 (Female) – Alarm Port

Table 1-13 defines the pinout of the DB9 female connector used with the alarm port on the DX1000.

Table 1-13. DB9 Pinout

Pin	Signal
1	NO1 - normally opened 1
2	NC1 - normally closed 1
3	COM2 - common 2
4	Reserved for future use
5	GND - signal ground
6	COM1 - common 1
7	NC2 - normally closed 2
8	NO2 - normally opened 2
9	Reserved for future use



1.4.7 DB9 (Female) – RS485 Serial Ports

Table 1-14 defines the pinout of the DB9 female connector used with serial ports on the DX1000 when they are configured for the RS485 interface..

Table 1-14. DB9 RS485 Pinout

Pin	Signal	Direction
1	RX-	In
2	RX+	In
3	TX-	Out
4	TX+	Out
5	GND	Power
6	Not Used	
7	Not Used	
8	Not Used	
9	Not Used	



Chapter 2

Installation

This chapter provides specific procedures for installing the Magnum DX1000, preparing for installation, and uninstalling the device.

2.1 Preparing for Installation

The DX1000 is designed to be installed in standard 19" racks or on a panel.

2.1.1 Tools

Regardless of the mounting system you are using you will need the following tools:

- Two screw drivers – one phillips head and one slot.
- A torque wrench (rated for ten and 32 inch pounds, or 1.1 Nm and 3.6 Nm)
- A wrench to connect a ground wire from the device chassis to a ground

The instructions in this manual cover only the physical installation. System configuration is handled through a web-based interface and is described in the *Magnum Network Software – DX Administrator's Guide*.

2.1.2 Site Suitability

Be sure that your installation site meets the following criteria:

- Conforms with the temperature and humidity ranges detailed in [Table 1-2](#).
- Can meet the power requirements detailed in [Table 1-5](#).
- Will remain stable after the addition of the 11 or 12 lb. DX1000.
- Permits at least two inches of space between the DX1000 and any other heat-producing device, such as motors, UPSs or heaters.

2.1.3 Wiring and Grounding Guidelines

The DX1000 requires several different types of connectors, cables, and wires. Requirements and recommendations are listed below:

- | | |
|------------------|--|
| Grounding | The primary ground stud located on the front face of the chassis must be used to connect to an approved ground with a wire meeting the following criteria: <ul style="list-style-type: none">• 14 AWG (minimum)• a maximum of five feet in length• terminated on the ground lug side with a #10 ring lug |
| Power | The cabling from facility power or from an alternative power source attached to the DX1000 chassis must meet the following criteria: <ul style="list-style-type: none">• cabling constructed using 14 AWG stranded wire• cable firmly attached to the terminal holes of the non-polarized power unit, as illustrated in Figure 2-5.• cable routed and strain relieved to the chassis according to good wiring practices |
| Copper | Copper I/O cables and connectors must be shielded. |

2.1.4 Fiber Optic Safety

Before installing the DX1000 you should be aware that devices that employ laser technology, such as the fiber optical SFP ports and associated cabling, can be dangerous. **Do not look directly into a fiber optic port or into the end of a fiber optic line.** Doing so could cause injury to your eye or blindness. Always assume that there is laser activity in the line or port, even if the device is powered down. As a reminder, whenever this manual calls for the handling of fiber optic lines, those instructions will be accompanied by a “Laser Warning,” as follows:



LASER WARNING: DO NOT LOOK INTO A FIBER OPTIC CABLE OR PORT! These can produce invisible light that may do serious eye damage. Always assume that fiber optic cables or ports are actively radiating light energy.

2.1.5 Fiber Optic Handling

Contamination from dust, dirt, oils from the hands and other sources can impede the transmission and reception of optical signals through the optical fibers. When handling the optical connectors and fiber cables, follow these precautions to minimize the contamination of the connectors and ports:

- Cover optical connectors and ports with dust caps when they are not in use.
- Do not touch fiber tips or the interior of optical ports when handling fiber cables and connectors.
- Clean fiber optic connectors as described in [Section 2.4.2.1, “Cleaning Connectors”](#) prior to making any optical connection.
- Clean optical ports as described in [Section 2.4.2.2, “Cleaning Optical Ports”](#) if you notice contaminants or degraded performance on the interface.

