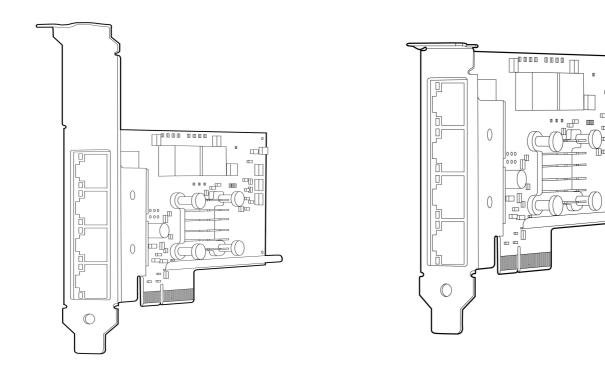## Overview

The HP Ethernet 1Gb 4-Port 331T Adapter features the next generation of Ethernet integration, offering a single chip solution that reduces power requirements and optimizes I/O slot utilization. It delivers full line-rate performance across all ports with low power consumption.

The HP 331T is ideal for virtualization, security, server consolidation, network segmentation, and other applications requiring maximum throughput and port density. The total aggregate throughput of 8Gb meets the needs of customers desiring high bandwidth.

The HP 331T supports advanced features such as Large Send and Receive offload capability, TCP checksum and segmentation, VLAN tagging, MSI-X, jumbo frames, IEEE 1588, and virtualization features such as VMware NetQueue and Microsoft VMQ.

Support for HP Sea of Sensors 3D Technology enhances server performance while reducing energy use and expense.

Models

HP Ethernet 1Gb 4-port 331T Adapter   647594-B21

Kit contents
- HP 331T adapter with pre-installed full height bracket
- Low profile bracket
- Quick install card
- Product warranty statement

Compatibility

Servers

ProLiant DL (rack-optimized):

- HP ProLiant DL160 Gen8
- HP ProLiant DL165 G7
- HP ProLiant DL320e Gen8
- HP ProLiant DL360e Gen8
- HP ProLiant DL360p Gen8
- HP ProLiant DL380e Gen8
- HP ProLiant DL380p Gen8
- HP ProLiant DL385p Gen8
- HP ProLiant DL560 Gen8
- HP ProLiant DL580 G7
- HP ProLiant DL585 G7
- HP ProLiant DL980 G7

ProLiant ML (expansion-optimized):

- HP ProLiant ML310e Gen8
- HP ProLiant ML310e Gen8 v2
- HP ProLiant ML350e Gen8
- HP ProLiant ML350p Gen8

ProLiant SL (scalable system):

- HP ProLiant SL210t Gen8
- HP ProLiant SL230s Gen8
- HP ProLiant SL250s Gen8
- HP ProLiant SL270s Gen8
- HP ProLiant SL4540 Gen8

NOTE: This is a list of supported servers. Some servers may be discontinued.

Standard Features

Performance

Product Features	- Industry-leading hardware integration for low power - Quad-port, PCIe 2.0 1Gb Ethernet adapter for HP ProLiant Gen8 Rack and Tower servers and certain G7 servers - Quad-port 1GbE provide up to 8 Gb full duplex throughput per adapter - Energy Efficient Ethernet (EEE) support - Optimized for virtual servers - Improved small packet performance - Supports the Preboot eXecution Environment (PXE)
Quad-port 1 Gigabit Ethernet Throughput	The HP 331T adapter provides 2,000 Mbps full duplex Ethernet transfer rate per port (8 Gbps aggregate full duplex) delivers outstanding network performance that improves response time and removes bottlenecks. Four ports on a single adapter are ideal for high density, I/O slot constrained servers, virtualization and security, applications, server consolidation, and increased network segmentation. The total aggregate throughput of 8Gbps in full-duplex mode also meets the needs for customers desiring high bandwidth but are not yet ready to move to 10 Gigabit Ethernet. **NOTE:** Port enumeration on the 331T is from the top down, i.e. the port near the top of the adapter is port #0 and the port closest to the gold teeth is port #3
Jumbo Frames	The 331T adapter support for jumbo frames (also known as extended frames) permits up to a 9K byte (KB) transmission unit (MTU) when running Ethernet, which is over five times the size of standard 1500-byte Ethernet frame. Jumbo frames can help achieve higher throughput and better CPU utilization and are particularly useful for database transfer and tape backup operations.
MSI and MSI-X	Up to 17 Message Signaled Interrupt (Extended) provides performance benefits for multi-core servers by load balancing interrupts between CPUs/cores
802.1Q VLANs	IEEE 802.1Q virtual local area network (VLAN) protocol allows each physical port of the HP 331T to be separated into multiple virtual NICs for added network segmentation and enhanced security and performance. VLANs increase security by isolating traffic between users. Limiting the broadcast traffic to within the same VLAN domain also improves performance.
TCP/IP Stateless Offloading	For overall improved system response, the 331T supports standard TCP/IP offloading techniques including: - TCP/IP, UDP checksum offload (TCO) moves the TCP and IP checksum offloading from the CPU to the network adapter. - Large send offload (LSO) or TCP segmentation offload (TSO) allows the TCP segmentation to be handled by the adapter rather than the CPU.
Time synchronization	Hardware assist for IEEE 1588 and IEEE 802.1AS time synchronization implementations for time sensitive applications

