

Note

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Related Publications

The following publications are related reading for the use of this adapter.

Publications shipped with your workstation:

- The workstation's instruction manual
- The workstation's *Hardware Maintenance Reference*
- The workstation's *Hardware Maintenance Service* manual

IBM Local Area Network publications:

- *IBM Local Area Network Technical Reference: Ethernet Adapter Interface*, SC30-3661
- *IBM Local Area Network Administrator's Guide*, GA27-3748

Software publications:

- *IBM Operating System/2 Local Area Network Server Network Administrators Reference Volume 1: Planning and Installation (Version 2.0)*, S04G-1032

For assistance in obtaining IBM publications, contact your IBM representative or the IBM branch office or authorized dealer serving your locality.



Safety Notices



Danger: Before you begin to install this product, read the safety information in *Caution: Safety Information—Read This First*, SD21-0030-02. This booklet describes safe procedures for cabling and plugging in



Perigo: Antes de iniciar a instalação deste produto, leia as informações de segurança *Cuidado: Informações de Segurança — Leia Primeiro*, SD21-0030-02. Este documento descreve como efectuar, de um modo seguro, as ligações eléctricas dos equipamentos. electrical equipment.



Vorsicht: Bevor mit der Installation des Produktes begonnen wird, die Sicherheitshinweise in *Achtung: Sicherheitsinformationen—Bitte zuerst lesen*, IBM Form SD21-0030-02. Diese Veröffentlichung beschreibt die Sicherheitsvorkehrungen für das Verkabeln und Anschließen elektrischer Geräte.



Fare: Før du begynner å installere dette produktet, må du lese sikkerhetsinformasjonen i *Advarsel: Sikkerhetsinformasjon — Les dette først*, SD21-0030-02 som beskriver sikkerhetsrutinene for kabling og tilkobling av elektrisk utstyr.



Danger: Avant de procéder à l'installation de ce produit, lisez d'abord les consignes de sécurité dans la brochure *ATTENTION: Consignes de sécurité—A lire au préalable*, SD21-0030-02. Cette brochure décrit les procédures pour câbler et connecter les appareils électriques en toute sécurité.



Perigo: Antes de começar a instalar este produto, leia as informações de segurança contidas em *Cuidado: Informações Sobre Segurança—Leia Isto Primeiro*, SD21-0030-02. Esse folheto

descreve procedimentos de segurança para a instalação de cabos e conexões em equipamentos elétricos.



Danger : Avant d'installer le présent produit, consultez le livret *Attention : Informations pour la sécurité — Lisez-moi d'abord*, SD21-0030-02, qui décrit les procédures à respecter pour effectuer les opérations de câblage et brancher les équipements électriques en toute sécurité.



Fare! Før du installerer dette produkt, skal du læse sikkerhedsforskrifterne i *NB: Sikkerhedsforskrifter—Læs dette først* SD21-0030-02. Vejledningen beskriver den fremgangsmåde, du skal bruge ved tilslutning af kabler og udstyr.



Pericolo: prima di iniziare l'installazione di questo prodotto, leggere le informazioni relative alla sicurezza riportate nell'opuscolo *Attenzione: Informazioni di sicurezza — Prime informazioni da leggere* in cui sono descritte le procedure per il cablaggio ed il collegamento di apparecchiature elettriche.



Varning — livsfara: Innan du börjar installera den här produkten bör du läsa säkerhetsinformationen i dokumentet *Varning: Säkerhetsföreskrifter— Läs detta först*, SD21-0030-02. Där beskrivs hur du på ett säkert sätt ansluter elektrisk utrustning.



VAARA: Ennen kuin aloitat tämän tuotteen asennuksen, lue julkaisussa *Varoitus: Turvaohjeet—Lue tämä ensin*, SD21-0030-02, olevat turvaohjeet. Tässä kirjasessa on ohjeet siitä, miten sähkölaitteet kaapeloidaan ja kytketään turvallisesti.



Gevaar: Voordat u begint met de installatie van dit product, moet u eerst de veiligheidsinstructies lezen in de brochure *PAS OP! Veiligheidsinstructies—Lees dit eerst*, SD21-0030-02. Hierin wordt



beschreven hoe u elektrische apparatuur op een veilige manier moet bekabelen en aansluiten.



Peligro: Antes de empezar a instalar este producto, lea la información de seguridad en *Atención: Información de Seguridad — Lea Esto Primero*, SD21-0030-02. Este documento describe los procedimientos de seguridad para cablear y enchufar equipos eléctricos.

IBM Local Area Network Adapter/A for Ethernet Overview

The IBM Local Area Network Adapter/A for Ethernet (LAN Adapter/A for Ethernet) allows you to attach IBM* Personal System/2* (PS/2*) computers equipped with Micro Channel* architecture to an Ethernet network.

The LAN Adapter/A for Ethernet transmits and receives data at a rate of 10 Mbps over networks using any of these types of media:

- IEEE 802.3 Standard 10BASE-T (unshielded twisted-pair, also known as *UTP*)
- IEEE 802.3 Standard 10BASE2 (thin coaxial)
- Drop cables (shielded twisted-pair, also known as an *attachment unit interface [AUI]*)



IBM LAN Adapter/A for Ethernet Installation

The LAN Adapter/A for Ethernet is for use with an IBM PS/2 computer equipped with Micro Channel architecture.

Installation Checklist

Use the following checklist to guide you through the installation procedure.

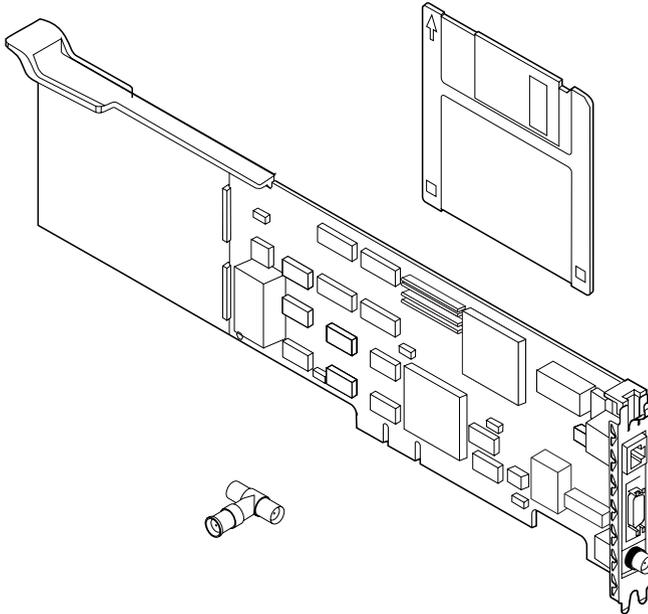
To install the LAN Adapter/A for Ethernet:

- ___ 1. Verify that you have a complete kit using the information in "Kit Contents" on page 4.
- ___ 2. Read the information in "Required Items" on page 5 to ensure that you have everything you need to install the adapter.
- ___ 3. Read the information in "Software Prerequisites" on page 8 to ensure that you have the programs necessary to use the adapter.
- ___ 4. Read the information in "Installation Tips and Help" on page 9 for additional assistance.
- ___ 5. Read "Updating the System Partition" on page 9 and follow the procedure.
- ___ 6. Read "Installing the Adapter and Connecting It to the Network" on page 10 and follow the procedure.
- ___ 7. Read "Configuring the Adapter" on page 13 and follow the procedure.
- ___ 8. Read "Changing the Adapter's Configuration" on page 15 and follow the procedure, if necessary.
- ___ 9. Read "Selecting and Installing the Correct Network Program Device Drivers for Your Environment" on page 20 and follow the procedure.



Note: If you are installing more than one LAN Adapter/A for Ethernet, install the first adapter and ensure that it is working before installing any remaining adapters.

Kit Contents



Along with this manual, this adapter kit consists of:

- The LAN Adapter/A for Ethernet
- The LAN Adapter/A for Ethernet Option Diskette
- A BNC T-type connector
- *Caution: Safety Information—Read This First* booklet

If any item is missing or damaged, contact your place of purchase.



Required Items

To install the LAN Adapter/A for Ethernet, you need:

- The LAN Adapter/A for Ethernet
- The LAN Adapter/A for Ethernet Option Diskette with the following files:

File Name:	File Description:
Root directory	
@FFE0.DGS	User diagnostic program
RPLBOOT.COM	Remote Program Load (RPL) utility program
@FFE0.ADF	Adapter definition file
OEMSETUP.INF	Installation utility for Windows** for Workgroups
IBMENII.OS2	OS/2* NDIS device driver
IBMENIIO.SYS	OS/2 ODI device driver
IBMENIIO.LDI	
IBMENIIO.COM	DOS ODI device driver
IBMENIIO.INS	OS/2 Installation information file
IBMENII.NIF	OS/2 network information file
IBMENI2.LAN	ODI NetWare** Version 2.2 server driver and object files
IBMENI2A.OBJ	
IBMENI2B.OBJ	
IBMENI2C.OBJ	
IBMENI2D.OBJ	
A8022.LAN	
A8022.OBJ	
B8022.OBJ	
C8022.OBJ	
D8022.OBJ	
DRIVER.LST	Driver list file
\DOS directory	
IBMENII.DOS	DOS NDIS device driver
IBMENII.NIF	DOS network information file
\MSLANMAN.DOS\DRIVERS\ETHERNET\IBMENII	
IBMENII.DOS	Microsoft** LANManager** DOS NDIS device driver
PROTOCOL.INI	Sample NDIS configuration file

File Name:**File Description:****\\MSLANMAN.DOS\DRIVERS\ETHERNET\NIF**

IBMENII.NIF Microsoft LANManager network
information file

\\MSLANMAN.OS2\DRIVERS\ETHERNET\IBMENII

IBMENII.OS2 Microsoft LANManager OS/2 NDIS device
driver

PROTOCOL.INI Sample NDIS configuration file

\\MSLANMAN.OS2\DRIVERS\ETHERNET\NIF

IBMENII.NIF Microsoft LANManager network
information file

NOVELL\NETWARE

IBMENIIO.LAN ODI NetWare Version 3.x / 4.x LAN server
driver

IBMENIIO.LDI NetWare loadable modules that enable
the NetWare 3.x / 4.x driver to be used
with NetWare 3.x software

ETHERTSM.NLM

LSLENH.NLM

MONITOR.NLM

MSM.NLM

MSM31X.NLM

PATCHMAN.NLM

\\README directory

READ.ME Additional information about the product,
including any exceptions and hints

NET.CFG Sample Novell NetWare version 3.11
configuration file.

\\README\LANSRV

READ.ME Additional information about LAN Server
Remote Initial Program Load (RIPL)

\\README\NETWARE

READ.ME Additional information about NetWare
Remote Initial Program Load (RIPL)

- One of the following cables (not provided with this adapter, but shown in the illustration on page 10):

- A Category 3, 4, or 5 cable with RJ-45 connectors, for use with the telephone twisted-pair (10BASE-T) media in your Ethernet network. The maximum length of twisted-pair cable between the concentrator and workstation is 100 m (328 ft).
- An RG-58 standard coaxial cable (IEEE Standard 802.3 10BASE2) with bayonet connectors (BNCs), if your Ethernet network uses thin coaxial media. The BNC T-type connector shipped with this kit is also required. The maximum length of thin coaxial cable between repeaters is 185 m (607 ft).
- A shielded twisted-pair (STP) drop cable with AUI connectors, if your Ethernet network uses external transceivers. A mini AUI-to-AUI adapter cable, P/N 59G9004, is also required. The maximum length of drop cable between transceivers is 50 m (164 ft).
- An IBM PS/2 computer equipped with Micro Channel architecture.
- The workstation's instruction manual.

Note: You also will need the backup copy of the reference diskette packaged with your PS/2 computer, if the PS/2 computer does *not* have its reference diskette information as a reference partition on its hard disk.

Software Prerequisites

The software needed for the LAN Adapter/A for Ethernet to operate in an Ethernet network differs according to the operating system environment you are using. The LAN Adapter/A for Ethernet operates in the following software environments.

- IBM DOS workstation environment
 - IBM DOS 3.3 or higher
 - IBM LAN Support Program Version 1.3 or higher
 - IBM DOS LAN Requester (shipped with LAN Server 3.0)
- IBM DOS server environment
 - IBM DOS 3.3 or higher
 - IBM LAN Support Program Version 1.3 or higher
 - IBM PC LAN Program (PCLP) Version 1.34
- OS/2 Version 2.0 or higher
- OS/2 LAN Server Version 2.0 or higher
- NetWare from IBM environment
 - NetWare from IBM Version 3.11, 3.12, 4.01, or 4.02 (for client environments)
 - NetWare from IBM Version 2.2, 3.11, 3.12, 4.01, or 4.02 (for server environments)
- Novell** NetWare environment
 - Novell NetWare Version 3.11, 3.12, 4.01, or 4.02 (for client environments)
 - Novell NetWare Version 2.2, 3.11, 3.12, 4.01, or 4.02 (for server environments)
- Microsoft Windows 3.x

The adapter kit's Option Diskette provides device drivers required to support the environments listed above. See "Selecting and Installing the Correct Network Program Device Drivers for Your Environment" on page 20 for further details.

Installation Tips and Help

This section provides references to other sections of this book, phone numbers, and tips about the adapter.

- Read the READ.ME file on the LAN Adapter/A for Ethernet Option Diskette for any new information.
- You may want to download the latest version of the adapter installation software from the IBM Personal Computer Company Bulletin Board System (BBS). See Appendix B, "BBS (Bulletin Board System)" on page 113.
- If you have problems with your workstation or adapter or need assistance, contact your IBM representative or call the IBM PC hotline at 1-800-772-2227 (U.S.) or 1-800-465-7999 (Canada).

Return to page 3 to continue. Step 4 of the Installation Checklist is complete.

Updating the System Partition

Note: Ensure that you have a backup copy of your workstation's reference diskette before updating the system partition. If you do not have a backup reference diskette, create one using your workstation's instructions.

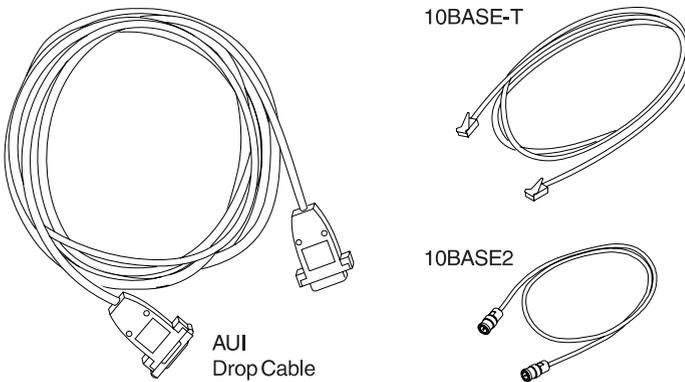
To avoid errors during automatic configuration of your PS/2 computer, you must update the system partition. Updating the system partition copies files from the LAN Adapter/A for Ethernet Option Diskette onto either the system partition or the backup reference diskette for your PS/2 computer.

Follow the directions in "Copy an Option Diskette" in your workstation's manual to copy the files from the LAN adapter kit's Option Diskette to the system partition. *Do not use the DOS COPY command to copy these files.*

After you have copied the Option Diskette, you are ready to install the LAN Adapter/A for Ethernet. Return to page 3 to continue. Step 5 of the Installation Checklist is complete.

Installing the Adapter and Connecting It to the Network

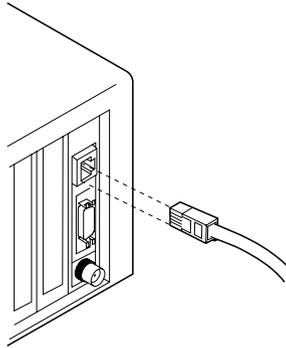
- 1 Switch off (O) the workstation.
- 2 Remove the workstation's cover and install the adapter as instructed in your workstation's manual. You can install the adapter in any available 16- or 32-bit expansion slot.
- 3 Close the workstation's cover.
- 4 Record the slot number in which you installed the adapter, in the space provided in the chart on page 16.
- 5 Determine the type of cable to be connected to the adapter from the following illustration:



Note: Only one cable can be connected to the LAN Adapter/A for Ethernet at any time.

