

### Note

Before using this information and the product it supports, be sure to read the general information under Appendix D, "Notices and Product Warranty" on page D-1 and "Electronic Emission Notices for STP Media" on page D-2 and "Electronic Emission Notices for UTP Media" on page D-5.

### First Edition (March 1998)

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**CLIENT PROGRAM** means that portion of the NetWare network operating system that executes on the personal workstation



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**Gevaar** Voordat u begint met het installeren van dit produkt, dient u eerst de veiligheidsrichtlijnen te lezen die zijn vermeld in de publikatie *Caution: Safety Information - Read This First*, SD21-0030. In dit boekje vindt u veilige procedures voor het aansluiten van elektrische apparatuur.



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





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



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**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.



危険： 導入作業を開始する前に、安全に関する小冊子SD21-0030 の「最初にお読みください」(Read This First)の項をお読みください。この小冊子は、電気機器の安全な配線と接続の手順について説明しています。



위험: 이 제품을 설치하기 전에 반드시 "주의: 안전 정보-시작하기 전에" (SD21-0030-02)에 있는 안전 정보를 읽으십시오.



#### ОПАСНОСТ

Пред да почнете да го инсталирате овој продукт, прочитајте ја информацијата за безбедност: "Предупредување: Информација за безбедност: Прочитајте го прво ова", SD21-0030. Оваа брошура опишува безбедносни процедури за каблирање и вклучување на електрична опрема.



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Uwaga:

Przed rozpoczęciem instalacji produktu należy zapoznać się z instrukcją: "Caution: Safety Information - Read This First", SD21-0030.

Zawiera ona warunki bezpieczeństwa przy podłączaniu do sieci elektrycznej i eksploatacji.



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



**ОСТОРОЖНО:** Прежде чем устанавливать этот продукт, прочтите Инструкцию по технике безопасности в документе "Внимание: Инструкция по технике безопасности -- Прочсть в первую очередь", SD21-0030. В этой брошюре описаны безопасные способы каблирования и подключения электрического оборудования.



Nebezpečenstvo: Pred inštaláciou výrobku si prečítajte bezpečnosté predpisy v

Výstraha: Bezpečnosté predpisy - Prečítaj ako prvé, SD21-0030. V tejto brožúrke sú opísané bezpečnosté postupy pre pripojenie elektrických zariadení.



Pozor: Preden zaènete z instalacijo tega produkta preberite poglavje: "Opozorilo: Informacije o varnem rokovanju-preberi pred uporabo," SD21-0030. To poglavje opisuje pravilne postopke za kabliranje,



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



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



危險：

開始安裝此產品之前，請先閱讀安全資訊。

注意：

請先閱讀 - 安全資訊 SD21-0030

此冊子說明插接電器設備之電纜線的安全程序。



---

## About This Manual

This manual describes how to install, configure, and test the IBM Auto Wake Token-Ring ISA Adapter and the IBM Turbo 16/4 Token-Ring ISA Adapter. (These two adapters are referred to together in this book as the *Token-Ring ISA Adapter*.) It includes information about troubleshooting, the remote program load function, LANAID, and IBM LAN Client.

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## How This Manual Is Organized

- Chapter 1, "Introduction," describes the Token-Ring ISA Adapter and its features.
- Chapter 2, "Preparing for Installation," tells you what you should get with the adapter, and the hardware and software requirements to use the adapter. It also provides details about UTP and STP adapter cables.
- Chapter 3, "Installing the Adapter," tells you how to install the adapter in your computer.
- Chapter 4, "Configuring the Adapter with LANAID," describes how to configure the adapter according to your network environment using the LAN Adapter Installation and Diagnostic Program, Version 2.
- Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1," describes the IBM LAN Client features, installation, and use.
- Chapter 6, "Device Driver Installation," describes how to install device drivers that the Token-Ring ISA Adapter needs to communicate over a Token Ring.
- Chapter 7, "Remote Program Load Function," describes the RPL function and how to set the adapter for use as an RPL device.
- Appendix A, "Troubleshooting and Testing," describes the methods you can use to ensure the correct configuration and function of the product within your computer environment. Messages generated by the program in the installation process and probable operator actions are included in this chapter.



- Appendix B, "IBM Internet, BBS and Telephone Support," describes how to use the IBM Bulletin Board system and the Internet to download new drivers.
- Appendix C, "How to Configure Route Switch Client Support," describes how to configure Route Switch Client Support on the various operating systems.
- Appendix D, "Notices and Product Warranty," contains the notices for the various countries and information about the warranty extended by IBM for this product.

This manual also includes a glossary of terms and abbreviations and an index.

---

## Where to Find More Information

The publications listed in this section provide additional information about adapters, LANs, and their operating systems.

Also, see Appendix B, "IBM Internet, BBS and Telephone Support" on page B-1.

## IBM Publications

The appropriate LAN adapter documentation (provided with the adapter)

*IBM LAN Technical Reference IEEE 802.2 and NetBIOS Application Programming Interfaces, SC30-3587*

*IBM LAN Server Command and Utilities, S10H-9686*

*IBM Guide to LAN Server Books, S10H-9688*

*IBM DOS LAN Services and Windows User's Guide, S10H-9684*

Manuals for Novell IntranetWare Client 32 and Novell NetWare Server 4.

Manuals for Novell TCP/IP interface

*LAN Administrator's Guide, GA27-3748*

*LAN Support Program User's Guide Version 1.3 (or higher),  
(Supplied with the IBM Local Area Network Support Program,  
Version 1.3 or higher), SC41-0584-00*

*LAN Technical Reference: Token-Ring Network Shared-RAM  
Adapters, SC30-3588*

*Personal Computer Disk Operating System User's Guide (Sup-  
plied with PC DOS)*

*Token-Ring Network Installation Guide, GA27-3678*

*Token-Ring Network Introduction and Planning Guide,  
GA27-3677*

*Token-Ring Network Problem Determination Guide, SX27-3710*

*Token-Ring Network Remote Program Load User's Guide,  
SK2T-0333*

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

- IBM Bulletin Board (919) 543-2307
- FTP Internet Server at [lansupport.raleigh.ibm.com](http://lansupport.raleigh.ibm.com)
- IBM Networking home page on the World Wide Web:  
<http://www.networking.ibm.com>

As of this writing the bulletin board telephone number and Internet  
Server address are current. If you should find that either the tele-  
phone number or the Internet address is not available, check the  
README file to see whether a new number or address is available.  
Also, see Appendix B, "IBM Internet, BBS and Telephone Support"  
on page B-1.



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## Chapter 1. Introduction

The IBM Turbo 16/4 Token-Ring ISA Adapter and IBM Auto Wake Token-Ring ISA Adapter are referred to collectively in this document as the *Token-Ring ISA Adapter*.

The Token-Ring ISA Adapter allows you to attach IBM PC systems, or IBM compatible computers that meet ISA or EISA requirements, to a Token-Ring network. The Token-Ring ISA Adapter transmits and receives data at a rate of either 4 or 16 Mbps over STP or UTP cable. You can install the Token-Ring ISA Adapter in either an 8-bit or a 16-bit slot.

The adapter is compatible with industry-standard Plug and Play BIOS, configuration managers, and operating system functions. However, Plug and Play features are not required to use this adapter.

The Plug and Play function greatly simplifies configuration of Plug and Play adapters in Plug and Play-enabled systems. The LAN Adapter Installation and Diagnostic (LANAID Version 2.2 or higher) works to simplify the installation and configuration of hardware and software in an environment that is not enabled for Plug and Play.

### Features

Features of the Token-Ring ISA Adapter include:

- Automatic installation in systems that are enabled for Plug and Play.
- Wake on LAN, a configurable option when you have the IBM Auto Wake Token-Ring ISA Adapter, that allows the PC to be powered ON when the Auto Wake Adapter senses a Wakeup frame on the LAN. This feature requires a PC that is designed to use Wake on LAN.
- RouteSwitch Client Support (see Appendix C, "How to Configure Route Switch Client Support" on page C-1).
- IBM LAN Client, which reduces use of DOS conventional memory.

- Enhanced mode, which includes:
  - Eight interrupt levels, increased from four
  - Greatly expanded I/O configuration choices
  - Performance up to 90% faster performance than the IBM Auto 16/4 Token-Ring ISA Adapter
  - Support for full duplex (FDX) Token-Ring LAN operation
  - 8-KB memory footprint, reduced from 24 KB in the IBM Auto 16/4 Token-Ring ISA Adapter
- LEDs that aid in monitoring the status of the adapter and problem solving.
- Support for a variety of network operating systems and network applications.
- Support for two Token-Ring ISA Adapters in a single computer. Some protocol drivers support only one adapter.
- Support for remote program load (RPL), which enables a computer without a hard disk or diskette drive to automatically load its operating system and applications from a remote server.
- Auto-Sense, a configurable option that permits the adapter to detect and operate at the data rate of the attached ring. This function eliminates problems due to manual configuration of a data rate that is not correct, and eliminates the need to reconfigure the adapter if the data rate of the ring is changed.
- Adapter management capability using SNMP and Desktop Management Interface (DMI) is available by using the LAN Adapter Management Agent. For an end-to-end management solution, the Agent can be used in conjunction with the Nways Workgroup Manager Version 1.1 or higher and with Nways Manager for AIX Version 1.2 or higher.

For more information about the Agent, or to download the Agent, see <http://www.networking.ibm.com/trl/trllma.html>.

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## Chapter 2. Preparing for Installation

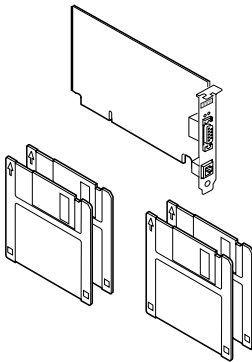
You need an IBM PC or an IBM compatible computer with an empty ISA or EISA slot and a 3-1/2 inch diskette drive.

For the IBM Turbo 16/4 Token-Ring ISA Adapter, you also need four or five high-density, blank, formatted diskettes for making backup copies. See "Contents of the IBM Turbo 16/4 Token-Ring ISA Adapter Kit" for information about preparing to install the IBM Turbo 16/4 Token-Ring ISA Adapter.

For the IBM Auto Wake Token-Ring ISA Adapter, you also need four high-density, blank, formatted diskettes for making backup copies. See "Contents of the IBM Auto Wake Token-Ring ISA Adapter Kit" on page 2-2 for information about preparing to install the IBM Auto Wake Token-Ring ISA Adapter.

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### Contents of the IBM Turbo 16/4 Token-Ring ISA Adapter Kit



*Figure 2-1. Adapter Kit Contents*

In addition to this manual, the adapter kit consists of:

- The IBM Turbo 16/4 Token-Ring ISA Adapter
- Four diskettes:

- Diskette 1: LANAID
- Diskette 2: Device Drivers
- Two IBM LAN Client diskettes
- *Caution: Safety Information – Read This First* booklet

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

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## Contents of the IBM Auto Wake Token-Ring ISA Adapter Kit

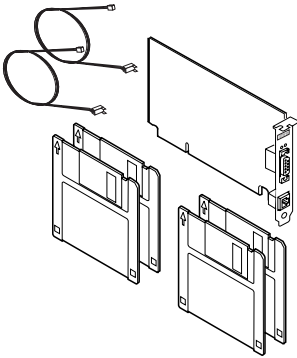


Figure 2-2. Adapter Kit Contents

In addition to this manual, the adapter kit consists of:

- The IBM Auto Wake Token-Ring ISA Adapter
- Two Wakeup signal cables
- Four diskettes:
  - Diskette 1: LANAID
  - Diskette 2: Device Drivers
  - Two IBM LAN Client diskettes
- *Caution: Safety Information – Read This First* booklet

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

## Other Hardware

To connect the Token-Ring ISA Adapter to a Token-Ring network, you need one of the cables described in Table 2-1 on page 2-4 and shown in Figure 2-3. The table describes the cables' connectors.

The recommended cable for connection of the adapter to the network is the IBM Token-Ring RJ-45 STP Adapter Cable or the Token-Ring UTP Cable.

IBM cannot accept responsibility for any interference caused by your use of other than the recommended cables and connectors.

**Note:** This adapter is fully Class B when used with STP cabling. However, when using this adapter in a residential environment with UTP cabling and your equipment is required to comply with FCC Class B, EN5022 Class B, or VCCI Class B concerning limits on radio interference, you must use a shielded power cord to attach your PC to the ac outlet. Otherwise, this adapter will comply with Class A emission limits only. IBM recommends shielded power cord, part number 6952304, or its equivalent for attaching your PC to the ac outlet. For countries other than the U.S. and Canada, please see "Shielded Power Cord Notices for UTP Media" on page D-7 for more information. Also see "Electronic Emission Notices for UTP Media" on page D-5 for more details.

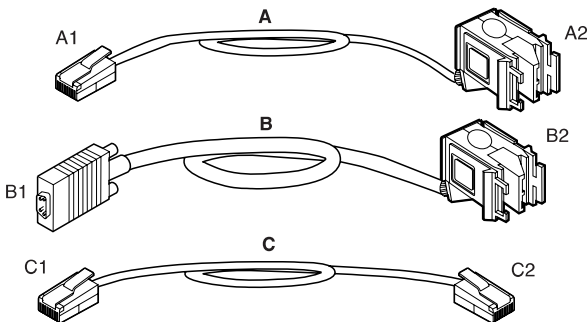


Figure 2-3. STP and UTP Adapter Cables

**Attention:** Only one data cable can be connected to the Token-Ring ISA Adapter at a time.



Table 2-1 describes the cables displayed in Figure 2-3 on page 2-3.

*Table 2-1. STP and UTP Cables*

<b>Callout</b>	<b>Cable or End</b>	<b>Description</b>
<b>A</b>	IBM Token-Ring RJ-45 STP Adapter Cable	IBM P/N 60G1063 or equivalent
<b>A1</b>	• Connector, adapter end	8-position, RJ-45 modular plug. Pin layout is described in Figure 2-4 on page 2-5.
<b>A2</b>	• Connector, network end	IBM Cabling System Data Connector or equivalent
<b>B</b>	IBM Token-Ring Network PC Adapter Cable or equivalent Token-Ring STP cable	IBM P/N 6339098 or equivalent
<b>B1</b>	• Connector, adapter end	9-position D, male
<b>B2</b>	• Connector, network end	IBM Cabling System Data Connector or equivalent
<b>C</b>	Token-Ring UTP cable—two twisted pairs of UTP cabling	For 4-Mbps Token Rings, EIA/TIA-568 category 3 or equivalent. For 16-Mbps Token Rings, EIA/TIA-568 category 4 or equivalent.
<b>C1</b>	• Connector, adapter end	8-position, RJ-45 modular plug
<b>C2</b>	• Connector, network end	8-position, RJ-45 modular plug or 6-position, RJ-11 modular plug. Pin layout is described in Figure 2-4 on page 2-5.

Modular UTP connectors (RJ-11 and RJ-45) and their pin layouts are described in Figure 2-4 on page 2-5. Note that pinouts for token-ring connectors are not the same as those for Ethernet.

ADAPTER END RJ-45 Modular Connector			UTP Cable	NETWORK END RJ-45 Modular Connector		
Twisted Pair	Signal Name	Pin		Pin	Signal Name	
2	TD -	3	—————	3	TD -	
1	RD+	4	—————	4	RD+	
1	RD -	5	—————	5	RD -	
2	TD+	6	—————	6	TD+	
(Not used)		1, 2, 7, 8		1, 2, 7, 8	(Not used)	

ADAPTER END RJ-45 Modular Connector			UTP Cable	NETWORK END RJ-11 Modular Connector		
Twisted Pair	Signal Name	Pin		Pin	Signal Name	
2	TD -	3	—————	2	TD -	
1	RD+	4	—————	3	RD+	
1	RD -	5	—————	4	RD -	
2	TD+	6	—————	5	TD+	
(Not used)		1, 2, 7, 8		1, 6	(Not Used)	

Figure 2-4. UTP Adapter Cable Detail

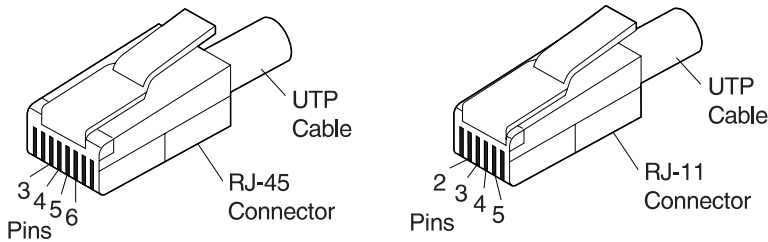


Figure 2-5. UTP Connectors

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## Other Software

The Token-Ring ISA Adapter can be used in a computer with any of the network environments listed.

Table 2-2 describes the network environments that are compatible with the Token-Ring ISA Adapter. Verify that you have the required software for your computer's network environment.

*Table 2-2 (Page 1 of 3). Supported Network Environments*

<b>Environment</b>	<b>Software Needed</b>
NetWare Server	Novell NetWare Version 3.12 or higher or Version 4.1 or higher
NetWare Client with DOS or DOS with Windows	<ul style="list-style-type: none"> <li>• Either NetWare DOS Requester or IBM LAN Client</li> <li>• IBM DOS Version 3.3 or higher</li> </ul>
NetWare Client with OS/2	<ul style="list-style-type: none"> <li>• NetWare Requester for OS/2</li> <li>• IBM Operating System/2 (OS/2) Version 1.3 or higher</li> </ul>
LSP Custom with DOS or DOS with Windows	<ul style="list-style-type: none"> <li>• LSP Custom</li> <li>• A network application that uses the IEEE 802.2 or NetBIOS protocol, such as IBM Personal Communications/3270 Version 3.0 or the DOS LAN Requester feature of IBM OS/2 LAN Server or DOS LAN Services (DLS).</li> <li>• IBM DOS Version 3.3 or higher</li> </ul>
DOS Client with DOS or DOS with Windows	Either DOS LAN Services (provided with LAN Client) or IBM LAN Client

Table 2-2 (Page 2 of 3). Supported Network Environments

Environment	Software Needed
LSP stand-alone with DOS	<ul style="list-style-type: none"> <li>• LSP (stand-alone) If your computer contains a second LAN adapter that is not a Token-Ring ISA Adapter, you need LSP (stand-alone) Version 1.3 or higher. The LAN Support Program (stand-alone) is a separate product from IBM that is not shipped with the Token-Ring ISA Adapter.</li> <li>• A network application that uses the IEEE 802.2 or NetBIOS protocol, such as IBM Personal Communications/3270 Version 3.0 or the DOS LAN Requester feature of IBM OS/2 LAN Server or DOS LAN Services (DLS).</li> <li>• IBM DOS Version 3.3 or higher</li> </ul>
OS/2 with IBM LAN Transports	<ul style="list-style-type: none"> <li>• IBM LAN Transports feature of one of the following products: <ul style="list-style-type: none"> <li>– IBM LAN Transports</li> <li>– IBM Network Transport Services/2</li> <li>– Extended Services for OS/2 Version 1.0</li> <li>– OS/2 LAN Server Version 2.0 or higher</li> <li>– TCP/IP for OS/2</li> </ul> </li> <li>• A network application that uses the IEEE 802.2 or NetBIOS protocol, such as: <ul style="list-style-type: none"> <li>– OS/2 LAN Server</li> <li>– OS/2 Communication Manager Version 1.11</li> </ul> </li> <li>• IBM OS/2 Version 1.3 or higher</li> </ul>
OS/2 with MPTS	<p>MPTS feature of one of the following products:</p> <ul style="list-style-type: none"> <li>• OS/2 Warp Connect</li> <li>• OS/2 Warp Server</li> <li>• LAN Server 4.0</li> </ul>
LAN Manager with DOS or OS/2	<ul style="list-style-type: none"> <li>• Microsoft LANManager Version 2.2x</li> <li>• IBM DOS 3.3 or higher <i>or</i></li> <li>• OS/2 Version 1.3 or higher</li> </ul>
Windows NT	Microsoft Windows NT Version 3.5 or higher



*Table 2-2 (Page 3 of 3). Supported Network Environments*

<b>Environment</b>	<b>Software Needed</b>
Windows 95	Microsoft Windows 95
Other DOS stations	<ul style="list-style-type: none"><li>• Any network application that uses an NDIS-compliant driver.</li><li>• IBM DOS 3.3 or higher</li></ul>
Other OS/2 stations	<ul style="list-style-type: none"><li>• A network application that uses an NDIS-compliant driver</li><li>• IBM OS/2 Version 1.3 or higher</li></ul>
Windows for Workgroups	<ul style="list-style-type: none"><li>• Microsoft Windows for Workgroups 3.11 or higher</li><li>• IBM DOS 3.3 or higher</li></ul>



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## Chapter 3. Installing the Adapter

This chapter describes installation of the IBM Auto Wake Token-Ring ISA Adapter or the IBM Turbo 16/4 Token-Ring ISA Adapter in your computer.

See "Installing the IBM Auto Wake Token-Ring ISA Adapter" on page 3-4 or "Installing the IBM Turbo 16/4 Token-Ring ISA Adapter," depending on which adapter you are installing.

**Windows 95 Users:** Before installing the adapter, you must run FIXWIN95.BAT. Insert Diskette 2: Device Drivers and type **FIXWIN95**.

Before installing either adapter, be sure to read "Electronic Emission Notices for STP Media" on page D-2 and "Electronic Emission Notices for UTP Media" on page D-5.

Diskette 1: LANAIID has a README.1ST file. It is recommended that you read this file before continuing.

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### Installing the IBM Turbo 16/4 Token-Ring ISA Adapter

The following steps describe installing the adapter in most computers.

- 1** Make backup copies of the Token-Ring ISA Adapter diskettes, using the DOS command DISKCOPY. Store the original diskettes in a safe place.
- 2** Make a note of the number imprinted on the adapter as explained in "Understanding the Adapter Labels" on page 3-8. You might need to know the MAC address later.
- 3** Switch OFF the computer and all attached devices.
- 4** Disconnect all cables, including the power cable. For convenience, label your cables for correct reconnection.

**Note:** In the United Kingdom, by law, telephone line cables must be disconnected from the computer before the power cord.

**5** Follow the instructions provided in your computer manual for removing the cover or otherwise accessing the adapter slots, then insert the adapter.

**6** Reinstall the computer cover and reconnect the cables as described in your computer manual. Follow all safety instructions.

**Note:** In the United Kingdom, by law, the power cord must be connected before the telephone line cables.

**7** Connect the network cable to the adapter and to the network (see Figure 3-1 on page 3-3).

**Attention**

Only one network cable may be attached to the adapter at one time.

**Note:** The Token-Ring ISA Adapter has been tested with both STP cable and UTP cable. See Appendix D, "Notices and Product Warranty" for detailed emissions information.

**Attention**

If using the Token-Ring ISA Adapter in a residential environment with UTP cabling, you *must* use a shielded power cord to attach your computer to the ac outlet in order to be Class B compliant. For more information, see Appendix D, "Notices and Product Warranty."