Standard Features

Optimized for Virtualization	I/O Virtualization support for VMware NetQueue and Microsoft VMQ help meet the performance demands of consolidated virtual workloads
SR-IOV	The HP 331T does not support SR-IOV (Single Root - Input Output Virtualization)
HP Sea of Sensors 3D	Support for HP Sea of Sensors 3D Technology which is a collection of 32 sensors that automatically track thermal activity - heat - across the server. When temperatures get too high, sensors can kick on fans and make other adjustments to reduce energy usage. What makes it better is the upgrade from all six fans kicking on at one time to a new system where only one kicks on - the one in proximity of the area that started heating up - thus reducing the amount of energy used for cooling.
Energy Efficient Ethernet	Compliant with IEEE 802.3az, featuring advanced power savings features throttles power usage with network load activity.

Versatility

10/100/1000T Twisted Pair Networks	In addition to Gigabit Ethernet, the HP 331T adapter supports both 10Mbps and 100Mbps providing compatibility with Ethernet and Fast Ethernet twisted pair networks.
Full and Half Height Brackets	The HP331T adapter ships with a pre-installed full height bracket and a half height bracket is also supplied to ensure trouble free installation. The included quick install card guides the user in the bracket exchange process
x4/x8/x16 PCI Express Compatibility	The x4 PCI Express interface on the HP 331T is compatible with x4, x8, and x16 PCI slots. If installed in a x8 or x16 slot, the adapter will operate at the x4 speed.

High Availability

Network Adapter Teaming	ProLiant Network Adapter Teaming provides fault tolerance and load balancing across a team of two or more network adapters. The team of adapters works together as a single virtual adapter. The HP 331T provides support for several different types of teaming enabling IT administrators to optimize availability, improve performance and help reduce costs. The teaming options offer IT professionals an easy, efficient, and cost-effective way to provide network fault tolerance and increased network bandwidth. For more information, refer to the ProLiant Network Adapter Teaming Whitepaper available at: http://bizsupport.austin.hp.com/bc/docs/support/SupportManual/c01415139/c01415139.pdf

Network Management

Auto-negotiation	The HP 331T automatically senses the speed of the device to which it is attached. It also automatically configures for full duplex, depending on the duplex mode of the switch, hub, or router connected to the adapter.

QuickSpecs

Standard Features

Management Support	Like all HP server adapters, the HP 331T ships with drivers and agents that can be managed from HP Systems Insight Manager, as well as using any other management application that supports SNMP. HP Systems Insight Manager can recognize the HP 331T individually or in teams, and can collect and report SNMP statistics on the adapter events.
Server Integration	The HP 331T is a completely integrated, tested, and qualified solution that is optimized for HP servers. HP validates a wide variety of major operating systems drivers with the network drivers plus provide a central interface to simplify network management.
Configuration Utilities	Each HP 331T ships with a suite of operating system-tailored configuration utilities that allow the user to enable initial diagnostics and configure adapter teaming. This includes a patented teaming GUI for Microsoft Windows operating systems. Additionally, support for scripted installations of teams in a Microsoft Windows environment allow for unattended OS installations.
LED Indicators	The colored LEDs on each port of the HP331T adapter indicate network activity, and network link speed. Amber link LED indicates 10/100Mb speed and Green indicates 1000Mb link speed. Per port bracket LED indicators show link integrity, network activity, and network speed for easy troubleshooting.
PXE boot Support	Support for pre-boot execution environment (PXE) enables automatic deployment of computing resources remotely from anywhere. It allows a new or existing server to boot over the network and download software, including the operating system, from a management/ deployment server at another location on the network. Additionally, PXE enables decentralized software distribution and remote troubleshooting and repairs.