- **LAN Adapter/A for Ethernet to a 10BASE-T network**

You need a Category 3, 4, or 5 cable with RJ-45 connectors. Connect the modular plug at one end of the cable to the adapter, as shown in the following illustration.

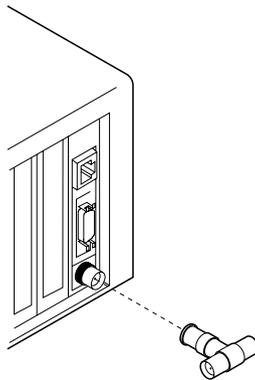


The maximum length of twisted-pair cable between the concentrator and workstation is 100 m (328 ft).

Connect the other end of the cable to the network. (The network connection usually is a hub or repeater device.) Return to page 3 to continue. Step 6 of the Installation Checklist is complete.

- **LAN Adapter/A for Ethernet to a 10BASE2 network**

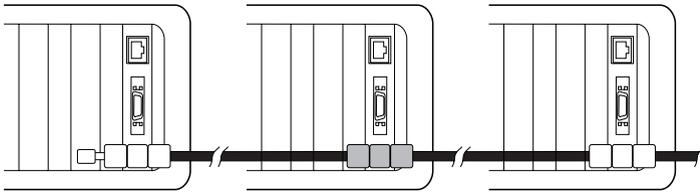
You need an RG-58 standard coaxial cable with BNC connectors. Connect the BNC T-type connector (shipped with the adapter) to the adapter, as shown in the following illustration.



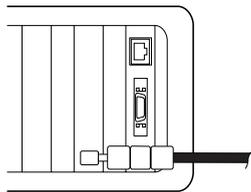
The maximum length of thin coaxial cable between repeaters is 185 m (607 ft).

Note: There may be a clearance problem on some PCs when installing the T-connector and attaching the connector to a 10BASE2 network. If there is insufficient clearance, rotate the T-connector to allow more clearance.

If the workstation you are installing is not the last device in the Ethernet network, attach cables from the Ethernet network to both ends of the T-connector, as shown in the following illustration.



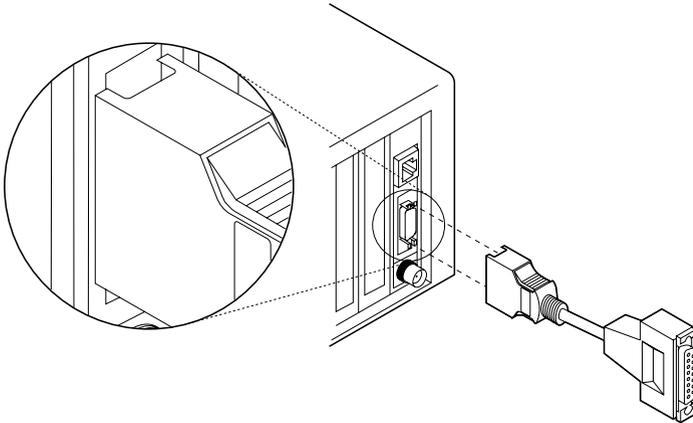
If the workstation you are installing is the last device in the Ethernet network, attach the cable from the Ethernet network to one end of the T-connector and a 50-ohm (50-Ω) terminator to the other end of the T-connector, as shown in the following illustration.



Return to page 3 to continue. Step 6 of the Installation Checklist is complete.

- **LAN Adapter/A for Ethernet to a network using drop cable**

Connect the smaller end of the mini AUI-to-AUI cable (P/N 59G9004) to the adapter, as shown in the following illustration.



Note: The mini AUI-to-AUI adapter cable is not included in the LAN adapter kit and must be obtained separately. Contact your IBM representative for assistance in obtaining these cables.

Connect the larger end of the mini AUI-to-AUI adapter cable to the AUI drop cable connected to the network. The maximum length of drop cable between transceivers is 50 m (164 ft). Return to page 3 to continue. Step 6 of the Installation Checklist is complete.

Configuring the Adapter

Configuring the adapter updates your workstation's reference information. You must access your workstation's reference information to perform the update. Refer to your workstation's manuals for information about accessing the workstation's reference information. This procedure presumes that you have accessed the reference information correctly.

1 Switch on (I) the workstation.

After the power-on sequence has finished processing, the IBM copyright panel is shown on the workstation's display. An adapter configuration error (00165) is then indicated, which is normal when installing a new adapter.

2 Type **Y (Yes)** in response to the panel that asks if you want to automatically configure the system.

A series of *automatic configuration running* messages are displayed during automatic configuration. When automatic configuration has been completed, the workstation displays an *automatic configuration complete* message.

3 Press **Enter** to activate the configuration and restart your workstation operating system.

4 Access your workstation's reference information again.

Before accessing the system programs, the LAN Adapter/A for Ethernet performs a power-on self-test (POST).

If there are no problems with the adapter, the following *test results* message is shown briefly.

```
IBM LAN Adapter/A for Ethernet POST/RPL v2.20
(c) IBM, NSC, 1994. All rights reserved.
Testing adapter in slot x... OK
```

In the message, *x* indicates the number of the slot in which the adapter is installed. The message is shown on the panel for several seconds and then the workstation continues with the power-on sequence.

Note: Additional messages may be displayed with the *testing adapter* message.

The IBM copyright panel is again shown on the workstation's display. Press **Enter** to return to the Main Menu Return to page 3 to continue. Step 7 of the Installation Checklist is complete.

If there is a hardware problem, the following POST error message is shown briefly to indicate that an error was detected on the adapter.

```
IBM LAN Adapter/A for Ethernet POST/RPL v2.20
(c) IBM, NSC, 1994. All rights reserved.
Testing adapter in slot x ... ***PRyyy (text)
```

The POST error message is followed immediately by the IBM copyright panel. Press **Enter** and another error message panel for POST, error message 25510 or 26500 is shown, depending on the PS/2 model number. See “Normal POST Message” on page 83 for further details on hardware error codes and corrective actions.

- a** Check to ensure that the steps in “Installing the Adapter and Connecting It to the Network” on page 10 were performed correctly.
- b** Reboot the computer and then return to Step 2 on page 14 of this procedure and retry configuring the adapter.

If the corrective actions and reconfiguration fail, the IBM copyright panel is again shown on the workstation’s display. Press **Enter**. A panel for POST error message 25510 or 26500 is then displayed. Press **Enter** to return to the Main Menu and go to “Testing the LAN Adapter/A for Ethernet” on page 79.

Changing the Adapter’s Configuration

This procedure assumes that you have already accessed your workstation’s configuration and have the Main Menu displayed.

- 1** Select **Set Configuration** on the Main Menu, by using the arrow keys and pressing **Enter**.

A *files being loaded* message is displayed until all processing has been completed, followed by the Set Configuration menu.

2 Select **Change Configuration** and press **Enter**.

The Change Configuration menu is displayed.

3 Select the LAN Adapter/A for Ethernet parameter you want to change.

4 Change the parameter by pressing **F5** or **F6** to change the value of the parameter. Figure 1 on page 18 describes each parameter.

5 Press **Enter** to move to the next parameter.

Note: If your workstation has two adapters using the same configuration parameter, a “ * Conflicts” message is shown in the upper right corner of the panel. Select unique configuration parameters for each adapter.

6 Copy the adapters parameters to the following chart when you have completed changing the adapter’s configuration parameters.

LAN Adapter/A for Ethernet Parameter Record	
	Slot Number __
Parameters:	
Base I/O Address	
Interrupt Request Level	
BIOS-ROM/RAM Location	
Network Media Connection	

7 Press **F10** to save the configuration.

During processing, a *saving configuration* message is displayed until all processing has completed.

8 Press **Enter** to continue and **F3** to exit Change Configuration.

9 Press **F3** to exit **Set Configuration**.

After processing has been completed, a *change confirmation* message is displayed.

10 Restart your workstation and its operating system.

11 You have configured your adapter.

If you want to test the adapter, go to “Testing the LAN Adapter/A for Ethernet” on page 79.

12 You have completed this procedure. Return to page 3 to continue. Step 8 of the Installation Checklist is complete.



Figure 1 (Page 1 of 2). Configuration Parameters

Adapter Base I/O Address

Description: This is the address used by the workstation to identify and communicate with each individual adapter.

Available Options: 1000, 2000, 3000, 4000, 5000, 6000, 7000

Default: 1000

Adapter Interrupt Request Level

Description: This parameter establishes the priority by which the adapter can interrupt the workstation. The lowest value is given the highest priority.

Available Options: 5, 10, 11, 15

Default: 5

Network Media Connection

Description: This parameter allows you to select the media type that is used to attach the Ethernet adapter to the network.

Available Options:

- Unshielded, twisted-pair (UTP) for 10BASE-T
- Thin coaxial Ethernet for 10BASE2
- Shielded, twisted-pair (AUI)

Default: UTP

Figure 1 (Page 2 of 2). Configuration Parameters

Adapter BIOS-ROM/RAM Location

Description: The adapter requires a memory location to be allocated for its BIOS-ROM and shared RAM. This parameter selects those memory locations.

Some of the addresses listed below under **Available Options** are 32-KB size and some are 16-KB size. If possible, a 32-KB memory size address should be selected to allow better throughput.

Available Options:

- 16-KB memory size addresses
C4000-C7FFF, C8000-CBFFF, D0000-D3FFF, D4000-D7FFF,
D8000-DBFFF
- 32-KB memory size addresses
C8000-CFFFF, D00000-D7FFF, D8000-DFFFF.

Default:

32-KB memory size addresses
C8000-CFFFF

Selecting and Installing the Correct Network Program Device Drivers for Your Environment

The network operating system software *must* be installed before you install the device driver. The Option Diskette contains the device drivers needed for the LAN Adapter/A for Ethernet to support network programs.

Find the network operating system environment running on your workstation in Figure 2 and then go to the indicated section for instructions about installing the device driver.

Figure 2 (Page 1 of 2). Device Driver Selection Table

If your operating system environment is:	Refer to:
IBM NetWare Version 2.2 Server or Novell NetWare Version 2.2 Server	"Installing the NetWare 2.2 Server Drivers" on page 22
IBM NetWare Version 3.11 or Novell NetWare Version 3.11 DOS Client	"Installing the DOS NetWare Version 3.11 Client Drivers" on page 29
IBM NetWare Version 3.11 or Novell NetWare Version 3.11 OS/2 Client	"Installing the OS/2 NetWare Version 3.11 Client Drivers" on page 32
IBM NetWare Version 3.11 or Novell NetWare Version 3.11 Server	"Installing the NetWare 3.11 Server Drivers" on page 36
IBM NetWare Version 3.12 or Novell NetWare Version 3.12 Server	"Installing the NetWare 3.12 Server Drivers" on page 42
IBM NetWare Version 3.12 or 4.0x or Novell NetWare Version 3.12 or 4.0x DOS/Windows Client	"Installing the DOS/Windows NetWare 3.12 or 4.0x Client Drivers" on page 47
IBM NetWare Version 3.12 or 4.0x or Novell NetWare Version 3.12 or 4.0x OS/2 Client	"Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers" on page 49
IBM NetWare Version 4.0x or Novell NetWare Version 4.0x Server	"Installing the NetWare 4.0x Server Drivers" on page 54
Novell NetWare for OS/2	"Installing the NetWare for OS/2 Server Drivers" on page 58

Figure 2 (Page 2 of 2). Device Driver Selection Table

If your operating system environment is:	Refer to:
Windows for Workgroups	"Installing the Windows for Workgroups Drivers" on page 63
IBM DOS/Windows workstation or DOS server	"Installing the DOS NDIS Drivers" on page 68
IBM OS/2 Extended Edition, LAN Server, or Extended Services*	"Installing the OS/2 NDIS Drivers" on page 73

Installing the NetWare 2.2 Server Drivers

Note: Before beginning this procedure, read the information in the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual regarding the preparation of your workstation and network. Do not install the software first. Ensure that you are using your working copies of the NetWare V2.2 software diskettes.

Before you begin the server installation process:

1 Copy the following files from the LAN Adapter/A for Ethernet Option Diskette to your working copy of the NetWare V2.2 SYSTEM-1 diskette:

- IBMENI2.LAN
- A8022.LAN

2 Copy the following files from the LAN Adapter/A for Ethernet Option Diskette to your working copy of the NetWare v2.2 LAN_DRV_001 diskette:

- IBMENI2A.OBJ
- IBMENI2B.OBJ
- IBMENI2C.OBJ
- IBMENI2D.OBJ
- A8022.OBJ
- B8022.OBJ
- C8022.OBJ
- D8022.OBJ

3 Identify whether you are installing the drivers in a new server or an existing server.

To install the NetWare V2.2 Server Drivers in a new server, continue with “Installing the NetWare Version 2.2 Drivers in a New Server” on page 23.

To install the NetWare V2.2 Server Drivers in an existing server, go to “Installing the NetWare Version 2.2 Drivers in an Existing Server” on page 25.

4 You have completed this procedure.

Installing the NetWare Version 2.2 Drivers in a New Server

To install the NetWare Version 2.2 drivers in a new server:

1 Follow the procedure defined in the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual, starting with the section titled *File Server Installation*.

2 Review your choices concerning:

- Operating system (OS) mode
- Number of buffers
- Whether the workstation will be a print server
- Whether to include core printing services

This information is in the “Operating System Generation” panel.

Note: The defaults are acceptable in most cases.

3 Select the first network adapter driver field.

4 Select the entry entitled “IBM LAN Adapter/A for Ethernet PS2 32 w/AT 2 v1.00EC (940705).”

5 Select the network adapter driver Configuration option.

6 Select “0: POS Automatic Configuration Card #1”. Follow the instructions in the manual if you are installing more than one adapter.

Note: The number of physical adapters depends on whether you use the virtual 802.2 driver. See “Virtual 802.2 Driver Restrictions” on page 27 for the restrictions.

7 Enter an 8-digit, hexadecimal number for the network address.

Note: The network address for each adapter must be unique.

8 Select the next network board driver field.

9 Select “802.2 Virtual LAN Board w/AT 2 v1.05 (930414).”

10 Select the network adapter driver Configuration option.

Only one option is presented: “0: no IRQ, no I/O Base, no DMA or RAM.”

11 Press **Enter**.

12 Enter an 8-digit, hexadecimal number for the network address.

Note: The network address for each adapter must be unique.

13 Continue with the rest of the NetWare installation process as described in *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual. Start with the section titled “Disk Driver Configuration.”

14 Insert the LAN Adapter/A for Ethernet Option Diskette in the workstation’s diskette drive when you are prompted to insert the LAN_DRV_544 diskette.

15 Continue with the NetWare installation process.

Note: The LAN_DRV_001 diskette is one of your NetWare Version 2.2 diskettes. The Novell installation process:

- Automatically links and configures the file server and operating system utilities
- Prompts you to define the file server
- Loads the operating system (NET\$OS.EXE)

16 You have completed this procedure. Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual for further information on how to use your NetWare Version 2.2 server.

Installing the NetWare Version 2.2 Drivers in an Existing Server

To use the LAN Adapter/A for Ethernet in a currently operating NetWare Version 2.2 server:

- 1** Remove any adapters as required and as described in *Novell NetWare Version 2.2 Installing and Maintaining the Network*.
- 2** Start the Novell Installation and Maintenance utility by inserting the NetWare diskette called SYSTEM-1 in your diskette drive.
- 3** Type **A:install** and press **Enter**.

If you have a dedicated server, boot your workstation from a DOS boot diskette. After the workstation has finished rebooting, replace the boot diskette with the SYSTEM-1 diskette, type **INSTALL**, and press **Enter**.
- 4** Select **Maintain an existing system** from the main Install Menu.

5 Review your choices in the Operating System Generation panel concerning:

- OS mode
- Number of buffers
- Whether the workstation will be a print server
- Whether to include core printing services

Note: The defaults are acceptable in most cases.

6 Remove any drivers for adapters you deleted.

7 Select the first network adapter driver field and press **Enter**.

8 Select **IBM LAN Adapter/A for Ethernet PS2 32 w/AT 2 v1.00EC (940705)**.

9 Select the network adapter driver Configuration option,

10 Select **0: POS Automatic Configuration Card #1** Follow the instructions in the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual if your are installing more than one adapter.

