PCI 100Base-T Network Adapter Installation and Service Guide

HP e3000 MPE/iX Computer Systems

Edition 2

**HEWLETT®
PACKARD**

Acknowledgments

1   PCI 10/100Base-TX/3000 Quick Installation

There are two options available for connecting the PCI-based HP e3000 system to a 10/100Base-T LAN: the RJ-45 LAN connection port on the Core I/O card (included with the base system hardware), or the PCI 10/100Base-TX add-on adapter card (A5230A) for the HP e3000. Both cards support 10Mbits/s and 100Mbits/s Fast Ethernet operation as well as full and half-duplex modes. Ensure that the speed, duplex, and autonegotiation settings of the associated data hub or switch match the settings on the card (as configured in the network configuration file, `NMCONFIG.PUB.SYS`). Refer to the sections on "Notes on Manual Speed and Duplex Mode Configuration" and "Notes on Autonegotiation and Autosensing" in this guide for background information on determining these settings, if needed. For a detailed description of using NMMGR to configure the 10/100Base-TX link in your NMCONFIG file, see the *NS 3000/iX NMMGR Screens Reference Manual* and the *HP e3000 Network Planning and Configuration Guide*.

1. Verify the PCI 10/100Base-TX software is present in the installed version of MPE/iX (must be 7.0 or later).

   - Make sure MPE/iX 7.0 or later has been successfully installed on the system. The PCI 10/100Base-TX software license is included with the FOS (Fundamental Operating System). No additional software installation is required.

   - Run the `NMMAINT,78` command and verify complete version information is displayed for the PCI 100Base-TX link software (subsystem 78).

     Sample output:

```
:nmmaint,78

NMS Maintenance Utility  32098-20014 B.00.10  (C) Hewlett Packard Co. 1984

TUE, APR  3, 2001, 2:59 PM

Datacom products build version: N.74.10


Subsystem version IDs:

Subsystem Number : 78

PCI 100Base-T Fast Ethernet driver           module versions:


NL procedure:    PCI_100BT_NL_VERS          Version:  A0070073

XL procedure:    PCI_100BT_XL_VERS          Version:  A0070073

Catalog file:    NMCAT78.NET.SYS            Version:  A0070072

NL procedure:    LNK_NL_VERS                Version:  A0070008


PCI 100Base-T Fast Ethernet driver -------   overall version = A.00.70

:
```

2. Prepare system for hardware installation and access the system card bay:

- Login with appropriate system management capabilities and prepare system for shutdown (e.g., terminate any active jobs or sessions, etc.)

- Issue a **<ctrl-a>** shutdown. Make sure the system is halted before continuing.

- When the system has shutdown completely, power off the system by pressing the system off button. Unplug the system.

If you are using the Core I/O card LAN connection port instead of an add-on adapter card, proceed to step 4.

- Open the system to gain access to the PCI backplane, if applicable.

- Select an empty PCI slot and remove the slot cover (if present).

3. Install the PCI 10/100Base-TX card:

- Observe antistatic precautions.

- Record the serial number from the card, if present.

- Grasp the card by its edges or faceplate with both hands, insert the card into the slot, and press the card firmly into place.

- Secure the card and retaining screws (if present). Reassemble the system.

4. Attach the system to the network:

- Attach the 8-pin (RJ-45) plug on a twisted-pair LAN cable into the RJ-45 connector on the card. The same RJ-45 connector is used for either 10 or 100Mbit/s operation.

- Attach the free end of the cable to an unused port on the appropriate hub or switch (or into a wall jack that is connected to a hub or switch). Connect power to system. Set the hub or switch speed and duplex mode. The PCI 10/100Base-TX card and the Core I/O card LAN connection port operate in either full-duplex or half-duplex mode.

- Power up the system.

- Bring up the MPE/iX operating system.

5. Configure the link using NMMGR:

- Run NMMGR and open the network configuration file (e.g., `NMCONFIG.PUB.SYS`).

- Using "NS Guided Configuration", configure or update the LAN Configuration. Change an existing, or add a new type LAN Network Interface (NI) so that the NI has a link type of BT100. Enter the Physical path of the LANIC so that it references the path of the newly installed 10/100Base-T card, or the Core I/O card LAN port.

NOTE   The Core I/O card will usually have a path of `0/0/0/0`; the path should be printed on the bulkhead near the RJ-45 port.

- On the 100Base-T "link configuration" screen, fill in the appropriate autonegotiation, speed, and duplex settings. (For more detailed information on the various screens, see the *NS 3000/iX NMMGR Screens Reference Manual* and the *HP e3000/iX Network Planning and Configuration Guide*.

- If DTS is required for the link, use the "DTS" screen to configure the link name, specifying BT100 as link type, and the appropriate I/O path. The link name and path can be the same as used with the NS.

- Perform configuration verification and exit NMMGR.

6. Verify the installation:

- Verify that the link starts successfully by starting a network subsystem (e.g., `NETCONTROL START; NET=LAN1`) that uses the newly configured link.

- Check console messages to verify that the link connected successfully. The link status can also be checked via the `LINKCONTROL` command. The following is a sample output for a successfully connected link:

```
:linkcontrol lanlink;status=L

Linkname: LANLINK    Linktype: PCI 100BT        Linkstate: CONNECTED
```

where "`LANLINK`" is the link name as configured in NMCONFIG on the "link configuration" data screen, and in this example, is the link name that was chosen for the NI named `LAN1`.

- Verify that the card's Link LED is on. Note that the LED cannot light unless the link software is also started.

