



3X-DEGXA-XX PCI-X/PCI Gigabit Ethernet Network Interface Controllers

User Guide

EK-DEGXA-IN. B01

This user guide provides installation information for the HP 3X-DEGXA-SB/-SA and 3X-DEGXA-TB/-TA PCI-X/PCI Gigabit NIC Families.

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Hewlett-Packard Company
P.O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

1-800-652-6672 (For continuous quality improvement, calls may be recorded or monitored.)

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- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN60950 (IEC60950) – Product Safety

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About This Guide

This user guide can be used for reference when servicing HP 3X-DEGXA-xx PCI-X/PCI Gigabit Ethernet Server Adapters.



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

HP Technician Notes



WARNING: Only authorized technicians trained by Hewlett-Packard should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Disconnect power from the system by unplugging all power cords from the power supplies.
 - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
-



CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- Alpha Network Option QuickSpecs
- AlphaServer Platform QuickSpecs
- AlphaServer Supported Options List
- For HP technical support refer to the HP website:
www.hp.com

Overview

Single-Port Gigabit Ethernet NICs (DEGXA)

The HP 3X-DEGXA-xx family of single-port PCI-X/PCI Gigabit Network Interface Cards (NICs) are used exclusively on HP AlphaServer and AlphaStation Systems. The 3X-DEGXA-SB and 3X-DEGXA-TB supersede the 3X-DEGXA-SA and 3X-DEGXA-TA respectively. Both sets of NICs can be plugged into either a PCI or PCI-X I/O bus; however, the (-SA & -TA) can only be operated in PCI-mode when installed in a PCI-X slot on an HP AlphaServer or AlphaStation platform. The -SA and -TA are configured by the Console during power-up to only operate in PCI mode. The -SB and -TB are configured by the console to match the maximum operating characteristics of the PCI-X or PCI slot they are plugged into.

NIC Descriptions

Single-Port DEGXA GbE Family

The DEGXA single-port NICs are based on Broadcom's 5703 family of highly integrated MAC ASICs.

The copper NICs (-TA/-TB) provide support for 10 Mbps, 100 Mbps, and 1000 Mbps Ethernet Connectivity utilizing twisted-pair copper cabling (**UTP**), and an **RJ-45 connector**. These NICs are capable of auto-negotiating to operate at the highest common mode supported by both ends of the connection – speed, half or full-duplex, & flow control. Operating at 1000 Mbps requires the use of CAT5 or better, four-twisted-pair, copper cabling. In addition, LEDs are provided as a visual aid to determining the operational status of the connection - link, activity, and port speed. Supported options include:

- 3X-DEGXA-TB This option supersedes the 3X-DEGXA-TA, and should be used for all new applications.
- 3X-DEGXA-TA This option has been superseded by the 3X-DEGXA-TB, and should NOT be used for any new applications.

The fiber NICs (-SA/-SB) provide support for 1000 Mbps Ethernet connectivity utilizing multi-mode fiber cabling (**MMF**), and a **duplex-SC connector**. These NICs are capable of auto-negotiating to determine the optimum level of flow-control supported by both ends of the connection. In addition, LEDs are provided as a visual aid to determining the operational status of the connection - link, & activity. Supported options include:

- 3X-DEGXA-SB This option supersedes the 3X-DEGXA-SA, and should be used for all new applications.
- 3X-DEGXA-SA This option has been superseded by the 3X-DEGXA-SB, and should NOT be used for any new applications.

HP AlphaServer and AlphaStation Support and Configuration Rules

In all cases, the Supported Options List <http://h18002.www1.hp.com/alphaserver/> for your HP *Alpha* System should be consulted prior to installation of these options. Operating System (OpenVMS, Tru64 UNIX) and Console minimum revisions apply, as well as maximum number of NICs and PCI/PCI-X slot restrictions.

