
ThinLAN 3000/V Link

Technical Data

**For HP 3000 Computer Systems
Product Number
30240A**

ThinLAN 3000/V Link provides the HP 3000 computer with a high-performance, reliable local communication link by connecting to an industry-standard IEEE 802.2/802.3 Type 10BASE2-compatible local area network. Ethernet packet framing is also supported for host systems requiring that protocol.

The IEEE 802.2/802.3 network offers superior performance when a fully interconnected network is needed for high-speed data communications over a distance of 185 meters or less within a single building.

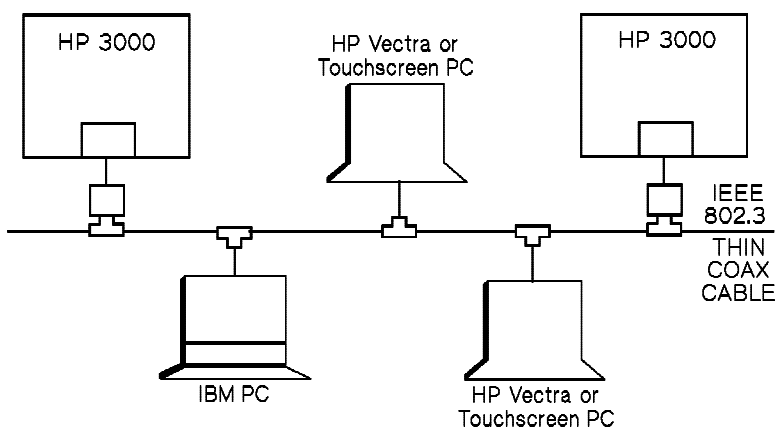
The bus structure of this network allows every node to directly communicate with

every other node via a single connection to the network. Each node's access to the network is controlled by the Carrier-Sense Multiple Access with Collision Detection (CSMA/CD) access method which ensures efficient use of the network. HP 30240A ThinLAN 3000/V Link provides a complete connection for an HP 3000 computer to the local area network, including programmatic access between HP 3000s. (All other components for the network, including the coaxial cable, are available from Hewlett-Packard.) For full interactive and programmatic networking capabilities with other HP 3000s, HP 32344A NS3000/V is required.

Features

- Consists of a hardware interface card, the Local Area Network Interface Controller (LANIC), a thin-cable Medium Attachment Unit (ThinMAU), and software.

Figure 1



- Supports connection of an HP 3000 MICRO 3000, MICRO 3000XE/LX/GX and Series 37 through 70 computer system to a Type 10BASE2 baseband coaxial cable adhering to the IEEE 802.3 local area network standard, using the IEEE 802.2 Type 1 link level.
- Supports 10-megabits-per-second link data transfer rate.
- Carrier-Sense Multiple Access (CSMA/CD) protocol controls network access. There is no centralized control; all nodes have equal access.
- Each HP 3000 connected to the network can communicate directly with all other HP 3000s, HP Vectra PCs, HP Touchscreen PCs and IBM PCs connected to the same coaxial cable.
- Any node may be attached or removed while the network is active if the BNC "T" connectors have already been installed on the coaxial cable.
- Uses a microprocessor-driven interface controller that reduces the HP 3000 overhead associated with communications line handling.
- Network transport software is based on Hewlett-Packard's full implementation of the de facto industry-standard Defense Advanced Research Project Agency (DARPA) protocols (TCP/IP), including the transport and network layer functions from the ISO Reference Model.
- Network InterProcess Communication software provides programmatic access to the network transport.

- Integrated node management software provides on-line configuration and logging.
- Network components are suitable for installation in a light industrial environment.