Note: The number of physical adapters depends on whether you use the virtual 802.2 driver. See "Virtual 802.2 Driver Restrictions" on page 27 for the restrictions.

11 Enter an 8-digit, hexadecimal number for the network address.

Note: The network address for each adapter must be unique.

12 Select the next network adapter driver field.

13 Select **802.2 Virtual LAN Board w/AT 2 v1.05 (930414)**.

14 Select the network adapter driver Configuration option.

Only one option is presented: **0: no IRQ, no I/O Base, no DMA or RAM.**

15 Press **Enter**.

16 Enter an 8-digit, hexadecimal number for the network address.

Note: The network address for each adapter must be unique.

17 Continue with the rest of the NetWare maintenance process as described in the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual.

18 Insert the LAN Adapter/A for Ethernet Option Diskette in the workstation diskette drive when you are prompted to insert the LAN_DRV_544 diskette,

19 Continue with the NetWare maintenance process.

Note: The LAN_DRV_001 diskette is one of your NetWare Version 2.2 diskettes. The Novell installation process:

- Automatically links and configures the file server and operating system utilities
- Prompts you to define the file server
- Loads the operating system (NET\$OS.EXE)

20 You have completed this procedure. Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare Version 2.2 Installing and Maintaining the Network* manual for further information on how to use your NetWare Version 2.2 server.

Virtual 802.2 Driver Restrictions

The use of the Novell Virtual 802.2 LAN Board driver allows the LAN Adapter/A for Ethernet to support 802.2 and 802.3 frame types.

NetWare Version 2.x products allow four logical LANs per server. 802.2 and 802.3 frame types on the same physical LAN adapter represent two different logical LANs; therefore:

- There is a maximum of four physical Ethernet LAN adapters in the workstation when none of the adapters use the virtual 802.2 LAN adapter driver.
- There is a maximum of three physical Ethernet LAN adapters in the workstation when only the first adapter in the system workstation both frame types.

For this support, select the second and third physical LAN adapters as the second and third cards (assigned *LAN B* and *LAN C* in the workstation). Then select the 8022 LAN drivers as the fourth LAN adapter (which will be assigned *LAN D*).

- There is a maximum of two physical Ethernet LAN adapters in the workstation when both adapters in the workstation support both frame types.

If you have two adapters in the server that need to support 802.2 frames, select the second physical LAN adapter as the second card (assigned *LAN B* in the workstation), and then select the 8022 LAN drivers as the third and fourth LAN adapters (these will be assigned *LAN C* and *LAN D*, respectively).

Note: The virtual driver has to be loaded last in all cases.

Installing the DOS NetWare Version 3.11 Client Drivers

Notes:

1. Before beginning this procedure, read the information in the *Novell NetWare Version 3.11 Installation* manual regarding the preparation of your workstation and network. Do not install the software first.
2. Make sure that you are using your working copies of the NetWare Version 3.11 software diskettes.
3. Make sure that there is a NetWare server in your network.
4. You do not need to run WSGEN for the LAN Adapter/A for Ethernet because it comes with an ODI driver.
5. This procedure describes how to create a bootable diskette that configures your workstation as a NetWare Version 3.11 client. If you prefer to boot your client from your hard disk, you:
 - a. Back up your hard disk.
 - b. Copy or create the files described in the procedure into a directory included in your path statement.
 - c. Update the CONFIG.SYS and AUTOEXEC.BAT on your hard disk.

To create a bootable client diskette:

- 1** Copy the following files onto the boot diskette from the NetWare diskettes:
 - LSL.COM
 - IPXODI.COM
 - NETX.COM — For DOS lower than Version 5.0
 - NETX.EXE — For DOS Version 5.0 or higher
- 2** Copy the driver IBMENIIO.COM from the LAN Adapter/A for Ethernet Option Diskette root directory to the boot diskette

- 3** Create an AUTOEXEC.BAT file on the boot diskette with the following statements (comments are indicated by a “;” at the beginning of the line — do not put these lines into your file):

```
LSL
IBMENIIO
IPXODI
NETX
prompt $p$g
;so you'll have your usual prompt
f:
;network drive letter, such as “f” or “m”,
;depending on your CONFIG.SYS
login username
;where username is the defined username for this client
```

- 4** create a CONFIG.SYS file on the boot diskette with the following statements (comments are indicated by a “;” at the beginning of the line — do not put these lines into your file):

```
files=30
buffers=10
lastdrive=e:
;this tells your workstation where the network drive is -
;it may have to be different for your workstation
```

5 Create a NET.CFG file with the following statements (there is a sample NET.CFG on the adapter option diskette; again, comments are indicated by a “;” at the beginning of the line):

```
;PB BUFFERS=10
;uncomment the above line if you want to use packet
;burst mode don't forget to use BNETX.EXE instead of
;NETX.EXE if you do use PB
;
link support
    Buffers 8 1514
;this is a good combination for buffers
:
link driver IBMENIIO
    Frame Ethernet_802.3
    Frame Ethernet_802.2
;    Frame Ethernet_II
;    Frame Ethernet_SNAP
;uncomment/comment the above lines as your protocol
;requires
```

After connecting your workstation to your network, boot your workstation from the diskette to establish communications. Refer to the Novell documentation for details about using your Novell client workstation.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the OS/2 NetWare Version 3.11 Client Drivers

Notes:

1. This procedure applies to the NetWare Requester for OS/2 that comes with NetWare Version 3.11.
2. You should have a copy of the software for NetWare Requester for OS/2 and have prepared your workstation as described in the *NetWare Requester for OS/2*.
3. You should be using working copies of the NetWare diskettes.

You can install the OS/2 client drivers on:

- A new OS/2 NetWare Requester; see “Installing the OS/2 NetWare Version 3.11 Client Drivers on a New Client.”
- An existing OS/2 NetWare Requester; see “Installing the OS/2 NetWare Version 3.11 Client Drivers on an Existing Client” on page 34.

Installing the OS/2 NetWare Version 3.11 Client Drivers on a New Client

To install the OS/2 client drivers on a new client:

- 1** Install the requester on the workstation as described in *NetWare Requester for OS/2*.
- 2** Select **Edit CONFIG.SYS** on the Requester Installation panel.
- 3** Select **3Com 503 LAN Driver** from the LAN Driver list.
Note: The LAN Adapter/A for Ethernet driver is not listed in this window and you cannot type in a driver name.
- 4** Copy the program files as instructed in the *NetWare Requester for OS/2*.

5 Edit CONFIG.SYS when you complete the installation.

Change:

```
DEVICE=C:\NETWARE\3C503.SYS
```

to:

```
DEVICE=C:\NETWARE\IBMENIO.SYS
```

6 Copy the file IBMENIO.SYS from the root directory of the LAN Adapter/A for Ethernet Option Diskette into the directory where you copied the program files.

7 Install the NetWare Utilities for OS/2 on your server.

Follow the instructions in *NetWare Requester for OS/2*.

8 You have completed this procedure.

9 Reboot your workstation after the installation to put your changes into effect.

No special NET.CFG commands are needed for this configuration. However, the default frame type for this driver is 802.3. To add 802.2 or other frame types, edit your requester's NET.CFG to include the following statements:

```
LINK DRIVER IBMENIO
FRAME = ETHERNET_802.2
FRAME = ETHERNET_802.3
```

You may also customize your configuration further as described in *NetWare Requester for OS/2*. Refer to *NetWare Requester for OS/2* for more details about using your requester.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the OS/2 NetWare Version 3.11 Client Drivers on an Existing Client

The simplest way to install the client drivers on an existing client is to modify the CONFIG.SYS in the root directory of the requester. Figure 3 is a section of an OS/2 CONFIG.SYS from a requester using the LAN Adapter/A for Ethernet.

```
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NetWare\LSL.SYS
RUN=C:\NetWare\DDAEMON.EXE
REM -- ODI-Driver Files BEGIN --
DEVICE=C:\NetWare\ibmenio.sys
REM -- ODI-Driver Files END --
REM DEVICE=C:\NetWare\ROUTE.SYS
DEVICE=C:\NetWare\IPX.SYS
rem DEVICE=C:\NetWare\SPX.SYS
rem RUN=C:\NetWare\SPDAEMON.EXE
rem DEVICE=C:\NetWare\NMPIPE.SYS
rem DEVICE=C:\NetWare\NPSEVER.SYS
rem RUN=C:\NetWare\NPDAEMON.EXE
DEVICE=C:\NetWare\NWREQ.SYS
IFS=C:\NetWare\NWIFS.IFS
RUN=C:\NetWare\NWDAEMON.EXE
rem DEVICE=C:\NetWare\NETBIOS.SYS
rem RUN=C:\NetWare\NBDAEMON.EXE
REM DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
```

Figure 3. An OS/2 requester CONFIG.SYS

To update an existing client:

- 1 Back up your CONFIG.SYS.
- 2 Locate the statement that contains the device driver statement, for example:

```
DEVICE=C:\NETWARE\3C529.SYS
```
- 3 Change the driver statement to:

```
DEVICE=C:\NETWARE\IBMENIO.SYS
```
- 4 Save your CONFIG.SYS.

5 Copy the driver IBMENIIO.SYS from the root directory of the LAN Adapter/A for Ethernet Option Diskette to the C:\NETWARE subdirectory on your Requester.

6 Update your requester's NET.CFG file, if necessary. When you finish, your driver section should resemble the following example:

```
LINK DRIVER IBMENIIO
  FRAME = ETHERNET_802.2
  FRAME = ETHERNET_802.3
```

Add other frame types if they are needed.

7 Install NetWare Utilities for OS/2 on your server as described in *NetWare Requester for OS/2*.

8 Shut down and reboot your OS/2 Requester when you have completed the installation process.

Refer to *NetWare Requester for OS/2* for further details about using your requester.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the NetWare 3.11 Server Drivers

Notes:

1. Before beginning this procedure, read the information in the *Novell NetWare Version 3.11 Installation* manual regarding the preparation of your workstation and network. Do not install the software first.
2. Ensure that you are using your working copies of the NetWare Version 3.11 software diskettes.

You can install the server drivers on a new server or an existing server.

To install the drivers on a new server, see "Installing the NetWare 3.11 Drivers on a New Server."

To install the drivers on an existing server, see "Installing the NetWare Version 3.11 Drivers on an Existing Server" on page 38.

Installing the NetWare 3.11 Drivers on a New Server

Note: This procedure recommends specific partitions and directories for your use. It does not prohibit you from using different partitions or directories; just change the procedure to match your specific needs.

To install the adapters on a new server:

- 1** Create a directory called **NETWARE** on your drive C.
- 2** Copy the SYSTEM-1 and the SYSTEM-2 diskettes into the NETWARE directory.
- 3** Boot the server from the internal hard disk as described in *Novell NetWare Version 3.11 Installation*. Follow the procedure in the Novell manual until you reach the section titled "Load LAN Drivers and Other Loadable Modules."

4 Load the drivers for the LAN Adapter/A for Ethernet as follows:

a Remove the NetWare diskette currently in your diskette drive.

b Insert the LAN Adapter/A for Ethernet Option Diskette.

c Type the following statements at the System console prompt:

```
LOAD A:\NOVELL\NETWARE\PATCHMAN.NLM
LOAD A:\NOVELL\NETWARE\LSLENH.NLM
LOAD A:\NOVELL\NETWARE\MSM31X.NLM
```

Note: This load may produce a “Notice” statement, which you can ignore.

```
LOAD A:\NOVELL\NETWARE\ETHERTSM.NLM
LOAD A:\NOVELL\NETWARE\IBMENIO.LAN FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
```

Notes:

- 1) *x* is the number of the slot in which you installed the LAN Adapter/A for Ethernet. If you have multiple adapters, you can selectively load the adapter using the **SLOT** parameter.
- 2) Use the name field to distinguish between the installed adapters. *IBM1* is only an example of a name; you can use any ASCII name in this field.

If this server is supplying Remote Program Load service to a client, you must load a second protocol into the adapter as in the following statement:

```
LOAD A:\NOVELL\NETWARE\IBMENNIO.LAN FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
```

5 Continue with the instructions in *Novell NetWare Version 3.11 Installation* until you reach the section “Bind the Protocol to the LAN Driver.”

At this point, return to this procedure to bind the protocols to the driver.

6 Enter the following statement at the System Console prompt:

```
BIND IPX TO IBM1 NET=A1
```

If you loaded the driver with a second protocol, you must also bind that protocol to the driver as such:

```
BIND IPX TO IBM2 NET=A2
```

7 Create an AUTOEXEC.NCF file.

8 Add the following statements to the end of the AUTOEXEC.NCF file:

```
LOAD INSTALL  
LOAD MONITOR  
MOUNT ALL
```

9 Update AUTOEXEC.NCF as described in “Updating AUTOEXEC.NCF” on page 40.

10 Copy files from the LAN Adapter/A for Ethernet Option Diskette to your NETWARE directory as described in “Copying Software from the LAN Adapter/A for Ethernet Option Diskette” on page 41 the next time you exit the server to the DOS prompt.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the NetWare Version 3.11 Drivers on an Existing Server

To install the drivers on an existing server:

- 1** Shut down the server.
- 2** Insert the LAN Adapter/A for Ethernet Option Diskette in your workstation’s diskette drive.
- 3** Copy files to your NETWARE directory as described in “Copying Software from the LAN Adapter/A for Ethernet Option Diskette” on page 41.

- 4** Start your server.
- 5** Select **System Options** from the Install panel.
- 6** Select **Edit AUTOEXEC.NCF** from the Available System Option menu.
- 7** Update AUTOEXEC.NCF as described in "Updating AUTOEXEC.NCF" on page 40.

You may want to remove lines from your AUTOEXEC.NCF that you are no longer using, such as load and bind statements for another Ethernet adapter.
- 8** Press **Esc** to save your AUTOEXEC.NCF.
- 9** Shut down and exit your server.
- 10** Restart your server.
- 11** You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare Version 3.11 Installation* manual for further information on using your server.

Updating AUTOEXEC.NCF

If you have not created an AUTOEXEC.NCF file before now, follow the instructions in *Novell NetWare Version 3.11 Installation* to create AUTOEXEC.NCF.

To update AUTOEXEC.NCF:

- 1 Add the following statements to the end of your AUTOEXEC.NCF:

```
LOAD C:\NETWARE\PATCHMAN.NLM
LOAD C:\NETWARE\LSLENH.NLM
LOAD C:\NETWARE\MMS31X.NLM
LOAD C:\NETWARE\ETHERTSM.NLM
LOAD C:\NETWARE\IBMENIO.LAN FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD C:\NETWARE\IBMENIO.LAN FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

Where *x* is the slot that contains the LAN Adapter/A for Ethernet and *IBM1* and *IBM2* are the names you assigned to the adapters.

Note: If these statements are already in your AUTOEXEC.NCF, you do not need to enter them again. Make sure that the above path names reflect the paths you used when you copied the NetWare software onto the workstation's hard disk.

- 2 Follow the instructions in the NetWare manual to save your AUTOEXEC.NCF.
- 3 Continue with the instructions in the NetWare manual.
- 4 Copy files from the LAN Adapter/A for Ethernet Option Diskette as described in "Copying Software from the LAN Adapter/A for Ethernet Option Diskette" on page 41 the next time you shut down the server.
- 5 You have finished with this procedure.

Copying Software from the LAN Adapter/A for Ethernet Option Diskette

Note: This procedure assumes that you have shut down the server and have exited to the DOS prompt, your boot drive is C, and your diskette drive is A.

To copy the option diskette:

1 Insert the LAN Adapter/A for Ethernet Option Diskette in your diskette drive.

2 Enter the following commands at the C:\> prompt:

```
COPY A:\NOVELL\NETWARE\MSM31X.NLM C:\NETWORK
COPY A:\NOVELL\NETWARE\LSLENH.NLM C:\NETWORK
COPY A:\NOVELL\NETWARE\PATCHMAN.NLM C:\NETWORK
COPY A:\NOVELL\NETWARE\ETHERTSM.NLM C:\NETWORK
COPY A:\NOVELL\NETWARE\IBMENTIO.LAN C:\NETWORK
```

3 You have completed this procedure.

Installing the NetWare 3.12 Server Drivers

Before you begin, make sure that the following conditions are true,

Notes:

1. You have correctly installed and prepared your workstation for the installation of NetWare as described in *Novell NetWare 3.12 Installation and Upgrade*.
2. You have a large enough partition to contain your NetWare server.
3. You are using the working copies of your Novell NetWare program diskettes.

You can install the DOS NetWare 3.12 Server Drivers in:

- A new server; see “Installing the DOS NetWare Drivers in a New Server.”
- An existing server; see “Installing the Drivers in an Existing Server” on page 44.

Installing the DOS NetWare Drivers in a New Server

To install the DOS drivers in a new server:

- 1** Create a NETWARE.312 directory.
- 2** Install the server software for use with a DOS partition on the hard disk as described in *Novell NetWare 3.12 Installation and Upgrade*.
Continue until you reach the section titled “Load LAN Drivers and Frame Types.”
- 3** Load the drivers for the LAN Adapter/A for Ethernet by:
 - a. Removing the NetWare diskette currently in your diskette drive.

b. Inserting the IBM LAN Adapter/A for Ethernet Option Diskette.

c. Entering at the System Console prompt:

```
LOAD A:\NOVELL\NETWARE\MSM31x.NLM
```

Note: This load may produce a “Notice” statement, which can be ignored.)