Fiber optic connectors should be cleaned after each use and optical ports should be cleaned if you notice contamination or degraded performance.

Fiber optic cables and connectors are fragile and can be easily broken through rough handling. When handling fiber optic media, take the following precautions:

- Do not strike the fiber cable with tools.
- Do not pinch, crimp, or compress the jacketing of the optical cable.
- Do not use less than the minimum bend radius of 3 inches (7.62 cm) when routing or coiling cables.

2.1.6 External Connections

You can speed up the installation of the DX1000 by having the following equipment and information on hand before beginning:

- A supply of cables and connectors of the required types.
- IP addresses for new devices and any existing devices you will be connecting to.
- Your notes on naming conventions and end point information.

2.2 Unpacking

Unpack and inspect the DX1000.

The DX1000 is shipped with the following items in the box:

- DX1000 unit
- Mounting brackets with screws
- Document CD-ROM
- Console Cable - DB9 terminations, 10' long
- Ethernet cable - RJ45 terminations, 10' long

Be sure that all the equipment you have ordered is included in the shipment.

Remove the unit from the styrofoam end caps and inspect the DX1000 chassis for dents or other shipping related damage. Report any damage immediately to GarrettCom customer support and DO NOT INSTALL the unit.

2.2.1 Attaching Optional Ethernet Fiber Optic SFPs

The SFPs are optional equipment for the DX1000. Depending on the specifics of your order these might have been installed at the factory. It is also possible that you have ordered them separately from GarrettCom or from another manufacturer. If this is the case, before proceeding with mounting the unit and making cable connections, you must install the SFPs in Ethernet ports E1 and E2.



ELECTRICAL WARNING: SFPs are static-sensitive devices. Failure to handle these devices properly can cause premature failure. Follow proper static safe handling precautions (such as the use of static safe wrist straps) when working with SFPs.

All SFPs must conform to industry standards and they share a similar appearance.



Figure 2-1. SFP and LC Connector

To install an SFP in port E1 or E2:

1. Slide the SFP into the Ethernet port until it is firmly seated.
2. Attach the protective cap to avoid contamination until you are ready to attach cable.

2.3 Installation of the DX1000 Unit

To install the DX1000 you must first

- Mount it
- Make the ground and power connections.
- Connect the network cables

2.3.1 Mounting

Your DX1000 shipment includes a pair of L-shaped brackets (2.5" x .875") suitable for mounting the device in a 19" rack system (see [Figure 2-4](#)) or on a panel. The DX device can be mounted in a 19" rack system with the I/O connectors and the power and ground connectors on the wire side (conventional mounting) or in the reverse configuration (see [Figure 2-2](#)).

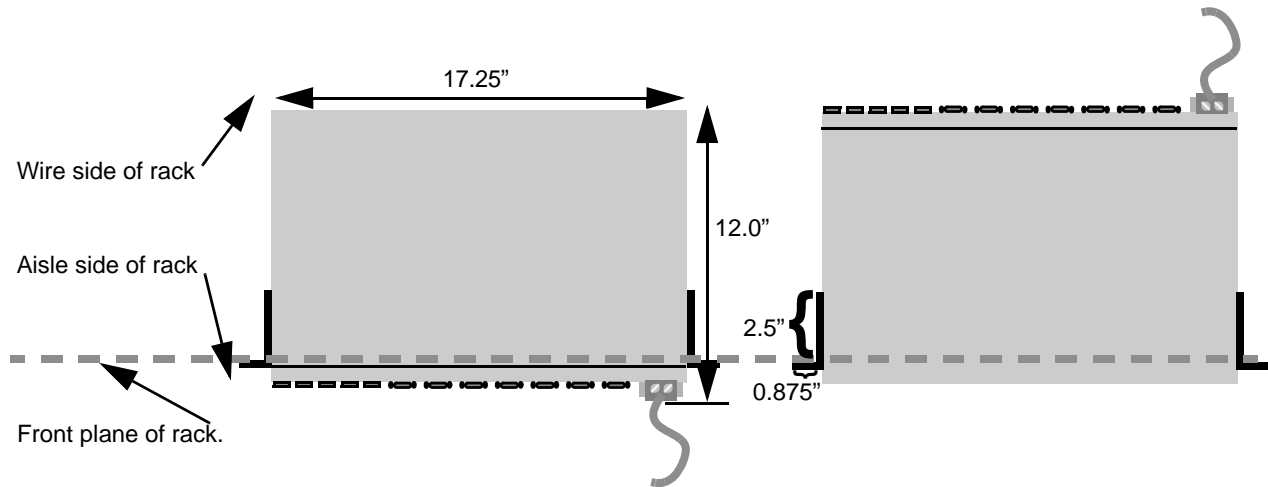


Figure 2-2. Top View: 19" Rack Conventional and Reverse Mounting

2.3.1.1 Mounting Options

The DX1000 can be mounted in a 19-inch rack system or on a panel.