**8** You have completed the physical installation of the Token-Ring ISA Adapter. Now the adapter must be configured for your system. To configure your adapter using LANAIID 2.2 or higher, go to Chapter 4, "Configuring the Adapter with LANAIID."

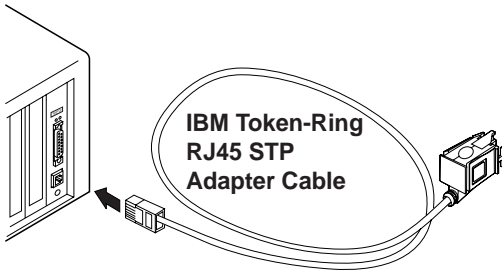
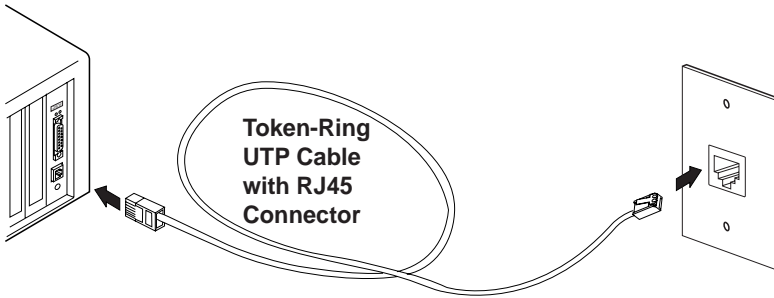
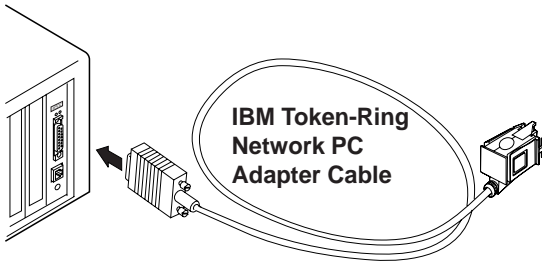


Figure 3-1. Connecting an Adapter Cable





## Installing the IBM Auto Wake Token-Ring ISA Adapter

- 1** Make backup copies of the Token-Ring ISA Adapter diskettes, using the DOS command DISKCOPY. Store the original diskettes in a safe place.
- 2** Make a note of the number imprinted on the adapter as explained in "Understanding the Adapter Labels" on page 3-8. You might need to know the MAC address later.
- 3** Switch OFF the computer and all attached devices.
- 4** Disconnect all cables, including the power cable. For convenience, label the cables for correct reconnection.

**Note:** In the U.K., by law, telephone line cables must be disconnected from the computer before the power cord.

### Attention

Ensure that your computer is unplugged from the electrical outlet. Power is always supplied to the power connector that attaches to the Auto Wake adapter, even when the system power switch is OFF.

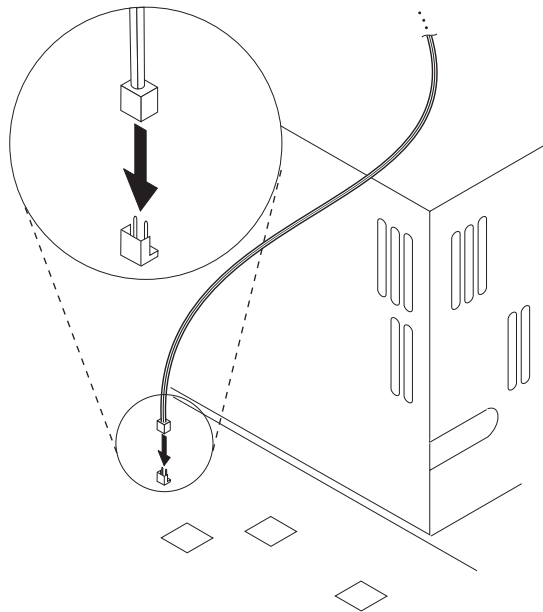
- 5** Follow the instructions provided in your computer manual for removing the cover or otherwise accessing the adapter slots, then insert the adapter.
- 6** Two Wake on LAN cables were shipped with your new adapter. Determine which to connect to your adapter in the following manner.
  - If your computer has a power supply cable marked **P9** or **P12**, then you must use Wake on LAN cable part number 42H2397. This cable has two connectors: one for the IBM Auto Wake Token-Ring ISA Adapter and one for the planar (mother board).
  - If the cable from the power supply is not present, then you must use Wake on LAN cable part number 76H7254. This cable has three connectors: two for the IBM Auto Wake

Token-Ring ISA Adapter and one for the planar (mother board).

**7** Connect the cables to your new IBM Auto Wake Token-Ring ISA Adapter as follows:

- Connect one end of the Wake on LAN cable to the planar. If you are using the two-connector cable, part number 42H2397, the signal connector on the planar has two pins as shown in Figure 3-2. If you are using the three-connector cable, part number 76H7254, this connector has three pins.

See your computer documentation for location of the connector.



*Figure 3-2. Wake on LAN Signal Connector on the Planar*

- Connect one end of the Wake on LAN cable to the appropriate connector on the adapter as shown in Figure 3-3 on page 3-6.

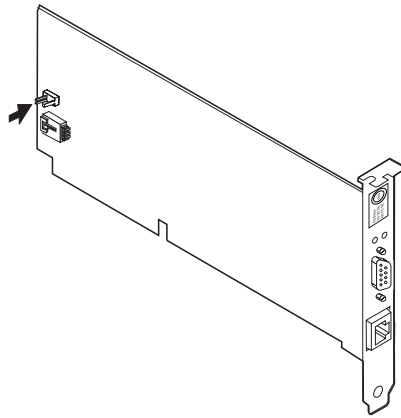


Figure 3-3. Connecting Cables to the Adapter

- If you are using the three-connector cable, part number 76H7254, connect the third end to the appropriate connector on the adapter. See Figure 3-3.

Otherwise, connect the power supply cable to the adapter. See Figure 3-3.

- 8** Re-install the computer cover and reconnect disconnected cables as described in your computer manual. Follow all safety instructions.

**Note:** In the U.K., by law, the power cord must be connected before telephone line cables.

- 9** Connect the network cable to the adapter and to the network (see Figure 3-1 on page 3-3).

**Attention**

Only one network cable may be attached to the adapter at one time.

**Note:** The Token-Ring ISA Adapter has been tested with both STP cable and UTP cable. See Appendix D, "Notices and Product Warranty" for detailed emissions information.

**Attention**

If using the Token-Ring ISA Adapter in a residential environment with UTP cabling, you *must* use a shielded power cord to attach your computer to the ac outlet in order to be Class B compliant. For more information, see Appendix D, "Notices and Product Warranty."

- 10** You have completed the physical installation of the Token-Ring ISA Adapter. Now the adapter must be configured for your system. To configure your adapter using LANAIID 2.2 or higher, go to Chapter 4, "Configuring the Adapter with LANAIID."

**About the Wake on LAN Feature**

The Wake on LAN feature can be enabled or disabled using your system configuration utility. Refer to your computer documentation for details about the configuration utility.

When the computer power is OFF, the IBM Auto Wake Token-Ring ISA Adapter constantly monitors the LAN for a Wakeup frame. When a Wakeup frame is detected, the IBM Auto Wake Token-Ring ISA Adapter signals the computer to switch ON the power supply.

The Wakeup frame can be a broadcast or an individually addressed frame. The following data is required, and can occur anywhere in the data portion of the Wakeup frame.

- 6 bytes of X'FF' followed by:
- 48-bit destination address, repeated 8 or more times. Eight repetitions are required; more than eight are acceptable.

The destination address can be the MAC address or a locally administered address.

You have completed the physical installation of the Token-Ring ISA Adapter. Now the adapter must be configured for your system. To configure your adapter using LANAIID 2.2 or higher, go to Chapter 4, "Configuring the Adapter with LANAIID."



## Understanding the Adapter Labels

Figure 3-4 shows the two labels on the bracket of the Token-Ring ISA Adapter.

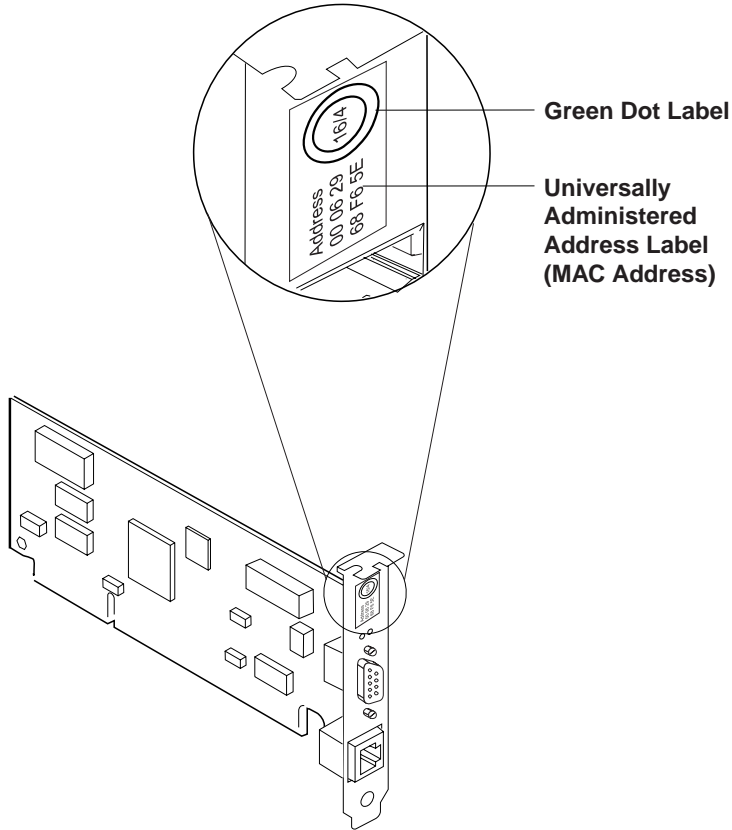


Figure 3-4. The Adapter Labels

The *universally administered address label* contains the adapter's universally administered address. This is the unique MAC address that was stored in the adapter memory at the factory. This 12-digit, hexadecimal address is recorded on the label in 2-digit increments from left to right, starting on the top row. In Figure 3-4 on page 3-8, the MAC address is X'0004 A000 0001' in noncanonical format (most significant bit first). If you want the adapter to be known on

the network by a locally administered address, you must configure the adapter's device driver to use a locally administered address.

You need to know the MAC address because the LAN Adapter Installation and Diagnostic Version 2.2 program identifies each installed Token-Ring ISA Adapter by this address. All installed adapters are shown in the list on the Main Menu by their address. The universal address on the label is displayed on the LAN AID panel, along with the alternate (canonical) format.



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## Chapter 4. Configuring the Adapter with LANAIID

After you have physically installed the adapter, you must configure it to operate with the hardware in your system. Your Token-Ring ISA Adapter is shipped with Plug and Play activated. If you are using a computer that is *not enabled* for Plug and Play, you must run LANAIID 2.2 or higher to configure your non-Plug and Play system.

Plug and Play computers do not require you to run LANAIID, because the adapter can be configured automatically by the computer. However, you can use LANAIID to set parameters manually for your Plug and Play computer, if desired.

If your computer is Plug and Play-enabled and you do not want to manually set adapter configuration parameters, you can skip the configuration process and go directly to Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1." You should be aware of any potential conflicts with other devices in your system when using this method. The configuration parameters are: RPL, Auto-Sense, Ring Speed, and Bus Width. The default for RPL and Auto-Sense is *enabled*, and for Ring Speed and Bus Width is 16.

### Notes:

1. Your Token-Ring ISA Adapter comes with a version of LANAIID 2.2 or higher that is unique to this adapter type. Other types of adapters, such as Ethernet adapters, cannot be configured with this LANAIID; however, you can use this LANAIID with older Token-Ring ISA Adapters.
2. Older versions of LANAIID are not compatible with LANAIID 2.2 or higher. Replace old copies with the current version. Current versions of LANAIID are available from the IBM Internet Web site **[www.networking.ibm.com/nes/neshome.html](http://www.networking.ibm.com/nes/neshome.html)**
3. Diskette 1: LANAIID has a README.1ST file. It is recommended that you read this file before continuing.



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## Installing and Starting LANAIID 2.2 or higher

Before running LANAIID, make sure that you have installed your adapter as described in Chapter 3, "Installing the Adapter."

### Install LANAIID

#### DOS and Windows 3.1x users

The LANAIID graphical user interface (GUI) operates under DOS or in a *full-screen* DOS session of Windows 3.1x. (A DOS "window" of Windows 3.1x will not work correctly.) You need at least 1.5 MB of free, extended memory and 300 KB of conventional memory to run the program. If your computer does not meet these requirements, then you can use LANAIIDC. To use LANAIIDC, go to "LANAIIDC Command Line Program" on page 4-5.

#### Windows 95 users

To boot DOS from Windows 95, restart the computer. When Starting Windows 95 is displayed, press **F8**, then select **Command prompt only** from the menu.

#### Windows NT and OS/2 Users

Windows NT users who do not have a DOS partition, and who want to change configuration parameters from the default values, must boot the LANAIID 2.2 or higher diskette and use LANAIIDC to configure the adapter. See "LANAIIDC Command Line Program" on page 4-5. However, if you have a DOS partition with DOS 5.0 or higher, you can boot DOS and then use the LANAIID GUI to configure the adapter.

Another useful method is to install and configure the adapter on another computer, and then move it to the Windows NT system. If you choose this method, ensure that there are no configuration conflicts between the two systems by configuring the adapter for resources known to be available in the target system.

## Start LANAIID

When at the DOS prompt, insert Diskette 1: LANAIID in drive A and then enter **A:INSTALL**.

The installation program asks you which drive, path, and directory you want to use for LANAIID. You can let it default to C for the drive and \LANAIID for the directory or you can enter new values. Press **Enter** for each entry.

The files are automatically decompressed and copied to the target directory. When this is completed, the LANAIID program is automatically invoked.

**Note:** To run LANAIID in the future, you can select the drive and directory on which you installed LANAIID, and then type **LANAIID**.

## Configuring with LANAIID

LANAIID options can be selected in at least two ways. You can click with a mouse or other pointing device, or you can make selections by tabbing to your selection and pressing Enter. (If you will be using a mouse with LANAIID, make sure that you have a mouse driver installed.) Push buttons can also be selected with *hot keys*. The hot keys are the letters that correspond to the underlined characters on the push button. Press **Alt** plus the hot-key letter.

- 1** When LANAIID starts, the copyright window is displayed, followed by the first selection window. The MAC addresses of the Token-Ring ISA Adapters found are presented.
- 2** Click the down arrow at the right of the box to display the list of IBM Token-Ring adapters installed in this computer. Highlight the one you want to configure.
- 3** Under Select a function below, select **Adapter Configuration**.
- 4** The next window is displayed in *folder* format. The folders' names are at the top of the window. To change from one to another, just click the name at the top of the folder.

The folder named **Hardware** is for information only. It displays the serial number of your adapter. The one named

**Configurable** contains all the configurable parameters that apply to your adapter.

If any value is in conflict with other values in your system, there will be a red and white sign, containing an exclamation point beside that value.

**Note:** In *non-Plug* and *Play* computers, you must use the **Configurable** folder in order to disable the *Plug and Play* feature of your adapter.

- 5** On the lower left are four push buttons: **Suggest**, **Default**, **Change**, and **Store**. Beneath these are three more: **Done**, **Cancel**, and **Help**.

To accept all default values, simply select **Done**.

To let the computer choose parameters for you, select **Suggest**. The **Suggest** button will select a set of valid parameters for you that do not conflict with your current configuration. To accept these values, select **Done**.

To set the parameter values yourself, select **Change**. The *Change Configuration* folder is presented. It has three parts: *Plug and Play*, *Other Parameters*, and *Adapter Modes*. In the *Plug and Play* window, make any changes that you choose. Next, select **Other Parameters**. Make any changes that you choose.

If you have made any changes, you must select **Store**, and then **Exit**. See "Systems with *Plug and Play* BIOS" on page 4-9 for more information about *Plug and Play* resources.

**Notes:**

1. If your computer or operating environment does not support *Plug and Play*, you must select **Disable** in the *Plug and Play* window of the **Configuration** folder.
2. Your adapter will not function if conflicts exist in the target operating environment, that is, if other devices in the computer have conflicting addresses or characteristics.

---

## Determining Plug and Play Status

You can determine whether or not your adapter is enabled for Plug and Play in either of two ways: The required method for Windows 95, OS/2, and Windows NT systems is to:

- Boot the LANAID diskette.
- Select **LANAIDC** from the menu.
- Enter **/V**.

Alternatively, you can:

- Go to a DOS session or to a full-screen DOS session of Windows 3.1x.
- Insert Diskette 1: LANAID in drive A.
- Enter **A:LANAIDC /V**.

The configuration setting will tell you whether or not your computer is enabled for Plug and Play. See "Systems with Plug and Play BIOS" on page 4-9 for a more complete description of the configurations.

---

## LANAIDC Command Line Program

LANAIDC is a command-line installation tool that can be used to perform automated adapter installation. LANAIDC must be run from DOS or from a *full-screen* DOS session of Windows 3.1x

To learn how to use a LANAIDC batch file to simplify configuration of adapters on multiple computers, see "Using LANAIDC in Batch Mode" on page 4-6.

## Running LANAIDC from the LANAID Boot Diskette

Boot the LANAID diskette and select **LANAIDC** from the menu. After booting Diskette 1: LANAID, you can enter **/H** for a listing of all the LANAIDC parameters and their use. Then, simply enter parameters in the form:

```
/parm /parm /parm
```

## Running LANAIDC from a DOS Prompt

To start LANAIDC manually, go to the directory where you installed the LANAID files, or insert your LANAID diskette in drive A and go to the A: prompt. To get a list of all the LANAIDC command line parameters and the help text that goes with each, enter **LANAIDC /H**.

To determine the current adapter settings, including the adapter serial number, enter **LANAIDC /V**.

Once you have determined which values you want to set or change, enter the LANAIDC command with parameters. The format for the LANAIDC command is:

```
LANAIDC /parm /parm /parm ...
```

When you have finished setting the adapter configuration parameters with LANAIDC, go to "Supported Operating Systems" on page 5-1.

---

## Using LANAIDC in Batch Mode

Using a batch file, you can invoke LANAIDC with your choice of parameters.

### Creating the Batch File

A batch file can be a valuable tool in environments where many similar computers are being upgraded with the same characteristics.

To create a batch file, use a text editor and name the file *nnnnnnnn.BAT*, where *nnnnnnnn* is a DOS text file name of up to 8 characters. Save the batch file on your hard disk in the directory where LANAID is installed, usually C:\LANAID.

An example of a LANAIDC batch file follows:

```
LANAIDC /ADAPTER=1 /FAST=ENHANCED
```

Parameters begin with a slash (/), are separated by one or more spaces, and must all be on the same line. If it is impossible to get all your parameters on one line, you can use the *File* parameter. See "Using the FILE Parameter with LANAI DC" on page 4-7.

### Executing the Batch File

To execute a LANAI DC batch file:

- At a DOS prompt, get to the drive and directory where LANAI DC is installed, usually C:\LANAI DC.
- Invoke the batch file by entering its name.

**Note:** Windows 95 and OS/2 users should refer to note 3 on page 4-1. Windows NT users should refer to "Windows NT and OS/2 Users" on page 4-2.

---

## Using the FILE Parameter with LANAI DC

You can create a text file that contains only the LANAI DC parameters. This is valuable if you want to use more parameters than will fit on the DOS command line. Parameter files can be created with any text editor and might look similar to this:

```
/ADAPTER=1  
/CONFIG=AUTOMATIC /RS=16 /AUTO=N
```

In this case, file parameters are separated by spaces and may be on one or more lines. The file name must be acceptable to DOS.

When you have finished editing the parameter file, save it on the drive and directory where LANAI DC is stored. This is usually C:\LANAI DC.

- To use your parameter file from your hard disk, go to the drive and directory where LANAI DC is stored and then enter **LANAI DC /FILE=*filename*** where *filename* is the name of the parameter file, including the drive and path, if different from the current drive and path.

- To invoke LANAIDC using the FILE parameter from the LANAID diskette, boot the LANAID diskette. On the LANAID command line enter **/FILE=filename**, where *filename* is the name of the parameter file, including the drive and path, if different from the current drive and path.

For a description of the available LANAIDC parameters, enter **LANAIDC /H**. An abbreviated version of LANAID help is presented by simply typing LANAIDC.

### **Error Messages with LANAIDC**

In a system that is enabled for Plug and Play, and that was configured manually, the system BIOS might determine that there is a conflict and that it cannot configure the Token-Ring ISA Adapter. In this case, it will not activate the adapter, and will assign 0 to the resource that is in conflict. One or more of the following messages might be observed:

<<Warning>> Forcing adapter I/O to A20 ... resource found set to zero

<<Warning>> Forcing adapter ROM to C200 ... resource found set to zero

<<Warning>> Forcing adapter RAM to C800 ... resource found set to zero

<<Warning>> The adapter configuration found was not valid

You must change the configuration setting indicated in the message, or use your BIOS setup utility to ensure that the resource is not being claimed by some other adapter.

---

## Systems with Plug and Play BIOS

LANAID offers three choices for configuring your Token-Ring ISA Adapter. You should understand the use of all the choices before you select one of them. Your Token-Ring ISA Adapter comes configured for Plug and Play. On the Configurable page of the folder presented:

### Plug and Play automatic configuration

If your system is enabled for Plug and Play, then the adapter should be configured for Plug and Play as well. This is the default recommended by LANAID when Plug and Play system software or BIOS is detected. With this option, your Token-Ring ISA Adapter is configured automatically by the Plug and Play BIOS, using valid options. All resource choices are available to the Plug and Play BIOS. The adapter will power up inactive, waiting to be activated by the Plug and Play system. The Plug and Play system will select the resource assignments for the adapter.

Some systems, including IBM ThinkPad and older non-Plug and Play computers, configure only adapters that are *required by the system to boot*. These systems cannot use the Automatic setting.

### Manual (locked) configuration for Plug and Play systems

This selection allows you to set your own options for a system that is Plug and Play enabled, while leaving the adapter Plug and Play enabled. Use this option if you want to allow Plug and Play to configure the adapter to use your choice of resources.

### Manual configuration for non-Plug and Play (legacy) systems

This selection configures the adapter as a legacy ISA device by disabling the adapter's Plug and Play feature. You must use this option when you are installing the adapter in a system that is not Plug and Play-enabled.

You can also use this option to control adapter resource assignments in a Plug and Play system, but if you do, you must also use the system's BIOS setup utility to reserve the resources you assign to the adapter in the legacy ISA resources section. To avoid having to use the BIOS setup utility, it is recommended that you select manual (locked) configuration for Plug and Play systems instead.



**Note:** This setting can be required for some Plug and Play-enabled systems, depending on the implementation. For example, some IBM ThinkPad and Aptiva computers require this setting to be used when RPL is disabled on the adapter.

### **Resources Set to 0**

In a Plug and Play-enabled system that has the adapter configured for Plug and Play with options set manually, a resource can be set to 0 by the system BIOS. If you get a message from LANAIDC indicating that a resource was found set to 0, change the configuration setting indicated in the message or use your BIOS setup utility to ensure that the resource is not being claimed by another adapter.

