16/4 Token-Ring CardBus Adapter User's Guide

May 2, 2000

16/4 Token-Ring CardBus Adapter

User's Guide

Note

Before using this information and the product it supports, be sure to read “Appendix D. Notices” on page 43.

Second Edition (June 2000)

This edition applies to the IBM 16/4 Token-Ring CardBus Adapter.

You can submit comments online to `http://www.ibm.com/networking/support/feedback.nsf/docsoverall`

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About this manual

This manual contains the information you need to install and use the IBM 16/4 Token-Ring CardBus Adapter.

Who should read this manual

This manual is intended for use by network administrators and other end users who install token-ring adapter hardware and software.

How this manual is organized

"Chapter 1. Introduction to the IBM 16/4 Token-Ring CardBus Adapter" on page 1 describes the features of the IBM 16/4 Token-Ring CardBus Adapter.

"Chapter 2. Inserting and removing the IBM 16/4 Token-Ring CardBus Adapter" on page 5 describes the procedure for installing the CardBus adapter hardware.

"Chapter 3. Software installation" on page 9 describes the procedure for software installation for a number of network operating environments.

"Chapter 4. Point enablers and Card and Socket Services" on page 19 describes point enablers and Card and Socket Services software.

"Chapter 5. Problem solving" on page 23 describes troubleshooting procedures and fixes that might be needed for your environment.

"Appendix A. CD-ROM content and software packages" on page 27 describes the files that are on the IBM 16/4 Token-Ring CardBus Adapter CD-ROM.

"Appendix B. NDIS 2 device driver parameters" on page 31 lists the NDIS 2 parameters, describes their usage, and lists their values.

"Appendix C. NDIS 2 device driver messages" on page 37 lists the NDIS 2 system messages, explains the meaning, and lists user actions.

"Appendix D. Notices" on page 43 lists the legal notices required for the IBM 16/4 Token-Ring CardBus Adapter.

Related publications

Refer to these publications for additional information:

- *IBM Token-Ring Adapter Features*
- *BOF for LAN Technical Reference Adapter Interfaces*, SBOF-6221
- *IBM Token-Ring Network Architecture Reference*, SC30-3374
- *LAN Technical Reference IEEE 802.2 and NETBIOS*, SC30-3587
- *Credit Card Adapter Technical Reference*, SC30-3585
- *NTS/2 LAN Adapter and Protocol Support Configuration Guide*, S96F-8489
- *LAN Technical Reference: Token-Ring Network Shared-RAM*, SC30-3588
- The manuals that were shipped with your network operating system

IBM adapter books and other documentation are available on the IBM Networking Web site:

`http://www.ibm.com/networking`

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Chapter 1. Introduction to the IBM 16/4 Token-Ring CardBus Adapter

This chapter describes the IBM 16/4 Token-Ring CardBus Adapter, the contents of the adapter kit, and the other materials you will need to install the adapter.

It is important that you are familiar with the computer in which you will install the adapter, and with the operating system and network software.

IBM 16/4 Token-Ring CardBus Adapter features

The IBM 16/4 Token-Ring CardBus Adapter is a 32-bit Type II CardBus adapter. It operates at 16/4 Mbps on a token-ring network and supports full-duplex operation.

Features include:

- Support for full-duplex (FDX), token-ring LAN operation.
- Adapter management capability provided by SNMP.
- Desktop Management Interface (DMI) provided by the LAN Adapter Management Agent. For an end-to-end management solution, you can use the agent in conjunction with the Nways® Workgroup Manager Version 1.1 or later and Nways Manager for AIX® Version 1.2 or later.
- Automatic Configuration and Power Interface (ACPI) power management feature. See “Automatic Configuration and Power Interface (ACPI)”.
- Mobile computing capability. The CardBus adapter does not have to be removed. To move from one location to another, simply disconnect the cable and reconnect it in the new location. See “Stealth mode” on page 2.
- Compliance with PCMCIA Version 7.0 and IEEE 802.5 standards.
- Auto Ring Speed, a configurable option that permits the CardBus adapter device driver to detect and operate at the data rate of the ring. See “Auto Ring Speed” on page 2.
- Support for a wide variety of network operating systems and network applications.