19-inch Rack

With the short legs of the mounting brackets oriented toward the front or back of the device (as depicted in [Figure 2-4](#)) the DX can be mounted in a 19-inch rack system.

The brackets attach with four screws to the screw holes located on each side of the DX (see [Figure 1-4](#)). In addition to selecting whether or not the connectors will be on the wire side or the aisle side you can also adjust the depth of the device within the mounting system.

[Figure 2-2](#) depicts two mounting options using the screw holes located toward the front and the back of the device chassis. You can also attach the mounting brackets to a set of four screw holes near the center of each side (see [Figure 1-4](#)). Each pair of mounting brackets can also be reversed to change the depth of the device in the rack by 2.5 ". This creates a total of 12 possible mounting positions.

Panel

With the short legs of the brackets oriented toward the top or bottom of the device the DX can be mounted flat against a panel; however, be sure to attach the DX to the panel using the upper or the middle set of screw holes. Do not use the bottom pair alone as this configuration can allow the weight of the device to pull the upper part of the chassis away from the panel.

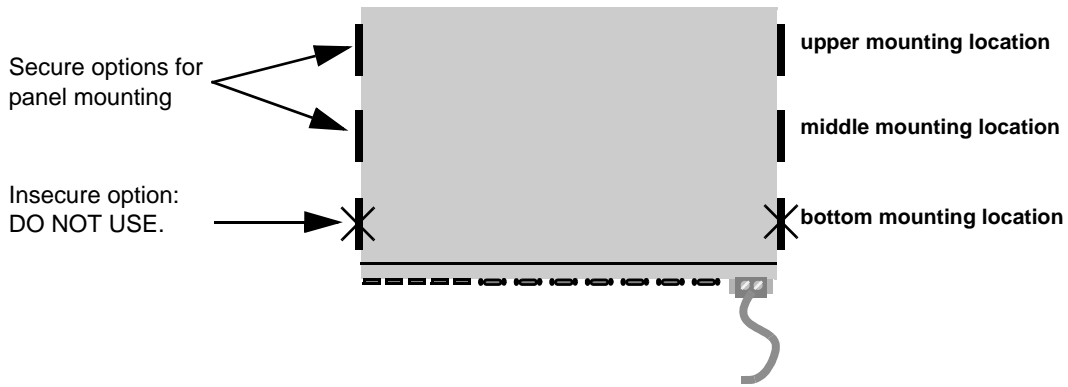


Figure 2-3. Secure Panel Mounting



Figure 2-4. Mounting brackets

2.3.2 Connecting to Ground and Power

The DX1000 comes with either single or dual power supplies in either high or low voltage. The unit does not have a power on/off switch and is active when the power is connected.

2.3.2.1 Making the Ground and Power Connections

The DX1000 provides a choice of one or two hardened DC or AC power supplies for industrial applications and/or hostile environments. The ground lugs and power supply connectors are located on the front face of the unit as shown in [Figure 2-5](#).

Making the Ground Connection

The ground wire should be 14 AWG terminated with a #10 ring lug.

Make the facility ground connection as follows:

1. Loosen the ground bolt on the chassis, insert the #10 ring lug, and tighten the ground bolt.
2. Connect the other end of the ground wire to the facility ground.

Making the Power Connection

Connect power to the unit as follows:



NOTE: In the case of a device with dual power supplies connect one power supply to main facility power and the other power supply to an alternative power source to sustain operation during power outages.

1. Ensure that the facility power or the alternative power source is shut off to the wires being connected to the DX1000. Check the voltage rating on the power connector to verify that it matches the power source.
Note that the voltage is specified on labels affixed to the power inputs and that paper labels (to be removed at installation) remind you to perform this voltage rating check.
2. Lift the protective cover from the power input (it is hinged at the top) and loosen the screws on the non-polarized power inputs of the DX1000.