---

## **Using the Token-Ring ISA Adapter in an EISA Computer**

EISA is an enhancement of the ISA technology that includes several improvements including an improved configuration mechanism. The Token-Ring ISA Adapter will work normally in an EISA system but will not take advantage of the improvements. If your EISA system has Plug and Play support, then the configuration utility can find and configure the adapter without loading the EISA configuration file.

When you install a Token-Ring ISA Adapter in an EISA system, you can still use LANAID to install and configure the adapter. However, you should also run the configuration utility to *manually* set the adapter's parameters to those selected with LANAID. This writes the settings into the EISA computer's configuration database and ensures that adapters that are installed later cannot use the same values.

If your system does not have Plug and Play support, configure your adapter using LANAID (manual, non-Plug and Play system) and then use your EISA configuration utility to tell the EISA system how and where you configured the adapter. This will prevent the EISA configuration utility from assigning used resources to the adapters.

To ensure that the adapter's resources are included in the database, perform the following steps:

- Perform the LANAIID configuration process and note the Interrupt, I/O Address, RAM Address, and ROM Address assigned by LANAIID.
- Run the EISA configuration utility supplied with your computer, and select the option to add an adapter. Add the Token-Ring ISA Adapter by inserting Diskette 1: LANAIID.
- When the utility has added the adapter, select the option to view or edit details to see the resources assigned by the EISA utility. Edit the Interrupt, I/O Address, RAM Address, and ROM Address and make them identical to those assigned by LANAIID.
- Save the configuration. These resources will be assigned in the configuration database and cannot be assigned to adapters installed later.

Remember that the EISA configuration utility does not configure the Token-Ring ISA Adapter. This process is to ensure that other adapters are not configured to resources used by this adapter.

---

## Compatibility with Previous and Third-Party Drivers

To use the IBM Turbo 16/4 Token-Ring ISA Adapter with device drivers that were shipped with other adapters, select **Auto 16/4 Mode** in LANAIID. Select the change button in the Configurable folder to go to the Change Configuration Parameters panel. Select the **Adapter Modes** folder on this panel.

To use the IBM Turbo 16/4 Token-Ring ISA Adapter or the IBM Auto Wake Token-Ring ISA Adapter with device drivers that were shipped with the IBM Turbo 16/4 Token-Ring ISA Adapter, select **ISA 16 Mode** in LANAIID. Select the change button in the Configurable folder to go to the Change Configuration Parameters panel. Select the **Adapter Modes** folder on this panel.

When using Ring Speed Auto-Sense with device drivers prior to the Auto 16/4 adapters, an incorrect initial ring speed will require an additional reboot to select the current speed.



---

## **Compatibility with Shadowing**

If shadowing is in use, you should disable shadowing of BIOS (shadow RAM) or shadow cache for the memory (RAM and ROM) used by this adapter, if it is configurable with the System BIOS Configuration Setup Utility shipped with your system. In some machines you do not need to disable both the shadow RAM and shadow cache. This utility is usually accessed during power-on of the system with keystrokes that are unique to each manufacturer. Refer to the documentation shipped with your machine to access this utility.



---

## Chapter 5. Installing IBM LAN Client for DOS or Windows 3.1

This chapter describes IBM LAN Client, and tells you how to install it using LAN AID 2.2 or higher. If you determine that you do not want to or cannot use IBM LAN Client, then skip to Chapter 6, "Device Driver Installation."

### Supported Operating Systems

IBM LAN Client supports the following desktop operating systems:

- MS-DOS 5.x and 6.x
- PC-DOS 5.x, 6.x, and 7.0
- Windows 3.1 and 3.11, in enhanced mode
- Windows for Workgroups 3.11

If you are using one of these operating systems, you can install and use IBM LAN Client. Otherwise, go to Chapter 6, "Device Driver Installation" to install your device drivers.

If you are not certain whether you want to install IBM LAN Client on your computer, read the LAN Transport section of the Networking Environment Support web site:

**<http://www.networking.ibm.com/nes/neshome>**

---

### About IBM LAN Client

IBM LAN Client provides program interfaces to support network application programs using selected IBM Token-Ring and Ethernet adapters. It allows a client workstation to communicate with an IBM LAN Server at Version 3.0, 4.0, and Warp Server, or with a Novell NetWare Server at Version 2.15c or higher, or to use TCP/IP applications. (The IBM and Novell IntranetWare Client code is included with this package but, with the exception of PING, TCP/IP applications are not.) Support is provided for programs written to the NetBIOS or IEEE 802.2 application programming interfaces.

In addition, IBM LAN Client provides support using one adapter-specific LAN device driver instead of two different kinds of drivers for your clients and servers. You select the appropriate device drivers and protocol stacks for your computer. The correct modules are automatically loaded, based on the options you select.

## **IBM LAN Client Features**

- As little as 4 KB conventional memory required. (See "DOS Conventional Memory Usage and Reduction" on page 5-3 for more details.)
- One common environment for concurrent multiple protocols.
- One or more of NetBIOS, IPX, TCP/IP, and IEEE 802.2.
- Shim modules, such as ODINSUP and LANSUP, are not needed.
- Includes client software for attachment to Novell NetWare Servers and IBM LAN Servers.
- Supports DOS LAN Services 5.x.
- New Novell IntranetWare Client for DOS/Windows.
- Provides full access to essential NetWare services such as NetWare Directory Services (NDS).
- Provides improved connection reliability, including the ability to auto-reconnect open files.
- Provides enhanced Large Internet Packet (LIP) and Packet Burst support.
- Includes an installation tool with a GUI for easy installation of client software.
- Includes a command-line version of the installation tool for use by network administrators installing on a large number of workstations.
- Allows the same adapter device driver to be used for client workstations and for Novell NetWare servers, reducing support complexity.

## DOS Conventional Memory Usage and Reduction

LAN Client minimizes the use of DOS conventional memory for network communications. With IBM LAN Client, IBM LAN adapter drivers and protocol stacks no longer require large amounts of DOS memory below 1 MB. The tables in this section show how little memory is required for IBM LAN Client, compared with existing implementations. The following table shows how little memory is required for IBM LAN Client compared to existing implementations. This table shows how much DOS conventional memory is used by IBM LAN Client for three popular communication protocols, compared with current usage.

*Table 5-1. IBM Auto 16/4 ISA and MC Adapter Memory Reduction Table*

<b>Protocol</b>	<b>Before IBM LAN Client</b>	<b>With IBM LAN Client</b>
IPX	32 KB	5 KB
IEEE 802.2	9 KB	4 KB
NetBIOS	32 KB	4 KB

## Supported Software

IBM LAN Client provides support for the following protocols and client applications:

### For DOS 5.0 or higher:

- IEEE 802.2
- NetBIOS
- DOS LAN Services 5.x (with IBM Warp Server)
- Novell IntranetWare Client (IPX/SPX) (with Novell NetWare 2.15c and higher)
- Novell IntranetWare Client
- PC3270 Version 4.x
- DCAF (Version 1.3 + CSDs)
- Artisoft LANtastic Version 6.0 (not supported with the IBM EtherJet ISA adapters or IBM EtherJet PC Card adapter)

- Attachmate 3270 Emulation
- LANDP (If you are using Version 2, make sure that the service level of LAN.EXE is MS004 or higher.)

### **For Windows 3.1, Windows 3.11, and Windows for Workgroups 3.11:**

- IEEE 802.2
- NetBIOS
- DOS LAN Services 5.x (with IBM Warp Server)
- Novell IntranetWare Client (IPX/SPX) (with Novell NetWare 4.x)
- AS/400 for Windows (Version 4.0, V3R1M0, and V3R1M1, 802.2 only, AnyNet TCP/IP not supported)
- TCP/IP using Winsock 1.1 or 1.2
- PC3270/Windows Version 4.x
- Artisoft LANtastic Version 6.0
- APPC/Windows

**Note:** IBM LAN Station Manager cannot be run in the same workstation as IBM LAN Client.

### **Related Documentation**

In addition to this document, you might need to consult the following publications:

- The appropriate LAN adapter documentation (provided with the adapter)
- *IBM LAN Technical Reference IEEE 802.2 and NetBIOS Application Programming Interfaces*, SC30-3587
- *IBM LAN Server Command and Utilities*, S10H-9686
- *IBM Guide to LAN Server Books*, S10H-9688
- *IBM DOS LAN Services and Windows User's Guide*, S10H-9684
- Manuals for Novell IntranetWare Client and Novell NetWare Server 4.
- Manuals for Novell TCP/IP interface

**Note:** IBM documentation can be obtained from your IBM marketing representative, or by calling IBM support at the following numbers:

- In the USA, 1-800-426-7299
- In Canada, 1-800-565-3344

**Note:** Novell documentation can be obtained by contacting Novell, either by calling 1-800-NETWARE or over the World Wide Web at <http://www.novell.com>

### Restrictions for This Release

The following restrictions apply for this release of IBM LAN Client:

- IBM LAN Client will operate with only one adapter.
- You cannot use RPL to download IBM LAN Client from either a Novell NetWare server or an IBM LAN Server.

### Protocols and Clients Supported by IBM LAN Client

IBM LAN Client provides support for the following protocols and clients:

- For DOS 5.0 or higher:
  - Novell IntranetWare Client (IPX/SPX)
  - IEEE 802.2
  - NetBIOS
  - DOS LAN Services
- For Windows 3.1:
  - Novell IntranetWare Client (IPX/SPX)
  - IEEE 802.2
  - NetBIOS
  - TCP/IP
  - DOS LAN Services
- For Windows for Workgroups 3.11:
  - Novell IntranetWare Client (IPX/SPX)
  - IEEE 802.2
  - NetBIOS
  - TCP/IP
  - DOS LAN Services



---

## Installation of IBM LAN Client Using LANAID

### Installing IBM LAN Client and the Protocol Drivers and Device Drivers

- 1** Start LANAID 2.2 or higher from the directory where you installed it. If it has not been installed, install LANAID from Diskette 1: LANAID by entering **a:install**. You will be prompted to enter the drive and path where you want LANAID installed.

Remember, LANAID should be run from native DOS. It can also be run from a *full-screen DOS session* of Windows 3.1x. Earlier versions of LANAID will not install IBM LAN Client.

- 2** When LANAID starts, the copyright window is displayed, followed by the first selection window. The MAC addresses of the Token-Ring ISA Adapters found are presented.

Select the **Software Installation** push button.

- 3** If your CONFIG.SYS file has multiple configuration blocks, a window will be displayed where you can select the appropriate one to be updated. Otherwise, go to the next step.

- 4** In the drop-down list at the top of this window, display the list of operating systems by clicking on the down arrow at the right. Highlight your choice of operating system with a single click. The default is DOS with Windows 3.1x.

To install IBM LAN Client using LANAID 2.2 or higher, the only valid choices are:

- DOS with Windows 3.10 or higher
- DOS (without Windows)
- Windows for Workgroups Version 3.11

- 5** If you have chosen an operating system that works with IBM LAN Client, the Express and the Custom selections in the center of the window will be active. You can choose Express to have the LANAID program install IBM LAN Client using the

default protocols provided for your adapter type and operating system.

*If you choose Express, the installation of IBM LAN Client will be completed automatically, with default protocols selected. Novell IntranetWare Client and 802.2 will be loaded.*

Select **Continue** to complete the installation.

- 6** If you want to customize parameters for your IBM LAN Client installation, first select the **Custom** radio button, and then select the protocols you want to install.

The IBM LAN Client Install window displays a selection box. When you choose one, you are asked for the directory in which it is to be installed, whether to update CONFIG.SYS and AUTOEXEC.BAT (default is yes), and for the name of the Windows directory.

- **Novell IntranetWare Client (IPX/SPX)**

NetWare Client is Novell's version of client software.

You cannot select both NetWare Client and DOS LAN Services.

- **DOS LAN Services (DLS)**

DLS is the DOS client software for LAN servers. When you select DLS you are asked for the following information:

- User Name
- Machine ID
- Domain Name

When you select DLS, NetBIOS is automatically selected as well.

You cannot select both DLS and NetWare Client.

- **NetBIOS**

When you select NetBIOS, no parameters are automatically set.

You can find more information about the NetBIOS device driver parameters on the Networking Environment Support web site: <http://www.networking.ibm.com/trl/trlclnt.html>

- **802.2**

Choose **802.2** when you are using the IEEE 802.2 protocol on your LAN.

When you select 802.2, no parameters are set automatically.

- **TCP/IP**

This option is presented under Windows or Windows for Workgroups only.

Choose **TCP/IP** when you are using the TCP/IP protocol on your network.

When you select TCP/IP, the Dynamic Host Configuration Protocol (DHCP) is enabled by default. If you do not want DHCP to be used, disable it, and then enter a Local IP Address and Local Subnet Mask. The Local Subnet Mask is required. The Local Subnet Mask is set to 255.255.240.0 by default. You can change it by typing in a new value and selecting OK.

You cannot select *both* DLS and NetWare Client; however, all other combinations are accepted. Some options are selected automatically, based on your other choice. If you choose DLS, then NetBIOS is selected automatically.

When you have finished customizing the parameters, select **Continue**.

**7** The IBM LAN Client configuration window appears. It is in folder format, with at least 2 pages. The number of pages depends on the protocols selected.

On the first page, labelled Software Install Options, you are asked whether to update CONFIG.SYS and AUTOEXEC.BAT (the default is yes). You are also asked to specify the directory in which to install IBM LAN Client, and the name of the Windows directory. On subsequent pages of the folder, you might be asked to change or verify IBM LAN Client information. Be sure to visit each page of the folder.

- 8** When you have finished, press the **Install** push button. You will be prompted to insert diskettes at the correct time, and the options that you have selected will be installed automatically. You might not use all of your diskettes.
- 9** When the LAN Client installation is complete, an Installation Complete window is displayed. Click **OK**.
- 10** You will see a window displaying installation information. Press the **Close** push button. The main window is displayed and your IBM LAN Client and device driver installation is complete. Exit LANAID and reboot the computer for the changes to take effect.

To change LAN Client parameters at a later time, you must run LANAID again.



---

## Chapter 6. Device Driver Installation

This chapter is not required for IBM LAN Client users. See Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1" for information about installing the IBM LAN Client.

This chapter contains the instructions for installing drivers that the Token-Ring ISA Adapter needs for communication over a Token Ring and with network software running on the workstation. It includes both manual and automatic installations.

If you are installing drivers for more than one Token-Ring ISA Adapter in the same workstation, make sure that you have performed for each adapter the steps described in Chapter 3, "Installing the Adapter" and Chapter 4, "Configuring the Adapter with LANAIID" before you start the driver installation.

Some network operating systems and network applications provide software that automates the installation of device drivers. These are described as *automatic*. *Manual* installation involves copying the drivers from Diskette 2: Device Drivers to the appropriate directory on the workstation.

If you believe that you are having a problem with the device driver files and want to download a new copy, see Appendix B, "IBM Internet, BBS and Telephone Support." The latest drivers can be downloaded from the IBM Internet web site at **<http://www.networking.ibm.com/nes/neshome.html>**

The tables in this chapter provide an index to the driver installation instructions. They direct you to the appropriate installation procedure for your environment. They are:

- **If you use DOS**, go to "DOS Operating System" on page 6-2.
- **If you use Novell NetWare**, go to "Novell NetWare Operating System" on page 6-13.
- **If you use OS/2**, go to "OS/2 Operating System" on page 6-19.

- **If you use a Windows operating system**, including Windows NT, Windows 95, and Windows for Workgroups, go to “Windows Operating Systems” on page 6-27.

---

## DOS Operating System

*Table 6-1. Driver Installation Instructions for DOS*

<b>If you have:</b>		<b>Go to:</b>
NetWare Client with <b>DOS</b> (for DOS or DOS with Windows 3.1 and lower)	Manual	“Manually Installing the ODI VLM Client Driver for DOS” on page 6-3
	Automatic	Chapter 5, “Installing IBM LAN Client for DOS or Windows 3.1” on page 5-1
LSP Custom (for DOS or DOS with Windows 3.1 and lower)		“Installing LSP Custom with DXMAID” on page 6-8
		“Installing LSP Custom without DXMAID” on page 6-10
LSP stand-alone		Refer to LAN Support Program (stand-alone) doc- umentation
LANManager		“Installing NDIS MAC Drivers for LANManager” on page 6-12
Other DOS workstations		“Installing NDIS MAC Drivers Using Other Installa- tion Programs” on page 6-42

## About DOS LAN Services

### Notes:

1. DOS LAN Services (DLS) replaces DOS LAN Requester (DLR).
2. Versions of LANAIID before LANAIID 2.2 will not install DLS.

DLS is now included with IBM LAN Client. For information about DLS and LAN Client, see "Installation of IBM LAN Client Using LANAIID" on page 5-6.

## Manually Installing the ODI VLM Client Driver for DOS

---

NetWare Client (includes  
Windows 3.1 and lower)

Diskette 2: Device Drivers  
Directory: NOVELL\DOS

---

You can install the DOS ODI client driver to use the Token-Ring ISA Adapter in an ODI environment, such as that provided by the NetWare DOS Requester or by the Novell NetWare DOS ODI Shell. The following steps describe the incorporation of the driver into an existing installation of the NetWare Requester.

- 1** Find the target directory path on the diskette or the hard disk where the NetWare Requester code is installed: for example, C:\NWCLIENT.
- 2** From the \NOVELL\DOS subdirectory on Diskette 2: Device Drivers, copy TOKEN.COM to the target directory.
- 3** If the PATH statement in AUTOEXEC.BAT has not already been changed, add the directory path from step 1 to the PATH statement: for example,  
PATH=C:\DOS;C:\NWCLIENT



- 4** The NetWare Requester is started with batch commands that can be incorporated into the AUTOEXEC.BAT, called from the AUTOEXEC.BAT or entered manually. For example, create a batch file, STARTNET.BAT on C:\NWCLIENT, which is invoked from the AUTOEXEC.BAT file and contains the following batch commands:

```
LSL
..driver..
ROUTE.COM
IPXODI
```

Replace the `..driver..` line with **TOKEN.COM** copied in step 2.

- 5** To change the TOKEN.COM driver parameter default values, edit the NET.CFG file. See the following example or refer to *Novell NetWare Workstation for DOS and MS Windows* for a sample NET.CFG file. Copy the edited NET.CFG file to the target directory (where the NetWare Requester code is installed).

```
Link Driver TOKEN
; The following are sample ODI keywords for TOKEN:
  FRAME TOKEN-RING
  PORT X
; where X corresponds to the port in which the target adapter is
; installed
  NODE ADDRESS 400000000001
```

**Note:** You can use any DOS text editor to edit the AUTOEXEC.BAT and NET.CFG files. Refer to *Novell NetWare ODI Shell for DOS* for more information about AUTOEXEC.BAT and NET.CFG.

Table 6-2 on page 6-5 contains the parameters that can be configured at DOS workstations by setting keywords in the NET.CFG file.

*Table 6-2 (Page 1 of 4). Parameters for Configurable TOKEN.COM and TOKEN.SYS Driver*

Parameter	Explanation
NODE ADDRESS	<p>To set a locally administered address for the adapter, type in the local address you want to use. The local address must contain 12 hexadecimal characters and can be specified in either MSB (the default), or LSB format. To specify an MSB node address, the letter "M" immediately follows the last digit of the node address. To specify an LSB node address, the letter "L" immediately follows the last digit of the node address.</p> <p>This keyword is specified as NODE ADDRESS in NET.CFG for DOS and OS/2 workstations. See the sample NET.CFG file shown in step 5 on page 6-4.</p> <p>If a node address is specified in MSB format, the characters must be within the range X'400000000000'-X'7FFFFFFFFFFF'. To specify a node address in MSB format, add an "M" to the end of the address (for example, X'400000000001M'). This address specified in LSB format would be X'020000000080L'.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Do not assign the same local address to two or more stations. Severe station communication or network failures might occur when two or more stations are assigned the same address.</li> <li>2. If you do not assign a locally administered address, the adapter uses the universally administered address (the address encoded in the adapter memory at the factory). The universally administered address appears on a label on the Token-Ring ISA Adapter (see Figure 3-4 on page 3-8).</li> </ol>

*Table 6-2 (Page 2 of 4). Parameters for Configurable TOKEN.COM and TOKEN.SYS Driver*

<b>Parameter</b>	<b>Explanation</b>
PORT	<p>The port keyword and value can be used to identify which NIC you intend to drive by specifying the starting I/O port of the range that the NIC has been configured to use. The range of previous models was limited to X'A20-A23' or X'A24-A27'. However, when used in enhanced mode, the Token-Ring ISA Adapter can use all configurable starting I/O ports from X'0200' to X'FFFC'.</p> <p><b>Valid values:</b> 0200 to FFFC</p> <p><b>Default value:</b> A20</p>
NIC UAA	<p>This parameter can be used to specify which physical network adapter is to be associated with this load of the LAN driver. The parameter value can be a 1-digit ordinal value or a 12-digit, hexadecimal, universally administered address (MAC address).</p> <p>With ordinal type parameter usage, an ordinal value of 1 indicates the adapter with the <i>lowest</i> universally administered address value. An ordinal value of 2 indicates the adapter with the next lowest universally administered address, and so on. If there are two adapters, the one with the higher MAC address has an ordinal value of 2.</p> <p>This parameter is not required for a single network adapter; however, this parameter is necessary if the system contains more than one network adapter and at least one of them is a Token-Ring ISA Adapter. Otherwise, system or network errors are likely to result.</p>
NOFULLDUPLEX	This parameter disables full-duplex ring insertion.

*Table 6-2 (Page 3 of 4). Parameters for Configurable TOKEN.COM and TOKEN.SYS Driver*

<b>Parameter</b>	<b>Explanation</b>
MAX FRAME SIZE	<p>This option sets the maximum number of bytes that can be put on the wire by the Token-Ring ISA Adapter. The number must be a multiple of 8 and include the number of bytes for the data packet for adapter overhead (6 bytes) and for the maximum header (35 bytes LAN header + 5 bytes SNAP header + 74 bytes protocol header). The total number of bytes is 114.</p> <p>If the LAN speed is 16 Mbps, the number must be between 632 and 17960. If the LAN speed is 4 Mbps, the number must be between 632 and 4464. If 2 KB packets are desired, calculate the maximum frame size as:</p> $2048 + 6 + 35 + 5 + 74 = 2168 \text{ (rounding up to next multiple of 8 gives 2168)}$ <p>An example NET.CFG entry for using 2-KB packets would appear as:</p> <pre>LINK DRIVER TOKEN MAX FRAME SIZE 2168</pre> <p>In an OS/2 environment, to set frame sizes greater than 1540 bytes, you must configure Link Support Layer (LSL) buffers equal to or greater than the frame size you desire. To configure the adapter to handle 4210-byte frames, use this statement in your NET.CFG file:</p> <pre>LINK SUPPORT BUFFERS 14 4210</pre> <p>Refer to the section that discusses NET.CFG options in <i>Novell NetWare Workstation 4.0 for OS/2</i> for information about configuring LSL buffers.</p>
FRAME	<p>This parameter indicates the token-ring frame type to be used by the LAN driver and network adapter.</p> <p><b>Default value:</b> TOKEN-RING  <b>Valid values:</b> TOKEN-RING, TOKEN-RING_SNAP</p>
NOSHALLOWMODE	<p>This parameter disables adapter shallow mode operation.</p>

*Table 6-2 (Page 4 of 4). Parameters for Configurable TOKEN.COM and TOKEN.SYS Driver*

<b>Parameter</b>	<b>Explanation</b>
RECEIVEBUFFERSIZE	This parameter can be set to a value from 192 to 2048, inclusive. Any value smaller than 192 is changed to 192. Any value larger than 2048 is changed to 2048. Numbers between 192 and 2048 that are not on an 8-byte boundary are rounded up to the next higher 8-byte boundary.
EXPRESSMODE	For DOS only, this parameter enables adapter fast-path receive express mode.