```
LOAD A:\NOVELL\NETWARE\ETHERTSM.NLM
```

```
LOAD A:\NOVELL\NETWARE\IBMENIIO.LAN FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
```

Notes:

- 1) *x* is the number of the slot in which you installed the LAN Adapter/A for Ethernet. If you have multiple adapters, you can selectively load the adapter using the **SLOT** parameter.
- 2) Use the name field to distinguish between the installed adapters. *IBM1* is only an example of a name; you can use any ASCII name in this field.

If this server is supplying Remote Program Load service to a client, you must load a second protocol into the adapter as in the following statement:

```
LOAD A:\NOVELL\NETWARE\IBMENIIO.LAN FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
```

d. Bind the protocols to the driver. At the System Console prompt, enter:

```
BIND IPX TO IBM1 NET=A1
```

If you loaded a second protocol into the driver, enter:

```
BIND IPX TO IBM2 NET=A2
```

4 Create an AUTOEXEC.NCF file.

5 Add the following statements to the end of the AUTOEXEC.NCF file:

```
LOAD INSTALL
LOAD MONITOR
MOUNT ALL
```

6 Update AUTOEXEC.NCF as described in “Updating AUTOEXEC.NCF” on page 45.

7 Copy files to your NETWARE directory as described in “Copying Software from the LAN Adapter/A for Ethernet Option Diskette” on page 46.

8 Start your server.

9 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare 3.12 Installation and Upgrade* manual for further information on using your server.

Installing the Drivers in an Existing Server

To install the drivers in an existing server:

1 Shut down the server.

2 Insert the LAN Adapter/A for Ethernet Option Diskette in your workstation’s diskette drive.

3 Copy files to your NETWARE.312 directory as described in “Copying Software from the LAN Adapter/A for Ethernet Option Diskette” on page 46.

4 Start your server.

5 Select **System Options** from the Install panel.

6 Select **Edit AUTOEXEC.NCF** from the Available System Option menu.

7 Update AUTOEXEC.NCF as described in “Updating AUTOEXEC.NCF” on page 45.

You may want to remove lines from your AUTOEXEC.NCF that you are no longer using, such as load and bind statements for another Ethernet adapter.

- 8** Press **Esc** to save your AUTOEXEC.NCF.
- 9** Shut down and exit your server.
- 10** Restart your server.
- 11** You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare 3.12 Installation and Upgrade* manual for further information on using your server.

Updating AUTOEXEC.NCF

If you have not created an AUTOEXEC.NCF file before now, follow the instructions in the *Novell NetWare 3.12 Installation and Upgrade* manual create AUTOEXEC.NCF.

To update AUTOEXEC.NCF:

- 1** Add the following statements to the end of your AUTOEXEC.NCF:

```
LOAD C:\NETWORK.312\MSM31X.NLM
LOAD C:\NETWORK.312\ETHERTSM.NLM
LOAD C:\NETWORK.312\IBMENIO.LAN FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD C:\NETWORK.312\IBMENNIO.LAN FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

Where *x* is the slot that contains the LAN Adapter/A for Ethernet and *IBM1* and *IBM2* are the names you assigned to the adapters.

Note: If these statements are already in your AUTOEXEC.NCF, you do not need to enter them again. Make sure that the above path names reflect the paths you used

when you copied the NetWare software onto the workstation's hard disk.

- 2** Follow the instructions in the NetWare manual to save your AUTOEXEC.NCF.
- 3** Continue with the instructions in the NetWare manual.
- 4** Copy files from the LAN Adapter/A for Ethernet Option Diskette as described in "Copying Software from the LAN Adapter/A for Ethernet Option Diskette" on page 41 the next time you shut down the server.
- 5** You have finished with this procedure.

Copying Software from the LAN Adapter/A for Ethernet Option Diskette

Note: This procedure assumes that you have shut down the server and have exited to the DOS prompt, your boot drive is C, and your diskette drive is A.

To copy the Option Diskette:

- 1** Insert the LAN Adapter/A for Ethernet Option Diskette in your diskette drive.
- 2** Enter the following commands at the C:\> prompt:

```
COPY A:\NOVELL\NETWARE\MSM31x.NLM C:\NETWARE.312
COPY A:\NOVELL\NETWARE\ETHERTSM.NLM c:\NETWARE.312
COPY A:\NOVELL\NETWARE\IBMENIIO.LAN c:\NETWARE.312
```
- 3** You have completed this procedure.

Installing the DOS/Windows NetWare 3.12 or 4.0x Client Drivers

Notes:

1. Before beginning this procedure, read the information in *Novell Workstation Basics and Installation* regarding the preparation of your workstation and network. Do not install the software first.
2. Make sure that there is a NetWare server in your network.
3. Make sure that you are using your working copies of the NetWare software diskettes.

To install the DOS/Windows NetWare 3.12 or 4.0x Client Drivers:

- 1** Install the DOS and Windows workstations as described in *Novell Workstation Basics and Installation*.
- 2** Complete Steps 1, 2, and 3 in the Novell Client Install menu.
- 3** Remove the Novell Install diskette from your workstation's diskette drive.
- 4** Insert the LAN Adapter/A for Ethernet Option Diskette.
- 5** Perform Step 4 from the NetWare Client Install menu. Press **Enter** to see the list of device drivers.

The workstation displays a Network Board list with the LAN Adapter/A for Ethernet driver highlighted.
- 6** Press **Enter** to select this driver.

The workstation displays a menu called Settings for the LAN Adapter/A for Ethernet. Three settings are available:

Media Frame Types The default setting is the 802.2 frame type. You may want to add 802.3 frame type support as well.

Optional Node Address The default setting is no optional node address.

Slot Number The default setting is no slot number indicated.

Help screens are available for each of these settings. You can display additional information about the possible selections for each setting by selecting an item and pressing **Enter**.

Most workstations can use the default settings.

7 Press **Esc** to return to the NetWare Client Install menu.

8 Continue with Step 5 in the NetWare Client Install menu.

The software copies the IBMENIIO.COM driver.

9 Follow the installation prompts to complete the installation

10 You have completed this procedure.

The NetWare installation process:

- Creates a new directory on your workstation called "NWCLIENT."
- Copies required files to the new directory.
- Creates a NET.CFG file for your configuration.
- Updates the AUTOEXEC.BAT and CONFIG.SYS files on your workstation.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to *Novell Workstation Basics and Installation* for further details about using your NetWare client.

Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers

Notes:

1. This procedure applies to the NetWare Requester for OS/2 that comes with NetWare Version 3.12 or 4.0x.
2. You should have a copy of the software for NetWare Requester for OS/2 and have prepared your workstation as described in *NetWare Workstation for OS/2*.
3. You should be using working copies of the NetWare diskettes.

You can install the OS/2 client drivers on:

- A new OS/2 NetWare Requester; see "Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers on a New Client."
- An existing OS/2 NetWare Requester; see "Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers on an Existing Client" on page 52.

Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers on a New Client

To install the OS/2 client drivers on a new client:

1 Install the requester on the workstation as described in *NetWare Workstation for OS/2*. When the workstation displays "Step 1 – Choose the ODI LAN Driver", do the following steps:

- a** Remove the diskette from your diskette drive.
- b** Insert the LAN Adapter/A for Ethernet Option Diskette in drive A.
- c** Position your cursor in the entry field titled Choose from the list or type in the driver name and enter:

IBMENI10.SYS

- 2** Continue with the NetWare installation procedure. For a basic installation, you can accept all of the defaults.
- 3** Insert the LAN Adapter/A for Ethernet Option Diskette when prompted to insert a diskette containing third-party ODI drivers.
Note: If you install NetWare Client for OS/2 from CD-ROM, you cannot redirect the source of the installation. See "Installing the ODI Driver during a CD-ROM Installation" on page 51 for details about installing the ODI driver when installing from a CD-ROM.
- 4** Update NET.CFG to add additional frame types, if needed. The default frame type is 802.3. The following statements are an example of the NET.CFG statements used to support the 802.2 frame type.

```
LINK DRIVER IBMENIIO  
FRAME = ETHERNET_802.2  
FRAME = ETHERNET_802.3
```

You can edit NET.CFG manually or through the NetWare Install program.
- 5** Customize your configuration further, if needed. See *NetWare Workstation for OS/2* for customization instructions.
- 6** Reboot your workstation to put your changes into effect.
- 7** You have finished this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to *NetWare Workstation for OS/2* for further details about using your client.

Installing the ODI Driver during a CD-ROM Installation

This procedure allows you to install the LAN Adapter/A for Ethernet Ethernet ODI driver when installing the NetWare client from a CD-ROM. To install the LAN Adapter/A for Ethernet Ethernet OS/2 ODI driver:

- 1** Select 3C509.SYS as the device driver during the CD-ROM-based installation.
- 2** Edit your CONFIG.SYS at the end of the installation but before rebooting your workstation.

a Find the statement:

```
DEVICE=C:\NETWARE\3C509.SYS
```

b Change the statement to:

```
DEVICE=C:\NETWARE\IBMENIIO.SYS
```

- 3** Save your CONFIG.SYS.
- 4** Copy the file IBMENIIO.SYS from the LAN Adapter/A for Ethernet Option Diskette to the C:\NETWARE directory.
- 5** You have finished this procedure.

Installing the OS/2 NetWare 3.12 or 4.0x Client Drivers on an Existing Client

The simplest way to install the client drivers on an existing client is to modify the CONFIG.SYS in the root directory of the requester. Figure 4 is a section of an OS/2 CONFIG.SYS from a client using the LAN Adapter/A for Ethernet.

```
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
REM -- ODI-Driver Files BEGIN --
DEVICE=C:\NETWARE\ibmenio.sys
REM -- ODI-Driver Files END --
REM DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
rem DEVICE=C:\NETWARE\SPX.SYS
rem RUN=C:\NETWARE\SPDAEMON.EXE
rem DEVICE=C:\NETWARE\NMPIPE.SYS
rem DEVICE=C:\NETWARE\NPSEVER.SYS
rem RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWAEMON.EXE
rem DEVICE=C:\NETWARE\NETBIOS.SYS
rem RUN=C:\NETWARE\NBDAEMON.EXE
REM DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
```

Figure 4. Example OS/2 CONFIG.SYS File

To update an existing client:

- 1** Back up your CONFIG.SYS.
- 2** Locate the statement that contains the device driver statement, for example:


```
DEVICE=C:\NETWARE\3C529.sys
```
- 3** Change the driver statement to:


```
DEVICE=C:\NETWARE\IBMENIO.SYS
```
- 4** Save your CONFIG.SYS.

5 Copy the driver IBMENIO.SYS from the root directory of the LAN Adapter/A for Ethernet Option Diskette to the C:\NETWARE subdirectory on your Requester.

6 Update your requester's NET.CFG file, if necessary. When you finish, your driver section should resemble the following example:

```
link driver ibmeniio
  frame = ethernet_802.2
  frame = ethernet_802.3
```

Add other frame types if they are needed.

7 Shut down and reboot your OS/2 Requester when you have completed the installation process.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete. Refer to *NetWare Workstation for OS/2* for further details about using your client.

Installing the NetWare 4.0x Server Drivers

Before you begin, make sure:

Notes:

1. You have correctly installed and prepared your workstation for the installation of NetWare as described in the *Novell NetWare 4.0x Installation and Upgrade* manual.
2. You are using the working copies of your Novell NetWare program diskettes.

You can install the DOS NetWare 4.0x Server Drivers in:

- A new server; see “Installing the DOS NetWare 4.0x Drivers in a New Server.”
- An existing server; see “Installing the DOS NetWare 4.0x Drivers in an Existing Server” on page 56.

Installing the DOS NetWare 4.0x Drivers in a New Server

To install the DOS drivers in a new server:

- 1** Install the server software as described in *Novell NetWare 4.0x Installation and Upgrade*.

Return to this procedure when you reach “Load LAN Drivers” in the manual.

- 2** Load the driver for the LAN Adapter/A for Ethernet by performing the following steps:

a Press **Insert** on the Load LAN Drivers panel.

b Insert the LAN Adapter/A for Ethernet Option Diskette into your workstation’s drive A.

c Press **Enter**.

The workstation displays a list with IBMENIIO.LAN driver highlighted.

d Press **Enter**.

The workstation displays a menu with a list of the parameters for the IBMENIIO driver. In that menu:

- Provide the slot number in which you installed the adapter.
- Do not enter a node address unless you plan to use a locally administered address.
- Select 802.2 and 802.3 frame types. These frame types are a recommended default for most environments.

Note: You can obtain help for each parameter by pressing F1 on this menu. The workstation loads and binds the driver.

3 Accept the default IPX** addresses assigned to the adapter.

4 Continue with the installation process as described in *Novell NetWare 4.0x Installation and Upgrade*.

The workstation displays the AUTOEXEC.NCF statements that list the loading and binding of the selected drivers.

5 Update AUTOEXEC.NCF, if necessary. You may want to add the following statements to the end of your AUTOEXEC.NCF:

```
LOAD IBMENIIO FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD IBMENIIO FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

Note: Do not reenter these statements if they are already in your AUTOEXEC.NCF.

6 Save your AUTOEXEC.NCF as described in *Novell NetWare 4.0x Installation and Upgrade*.

7 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to the *Novell NetWare 4.0x Installation and Upgrade* for further information about using your server.

Installing the DOS NetWare 4.0x Drivers in an Existing Server

To install the drivers on an existing server:

- 1** Start your server.
- 2** Select **Maintenance/Selective Install** from the NetWare Server Installation Version 4.x Menu.
- 3** Select **LAN Driver Options** from the Installation Options menu.
- 4** Press **Insert** and place the LAN Adapter/A for Ethernet Option Diskette into your workstation's drive A.
- 5** Press **Enter**. The workstation displays a list with IBMENIIO.LAN driver highlighted.
- 6** Press **Enter**.
- 7** Follow the instructions to copy the driver to your workstation.
- 8** Press **Enter**.

The workstation displays a menu with a list of the parameters for the IBMENIIO driver. In that menu:

- Provide the slot number in which you installed the adapter.
- Do not enter a node address unless you plan to use a locally administered address.
- Select 802.2 and 802.3 frame types. These frame types are a recommended default for most environments.

Note: You can obtain help for each parameter by pressing the F1 key on this menu. The workstation loads and binds the driver.

9 Accept the default IPX addresses assigned to the adapter.

10 Exit the LAN Driver installation section.

11 Update AUTOEXEC.NCF, to automate the loading and binding of the driver. The following statements are an example of an AUTOEXEC.NCF file.

```
LOAD IBMENIIO FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD IBMENIIO FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

X is the number of the slot in which you installed the LAN Adapter/A for Ethernet. If you have more than one adapter in your server, you can specify which driver to load into each adapter. The name field helps you distinguish which adapter you are loading.

Note: The name can be any ASCII characters.

12 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to *Novell NetWare 4.0x Installation and Upgrade* for further information about using your server.

Installing the NetWare for OS/2 Server Drivers

NetWare for OS/2 is a product that allows an IBM OS/2 system and a NetWare Server to run on the same machine at different times.