For information about the following features, refer to *IBM Token-Ring Adapter Features*:

- LAN Adapter Management Agent
- Route Switching
- Class of Service (CoS)
- Tivoli® Management Agent

Automatic Configuration and Power Interface (ACPI)

If your computer supports ACPI, it has built-in energy-saving capabilities. When you enable ACPI, usually through the computer BIOS settings, the operating system controls the power management features of your computer. Not all operating systems support ACPI BIOS mode. Refer to your operating system documentation to determine if your operating system supports ACPI. Refer to your computer system documentation to determine if your computer offers ACPI BIOS support and how to enable it. The CardBus adapter implements the PCI Bus Power Management Interface Specification Version 1.0 that works together with ACPI. The CardBus adapter (and the entire system) can be placed in various power-saving modes. You can dynamically configure the CardBus adapter to look for network

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protocol-specific events. Upon detecting these events, the CardBus adapter can signal a wake-up condition that brings the system to a fully-powered (operational) state.

Auto Ring Speed

The Auto Ring Speed function helps you to avoid problems that can result from manually configuring an incorrect data rate. The function also eliminates the need to reconfigure the CardBus adapter if the data rate of the ring changes.

Note: You should not select Auto Ring Speed if yours might be the first computer to attach to your ring. In that case, the CardBus adapter will not allow you to connect. You will have to try to connect again after another token-ring user is on the ring.

When using the adapter in Auto Ring Speed mode, be aware of transmit buffer limitations that can cause problems. A 16-Mbps token ring can support transmit buffer sizes up to 17,960 bytes. A 4-Mbps token ring can support transmit buffer sizes up to 4464 bytes. This restriction, which might affect your application, is due to the speed of the media.

If your software is configured to try 16-Mbps ring operation first, use a transmit buffer size less than or equal to 4464 bytes. This will ensure that you will not have any open PC Card errors due to improper transmit buffer size if your CardBus adapter must change ring speed.

Stealth mode

The stealth mode allows you to remove power from the CardBus adapter by removing the connector cable from the adapter. The operating system does not sense the presence of the card in the slot when the cable is detached.

If the system is running or connected to the network or both, stop the CardBus adapter before you remove the cable or card.

Note: Under a Plug and Play operating system, if the cable is disconnected at boot time, the operating system will not detect the adapter. Therefore, it will not try to load the device drivers. Under an operating system that is not Plug and Play, the operating system will try to load the device drivers. As a result, the operating system will generate an error message referring to the adapter or the device drivers or both.

Installation checklist

Note: You cannot use the CardBus adapter without a network operating system on the computer.

To install your CardBus adapter, complete the following steps. You might want to mark this page for easy retrieval or make a copy for reference.

1. Prepare for installation. You will need the following items:
   - The manual provided with your computer
   - The manual provided with your network operating system or network application
   - Your operating system and network application software
2. Check the shipping package contents list. See “Package contents” on page 3.

3. Insert the CardBus adapter into your computer. See “Chapter 2. Inserting and removing the IBM 16/4 Token-Ring CardBus Adapter” on page 5.
4. Install the CardBus adapter software. See “Chapter 3. Software installation” on page 9.
5. After you install the software, reboot your system to apply the changes. Make sure that your CardBus adapter is inserted into your computer before you reboot. For information on hot-plugging the CardBus adapter, see “Hot-pluggability and suspend/resume issues” on page 7.

Package contents

The IBM 16/4 Token-Ring CardBus Adapter kit contains the following items:

- IBM 16/4 Token-Ring CardBus Adapter (PN 34L4899)
- Adapter cable with RJ-45 connector for use with UTP or STP network wiring (PN 31L5035)
- STP connector for connecting to an STP telecommunications outlet (PN 73G8314)
- A CD-ROM containing drivers and product documentation (PN 31L4939)

Chapter 2. Inserting and removing the IBM 16/4 Token-Ring CardBus Adapter

Inserting the adapter

Notes:

1. This adapter works only with laptop computers that support CardBus.
2. If you are using Card and Socket Services, you might be able to use hot-pluggability features. See “Hot-pluggability and suspend/resume issues” on page 7.