Warranty

Warranty	Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Service and Support	**HP Technology Services**
	HP Technology Services offers you consultants and support experts to solve your most complex infrastructure problems. We help keep your business running, boost availability, and avoid downtime.

Protect your business beyond warranty with HP Care Pack Services
When you buy HP Options, it's also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HP Foundation Care services deliver scalable support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care or Critical Advantage. These services help you deliver high levels of application availability through proactive service management and advanced technical response.

Here is the support service recommendation from the Foundation Care and Proactive Care portfolio. For customized support service solution, HP can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services   **3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf

OR

3-Year HP 24x7 4 hour Response, HP Collaborative Support

Offers customers a single point of contact for server problem diagnosis, hardware problem resolution, and basic software problem diagnosis, fault isolation, and resolution if available to HP. If the problem is with HP HW, the representative will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP ProLiant Server Hardware Installation

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

Service and Support

Related HP Care Pack Services to enhance your HP product experience

Related Services

3-Year HP 24x7 4 hour Response, Proactive Care or Critical Advantage

Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-2140ENW.pdf

OR

3-Year HP 6-hour Onsite Call-to-Repair, HP Collaborative Support

Offers customers a single point of contact for server problem diagnosis, hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request to the HP Global Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HP. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP Proactive Select Service

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf

Insight Remote Support

Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport

HP Support Center

Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc

HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.
HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement.

*HP' Support Center Mobile App is subject to local availability

Service and Support

Parts and materials	HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Supplies and consumable parts will not be provided as part of this service; standard warranty terms and conditions apply. Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual or the technical product data sheet will not be provided, repaired or replaced as part of this service.
Warranty / Service Coverage	For ProLiant servers and storage systems, this service covers HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply.
	The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.
For more information	To learn more on services for HP ESSN Options, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant or www.hp.com/services/bladesystem

Related Options

Gigabit Server Adapters	HP NC112T PCI Express Gigabit Server Adapter	503746-B21
	HP NC360T PCI-E Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI-E Quad Port Gigabit Server Adapter	435508-B21
	HP NC365T 4-port Ethernet Server Adapter	593722-B21
	HP NC373T PCI-E Multifunction Gigabit Server Adapter	394791-B21
	HP NC373F PCI-E Multifunction 1000SX Gigabit Svr Adapter	394793-B21
	HP NC375T PCI Express Quad Port Gigabit Server Adapter	538696-B21
	HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter	458492-B21
	HP Ethernet 1Gb 2-port 332T Adapter	615732-B21
	HP Ethernet 1Gb 2-port 361T Adapter	652497-B21

10 Gigabit Server Adapters	**NOTE:** A minimum of two Gigabytes (2 GB) of server memory is required per each adapter.	
	HP NC522SFP Dual Port 10GbE Gigabit Server Adapter	468332-B21
	HP NC523SFP 10Gb 2-port Server Adapter	593717-B21
	HP NC524SFP Dual Port 10GbE Module	489892-B21
	NOTE: NC524SFP is available only on DL370 G6, ML370 G6, DL580 G7, DL585 G7, and DL980 G7.	
	HP NC550SFP Dual Port 10GbE Server Adapter	581201-B21
	HP NC552SFP 10Gb 2-port Ethernet Server Adapter	614203-B21
	HP Ethernet 10Gb 2-port 530SFP Adapter	652503-B21
	HP Ethernet 10Gb 2-port 530T Adapter	656596-B21
	HP Ethernet 10Gb 2-port 560SFP+ Adapter	665249-B21
	HP Ethernet 10Gb 2-port 561T Adapter	716591-B21
	HP Ethernet 10Gb 2-port 570SFP+ Adapter	718904-B21