Before you begin make sure:

Note: You have correctly installed and prepared your workstation for the installation of NetWare as described in the *Installing NetWare for OS/2* manual.

Note: You cannot use the LAN Adapter/A for Ethernet with its OS/2 NDIS device driver at the same time that you are using NetWare for OS/2. The LAN Adapter/A for Ethernet cannot be shared in one server to run both an OS/2 networking application (IBM LAN Server, for example) and NetWare for OS/2.

Using the LAN Adapter and Protocol Support (LAPS) utility (or manually):

- Remove any reference to the IBMENII.OS2 driver from the CONFIG.SYS file.
- Remove any references to the IBMENII.OS2 driver from the PROTOCOL.INI file.

You can install the NetWare for OS/2 Server Drivers in:

- A new server; see "Installing the NetWare for OS/2 Drivers in a New Server."
- An existing server; see "Installing the NetWare for OS/2 Drivers in an Existing Server" on page 60.

Installing the NetWare for OS/2 Drivers in a New Server

To install the NetWare for OS/2 drivers in a new server:

- 1** Create the NetWare disk partitions manually, as instructed in *Installing NetWare for OS/2*.

- 2** Install the server software as instructed in *Installing NetWare for OS/2*.
- 3** Select the **DSKSHARE.DSK** driver if your NetWare for OS/2 and OS/2 files systems are installed on the same hard disk when the installation program prompts you to load the disk driver.
- 4** Insert the LAN Adapter/A for Ethernet Option Diskette when the installation program prompts you to load the LAN driver that corresponds to the network interface adapter in this server.
- 5** Press **Insert**.
- 6** Press **Enter** to accept the default search path of drive A.
- 7** Select the **IBMENIIO.LAN** driver. In this menu:
 - Enter the slot number of the adapter.
 - Do not enter a node address unless you plan to use a locally administered address.
 - Select 802.2 and 802.3 frame types. These frame types are a recommended default for most environments.
- 8** Press **F10** to load the driver.
- 9** Reply **No** to the message asking you if you want to share the LAN adapter with the NetWare Requester for OS/2.
- 10** Reply **OK** when you receive the second message that informs you that adapter sharing will not be enabled.
- 11** Update AUTOEXEC.NCF, to automate function loads. The following example shows the statements in AUTOEXEC.NCF:

```
LOAD IBMENIIO FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD IBMENIIO FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

Note: Do not add these statements if they are already in your AUTOEXEC.NCF.

12 Complete the NetWare for OS/2 installation.

13 Shut down the workstation when the installation has been completed.

14 Reboot your server.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete. Refer to *Installing NetWare for OS/2* for more information about using your server.

Installing the NetWare for OS/2 Drivers in an Existing Server

Notes:

1. This procedure assumes that you are installing the drivers in a server running NetWare for OS/2 that is already operational.
2. You will not make any changes to the OS/2 software during this procedure.

To install the NetWare for OS/2 drivers in an existing server:

1 Start your server.

2 Select **Maintenance/Selective Install** from the NetWare Server Installation Version 4.x menu.

3 Select **LAN Driver Options** from the Installation Options menu,

4 Press **Insert**.

5 Insert the LAN Adapter/A for Ethernet Option Diskette in your workstation's drive A.

6 Press **Enter**.

The workstation displays a list containing IBMENIIO.LAN driver, which should be highlighted.

7 Press **Enter** to select the driver.

8 Follow the instruction to copy the driver to your workstation.

The workstation displays menu with a list of parameters for the IBMENIIO driver. In that menu:

- Provide the number of the slot in which you installed the adapter.
- Do not enter a node address unless you plan to use a locally administered address.
- Select 802.2 and 802.3 frame types. These frame types are a recommended default for most environments.

Note: You can obtain help for each parameter by pressing the F1 key on this menu.

The workstation loads and binds the driver.

9 Accept the default IPX addresses assigned to the adapter.

10 Exit the LAN Driver installation section.

11 Update AUTOEXEC.NCF, to automate the loading and binding of the driver. The following statements are an example of an AUTOEXEC.NCF file.

```
LOAD IBMENIIO FRAME=ETHERNET_802.2 SLOT=x NAME=IBM1
LOAD IBMENIIO FRAME=ETHERNET_802.3 SLOT=x NAME=IBM2
BIND IPX TO IBM1 NET=A1
BIND IPX TO IBM2 NET=A2
```

X is the slot number in which you installed the LAN Adapter/A for Ethernet. If you have more than one adapter in your server, you can specify which driver to load into each adapter. The name field helps you distinguish which adapter you are loading.



Note: The name can be any ASCII characters.

12 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Refer to *Installing NetWare for OS/2* for more information about using your server.



Installing the Windows for Workgroups Drivers

Note: If you are using EMM386.EXE as your memory manager, you must make changes to your CONFIG.SYS file that enable your workstation to use your LAN Adapter/A for Ethernet before installing the adapter drivers. You will need the ROM/RAM addresses that the LAN Adapter/A for Ethernet is using to update CONFIG.SYS. To find these addresses:

- 1** Access your workstation's reference information. Refer to your workstation's manuals for instructions about accessing the reference information.
- 2** Choose **Set Configuration** from the menu. The workstation displays the Set Configuration menu.
- 3** Choose **View Configuration**. The workstation displays current configuration.
- 4** Locate the LAN Adapter/A for Ethernet configuration information.
- 5** Write down the Adapter BIOS-ROM/RAM Location the adapter is using. An example of the ROM/RAM addresses is D800-DFFF.
- 6** Exit the reference information. The workstation will reboot.

When your workstation has completed the reboot, make a backup copy of CONFIG.SYS. Edit your CONFIG.SYS file.

- 1** Locate the **DEVICE** (or **DEVICEHIGH**) statement for EMM386. For example:
`DEVICE=C:\WINDOWS\EMM386.EXE`
- 2** Change the device statement to include the **NOEMS** parameter and the **X** switch. For example:

```
DEVICE=C:\WINDOWS\EMM386.EXE NOEMS X=ssss-eeee
```

SSSS is the first address you recorded in step 6 on page 63 and eeee is the second address you recorded in step 6 on page 63.

3 Save your CONFIG.SYS.

4 Reboot your workstation to put your changes into effect.

You can install the Windows for Workgroup drivers in:

- A new Windows for Workgroup system; see “Installing the Drivers in a New Windows for Workgroup System.”
- An existing Windows for Workgroup system; see “Installing the Drivers in an Existing Windows for Workgroups System” on page 66.

Before installing the drivers, you should back up the following files:

- CONFIG.SYS
- AUTOEXEC.BAT
- SYSTEM.INI in your WINDOWS directory
- PROTOCOL.INI in your WINDOWS directory, if it exists

Backing up the files gives you the ability to recover your workstation should an error occur during the installation.

Installing the Drivers in a New Windows for Workgroup System

This procedure describes the installation of the IBM LAN Adapter/A for Ethernet in a Windows for Workgroups (Version 3.11) environment. Refer to the Microsoft manuals for detailed instructions about installing Windows for Workgroups. To install the drivers:

1 Start the Windows for Workgroups installation.

2 Select **Advanced** when the installation program displays the Network Setup dialog box.

- 3** Select the **Networks** option. The program displays a Networks dialog box.
- 4** Select **Install Microsoft Windows Network**. You can also select support for other network operating systems, if you desire.
- 5** Select **OK**. The program returns to the Network Setup dialog box.
- 6** Go to "Installing the Driver."
- 7** Continue with the Windows for Workgroups installation.
- 8** You have completed this procedure.
Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

See the Windows for Workgroups manuals for information about using your Windows for Workgroups system.

Installing the Driver

To install the adapter driver:

- 1** Select **Drivers**. The program displays the Install Driver dialog box.
- 2** Insert the LAN Adapter/A for Ethernet Option Diskette in drive A. The program displays a dialog box with a list of adapters.
- 3** Select **LAN Adapter/A for Ethernet**.
- 4** Select **OK**. The program displays a list box of network drivers. This list should contain:
 - LAN Adapter/A for Ethernet (NDIS2)

- Microsoft NetBEUI
- Any protocols for other network operating systems you selected in step 4 on page 65 in "Installing the Drivers in a New Windows for Workgroup System" on page 64.

- 5** Select **Close**. The program returns to the Network Setup dialog box with your selections in the Drivers list.
- 6** Select **Continue**. The program displays the Microsoft Windows Network Names dialog box.
- 7** Change the **User Name**, **Workgroup Name**, and **Computer Name** in the entry fields in this dialog box, if needed. In most cases, you can use the defaults.
- 8** Select **OK**. The program copies the drivers from the Option Diskette. If the program redisplayes the Install Driver dialog box, type **A:\DOS** in the entry field and select **OK**.
- 9** You have finished this procedure.
- 10** Return to the procedure that brought you here.

Installing the Drivers in an Existing Windows for Workgroups System

To install the drivers in an existing Windows for Workgroups system:

- 1** Select the **Network** icon from the Program Manager window.
- 2** Select **Network Setup** from the Network dialog box. If you need to remove an adapter, you should do so now. To remove an adapter:
 - a** Select **Drivers**.
 - b** Select the adapter you are removing in the Network Drivers dialog box.
 - c** Select **Remove**.

d Select **Yes** in answer to the message you receive to verify removal of the adapter.

e Select **Close** in the Network Drivers dialog box.

3 Go to "Installing the Driver" on page 65.

4 Select **Restart now** for your changes to take effect.

5 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the DOS NDIS Drivers

The LAN Adapter/A for Ethernet Option Diskette contains NDIS device drivers that allow you to use the adapter in any DOS NDIS environment. You can use the adapter with:

- IBM Local Area Network Support Program (LSP)
- Windows 3.1
- Windows for Workgroups

Refer to the *Microsoft Windows User's Guide* for information about installing the drivers in Windows 3.1. The Windows for Workgroups installation is described in "Installing the Windows for Workgroups Drivers" on page 63.

For LSP, you can install the NDIS drivers either:

- Automatically using DXMAID; see "Automatically Installing the DOS NDIS Drivers."
- Manually; see "Manually Installing the DOS NDIS Drivers" on page 69 and "Manually Installing the DOS NDIS Drivers for Two or More Adapters" on page 71.

Automatically Installing the DOS NDIS Drivers

Note: Use your working copies of the LSP diskettes for this procedure.

To install the DOS NDIS drivers:

- 1** Insert the LSP diskette that contains the DXMAID utility in your drive A.
- 2** Enter **A:** to switch to the diskette drive.
- 3** Enter **DXMAID** at the A:> prompt to start DXMAID.

- 4** Follow the directions displayed by DXMAID. Refer to the *Local Area Network Support Program User's Guide* for any required assistance.
- 5** Insert the LAN Adapter/A for Ethernet Option Diskette in drive A when DXMAID displays the Process Diskette Drive panel.
- 6** Verify the selections on the Primary Adapter panel. The selections should be:

Primary Adapter Driver	IBMENII.DOS
Protocol Drivers	IBM DOS NETBIOS (DXMT0MOD.SYS) IBM DOS IEEE 802.2 Protocol for NDIS (DXME0MOD.SYS)
- 7** Press **F4** to install the configuration.
- 8** Follow the directions to complete the installation and exit DXMAID.
- 9** Reboot your workstation to put your changes into effect.
- 10** You have completed this procedure.
Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Manually Installing the DOS NDIS Drivers

Note: This procedure assumes that you are using LSP as your network operating system.

To install the DOS NDIS drivers manually:

- 1** Install LSP, if it is not installed.
- 2** Back up your CONFIG.SYS file.

3 Edit CONFIG.SYS so that DEVICE statements resemble the following statements:

```
DEVICE=C:\LSP\PROTMAN.DOS /I:C:\LSP
DEVICE=C:\LSP\IBMENII.DOS
DEVICE=C:\LSP\DXMA0MOD.SYS 001
DEVICE=C:\LSP\DXME0MOD.SYS
DEVICE=C:\LSP\DXMT0MOD.SYS 0=N
```

In the example:

- The first statement names the protocol manager.
- The second statement names the adapter driver.
- The final three statements name the protocol drivers used by the network operating system.

4 Save your CONFIG.SYS.

5 Install the LAN Adapter/A for Ethernet Options Diskette in the diskette drive.

6 Copy IBMENII.DOS from the \DOS directory on the option diskette to the \LSP directory on your hard disk.

7 Update PROTOCOL.INI (in C:\LSP): Either add the following statements or change existing statements to match the following statements:

```
[PROTMAN_MOD]
  DriverName = PROTMAN$

[DXMAIDXCFCG]

  DXME0_NIF = DXME0.NIF
  DXMJ0MOD_NIF = DXMJ0MOD.NIF
  IBMENII_NIF = IBMENII.NIF

:

[DXME0_NIF]

  DriverName = DXME0$
  Bindings = IBMENII_nif

[IBMENII_NIF]

  DriverName = IBMENII$
```

8 Reboot your workstation to put your changes into effect.

9 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Manually Installing the DOS NDIS Drivers for Two or More Adapters

Manually adding DOS NDIS drivers for multiple adapters is similar to adding the drivers for a single adapter. This procedure describes the steps you need to support two adapters. For each additional adapter, you would add an additional statement similar to the statements added in this procedure.

Before beginning this procedure, make sure that you have already completed steps 1 through 6 on page 70.

For the second adapter:

1 Copy the DEVICE statement that loads IBMENII.DOS. For example:

```
:  
DEVICE=C:\LSP\IBMENII.DOS  
DEVICE=C:\LSP\IBMENII.DOS
```

```
:
```

2 Update your PROTOCOL.INI to reflect the following changes in the [DXMAIDXCFG], and [IBMENII_NIF] statements as follows:

```
[PROTMAN_MOD]
  DriverName = PROTMAN$

[DXMAIDXCFG]

  DXME0_NIF = DXME0.NIF
  DXMJ0MOD_NIF = DXMJ0MOD.NIF
  IBMENII_NIF = IBMENII.NIF
  IBMENII2_NIF = IBMENII.NIF

:

[DXME0_NIF]

  DriverName = DXME0$
  Bindings = IBMENII_nif

[IBMENII_NIF]

  DriverName = IBMENII$

[IBMENII2_NIF]

  DriverName = IBMENII2$
```

- 3** Shut down your workstation.
- 4** Reboot your workstation to put your changes into effect.
- 5** You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Installing the OS/2 NDIS Drivers

The LAN Adapter/A for Ethernet Option Diskette contains NDIS device drivers that allow you to use the adapter in any OS/2 NDIS environment, such as LAN Server 3.0 or Communications Manager/2.

You can install the NDIS drivers either:

- Automatically, using Local Area Network Adapter and Protocol Support (LAPS) which comes with OS/2 LAN Server; see “Using LAPS to Install the OS/2 NDIS Drivers.” If you do not have LAPS on your workstation, you must install the NDIS drivers manually.
- Manually; see “Manually Installing the OS/2 NDIS Drivers for One Adapter” on page 75 and “Manually Installing the OS/2 NDIS Drivers for Two or More Adapters” on page 77.

Using LAPS to Install the OS/2 NDIS Drivers

To install the OS/2 NDIS drivers using LAPS:

- 1** Start LAPS. Either double-click on the LAPS icon or run LAPS.EXE in an OS/2 window from the directory in which the program is installed.
- 2** Insert the LAN Adapter/A for Ethernet Option Diskette in drive A.
- 3** Select **Install** on the first LAPS window.
- 4** Select **OK** on the Install Additional Network Driver window. The NDIS drivers are copied onto your hard disk.
- 5** Select **OK** from the Installation Complete window.
- 6** Select **Configure** on the first LAPS window.

- 7** Verify that **Configure LAN transports** is selected in the Configuration window.
- 8** Select **Continue** on the Configuration. LAPS displays the Configure Workstation window.
- 9** Select **LAN Adapter/A for Ethernet (IBMENII.OS2)** from the Network Adapters list in the Configure Workstation window.
- 10** Select **Add**.
LAPS adds LAN Adapter/A for Ethernet to the Current Configuration list.
- 11** Select the protocols from the Protocol list in the Configure Workstation window. At a minimum, you should:
 - a** Select **IBM IEEE 802.2** from the Protocol list in the Configure Workstation window.
 - b** Select **Add**.
 - c** Select **IBM OS/2 NETBIOS** from the Protocol list in the Configure Workstation window.
 - d** Select **Add**.
LAPS adds the selected protocols to the Current Configuration list.
- 12** Select **OK** in the Configure Workstation window.
- 13** Select **Exit** in the first LAPS window.
LAPS displays the CONFIG.SYS Update window that informs you that LAPS will back up and update your CONFIG.SYS and the name of the backup file.
- 14** Select **Continue** to update CONFIG.SYS.

LAPS updates CONFIG.SYS and then displays the CONFIG.SYS Updated window.

15 Select **OK**.

LAPS displays an Exiting LAPS window that tells you how to complete the installation process.

16 Shut down your workstation.

17 Reboot your workstation to put your changes into effect.

18 You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

If you want to add additional LAN Adapter/A for Ethernets, repeat this procedure for each adapter.

Manually Installing the OS/2 NDIS Drivers for One Adapter

Note: This procedure assumes that you are using IBM LAN Server as your network operating system and that the directory for the program is C:\IBMCOM.

To install the OS/2 NDIS drivers manually:

- 1** Insert the LAN Adapter/A for Ethernet Option Diskette in a diskette drive.
- 2** Copy IBMENII.OS2 and IBMENII.NIF from the root directory of the Option Diskette to C:\IBMCOMMACS.
- 3** Back up your CONFIG.SYS file.
- 4** Update CONFIG.SYS. Make the following changes:
 - Add C:\IBMCOM\DLL to the LIBPATH statement.

- Add the following statements after the FILES statement:

