

Overview

Models

New Models	PCI-X/PCI to Single-port 1000BASE-SX (MMF with duplex SC connector) Gigabit Ethernet NIC	3X-DEGXA-SB
	PCI-X/PCI to Single-port 10/100/1000BASE-T (Twisted-Pair Copper with RJ45 connector) Ethernet NIC	3X-DEGXA-TB
End-of-Life Models	PCI-X/PCI (PCI Mode Only) to Single-port 1000BASE-SX (MMF with duplex SC connector) Gigabit Ethernet NIC - Superseded by 3X-DEGXA-SB	3X-DEGXA-SA
	PCI-X/PCI (PCI Mode Only) to Single-port 10/100/1000BASE-T (Twisted-Pair Copper with RJ45 connector) Ethernet NIC - Superseded by 3X-DEGXA-TB	3X-DEGXA-TA
Retiring Models (Check availability prior to ordering)	PCI to Single-port 1000BASE-SX (MMF with duplex SC connector) Gigabit Ethernet NIC	Compaq DEGPA-SA
	PCI to Single-port 1000BASE-T (Twisted-Pair Copper with RJ45 connector) Gigabit Ethernet NIC	Compaq DEGPA-TA

Introduction

The 3X-DEGXA-**T*** NICs provides **single-port** 10 Mbps, 100 Mbps, or 1000 Mbps Ethernet copper connectivity using Unshielded Twisted Pair (**UTP**) copper cable via an **RJ45** connector. CAT 5 or better, 4-pair UTP copper cable is required for 1000Mbps operation. These NICs will auto-negotiate to operate at the highest common mode (speed, and half or full-duplex) available to both ends. For this reason, these NICs can be used to "future proof" today's 10 or 100 Mbps Ethernet network applications by allowing system level transparent migration to Gigabit.

The 3X-DEGXA-**S*** provides **single-port** 1000Mbps Ethernet fiber connectivity using Multi-Mode-Fiber (MMF) via a duplex **-SC** connector.

NOTE: Refer to the "Supported Options List" for HP Alpha Systems to determine support status and platform specific configuration rules.
<http://h18002.www1.hp.com/alphaserver/technology/index.html>

Standard Features

NIC ASIC Technology

The 3X-DEGXA-xx Family of single-port Gigabit Ethernet (GbE) NICs is based on the 5703 ASIC developed by Broadcom. The 5703 series of Gigabit silicon takes advantage of the latest in ASIC technology to provide the highest levels of functional integration - MAC and PHY on a single chip.

The DEGPA-xx Family of Gigabit Ethernet (GbE) NICs is based on the award winning TIGON II ASIC originally developed by Alteon WebSystems.

Full-Duplex Gigabit Ethernet

Separate read and write DMA paths are provided to support full-duplex Gigabit Ethernet connectivity. Each DMA channel is capable of sustaining near gigabit per second line rates across a 64-bit PCI bus. This ensures that the PCI-to-Gigabit Ethernet NIC will not be a bottleneck in high-performance data networking applications.

Built-in intelligence to minimize packet latency and system overhead

Interrupt Coalescing -- protects systems from being overrun by excessive receive interrupts. For example, when traffic is light, the NIC interrupts the host after receiving every packet to minimize network latency. In heavy traffic, the NIC is able to optimize host efficiency by adjusting the CPU interrupt rate - (receiving back-to-back packets and issuing a single interrupt only when buffer space is low or its timer has expired). This feature helps to maximize the sustainable network throughput, minimize the host CPU overhead, and leave more host CPU cycles available to applications.

Standard Ethernet and Jumbo Frame Support

By default, the Gigabit Ethernet NICs support the standard 1518 byte maximum Ethernet frame size. In addition, when connected point-to-point with another cooperating NIC or switch, the PCI-to-Gigabit Ethernet NICs can transfer Jumbo Frames of up to 9,018 bytes in length. The use of Jumbo Frames can further reduce system level packet processing overhead down to one third of that required to process standard frame sizes.

Any application that transfers large files or program images can benefit from the use of Jumbo Frames. However, realizing the benefits of this capability is heavily dependent on the ability of the network infrastructure to pass jumbo frames end-to-end. If users intend to take advantage of Jumbo Frames in their application, it is incumbent on them to confirm that all of the intermediate switches and/or routers support Jumbo Frames.