## Installing LSP Custom with DXMAID

LSP Custom is not shipped with your Token-Ring ISA Adapter. For information about how to download a copy from the Internet, go to <http://www.networking.ibm.com/nes/neshome>

---

LSP Custom with DOS  
(includes Windows 3.1 or lower systems)

---

- 1** Perform *one* of the following two steps:
  - a** If you plan to run the Installation Aid from a diskette, insert a copy of the LSP Custom Program Diskette in drive A. Make drive A the current drive and switch to the \LSP subdirectory.
  - b** If you plan to run the Installation Aid from a hard disk, set the hard disk as the current drive and make the directory in which the LSP Custom files are located the current directory. If you plan to install the working copy of LSP Custom on the same hard disk, be sure that you give the target directory a name different from that of the source directory.
- 2** Type **dxmaid** and press **Enter**.

- 3 Select the responses and type in the requested information on the first Installation Aid window. Press **Enter** to continue.

**Note:** If you need more information about a field, place the cursor on the field and press **F1** for help. To obtain additional help, press **F1** from the help window.

- 4 The option panel is displayed. To add or remove LSP Custom drivers, position the cursor on the field for the driver and press **F6**. To view or change driver parameters, press **F5**. If you do not make any changes, default drivers and parameter values are installed.

**Note:** To see a description of one of the parameters, select the value of the parameter at the Parameter Selection panel and press **F1**.

- 5 When you have finished adding and removing drivers and setting parameters, press **F4** to install the drivers and complete the installation of LSP Custom. When the installation is complete, you are returned to DOS.

- 6 If you intend to install from the hard drive, make sure that drive A is empty. If you are loading LSP Custom from a target diskette you have built for future use, insert that diskette in drive A. Press **Ctrl+Alt+Del** to reboot the computer.

- 7 A copyright statement is displayed. Look for messages. If there are no messages, or if there are only informational messages, the LSP Custom is correctly loaded.

If any error messages are displayed, the LSP Custom might not have been installed correctly. Look up the error message and follow the recommended action.

If no LSP Custom copyright statement is displayed, the LSP Custom is not installed or has been removed. In this case, make a new backup copy and reinstall the program.

Installation is now complete.

## Installing LSP Custom without DXMAID

---

LSP Custom with DOS  
(includes Windows 3.1 and  
lower)

---

If you want to install the LSP Custom Program manually, perform the following steps:

- 1** Insert the diskette that contains LSP Custom in drive A. Make drive A the current drive.
- 2** Create a directory to which you want to copy the LSP Custom files. Make that directory the current directory. Copy all the program files for LSP Custom.

The following example shows the commands that you can enter at the DOS prompt to copy the LSP Custom files from a diskette in drive A to the \LSP directory of the working copy:

```
C:  
CD\  
MD \LSP  
COPY A:\LSP\*.* C:\LSP
```

In this example, the files are copied to drive C on the hard disk.

The driver, DXMT0MOD.SYS, provides the NetBIOS interface. If you do not need the NetBIOS interface, you can erase this file from your directory.

- 3** Edit the CONFIG.SYS file to load the drivers. Edit the CONFIG.SYS file to include the following lines:

```
DEVICE=\LSP\DXMA0MOD.SYS  
DEVICE=\LSP\DXMC0MOD.SYS
```

If you plan to use the NetBIOS interface provided by the DXMT0MOD.SYS, include the statement:

```
DEVICE=\LSP\DXMT0MOD.SYS
```

These statements can be listed anywhere in the CONFIG.SYS but must be listed in the order as shown.

Some tips on editing the CONFIG.SYS follow:

- The DEVICE= statement needs to include the path DEVICE=\LSP\DXM..., where \LSP represents the directory. You can substitute another directory name in place of \LSP.
- The length of each DEVICE= statement must not exceed one line in the CONFIG.SYS file.
- If the working copy has a CONFIG.SYS file, be sure to change only the lines needed for the LSP Custom device drivers. For safety, copy the original CONFIG.SYS file to a file with a unique extension to save it before editing.

When you have finished editing the CONFIG.SYS file, make sure that you save it.

- 4** To change the driver parameters, you must edit the DEVICE statement in CONFIG.SYS. For more information, see the LAN Support Program documentation at <http://www.networking.ibm.com/nes/neshome>
- 5** Reboot the workstation to activate LSP Custom. Your application program, such as DOS LAN Requester, should now be able to use LSP Custom for communication.
- 6** Confirm the installation. To confirm the installation of the device drivers, look for messages that indicate that the Token-Ring ISA Adapter driver and the protocol driver have been installed.
  - If the messages indicate that the drivers have been installed, the installation is now complete and you have finished with this manual.
  - If error messages are displayed, LSP Custom might not be correctly configured.



## LSP Stand-Alone

Refer to LAN Support Program (stand-alone) documentation on the web at <http://www.networking.ibm.com/nes/neshome>

## Installing NDIS MAC Drivers for LANManager

---

LANManager	Diskette 2: Device Drivers
	Directory: MSLANMAN.DOS
	Diskette 2: Device Drivers
	Directory: MSLANMAN.OS2

---

The NDIS MAC device drivers can be installed in a Microsoft LANManager environment for either DOS or OS/2. For operation in this environment, Diskette 2: Device Drivers contains the necessary device driver and other files in these directories:

```
\MSLANMAN.DOS\DRIVERS\TOKENRING\IBMTOK  
\MSLANMAN.OS2\DRIVERS\TOKENRING\IBMTOK
```

In each directory, there is a PROTOCOL.INI file that contains the configuration parameters and an IBMTOK.NIF file with information about each parameter.

The installation network information file, also named IBMTOK.NIF, is located in a separate directory for each environment. This file is used by the Microsoft LANManager Setup program, and its contents differ from those of the IBMTOK.NIF files mentioned in the preceding paragraph.

The DOS installation network information file is located in the  
\MSLANMAN.DOS\DRIVERS\NIF  
directory on the device driver diskette.

The OS/2 installation network information file is located in the  
\MSLANMAN.OS2\DRIVERS\NIF  
directory on the device driver diskette.

To install the adapter NDIS MAC device drivers, follow the instructions in the *Microsoft LANManager Installation and Configuration Guide* for using the LANManager Setup program. When you get to the step to add a network device driver configuration, select the **Other Driver** option from the Network Adapter Drivers panel. When prompted, insert the device driver diskette in drive A, and press **Enter**. The installation process will be completed.

---

## Novell NetWare Operating System

*Table 6-3. Driver Installation Instructions for Novell NetWare*

If you have:	Go to:
NetWare Server	"Installing the Novell NetWare Server LAN Driver" on page 6-14

## For Novell Clients

*Table 6-4. For Novell Clients*

If you have:	Go to:	
NetWare Client with DOS (for DOS or DOS with Windows 3.1 and below)	Manual	"Manually Installing the ODI VLM Client Driver for DOS" on page 6-3
	Automatic	Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1"
NetWare Client with OS/2	"Manually Installing the ODI Driver for OS/2" on page 6-20	

## Installing the Novell NetWare Server LAN Driver

---

NetWare Server

Diskette 2: Device Drivers

Directory: NOVELL\NETWARE

---

**Note:** If this adapter is the first to open on the Token Ring, Auto-Sense must be set to OFF and the correct data rate must be chosen manually.

- 1** Select a target directory on the diskette or on the computer's hard disk to use as the directory for the adapter LAN driver and the associated files for NetWare.

If NetWare is already installed, the target directory should be the directory used by NetWare for SERVER.EXE: for example, C:\NWSERVER or C:\SERVER.312.

- 2** Copy the following files from the \NOVELL\NETWARE subdirectory on Diskette 2: Device Drivers to your target directory:

For NetWare 4.x, install:

MSM.NLM  
NBI.NLM

For NetWare 3.12, install:

MSM31X.NLM  
NBI31X.NLM

For both NetWare 3.12 and 4.x, install:

TOKENTSM.NLM  
TOKEN.LAN  
TOKEN.LDI

- 3** From the directory containing the SERVER.EXE file, type **server** and then press **Enter** to start the server.

The remaining steps describe how to configure the server and LAN driver to load automatically each time the server is started.

- 4** From the NetWare Operating System console (at the prompt), type **load install** and press **Enter**.

## 5 Select **Driver Options**.

## 6 Select **Configure Network Drivers**.

## 7 Select **Select a Driver**:

- Press the **INS** key to install an unlisted driver.
- Press the **F3** key to change the path.

## 8 Enter the path where you copied the NLM files and TOKEN.LAN file in 2 on page 6-14. Entering this path should locate the TOKEN.LAN file. Press **Enter** to select the TOKEN.LAN file.

## 9 Reply "Yes" to the question "Do you want to copy driver TOKEN.LAN?" Allow the INSTALL to copy TOKEN.LDI.

## 10 Select **Select/Modify driver parameters and protocols** in order to choose which parameters you want to load the driver. See Table 6-5 on page 6-16 for a description of driver parameters.

Press **F3** if you want to load and bind both TOKEN-RING and TOKEN-RING\_SNAP frame types.

## 11 Select **Save parameters and load driver**.

If you switch to the server CONSOLE panel, you should see that the driver has been loaded. You can type CONFIG from the console to verify that it has loaded and bound correctly.

The INSTALL should also have updated your AUTOEXEC.NCF file and inserted the load and bind commands, so that the driver will be loaded when the server is restarted.

## 12 Optionally, you can load another instance of the driver if you have more than one Token-Ring ISA Adapter installed. Note that you must specify either PORT or NIC\_UAA to differentiate the two adapters. See Table 6-5 on page 6-16 for more information about these parameters.

**13** Once your server is up and running, copy the appropriate NLM files from step 2 on page 6-14 into your SYS:\SYSTEM directory from the Administrator's or Supervisor's client connection.

**Note:** You should also go to Novell's support Web site on a regular basis for updated NLM files and Service Packs.

Table 6-5 describes the parameters of the LAN driver

*Table 6-5 (Page 1 of 3). Parameters for TOKEN.LAN Driver*

Parameter	Explanation
FRAME	<p>This parameter indicates the Token-Ring frame type to be used by the LAN driver and network adapter.</p> <p><b>Default value:</b> TOKEN-RING <b>Valid values:</b> TOKEN-RING, TOKEN-RING_SNAP</p>
PORT	<p>The port keyword and value can be used to identify which NIC you intend to drive by specifying the starting I/O port of the range that the NIC has been configured to use. The range of previous models was limited to X'A20-A23' or X'A24-A27'. However, when used in enhanced mode, the Token-Ring ISA Adapter can use all configurable starting I/O ports from X'0200' to X'FFFC'.</p> <p>This keyword value is required only when more than one Token-Ring ISA Adapter is installed in the server and the NIC_UAA keyword is not specified. <i>Do not use the PORT and NIC_UAA keywords on the same load line.</i></p> <p><b>Valid values:</b> 0200 to FFFC <b>Default value:</b> none</p>

*Table 6-5 (Page 2 of 3). Parameters for TOKEN.LAN Driver*

<b>Parameter</b>	<b>Explanation</b>
NIC_UAA	<p>An alternative to the PORT keyword, the NIC_UAA keyword can be used to identify which NIC you intend to drive. Use this keyword if you do not know the I/O port, or if the I/O port is subject to change. Two value types are supported for this keyword:</p> <ul style="list-style-type: none"><li>• An ordinal value of 1 or 2, indicating which NIC to drive. For example: LOAD TOKEN NIC_UAA=1. An ordinal value of 1 corresponds to the NIC with the lowest UAA value. An ordinal value of 2 corresponds to the NIC with the next-lowest UAA value.</li><li>• The 12-digit, hexadecimal UAA value stored in the adapter during manufacture. For example: LOAD TOKEN NIC_UAA=0004AC000001</li></ul>

This keyword is required only when more than one Token-Ring ISA Adapter is installed in the server and the PORT keyword is not specified. *Do not use the PORT and NIC\_UAA keywords on the same loadline.*

Table 6-5 (Page 3 of 3). Parameters for TOKEN.LAN Driver

Parameter	Explanation
NODE	<p>Use this parameter to specify a locally administered address for the Token-Ring ISA Adapter. The adapter can be known on the network by its universally administered address (the address encoded in the adapter memory at the factory) or by a locally administered address (a unique, user-assigned address).</p> <p>The universally administered address appears on a label on the Token-Ring ISA Adapter bracket (see Figure 3-4 on page 3-8).</p> <p>The value of the locally administered address must be unique among the addresses on the network and contain 12 hexadecimal digits.</p> <p><b>Default value:</b> Universally administered address</p> <p><b>Valid values:</b> X'400000000000' to X'7FFFFFFFFF' immediately followed by one of the following address format indicators:</p> <ul style="list-style-type: none"> <li><b>M</b> to indicate that the address is in most significant bit (MSB) first format. M is the default address format indicator.</li> <li><b>L</b> to indicate that the address is in least significant bit (LSB) first format.</li> </ul>
NOFULLDUPLEX	The presence of this parameter causes full-duplex ring insertion to be disabled.
NOSHALLOWMODE	The presence of this parameter causes adapter shallow mode operation to be disabled.
EXPRESSMODE	The presence of this parameter causes fast-path receive express mode to be enabled.
RECEIVEBUFFERSIZE	This parameter can be set to a value from 192 to 2048, inclusive. Any value smaller than 192 is changed to 192. Any value larger than 2048 is changed to 2048. Numbers between 192 and 2048 that are not on an 8-byte boundary are rounded up to the next higher 8-byte boundary.

---

## OS/2 Operating System

*Table 6-6. Driver Installation Instructions for OS/2*

---

<b>If you have:</b>	<b>Go to:</b>
NetWare Client with OS/2	"Manually Installing the ODI Driver for OS/2" on page 6-20
OS/2 with MPTS	"Installing OS/2 Drivers with MPTS" on page 6-22
OS/2 LAPS (or LAN Transports)	"Installing the OS/2 NDIS MAC Device Driver Using LAPS" on page 6-23
OS/2 Warp Connect	"Installing OS/2 Drivers with MPTS" on page 6-22
OS/2 Warp Server	"Installing OS/2 Drivers with MPTS" on page 6-22
OS/2 SMP	"Installing OS/2 Drivers with MPTS" on page 6-22
LANManager	"Installing NDIS MAC Drivers for LANManager" on page 6-12
Other OS/2 workstations	"Installing NDIS MAC Drivers Using Other Installation Programs" on page 6-42



## Manually Installing the ODI Driver for OS/2

---

Novell IntranetWare      Diskette 2: Device Drivers  
Client with OS/2        Directory: NOVELL\OS2

---

**Note:** Before installation, copy TOKEN.SYS from your Token-Ring ISA Adapter Diskette 2: Device Drivers to the root directory of your Novell NetWare Requester source files.

To install the driver on an OS/2 workstation, perform the following steps:

- 1** Refer to the workstation basics and installation manuals from Novell to begin. When a dialog box titled Requester Installation appears during the installation process, continue with the following steps.
- 2** If you are installing the NetWare OS/2 Requester on a workstation, select **Edit CONFIG.SYS and Copy All Files....** If the NetWare OS/2 Requester is already installed on the workstation and only a driver update is needed, then select **Only Edit CONFIG.SYS....**
- 3** On the next panel, specify the name of the Token-Ring ISA Adapter driver—TOKEN.SYS.
- 4** When you get to the panel labeled “Copy ODI LAN Driver files,” select **Copy only the default driver.**
- 5** Continue with the installation, following the instructions on the panels.
- 6** When Installation Complete appears in the Novell NetWare OS/2 Requester window, go to the Configuration menu and select **This workstation....**
- 7** Click **Edit** to accept the default location for the NET.CFG file.
- 8** In the edit box titled Current NET.CFG File Contents, type the following lines:

```
link driver IBMTRPO
  SLOT 10001
link support
  BUFFERS 8 4096
```

**Notes:**

- a. To enable source routing, changes will have to be made to the CONFIG.SYS file. Refer to Novell's *Workstation for OS/2* manual for instructions on how to enable source routing.
- b. The lines in the NetWare Requester section of the CONFIG.SYS file must be in a certain order. Do not reorder the lines in this section of CONFIG.SYS. Refer to the Novell manuals for more information.

**9** Click **Save** to complete the Novell NetWare OS/2 Requester installation.

**10** Reboot the computer in order to make the changes take effect.

**Note:** To make changes in the NetWare OS/2 Requester configuration, double-click the Novell icon on the desktop. Double-click the Install icon in the Novell window. Go to the Configuration and select **This workstation....** Make sure that the correct NET.CFG is shown in the next dialog box and click **Edit**. Edit the NET.CFG file in the edit box titled Current NET.CFG File Contents. When the changes are complete, click on **Save**. It is necessary to reboot the computer in order to make the changes take effect.

**11** Installation is now complete. Check for the following conditions to determine whether the adapter is working correctly and whether installation has been completed successfully:

- The device driver files loaded successfully. There are no error messages.
- The adapter LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, go to Appendix A, "Troubleshooting and Testing."

## Installing OS/2 Drivers with MPTS

OS/2 with MPTS

Diskette 2: Device Drivers  
Directory: (root)

### 1 Start MPTS in one of the following ways:



- Select the MPTS icon from the OS/2 desktop MPTS .
- In an OS/2 session, go to the directory where MPTS.EXE is located (usually \IBMCOM) and enter **MPTS**.

The IBM logo panel is presented. Click the **OK** push button in this panel.

- 2** On the Multi-Protocol Transport Services panel, select the **Install** push button.
- 3** Insert Diskette 2: Device Drivers in drive A and make drive A the current drive. Enter the source drive for the .NIF files on the Install Additional Network Drivers panel, and then select **OK**.
- 4** Continue to click **OK** push buttons until you are returned to the Multi-Protocol Transport Services panel. Click the **Configure** push button.
- 5** On the Configure panel select the **LAN adapters and protocols** radio button, then select **Configure**.
- 6** On the LAPS Configuration panel:
  - Under Network Adapters, **select IBM T-R Shared RAM Family** and then click **Add**.
  - Under Protocols, select the protocols used by your application. If you are not sure which are used, select **IEEE 802.2** and **IBM OS/2 NetBIOS**. You must click **Add** after each selection.

- Under Current Configuration you can edit the parameters for the configuration you have selected, if you choose to do so.

When you have finished, select **OK**.

- 7** On the Configure panel, select the **Close** push button.
- 8** The Multi-Protocol Transport Services panel is presented when the configuration is finished. Select the **Exit** push button.
- 9** The next panel presented is the Update CONFIG.SYS panel. To save your updates, make sure that the Update CONFIG.SYS check box is checked, and then choose a drive. Click **Exit**.
- 10** Select **OK** on the message panel.
- 11** After you have completed all steps you must exit all programs and shut down OS/2 for your changes to take place. Click **Exit** on the Exiting MPTS panel to continue.

You have completed the installation process. The indicators that installation is complete are:

- You are able to log on and communicate with the network.
- The LEDs indicate normal operation. See “Understanding the Adapter LEDs” on page A-6.

If you have problems, go to Appendix A, “Troubleshooting and Testing.”

**Note:** OS/2 logs adapter installation details in LANTRAN.LOG. This file can be useful in troubleshooting problems.

## Installing the OS/2 NDIS MAC Device Driver Using LAPS

---

OS/2 with IBM LAN	Diskette 2: Device Drivers
Transports	Directory: (root)

---

The OS/2 NDIS MAC device driver is needed to run in an OS/2 LAN Server environment or an OS/2 Extended Services environment. Diskette 2: Device Drivers contains the OS/2 NDIS MAC device driver under the name `IBMT0K.0S2` in the root directory.

You can use the OS/2 device driver installation tool, LAN Adapter and Protocol Support program (`LAPS.EXE`), to install the OS/2 NDIS MAC device driver.

**Note:** The Token-Ring ISA Adapter is a member of the IBM Token-Ring Shared Ram ISA family of adapters.

- 1** Start LAPS in one of the following ways:
  - From the OS/2 desktop, select the LAPS icon.
  - From an OS/2 session, go to the directory where `LAPS.EXE` is installed (usually `IBMCOM`) and enter **LAPS**.
- 2** When the IBM Logo panel is displayed, select **Install**.
- 3** You will be prompted for the source of the `.NIF` files. Insert Diskette 2: Device Drivers in drive A and click the **OK** push button.
- 4** When you see the message Successfully installed the network driver, click **OK**.
- 5** On the IBM Logo panel, select **Configure**.
- 6** Select **Configure LAN Transports** and then click **Continue**.
- 7** In the Configure Workstation window perform the following actions:
  - In the Network adapters list box, highlight **IBM T-R Shared RAM Family**, and then select **Add**.
  - In the Protocols list box, select the protocols used by your network application. Click the **Add** push button after each selection. If you are not certain which protocols are used, select **IEEE 802.2** and **NetBIOS**. You must choose at least one protocol if you are adding a new adapter.

The protocols you select should appear in the Current Configuration list box under the adapter driver name. If you want to edit the parameter settings for a selected protocol, highlight that protocol and click **Edit**.

- When you have finished setting the values on this panel, click **OK**.

**8** On the IBM Logo panel, select **Exit**.

**9** You will see messages regarding updates to the CONFIG.SYS file. Verify that the drive and directory for CONFIG.SYS are correct and then click **Continue**. *Do not* click Exit in this window unless you want to quit without saving your input.

**10** When you see the message indicating that CONFIG.SYS was successfully updated, select **OK**.

**11** Select **Exit** on the Exiting LAPS panel.

**12** Shut down OS/2 and restart your computer.

You have completed the driver installation process.

**Note:** OS/2 logs adapter installation details in LANTRAN.LOG. This file can be useful in troubleshooting problems.

---

## Supporting Two Adapters with NDIS Drivers

When two adapters are installed in the same workstation, there must be one `DEVICE=C:\..path..\` statement in the CONFIG.SYS file for each Token-Ring ISA Adapter in the workstation and two NDIS MAC device driver sections in PROTOCOL.INI.