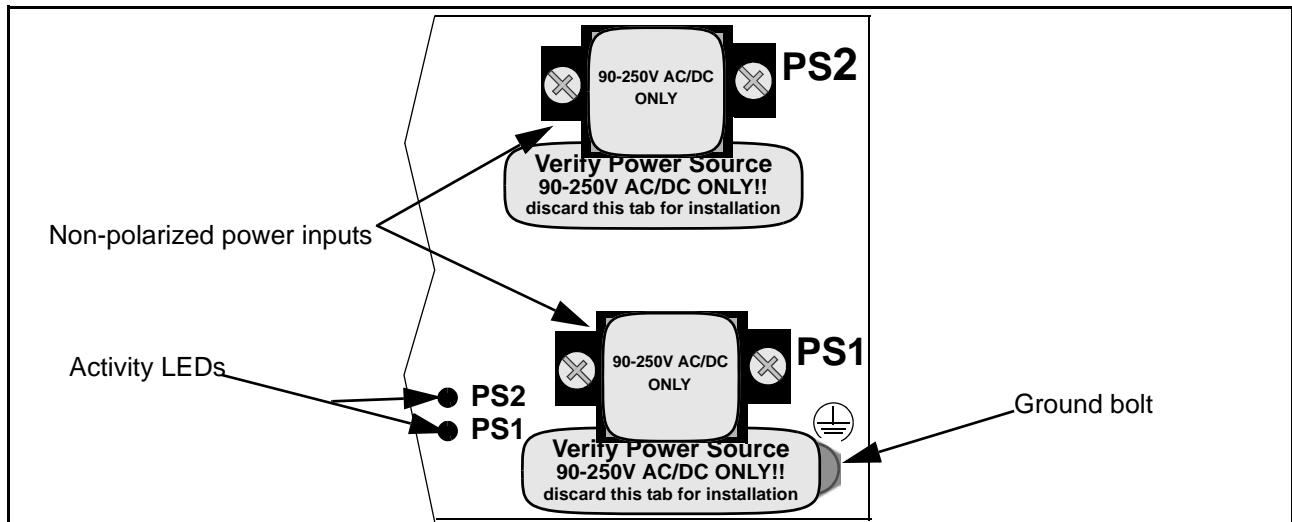


Figure 2-5. Ground and Power Connections

3. Connect the two power wires to the non-polarized power input points and tighten the screws to 10 inch lbs. Lower the protective cover over the screw heads and route the wires through the cutouts.
The power wires should be 14 AWG and be terminated with a #6 ring lug.



ELECTRICAL WARNING: Always ensure that the ground connection is made prior to connecting facility power to the DX1000. The ground provides a protective circuit connection to ground in cases of transients and power surges. Connect the facility power to a DC or AC unit as described in the following sections.

4. At the facility power source or alternative power source apply power to the DX1000.
5. The power supply LED will illuminate green after roughly 20 seconds.

2.3.3 Connecting to the Console Port and the Alarm Port

2.3.3.1 Console Port

The Console Port enables configuration of the device and is connected by a serial cable to a PC. For hardware installation see [Section 2.3.4](#), below. For startup and configuration information see the *Magnum Network Software – DX Administrator’s Guide*.

2.3.3.2 Alarm Port

In MNX-DX version 2.0 and higher software versions the alarm port carries alarm signals to provide notification of events specified by software configuration. The events that can be set to trigger alarms are described in the *Magnum Network Software – DX Administrator’s Guide*.

Wire the pins of the alarm port appropriately depending on whether your downstream alarm system expects normally open or normally closed operation. See [Table 1-13](#) for alarm port pinout. [Table 2-1](#) defines the ratings of the alarm port contacts.

Table 2-1. Alarm Port Contacts Ratings

Nominal Switching Capacity (resistive load)	0.5A at 30VDC, 0.25A at 125VAC
Maximum Switching Power (resistive load)	15W, 31VA
Maximum Switching Voltage	110 VDC, 125 VAC
Maximum Switching Current	0.5A

2.3.4 Connecting Network Cables

There are three types of network connections that can be made to the DX1000. They are serial, Ethernet copper, and Ethernet fiber optic. The following sections describe each type of connection separately.

