LAN/1000 Link Interface to Local Area Network

HEWLETT PACKARD

HP 1000 A-Series Computer Interfaces

product number 12076A

The HP 12076A LAN/1000 Link is an interface for connecting HP 1000 A-Series Computers to Local Area Networks (LANs). This microprocessor based interface, together with 91790A NS/1000 Network Services software, supports high-level user access between the LAN/1000 Linked HP 1000 A-Series computers and other computers on the Local Area Network, including other HP 1000 A-Series computers, HP 3000 Systems, HP 9000 computers, and DEC VAX™ computers.

Features

- NS/1000 software supports high-level communication with other systems via the LAN/1000 Link connected Local Area Network.

- 10M bits/second Burst Transfer Rate.

- Single card interface.

- 1500 byte frame size.

- Operational compatibility with IEEE standard 802.3 and Ethernet Rev.1.

- Provides 0.5A at 12V for MAU.

- Provides physical signalling layer and media access control sublayer.

- Interface adds preamble, Source Address and CRC to transmit packets and strips preamble and CRC from receive packets.

- 32K bytes of on-board RAM for buffering of transmit and receive packets.

- Ability to receive multiple back-to-back packets.

- Supports Multicast, Broadcast, and Individual Addressing.

- Collection of Link Statistics (collided packets, bad packets, etc.).

- On-board loopback of transmit packets addressed to self.

- Card configuration stored in non-volatile memory.

- Generation of response packets for TEST and XID packets for specific DSAP.

- Power-on self test.
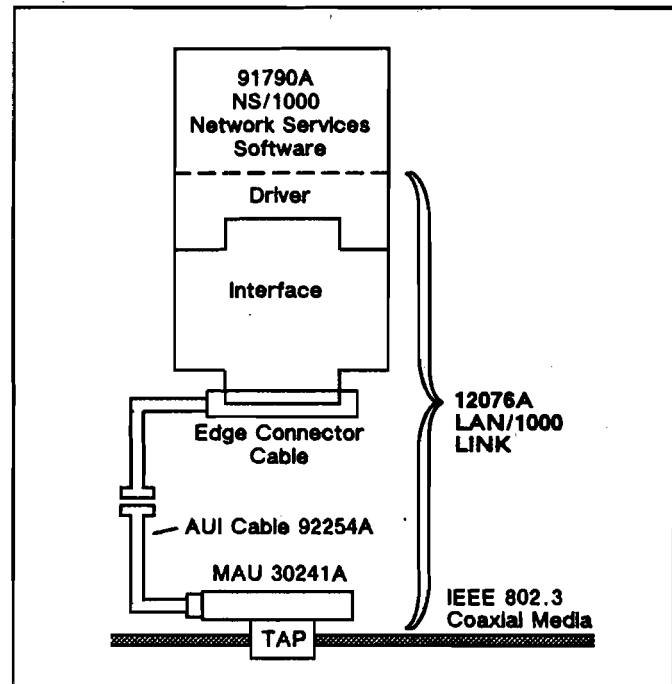
Functional Description

Versatile LAN Connectibility

The LAN/1000 Link product provides the interface between an A-Series computer and an IEEE 802.3 Local Area Network (LAN). The 12076A equips an A-Series computer to communicate with other computers at a 10M bits/second transfer rate along the LAN. The product consists of a printed circuit assembly, a card connector cable, an Attachment Unit Interface (AUI) cable, and an installation guide. Interface driver and node management software are structured to the RTE-A operating system (92077A), version 4.1 or later. The diagram above shows the 12076A as it connects to an IEEE 802.3 type 10 Base 5 backbone ("thick") coaxial cable. The product can also be connected to an IEEE 802.3 Type 10 base 2 ThinLAN ("thin") coaxial cable via an HP 28641A ThinMAU.

The 12076A can connect to Ethernet Rev. 1 baseband local area networks using an optional card connector cable. The LAN/1000 Link transmits and receives both IEEE 802.3 and Ethernet Rev. 1 type packets.

Capabilities

The LAN/1000 Link product provides the signaling layer and the media access control sublayer protocols as defined in the IEEE 802.3 and Ethernet Rev. 1 standards. This capability allows the interface to prepare packets for transmission by adding preamble and Cyclic Redundancy Check (CRC) transmit packets according to link access protocol, receive incoming packets addressed to the node, and check them for correctness before transmitting them to the host CPU. The LAN/1000 Link also provides diagnostic and link management functions such as self test, loopback, promiscuous mode addressing, and statistics gathering. Higher level protocols are handled by HP 91790A NS/1000 Network Services software or user's custom networking software in the host system.

For customers who prefer to use the 12076A LAN/1000 Link Interface with their own customized networking software, Hewlett-Packard offers the 12079A Direct Driver Access (DDA) product. The 12079A product provides the necessary information to interface the user's customized networking software to the driver contained in the LAN/1000 Link product.

Communication Line Statistics

As packets are transmitted and received from the link, the interface firmware tabulates occurrences of particular events and returns these counts as statistics when requested. When reading the statistics, a user has the capability of resetting them all. Good received packets, good transmitted packets, good bytes transmitted, and good bytes received, are all 32-bit unsigned integers All other statistics are 16-bit unsigned integers.