### CONFIG.SYS:

For DOS:

```
DEVICE=C:\..path..\IBMTOK.DOS
DEVICE=C:\..path..\IBMTOK.DOS
```

For OS/2:

```
DEVICE=C:\..path..\IBMTOK.OS2
DEVICE=C:\..path..\IBMTOK.OS2
```

### **PROTOCOL.INI:**

#### **Example 1**

```
[IBMTOK_MOD]
Drivename = IBMTOK$
Adapter = "UAA1"
```

```
[IBMTOK2_MOD]
Drivename = IBMTOK2$
Adapter = "UAA2"
```

```
[A_PROTOCOL_DRIVER]
Bindings = IBMTOK_MOD, IBMTOK2_MOD
```

The device driver will assign the token-ring network adapter that has the lowest universally administered address to IBMTOK\$, and the adapter with the next lowest universally administered address to IBMTOK2\$. If you want to change this assignment, use the ADAPTER keyword, as in example 2.

## Example 2

```
[IBMTOK_MOD]
Drivername = IBMTOK$
Adapter = "UAA2"
```

```
[IBMTOK2_MOD]
Drivername = IBMTOK2$
Adapter = "UAA1"
```

```
[A_PROTOCOL_DRIVER]
Bindings = IBMTOK_MOD, IBMTOK2_MOD
```

## Windows Operating Systems

*Table 6-7 (Page 1 of 2). Driver Installation Instructions for Windows Operating Systems*

<b>If you have:</b>		<b>Go to:</b>
Windows 95		"Windows 95 with NDIS 3.1" on page 6-28
Windows NT		"Windows NT Version 3.51 with NDIS 3.1" on page 6-32 or "Windows NT 4.0 with NDIS 3.1 or NDIS 4.0" on page 6-34.
Windows for Workgroups		"Windows for Workgroups with NDIS 3" on page 6-41
Novell IntranetWare Client for Windows 95		"Novell IntranetWare Client for Windows 95" on page 6-37
NetWare Client with DOS (for DOS or DOS with Windows 3.1 and below)	Manual	"Manually Installing the ODI VLM Client Driver for DOS" on page 6-3
	Automatic	Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1" on page 5-1



*Table 6-7 (Page 2 of 2). Driver Installation Instructions for Windows Operating Systems*

<b>If you have:</b>		<b>Go to:</b>
LSP Custom (for DOS or DOS with Windows 3.1 and below)	Automatic	"Installing LSP Custom with DXMAID" on page 6-8
	Manual	"Installing LSP Custom without DXMAID" on page 6-10

## Windows 95 with NDIS 3.1

Windows 95 with NDIS 3.1	Diskette 2: Device Drivers Directory: (root)
--------------------------	---

In order to prepare the system for adapter installation, insert Diskette 2: Device Drivers and run FIXWIN95.BAT.

You will need your Windows 95 CD-ROM or diskettes during the installation procedure.

### Windows 95 in Automatic Configuration Mode

This section assumes that the adapter is in Plug and Play mode and the machine is Plug and Play capable. Use LANAIID to make sure that the adapter is in Plug and Play (automatic configuration) mode before beginning. See "Determining Plug and Play Status" on page 4-5.

Use the following procedure if you have Windows 95 GA. Use "Windows 95 OSR2" on page 6-29 for Windows 95 OSR2.

### Windows 95 GA

- 1** Physically install the IBM Token-Ring ISA Adapter in the computer, and turn on the machine.
- 2** Windows 95 will detect the new hardware and bring up a dialog box to allow a choice of drivers. Select **Driver Diskette from Hardware Manufacturer** and then select **OK**.
- 3** Insert Diskette 2: Device Drivers in the appropriate drive.

- 4** Windows 95 will prompt for the location of the driver installation media. Type: A:\ and then select **OK**.
- 5** Select **Finish** to continue.  
**Note:** If the search fails, select **Other Locations....** If you are installing from a diskette, type A:\, then press **ENTER**.
- 6** At this point, Windows might prompt you for network names. Type in your computer's name and workgroup. Consult a system administrator if you do not know this information. Select **OK** to continue.
- 7** The driver files will be copied at this point. You will be prompted to insert the Windows 95 diskettes or CD-ROM.
- 8** After the files have been copied, a dialog box will display the following message: In order to finish setting up your new hardware, you must restart your computer. Remove any diskettes from the computer and select **Yes**.
- 9** The system will be rebooted.
- 10** When the system restarts, check to make sure that the network connection is active, and that the status LEDs on the back of the adapter show normal operation (Green ON, Amber OFF).
- 11** Installation is now complete.

If you have problems, go to Appendix A, "Troubleshooting and Testing." For additional information about driver installation with Windows 95, refer to your Windows 95 user documentation and online help information.

### Windows 95 OSR2

- 1** Physically install the IBM Token-Ring ISA Adapter in the computer, and turn on the machine.
- 2** Certain versions of Windows 95 will bring up an Update Device Driver Wizard dialog box which states that "This wizard will

complete the installation of: IBM Turbo 16/4 Token-Ring ISA Adapter.” or “This wizard will complete the installation of: IBM Auto Wake Token-Ring ISA Adapter”.

- 3** Insert Diskette 2: Device Drivers in the appropriate drive.
- 4** Select **Next >**.
- 5** Select **Finish** to continue.
- 6** Certain versions of Windows 95 might prompt you again for the location of the driver files. Click **OK** to continue. The files are on the diskette that you are using. The system might also prompt for the Windows 95 CD-ROM. In this case, insert the CD-ROM and click **OK**.
- 7** At this point, Windows might prompt you for network names. Type in your computer's name and workgroup. Consult a system administrator if you do not know this information. Select **OK** to continue.
- 8** The driver files will be copied at this point.
- 9** After the files have been copied, a dialog box will display the following message: In order to finish setting up your new hardware, you must restart your computer. Remove the driver diskette from the computer and select **Yes**.
- 10** The system will be rebooted.
- 11** When the system restarts, check to make sure that the network connection is active, and that the status LEDs on the back of the adapter show normal operation (Green ON, Amber OFF).
- 12** Installation is now complete.

If you have problems, go to Appendix A, “Troubleshooting and Testing.” For additional information about driver installation with Windows 95, refer to your Windows 95 user documentation and online help information.

## Windows 95 in Non-Automatic Configuration Mode

- 1** Physically install the IBM Token-Ring ISA Adapter in the computer, and turn on the machine.
- 2** Select **Start▶Settings▶Control Panel**.
- 3** Double-click on the **Network Control Panel** icon.
- 4** Select **Add...**, then select **Adapter** and **Add**.
- 5** Insert Diskette 2: Device Drivers in the appropriate drive.
- 6** Windows 95 will prompt for the type of adapter being installed. Select **Have disk...**
- 7** Windows 95 will prompt for the location of the driver installation media. Type **A:\** and then select **OK**.
- 8** Windows 95 asks you to select the Network adapter that matches your hardware. Select the appropriate model and then **OK**.
- 9** Windows 95 will display the network components that are installed. Click **OK**.
- 10** At this point, Windows 95 might prompt you for network names. Type in your computer's name and workgroup. Consult a system administrator if you do not know this information. Select **OK** to continue.
- 11** The driver files will be copied at this point. You will be prompted to insert Windows 95 diskettes or CD-ROM.  
*Certain versions of Windows 95 might prompt you again for the location of the driver files. Type in the appropriate location and click **OK** to continue.*
- 12** After the files have been copied, a dialog box will display a message saying that the computer needs to be restarted to

complete the installation. Remove the diskette or CD-ROM from the computer and select **Yes** or **OK**.

- 13** The system will be rebooted.
- 14** When the system restarts, check to make sure that the network connection is active, and that the status LEDs on the back of the adapter show normal operation (Green ON, Amber OFF).
- 15** Installation is now complete.

If you have problems, go to Appendix A, "Troubleshooting and Testing." For additional information about driver installation with Windows 95, refer to your Windows 95 user documentation and online help information.

## Windows NT Version 3.51 with NDIS 3.1

---

<b>Windows NT</b>	Diskette 2: Device Drivers Directory: (root)
-------------------	---

---

Refer to the *Microsoft Windows NT System Guide* for the general procedure for installing network drivers for Windows NT. The following instructions should apply in most circumstances.

- 1** Be sure that the network card is physically installed and that Windows NT 3.51 is running.
- 2** Log on to Windows NT as an administrator.
- 3** From the **Main** program group within the Program Manager, find and double-click the **Control Panel** icon.  
**Note:** If the Control Panel icon is not displayed, select **MS-DOS Command Prompt** to display the command-line prompt, and enter **Control** on the command line.
- 4** In the Control Panel window, double-click the **Network** icon.
- 5** In the Network Settings control panel, click **Add Adapter**.

- 6** In the Add Network Adapter dialog box, click the drop-down list for Network Adapter Card. Scroll down the list and select **<Other> Requires disk from manufacturer**. Then, select **Continue**.
- 7** Insert Diskette 2: Device Drivers in drive A and enter the path, **A:**.
- 8** Select **OK** to accept the drive and path information.
- 9** In the Select OEM Option dialog box, select the appropriate option.  
  
Several work-in-progress panels are displayed, indicating that the driver and its supporting files are being copied to your computer's hard disk.
- 10** The Network Settings panel is displayed again. There should be an entry for the appropriate option in the Installed Adapter Cards list box.  
  
**Note:** To change default values for an adapter, select that adapter on the Installed Adapters list box, and then select **Configure**. Make the necessary changes and select **OK**. You might also need to configure Network Software.
- 11** Select **OK** on the Network Settings panel to complete the installation.  
  
**Note:** If TCP/IP is installed on the computer and the IP Address and Subnet Mask Address information has not been entered, or if other network software parameters have not been set, required configuration panels will be displayed. Enter all necessary information and select **OK**.
- 12** The message **Your network settings have changed. You will need to exit and restart Windows NT so that the new settings can take effect** will be displayed. Remove Diskette 2: Device Drivers from the computer. Select **Restart now** in order to have Windows NT automatically restart your computer.

**13** Installation is now complete.

**14** Check for the following conditions to determine whether the adapter is working correctly and whether installation has been completed successfully:

- The device driver files loaded successfully. There are no error messages.
- The adapter LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, go to Appendix A, "Troubleshooting and Testing" on page A-1.

## Windows NT 4.0 with NDIS 3.1 or NDIS 4.0

---

<b>Windows NT</b>	Diskette 2: Device Drivers Directory: (root)
-------------------	---

---

Refer to the *Microsoft Windows NT System Guide* for the general procedure regarding installation of network drivers for Windows NT. The following instructions should apply in most circumstances.

**Note:** The installation process will choose the appropriate NDIS driver for installation. If Service Pack 3 or later is installed, the NDIS 4.0 driver will be used; otherwise, the NDIS 3.1 driver will be installed. This is done to work around a defect in the networking code in Windows NT 4.0 that was not fixed until Service Pack 3.

- 1** Ensure that the network card is physically installed and that Windows NT 4.0 is running.
- 2** Log on to Windows NT as an administrator.
- 3** Select **Start ► Settings ► Control Panel**.
- 4** From the Control Panel window, double-click the **Network** icon.
- 5** Select the **Adapters** tab.
- 6** Select **Add**.

- 7** Windows NT will display a dialog box that includes a list of network adapters. Click on **Have Disk**.
- 8** Insert Diskette 2: Device Drivers in drive A and select **OK**.
- 9** In the Select OEM Option dialog box, select the appropriate option. Click **OK**.

Several work-in-progress panels are displayed, indicating that the driver and its supporting files are being copied to your computer's hard disk.
- 10** The Network Control panel is displayed again. There should be an entry for the appropriate option in the Network Adapters list box.

**Note:** To change default values for an adapter, select that adapter on the Installed Adapters list box, and then select **Properties**. Make the necessary changes and select **OK**.
- 11** Select **Close** to complete the installation.

**Note:** If TCP/IP is installed on the computer and the IP Address and Subnet Mask Address information has not been entered, or if other network software parameters have not been set, required configuration panels will be displayed. Enter all necessary information and select **OK**.
- 12** The message **You must shut down and restart your computer before the new settings will take effect. Do you want to restart your computer now?** will be displayed. Select **Yes** in order to have Windows NT automatically restart your computer.
- 13** Check for the following conditions to determine whether the adapter is working correctly and whether installation has been completed successfully:
  - The device driver files loaded successfully. There are no error messages.





- The adapter LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems go to Appendix A, "Troubleshooting and Testing."

## Novell IntranetWare Client for Windows 95

(Formerly known as NetWare Client 32 for Windows 95.)

---

Novell IntranetWare Client for Windows 95	Diskette 2: Device Drivers Directory: NOVELL\NETWARE
---	---

---

**Note:** You will need the Windows 95 diskettes or CD-ROM to complete this installation.

### Step 1: Novell Installation Flowchart

See the figure on the following page or other Novell documentation for instructions for accessing the IntranetWare Client software and running the setup program.

Do not install IntranetWare Client 2.2 for Windows 95 directly from the Novell CD-ROM. To install this product do one of the following:

- Copy the install files to a local or networked hard drive from the CD-ROM or from the web at <http://support.novell.com>
- Copy the install files to diskettes from the CD-ROM or from the web at <http://support.novell.com>

After copying and expanding the compressed diskette images, complete the following steps before you install IntranetWare Client 2.2 for Windows 95.

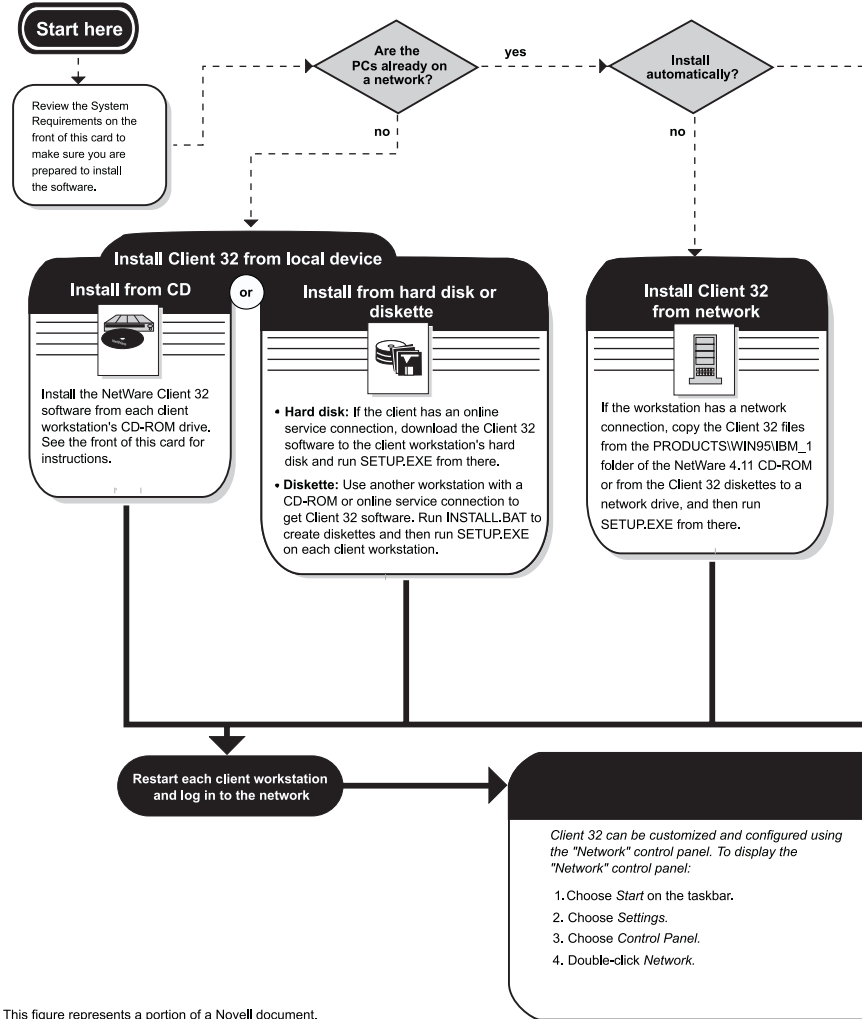
- 1** Search the files you just copied for the TOKEN.INF file.
- 2** Delete the TOKEN.INF file. A replacement TOKEN.INF file is shipped on the diskettes included with this product.  
  
During the Novell setup process you will see an error message about this file missing. Continue with the installation as the new file will be used.
- 3** Continue the installation according to the figure on the following page, then continue with the steps listed here.

## Step 2: IBM Driver Installation

- 1** When you reach the Select Drive panel in the setup program, select **Have disk...**
- 2** Insert Diskette 2: Device Drivers in drive A and type **a:\novell\netware**. Click **OK**.
- 3** On the Select Device panel select the appropriate adapter. Click **OK**.
- 4** You will be prompted to insert Windows 95 diskettes or CD-ROM.
- 5** When you get back to the IntranetWare Client Installation panel, remove the diskette from drive A and select **Reboot**.
- 6** Installation is now complete.
- 7** Check for the following conditions to determine whether the adapter is working correctly and whether installation has been completed successfully.
  - The device driver files loaded successfully. There are no error messages.
  - The adapter LEDs indicate normal operation: Green ON, Amber OFF.

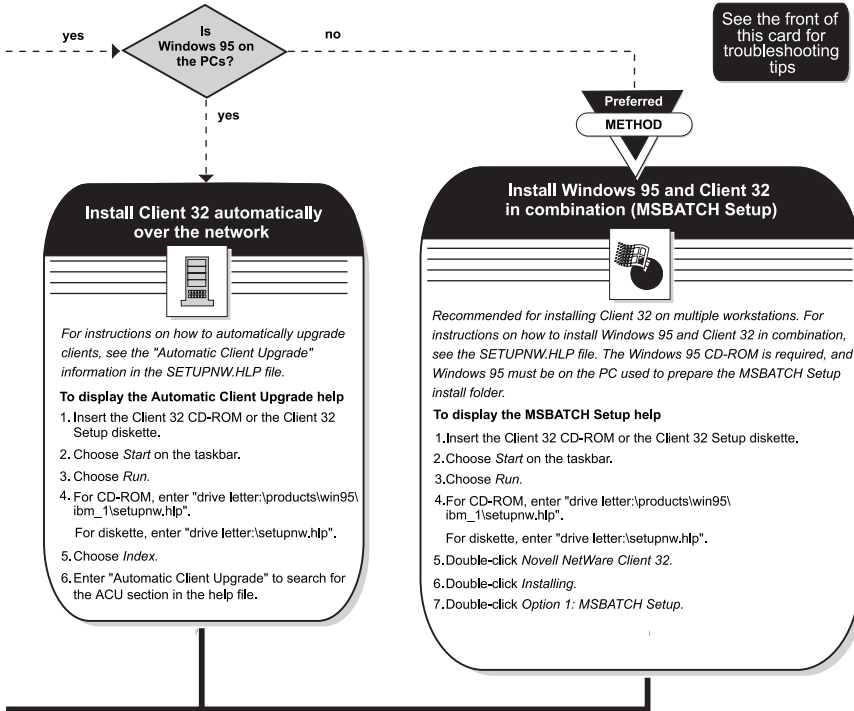
If you experience problems, go to Appendix A, "Troubleshooting and Testing" on page A-1.

# Installation: NetWare Client



This figure represents a portion of a Novell document, NetWare® Client™ 32™ for Windows® 95®, ©1987, 1995 Novell, Inc. All Rights Reserved. Used with permission of Novell, Inc.

# 32 for Windows 95



### Customize Client 32

Each network component can be configured. For example, to configure the "Novell NetWare Client 32" component:

1. Display the Network control panel.
2. Choose *Novell NetWare Client 32*.
3. Choose *Properties*.
4. Enter or change values as appropriate.
5. Choose *OK*.
6. Choose *OK* on the Network control panel.

Client 32 also has additional functionality (such as *SNMP* and *NetWare/IP™*) that you can add. These are added using the "Network" control panel. For detailed instructions, see the *SETUPNW.HLP* file.

Client 32 can also be configured using the *System Policy Editor*. For more information, see the *NWCFG95.HLP* file.

## Windows for Workgroups with NDIS 3

---

Windows for  
Workgroups

Diskette 2: Device Drivers  
Directory: (root)

---

**Note:** Refer to the *Microsoft Windows For Workgroups System Guide* for the general procedure regarding installation of network drivers for Windows for Workgroups.

**Note:** If you are using two adapters in this environment, see “Supporting Two Adapters with NDIS Drivers” on page 6-25. Each adapter must have a unique Relative Burned-In Address.

- 1** Insert Diskette 2: Device Drivers in drive A.
- 2** Double-click the Network group icon from the Program Manager window.
- 3** Double-click the Network Setup icon.
- 4** Click **Drivers** and then **Add Adapter...**
- 5** Click **Unlisted or updated network adapter** and then **OK**.
- 6** Enter **A:\WFW** and click **OK**.
- 7** Click the appropriate option, and click **OK**.
- 8** Click **CLOSE**.
- 9** Click **OK**.
- 10** You might be prompted to reinstall specific network-related files. Reinstall them as needed.
- 11** You might also be prompted to insert the Windows for Workgroups program application diskettes or CD-ROM. Follow the instructions.
- 12** Select **OK** for any messages regarding updates to the SYSTEM.INI and PROTOCOL.INI files.

- 13** When prompted to restart your computer, click **RESTART COMPUTER**.
- 14** Windows for Workgroups will automatically restart your computer and the driver will be loaded.
- 15** At system startup, check for the following conditions to determine whether you have successfully installed the adapter:
- The device driver files loaded successfully. There are no error messages.
  - The adapter LEDs indicate normal operation. See “Understanding the Adapter LEDs” on page A-6.
  - You are able to log on and communicate with the network.
- If you experience problems, go to “Troubleshooting Process.”

### Installing NDIS MAC Drivers Using Other Installation Programs

If your network operating system or network application provides an installation program that can be used to install an NDIS adapter driver and an NDIS-compliant protocol driver, refer to that product’s documentation for instructions on the use of the program to install the NDIS MAC driver (IBMTOK.DOS or IBMTOK.OS2) and the protocol driver.

---

<b>Other DOS workstations</b>	Diskette 2: Device Drivers Directory: DOS
<b>Other OS/2 workstations</b>	Diskette 2: Device Drivers Directory: (root)

---

When you have finished the installation:

- 1** Reboot the workstation to load the drivers. Look for messages that indicate that the drivers have been installed.



**2** If the messages indicate that the drivers have been installed, the installation is now complete, and you have finished with this document.

If error messages have been displayed, or you do not see messages that indicate that the drivers have been installed, go to “Troubleshooting Process” on page A-1.







---

## Chapter 7. Remote Program Load Function

The Remote Program Load (RPL) function enables the adapter to bring up a client computer using files the computer receives from a LAN server. The RPL function works correctly only if the following conditions are met:

- 1** A network operating system or LAN server must be active on the network for the adapter to complete an RPL. The Token-Ring ISA Adapter supports RPL from the following servers:
  - IBM OS/2 Warp Server
  - IBM OS/2 LAN Server 3.0
  - IBM OS/2 LAN Server 4.0
  - Novell NetWare 4.1x
  - Novell NetWare 3.12
  
- 2** The adapter must be installed in a client computer in which the startup sequence lists the RPL selection before any hard disk drive in the boot order; any diskette drives listed before the RPL selection are empty. Refer to your computer's documentation to determine whether your computer supports this function. This function is typically implemented in the computer's BIOS setup utility. Or, the RPL adapter is the only bootable entity on the computer because:
  - The computer has no hard disk or has an unbootable hard disk.
  - The diskette drive is empty, or there is no diskette drive.
  