To insert the adapter into your computer, perform the following steps:

1. Switch OFF (**O**) the power to the computer.
2. Determine what type of network cable to use and connect the cable to the network:

   Note: Shielded cables and connectors must be used in a Class B environment.

   - If your network uses STP or UTP cabling with an RJ-45 telecommunications outlet, as shown in Figure 1, attach the RJ-45 (8-pin modular) connector on the adapter cable (PN 31L5035) to the RJ-45 telecommunications outlet.

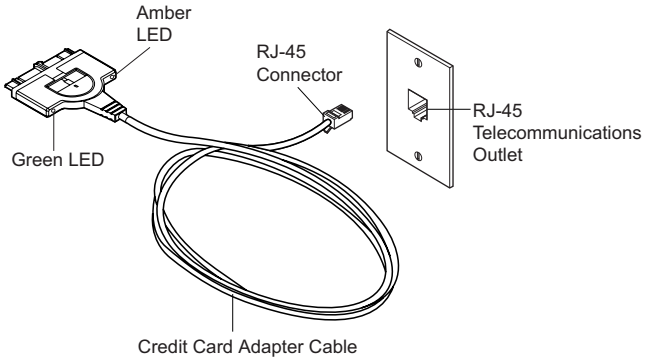


Figure 1. Connecting the adapter cable to RJ-45 outlet

   - If your network uses STP cabling with an STP telecommunications outlet, as shown in Figure 2, perform the following procedure:

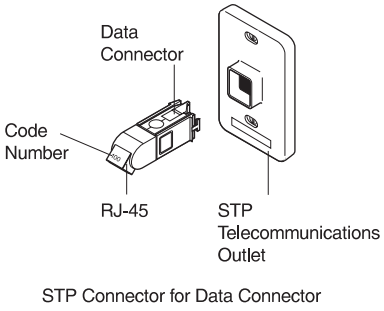


Figure 2. Connector for STP outlet

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a. Attach the RJ-45 connector on the adapter cable (PN 31L5035) to the RJ-45 end of the STP connector (PN 73G8314).
b. Attach the STP connector to the STP telecommunications outlet.

The STP connector is specifically designed to work with the CardBus adapter.

Note: Verify that you are using the correct STP connector. The correct STP connector and adapter cable have the code number 100 on the connectors that attach to each other.

3. To attach the cable to the adapter, move the latching button (the half-circle in the center of the cable connector) toward the cable. You must retract the latch to connect or disconnect the cable.

   Attach the cable to the adapter with the cable part number on the bottom, as shown in Figure 3. The connector is keyed to attach to the CardBus adapter only one way. If you feel any resistance, remove the connector, turn it over, and reattach it.

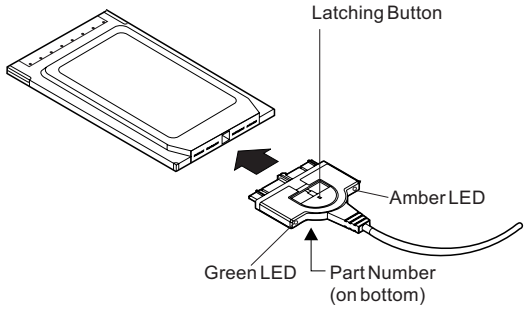


Figure 3. Attaching the cable to the adapter

4. To lock the cable securely, move the latching button in toward the adapter.

   Note: There are cases in which you might want to leave the cable latch retracted. For example, if the latch is retracted when you pull the cable, the cable will disconnect from the adapter. This could prevent someone from accidentally pulling your computer off of a table.

5. Insert the CardBus adapter in the slot, as shown in Figure 4. If you are using a point enabler, note which slot you use.