Features

Standard features of the 3X-DEGXx-xx PCI-X/PCI Gigabit NICs include:

- PCI v2.2 32/64 bit, 33/66-MHz Bus Interface
- PCI-X v1.0 32/64-bit 66/100/133-MHz Bus Interface
(Please note that the “3X-DEGXA-SA & -TA will only operate in “PCI Mode” when plugged into an Alpha system PCI-X slot.)
- 64-bit addressing for systems with more than 4GB of physical memory
- PCI Hot-plug compliant
- Adaptive Interrupt Frequency
- Gigabit Ethernet (IEEE 802.3-1999)
- Flow Control (IEEE 802.3x)
- Standard Ethernet frame size (1500 bytes), and Jumbo Frame upto 9000 bytes
- Layer 2 Priority Encoding (802.1p) with support for up to four priority queues
- Virtual LANs (802.1q) with support for up to 64 VLANs
- Support for IEEE standards 802.3ab, 802.3u
- Four unique MAC unicast addresses
- Multicast support via 128 bits hashing hardware
- UTP - Auto-negotiating 10/100/1000 RJ-45 port delivers full- or half-duplex Gigabit Ethernet over CAT5 or better four copper twisted-pair cabling
- LED indicators for activity, link integrity, and speed
- Driver support is part of the Tru64 UNIX and OpenVMS operating system distributions and respective updates.
- Console Pre-Boot Execution Environment for both Tru64 UNIX and OpenVMS

Hardware Overview

3X-DEGXA-TA/TB PCI/PCI-X to Single-port 10/100/1000 UTP Ethernet NIC

The 3X-DEGXA-TA/TB NIC has one auto-negotiating 10/100/1000 RJ-45 port. LED indicators show link, activity, and port speed. Refer to Table 1-1 for descriptions of LED operations.

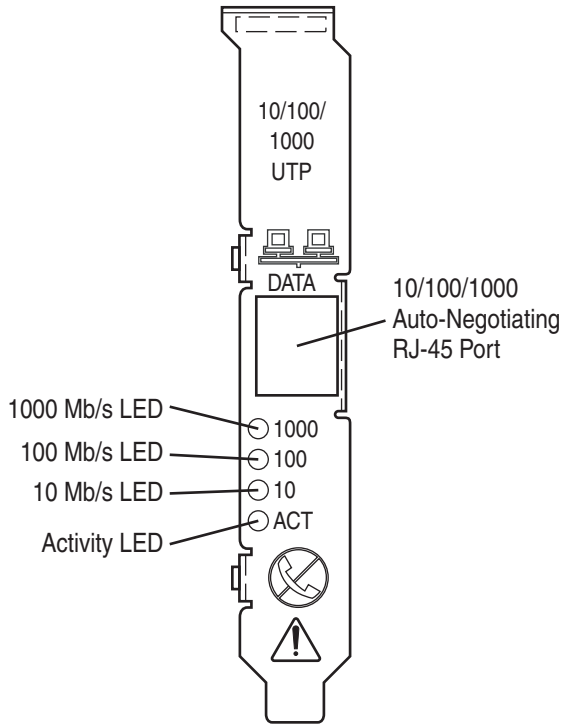


Figure 1-1 3X-DEGXA-TA/TB RJ-45 Port and LED Locations

Connectors

The faceplate on the 3X-DEGXA-TA/TB NIC provides a single **RJ-45** connector for connecting the NIC to another network device.

LED Indicators

The faceplate of the 3X-DEGXA-TA/TB 10/100/1000BASE-T NIC has four LEDs: one for each port speed option (10 Mb/s, 100 Mb/s, & 1000 Mb/s), to indicate which link is active, and one LED for data transfer status. Until the driver software is properly installed, all four LEDs will remain lit when the server is powered on.

The following table describes the LED indicators located on the front panel of the HP 3X-DEGXA-TA/TB NIC.

Table 1-1: 10/100/1000 LED Operations for the 3X-DEGXA-TA/TB Adapter

LED	Display	Description
1000	On	1000 Mbps Link to the adapter is established. The adapter is sending or receiving network data at 1000 Mb/s.
	Off	The adapter is not sending or receiving network data at 1000 Mb/s.
100	On	100 Mbps Link to the adapter is established. The adapter is sending or receiving network data at 100 Mb/s.
	Off	The adapter is not sending or receiving network data at 100 Mb/s.
10	On	10 Mbps Link to the adapter is established. The adapter is sending or receiving network data at 10 Mb/s.
	Off	The adapter is not sending or receiving network data at 10 Mb/s.
ACT	On or Blinking	The adapter is sending or receiving network data at 10, 100, or 1000 Mb/s, as indicated by the 10, 100, and 1000 LEDs. The adapter is receiving power, and the cable connection is functional.
	Off	No network data is being sent or received. The adapter is not receiving power, the cable connection is faulty, or the driver is not loaded.