- 3** The adapter must be RPL-enabled. The adapter is shipped with RPL enabled, or you can use LAN Aid to select RPL enabled.
  
- 4** If your computer has no diskette drive, the adapter must first be configured in another computer and then installed in your computer. When you use one computer to configure the adapter for use in another computer, avoid any interrupt or memory conflicts with other adapters in the target computer.

See Chapter 4, “Configuring the Adapter with LANAIID” for information about configuring the adapter.

**Note:** If IPL is being attempted from the fixed disk rather than from the network, create or modify the BOOTCONF.SYS file on your NetWare server. For information on how to create this file, refer to your NetWare documentation. Add the parameter boot=f on the line that refers to this computer’s adapter. You must have a current RPL.NLM file on the NetWare server that supports the boot=f parameter.

---

## Configuring Your OS/2 LAN Server for RPL to Clients with the Token-Ring ISA Adapter

This section describes the steps required to configure your OS/2 LAN Server to support RPL to client computers with the Token-Ring ISA Adapter.

### 1 Make sure your OS/2 LAN Server is at the required CSD level.

OS/2 LAN Server 3.0: CSD level IP07060 (See Notes)

OS/2 LAN Server 4.0: CSD level IP08152 (See Notes)

OS/2 Warp Server: No CSD required

#### Notes:

- a. You can make sure you are at the correct CSD level by running the SYSLEVEL command in an OS/2 panel on your server.
- b. Ensure that you follow all the power-on self-test (POST) installation steps described in the IPxxxxx.INF (where xxxxx is the CSD level), located on the first CSD disk. POST installation steps usually include some or all of the following:
  - Install LSP, and sometimes DLS or DLR updates.
  - Run RPLINST to install an OS/2 RPL image, if not installed.
  - Run RPLSxxxx.CMD (xxxx is the CSD level being applied) to update the OS/2 image profiles.

- Run GETRPL.EXE to update RPL profiles.
- Run RPLSETD.COM (OS/2 RPL only) to update the RPL clients with the bus type (ISA for the Token-Ring ISA Adapter) and display type.

**2** Insert Diskette 2: Device Drivers in drive A and copy the following files to the specified server directory. If your server is not on drive C, replace C: with the correct directory.

Source File Name	Copy to Subdirectory:
A:\DOS\IBMTOK.DOS	C:\IBMLAN\DOSLAN\LSP\DOS
A:\DOS\IBMTOK.NIF	C:\IBMLAN\DOSLAN\LSP\DOS
A:\DOS\LT2.MSG	C:\IBMLAN\DOSLAN\LSP\DOS
A:\IBMTOK.OS2	C:\IBMLAN\RPL\IBMCOMM\ACS
A:\IBMTOK.NIF	C:\IBMLAN\RPL\IBMCOMM\ACS
A:\LT2.MSG	C:\IBMLAN\RPL\IBMCOM
A:\LT2H.MSG	C:\IBMLAN\RPL\IBMCOM
A:\LSP\DXMA0MOD.SYS	C:\IBMLAN\DOSLAN\LSP (See note)
A:\LSP\DXMC0MOD.SYS	C:\IBMLAN\DOSLAN\LSP
A:\LSP\DXM.MSG	C:\IBMLAN\DOSLAN\LSP

**Note:** Do *not* copy A:\LSP\DXMT0MOD.SYS to this directory.

**3** Create a Remote IPL Requester image for each client with a Token-Ring ISA Adapter. This procedure is described in the OS/2 LAN Server documentation. For the Server Record Identifier, choose:

Server Record ID	Operating System RPL
R_DTK_NDIS	DOS with NDIS Device Drivers
R_DTK	DOS with non-NDIS Device Drivers
R_20_OTK	OS/2 2.0
R_21_OTK	OS/2 2.1
R_30_OTK	OS/2 3.0

You will see Server Record Identifiers for only the OS/2 images that you have installed.

---

## Configuring Your Novell NetWare Server for RPL to Clients with the Token-Ring ISA Adapter

- 1 Install the following files on the Novell NetWare Server (See Notes):

Source File	Novell Directory
TOKEN.RPL	\SYSTEM
RPL.NLM	\LOGIN

### Notes:

- a. You *must* obtain a new TOKEN.RPL file dated 5/96 or later to RPL with this adapter. Contact IBM or Novell support, BBS, or Web sites to obtain this update.
- b. Use RPL.NLM dated 10/95 or later, available from Novell.
- c. To install these files, you must be logged on to the NetWare Server with supervisor authority.

- 2 Make sure that you have the following in your AUTOEXEC.NCF file after loading your Server network driver:

```
load route
load rpl
bind rpl to <driver>
```

Where <driver> is your server adapter driver. If you need help in editing the AUTOEXEC.NCF file, refer to your Novell NetWare documentation.

- 3 Create NetWare client images for the Token-Ring ISA Adapter. A sample procedure follows.

Prepare a bootable DOS diskette. For a VLM diskette image perform the following. For a NETX diskette image, go to page 7-5.

Place the following files on the bootable DOS diskette:

```
COMMAND.COM  AUTOEXEC.BAT  CONFIG.SYS  NET.CFG
LSL.COM      TOKEN.COM      ROUTE.COM   IPXODI.COM  VLM.EXE
CONN.VLM    SECURITY.VLM   NWP.VLM    REDIR.VLM
IPXNCP.VLM  NDS.VLM      FIO.VLM    PRINT.VLM
TRAN.VLM    BIND.VLM     GENERAL.VLM NETX.VLM
```

Your CONFIG.SYS should have the following statements:

```
REM Use next three to use high memory and XMS memory
REM DOS=HIGH
REM DEVICE=a:\HIMEM.SYS
REM DEVICE=a:EMM386.EXE NOEMS
FILES=40
BUFFERS=20
LASTDRIVE=Z
```

Your AUTOEXEC.BAT should have the following statements:

```
PATH A:\
PROMPT $P$G
SET NWLANGUAGE=ENGLISH
LSL
TOKEN
ROUTE
IPXODI
VLM
F:
LOGIN YourID
```

For a NETX image, place the following files on the bootable DOS diskette:

```
COMMAND.COM,  AUTOEXEC.BAT,  LSL.COM,      NETX.EXE
TOKEN.COM,   ROUTE.COM,   IPXODI.COM,  NET.CFG,
```

Your CONFIG.SYS should have the following statements:

```
REM Use next three to use high memory and XMS memory
REM DOS=HIGH
REM DEVICE=a:\HIMEM.SYS
REM DEVICE=a:EMM386.EXE NOEMS
FILES=40
BUFFERS=20
REM LASTDRIVE=Z
```

Your AUTOEXEC.BAT should have the following statements:

```
PATH A:\
PROMPT $P$G
LSL
TOKEN
ROUTE
IPXODI
NETX
F:
LOGIN YourID
```

Update the diskette with TOKEN.COM from Diskette 2: Device Drivers.

Generate the image using DOSGEN (refer to your Novell documentation for information on creating images and running DOSGEN).

Following is a sample of the NET.CFG file for NETX or VLM clients:

```
Link support
buffers 3 18000

LINK DRIVER TOKEN
    PORT A20
    FRAME TOKEN-RING MSB
    MAX FRAME SIZE 17960

NetWare DOS Requester
    FIRST NETWORK DRIVE F
    MESSAGE LEVEL = 2
    signature level = 0
CACHE BUFFERS 3
```

---

## Enabling Your Computer for RPL

For RPL to take control, there must be no other bootable source available or, if your computer supports specification of the boot sequence or startup sequence, the RPL sequence must appear before any other bootable source. In a selectable boot or startup sequence the RPL function is usually called *boot from network* or *RPL from network*.

Some computers support selection of the startup sequence through the setup utility or reference diskette. Refer to your computer's documentation to determine whether your computer supports this function and, if it does, how to access it.

If your computer does not support selection of the startup sequence and does not have a fixed disk, you can mark the fixed disk as unbootable. The *IBM Token-Ring Network Remote Program Load User's Guide* contains a program to mark a fixed disk as unbootable. Also, some versions of IBM OS/2 LAN Server include programs to mark a fixed disk as unbootable. Refer to your IBM LAN Server documentation.

---

## RPL Failure Indications

The following table details possible failure indications and suggested actions.

*Table 7-1 (Page 1 of 2). Failure Indications for the RPL Function*

<b>Problem Indication</b>	<b>Problem Determination Action</b>
An error is displayed indicating that there is no diskette drive.	See "Computers with No Diskette Drives" on page 7-8.
The computer beeps more than once.	See "Multiple Beeps" on page 7-8.
The computer's BASIC panel is displayed, or a message indicates that no bootable source was found.	See "BASIC Panel Displayed" on page 7-8.
A system panel or an application panel is displayed.	See "System Panel Displayed" on page 7-9.
A Bring-Up Error. The BU field on the display panel is highlighted.	See "Bring-Up Error" on page 7-9.
An Open Error. The OP field on the display panel is highlighted.	See "Open Error" on page 7-10.
A Ring Status Error. The RS field on the display screen has a value other than zero (0) or is highlighted.	See "Ring Status Error" on page 7-12.



*Table 7-1 (Page 2 of 2). Failure Indications for the RPL Function*

<b>Problem Indication</b>	<b>Problem Determination Action</b>
A PC Error. The PC field on the display panel is highlighted or is shown with counters not being updated.	See "PC Error" on page 7-14.
An Adapter Error. The AE field appears at the bottom of the display panel.	See "Adapter Error" on page 7-15.
The RQ field on the display panel has a value greater than 10.	See "Request Count Greater Than 10" on page 7-16.
The display panel shows any response that has not been identified.	Have your computer serviced.

## **Computers with No Diskette Drives**

Some IBM PC systems will display an error if they do not have a diskette drive installed. For these computers, perform the step that is required to continue. Follow the instructions in the user's guide for your computer.

## **Multiple Beeps**

The computer did not perform the POST successfully. Refer to the user's guide for your computer. Correct the problem and restart the computer. If the problem continues, have your computer serviced.

## **BASIC Panel Displayed**

If the computer's BASIC panel is displayed, or if you get other indications that no bootable source was found, verify that the adapter is installed in your computer. Verify that the adapter is configured correctly, ensuring that there are no interrupt or message conflicts. If the adapter is installed in an 8-bit slot (the bottom part of the adapter farthest from the bracket is outside the slot), use LANAIID to configure the adapter for 8-bit operation.

## System Panel Displayed

The POST has completed, but the computer is loaded from the hard disk or diskette.

- If the computer has one or more diskette drives but no fixed-disk drive, ensure that there is no diskette in drive A.
- If the computer has a hard disk, then one of the following choices must be true:
  - The startup sequence on the computer lists the RPL selection before any hard-disk drive in the boot order; any diskette drives listed before the RPL selection are empty. Refer to your computer documents to determine whether your computer supports this function.
  - The RPL adapter is the only bootable entity on the computer: that is, there is no diskette drive or all diskette drives are empty and there is no bootable hard-disk drive. See “Enabling Your Computer for RPL” on page 7-6 for information on marking a hard disk as unbootable.

## Bring-Up Error

The display panel shows that the elapsed time (ET) field has stopped with only a few seconds of time accumulated, and the bring-up (BU) error field is highlighted. The RPL function tried three times and was unable to initialize the adapter for use.

---

### X'0022'

**Cause:** A module on the adapter is not responding correctly.

**Action:** The adapter appears defective. Run the adapter diagnostics.

---

### X'0024'

**Cause:** The RAM diagnostic failed.

**Action:** Using LANAIID, check the configuration of your adapter to make sure that the shared RAM address does not conflict with any other addresses in your computer.

---

## All others

**Cause:** Adapter Failure.

**Action:** The adapter appears defective or there is a conflict between the adapter configuration and your computer. If your computer is enabled for Plug and Play, use LANAID to ensure that the adapter is Plug and Play-enabled. If your computer is not enabled for Plug and Play, use LANAID to make sure that the adapter is Plug and Play-disabled, and make sure that the shared RAM address does not conflict with any addresses in your computer. If the problem persists, run the adapter diagnostics and have the computer serviced, if necessary.

## Open Error

The open error field (OP) contains an error code. This code can be displayed normally, or flashing, or highlighted, or both.

- If the error code is flashing, the RPL function is trying to open the adapter after an unsuccessful attempt. If the error code is OP-0024, then the adapter data rate does not match the ring data rate. The RPL function will change the adapter data rate and reopen the adapter. The altered data rate is stored on the adapter.
- If the error code is highlighted, the RPL function tried to open the adapter for use but failed. The adapter data rate might not match the ring data rate of the network. You can attempt to correct this problem by using **F4** or numeric **4** to select a 4Mbps rate or **F6** or numeric **6** to select a 16Mbps rate. Ensure that you select the adapter data rate that corresponds to the ring data rate of your network. An adapter attempting to open at the incorrect ring data rate could disrupt the network. The selected data rate will be stored on the adapter.
- If the error code is highlighted and flashing, then two adapters are present in the computer and one of them failed to open. The computer is now trying to open the other adapter.

If the problem persists, record the open error code. The error code is of the form OP-00XX DR C.

**XX** Specifies the reason code.

**DR** Specifies the data rate, 04 or 16.

**C** Specifies the cable connection port being used for adapter communications.

S or U, which specifies STP or UTP.

Refer to the open error reason code (for example, X'0011') in the following list to resolve the problem. If the problem persists and you are directed elsewhere for more information, note that you are experiencing an open error and note the reason code.

---

#### **X'0011'**

**Cause:**

- A cable is not attached or is not securely attached to your adapter.
- If your adapter is connected to the network by means of an active concentrator, such as an IBM 8230 Multistation Access Unit, this error could mean that the adapter data rate does not match that of the Token Ring.
- Adapter lobe failure.

**Action:** If the adapter has failed to open after three tries, you are prompted to select F4 or numeric 4 to set the adapter data rate to 4 Mbps or to select F6 or numeric 6 to set the adapter data rate to 16 Mbps. Ensure that the selected data rate corresponds to the ring data rate of the network. The RPL function will attempt to open the adapter three more times at the selected data rate. If all retry attempts have been exhausted, the Open Error code is displayed in reverse video. If the error persists, refer to the *IBM Token-Ring Network Problem Determination Guide*.

---

#### **X'0024'**

**Cause:** The adapter data rate setting is different from the data rate of the Token Ring.

**Action:** The RPL function will attempt to open the adapter at the alternate data rate.

---

**X'002D'****Cause:**

- Your computer is trying to be the first active computer on the local Token-Ring network. An adapter performing the RPL function will not open on the ring unless another adapter is already active on the ring.
- If your adapter is connected to the network by means of an active concentrator, such as an IBM 8230 Multistation Access Unit (MSAU), this error could mean that the adapter data rate does not match that of the Token Ring.

**Action:** If the adapter fails to open after three tries, you are prompted to select F4 or numeric 4 to set the adapter data rate to 4 Mbps or to select F6 or numeric 6 to set the adapter data rate to 16 Mbps. Ensure that the selected data rate corresponds to the ring data rate of the network. The RPL function will attempt to open the adapter three more times at the selected data rate. displayed in reverse video. If the error persists, ensure that the server computer is active on the network and restart your computer to restart the RPL sequence.

---

**X'002E'**

**Cause:** The adapter data rate might be different from the ring data rate of the network.

**Action:** Change the adapter data rate to match the ring data rate of the network, if possible. If this error persists, refer to the *IBM Token-Ring Network Problem Determination Guide*.

---

**All Others**

**Cause:** Adapter Open Failure.

**Action:** Refer to the *IBM Token-Ring Network Problem Determination Guide*.

**Ring Status Error**

A ring error was detected when the RPL function was executing. The ring status (RS) error field contains the error code. Locate the error code in the following table to determine the correct action to take. Some values might be displayed that are a combination of the values listed in the following message list. The x's in the error codes can be any hexadecimal number between 0 and F.

---

**X'4xxx' to X'Dxxx'****Cause:**

- No receive signal was detected.
- The ring is in a beaconing condition.
- The adapter is transmitting beacon frames.

**Action:** Refer to the *IBM Token-Ring Network Problem Determination Guide*.

---

**X'2000'**

**Cause:** This adapter has detected a soft-error condition.

**Action:** No action required.

---

**X'08xx'**

**Cause:** Wire fault. The adapter has detected a problem in itself or in its lobe.

**Action:** Refer to the *IBM Token-Ring Network Problem Determination Guide*.

---

**X'04xx'**

**Cause:** The adapter detected an internal hardware error.

**Action:** Have your computer serviced.

---

**X'x1xx'**

**Cause:** Remove received. This adapter removed itself from the ring.

**Action:** Contact your network administrator for assistance.

---

**X'0080'**

**Cause:** Counter overflow. One of the error log counters has incremented past 256.

**Action:** Restart the computer.

---

**X'0040' or X'0060'**

**Cause:** Single station. The adapter has opened and is the only station on the ring. This bit will reset when another station inserts.

**Action:** No action is required unless other stations are known to be operating on this ring. If other stations are on the ring, refer to the *IBM Token-Ring Network Problem Determination Guide*.

---

**X'0020'**

**Cause:** Ring recovery. The adapter is transmitting or receiving claim token frames.

**Action:** No action is required.

---

**All others**

**Cause:** Reserved.

**Action:** Contact your network administrator for assistance.

**PC Error**

The RPL function has detected a problem with either the software or hardware in your computer. The IBM Personal Computer or IBM Personal System/2 error field (PC) contains the error code. Retry the operation by restarting the computer at least once. If the problem persists, locate the error code in the following table to determine the correct action to take.

---

**X'05xx'**

**Cause:** An invalid Command Control Block (CCB) code was issued to the Adapter Support Subset.

X'xx' = The CCB code.

**Action:** Check the bootstrap program (on the server computer) if it is user-written. If not, contact your network administrator for assistance. Provide the CCB code.

---

**X'06xx'** (not highlighted)

**Cause:** PROGRAM.ALERT frames being transmitted, where **xx** represents the alert code:

- X'00' = Unexpected error response frame received.
- X'02' = File not found.
- X'04' = Out of memory space.
- X'06' = Memory overrun.
- X'08' = Unexpected DLC status received.

**Action:** Restart the computer. If this error persists, contact your network administrator for assistance.

---

**X'07xx'**

**Cause:** The adapter failed a wrap test, where X'xx' equals the System Status Block (SSB) return code.

**Action:** The adapter appears defective. Run the adapter diagnostics. Have your computer serviced if necessary.

---

**All others**

**Cause:** A computer hardware or software error has occurred.

**Action:** There could be a conflict between the adapter configuration and your computer. If your computer is enabled for Plug and Play, use LANAIID to make sure that the adapter is Plug and Play-enabled. If your computer is not enabled for Plug and Play, use LANAIID to make sure that the adapter is Plug and Play-disabled, and make sure that the RAM address does not conflict with any addresses in your computer. If the problem persists, perform the computer diagnostic test procedure or contact your network administrator for assistance.

**Adapter Error**

Two Token-Ring adapters are installed in the machine. All attempts to open one adapter have failed, and the RPL function is now attempting to open the other adapter. This function is not supported on all Token-Ring adapters but is supported if there are two Token-Ring ISA Adapters in the same computer. If the RPL function fails at all attempts to open the first adapter, then the RPL function will attempt to open the other adapter. The AE message or Adapter Error will appear at the bottom of the display, indicating the failure of the first adapter. See page 7-21 for a complete description.



## Request Count Greater Than 10

The request (RQ) count field shows a number greater than 10. After 10 tries, your computer has not been served by the server computer. Verify that your computer is active and connected to the network, and has an operating loader program.

If the server computer is active, determine that the server computer and your computer are gaining access to the same network. Determine whether the server computer is servicing other computers, making it busy and unable to respond.

If the server computer and your computer are gaining access to the same network, and the server computer is available, contact your network administrator for assistance.

---

## Requesting Device Error and Status Messages

Each type of message you might see on the Requesting Device display is shown on this sample panel in Figure 7-1 and described on the following pages.

```
ET-00:00:45
ID-166
CE-0085
BU-0000
AA-10005A000567
AL-00 0000 B001253
BL-00112233
MM-CC00 02
SR-D800 08
OP-0000 04 S

RQ-0001
SF-0001
SN-0023
DS-0080
RS-0040
PC-4020
AC-0040 0000 0000 0000

AE-166 XX-011 04 S
```

Figure 7-1. Sample Messages

---

## Requesting Device Message Descriptions

Each error message is presented in the same order as shown on the sample panel.

---

### ET-00:00:45

**Explanation:** Elapsed Time. A continuously updated field indicating the elapsed time since the RPL function gained control. The ET field is reset to 0 each time the RPL function attempts to open after an open failure.

---

### ID-nnn

**Explanation:** Identification. An indication of which adapter is using the RPL function, where nnn is the adapter identifier.

- A value of 166 indicates the first Token-Ring adapter.
- A value of 167 indicates the next Token-Ring adapter.

---

### CE-0085

**Explanation:** Configuration Error. This field is displayed if the RPL function has exhausted all attempts to open the adapter. A highlighted or reverse-video field elsewhere on the display will provide the error code. Refer to this error code and follow the recommended action.

---

### BU-0000

**Explanation:** Bring-Up. This field is displayed as X'0000' if the adapter has been successfully initialized and opened. If not, a code other than X'0000' is displayed and the field is highlighted. See "Bring-Up Error" on page 7-9 for more information about this error.

---

### AA-10005A000567

**Explanation:** Adapter Address. The permanently encoded address of the Token-Ring adapter in the requesting device. This address is always 12 hexadecimal characters (6 bytes) long.

---

**AL-00 0000 B001253 • OP-0000 04 S**

---

**AL-00 0000 B001253**

**Explanation:** Adapter Level. The Engineering Change (EC) level of the code on the Token-Ring ISA Adapter.

---

**BL-00112233**

**Explanation:** BIOS Level (Module Level). The Engineering Change (EC) level of the code in the RPL function.

---

**MM-CC00 02**

**Explanation:** Memory (Read-Only Memory). The first 4 digits are the hexadecimal ROM address set on the adapter. The last 2 digits are the interrupt level set on the adapter.

---

**SR-D800 08**

**Explanation:** Shared RAM. The first 4 digits are the hexadecimal, shared-RAM address that the adapter uses. The last 2 digits are the shared-RAM size (in decimal). **08** indicates 8 kilobytes (8 KB) of memory, **16** indicates 16 KB of memory, **32** indicates 32 KB of memory, and **64** indicates 64 KB of memory.

---

**OP-0000 04 S**

**Explanation:** Open Return Code. The first 4 digits are the open return code; the next 2 digits are the adapter data rate, 04 or 16 Mbps; and the final character indicates the cable connection port being used (this character is always **S** for adapters with a single cable connection port).