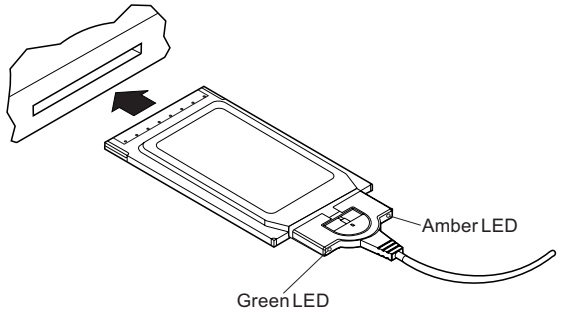


Figure 4. Inserting the adapter into the CardBus slot

The CardBus adapter is keyed to attach to the PC only one way. If you feel resistance as you are inserting the adapter, remove the adapter, turn it over, and reinsert it.

6. Switch ON (**I**) the power to the computer.

Removing the adapter

Note: If you are using Card and Socket Services, you may be able to use hot-pluggability features. See "Hot-pluggability and suspend/resume issues" for more information.

To remove the CardBus adapter from your computer, perform the following steps:

1. Switch OFF (**O**) the power to the computer.
2. With the cable still attached to the adapter, pull the adapter from the computer.
3. To detach the cable from the adapter, retract the latching button (the half-circle in the center of the connector) by moving it toward the cable.
4. Grasp the connector and unplug it from the adapter.
5. Store the adapter.

Note: When the cable is removed from the CardBus adapter, the adapter appears to the system as if it is physically removed from the socket.

Hot-pluggability and suspend/resume issues

Some drivers support a level of hot-pluggability and suspend/resume. These drivers are for Card Wizard 4.1 and 5.0 on Windows NT® Workstation 4.0, Windows® 95 OSR2, Windows 98, and Windows 2000 Professional.

Attention: To use the hot-plugging features of this card, you must use Card and Socket Services. If you are using a point enabler, *do not* unplug your card while the power is on. You might damage both your card and the machine.

Hot-pluggability refers to the ability to remove and insert your CardBus adapter at any time while the machine is running. Hot-plugging allows you to remove your card while you are using battery power, thus reducing the drain on your battery. It also provides greater freedom to use portable computers in a portable manner. When you remove the cable from the CardBus adapter, the adapter appears removed physically from the system. When you reattach the cable, the adapter appears inserted into the system. You can hot-plug the CardBus adapter without physically removing it from the socket by removing and attaching the cable.

Windows 95, Windows 98, and Windows 2000 Professional

Windows 95, Windows 98, and Windows 2000 Professional have built-in support for hot plugging and suspend/resume. They recognize the CardBus adapter when it is inserted into a CardBus socket (or the cable is attached to an inserted CardBus adapter) and load the correct driver and configured protocol stack for the CardBus adapter.

If you plan to disconnect from your network, perform the following procedure:

1. Click the CardBus adapter icon on the status bar.

   A message box appears with a message to stop the CardBus adapter.
2. Click the message box.

3. When the Safe to remove message appears, you can either remove the cable or physically remove your CardBus adapter.

Chapter 3. Software installation

This chapter describes how to install the driver software for your IBM 16/4 Token-Ring CardBus Adapter. To install the software, perform the following procedure:

1. Get the latest level of LAN driver updates for your operating system to ensure that your code is at the latest level.
2. Make sure that your CardBus adapter is inserted into your computer. If it has not, follow the instructions in “Chapter 2. Inserting and removing the IBM 16/4 Token-Ring CardBus Adapter” on page 5.
3. Get the driver for your environment. There are three places to find the driver. We recommend the first one listed here. All three methods will place the driver in a directory according to the structure in Table 1.
   - Method A: Get the driver from a software package on the IBM Networking Web site. This will ensure that you get the latest driver.
     a. Go to *x*:\startcd.htm (where *x* is your CD-ROM drive).
     b. Select **IBM Networking Web Site (Product Support)**.
     c. Select **Downloads** and select the appropriate software package for your environment.
     d. Run the package to expand the files. The driver will be placed in the directory listed in Table 1.