UTP Category 5 Cable

The 3X-DEGXA-TA/TB NICs can use existing Category 5 (or better) four-twisted-pairs cable to deliver Gigabit Ethernet over copper, according to the IEEE 802.3ab specifications. For new installations, Category 5e cable is recommended. For troubleshooting and other information about cabling, refer to “UTP Cable Specifications” in Appendix B.

It is highly recommended that users read the “Running 1000BASE-T Gigabit Ethernet over Copper Cabling” white paper available from the Gigabit Ethernet Alliance Web Site when considering the use of installed CAT 5 cable or planning for new copper cable installation: http://www.10gea.org/GEA_copper_0999_rev-wp.pdf

3X-DEGXA-SA/SB PCI/PCI-X to Single-port 1000 Mbps Ethernet MMF NIC

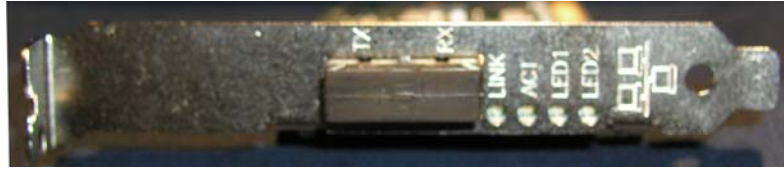


Figure 1-2 3X-DEGXA-SA/SB Single-port MMF NIC w/SC Connector

Connectors

The faceplate of the 3X-DEGXA-SA/SB NIC has a duplex “SC” MMF connector.

LEDs

There are four LEDs on the faceplate: one to indicate link status and one for data transfer status/ACT, LED1 & LED2 are **not** used. Once the NIC hardware and its driver software have been properly installed on your system, the LEDs will indicate the following NIC status:

Table 1-2: 1000 LED Operations for the 3X-DEGXA-SA/SB Adapter

LED	Display	Description
Act	Blinking	Data detected on port
	On	Data detected on port
	Off	No data detected on port
Link	Blinking Slowly	Port has been disabled by software.
	On	Good link.
	Off	No link; possible bad cable, bad connector, or configuration mismatch
LED1 LED2	---	NOT used

Installing the Adapter

Overview

This chapter describes installation precautions and explains how to install the adapter. It also describes how to connect the network cable.



WARNING: To avoid the risk of personal injury or damage to the equipment, consult the safety information and user documentation provided with the equipment before attempting installation of the adapter.

Many servers are capable of producing energy levels that are considered hazardous. Users should not remove enclosures, nor should they bypass the interlocks provided for removal of these hazardous conditions.

Installation of this adapter should be performed by individuals who are both qualified in the servicing of computer equipment, and trained in the hazards associated with products capable of producing hazardous energy levels.

NOTE: Before removing the cover of the server, refer to the HP documentation for the proper methods for installing a PCI card and avoiding electric shock hazards.

Electrostatic Discharge Precautions

A discharge of static electricity from a finger or other conductor can damage components on the adapter. This can make the adapter inoperable. In addition to the following information, refer to Appendix A for more precautions.

To prevent electrostatic damage, observe the following precautions:

- Always properly ground yourself when touching a static-sensitive component or assembly.
- Avoid hand contact by transporting and storing parts in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free locations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.

Installing the Adapter in a Server

Refer to the HP AlphaServer documentation for additional information on how to safely install a PCI-X/PCI card in the server. Please refer to the AlphaServer and AlphaStation QuickSpec and Supported Options List <http://h18002.www1.hp.com/alphaserver/> for your Alpha CPU for configuration and PCI-X/PCI slot restrictions.