```
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTOCOL\PROTMAN.OS2 /I:C:\IBMCOM
```

Note: These statements are examples; your statements will vary based on your directory names.

- Add the following statements at the end of your CONFIG.SYS:

```
RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE

DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLL.OS2

DEVICE=C:\IBMCOM\MACS\IBMENII.OS2

RUN=C:\IBMCOM\LANDLL.EXE
```

- Verify that the STACKS statement is *not* STACKS=0,0.

5 Update PROTOCOL.INI (in C:\IBMCOM): Either add the following statements or change existing statements to match the following statements:

```
[IBMENII_nif]

DriverName = IBMENII$
NETADDRESS = 02008040C020
```

Notes:

- a. You need the NETADDRESS statement only if you are using locally-administered addresses. The address in the statement is for example purposes only — use the address assigned to you in your statement.
- b. You should need to add only the **IBMENII_nif** and **Bindings** statements to the sections in the following sections.

```
[IBMLXCFG]

LANDD_nif = LANDD.nif
NETBEUI_nif = NETBEUI.nif
IBMENII_nif = IBMENII.nif
```

```
[LANDD_nif]

DriverName = LANDD$
Bindings = IBMENII_nif
```

```
:
```

```
[NETBEUI_nif]

DriverName = netbeui$
Bindings = IBMENII_nif
```

```
:
```

- 6** Shut down your workstation.
- 7** Reboot your workstation to put your changes into effect.
- 8** You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Manually Installing the OS/2 NDIS Drivers for Two or More Adapters

Manually adding OS/2 NDIS drivers for multiple adapters is similar to adding the drivers for a single adapter. This procedure describes the steps you need to support two adapters. For each additional adapter, you would add an additional statement similar to the statements added in this procedure.

Before beginning this procedure, make sure that you have already completed steps 1 through 4 on page 75.

For the second adapter:

- 1** Copy the DEVICE statement that loads IBMENII.OS2. For example:

```
:  
  
    DEVICE=C:\IBMCOM\MACS\IBMENII.OS2  
    DEVICE=C:\IBMCOM\MACS\IBMENII.OS2  
  
:
```

- 2** Update your PROTOCOL.INI to reflect the following changes in the [IBMLXCFG], [LANDD_nif], and [NETBEUI_nif] statements as follows:

```
[IBMLXCFG]  
  
    LANDD_nif = LANDD.nif  
    NETBEUI_nif = NETBEUI.nif  
    IBMENII_nif = IBMENII.nif  
    IBMENII_nif02 = IBMENII.nif ←Added statement  
  
[LANDD_nif]  
  
    DriverName = LANDD$  
    Bindings = IBMENII_nif,IBMENII_nif02 ←Changed statement  
  
:  
  
[NETBEUI_nif]  
  
    DriverName = netbeui$  
    Bindings = IBMENII_nif,IBMENII_nif02 ←Changed statement  
  
:
```

- 3** Shut down your workstation.
- 4** Reboot your workstation to put your changes into effect.
- 5** You have completed this procedure.

Return to page 3 to continue. Step 9 of the Installation Checklist is complete.

Testing the LAN Adapter/A for Ethernet

To test the adapter:

- 1** Access your workstation's reference information. See your workstation's manuals for instructions about accessing the reference information.

After the POST has been completed and *if there are no problems with the adapter*, the following test results message is displayed briefly.

```
IBM LAN Adapter/A for Ethernet POST/RPL v2.20
(c) IBM, NSC, 1994. All rights reserved.
Testing adapter in slot x... OK
```

The IBM copyright panel is shown on the workstation's display. Press **Enter** to go to the Main Menu. Continue with step 2.

If there is a hardware problem, the following POST error message (25510 or 26500) is displayed briefly, indicating that an error was detected on the adapter.

```
IBM LAN Adapter/A for Ethernet POST/RPL v2.20
(c) IBM, NSC, 1994. All rights reserved.
Testing adapter in slot x ... ***PRyyy (text)
```

The POST error message is followed immediately by the IBM copyright panel. Press **Enter** and another error message for POST, error message 25510 or 26500, is shown, depending on the PS/2 model number. Press **Enter** to go to the Main Menu.

- 2** At the Main Menu, press **Ctrl-A**.

The Advanced Diagnostic Menu is displayed.

- 3** Select **Run system checkout** by using the arrow keys and pressing **Enter**.

The workstation displays a series of *tests are loading* messages.

- 4** Follow the instructions shown on the display to complete testing of the LAN Adapter/A for Ethernet.

If testing detects errors, an error panel is shown. Refer to "Decimal Error Codes" on page 92 for a list of error codes and corrective actions.

If testing does not detect errors, a *testing finished* message is shown. Follow the instructions shown on the display to exit the testing program. You have completed testing the LAN Adapter/A for Ethernet.

Using Remote Initial Program Load (RIPL)

The Remote Initial Program Load (RIPL) functions require that a workstation with the LAN Adapter/A for Ethernet run one of the following network operating systems:

- IBM OS/2 LAN Server 2.0
- IBM OS/2 LAN Server 3.0
- Novell NetWare 2.2 or 3.11
- Microsoft LANManager 2.1

Note: The LAN Adapter/A for Ethernet RIPL feature for Microsoft LANManager is supported only with the 16-bit mode of the LAN Adapter/A for Ethernet.

The RIPL feature can be used in workstations with or without diskette drives.

Workstations with Diskette Drives

To use the LAN Adapter/A for Ethernet RIPL function in workstations with diskette drives, run the RPLBOOT.COM utility program, which is included on the Option Diskette. The utility program temporarily disables the diskette drives so that the RIPL function is loaded to the workstation from the LAN server, rather than from the diskette drive.

Note: Do *not* use the RPLBOOT.COM utility program if the workstation has a hard-disk-drive option in addition to the diskette drives (as in an IBM PS/2 Model 56 LS, for example). To use RIPL with the hard-disk-drive option, use the utility program included with the workstation's reference information to disable the drives.

Workstations without Diskette Drives

The RIPL function allows the LAN Adapter/A for Ethernet to activate workstations without diskette drives, using files sent from a LAN server. If the workstation does not have a diskette drive, only two RIPL-executing adapters may be installed in the workstation.



When a LAN Adapter/A for Ethernet is installed in a workstation without a diskette drive, the adapter detects the absence of the diskette drive and the RIPL function is automatically activated as part of the power-on sequence.

Installing RIPL in a LAN Server

The RIPL function of the LAN Adapter/A for Ethernet can also be used in a workstation that is set up as a LAN server. For specific instructions on installing the RIPL program in a LAN server, please refer to your network operating system documentation.

RIPL with Novell NetWare

The RIPL function of the LAN Adapter/A for Ethernet can also be used in a workstation with Novell NetWare. For specific instructions on installing the RIPL program in a Novell NetWare environment, please refer to your Novell Netware system documentation.

Reactivating a Hard Disk after RIPL

To reactivate your workstation's hard disk if you are using DOS, use the DOS utility FDISK command and set an active partition. The active partition can be set by reactivating your workstation using an operating system boot diskette.

To reactivate your workstation's hard disk if you are using OS/2, use the DOS Install diskette and the FDISK command to set an active partition.



Solving Problems

Problems with the LAN Adapter/A for Ethernet may be detected during:

- POST
- RIPL
- Adapter testing

The following sections describe the message formats and list the messages with explanations and corrective actions.

Normal POST Message

A power-on self-test (POST) is performed each time the workstation is switched on and displays test results on the terminal display.

The following example shows test results for a correctly functioning adapter after the POST has completed processing.

```
IBM LAN Adapter/A for Ethernet POST/RPL v2.20
(c) IBM, NSC, 1994. All rights reserved.
Testing adapter in slot x... OK
```

X indicates the number of the slot in which the adapter is installed. The message is shown on the panel for several seconds, and then the workstation continues with the power-on sequence.

Note: Additional messages may be displayed with the *testing adapter* message.

When a POST error occurs during the workstation's power-on sequence, the workstation displays a message directing you to press F1 to continue. Pressing F1 at this starts the operating system but leaves the adapter unusable.

When a POST error occurs, you should access the workstation's reference information as described in the workstation's manual and

then test the adapter as described in "Testing the LAN Adapter/A for Ethernet" on page 79.

POST Error Messages

When POST errors occur, they can sometimes be resolved by installing the adapter again to verify that the workstation's system unit is working correctly, or by installing the adapter in another workstation. If the error condition persists, contact your IBM representative or call the IBM PC hotline at 1-800-772-2227 (U.S.) or 1-800-465-7999 (Canada).

In addition to the POST for the LAN adapter, other adapters and features in your workstation are also tested as part of the power-on sequence. Note any messages displayed while your workstation is powering on. If the displayed error message is other than one of the messages in this section, refer to the documentation for your workstation, or that of its installed features, for further instructions.

After all testing has been completed and POST errors have been reported, the workstation attempts to access the the reference information on the boot drive. (The information is on either the Reference Diskette or the reference partition, if the PS/2 includes its reference information as a partition on the hard disk). If the workstation finds reference information, it accesses the information and processes the accessed instructions.

The following pages contain the error messages with possible causes and corrective actions.

PR001

Explanation: POST/RPL ROM integrity error.

Problem Determination: ROM not correctly inserted in socket or ROM defective.

Operator Response: Verify that the ROM is correctly inserted in the socket on the adapter. Also verify that the ROM is not damaged (for example, make sure that no pins are bent or missing). If the ROM is inserted correctly and is undamaged and problems persist, have the adapter serviced.

PR002

Explanation: I/O configuration error.

Problem Determination: Adapter not configured correctly for the workstation. Possible I/O address conflict.

Operator Response: Check the adapter configuration and the workstation configuration. If the adapter and workstation configurations are correct and problems persist, have the adapter serviced.

PR003

Explanation: Memory configuration error.

Problem Determination: Adapter not configured correctly for the workstation. Possible memory conflict.

Operator Response: Verify that the adapter configuration and the workstation configuration are correct. If the adapter and workstation configurations are correct and problems persist, have the adapter serviced.

PR004

Explanation: ID PROM integrity error.

Problem Determination: The Ethernet Controller's ID PROM is defective.

Operator Response: Have the adapter serviced.

PR005

Explanation: Buffer memory integrity error.

Problem Determination: On-card RAM is defective.

Operator Response: Have the adapter serviced.



PR006 • PR010

PR006

Explanation: Register integrity error.

Problem Determination: Ethernet adapter is defective.

Operator Response: Have the adapter serviced.

PR007

Explanation: Watchdog timer error.

Problem Determination: Ethernet adapter is defective.

Operator Response: Have the adapter serviced.

PR008

Explanation: No interrupt received.

Problem Determination: Adapter not configured correctly for the workstation or the system interrupt signal is defective. Possible interrupt conflict.

Operator Response: Verify that the adapter configuration and the workstation configuration are correct. Run the system diagnostics. If the adapter and workstation configurations are correct and the system diagnostics run without error and problems persist, have the adapter serviced.

PR009

Explanation: CAM integrity error.

Problem Determination: Ethernet adapter is defective.

Operator Response: Have the adapter serviced.

PR010

Explanation: Cable connection error.

Problem Determination:

1. Cable not connected or not connected correctly.
2. Wrong cable type configured.

Operator Response:

1. Check all cable connections.
2. Verify that the cable type is configured correctly.
3. Verify that the cable is working correctly.



PR011

Explanation: Transmission loopback error.

Problem Determination:

1. Defective cable.
2. Defective adapter.

Operator Response: Verify that the cable is working correctly. If the cable is working correctly and problems persist, have the adapter serviced.

PR012

Explanation: Insufficient memory for RPL.

Problem Determination: Not enough RAM available on the workstation's system unit.

Operator Response: Reallocate workstation RAM or add workstation RAM.

PR100

Explanation: Adapters not responding or failures detected.

Problem Determination: Unknown.

Operator Response: Verify that the installation was performed correctly. If installation was performed correctly and problems persist, have the adapter serviced.



RIPL Messages

During RIPL, the following information is displayed briefly:

ADR: 0800 5A7F 8170¹

IRQ: 5¹

MMI: C400¹

PIO: 1000¹

SLT: 03¹

RPL: 10BASE-T

FFC: 25¹

Where:

Parameter Meaning

ADR The universally administered address of the adapter

IRQ The IRQ interrupt level that was configured for the adapter

MMI The location of the adapter's RAM address

PIO The programmed I/O address that was configured for the adapter

SLT The slot number in which the adapter is located

RPL The media which the adapter is using during this RIPL

FFC The find-frame count

Note: The value for FFC increments until the RIPL begins or a problem is resolved.

If problems occur with RIPL, check the cables to verify that they are connected correctly. If all cables are connected correctly and RIPL failures continue to occur, copy any error messages shown and contact your LAN administrator for assistance.

Some network operating systems require you to create a boot image that is downloaded to workstations without diskette drives on which the LAN Adapter/A for Ethernet is installed. Refer to your network

¹ This value varies for each individual adapter, depending on how the adapter was configured.





operating system documentation for further information on creating boot images.



Adapter Testing Error Messages

Testing-related information can be found in the *IBM Local Area Network Technical Reference: Ethernet Adapter Interface*.

The following text and figures describe error messages that are generated by the LAN Adapter/A for Ethernet diagnostics. When an error occurs, testing of the adapter stops and the workstation displays and logs one of three error messages. The format of these error messages is shown in Figure 5.