- Verify connectivity with a remote system, e.g., by issuing a "ping" command via the NETTOOL or PING utilities, or by establishing a remote VT session (after issuing an `NSCONTROL START`).

If the link could not be brought up and the remote connection successfully verified, refer to the section on "Quick Troubleshooting Tips".

Notes on Manual Speed and Duplex Mode Configuration

Ensure that the speed, duplex mode, and autonegotiation of the associated switch are configured the same as in the NMMGR configuration for the PCI 10/100Base-TX card. If the switch supports autonegotiation on the ports connected to the cards, this should be enabled as explained in "Notes on Autonegotiation and Autosensing."

The NMMGR default is autonegotiation, so if the switch does not support it, you will need to change settings before using the link.

NOTE   Operation of a link under mismatched host/hub port setting conditions may result in poor throughput, disconnects and/or application errors.

Because the PCI 10/100Base-TX LAN card and Core I/O card LAN port support autonegotiation, you should not normally need to manually set the duplex mode when connected to a switch port which is also enabled for autonegotiation. Sometimes you may need to manually set the duplex mode of the card — for example, if the switch is operating at full duplex but does not autonegotiate.

Full-duplex mode is most commonly found in switches rather than hubs. It may be found in either 10 Mbit/s or 100Mbit/s switch devices. Full-duplex mode may provide a throughput advantage under some circumstances, but the degree of the advantage is application-dependent.

To manually set the duplex mode of the PCI card, refer to the link configuration screen in the active NMCONFIG network configuration file, using NMMGR to access the configuration data and make changes.

The PCI 10/100Base-TX card and the Core I/O card LAN port support both half- and full-duplex operation.

Notes on Autonegotiation and Autosensing

The PCI 10/100Base-TX/3000 product provides the means for interfacing various types of HP e3000 systems to either a 10Base-T or 100Base-TX network. 100Base-TX is a subset of 100Base-T networking defined by the IEEE 802.3u-1995 standard. 100Base-TX provides 100 Mbits/s data transmission over category 5 unshielded twisted-pair (UTP) cable for which two pairs of wires in the cable are used — one wire pair for receiving data, and one wire pair for transmitting data. The same card port that supports 100Base-TX operation can also support 10Base-T operation (this is true for both the add-on adapter card and the Core I/O card LAN port).

Autonegotiation is a mechanism defined in the IEEE 802.3u specification whereby devices sharing a link segment can exchange information while the link is being established and automatically configure themselves to operate at the most efficient mode shared between them.

Autonegotiation is like a rotary switch that automatically switches to the correct technology such as 10Base-T or 100Base-TX or between half- and full-duplex modes. Once the most efficient common mode is determined, autonegotiation passes control of the link to the appropriate technology, sets the appropriate duplex mode, and then becomes transparent until the link is broken.

The following is the IEEE 802.3u-defined autonegotiation hierarchy for resolving multiple common abilities for a 10/100Base-TX card:

- 100Base-TX full-duplex (most efficient)
- 100Base-TX half-duplex
- 10Base-T full-duplex
- 10Base-T half-duplex (least efficient)

For example, if both devices on the link support 10Base-T (half-duplex) and 100Base-TX (half-duplex), autonegotiation at both ends will select 100Base-TX (half-duplex) instead of 10Base-T (half-duplex).

Many 100Base-TX devices on the market today such as hubs and switches do not support autonegotiation. Either the speed and duplex mode of the device are fixed (as is usually the case with hubs), or they are often manually configured at the desired speed and duplex (as is often the case for switches). However, switches that support autonegotiation are becoming more commonplace

If the PCI 10/100Base-TX/3000 card or the Core I/O card LAN port is connected to a device, such as a switch, that is autonegotiating, the PCI card will autonegotiate with the device to mutually determine the highest possible speed and duplex settings between them.

If the PCI 10/100Base-TX/3000 card or the Core I/O card LAN port is connected to a device that does not support autonegotiation or a device that has autonegotiation disabled, the PCI card will autosense the speed of the link and set itself accordingly. *The duplex mode of the card may be set to half-duplex in this case.* If you want the card to operate in full-duplex mode, you must set it using the method described in "Notes on Manual Speed and Duplex Mode Configuration" in this document.

The PCI 10/100Base-TX card or the Core I/O card LAN port will sense when the connection between itself and a hub or switch on the other end of a link has been broken. If a connection is made to another (or the same) device and autonegotiation is enabled, the autonegotiation and autosensing process will be done again automatically. Autonegotiation and autosensing are also done whenever the interface is reset.

Quick Troubleshooting Tips

Problem: Incomplete version information displayed when
`:NMMAINT,78` command is issued.

This indicates that the FOS software installation or update (must be running on MPE/iX 7.0 or later) has not completed successfully. Consult your HP software support representative.

Problem: When an attempt is made to bring up the link (e.g., via a `:NETCONTROL START` command for a LAN using that link), it does not connect successfully. Connection failure messages are logged to the console or a `:LINKCONTROL linkname;STATUS=L` command shows the link as "DISCONNECTED".

This often suggests an incompatibility between the card's speed and duplex settings and the switch or hub settings. Make sure to review the settings for autonegotiation, speed and duplex in the link configuration data and make sure they are consistent with what the hub or switch expects and supports. Bring the LAN down (`:NETCONTROL STOP` or `:DTCCNTRL` option 4) and back up again, to cause software to read the new configuration. If you still cannot connect successfully, make sure all the cables are securely connected between the card and the hub/switch and that the card is properly seated. If that fails, consult your HP support representative.