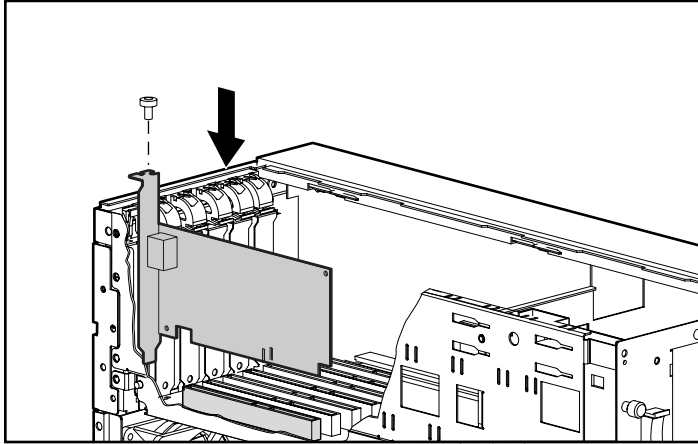


Figure 2-1: Installing the Adapter in a Server



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



CAUTION: If the server is not PCI Hot Plug compliant, power it down and unplug the power cord from the power outlet before removing the server cover. Failure to do so may damage the adapter or server.

1. Power down the computer and disconnect the power cable.
2. Remove the system cover.
3. Attach the antistatic ground strap to your wrist and clip the other end of the strap to the computer's chassis ground.
4. Unscrew and remove the option slot cover from the selected PCI-X/PCI slot, insert the adapter into the slot, then secure it with the slot cover screw.
5. Replace the server cover, reconnect the power cable, and then power up your system.

NOTE: The 3X-DEGXA-xx will work in either a 32-bit PCI (1), or 64-bit PCI-X/PCI (2) slot (see the following figure). It is recommended that you use a 64-bit slot, if available for optimum system-level performance.

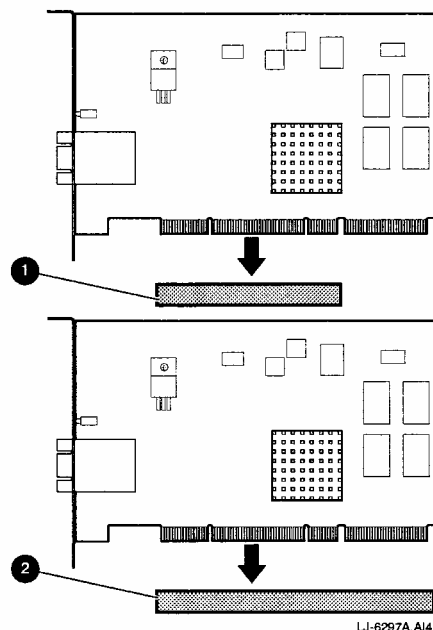


Figure 2-2 PCI 32- and 64-bit Slots

Connecting the Network Cable

Twisted Pair Copper UTP NICs (10/100/1000BASE-TX) Cable Length

It is highly recommended that users read the “Running 1000BASE-T Gigabit Ethernet over Copper Cabling” white paper available from the Gigabit Ethernet Alliance Web Site when considering the use of installed CAT 5 cable or planning for new copper cable installation: http://www.10gea.org/GEA_copper_0999_rev-wp.pdf

Table 2-1 Twisted Pair Copper UTP Cable Lengths

Port Type	Connector	Media	Maximum Distance
10BASE-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (328 ft)
100/1000BASE-T	RJ-45	Cat 5 or better UTP (*)	100 meters (328 ft)

(*) Gigabit Ethernet requires four (4) twisted pairs.

A crossover cable is required for point-to-point operation (connected directly to another host without an intervening switch). A straight-through cable will work provided that the DEGXA is configured to auto-negotiate; however, a crossover cable is highly recommended to avoid possible confusion.

To secure the cable, plug the cable connector into the RJ-45 port. Ensure that the tab on the plug clicks into position, indicating that it is properly seated.

For more information, refer to “UTP Cable Specifications” in Appendix C.