Functional Description

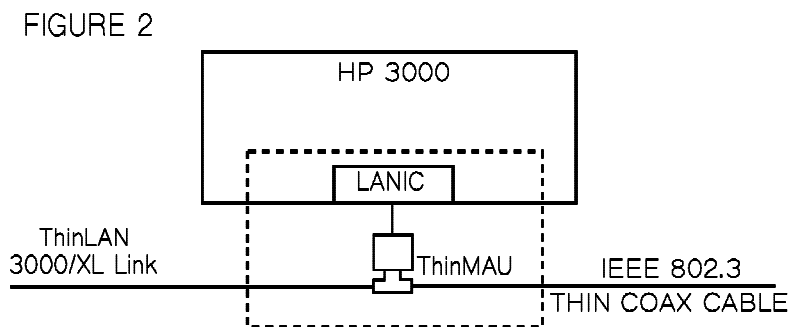
ThinLAN 3000/V Link contains the hardware and software required to connect an HP 3000 MICRO, MICRO/XE/LX/GX, Series 37 and 39 through 70 to an IEEE 802.3 Type 10BASE2 thin coaxial cable. It also provides programmatic access to network communication between HP 3000s, through a set of Network InterProcess Communication calls.

Hardware Components

Figure 2 shows the two major hardware components of the HP 30240A ThinLAN 3000/V Link: the Local Area Network Interface Controller (LANIC) and the thin-cable Medium Attachment Unit (ThinMAU). The thin coax cable is not included with ThinLAN 3000/V Link.

The standard product connects to a thin (IEEE Type 10BASE2) coaxial cable; a thick coaxial (IEEE 10BASE5) option is also available. EtherTwist using unshielded twisted-pair wire is a third option.

Note: To use the EtherTwist option, twisted-pair wiring is used in place of coaxial cable, and a connection to a EtherTwist Hub is required.



Local Area Network Interface Controller

The Local Area Network Interface Controller (LANIC) is a microprocessor-based communication controller that plugs into the HP 3000 backplane. It handles buffering, IEEE 802.2 and 802.3 protocols, error checking, and keeps track of network statistics. When addressed by another node on the network, the LANIC receives frames of information and checks for accuracy of the data before passing the frames to the host. To transmit, an addressed frame is sent from the host to the LANIC, where error checking information is added. The LANIC then tests to see if the cable is busy and if not, transmits the frame.

Features

- 8-bit microprocessor
- VLSI communication controller chip with 16-bit data path
- IEEE 802.2 link-level protocol handling
- IEEE 802.3 CSMA/CD Access Method handling
- Built-in self-test on-line diagnostics run under MPE
- ThinLAN performance statistics collection

Thin Medium Attachment Unit

The Thin Medium Attachment Unit (ThinMAU) provides the physical and electrical connection to the network coaxial cable; it is powered by the LANIC through the integral AUI cable. The ThinMAU receives signals from

and sends signals to the coaxial cable, and also detects collisions resulting from two nodes starting to transmit simultaneously. The ThinMAU also provides electrical isolation from the coaxial cable and performs several other functions to ensure network reliability, that is, if a ThinMAU fails by continuously transmitting, a circuit will detect the failure and shut down the ThinMAU.

A ThinMAU is attached to the coaxial cable using a BNC "T" connector. The BNC "T" connector and connector cover are included with ThinLAN 3000/V Link or can be ordered separately for assembly with Type 10BASE2 coaxial cable. Connecting a ThinMAU to the thin cable is done by simply connecting the ThinMAU BNC "T" connector to the thin-cable BNC connectors.

The ThinMAU has an integrated 1-meter Attachment Unit Interface (AUI) cable. A 2-meter internal LANIC cable connects the LANIC to the AUI cable for all Series except the MICRO, MICRO/XE and Series 37. In the Series 39 through 70, the LANIC cable and AUI cable connect at the system junction panel. No additional AUI cables are allowed.

Software Components

HP 30240 ThinLAN 3000/V Link includes software corresponding to layers 1 through 4 of the Open Systems Interconnection (OSI) Reference Model (see Figure 3). It also includes a programmatic interface to network communication and node management software.

The lowest layers, corresponding to OSI layers 1 and 2, consist of the IEEE 802.2 and 802.3 protocols. CSMA/CD gives every node on the coaxial cable equal access to the network; a sending node monitors the network to ensure that no other node is transmitting before it attempts transmission. If, while transmitting, the sending node detects a collision, the sending node initiates a jam signal and waits before retransmitting. Transmission consists of sending addressed frames of data to the coaxial cable at a data rate of 10 megabits per second. The IEEE 802.2 procedures are Type 1 (unacknowledged datagrams).