```

                Error      Page  1 of 1

HH:MM:SS  Slot = x
IBM LAN Adapter/A for Ethernet
Error Code = 0265yyx0
Appended Instructions

    where x = failing slot
           yy = decimal error code
```

Figure 5. Error Display. The display contains the basic error information.

Values for the decimal error code range from 01 to 99 and are described in Figure 8 on page 92. The first digit of the error code corresponds to the number of the test being processed; the second digit of the code is that of the error occurring during the test.

Depending upon where the test failed, the *Appended Instructions* will match either Figure 6 on page 91 or Figure 7 on page 91.

Possible causes for the error:

- The adapter is configured for COAX, but no COAX cable is connected.
- The adapter is not connected to a valid COAX network.
- The adapter or cable is defective.

The correct media type will be inserted (where 'COAX' is displayed above) before the message is displayed.

Figure 6. Appended Instructions. There is an adapter and system unit problem.

Have your IBM LAN Adapter/A for Ethernet Adapter and Cable serviced.

Figure 7. Appended Instructions. There is an adapter or cable problem.

Decimal Error Codes

Figure 8 contains the list of values for error codes, as well as a brief description of the codes

Figure 8 (Page 1 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
01	POS compare error	The user answered "no" when asked if the displayed POS contents matched those displayed by the diagnostics.	<ol style="list-style-type: none"> 1. Check to ensure that the steps in "Installing the Adapter and Connecting It to the Network" on page 10 were performed correctly. 2. Return to "Configuring the Adapter" on page 13 and reconfigure the adapter. 3. If both of the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
10	PROM unreadable		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
11	PROM checksum incorrect	POST/RPL PROM defective.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 2 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
20	Failed LAN Adapter/A for Ethernet controller register access test	Unable to read and write successfully to LAN Adapter/A for Ethernet controller's registers.	<ol style="list-style-type: none"> 1. Check to ensure that the steps in "Installing the Adapter and Connecting It to the Network" on page 10 were performed correctly. 2. Return to Step 2 on page 14 of "Configuring the Adapter" on page 13 and reconfigure the adapter. 3. If both of the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
30	No IRQ responding	The diagnostics timed out.	<ol style="list-style-type: none"> 1. Check to ensure that the steps in "Installing the Adapter and Connecting It to the Network" on page 10 were performed correctly. 2. Return to Step 2 on page 14 of "Configuring the Adapter" on page 13 and reconfigure the adapter. 3. If both of the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 3 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
31	Wrong IRQ responding		<ol style="list-style-type: none">1. Check to ensure that the steps in "Installing the Adapter and Connecting It to the Network" on page 10 were performed correctly.2. Return to Step 2 on page 14 of "Configuring the Adapter" on page 13 and reconfigure the adapter.3. If both of the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
32	Too many IRQs responding	<p>Several interrupts occurred.</p> <p>All interrupts were masked.</p>	<ol style="list-style-type: none">1. Check to ensure that the steps in "Installing the Adapter and Connecting It to the Network" on page 10 were performed correctly.2. Return to Step 2 on page 14 of "Configuring the Adapter" on page 13 and reconfigure the adapter.3. If both of the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 4 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
33	Unable to install clock interrupt		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
40-44	Read data does not match written data in SRAM	Error reading in SRAM with a test pattern written.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
45	Read data does not match written data in SRAM		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
46	Read data does not match written data in SRAM		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
50	Test failed		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 5 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
60	UTP link problem	The UTP cable is not connected correctly or is defective.	<ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. 3. Verify that the cable is working correctly. 4. If the above actions fail, contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
61	Unable to install clock interrupt		Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
62	Transmission error	Unable to send packet successfully.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>

Figure 8 (Page 6 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
63	Timeout error	Timeout occurred while waiting for data.	<ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
64	Excessive collisions	Unable to send test packet because of excessive collisions.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
70	Load error	Unable to proceed with loopback test.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 7 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
71	Timeout error	Timeout occurred while waiting for data in loopback test.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
72	Data compare error	Data received does not match data sent in test.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
73	Incorrect packet received	Packet was received but was not the packet expected.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
74	Packet transmission error		<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>

Figure 8 (Page 8 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
80	Load error	Unable to proceed with test.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.
81	Timeout error	Timeout occurred while waiting for data during test.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
82	Data compare error	Data received does not match data sent in test.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>

Figure 8 (Page 9 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
83	Incorrect packet received	Packet was received but it was not a test packet.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
84	Packet transmission error		<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
90	Load error	Unable to proceed with test.	Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.

Figure 8 (Page 10 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
91	Timeout error	Timeout waiting for data in test.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
92	Data compare error	Data received does not match data sent.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none"> 1. Check all cable connections. 2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>

Figure 8 (Page 11 of 11). Error Codes

Error Code	Description	Extended Info (If any)	Corrective Actions
93	Incorrect packet received	Packet was received, but was not a test packet.	<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none">1. Check all cable connections.2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>
94	Packet transmission error		<p>Verify that the cable is working correctly.</p> <ol style="list-style-type: none">1. Check all cable connections.2. Verify that the cable type is configured correctly. <p>If the cable is working correctly and problems persist, have the adapter serviced.</p> <p>Contact your IBM service representative or IBM authorized dealer to have your adapter serviced.</p>

Appendix A. Notices and Product Warranty

Notices

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Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled *Digital Apparatus*, ICES-003 of Industry Canada.

Avis de conformité aux normes d'Industrie Canada

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouiller : *Appareils numériques*, NMB-003 édictée par Industrie Canada.



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International Business Machines Corporation Armonk, NY 10504

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Machine IBM Local Area Network Adapter/A for Ethernet

Warranty Period* Lifetime

**Elements and accessories are warranted for three months. Contact your place of purchase for warranty service information.*

Production Status

Each Machine is manufactured from new parts, or new and serviceable used parts (which perform like new parts). In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

The IBM Warranty

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. IBM calculates the expiration of the warranty period from the Machine's Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period, IBM or your reseller will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine. IBM or your reseller will specify the type of service.

For a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Some of these transactions (called "Net-Priced" transactions) may include additional parts and associated replacement parts that are provided on an exchange basis. All removed parts become the property of IBM and must be returned to IBM.

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If a Machine does not function as warranted during the warranty period, IBM in its sole discretion will repair, replace it (with a Machine that is at least functionally equivalent), or refund the purchase price. To obtain coverage under the warranty you may be required to present proof of purchase.

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To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-426-7299** In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

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When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced.

It is your responsibility to:

1. obtain authorization from the owner (for example, your lessor) to have IBM or your reseller service a Machine that you do not own;
2. where applicable, before service is provided —
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. inform IBM or your reseller of changes in a Machine's location, and
 - d. for a Machine with exchange service, remove all features, parts, options, alterations, and attachments not under warranty service. Also, the Machine must be free of any legal obligations or restrictions that prevent its exchange; and
3. be responsible for loss of, or damage to, a Machine in transit when you are responsible for the transportation charges.

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IBM does not warrant uninterrupted or error-free operation of a Machine.

Misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible may void the warranties.

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Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

Appendix B. BBS (Bulletin Board System)

If your IBM Local Area Network Adapter/A for Ethernet installation diskettes are damaged, or you need to obtain an updated version of the installation program in the United States and Canada you can call the IBM Personal Computer Company BBS using the following phone numbers:

United States	(919) 517-0001
Vancouver	(604) 664-6464
Toronto	(416) 946-4244
Montreal	(514) 938-3022
Winnipeg	(204) 934-2798

You can download a copy of the installation diskettes from the BBS by using a modem. In the United States, search directory 32 for "IBMETHA." In Canada, search directory 16. You may also need to download the following utilities to help you create the LAN Adapter/A for Ethernet Option Diskette.

- LOADDSKF.EXE
- LDF

If you do not have a modem or you are outside the United States or Canada, contact your IBM marketing representative.



Appendix C. Glossary of Terms and Abbreviations

This glossary includes terms and definitions from the *IBM Dictionary of Computing* (New York; McGraw-Hill, Inc., 1994).

- The symbol (A) identifies definitions from the *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018.
- The symbol (I) identifies definitions from published parts of the *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1).
- The symbol (T) identifies definitions from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1.

The following cross-references are used in this glossary:

Contrast with: This refers to a term that has an opposed or substantively different meaning.

Synonym for: This indicates that the term has the same meaning as a preferred term, which was defined in its correct place in the glossary.

Synonymous with: This is a backward reference from a defined term to all other terms that have the same meaning.

See: This refers the reader to multiple-word terms that have the same last word.

See also: This refers the reader to related terms that have a related, but not synonymous, meaning.

Deprecated term for: This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

active. (1) Able to communicate on the network. A token-ring network adapter is active if it is able to transmit and receive on the network.

(2) Operational. (3) Pertaining to a node or device that is connected or is available for connection to another node or device. (4) Currently transmitting or receiving.

adapter. In a LAN, within a communicating device, a circuit card that, with its associated software and/or microcode, enables the device to communicate over the network.

address. (1) In data communication, the IEEE-assigned unique code or the unique locally administered code assigned to each device or workstation connected to a network. (2) A character, group of characters, or a value that identifies a register, a particular part of storage, a data source, or a data sink. The value is represented by one or more characters. (T) (3) To refer to a device or an item of data by its address. (A) (4) The location in the storage of a computer where data is stored. (5) In word processing, the location, identified by the address code, of a specific section of the recording medium or storage. (T)

alternate adapter. In a personal computer that is used on a LAN and that supports installation of two network adapters, the adapter that uses alternate (not standard or default) mapping between adapter-shared RAM, adapter ROM, and designated computer memory segments. The alternate adapter is usually designated as adapter 1 in configuration parameters. Contrast with *primary adapter*.

American National Standard Code for Information Interchange (ASCII).

The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphics characters. (A)

application program. (1) A program written for or by a user that applies to the user's work. Some application programs receive support and services from a special kind of application program called a network application program. (2) A program used to connect and

communicate with stations in a network, enabling users to perform application-oriented activities.

architecture. The description of the logical structure, formats, protocols, and operational sequence for transmitting information through, and controlling the configuration and operation of, a network.

ASCII. American Standard Code for Information Interchange.

attach. (1) To make a device a part of a network logically.
(2) To participate in the data passing protocol of the ring.

Note: Not to be confused with *connect*, which implies physically connecting a device to a network.

attaching device. Any device that is physically connected to a network and can communicate over the network.

attachment unit interface (AUI). In a local area network, the interface between the medium attachment unit and the data terminal equipment within a data station. (I) (A)

AUI. Attachment unit interface.

B

backup copy. A copy, usually of a program or of a library member, that is kept in case the original or the working copy is unintentionally altered or destroyed.

Basic Input/Output System (BIOS). In IBM personal computers with PC I/O channel architecture, microcode that controls basic hardware operations such as interactions with diskette drives, fixed disk drives, and the keyboard.

BIOS. Basic input/output system.

buffer. (1) A portion of storage used to hold input or output data temporarily. (2) A routine or storage used to compensate for a difference in data rate or time of occurrence of events, when transferring data from one device to another. (A)

C

checksum. (1) The sum of a group of data associated with the group and used for checking purposes. (T) (2) On a diskette, data written in a sector for error-detection purposes; a calculated checksum that does



not match the checksum of data written in the sector indicates a bad sector.

Note: The data is either numeric or other character strings regarded as numeric for the purpose of calculating the checksum.

client. (1) A user. (2) A functional unit that receives shared services from a server. (T)

coaxial (coax) cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of a larger diameter, usually copper tubing or copper braid.

command. (1) A request for performance of an operation or execution of a program. (2) A character string from a source external to a system that represents a request for system action.

configuration. (1) The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term may refer to a hardware configuration or a software configuration. (I) (A) (2) The devices and programs that make

up a system, subsystem, or network. (3) The manner in which hardware and software of an information processing system are organized and interconnected. (T) (4) The devices and programs that make up a system, subsystem, or network. (5) The task of defining the hardware and software characteristics of a system or subsystem. (6) See also *system configuration*.

configuration file. The collective set of definitions that describes a configuration.

configuration list. In a LAN, a list of all of the names and addresses of stations attached to a LAN segment.

configuration parameters. Variables in a configuration definition, the values of which characterize the relationship of a product, such as a bridge, to other products in the same network.

connect. In a LAN, to physically join a cable from a station to an access unit or network connection point. Contrast with *attach*.

connection. (1) In data communication, an association established between functional



units for conveying information. (I) (A) (2) In Open Systems Interconnection architecture, an association established by a given layer between two or more entities of the next higher layer for the purpose of data transfer. (T)

connector. A means of establishing electrical flow.

controller. A unit that controls input/output operations for one or more devices.

cursor. (1) A movable, visible mark used to indicate the position at which the next operation will occur on a display surface. (2) A unique symbol that identifies a character position in a screen display, usually the character position at which the next character to be entered from the keyboard will be displayed.

customize. The process of defining and activating a configuration and changing system parameters to meet user requirements.

D

data packet. (1) In an Open Systems Interconnection (OSI) network, a data unit passed between transport layer entities.

default. Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

device driver. The code needed to attach and use a device on a computer or a network.

diagnostics. Modules or tests used by computer users and service personnel to diagnose hardware problems.

direct memory access (DMA). The transfer of data between memory and I/O units without processor intervention.

disable. To make nonfunctional.

diskette. A flexible magnetic disk enclosed in a protective container.

diskette drive. The mechanism used to seek, read, and write data on diskettes.

Disk Operating System (DOS). (1) An operating system



for computer systems that use disks and diskettes for auxiliary storage of programs and data.

(2) A program that controls the operation of an IBM Personal Computer or Personal System/2 computer and the execution of application programs.

display field. An area in the display buffer that contains a set of characters that can be manipulated or operated upon as a unit.

display station. An input/output device containing a display screen and an attached keyboard that allows a user to send information to or receive information from the system.

DLL. Dynamic link library.

DMA. Direct memory access.

DOS. Disk Operating System.

drop. A cable that leads from a faceplate to the distribution panel in a wiring closet. When the IBM Cabling System is used with the IBM Token-Ring Network, a drop may form part of a lobe. See also *lobe*.

dynamic link library (DLL). A module containing a dynamic line routine (DLR) that is linked at load or run time.

E

enable. To make functional.

enabled. (1) On a LAN, pertaining to an adapter or device that is active, operational, and able to receive frames from the network. (2) Pertaining to a state of a processing unit that allows the occurrence of certain types of interruptions.

(3) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

ER. (1) Explicit route.

Ethernet. (1) A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD). (2) A passive coaxial cable whose interconnections contain devices or components, or both, that are all active. It uses CSMA/CD technology to provide a best-effort delivery system.

Ethernet network. A baseband LAN with a bus topology in

which messages are broadcast on a coaxial cable using a carrier sense multiple access/collision detection (CSMA/CD) transmission method.

exit. To execute an instruction or statement within a portion of a program in order to terminate the execution of that portion. (T)

expansion slot. In an IBM personal computer, one of several receptacles in the system board of the system unit or expansion unit into which a user can install an expansion board such as a memory expansion option.

explicit route (ER). In SNA, a series of one or more transmission groups that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. Contrast with *virtual route (VR)*.

F

fault. An accidental condition that causes a functional unit to fail to perform its required function. (I) (A)

field. On a data medium or a storage medium, a specified

area used for a particular category of data; for example, a group of character positions used to enter or display wage rates on a panel. (T) See *display field*.

file. A named set of records stored or processed as a unit. (T)

file name. (1) A name assigned or declared for a file. (2) The name used by a program to identify a file.

file server. A high-capacity disk storage device or a computer that each computer on a network can access to retrieve files that can be shared among the attached computers.

fixed disk. A rigid magnetic disk used in a fixed disk drive.

fixed disk drive. In a personal computer system unit, a disk storage device that reads and writes on rigid magnetic disks. It is faster and has a larger storage capacity than a diskette and is permanently installed.

flow control. In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow

control is to optimize the flow rate of message units with minimum congestion in the network; that is, to neither overflow the buffers at the receiver or at intermediate routing nodes, nor leave the receiver waiting for more message units.

frame. (1) The unit of transmission in some LANs, including the IBM Token-Ring Network and the IBM PC Network. It includes delimiters, control characters, information, and checking characters. On a token-ring network, a frame is created from a token when the token has data appended to it. On a token bus network (IBM PC Network), all frames including the token frame contain a preamble, start delimiter, control address, optional data and checking characters, end delimiter, and are followed by a minimum silence period. (2) A housing for machine elements. (3) In synchronous data link control (SDLC), the vehicle for every command, every response, and all information that is transmitted using SDLC procedures. Each frame begins and ends with a flag.