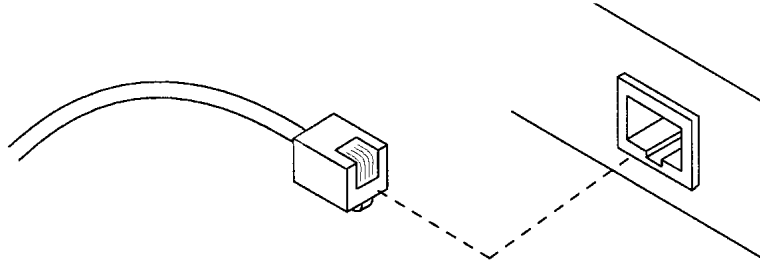


Figure 2-3 Connecting to the RJ-45 Port on DEGXA

Multi-Mode Fiber (MMF) NIC (1000BASE-SX 850 nm Laser) Cable Lengths

Table 2-2 Multi-Mode Fiber (MMF) NIC (1000BaseSX 850 nm Laser) Cable Lengths

Fiber	Connector	Bandwidth	Maximum Distance
62.5/125um	Duplex SC	160 MHz	2 to 220 m (6.5 to 721.78 ft)
	Duplex SC	200 MHz	2 to 275 m (6.5 to 902.23 ft)
50/125um	Duplex SC	400 MHz	2 to 500 m (6.5 to 1640.42 ft)
	Duplex SC	500 MHz	2 to 550 m (6.5 to 1804.46 ft)

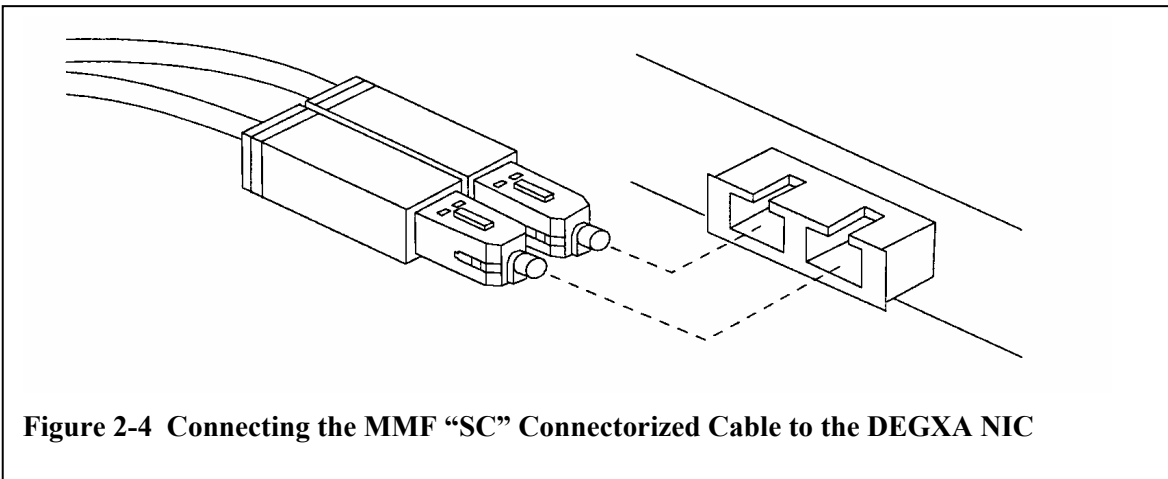


Figure 2-4 Connecting the MMF “SC” Connectorized Cable to the DEGXA NIC

Software Installation

This section provides information on installing the 3X-DEGXA-xx software driver in Tru64 UNIX and OpenVMS operating systems.

For further information, refer to your operating system documentation.

Console

The minimum supported revision for your AlphaServer or AlphaStation should be determined prior to installation by referring to the Supported Option List (SOL) for your system.

<http://h18002.www1.hp.com/alphaserver/>

The Alpha SRM console uses the `egn0_mode` environment variable.

To store the NIC communication settings for the 3X-DEGXx-xx family of adapters (where n is the Ethernet port letter).

To update your console firmware to the latest revision, browse the website:

<http://ftp.digital.com/pub/DEC/Alpha/firmware/>

Tru64 UNIX

The drivers for this family of Gigabit Ethernet NICs is included with the operating system, can be part of an IPK, NHD kit, or Patch Kit. Please refer to the Supported Options List for your Alpha CPU for the minimum supported versions, installation and configuration information. A minimum revision Console support may also be required.

OpenVMS

The drivers for this family of Gigabit Ethernet NICs are included with the operating system or TIMA Kit. Please refer to the Supported Options List for your Alpha CPU for the minimum supported versions, installation and configuration information. A minimum revision Console support may also be required.