The Network Layer, corresponding to OSI layer 3, is based on the DARPA Internet Protocol (IP). IP provides fragmentation/reassembly and internetting capability.

The Transport Layer, corresponding to OSI layer 4, is based on Hewlett-Packard's full implementation of the DARPA Transmission Control Protocol (TCP). TCP provides end-to-end, reliable

connection-oriented services with flow control and multiplexing. TCP also provides mechanisms for detecting and correcting for duplicated, lost, or out-of-sequence packets.

The user interface to the network is Network InterProcess Communication for HP 3000-to-HP 3000, HP 1000, and PC communications. Network InterProcess Communication is a set of eighteen programmatic calls for the rapid exchange of data between processes (the processes may be on a single system or on different systems on the LAN). Network InterProcess Communication is the ideal means for implementing efficient, distributed applications.

For higher level services, each system on the network must also have HP 32344A NS3000/V. NS3000/V provides interactive and programmatic facilities such as file transfer, remote IMAGE database access, remote file, and peripheral access and remote process management. (See the NS3000/V data sheet for more details.)

Using NS3000/V Services or Equivalent User-written Functionality

With HP 3000/V LAN Link, customers' networks can be connected in a way that is transparent to users and allows high connectivity between networks. For example, a transparent gateway can be configured between a point-to-point network and a LAN. Consequently, users on the point-to-point network would be able to transparently

access resources on the LAN, and users would be able to transparently access resources on the point-to-point network.

Node management software is also included in the ThinLAN 3000/V Link and provides a friendly user interface for the network management functions of configuration, tracing, and logging. Node management provides an on-line user configurator for easy initial configuration (of the LAN and network transport software) and reconfiguration without bringing down the HP 3000. Node management also delivers flexible event logging and the ability to selectively trace several levels of network software. On-line diagnostics provide the ability to test the systems LANIC and ThinMAU, as well as send test frames to and receive test responses from other nodes.

Network Capacity and Performance

Although data may be traveling through the network at a rate of 10 megabits per second, the throughput achieved by a user at an HP 3000 node will be lower. This is primarily due to the overhead of the software providing network services and the user's application programs. Among the factors affecting user throughput are the type of software capability being used, the main memory and speed of each processor (and its peripherals) involved in the transfer and the load on

FIGURE 3

7 APPLICATION		NS3000/XL (HP 32344A)
6 PRESENTATION		
5 SESSION		(NOT USED)
		NETWORK IPC
4 TRANSPORT		TRANSPORT PROTOCOLS
3 NETWORK		INTERNET PROTOCOL
2 DATA LINK		IEEE 802.3 MEDIA ACCESS CONTROL IEEE 802.2 LOGICAL LINK CONTROL
1 PHYSICAL		(LAN LINK HARDWARE)
	OSI MODEL	THINLAN LINK SOFTWARE COMPONENTS

each system from non-network applications.

Because of the number and complexity of these factors, it is difficult to make useful generalizations about the performance or capacity of the network in a particular application. Hewlett-Packard Systems Engineers and Data Communications Specialists are available to consult in network design. They have data on the system and network parameters that affect network operation. With this information and an accurate understanding of the target environment, they can assist in designing an effective network.

Functional Specifications

Signalling Rate:	Data is transmitted in bursts at 10 megabits per second in accordance with the IEEE 802.3/802.2 standard.		
Frame Length:	Up to 1514 bytes (including header)		
Cable Alternatives:	ThinLAN Standard	ThickLAN (Optional)	EtherTwist (Optional)
IEEE Cable specification	Type 10BASE2	Type 10BASE5	Twisted-pair*
Maximum segment length	185 meters	500 meters	100 meters Hub to Node
Maximum number of nodes per segment	30 meters	100 meters	12 Nodes per Hub
Minimum distance between nodes	0.5 meters	2.5 meters	No Min.
Maximum AUI cable length	1 meter	48 meters	1 meter

* For more complete wiring information, refer to the HP EtherTwist wiring specification note.