2.3.4.1 Connecting Serial Cables

This procedure assumes that one end of the serial device cable is already attached to the end unit. Be aware of the serial port numbering scheme when installing the cables (see [Figure 1-1 on page 1](#)). The ports are configured in software later on and if a device is accidentally connected to the wrong port it will be difficult to detect.

Connect cables to the Serial ports as described below:

1. Align the DB9 connector with appropriate serial port and push gently until the connector is completely mated to the port.
2. Tighten the two extended capture screws hand tight.
3. Make sure that the connector is not supporting the whole weight of the cable. Providing strain relief on these cables will ensure a stable connection.
4. Return to step one above and connect the remainder of the serial cables.

2.3.4.2 Connecting Ethernet Copper Cables

The Ethernet ports are standard RJ45 ports. Connect the shielded Ethernet cables to the Ethernet ports as follows.(see [Figure 1-1 on page 1](#)).

1. Install the RJ45 connector into the port with the clip facing down.
2. Push the RJ45 connector into the slot until you hear a click.
3. Give the cable a gentle tug to ensure that the connector clip is firmly seated.
4. Verify that the connection has been made by checking the LED associated with this port on the DX1000 chassis. It should be illuminated. If the link LED is not illuminated verify that the equipment on the other end of the cable is powered up and properly connected.
5. Return to step one above and connect the remainder of the cables.

2.3.4.3 Connecting Fiber Ethernet Cables

Ports E-1 and E-2 can be configured with SFPs to support fiber optic connections. These ports accept LC type connectors. The procedure for installing these connectors is given in [Section 2.2.1, "Attaching Optional Ethernet Fiber Optic SFPs"](#).

Follow the fiber optic safety precautions and steps to install the fiber optic cables to these ports and refer to [Figure 1-1](#) for Ethernet port locations.



LASER WARNING: DO NOT LOOK INTO A FIBER OPTIC CABLE OR PORT! These can produce invisible light that may do serious eye damage. Always assume that fiber optic cables or ports are actively radiating light energy.

Connect cables to the fiber optic ports as described below:

1. Remove the dust cap from the optical port and from the fiber cable end.
2. Inspect the cable end and the port for contamination. If any contamination is found clean the port or cable according to [Section 2.4.2, "Cleaning Fiber Optic Devices"](#).
3. Insert the fiber cable connector into the fiber port. Listen for the click that signifies the connector is properly seated.
4. Give the cable a gentle tug to make sure it is securely installed.

5. Ensure that the cables are properly secured and do not hang freely. Excessive bending could cause damage to the fiber strand.
6. Return to step one above and connect the remainder of the cables.

2.3.4.4 Connecting the WAN Cable

The WAN connections on the DX1000 can be a DDS or a T1/E1. An RJ48 is used for both the DDS and the T1/E1 ports. This is a modular connector that connects the DX1000 to the external telecommunications network. The following procedure assumes that the line and telecom equipment are ready to accept data traffic from the DX1000 and the interfacing cable is already attached to this gear.

Connect the RJ48-terminated cable to the WAN port as follows (see [Figure 1-1 on page 1](#)):

1. Install the RJ48 connector into the port with the clip facing down.
2. Push the RJ48 connector into the slot until you hear a click.
3. Give the cable a gentle tug to ensure that the connector clip is firmly seated.
4. Verify that the connection has been made by checking the LED associated with this port on the top of the DX1000 chassis. It should be illuminated. If the link LED is not illuminated verify that the equipment on the other end of the cable is powered up and properly connected.

2.4 Maintenance

The DX1000 is designed to be replaced as a unit. There are no servicing requirements and there are no user-repairable components in this device. Maintenance is limited to replacing the unit.

The following sections detail disconnecting all connections to the chassis, removing the chassis, cleaning optical devices and packing the DX1000 for return to the manufacturer. If it is still possible to connect a terminal to the malfunctioning DX1000 and retrieve any configuration data from the device, do so prior to removing power.

2.4.1 Removing the DX1000

Removing the DX1000 entails disconnecting the network cabling, disconnecting the power and ground lines, and removing the chassis from the rack or other installation location. The unit can then be packed for shipment to the manufacturer.

2.4.1.1 Disconnecting Network Cables

The sequence for removal of the serial and Ethernet cables is not important, but it is important to note that there are active devices connected to each end of the cable.