Troubleshooting

Overview

This section describes techniques for troubleshooting the port LEDs on your 3X-DEGXA-xx Gigabit Ethernet NICs.

Checking the Port LEDs

3X-DEGXA-TA/TB:

Refer to TABLE 1-1 in this manual.

3X-DEGXA-SA/SB:

Refer to TABLE 1-2 in this manual.

Troubleshooting Checklist

The following checklist provides recommended actions to take to resolve problems installing the DEGXA NIC or running it in your system.

Inspect all cables and connections. Verify that the cable connections at the DEGXA NIC and the device that it is connected to are attached properly. Make sure that the cable length and rating are compliant with requirements listed in Section “Connecting the Network Cable” section of this manual.

Connect the NIC to a different network port and run the tests again. If the test results reflect that the NIC is functioning properly, the original network port may be defective or improperly configured.

Check the NIC installation by reviewing the installation steps above. Make sure that the NIC is properly seated in a PCI-X/PCI slot. Check for specific hardware problems, such as obvious damage to NIC components or the PCI edge connector.

Check the configuration settings, refer to the Supported Options List <http://h18002.www1.hp.com/alphaserver/> for your Alpha CPU for any PCI/PCI-X Slot configuration rules, and/or minimum console or operating system minimum revision requirements.

Try inserting the NIC in another PCI-X/PCI slot. If the new position works, the original slot in your system may be defective.

Replace failed NIC with one that is known to work properly. If the second NIC works in the slot where the first one failed, the original NIC is probably defective.

Install the NIC in another functioning system and run the tests again. If the NIC passed the tests in the new system, the original system may be defective.

Remove all other adapters from the system and run the tests again. If the NIC passes the tests, the other adapters may be causing contention.

Electrostatic Discharge

Overview

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a Hewlett-Packard authorized reseller install the part.

NOTE: For more information on static electricity or assistance with product installation, contact your HP authorized reseller.

Specifications**3X-DEGXx-xx PCI-X/PCI Gigabit NIC Specifications****Table B-1: 3X-DEGXx-xx PCI-X Gigabit NIC Specifications**

Specification	Description
Network Controller Chipset	Broadcom 5703x
Data Transfer Method	PCI-X v1.0 32/64-bit, 66/100/133-MHz SA & TA variants operate in PCI mode when plugged into a PCI-X bus slot. PCI v2.2 32/64-bit, 33/66-MHz 3.3V I/Os (5V tolerant) PCI Bus Master DMA
Standards Supported	IEEE 802.3ab, 802.3u, 802.1p up to 4, 802.1q up to 64 802.3z, 802.3x
Dimensions	6.6 x 2.5 inches (L x W), 16.5 cm x 6.4 cm
Connector	Copper Single & Dual Port – RJ-45(s) Fiber Single-port – duplex “SC”
Interrupts Supported	Automatically configured
Temperature Range	Operating: 0°C to 55°C / 32°F to 131°F Storage: -65°C to 85°C / -85°F to 185°F
Relative Humidity	Operating: 5% to 85% Storage: 5% to 95%
Emissions Classifications	World-Wide compliance
European Classifications	EN 55022 (CISPR 22) – Electromagnetic Interference EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
Safety Compliance	EN 60590

Power Requirement	3X-DEGXA-SA/SB
	Operating Voltage: +5V +/- 5%
	Power Consumption: 4.5 Watts Maximum: 900 mA @ 5V(DC)
	3X-DEGXA-TA/TB
	Operating Voltage: +5V +/- 5%
	Power Consumption: 4.5 Watts Maximum: 900 mA @ 5V(DC)
MTBF	100,000 hours with 95% confidence level

UTP Cable Specifications

To connect to the network, the 3X-DEGXA-xx NICs use the following cable for 1000BASE-T transmission.

- Four-Pair Category 5 UTP or better
- 22-26 AWG, 100Ω @ 1MHz
- EIA/TIA 568a or EIA/TIA 568b

Using UTP Category 5 Cable in Gigabit Over Copper Installations

For Gigabit over copper installations, Category 5 UTP or better 1000BASE-T cable must comply with the IEEE 802.3ab 1000BASE-T standard. For new installations, Category 5e (enhanced Category 5) or better cable is recommended.