The following statistics are collected:

1. Interface firmware revision code (not resettable).
2. Total number of good bytes transmitted.
3. Total number of good bytes received.
4. Total number of good packets transmitted.
5. Total number of good packets received.
6. Total number of errors on transmit.
7. Total number of bad frames received.
8. Total number of times no heartbeat was indicated after a transmission.
9. Total number of times a packet was missed due to a lack of resources.
10. Total number of memory errors.
11. Total number of receive framing errors.
12. Number of packets discarded by driver (on card).
13. Number of packets received with a CRC error.
14. 802.3 length field errors.
15. Total number of times the transmission of a packet was completed after 2 to 15 retries.
16. Number of times exactly one retry was needed to transmit.

17. Number of times any packet was deferred while trying to transmit.
18. Total number of underflow errors on transmit.
19. Number of times the interface detected a late collision on transmit.
20. Number of times the carrier was lost when transmitting a frame.
21. Number of times the transmission of a frame failed after 16 retries.
22. TDR information from last valid TDR.

User Configurable Address

Each interface is shipped with a unique link level (node) address. In order to allow the user the most flexibility, the nodal address may be changed from the factory set address. This is an important feature for OEMs who may want their devices to have specific addresses or may not have software which can be easily updated as nodes are moved around in the network.

Remote Forced Cold Load Capability

The A-Series LAN interface supports Virtual Control Panel/Remote Forced Cold Load modes of operation. Hence, the host may be downloaded and booted from a remote node over the LAN. However, this capability is NOT supported by NS/1000. It must be implemented in user-developed software.

Functional Specifications

NS/1000 Compatibility

High level communication via the 12076A LAN/1000 Link interface is supported by 91790A NS/1000 software as described in the 91790A data sheet on page 5-1. All NS/1000 networking features are supported by the LAN/1000 Link interface except remote Virtual Control Panel (VCP) access.

General Characteristics

Network Topology: Bus.

Network Medium: Digital baseband IEEE 802.3 Type 10 base 5 backbone ("thick") coax.

Maximum Distance Between Nodes per Segment: 500 meters (excluding AUI cables).

Minimum Distance Between Nodes: 2.5 meters.

Maximum Number of Nodes: 100.

Maximum AUI Length: 42 meters.

Transmission Characteristics

Transmission Mode: Baseband Digital.

Access Methods: Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

Impedance: 50Ω.

Configuration Information

Computer and System Compatibility: The LAN/ 1000 Link Interface is compatible with all HP 1000 A-Series Computers and Systems, operating under the same environmental conditions.

Software Support: Operation of the LAN/1000 Link interface is supported by HP 91790A NS/1000 software, under RTE-A revision 4.1, as described in the NS/1000 data sheet on page 5-1.

Computer I/O Channels Required: One per 12076A interface.

DC Current Requirements

4.5A (+5V), 0.5A (+12V), 0.38A (−12V).

Interface Dimensions

289 mm (11.38 in.) long, 172 mm (6.75 in.) wide, 1.6 mm (0.063 in.) board thickness, with 10.2 mm (0.4 in.) top-of-board parts clearance and 5.1 mm (0.2 in.) beneath-board clearance.

Ordering Information

HP 12076A LAN/1000 Link Interface

The 12076A Interface includes:

1. 12076-60001 LAN/1000 Link Interface card.
2. 12076-63001 802.3 Card Connector Cable.
3. 30241-60101 Medium Attachment Unit.
4. 0362-0819 Coaxial Cable Tap Kit.
5. 99254A 6 meter FEP AUI.
6. 12076-90001 Installation Manual.
7. 12076-90002 Node Manager User's Guide.

HP 12076A Options

001: Substitutes an Ethernet Rev. 1 Card Connector Cable for the standard IEEE 802.3 compatible cable. This option also deletes the AUI and the MAU. Since there are grounding differences between the two types of hardware, it is important to distinguish the type of media hardware being used at a node. If the media access hardware conforms to Ethernet Rev. 1, then Option 001 should be ordered.

002: Provides only the latest firmware EPROMs. Customers on support subscriptions will receive updates automatically.

241: Deletes the 6 meter FEP AUI cable and the Medium Attachment Unit.

NOTE: Software for Node Management interface and driver are incorporated into the 92077A RTE-A operating system, Version 4.1 or later.

Related Products

12079A Direct Driver Access provides 12079-90001 Driver Reference Manual.

28641A ThinMAU with integral 1 meter AUI cable, is available from Direct Marketing Division. This product is used to connect the 12076A interface to IEEE 802.3 Type 10 Base 2 ThinLAN coaxial cable.

30241A Medium Access Unit can be ordered separately through HP Direct Marketing Division. This product is for attachment to 802.3 backbone "thick" coax cable only.

Attachment Unit Interface (AUI) Cables are available from Direct Marketing Division. They come in various sizes up to a maximum length of 48 meters. Both PVC and Teflon cables are available. PVC should be used when the cable will be installed in a conduit. Teflon (FEP) cable should be used when installing into ceilings and walls. Due to local and municipal codes, the customer is responsible for proper cable selection. AUI cables cannot be used with the 28641A ThinMAU.

IEEE 802.3 Coaxial Cable and Installation Kits are available from Direct Marketing Division for both "thin" and "thick" coaxial cable environments. The cables are offered in lengths that have been determined to be optimum for minimizing impedance problems when connecting multiple cables.