H

hardware. Physical equipment as opposed to programs, procedures, rules, and associated documentation. (I) (A)

I

IBM Personal Computer Disk Operating System (DOS). A disk operating system based on MS-DOS**.

IEEE. Institute of Electrical and Electronics Engineers.

incoming call packet. A call supervision packet transmitted by a data circuit-terminating equipment (DCE) to inform a called data terminal equipment (DTE) that another DTE has requested a call.

input/output (I/O).

- (1) Pertaining to a device whose parts can perform an input process and an output process at the same time. (I)
- (2) Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process.
- (3) Pertaining to input, output, or both.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (l) (2) A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. (A) (3) Hardware, software, or both, that links systems, programs, or devices.

Internet Packet Exchange

(IPX). The routing protocol used to connect Novell's servers or any workstation or router that implements IPX with other workstations. Although similar to TCP/IP, it uses different packet formats and terminology. See also *TCP/IP* and *Xerox Network Services (XNS)*.

interrupt. (1) A suspension of a process, such as execution of a computer program, caused by an external event and performed in such a way that the process can be resumed. (A) (2) To stop a process in such a way that it can be resumed. (3) In data communication, to take an action at a receiving station that causes the sending station to end a transmission. (4) A means of

passing processing control from one software or microcode module or routine to another, or of requesting a particular software, microcode, or hardware function.

interrupt level. The means of identifying the source of an interrupt, the function requested by an interrupt, or the code or feature that provides a function or service.

I/O. Input/output.

IPX. Internet Packet Exchange.

L

LAN. Local area network.

LAN adapter. The circuit card within a communicating device (such as a personal computer) that, together with its associated software, enables the device to be attached to a LAN.

link. (1) The logical connection between nodes including the end-to-end link control procedures. (2) The combination of physical media, protocols, and programming that connects devices on a network. (3) In computer programming, the part of a program, in some cases a single instruction or an address, that passes control and

parameters between separate portions of the computer program. (l) (A) (4) To interconnect items of data or portions of one or more computer programs. (5) In SNA, the combination of the link connection and link stations joining network nodes.

link-attached. Pertaining to devices that are physically connected by a telecommunication line. Synonymous with *remote*.

lobe. In the IBM Token-Ring Network, the section of cable (which may consist of several cable segments) that connects an attaching device to an access unit.

local area network. (1) A computer network located on a user's premises within a limited geographical area. (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. See also *token ring* and *Ethernet*.

Note: Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T)

local directory database. That set of resources (LUs) in the network known at a particular node. The resources included are all those in the node's domain as well as any cache entries.

locally administered address. An adapter address that the user can assign to override the universally administered address. Contrast with *universally administered address*.

M

main storage. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent processing.

MAN. Metropolitan area network.

mark. A symbol or symbols that indicate the beginning or the end of a field, a word, an item of data or a set of data such as a file, record, or block.

Mbps. Megabits per second.

medium. A physical carrier of electrical or optical energy.

memory. Program-addressable storage from which instructions

and other data can be loaded directly into registers for subsequent execution or processing. Synonymous with *main storage*.

message. (1) A logical partition of the user device's data stream to and from the adapter. (2) A group of characters and control bits transferred as an entity.

metropolitan area network (MAN). (1) An interconnection of two or more networks that may operate at higher speeds and cross administrative boundaries, and may use multiple access methods. (2) A network formed by the interconnection of two or more networks which may operate at higher speeds than those networks, may cross administrative boundaries, and may use multiple access methods. (T) Contrast with *local area network* and *wide area network (WAN)*.

Micro Channel. The architecture used by IBM Personal System/2 computers, Models 50 and above. This term is used to distinguish these computers from personal computers using a PC I/O channel, such as an IBM PC, XT*, or an IBM Personal

System/2 computer, Model 25 or 30.

modem (modulator/demodulator). A device that converts digital data from a computer to an analog signal that can be transmitted in a telecommunication line, and converts the analog signal received to data for the computer.

modem (modulator/demodulator). (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted in a telecommunication line, and converts the analog signal received to data for the computer.

monitor. (1) A functional unit that observes and records selected activities for analysis within a data processing system. Possible uses are to show significant departures from the norm, or to determine levels of utilization of particular functional units. (I) (A) (2) Software or hardware that observes,



supervises, controls, or verifies operations of a system. (A)

monitor. (1) A device that observes and records selected activities within a data processing system for analysis. Possible uses are to indicate significant departures from the norm, or to determine levels of utilization of particular functional units. (T) (2) Software or hardware that observes, supervises, controls, or verifies operations of a system. (A) (3) In a token-ring network, the function required to initiate the transmission of a token on the ring and to provide soft-error recovery in case of lost tokens, circulating frames, or other difficulties. The capability is present in all ring stations.

N

multidrop (network). A network configuration in which there are one or more intermediate nodes on the path between a central node and an endpoint node.

N

name. An alphanumeric term that identifies a data set, statement, program, or cataloged procedure.

n-bit byte. A string that consists of n bits. (T)

NetBIOS. Network Basic Input/Output System. The standard interface to networks, IBM PCs and compatible personal computers, used on LANs to provide message, print server, and file server functions. The IBM NetBIOS application program interface (API) provides a programming interface to the LAN so that an application program can have LAN communication without knowledge and responsibility of the data link control (DLC) interface.

network. (1) A configuration of data processing devices and software connected for information interchange. (2) An arrangement of nodes and connecting branches. Connections are made between data stations. (T) (3) A signal path connecting input/output devices to a system. A network may consist of multiple LAN segments connected together



with bridging products. See ring (network).

network administrator. A person who manages the use and maintenance of a network.

network architecture. The logical structure and operating principles of a computer network. (T) See also *systems network architecture (SNA)* and *Open Systems Interconnection (OSI) architecture*.

Note: The operating principles of a network include those of services, functions, and protocols.

Network Basic Input/Output System (NetBIOS). A message interface used on LANs to provide message, print server, and file server functions. The IBM NETBIOS application program interface (API) provides a programming interface to the LAN so that an application program can have LAN communication without knowledge and responsibility of the data link control (DLC) interface.

network identifier (ID). A 1- to 8-byte customer-selected name or an 8-byte IBM-registered name that uniquely identifies a specific subnetwork.

network interface (NI). The point of interconnection between the public switched network and a privately owned terminal.

network operator. (1) A person or program responsible for controlling the operation of all or part of a network. (2) In a multiple-domain network, a person or program responsible for controlling all domains.

node. (1) Any device, attached to a network, that transmits and/or receives data. (2) An endpoint of a link, or a junction common to two or more links in a network. (3) In a network, a point where one or more functional units interconnect transmission lines. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities.

node address. The address of an adapter on a LAN.

noise. (1) A disturbance that affects a signal and that can distort the information carried by the signal. (T) (2) Random variations of one or more characteristics of any entity, such as voltage, current, or data. (A) (3) Loosely, any disturbance tending to interfere with normal



operation of a device or system.
(A)

O

Open Systems Interconnection (OSI). (1) The interconnection of open systems in accordance with standards of the International Organization for Standardization (ISO) for the exchange of information. (T) (A)
(2) The use of standardized procedures to enable the interconnection of data processing systems.

Note: OSI architecture establishes a framework for coordinating the development of current and future standards for the interconnection of computer systems. Network functions are divided into seven layers. Each layer represents a group of related data processing and communication functions that can be carried out in a standard way to support different applications.

Open Systems Interconnection (OSI) architecture. Network architecture that adheres to a particular set of ISO standards that relates to Open Systems Interconnection. (T)

Open Systems Interconnection (OSI) reference model. A

model that describes the general principles of the Open Systems Interconnection, as well as the purpose and the hierarchical arrangement of its seven layers. (T)

operating system. Software that controls the execution of programs. An operating system may provide services such as resource allocation, scheduling, input/output control, and data management. (A) Examples are IBM PC DOS and IBM OS/2.

Operating System/2* (OS/2). A set of programs that control the operation of high-speed large-memory IBM personal computers (such as the IBM Personal System/2 computer, Models 50 and above), providing multitasking and the ability to address up to 16 MB of memory. Contrast with *Disk Operating System (DOS)*.

operation. (1) A defined action, namely, the act of obtaining a result from one or more operands in accordance with a rule that completely specifies the result for any permissible combination of operands. (A)
(2) A program step undertaken or executed by a computer.
(3) An action performed on one or more data items, such as



adding, multiplying, comparing, or moving.

option. (1) A specification in a statement, a selection from a menu, or a setting of a switch, that may be used to influence the execution of a program. (2) A hardware or software function that may be selected or enabled as part of a configuration process. (3) A piece of hardware (such as a network adapter) that can be installed in a device to modify or enhance device function.

OSI. Open Systems Interconnection.

P

padding. A technique by which a receiving station controls the rate of transmission of a sending station to prevent overrun or congestion. See also *flow control*.

packet. (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals, and possibly error control information are arranged in a specific format. (1)

page. (1) The portion of a panel that is shown on a display surface at one time. (2) To move back and forth among the pages of a multiple-page panel. See also *scroll*. (3) In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between real storage and virtual storage.

panel. The complete set of formatted information that appears in a single display on a visual display unit.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (4) Pertaining to the simultaneity of two or more processes. (5) Pertaining to the simultaneous processing of the individual parts of a whole, such

as the bits of a character and the characters of a word, using separate facilities for the various parts. (6) Contrast with *serial*.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (l) (A) (2) An item in a menu or for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

path. (1) In a network, any route between any two nodes. (T) (2) The route traversed by the information exchanged between two attaching devices in a network. (3) A command in IBM Personal Computer Disk Operating System (PC DOS) and IBM Operating System/2 (OS/2) that specifies directories to be searched for commands or batch files that are not found by a search of the current directory.

PC. Personal computer.

personal computer (PC). A desk-top, free-standing, or portable microcomputer that usually consists of a system unit, a display, a monitor, a keyboard, one or more diskette drives, internal fixed-disk storage, and

an optional printer. PCs are designed primarily to give independent computing power to a single user and are inexpensively priced for purchase by individuals or small businesses. Examples include the various models of the IBM Personal Computers, and the IBM Personal System/2 computer.

plug. (1) A connector designed to insert into a receptacle or socket. (2) To insert a connector into a receptacle or socket.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. Synonymous with *socket*. (3) In TCP/IP, a 16-bit number used to communicate between TCP and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same port number in all TCP/IP implementations. (4) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter, however, there can be more than one port on an adapter. There may be one or more ports

controlled by a single DLC process. (5) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine.

Power-on self-test (POST). A series of diagnostic tests that are run automatically each time the computer's power is turned on.

primary adapter. In a personal computer that is used on a LAN and that supports installation of two network adapters, the adapter that uses standard (or default) mapping between adapter-shared RAM, adapter ROM, and designated computer memory segments. The primary adapter is usually designated as adapter 0 in configuration parameters. Contrast with *alternate adapter*.

problem determination. The process of determining the source of a problem; for example, a program component, a machine failure, telecommunication facilities, user or contractor-installed programs or equipment, an environment failure such as a power loss, or user error.

procedure. A set of instructions that gives a service representative a step-by-step

procedure for tracing a symptom to the cause of failure.

programmed I/O (PIO). In an IBM personal computer (PC), a method of accessing an input or output port with specific instructions.

protocol. (1) A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. (I) (2) In Open Systems Interconnection architecture, a set of semantic and syntactic rules that determine the behavior of entities in the same layer in performing communication functions. (T) (3) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

put. In 3174 central site customizing, to store data from the working copy into a library member.

R

RAM size. The amount of RAM that is directly mapped into the computer's memory map.

random access memory

(RAM). A computer's or adapter's volatile storage area into which data may be entered and retrieved in a nonsequential manner.

read-only memory (ROM). A computer's or adapter's storage area whose contents cannot be modified by the user except under special circumstances.

read-only memory (ROM). Memory in which stored data cannot be modified by the user except under special conditions.

receive. To obtain and store information transmitted from a device.

receive. The action of a station in accepting a frame, token, or control sequence from the medium.

Reference Diskette. A diskette shipped with the IBM Personal System/2 computers with Micro Channel architecture. The diskette contains code and files used for configuration of options and for hardware diagnostic testing.

register. (1) A storage area in a computer's memory where specific data is stored. (2) A storage device having a specified storage capacity such

as bit, byte, or computer word, and usually intended for a special purpose. (I)

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line. Contrast with *local*. Synonym for *link-attached*.

remote program load. A function provided by adapter hardware components and software that enables one computer to load programs and operating systems into the memory of another computer, without requiring the use of a diskette or fixed disk at the receiving computer.

remove. (1) To take an attaching device off a network. (2) To stop an adapter from participating in data passing on a network.

repeater. In a network, a device that amplifies or regenerates data signals in order to extend the distance between attaching devices.

ring (network). Multiple rings may be connected together by means of bridges to form a single network.

ROM. Read-only memory. (A)

route. (1) The path that network traffic uses to get from source to destination. (2) An ordered sequence of nodes and transmission groups (TGs) that represent a path from an origin node to a destination node traversed by the traffic exchanged between them.

routine. Part of a program, or a sequence of instructions called by a program, that may have some general or frequent use.

S

scroll. To move all or part of the display image vertically or horizontally to display data that cannot be observed within a single display image. See also *page (2)*.

select. The process of choosing a single symbol or menu item by placing the cursor on it and clicking the mouse button. To select multiple symbols simultaneously, press and hold the Shift key down while clicking on the symbols you want to select.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (2) Pertaining

to the sequential or consecutive occurrence of two or more related activities in a single device or channel.

(3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts.

(4) Contrast with *parallel*.

server. (1) A device, program, or code module on a network dedicated to providing a specific service to a network. (2) On a LAN, a data station that provides facilities to other data stations. Examples are a file server, print server, and mail server.

shared RAM (SRAM). Random access memory (RAM) on an adapter that is shared by the computer in which the adapter is installed.

signal. (1) A time-dependent value attached to a physical phenomenon for conveying data. (2) A variation of a physical quantity, used to convey data.

socket. (1) Synonym for *port (2)*. (2) An abstraction used by Berkeley UNIX** that allows an application to access TCP/IP protocol functions. (3) An IP address and port number pairing. (4) In TCP/IP, the Internet



address of the host computer on which the application runs, and the port number it uses. A TCP/IP application is identified by its socket.

support program. A program that provides the necessary functions or resources for the correct operation of a functional unit (such as an adapter).

switch. On an adapter, a mechanism used to select a value for, enable, or disable a configurable option or feature.

system. In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions. (I) (A)

system configuration. A process that specifies the devices and programs that form a particular data processing system.

system unit. (1) A part of a computer that contains the processing unit, and may contain devices such as disk and diskette drives. (2) In an IBM personal computer, the unit that contains the processor circuitry, ROM, RAM, and the I/O channel. It may have one or more disk or diskette drives.

T

TCP/IP. Transmission Control Protocol/Internet Protocol.

telephone twisted pair. One or more twisted pairs of copper wire in the unshielded voice-grade cable commonly used to connect a telephone to its wall jack. Also referred to as “unshielded twisted pair” (UTP).

terminal. In data communication, a device, usually equipped with a keyboard and display device, capable of sending and receiving information.

terminator. A 75-ohm, resistive connector used on the end of a cable or an unused tap to minimize cable reflections.

throughput. (1) A measure of the amount of work performed by a computer system over a given period of time, for example, number of jobs per day. (I) (A)
(2) A measure of the amount of information transmitted over a network in a given period of time. For example, a network’s data transfer rate is usually measured in bits per second.

timeout. (1) An event that occurs at the end of a predetermined period of time that

began at the occurrence of another specified event. (I)
 (2) A time interval allotted for certain operations to occur: for example, response to polling or addressing before system operation is interrupted and restarted.

token ring. A network with a ring topology that passes tokens from one attaching device (node) to another. A node that is ready to send can capture a token and insert data for transmission.

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of protocols that allow cooperating computers to share resources across a heterogeneous network.

twisted pair. A transmission medium that consists of two insulated conductors twisted together to reduce noise. (T)

U

universally administered address. In a local area network, the address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique. Contrast with *locally administered address*.

unshielded twisted pair (UTP). See *telephone twisted pair*.

V

version. A separate IBM-licensed program, based on an existing IBM-licensed program, that usually has significant new code or new function.

W

wide area network (WAN).
 (1) A data communications network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks and national telephone networks. Contrast with *local area network* and *metropolitan area network (MAN)*
 (2) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T)

window. (1) In computer graphics, a predetermined part of a virtual space. (2) A division of a screen in which one of several programs being executed

concurrently can display information. (3) One or more parts of a display screen with visible boundaries in which information is displayed. (4) See also *help window*.

workstation. (1) An I/O device that allows either transmission of data or the reception of data (or both) from a host system, as needed to perform a job: for example, a display station or printer. (2) A configuration of I/O equipment at which an operator works. (T) (3) A terminal or microcomputer, usually one connected to a

mainframe or network, at which a user can perform tasks.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

X

Xerox Network Services (XNS).** A Xerox Network Services protocol. This term collectively describes the suite of internet protocols developed by the Xerox Corporation. Although similar to TCP/IP protocols, XNS uses different packet formats and terminology. See also *IPX*.





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