It is highly recommended that users read the “Running 1000BASE-T Gigabit Ethernet over Copper Cabling” white paper available from the Gigabit Ethernet Alliance Web Site when considering the use of installed CAT 5 cable or planning for new copper cable installation: http://www.10gea.org/GEA_copper_0999_rev-wp.pdf

RJ-45 Pinouts and Crossover Function

The Ethernet standard also specifies that each segment implement a crossover function to connect the transmitter of one device to the receiver of a device at the other end, and vice-versa. The crossover function may be implemented internally at the hub or switch, or externally through the twisted-pair media.

When configured to Auto-Negotiate, the 3X-DEGXA-TA/TB NICs will, during the initialization/auto-negotiation process, auto-configure themselves when required to provide an internal cross-over, thus simplifying installation and eliminating the need for cross-over cables; however, it is highly recommended that a cross-over cable be used to eliminate possible confusion.

10/100 Straight-Through Pinouts

If the crossover function is implemented internally, the port is labeled MDI-X (Medium Dependent Interface-Crossover). When an MDI-X port is connected to an MDI port, the twisted pair media should be wired straight through using the physical pinouts indicated in Table B-2.

Table B-2: 10/100 Pinouts Using Internal, Straight-Through Crossover

Pin	Function	Color Match	Function	Pin
1	TD+	White/Orange		1
2	TD-	Orange/White		2
3	RD+	White/Green		3
4		Blue/White		4
5		White/Blue		5
6	RD-	Green/White		6
7		White/Brown		7
8		Brown/White		8

Figure B-1 shows the straight-through 10/100 connector wiring to be used when the crossover function is implemented on the hub or switch.

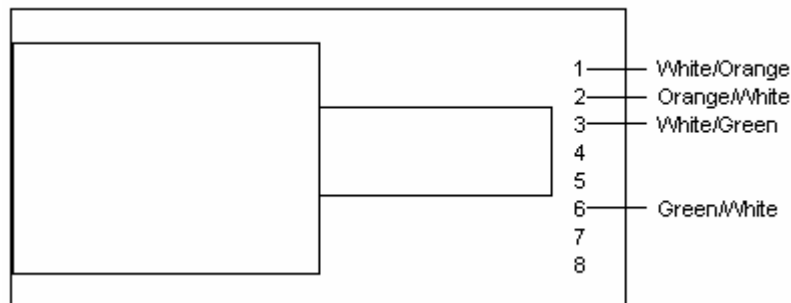


Figure B-1: 10/100 Straight-through Wiring for RJ-45 Connector

10/100 Crossover Pinouts

When the crossover function is not provided within the hub or switch, you must implement the crossover through the twisted-pair media using the physical pinouts indicated in Table B-3.

Table B-3: 10/100 Pinouts Using External Crossover

Pin	Function	Color/Match	Function	Pin
1	TD+	White/Orange	RD+	3
2	TD-	Orange/White	RD-	6
3	RD+	White/Green	TD+	1
4		Blue/White		
5		White/Blue		
6	RD-	Green/White	TD-	2
7		White/Brown		
8		Brown/White		

Figure B-2 shows the correct wiring to use when the crossover function is implemented externally in the twisted-pair cabling.

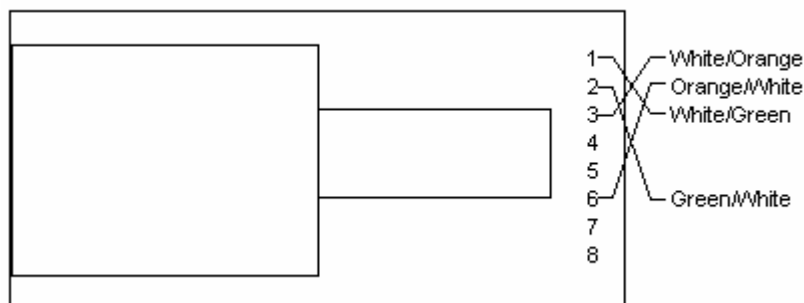


Figure B-2: 10/100 External Crossover for RJ-45 Connector

Gigabit over Copper Internal Straight-Through Pinouts

Unlike connections in which the crossover function is implemented internally at the hub or switch, the 3X-DEGXA-TA/-TB NICs provide their own automatic crossover function. This means you can wire twisted-pair media straight through for adapter-to-hub, adapter-to-switch, or adapter-to-adapter connections using the pinouts shown in Table B-4.