Dual Linked-List, Scatter/Gather DMA Engines

Optimized Data Transfers - With dual, linked-list, scatter/gather DMA engines with byte boundary addressability, the PCI-to-Gigabit Ethernet NIC can move packet header and data to and from non-contiguous host memory locations. The PCI interface within the ASIC contains two independent linked-list, scatter/gather, DMA channels. One is used exclusively for host memory reads while the other is used exclusively for host memory writes.

Protocol Assist

The PCI-to-Gigabit Ethernet NIC provides built-in hardware to calculate TCP, UDP and IP checksums, and provide endian conversion on the fly. Utilization of these features is operating system and protocol stack dependent.

Auto (link) Negotiation

The default configuration for auto negotiation of the Gigabit Ethernet link is auto. With this setting, the NIC will use IEEE 802.3z auto negotiation. If users connect the NIC to Gigabit Ethernet equipment that does not support auto negotiation, auto negotiation can be turned off by the respective host CPU driver (OpenVMS and Tru64 UNIX).

Standard Features

System Level Performance Considerations The PCI-to-Gigabit Ethernet NIC is a very high performance hardware device. When configured for full-duplex operation, and installed by itself in a 64-bit Bus-Master PCI I/O bus slot, the DEGPA is capable of presenting a PCI I/O bus load approaching 200 Megabytes per second (100 MB/sec transmit and 100 MB/sec receive), per port, and the DEGXA is capable of presenting a PCI I/O bus load approaching 250 Megabytes per second (125 MB/sec transmit and 125 MB/sec receive), per port

System Level Factors That Can Impede Achievable Data Rates In many application environments today, achievable throughput can be constrained by mass-storage subsystem I/O rates, and interference from other lower performance devices plugged into the same PCI bus.

What You Should Expect Optimization in any particular application environment, on a particular host CPU platform, and running a particular operating system and protocol stack, may require some tuning and hardware re-configuration in order to achieve the most optimum application performance.

Gigabit Ethernet performance with TPC/IP depends on several factors

Some of the influencing factors are as follows:

CPU speed/utilization - the speed at which data can be delivered to the NIC influences throughput. If CPU(s) are busy doing several tasks, the task using Gigabit Ethernet may not get enough run time to deliver packets. In general, faster CPUs will deliver better throughput up to the limits of its PCI/PCI-X I/O bus implementation.

PCI Bus speed/arbitration - fast access to the PCI bus is critical for high throughput. In general, using a 64-bit PCI slot can provide better performance and use less PCI resources than a 32-bit PCI slot. Placing the NIC on the same PCI bus as other peripherals may degrade throughput. Each system type may also have different PCI to host speed considerations (the speed at which the PCI to host hardware allows the device to operate).

Application/Transport factors - TCP applications (ftp, rcp, etc..) that expect performance should consider using a message size of 65000 bytes and a window size of 128000 bytes. Even when an application is modified to use these settings, high throughput may not be attainable. This is particularly true when an application is waiting for data to send (data from a disk, for example).

Regardless, in most applications where greater LAN bandwidth is required, a single GbE NIC provides a more robust system level solution (less host CPU overhead) than using multiple lesser bandwidth Fast Ethernet 100 Mbps devices.

Configuration and Ordering Information

Host Platform Support and Configuration Rules

NOTE: Before ordering, refer to the Supported Options List (SOL) for specific AlphaServers or AlphaStations at:

<http://h18002.www1.hp.com/alphaserver/technology/index.html> to determine support status (hardware configuration rules, minimum supported revisions for operating systems, console firmware, and other related layered products).

Driver Support and Where to Find It

Driver Support is provided as part of the host AlphaServer or AlphaStation Operating System Distribution - Tru64 UNIX and OpenVMS. As stated above, refer to the respective host Alpha system Supported Options List to determine support, minimum revisions, and any required patch kits

Ordering Information

Part Number	Description
3X-DEGXA-SB	PCI/PCI-X to Single-port 1000BASE-SX (MMF) Gigabit Ethernet NIC w/duplex SC connector
3X-DEGXA-TB	PCI/PCI-X to Single-port 10/100/1000BASE-TX Twisted-Pair Copper Gigabit Ethernet NIC w/RJ45 connector