If the adapter has successfully attached to the ring, the open return code is X'0000'. If a code other than 0 is displayed and the field is highlighted, flashing, or reverse video, see "Open Error" on page 7-10 for more information. Some open return codes might indicate that the adapter data rate does not match the ring data rate of the network. For these error codes, a prompt is displayed so that you can select the correct adapter data rate. Select **F4** or the numeric **4** for 4 Mbps or **F6** or numeric **6** for 16 Mbps. Ensure that you select the data rate corresponding to the ring data rate of your network. Adapters attempting to open at the incorrect data rate can disrupt the network.

---

**RQ-0001**

**Explanation:** Request Count (FIND Frame Count). The number (in hexadecimal) of FIND frames that have been transmitted. An excessive request count (greater than 10, for instance) indicates that the loading device either is not present or is congested.

---

**SF-0001**

**Explanation:** SEND.FILE.REQUEST Frame Count. The number of SEND.FILE.REQUEST frames that have been transmitted. An excessive SEND.FILE.REQUEST frame count (greater than 10, for instance) indicates that the loading device is not responding after having been found.

---

**SN-0023**

**Explanation:** File Response Sequence Number. This value is displayed when the loading device has responded to the SEND.FILE.REQUEST. It indicates how many times valid FILE.DATA.RESPONSE frames have been received.

---

**DS-0080**

**Explanation:** DLC Status. The message provided by the adapter if an unexpected Data Link Control (DLC) condition occurs.

The values displayed are useful to the person writing a loader program for analysis of a complex DLC problem on the network. Some values might be displayed that are a combination of the values listed in the following table. Refer to the *IBM Token-Ring Network Remote Program Load User's Guide*, for more information on writing a loader program, or refer to the *IBM LAN Technical Reference: Token-Ring Network Adapter Interface*, for more information on DLC.

Hex Value	Meaning	Load Requester Action
X'8000'	Link lost	Issue a close station CCB
X'4000'	DM or DISC	Issue a close station CCB
X'2000'	FRMR received	Issue a close station CCB and PROGRAM.ALERT frames
X'1000'	FRMR sent	Issue a close station CCB and PROGRAM.ALERT frames

**RS-0040 • AC-0040 0000 0000 0000**

Hex Value	Meaning	Load Requester Action
X'0800'	SABME received	Issue a connect station CCB
X'0400'	SABME received, link opened	Issue a connect station CCB
X'0200'	Remote is busy	Ignore
X'0100'	Remote not busy	Ignore
X'0080'	Inactivity Timer (Ti) expired	Ignore
X'0040'	DLC overflow	Ignore
X'0020'	Priority change	Ignore
X'0001'	Local busy	Not set by requester

**RS-0040**

**Explanation:** Ring Status. This field displays a code indicating the status of the ring. The field is highlighted if the operation cannot continue; it is not highlighted if processing can continue. For more information, see "Ring Status Error" on page 7-12.

**PC-4020**

**Explanation:** IBM Personal Computer or IBM Personal System/2 computer error. This field displays an error code indicating that the adapter has difficulty in functioning with the computer. In most cases, the screen is frozen and this field is highlighted, because the adapter cannot continue. For more information, see "PC Error" on page 7-14.

**AC-0040 0000 0000 0000**

**Explanation:** Adapter Check. The adapter has detected an internal error and cannot continue.

Restart your computer. If this problem persists, have your computer and the adapter serviced. Record the adapter check code to give to the service person when the computer is serviced.

## AE-nnn XX-0011 04 S • AE-nnn XX-0011 04 S

---

### AE-nnn XX-0011 04 S

**Explanation:** Adapter Error. The adapter in the requesting device could not establish communication with the loading device. The adapter identifier is **nnn**, where **nnn** can have one of the following values:

- A value of 166 indicates the first Token-Ring adapter.
- A value of 167 indicates the next Token-Ring adapter.

The reason for this error is indicated in the XX message to the right of AE-**nnn**. XX can be either BU or OP. The BU and OP messages were described previously.



## Appendix A. Troubleshooting and Testing

This section describes methods for testing the Token-Ring ISA Adapter and for resolving adapter problems.

To determine if the adapter is open and operating correctly, you can observe the adapter LEDs. See Table A-3 on page A-6.

### Troubleshooting Process

If you were not able to successfully complete the installation procedures in Chapter 6, "Device Driver Installation" or a driver from Diskette 2: Device Drivers is not operating correctly, locate the symptom that best describes the problem in Table A-1, go to the section that contains the recommended actions for resolving the problem, and follow that procedure.

*Table A-1. Adapter Problems and Solutions*

Symptom	Go To
The adapter is not operating.	"Diagnostic Testing"
The adapter cannot communicate on the ring, but other stations on the ring can communicate.	"Solving an Adapter Communication Problem" on page A-3
A problem is indicated by the adapter LEDs.	"Solving Problems Indicated by the LEDs" on page A-4
There is a problem with loading the drivers.	"Solving Driver Installation Problems" on page A-7

### Diagnostic Testing

- 1 Make sure that the Token-Ring ISA Adapter is cabled to the network.
- 2 Start LANAIID if it is not already started.  
On the opening LANAIID panel, select **Diagnostics**.
- 3 Follow any online instructions to complete the test. If a failure occurs, follow the Help text.



- 4 If you learn nothing from the test, perform the test described in "Stand-alone Diagnostic."

### Stand-alone Diagnostic

1. Boot Diskette 1: LANAIID.
2. Select **Diagnostics** from the menu presented.
3. Follow the instructions.

If the test indicates that your Token-Ring ISA Adapter is defective, or if you believe you have a problem with the Token-Ring ISA Adapter, call the IBM HelpCenter at 1-800-426-7299 in the United States or 1-800-565-3344 in Canada.

If you have run the diagnostic tests, have followed the instructions in "Troubleshooting Process" on page A-1, and are still having trouble with the adapter, make sure that you have followed the instructions in the sections listed below:

- "Compatibility with Previous and Third-Party Drivers" on page 4-11
- "Compatibility with Shadowing" on page 4-12
- "Using the Token-Ring ISA Adapter in an EISA Computer" on page 4-10
- "Supporting Two Adapters with NDIS Drivers" on page 6-25

### Problems Configuring Two Token-Ring ISA Adapters

If the following message is displayed, ensure that one of the adapters is configured as ALTERNATE in the PROTOCOL.INI file.

```
PR00030: Multiple adapters are trying to use the same interrupt level. The request to bind *** to *** cannot be completed.
```

You can edit this file from the Configure Workstation window.

### Configuring Two Token-Ring ISA Adapters in Windows for Workgroups Environments

If you are using Windows for Workgroups with two IBM Token-Ring adapters, you must set one adapter to ALTERNATE. Use the **SETUP** option on the *Network Drivers* window, and then select the **ADVANCE** option. If you are using the "Real Mode and Enhanced

Mode NDIS Driver” you must set the NDIS3 Alternate Adapter settings.

To set the Alternate Adapter (NDIS3) setting, highlight the **Alternate Adapter (NDIS 3) Setting** line and then click the value button. Use the side bar arrow to set the value to 0. Click **Set** to save the value. If you are using enhanced mode drivers in Windows for Workgroups, you must manually change the *relative burned-in address* parameter on the second adapter. Perform the following steps:

- 1 Double-click the **Network Setup** icon.
- 2 Activate the Network Drivers window by selecting **Drivers**.
- 3 Select the adapter for which you are changing the parameter value, and then click the **Setup** push button.
- 4 In the next window, click the **Advanced** push button.
- 5 Select **Enh - Relative Burned-in Address** from the parameters list and set its value to 2.
- 6 Select **OK** to save your change, and then exit.
- 7 Restart the system.

## Solving an Adapter Communication Problem

Use the following procedure if the adapter is unable to communicate on the ring but other stations can:

- 1 Verify that the appropriate adapter cable is connected to the adapter and to the ring. See Figure 2-3 on page 2-3 for a description of the compatible adapter cables.
- 2 Verify that the setting for the adapter Data Rate option matches the data rate of the network, or that the data rate has been set to Auto-Sense. Use LANAIID to determine the current setting.  
**Note:** If the adapter is configured to auto-sense ring speed, make sure that another adapter on the ring (a server or bridge) is already open. The adapter will not open onto a ring if it is the only station on the ring and it is set to auto-sense ring speed.
- 3 Replace the adapter cable with a known, good cable.

- 4 Make sure that the adapter is firmly seated in the expansion slot. Be sure to follow correct safety procedures when checking the adapter.
- 5 Verify that the network application or other network software is operating correctly on the computer in which the Token-Ring ISA Adapter is installed.
- 6 Use "Diagnostic Testing" on page A-1 to run the adapter diagnostics.
- 7 If your machine is configured for shadowing of BIOS (shadow RAM) or shadow cache for the memory used by the adapter, disable this function (see "Compatibility with Shadowing" on page 4-12 for more information).

### **Solving Problems Indicated by the LEDs**

Use this procedure if you observe an LED state that indicates a problem. Table A-3 on page A-6 describes all the adapter LED states. Use Table A-2 on page A-5 to determine the recommended action for those LED states that indicate potential problems.

*Table A-2. Recommended Actions for Problem LED States*

<b>Amber</b>	<b>Green</b>	<b>Recommended Action</b>
On	Off	Go to "Diagnostic Testing" on page A-1 to test the adapter.
Blinking	Off	Perform the following procedures as appropriate: <ol style="list-style-type: none"> <li><b>1</b> Perform the steps under "Solving an Adapter Communication Problem" on page A-3.</li> <li><b>2</b> Verify that the adapter is configured correctly. See Chapter 4, "Configuring the Adapter with LANAIID," if you need to change the configuration. If the adapter is configured to auto-sense ring speed, make sure that another adapter on the ring (a server or bridge) is already open. The adapter will not open onto a ring if it is the only station on the ring and it is set to auto-sense ring speed.</li> <li><b>3</b> If you saw messages that indicate that the adapter and protocol drivers did not load, perform the procedure in "Solving Driver Installation Problems" on page A-7.</li> <li><b>4</b> If other stations on the ring are having problems communicating, contact your network administrator.</li> </ol>
Blinking	On	Go to "Solving an Adapter Communication Problem" on page A-3.

**Note:** During installation, the LEDs can freeze in states that are not identified in this manual. Disregard these states while the LANAIID program is running, until the next reboot.

## Understanding the Adapter LEDs

The Token-Ring ISA Adapter LEDs provide information useful for monitoring the status of the adapter and for problem-solving (see Table A-3). Some LED states might be too brief to observe; however, the last three LED states listed in the table indicate problems. See “Solving Problems Indicated by the LEDs” on page A-4 for procedures for solving problems indicated by the LEDs.

Table A-3. Explanation of the Adapter LED States

Amber	Green	Explanation
Blinking (500 milli- seconds)	Blinking (500 milli- seconds)	The adapter is active and waiting for initialization.
Off	Off	The adapter initialization is in progress, the computer is powered off, or the adapter is not active. Run LANAIID and verify the adapter's configuration. The adapter might be configured for Plug and Play although the system is not enabled for Plug and Play. Reconfigure a valid configuration and store it in the adapter.
Off	Blinking	The adapter did not detect any problems during its self-diagnostic tests and is waiting to open.  If this LED state occurs after the adapter is open, this state indicates that the adapter has closed.
Off	On	The adapter is open and operating correctly.
On	Off	The adapter self-diagnostic tests failed or there is a problem with the adapter.
Blinking	Off	The adapter is closed. One of the following conditions exists: <ul style="list-style-type: none"> <li>• The adapter open failed.</li> <li>• The adapter detected a wire fault.</li> <li>• The adapter failed the auto-removal test.</li> </ul>
Blinking	On	The adapter has detected beaconing or a hard error.

**Note:** The terms *auto-removal*, *beaconing*, *hard error*, *initialization*, *open*, and *wire fault* are defined in the glossary, beginning on page X-1.

## Solving Driver Installation Problems

Use this procedure if you are having problems starting the Token-Ring ISA Adapter drivers.

- 1 Ensure that you performed the procedures in Chapter 5, "Installing IBM LAN Client for DOS or Windows 3.1" or Chapter 6, "Device Driver Installation" correctly.
- 2 Perform diagnostic testing described in "Diagnostic Testing" on page A-1 to rule out the possibility of a hardware configuration problem.
- 3 In Table A-4, locate the row that describes the network operating system or network application on the computer and perform the recommended actions.

### Driver Installation Messages

Table A-4 (Page 1 of 3). Driver Installation Messages

Environment	Message Type and Action
NetWare Server	<ul style="list-style-type: none"> <li>• Message prefix TOKEN: see "Novell NetWare Server Driver Messages" on page A-11 for messages pertaining to this adapter. Refer to the online manual <i>NetWare System Messages</i> for explanations and recommended actions for any messages not listed.</li> <li>• NetWare messages: refer to the online manual <i>NetWare System Messages</i> to determine the appropriate action.</li> </ul>
NetWare Client with DOS or DOS with Windows	Message prefix TOKEN: see "Novell NetWare Client with DOS Driver Messages" on page A-12 for messages relating to this adapter. Refer to the online manual <i>NetWare System Messages</i> for explanations and recommended actions for any messages not listed.
NetWare Client with OS/2	Message prefix TOKEN: see "Novell NetWare Client with OS/2 Driver Messages" on page A-14 for messages relating to this adapter. Refer to the online manual <i>NetWare System Messages</i> for explanations and recommended actions for any messages not listed.

Table A-4 (Page 2 of 3). Driver Installation Messages

Environment	Message Type and Action
LSP Custom with DOS or DOS with Windows	If the LSP Custom copyright statement did not display, go to "Installing LSP Custom without DXMAID" on page 6-10 to repeat the procedure.
LSP Stand-alone with DOS	<ul style="list-style-type: none"> <li>• If the LSP (stand-alone) copyright statement was not displayed, go to "Installing LSP Custom without DXMAID" on page 6-10 to repeat the procedure.</li> <li>• Message prefix LT2: go to "DOS and OS/2 NDIS MAC Driver Messages" on page A-9.</li> </ul>
OS/2 with IBM LAN Transports	<p>Review LAPSHIST.LOG in the subdirectory OS2\INSTALL, and LANTRAN.LOG in the subdirectory \IBMCOM, for messages.</p> <ul style="list-style-type: none"> <li>• Message prefix LT2 or reference to IBMTOK: go to "DOS and OS/2 NDIS MAC Driver Messages" on page A-9.</li> <li>• OS/2 messages are available with the OS/2 help facility. For example, enter <b>help xxxxx</b> where <b>xxxxx</b> is the message number (for example "help LT20040").</li> </ul>
LAN Manager with DOS or OS/2	<ul style="list-style-type: none"> <li>• Review the Microsoft LANManager log, LANMAN\LOGS\NET.ERR, for error messages. Use the LANManager <i>net error</i> command to obtain explanations.</li> <li>• Verify that the Token-Ring ISA Adapter has not been configured for both LANManager and the LAN Support Program or the LAN Adapter Protocol and Support Program (LAPS). One indication of this condition would be two Device statements for the Protocol Manager (PROTMAN) in the CONFIG.SYS file.</li> </ul> <p>If the adapter has been configured for LAN Support Program or IBM LAN Transports, remove the CONFIG.SYS statements that load the NDIS MAC driver and the protocol drivers for that program.</p>
Windows for Workgroups	Message prefix LT2: go to "DOS and OS/2 NDIS MAC Driver Messages" on page A-9.

*Table A-4 (Page 3 of 3). Driver Installation Messages*

<b>Environment</b>	<b>Message Type and Action</b>
Windows NT	Review the Events listing in the Event Viewer.
Windows 95	Determine the status of the adapter in the Device Manager.
Other DOS and OS/2 stations	Refer to the documentation provided with the network operating system or network application that you used to install the adapter and protocol driver.

### **DOS and OS/2 NDIS MAC Driver Messages**

This section contains the messages for the DOS NDIS MAC driver.

**Note:** OS/2 message information can be displayed with the OS/2 help facility. For example, enter **help xxxxx** where **xxxxx** is the message number such as "help LT20040".

---

**LT20022E A failure during initialization of the IBMTOK.DOS driver has occurred. Press any key to continue ....**

**Cause:** This is a generic initialization failure message. If the IBMTOK.DOS device driver encounters any errors during initialization, the specific message related to the error will accompany this generic message.

**Action:** Resolve the specific error message. In addition, ensure that a DEVICE statement for PROTMAN.DOS exists in the CONFIG.SYS file.

---

**LT20023E An unrecognized parameter was found in PROTOCOL.INI.**

**Cause:** An unrecognized parameter was found while processing the IBM Token-Ring Network Driver section of PROTOCOL.INI.

**Action:** Correct the parameter or remove it from PROTOCOL.INI.

---

**LT20024E A value specified for a parameter in PROTOCOL.INI is not valid.**

**Cause:** The value provided for the parameter is not the correct type or is not a valid value.

**Action:** Change the value for the parameter in PROTOCOL.INI.



## LT20025E • LT20035E

---

### LT20025E A configuration error was found in PROTOCOL.INI.

**Cause:** Conflicting parameter values were found while processing the IBM Token-Ring Network Driver section of PROTOCOL.INI.

**Action:** Examine the configuration parameters and correct the conflicting values in PROTOCOL.INI.

---

### LT20026E The adapter is not responding or was not found.

**Cause:** One of the following conditions has caused this error.

- The logical primary or alternate setting in the PROTOCOL.INI file does not map to the physical primary or alternate setting.
- The adapter is not responding to a request to start.
- The adapter is configured to enable Plug and Play function, but this system is not enabled for Plug and Play.
- There is no physical adapter in this machine.

**Action:** If an adapter is already in this system, check the logical primary or alternate setting. Check the cable and ensure that the connection to the Token-Ring network addressable unit (NAU) is functioning correctly. Then, run the hardware diagnostics for the adapter to ensure that the adapter and options are correctly installed.

Configure the adapter to disable the Plug and Play function.

If there is no adapter in this machine, install a Token-Ring adapter or remove the device driver statement from the CONFIG.SYS file.

---

### LT20027E The protocol manager could not be opened.

**Cause:** An unexpected error occurred when the program attempted to open the protocol manager.

**Action:** Check the drive and directory to ensure that the protocol manager is located in the specified path.

---

### LT20035E A maximum of two Token-Ring shared-RAM device drivers may be active at the same time.

**Cause:** You are attempting to load more than two Token-Ring shared RAM device drivers.

**Action:** Verify that you are attempting to load no more than two instances of any combination of IBMTOK.DOS or TOK.DOS in your CONFIG.SYS file.

---

**LT20040E** This is a generic initialization failure message. If the IBMTOK.DOS device driver encounters any errors during initialization, the specific message related to the error will accompany this message.

**Action:** Resolve the specific error message. In addition, ensure that a DEVICE statement for PROTMAN.DOS exists in the CONFIG.SYS file.

### Novell NetWare Server Driver Messages

This section contains the messages for the Novell NetWare Server driver.

---

#### TOKEN-NW-051 The NIC\_UAA value is not valid

**Cause:** The NIC\_UAA ordinal value specified is outside the allowable range.

**Action:** Specify a value of either 1 or 2.

**Cause:** The 12-digit hexadecimal NIC\_UAA value does not correspond to the UAA of either NIC installed in the system.

**Action:** Check the UAA (MAC Address) label on the bracket of the NIC you are attempting to drive. Respecify the correct UAA value. For more information on the NIC\_UAA keyword, see Table 6-5 on page 6-16.

---

#### TOKEN-NW-207 NIC Data Rate/Ring Speed Mismatch, Changing NIC Date Rate.

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Token-Ring ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** None. Auto-Sense is enabled if this message is displayed. The Token-Ring ISA Adapter automatically changes to the correct ring speed and attempts to reopen.

---

#### TOKEN-NW-208 NIC Data Rate/Ring Speed Mismatch, Unload driver and reconfigure NIC to match Ring Speed.

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Token-Ring ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** Auto-Sense is disabled if this message is displayed. It is recommended to leave Auto-Sense disabled on the server's NIC.

## TOKEN-NW-209 • TOKEN-NW-210

---

### TOKEN-NW-209 NIC Data Rate Change Unsuccessful.

**Cause:** The NIC was unable to automatically change the data rate when set to Auto-Sense mode.

**Action:** Reconfigure the NIC to verify that it is set for Automatic Ring Speed Detection (Auto-Sense).

---

### TOKEN-NW-210 NIC cannot be opened in Auto-Sense mode if it is the only station on the ring, or if the cable is disconnected from the wall.

**Cause:** While attempting to open a new Token-Ring ISA Adapter with the Auto-Sense option enabled, the system determined that the adapter is the only station on the ring. To avoid disruptions on the network, the adapter will not be opened.

**Action:** Perform one of the following steps:

- Reconfigure the Token-Ring ISA Adapter Auto-Sense option to Off and set the data rate to the data rate used by the access unit to which the adapter is connected.
- Wait until another station attaches to the network. The Token-Ring ISA Adapter will sense the established data rate automatically and connect to the network.
- If the cable has been disconnected from the wall or access unit, reconnect it.

## Novell NetWare Client with DOS Driver Messages

This section contains the messages for the DOS driver with Novell NetWare Client.

---

### TOKEN-DOS-211 NIC Data Rate/Ring Speed Mismatch, Changing NIC Data Rate.

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Token-Ring ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** None. Auto-Sense is enabled if this message is displayed. The Token-Ring ISA Adapter automatically changes to the correct ring speed and attempts to reopen.

---

### TOKEN-DOS-212 NIC Data Rate Change Unsuccessful.

**Cause:** The NIC was unable to automatically change the data rate when set to Auto-Sense mode.

**Action:** Reconfigure the NIC to verify that it is set for Automatic Ring Speed Detection (Auto-Sense).

## TOKEN-DOS-207 • TOKEN-DOS-250

---

### TOKEN-DOS-207 Initialization Error = 24 - NIC Data Rate/Ring Speed Mismatch.

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Auto 16/4 ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** Auto-Sense is disabled if this message is displayed. The NIC must be reconfigured to the correct ring speed. If other stations are already on the ring, the adapter can be reconfigured for Auto-Sense; otherwise, leave Auto-Sense disabled and manually configure the correct data rate.

---

### TOKEN-DOS-207 Initialization Error = 2D - Auto-Sense and/or RPL Enabled; No Other Adapters Present On The Ring

**Cause:** While attempting to open a new Token-Ring ISA Adapter with the Auto-Sense option enabled, the system determined that the adapter is the only station on the ring. To avoid disruptions on the network, the adapter will not be opened.

**OR**

While attempting to RPL a workstation, no monitor station could be found.

**Action:** Perform one of the following steps:

- Reconfigure the Token-Ring ISA Adapter Auto-Sense option to Off, and set the data rate to the rate used by the access unit to which the adapter is connected.
- Wait until another station, or the monitor, attaches to the network and then reload the driver.

---

### TOKEN-DOS-250 NET.CFG Custom Keyword NIC\_UAA Not Valid

**Cause:** In a system with at least two NICs installed and with at least one of the NICs being a Token-Ring ISA Adapter, the UAA custom keyword associated with this driver load does not match the universally administered address of any of the NICs installed in the system.