NOTE: To operate at Gigabit speeds, all four pairs of wires must be terminated within the RJ-45 connector.

Table B-4: Gigabit over Copper Pinouts Using Internal Crossover

Pin	Function	Color Match	Function	Pin
1	BI_DA+	White/Orange	BI_DA+	1
2	BI_DA-	Orange/White	BI_DA-	2
3	BI_DB+	White/Green	BI_DB+	3
4	BI_DC+	Blue/White	BI_DC+	4
5	BI_DC-	White/Blue	BI_DC-	5
6	BI_DB-	Green/White	BI_DB-	6
7	BI_DD+	White/Brown	BI_DD+	7
8	BI_DD-	Brown/White	BI_DD-	8

Figure B-3 shows straight-through Gigabit over copper connector wiring to be used when the crossover function is implemented within the hub or switch.

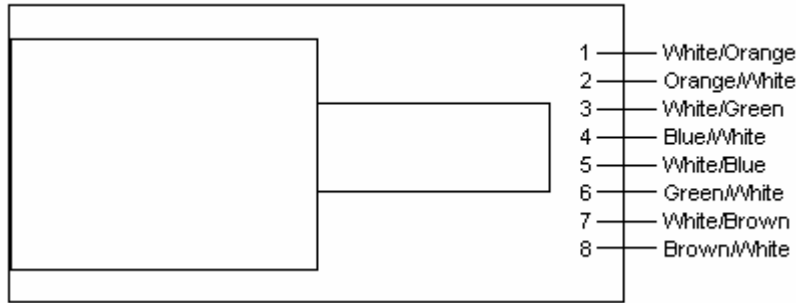


Figure B-3: Gigabit Straight-through Wiring for RJ-45 Connector

Gigabit over Copper External Crossover Pinouts

When a crossover function is not provided by the adapter, hub or switch, you must implement it through the twisted-pair media using the physical pinouts shown in Table B-5.

Table B-5: Gigabit over Copper Crossover Pinouts

Pin	Function	Color Match	Function	Pin
1	BI_DA+	White/Orange	BI_DB+	3
2	BI_DA-	Orange/White	BI_DB-	6
3	BI_DB+	White/Green	BI_DA+	1
4	BI_DC+	Blue/White	BI_DD+	7
5	BI_DC-	White/Blue	BI_DD-	8
6	BI_DB-	Green/White	BI_DA-	2
7	BI_DD+	White/Brown	BI_DC+	4
8	BI_DD-	Brown/White	BI_DC-	5

Figure B-4 shows the correct Gigabit over copper wiring to be used when the crossover function is implemented externally in the twisted-pair cabling.

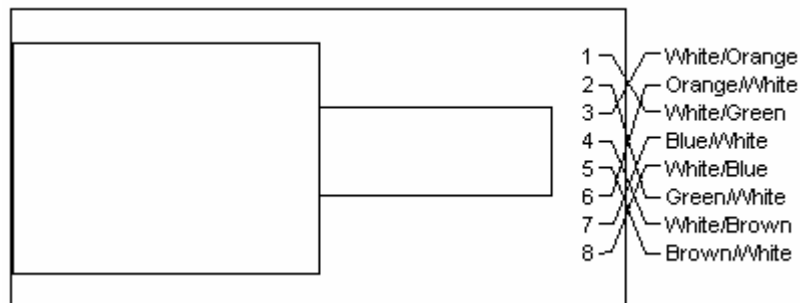


Figure B-4: Gigabit Over Copper External Crossover for RJ-45 Connector

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The 3X-DEGXA-SB is reported as being a 3X-DEGXA-SA, and the 3X-DEGXA-TB is reported as being a 3X-DEGXA-TA. This has no effect on the operation or performance of either the 3X-DEGXA-SB or –TB, and has been corrected beginning in BL25.