Product Hardware Specifications

Ethernet Compliance	IEEE 802.3z Gigabit Ethernet Standard IEEE 802.3u Fast Ethernet IEEE 802.3i 10 BaseT Twisted Pair IEEE 802.3ab Gigabit Ethernet over Copper IEEE 802.3ad (static configuration mode only) IEEE 802.3x "Pause" Frame Flow Control (X-on/X-off), Symmetric and Asymmetric IEEE 802.1q VLAN Tagging (up to 64) IEEE 802.1p Quality of Service / Priority		
Communications Processor	3X-DEGXA-*B Broadcom 5703 Rev B0 w/96KB Packet Buffer DEGPA-*A Alteon WebSystems TIGON II w/1MB Packet Buffer		
Bus Interface	IEEE 802.1p Quality of Service / Priority 3X-DEGXA-*A - PCI 2.2 bus master, and PCI-X 1.0 PCI mode only DEGPA - PCI V2.1 bus master Universal, 3.3 and 5.0 volt bus signaling 33-66 MHz on PCI, and up to 133 MHz on PCI-X 64-bit addressing and 32-/64-bit data path PCI interrupt: 5703 interrupt INTA PCI Hot Plug capable		
Connectors	Single-port Fiber - "-SA/-SB" Duplex-SC fiber connector (Supports 62.5/125 micron fiber, and 50/125 micron MMF) Single and dual-port Copper NICs "-TB/-TA" utilize RJ45 connector(s) for CAT 5 or better UTP Copper NOTE: 1000-MHz operation requires four pairs.		
Operating Distance	1000BASE-SX Shortwave (850 nm) Laser		
	Fiber	Bandwidth	Maximum Length (1)
	62.5/125	160 MHz 200 MHz	721.78 ft/220 m 902.23 ft/275 m
	50/125	400 MHz 500 MHz	1640.42 ft/500 m 1804.46 ft/550 m
	1000BASE-T UTP Copper		
	Cable - 4 Pair CAT 5 or better		328.08 ft/100 m

(1) In all cases, the maximum operating distance may be reduced by the number of splices, connectors, patch-cables, and cable quality.

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

Alpha Platform Support	Refer to the Supported Option List for specific Alpha host CPUs to confirm support status, minimum supported driver revisions, minimum console version, as well as any platform-specific configuration restrictions. Single slot, PCI short form factor
Dimensions	DEGPA - 6.6 in x 3.75 in (16.76 cm x 9.53 cm) PCI Short Card DEGXA - 6.6 in x 2.5 in (16.76 cm x 6.35 cm) PCI Short Card

Product Hardware Specifications

Environmental	DEGPA-S*/-T* Retiring		
	Operating	Temperature	32° to 131°F (0° to 55°C)
		Humidity	5% to 85% (non-condensing)
	Non-Operating	Temperature	-40° to 185°F (-40° to 85°C)
		Humidity	5% to 95% (non-condensing)
	3X-DEGXx-xx		
	Operating	Temperature	32° to 131°F (0° to 55°C)
		Humidity	10% to 95% (non-condensing)
	Non-Operating	Temperature	-40° to 185°F (-40° to 85°C)
		Humidity	5% to 95% (non-condensing)
Power	Fiber DEGPA-SA		Copper DEGPA-TA
	Maximum	14W (2.8 A @ +5 VDC)	15W (3.0 A @ +5.0 VDC)
	Typical	10W (2.0A @ +5 VDC)	
	Fiber 3X-DEGXA-S*		Copper 3X-DEGXA-T*
	Maximum	TBS	TBS
	Typical	TBS	TBS
Certifications	Emissions:		
	FCC Class B		
	Agency Approvals:		
	USA: FCC (CFR 47 part 15) and UL 60950		
	Canada: ICES-003 and CSA60950		
	Japan: VCCI		
	Korea: MIC (RRL), EMC Registration		
	Australia (C-Tick): ACA, AS/NZS3548/EN55022:1998, EN55024:1998		
	EU (CE): EN55022:1998 (CISPR 22), EN55024:1998, and IEC60950:1999 (EN60950:2000)		
	Taiwan: BSMI		
MTBF	Fiber DEGPA-SA		Copper DEGPA-TA
	Calculated using Belcore Reliability Prediction Procedure:		
	95°F/35°C (77°F/25°C ambient, w/50°F/10°C Rise):		
	1,029,666 hours		
	113°F/45°C (77°F/25°C ambient, w/68°F/20°C Rise):		
	697,829 hours		
	3X-DEGXA-S*		3X-DEGXA-T*
	(Bellcore Issue 6, December 1997)		
	35°C 1.82M hours		30°C 2.12M hours
	45°C 1.41M hours		40°C 1.73M hours
55°C 1.04M hours		55°C 1.20M hours	
Warranty	Maximum - The remaining warranty of the HP AlphaServer in which it is installed.		
	Minimum - 1-year Return-to-Factory with Advance Exchange		
	NOTE: Certain restrictions and exclusions apply. Contact 1-800-OK-COMPAQ for details.		

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