**Action:** Correct the NIC\_UAA custom keyword.

## TOKEN-OS2-214 • TOKEN-OS2-217

### Novell NetWare Client with OS/2 Driver Messages

This section contains the messages for the OS/2 driver with Novell NetWare Client.

---

#### TOKEN-OS2-214 NIC Data Rate/Ring Speed Mismatch ...

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Token-Ring ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** Auto-Sense is disabled if this message is displayed. The NIC must be reconfigured to the correct ring speed. If there are other stations already on the ring, the adapter can be reconfigured for Auto-Sense; otherwise, leave Auto-Sense disabled and manually configure the correct data rate.

---

#### TOKEN-OS2-215 NIC Data Rate/Ring Speed Mismatch, Changing NIC Data Rate

**Cause:** The data rate of the Token Ring is different from the data rate configured for the Token-Ring ISA Adapter. The difference was detected when the adapter attempted to insert into the Token Ring.

**Action:** None. Auto-Sense is enabled if this message is displayed. The Token-Ring ISA Adapter automatically changes to the correct ring speed and attempts to reopen.

---

#### TOKEN-OS2-216 NIC Data Rate Change Unsuccessful ...

**Cause:** The NIC was unable to automatically change the data rate when set to Auto-Sense mode.

**Action:** Reconfigure the NIC to verify that it is set for Automatic Ring Speed Detection (Auto-Sense).

---

#### TOKEN-OS2-217 Auto-Sense And/Or RPL Enabled; No Other Adapters Present On The Ring

**Cause:** While attempting to open a new Token-Ring ISA Adapter with the Auto-Sense option enabled, the system determined that the adapter is the only station on the ring. The adapter will not be opened, to avoid disruptions on the network.

**OR**

While attempting to RPL a workstation, no monitor station could be found.

**Action:** Perform one of the following actions:

- Reconfigure the Token-Ring ISA Adapter Auto-Sense option to Off and set the data rate to the data rate used by the access unit to which the adapter is connected.

- Wait until another station, or the monitor, attaches to the network and then reload the driver.

---

**NET.CFG Custom Keyword NIC\_UAA in error.**

**Cause:** In a system with at least two NICs installed, and with at least one of the NICs being a Token-Ring ISA Adapter, the UAA custom keyword associated with this driver load does not match the universally administered address of any of the NICs installed in the system.

**Action:** Correct the NIC UAA custom keyword.

---

**Some Known Problems**

Following is a list of known problems that you might encounter, and their solutions.

**8/16 Bus Width Settings Problem**

If your adapter is being configured by BIOS to 8-bit mode, even though you selected 16-bit mode in LANAIID, contact your system supplier. If no fix is available, configure the adapter using manual mode for non-Plug and Play systems.

**Audio Sound Cards**

Some sound cards respond to I/O addresses X'220', X'620', X'A20', and X'E20' when configured for X'220'. If you are having a problem using your Token-Ring adapter in a system that has a sound card, you can reconfigure the sound card to another address or reconfigure your Token-Ring adapter.

**Message “This Driver Requires LSL Version 2.11 or Higher”**

This message is returned when you attempt to load token drivers that meet current Novell specifications in combination with older client modules. Upgrade your requester using current modules available from Novell.

### **EMM386 (Extended Memory Manager)**

A common source of installation problems is due to conflicts between EMM386 and the RAM and ROM areas assigned to the adapter. You must ensure that you exclude the RAM and ROM areas used by the adapter from use by EMM386.

For example, you can put the following in the EMM386 line of your CONFIG.SYS to exclude the region from X'CC00' to X'D000' from being used by EMM386:

```
X=CC00-CFFF
```

(This is only an example.) Remember to reboot your system after making any changes to CONFIG.SYS.

---

## Appendix B. IBM Internet, BBS and Telephone Support

If you are experiencing problems with your installation and would like a new device driver diskette image, you can download it from IBM through either the Internet or the IBM Bulletin Board System. You can also search an on-line information base of installation tips using any standard Web browser.

---

### Internet/World Wide Web

Updated diskette images for the Token-Ring ISA Adapter can be obtained using ANONYMOUS FTP or a Web browser from the following sources:

- The IBM Network Environments Support home page at <http://www.networking.ibm.com/nes/neshome.html>. This Web page also has a link to the information base of installation tips.
- The IBM Networking Systems LAN Support Server at <ftp://lansupport.raleigh.ibm.com/pub/products/lanprods/token>  
Use the index to find the correct files for your Token-Ring ISA Adapter.
- The IBM PC Company Bulletin Board System at <http://www.pcco.ibm.com>

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### Bulletin Board System

Updated diskette images for the Token-Ring ISA Adapter can also be downloaded from any of the following numbers for the IBM Bulletin Board System:

- United States (919) 517-0001 (directory 32)
- Canada
  - Vancouver (604) 664-6464
  - Toronto (416) 946-4244
  - Montreal (514) 938-3022
  - Markham (905) 316-4255



Requirements for the asynchronous electronic connection to the Bulletin Board are:

- A modem that supports 1200 baud or more
- Communications software capable of supporting XMODEM file transfer protocols
- A switched telephone line

Make sure that your modem is set to 8 data bits, 1 stop bit, no parity, and a standard transmission speed from 1200 bps and up.

---

## For Telephone Assistance

If you need telephone assistance, contact the IBM HelpCenter. In the United States, call 1-800-426-7299. In Canada, the number to call is 1-800-565-3344. Please be prepared to provide the following information to the call taker:

- Adapter name
- Which adapter device driver you are using and its version number
- PC type, model, and RAM size
- Operating system and version number
- Which application software you are using and its version
- A description of the problem
- Names of any files sent
- Contact Name, phone number, e-mail address

When requesting support for the IBM LAN Client program, please be prepared to also provide the following information:

- LAN Client version number (displayed when the LAN Client Program is loaded)
- The contents of CONFIG.SYS
- The contents of AUTOEXEC.BAT and STARTNET.BAT
- The contents of NET.CFG, NETWORK.INI, RESOLV.CFG

- The contents of SYSTEM.INI and WIN.INI if using MS WINDOWS
- The MODULE.TXT file created by running the command MODULES >MODULES.TXT from the command prompt after loading LAN Client.
- Is there a Hardware Copy Protection Device being used?
- The version of EMM386 you are using (displayed by loading EMM386 from the command line)
- The version of HIMEM.SYS you are using



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## Appendix C. How to Configure Route Switch Client Support

Route Switch Client support has become a standard part of the device drivers for the IBM Turbo 16/4 Token-Ring ISA Adapter and the IBM Auto Wake Token-Ring ISA Adapter, making installation of the support as easy as upgrading the device driver.

Once a Route Switch Client-enabled driver has been installed, configuration consists of setting just two parameters. The first parameter, Route Switch Client Enable, is used to enable and disable Route Switch Client support. By default this parameter is set to NO in order to disable it. Setting this parameter to YES will enable Route Switch Client Support.

The second parameter, Route Switch Client Table Entries, specifies the maximum number of logical connections that can be switched at any one time. Valid values for this parameter are: 16, 32, 64, 128, 512, and 1024. Workstations or client machines should set this value to one of the smaller values, and servers should set this value to one of the larger values.

### Why Route Switch Client?

The performance improvement realized from MSS Route Switching Client support is greatest in network environments where end-to-end delays are due primarily to router bottlenecks. In networks where routers are not the primary source of delay between two endpoints, MSS Route Switching Client can be used to prevent the overloading of routers from ever occurring.

Due to the client/server based design of Route Switching, the client function is not required in both machines communicating with each other through routers in order to achieve benefits. Route Switching allows for an asymmetric configuration where only one of the machines has been enabled with Route Switching to direct traffic through the switching network while the other machine's traffic is still being routed. This means significant benefits can be obtained by placing the MSS Route Switching Client function on just the LAN-based servers where vast amounts of data are being sent

versus being received. As time permits, the device drivers for the workstation adapters can be upgraded with Route Switch enabled drivers, further increasing performance improvements.

## Windows 95

The following instructions describe how to enable the Route Switch Client function in the Windows 95 driver. These instructions assume that the IBM Token-Ring Adapter is already installed and configured.

To set the Route Switch Client parameters in Windows 95 follow these instructions:

- 1** Click **Start**.
- 2** Click **Settings/Control Panel**.
- 3** Double-click **Network**.
- 4** Make sure that the Configuration tab is selected.
- 5** If more than one adapter is configured, select the IBM adapter to be configured by clicking the name in the top window.
- 6** Click the **Advanced** tab to show configuration parameters.
- 7** Click **Enable Route Switch Client**.
- 8** Click the down arrow for the value of this feature and select **Yes**.
- 9** Click **Route Switch Table Size**.
- 10** Enter a value for the number of Route Switch table entries.
- 11** Select **OK** to save the changed values.

## Windows NT 4.0 and Higher

The following instructions enable the Route Switch Client function in the Windows NT 4.0 driver. These instructions assume that the IBM Token-Ring Adapter is already installed and configured. If not, refer to the installation and configuration manual for the adapter being used.

To set the Route Switch Client parameters in Windows NT 4.0 follow these instructions:

- 1** Click **Start**.
- 2** Click **Settings/Control Panel**.
- 3** Double-click **Network**.
- 4** Click the **Adapters** tab.
- 5** If more than one adapter is configured, select the IBM adapter to be configured by clicking the name in the top window.
- 6** Open the **Properties** window for this adapter by either double-clicking the adapter's name as in step 5 or by clicking the Properties button.
- 7** Click the **Route Switch Client** tab.
- 8** Enable Route Switch Client by clicking the check box titled **Enable Route Switch Client Feature**.
- 9** Select the table size by dragging the slider to the appropriate value.
- 10** Select **OK** to save the changed values.

## Windows NT 3.51

The following instructions enables the Route Switch Client function in the Windows NT 3.51 driver. These instructions assume that the IBM Token-Ring Adapter is already installed and configured.

To set the Route Switch Client parameters in Windows NT 3.51 perform the following steps:

- 1** In the Program Manager, double-click the **Control Panel** icon in the Main program group.
- 2** In the Control Panel window, double-click the **Network** icon.
- 3** If there is more than one adapter configured, select the IBM adapter to be configured by clicking the name in the Installed adapters panel.
- 4** Open the **Properties** window for this adapter by either double-clicking the adapter's name as in step 3 or by clicking the configure button.
- 5** Click the **Route Switch Client** tab.
- 6** Enable Route Switch Client by clicking the check box titled **Enable Route Switch Client Feature**.
- 7** Select the table size by dragging the slider to the appropriate value.
- 8** Select **OK** to save the changed values.

---

## **Appendix D. Notices and Product Warranty**

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### **Notices**

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service in this publication is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, programs, or services, except those expressly designated by IBM, are the user's responsibility.

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### **Safety**

#### **Telecommunications Safety Requirements in the United Kingdom**

This IBM product is made to high safety standards. It complies inherently with telecommunications safety standard BS 6301. It is not designed to provide protection from excessive voltages appearing externally at its interfaces. Therefore, when this product is connected to a public telecommunications network via any other equipment, and you connect to this product items not supplied by IBM United Kingdom Ltd., you must comply with mandatory telecommunications safety requirements.





## Notices for STP Media

### Statement of Compliance with the United Kingdom Telecommunications Act 1984

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connections to the public telecommunications systems in the United Kingdom.

---

### Electronic Emission Notices for STP Media

#### Federal Communications Commission (FCC) Statement

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. 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.

## Notices for STP Media

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 B 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 B prescrites dans la norme sur le matériel brouiller: *Appareils numériques*, NMB-003 édictée par Industrie Canada.

### European Norm (EN) Statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. IBM cannot accept responsibility for any interference caused by using other than recommended cables and connectors.



## Notices for STP Media

### Hinweis zur Elektromagnetischen Verträglichkeit (EMVG)

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die

IBM UK Ltd  
PO Box 30  
Spango Valley,  
Greenock,  
Scotland PA16 0AH.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

### Japanese Voluntary Control Council for Interference (VCCI) Statement

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づきクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。  
取扱説明書に従って正しい取り扱いをして下さい。



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## Electronic Emission Notices for UTP Media

In order to be compliant with FCC Class B, EN55022 Class B, and VCCI Class B emissions standards, as stated on pages D-2, D-3, and D-4 when using this adapter with UTP cabling, you **MUST** use a shielded power cord as described in "Other Hardware" on page 2-3 to attach your PC to the AC outlet. Otherwise, the following statements apply for this adapter.

## Federal Communications Commission (FCC) Statement

**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-



## Notices for UTP Media

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.

### **European Norm (EN) Statement**

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

**Warning:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Operation of this product in a domestic/residential environment may cause radio interference, which the user may be required to take measures to suppress.

### **Hinweis zur Elektromagnetischen Verträglichkeit (EMVG)**

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen. Der Außsteller der Konformitätserklärung ist die

IBM UK Ltd  
PO Box 30  
Spango Valley,  
Greenock,  
Scotland PA16 0AH.

## Notices for UTP Media

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind. (Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

### **Japanese Voluntary Control Council for Interference (VCCI) Statement**

This product is a Class A Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Technology Equipment (VCCI). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づきクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

### **Shielded Power Cord Notices for UTP Media**

When using the Token-Ring ISA Adapter in a Class B environment with UTP cable media, you must use a shielded power cord to attach your PC to the ac outlet in order to be Class B compliant.

Shielded power cords used in the United States and Canada are listed by Underwriters Laboratories (UL) and certified by the Canadian Standards Association (CSA). Always purchase a shielded power cord with the UL or CSA rating located on the packaging or power cord itself. These shielded power cords are readily available at your local electronic distributors. IBM makes the shielded power cord P/N 6952304 available through your IBM Marketing Represent-

## Notices for UTP Media

tative for use at 115 volts in the United States and Canada. If purchasing other than the IBM P/N, use a UL-listed or CSA-certified shielded power cord consisting of a minimum 18 AWG, type SVT or SJT, three-conductor line cord, a maximum of 15 feet in length, and a NEMA WD-1 5-15P type attachment plug rated at 15 amperes, 125 volts.

For PCs intended to be operated at 230 volts in the United States and Canada, use IBM shielded line cord P/N 1838578, available through your IBM Marketing Representative or purchase a UL-listed or CSA-certified line cord consisting of a minimum 18 AWG, type SVT or SJT, three-conductor cord, a maximum or 15 feet in length, and a NEMA WD-1 6-15P type attachment plug rated at 15 amperes, 250 volts.

For all PCs intended to be operated at 230 volts outside the United States and Canada, use the shielded line cord specific to your country as shown in the following table. These shielded power cords are available through your country IBM Marketing Representative.

*Table D-1 (Page 1 of 2). Shielded Power Cords Listed by Country*

<b>IBM Power Cord Part Number</b>	<b>Used in These Countries</b>
13F9948	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9988	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
14F0006	Denmark

## Notices for UTP Media

*Table D-1 (Page 2 of 2). Shielded Power Cords Listed by Country*

<b>IBM Power Cord Part Number</b>	<b>Used in These Countries</b>
14F0024	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0042	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0060	Liechtenstein, Switzerland
14F0078	Chile, Ethiopia, Italy, Libya, Somalia
14F0096	Israel
1838578	Thailand
6952304 (115v usage) 1838579 (230v usage)	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela



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## Warranty



International Business Machines Corporation Armonk, NY 10504

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### Statement of Limited Warranty

*The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or an IBM authorized reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Machines are subject to these terms only if purchased in the United States or Puerto Rico, or Canada, and located in the country of purchase. If you have any questions, contact IBM or your reseller.*

**Machine** IBM Auto Wake Token-Ring ISA Adapter and  
IBM Turbo 16/4 Token-Ring ISA Adapter

**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.

Replacement parts assume the remaining warranty of the parts they replace.

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.

This warranty is non-transferable by the end-user customer.

## Warranty Service

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.

Depending on the Machine, the service may be 1) a "Repair" service at your location (called "On-site") or at one of IBM's or a reseller's service locations (called "Carry-in") or 2) an "Exchange" service, either On-site or Carry-in.

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.

## Extent of Warranty

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## Glossary

### A

**ac.** alternating current.

**adapter.** The circuit card within a communicating device (such as an IBM Personal Computer) and its associated software that enable the device to be attached to a network.

**application program.** A program written for or by a user that applies to the user's work.

**auto-removal.** A state in which a token-ring adapter removes itself from the network to perform tests to determine whether it is the cause of a hard error. If the tests are passed, the adapter will reattach itself to the network.

**Auto-Sense.** A configurable option that permits the adapter to detect and operate at the data rate of the attached ring. This function eliminates problems due to manual configuration of a data rate that is not correct, and eliminates the need to reconfigure the adapter if the data rate of the ring is changed.

### B

**Base I/O port.** Base Input/Output Port. This port specifies a channel through which information is transferred between the CPU and other devices. This port has a hexadecimal address.

**Base Memory Address.** Also referred to as RAM Start Address, this address defines the region in the computer memory to be used by the network card to exchange information between this computer and another in the network.

**beaconing.** An error-indicating function of adapters that assists in locating the problem causing a hard error on the token-ring network. Beaconing can result in the adapter removing itself from the network to determine whether it is the cause of the error. See also *hard error*, *soft error*.

**BBS.** Bulletin Board System.

### C

**CCB.** Command control block.

**configuration.** (1) (TC97) The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional units. The term may refer to a hardware or a software configuration. (2) The devices and programs that make up a system, subsystem, or network.

**configuration file.** The collective set of item definitions that describe a configuration.



## D

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

**Disk Operating System (DOS).** A program that controls the operation of an IBM Personal Computer or IBM Personal System/2 computer and the running of application programs.

**DLR.** DOS LAN Requester.

**DLS.** DOS LAN Services.

**DMI.** Desktop Management Interface.

**DOS.** Disk Operating System.

## E

**EIA/TIA.** Electronics Industries Association/Telecommunications Industries Association.

**EISA.** Extended Industry Standard Architecture.

**EMC.** Electromagnetic Compatibility.

**EMM.** Expanded Memory Manager.

## F

**formatted diskette.** A diskette on which track and sector control information has been written and which may or may not contain data.

**Note:** A diskette must be formatted before it can receive data.

**frame.** The unit of transmission in the Token-Ring network. It includes delimiters, control characters, information, and checking characters.

## G

**GUI.** Graphical User Interface.

## H

**hard error.** An error occurring on the network that makes it inoperative. Removal of the source of the error or reconfiguring is required before the network can resume reliable operation. See also *beaconing*, *soft error*.

**help panel.** Information displayed by a program or system in response to a help request from a user. An on-line display that tells you how to use a command or another aspect of a product. See also *panel*.

## I

**ID.** Identification.

**IEEE.** Institute of Electrical and Electronic Engineers.

**initialization.** A state in which the adapter is prepared for use after its computer is powered on or restarted. During initialization, the adapter runs its self-diagnostic tests.

**IRQ.** Interrupt Request. An electronic signal used by hardware to interrupt a CPU. Each device in your system must use a separate IRQ to work properly. A list of commonly used IRQs follows.

- 2, 9 — EGA/VGA, Token-Ring Adapters
- 3 — Generally available, unless used for bus mouse
- 4 — COM1, COM3
- 5 — Generally available, unless used for LPT2
- 6 — Diskette drive controller
- 7 — Parallel port LPT1
- 8 — Real time clock
- 12 — Mouse (for PS/2)
- 13 — Math coprocessor
- 14 — Hard disk controller

**ISA.** Industry Standard Architecture.

## K

**KB.** Kilobyte.

**kilobyte (KB).** 1024 bytes.

## L

**LAN.** Local area network.

**LANAID.** The LAN Adapter Installation and Diagnostic Program. This program works to simplify the installation and configuration of hardware and software in a non-Plug and Play environment.

**LAN segment.** Any portion of a local area network (for example, a single ring or bus) that can operate independently, but is connected to the establishment network by means of bridges, controllers, or gateways.

**LED.** Light-emitting diode.

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

**local area network (LAN).** A data network located on the user's premises in which a serial transmission is used for direct data communication among data stations.

**LAPS.** LAN Adapter and Protocol Support.

**LLC.** Logical link control.

**LSB.** Least significant bit.



**LSL.** Link Support Layer (Novell ODI specification).

**LSP.** LAN Support Program.

## M

**MAC.** Medium access control.

**MB.** Megabytes, 1 million bytes.

**Mbps.** Megabits per second.

**MPS.** Multi-Processing System.

**MPTS.** MultiProtocol Transport Services.

**MSB.** Most significant bit.

## N

**NAU.** Network addressable unit.

**NDIS.** Network Definition Interface Specification.

**NetBIOS.** Local area network basic input/output system.

**network.** A configuration of data processing devices and software connected for information interchange.

**NIC.** Network Interface Card.

**NLM.** NetWare Loadable Module.

## O

**ODI.** Open Data-link Interface.

**open.** A state in which a Token-Ring adapter is attached to the ring.

## P

**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*.

**panel.** (1) A formatted display of information that appears on a terminal screen. See also *help panel*. (2) In computer graphics, a display image that defines the locations and characteristics of display fields on a display surface.

**path.** (1) The route traversed by the information exchanged between two attaching devices in the network. (2) A command in DOS that searches specified directories for commands or batch files that were not found by a search of the current directory.

**PC.** Personal computer.

**POST.** Power-on-self-test.

**PROM.** Programmable Read Only Memory.

**PS/2.** Personal System/2.

## R

**RAM.** Random access memory.

**RAM paging.** RAM paging is a technique that allows the computer software to access all the RAM on the adapter, without having to map the entire shared RAM into the computer's memory map. The shared RAM on the adapter is paged into the computer's memory map one area at a time.

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

**random access memory (RAM).** A computer's storage area into which data may be entered and retrieved in a nonsequential manner.

**read-only memory (ROM).** A computer's storage area whose contents cannot be modified.

**ring (network).** A network configuration where a series of attaching devices, such as IBM Personal Computers, are connected by unidirectional transmission links to form a closed path. A ring of a token-ring network is referred to as a LAN segment or as a token-ring network segment.

**ROM.** Read-only memory.

**RPL.** Remote Program Load.

## S

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

**server.** A device, program, or code module on a network dedicated to a specific function.

**shared RAM.** Random access storage on the adapter that is shared by the computer in which the adapter is installed.

**SMP.** Symmetric multiprocessors.

**soft error.** (1) An intermittent error on a network that requires retransmission. The adapters are able to retransmit the data that had the difficulty and communication continues. (2) An error on a network that affects the network's performance but does not, by itself, affect its overall reliability. If the number of soft errors reaches the ring error limit, reliability is affected. See also *beaconing*, *hard error*.

**STP.** Shielded twisted pair.

## T

**TCP/IP.** Transmission Control Protocol/Internet Protocol.



## U

**UAA.** Universally administered address.

**UTP.** Unshielded twisted pair.

**UUCP.** Unix-to-Unix Communications Protocol

## V

**VGA.** Video graphics adapter.

## W

**wire fault.** An error condition caused by a break or short in the cable segment that connects an adapter to its access unit.

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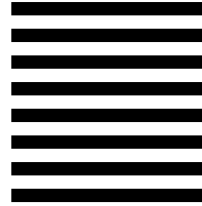


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