1. Remove all of the Async DB9 connectors from the serial ports by unscrewing the two captive screws on each cable and pulling the connector off the port.

(Label the connector with the port number if the cable is to be reconnected at some later time.)

2. Remove the Ethernet RJ45 connectors from the Ethernet ports by pressing on the clip on the underside of the modular connector and pulling the connector straight out. (Label the connector with the port number if the cable is to be reconnected at some later time.) Repeat for the RJ48 WAN connector.



LASER WARNING: DO NOT LOOK INTO A FIBER OPTIC CABLE OR PORT! These can produce invisible light that may do serious eye damage. Always assume that fiber optic cables or ports are actively radiating light energy.

3. Following the safe handling procedures for fiber optic cables and connectors, remove any fiber optic cable connected to the Ethernet fiber ports. Immediately install dust caps on the cable end and the fiber port. (Label the connector with the port number if the cable is to be reconnected at some later time.)

2.4.1.2 Disconnecting Power and Ground Lines



ELECTRICAL WARNING: Before disconnecting either AC or DC power connections at the DX1000 ensure that the power has first been turned off at the source. Failure to shut power off prior to removing the power connections could expose you to dangerous voltages causing injury or death.

Follow the procedure below to disconnect the power and ground lines.

1. Verify that power to the DX1000 is turned off.
2. Lift the protective cover from the power input (it is hinged at the top) and use a screw driver to loosen the screws on the non-polarized power inputs of the DX1000, as shown in [Figure 2-5](#). Remove the wires from the connector.



ELECTRICAL WARNING: If the wires are not to be used immediately properly insulate them to ensure that an accidental turning on of the power will not cause a short or electrical hazard.

3. Remove the ground wire from the chassis by loosening the Ground Lug.

2.4.1.3 Packing the DX1000 for Shipment

If you have saved the shipping box that your DX1000 was received in then add the end styrofoam pieces around the chassis and place the unit in the box. Please contact customer support to receive a valid RMA number so that this item is either repaired and returned or credited to your account. Products without a proper RMA number will not be accepted for repair by GarrettCom.

If you have not saved the original shipping container then place the unit in a box so that normal shipping activities will not cause any damage to the unit. GarrettCom has no responsibility for the product during return shipping. For more warranty information, see [“Warranty” on page ii](#), and for details for the requirements for returning equipment, see [“Return Of Equipment” on page iii](#).

2.4.2 Cleaning Fiber Optic Devices

This section covers the cleaning requirements and procedures for the fiber optic cable connectors and the optical ports on the DX1000. Clean the connectors after each use and the optical ports when contamination is suspected or there is a performance degradation which may be attributable to contamination. All fiber optic connectors and optical ports should be capped with dust caps when not in use.

The cleaning materials used should be rated for fiber optic devices. Specifically cloth, wipes and swabs should be lint-free, non-abrasive and free of additives. Cleaning fluids should be restricted to optical-grade isopropyl alcohol. Canned (compressed) air should be used to blow out dust and particulate matter and to dry residual isopropyl alcohol after cleaning.

2.4.2.1 Cleaning Connectors

These instructions are recommended each time a fiber optic connector is used. Clean the fiber optic connectors as follows:

1. Blow out any dust or particulate matter from the connector end, using canned air.
2. Wipe out the connector end surfaces with a cloth or pad saturated in isopropyl alcohol.
3. Blow dry the connector surfaces, using canned air, by directing the air flow across the tip but not directly down onto the tip.
4. Using care not to touch the fiber tip, install a dust cap or connect to an optical port.

2.4.2.2 Cleaning Optical Ports

These instructions are recommended only when there is evidence of contamination or when reduced performance has been detected. Clean the optical ports as follows:

1. If required, remove the fiber optic connector from the optical port and clean the connector as described in "Cleaning Connectors," above.
2. Insert the extension tube, supplied with the canned air, into the canned air nozzle and blow out the optical port. Use care not to touch the bottom of the optical port.
3. Reconnect the fiber optic connector removed in step 1.

If degraded performance persists, perform the following additional steps:

4. Remove the fiber optic connector and place a dust cap on the end.
5. Using a small-head, lint-free swab gently wipe out the optical port. Repeat steps 2 and 3.