FlexibleLOM Adapters	**NOTE:** A minimum of two Gigabytes (2 GB) of server memory is required per each adapter.	
	Ethernet Adapters	
	HP Ethernet 1Gb 4-port 331FLR Adapter	629135-B21
	HP Ethernet 1Gb 4-port 366FLR Adapter	665240-B21
	HP Ethernet 10Gb 2-port 530FLR-SFP+ Adapter	647581-B21
	HP Ethernet 10Gb 2-port 560FLR-SFP+ Adapter	665243-B21
	HP Ethernet 10Gb 2-port 561FLR-T Adapter	700699-B21
	HP Ethernet 10Gb 2-port 570FLR-SFP+ Adapter	717491-B21
	FlexFabric Adapters	
	HP FlexFabric 10Gb 2-port 526FLR SFP+ Adapter	629138-B21
	HP FlexFabric 10Gb 2-port 533FLR-T Adapter	700759-B21
	HP FlexFabric 10Gb 2-port 534FLR-SFP+ Adapter	700751-B21
	HP FlexFabric 10Gb 2-port 554FLR-SFP+ Adapter	629142-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs	

Technical Specifications

General Specifications	Network Processor	Broadcom BCM5719 chipset
	Data rate	Four ports, each at 2 Gbps full duplex; 8 Gbps aggregate full duplex theoretical bandwidth.
	Data path	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
	On-board memory	4 Mbit for PCA
	Bus type	PCIe 2.0
	Bus speed	Gen 2 x4
	Interrupt levels	Automatically configured
	Connector	RJ-45 (Four)
	Cable distance	Up to 328 ft (100 m)
	Wiring	Category 5/ (CAT-5) or better twisted-pair cabling
	Dimensions	13.21 cm x 6.86 cm [5.2 in x 2.7 in (L x W)] (without bracket)
	Form factor	Low profile card with both full height (pre-installed) and half height brackets included in kit

IEEE Compliance	802.3, 802.3ab, 802.3u, 802.3x, Dynamic 802.3ad, 802.1Q, 802.3az, 1588, 802.1as	

Power and Environmental Specifications	Operating	Temperature	32° to 131° F (0° to 55° C)
		Humidity	10% to 90% non-condensing
	Non-operating	Temperature	-85° to 185° F (-65° to 85° C)
		Humidity	5% to 95% non-condensing
	Power requirement	4.3 W (1000Base-T, maximum traffic) 1.0 W (AUX power with WoL)	
	Emissions classification	Class B	
	Agency approvals	USA	FCC Part 15 Class B
		Canada	ICES=--3, Issue 4
		Japan	VCCI V3 (2010.04) Class B
		Korea	KN22 ClassB, KN24
		Australia	EN55022:2006+A12007 class B
		European Union	EN55024:1998+A1:2011+A2; EN61000-3-2:2006, EN61000-3-3:2008
		International	EN55022:2006 + A1:2007 Class B
	RoHS Compliance	6 of 6	
	Safety	UL Mark (USA and Canada)	
		CE Mark	
		EN 60590	

Operating System Support	- Microsoft Windows Server 2008 (32/64), Enterprise, Web, Embedded, and R2 - Microsoft Windows HPC Server 2008 - Microsoft certified miniport and teaming drivers - Microsoft Windows 2008 Standard (32 and x64) - Microsoft Windows 2008 Enterprise (32 and x64) - Microsoft Windows Small Business Server 2011 (SBS V7) - base - Microsoft Windows Small Business Server 2011 Essentials

Technical Specifications

- RHEL 5.7 x86 and AMD 64 & EM 64T
- RHEL 6.1 x86 and AMD 64 & EM 64T
- SLES10: x86 and AMD 64 & EM 64T
- SLES 11: x86 and AMD 64 & EM64T
- Solaris 10
- VMware ESX/ESXi 4.1, ESXi 5.0 and ESXi 5.1
- Citrix
- HyperV (Windows 2008 32 and 64)

NOTE: For more Linux OS support & certification information, please visit the ProLiant & Bladesystem Server Linux matrix: http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
		The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.