Product Requirements

- An HP 3000 MICRO 3000, MICRO 3000XE/LX/GX, Series 37, 39, 4x, 5x, 6x or 70
- MPE V/E Extended microcode firmware
- At least 2 Mbytes of memory. (Generally, systems that are now memory-limited should add 1 Mbyte to maintain current performance.) See your HP System Engineer to help determine your requirements.

System Environment

ThinLAN 3000/V Link is supported on the HP 3000 MICRO 3000, MICRO 3000XE/LX/GX, Series 37, 39, 4x, 5x, 6x, or 70 executing the MPE V/E operating system, "U" MIT, or later versions. Ethernet is supported on MPE/V operating system, V Delta5 MIT or later versions. One ThinLAN 3000/V Link is supported per system.

The ThinMAU provided with the 30240A ThinLAN 3000/V Link can be connected to any coaxial cable which fully complies with the IEEE 802.3 specification for Type 10BASE2 baseband coaxial cable. Use of Hewlett-Packard coaxial cable is recommended.

Installation and Configuration Policy

The customer is responsible for loading the ThinLAN 3000/V Link software onto the system.

Hewlett-Packard will install the LAN Interface Controller (LANIC) and perform minimum configuration of the ThinLAN 3000/V Link in order to verify minimum product functionality. These activities are included in the product purchase price.

Customer Responsibility

Prior to having HP personnel on-site to verify the installation and perform minimum configuration of ThinLAN 3000/V Link, the customer is responsible for the following:

- Installing the thin coaxial cable, including terminators and BNC "T" connectors, and connecting the ThinMAU to the BNC "T" connector within one meter of the system's junction panel.
- Complying with all applicable building codes in the installation of the LAN cabling and components.
- Obtaining a valid IP address prior to the configuration of the ThinLAN 3000/Link.
- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP) including:
 - System configurations
 - Logical network map identifying relevant traffic flow
 - Physical network map identifying relevant network hardware components
- Updating the HP 3000 system to the proper release level and installing the ThinLAN 3000/V Link software using AUTOINST. Refer to the HP Update Manual (32033-90036).
- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the correct version levels using the NMMMAINT.PUB.SYS utility.

- Performing full system backups (as necessary) and ensuring that the HP 3000 system and personnel with HP 3000 system management experience and LAN management experience are available when HP is on-site to complete installation and minimum configuration of the ThinLAN 3000/V Link.

After HP has completed the minimum configuration of the ThinLAN 3000/V Link, the customer is also responsible for completing the configuration in order to fully integrate the ThinLAN 3000/V Link into the existing customer network.

HP Responsibility

Following the installation of the ThinLAN 3000/V Link software, HP is responsible for the following:

- Installing and verifying the operation of the LAN Interface Controller (LANIC).
- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Connecting the LANIC to the customer's ThinMAU (only if the ThinMAU is accessible).
- Configuring the ThinLAN 3000/V Link product to the minimum default configuration necessary to verify software and hardware functionality. This default configuration includes configuring the LANIC for the ThinLAN 3000/V Link into the system I/O configuration via SYSDUMP and configuring the link and Network Interface in the network configuration file (NMCONFIG) using the NMMGR utility.

- Verifying that with the minimum configuration, the ThinLAN 3000/V Link product accesses the customer's ThinMAU (if connected), after the product is started by the NETCONTROL command.

These steps complete HP's portion of the installation and minimum configuration of the ThinLAN 3000/V Link.

Additional Implementation Assistance

For implementation needs that go beyond installation, the customer can either provide self-support, or can purchase additional services from HP. These services include Network Startup and HP ConsultLine. In addition, the customer can also purchase service from HP on a time-and-materials basis.

Network Startup includes implementation scheduling and coordination assistance, network configuration and verification testing, and network documentation.

Ordering Information

30240A ThinLAN 3000/V Link. Includes everything needed to connect an HP 3000 system to an IEEE 802.3 Type 10BASE2 local area network: LANIC, LANIC cable, ThinMAU with 1-meter integrated PVC AUI cable, BNC "T" connector, connector cover, and software.

Select **one** processor option

Processor Options

- 100** For MICRO 3000, MICRO 3000XE, MICRO 3000LX, MICRO 3000GX, Series 37
- 300** For Series 39, 40, 42, 52
- 400** For Series 44, 48, 58
- 500** For Series 64, 68, 70

EtherTwist Options

- 142** Substitutes twisted-pair MAU with integrated 1-meter AUI cable for use with EtherTwist. A port must be available on a EtherTwist Hub (28684A) to connect this option.
- 242** Deletes ThinMAU and substitutes ThickLAN product (also known as LAN3000/V). This option deletes the ThinMAU, "T" connector cover, and other hardware associated with the standard product. In its place, the ThickMAU, 6-meter AUI cable, and TAP is added. The LAN3000/V Link includes everything

needed to connect an HP 3000 to an IEEE 802.3 Type 10BASE5 local area network.

Support Products

30240A+S00 Software Material Subscription (SMS) for ThinLAN 3000/V Link
30240A+W00 Extended SMS for ThinLAN 3000/V Link

(Response Center Support and Account Management Support customers must also order the appropriate Data Communications Category Support, if it has not already been purchased. The highest category need be purchased only once for all products in that or lower category; C=highest, A=lowest.)

Customers with hardware support agreements must add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

Documentation

Included with the ThinLAN 3000/V Link

30240-90002 LANIC Installation and Service Manual for Series 29, 4x, 5x, 6x, and 70.
30240-90101 LANIC Installation and Service Manual for MICRO 3000, MICRO 3000/XE, and Series 37.

Related Documents

5957-4624 Making the LAN Connection
5955-7680 LAN Cable and Accessories Installation Manual
5955-7681 Link Hardware Troubleshooting Manual
5955-7689 LAN 3000/V ThinLAN
5959-2208 HP SiteWire Twisted-Pair Cabling Installation Guide
30242-90002 Local Area Network Cabling and Installation Guide
30242-90003 LAN 3000/V Diagnostic and Troubleshooting Guide
32344-90001 NS 3000/V User/Programmer Reference Manual
32344-90002 NS 3000/V Network Manager Reference Manual V.1
32344-90012 NS 3000/V Network Manager Reference Manual V.2
32344-90003 NS 3000/V Communications Handbook Section
32344-90005 NS 3000/V Error Messages and Recovery Manual
27208-90001 ThinLAN 3000/V Installation Instructions (for HP Vectra LANIC)
28641-90001 ThinMAU Installation

Coaxial Cable and LAN Accessories

HP 30240A ThinLAN 3000/V Link provides all the components of an HP 3000 connection to the coaxial cable of an IEEE 802.3 Type 10BASE2 local area network. A complete line of local area network products, including coaxial cable, installation tools, and BNC connector products, are available from the HP Computer Users Catalog. These accessory products are described briefly here. For detailed planning information, refer to the LAN 3000/V and ThinLAN 3000/V Design Guide (P/N 5955-7689), available from your HP sales representative.

The following products may be ordered from the HP Computer Users Catalog.

Thin Coaxial Cables and Connectors

92227 (A-H) Thin Coaxial Cable Kits – cut-to-length connected PVC-jacketed thin coaxial cables

92227J Thin Cable cut-to-length unconnected PVC-jacketed thin coaxial cable

92227K Thin Cable cut-to-length unconnected FEP-jacketed thin coaxial cable

See the HP Computer Users catalog for ThickLAN products

Accessories for Cut-to-Length Thin Cable

92227L Connector pair for cut-to-length thin cable

92227M Cable tool kit for cut-to-length thin cable

92227N BNC “T” connector

92227P Terminator pair

91117R BNC “T” connector cover

Test Kit

92227Q Loopback connector for ThinMAU required for operation of node diagnostic for customer isolation of failures to coaxial cable or ThinMAU.

See the HP Computer Users Catalog for ThickLAN test kit and installation tools.

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