     Note: You can access the Web site directly at:
     `http://www.ibm.com/networking/support`.
   - Method B: Use the driver shipped on this CD-ROM directly with your network operating system’s installation software. Note the directory containing the driver (see Table 1).
   - Method C: Get the driver from a software package shipped on this CD-ROM.
     a. Go to *x*:\startcd.htm (where *x* is your CD-ROM drive).
     b. Select **CD-ROM (Product Support)**
     c. Select **Downloads** and choose the appropriate software package for your environment.
     d. Run the package to expand the files. The driver will be placed in the directory listed in Table 1.
4. Install the driver. Use Table 2 on page 10 to find the location of the installation instructions for your environment. We recommend that you install the latest service pack for your operating environment before installing the CardBus adapter software.

Table 1. Driver file directory structure

Operating System	Directory
Windows NT 4.0	\(root)
Windows 95 OSR2	\(root)
Windows 98	\(root)
Windows 2000 Professional	\(root)
OS/2®	\OS2

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Table 2. Installation instructions

Environment	Page
OS/2	
OS/2 (MPTS)	10
OS/2 Warp Connect or Server	11
Windows 32-bit	
Windows NT 4.0	12
Windows 95 OSR2	13
Windows 98	14
Windows 2000 Professional	16
Remote Unattended Installation (Windows NT, Windows 95 OSR2, Windows 98, and Windows 2000 Professional)	17

OS/2 NDIS 2 device driver using MPTS

This driver is supported only on the IBM ThinkPad® Model 600 series of laptop computers. No other ThinkPad computers support the driver. The driver must be used in conjunction with the OS/2 point enabler (CB_PEOS2.SYS). For information on installing the OS/2 point enabler, see “OS/2 point enabler” on page 20.

Use the following procedure to install the OS/2 NDIS 2 device driver, using Multiple Protocol Transport Services (MPTS):

1. When updating an existing driver, perform the following procedure to prevent error message `X100035` from occurring. Error message `X100035` indicates that you could not install the driver or restore the previous version. This procedure is particularly useful when the existing driver was installed from the CardBus adapter CD-ROM.
   a. From an OS/2 window, go to the drive where OS/2 is installed. Change to the ibmcom subdirectory (where *x* is your drive letter):

      ```
      x: cd \ibmcom
      ```

   b. Enter the following commands:

      ```
      attrib -r ibmtrp.* /s
      attrib -r la1*.msg
      ```

2. Start MPTS by performing either of the following actions:
   - From the OS/2 desktop, double-click the MPTS icon.
   - From an OS/2 window, go into the ibmcom subdirectory and enter **mpts** at the OS/2 prompt.
3. Select **OK** on the MPTS logo panel.
4. Select **Install**.
5. When prompted for the source of the .NIF file, enter the path to the driver directory.
6. After the Installation Complete message appears, select **OK**.

   You will return to the main menu.
7. Select **Configure** in the MPTS dialog box.
8. On the Configure panel, make sure that **LAN adapters and protocols** is preselected and then select **Configure** at the bottom of the panel.
9. In the Configuration panel, in the Network Adapters group box, select **IBM PCI and CardBus Token-Ring Adapters (IBMTRP.OS2)** and then select **ADD**.

Note: You can edit parameter settings for this CardBus adapter. Highlight your CardBus adapter in the Current Configuration list box and select **Edit**.

10. In the Protocols list box, select the protocols used by your network application. Highlight each protocol and select **ADD**.

    Note: If you are not sure which ones to use, select **IBM IEEE 802.2** and **IBM OS/2 NetBIOS** protocol drivers or ask your network administrator.

    The protocol drivers you have selected will appear under the CardBus adapter driver name in the Current Configuration list box.

    Note: You can edit parameter settings for the protocols. Highlight a protocol and select **Edit**.

11. Select **OK** when you have finished selecting and editing protocols in the MPTS Configuration panel.
12. Select **Close** on the Configure panel.
13. Select **Exit** in the MPTS dialog box.
14. Select **Exit** on the Update CONFIG.SYS panel to update the CONFIG.SYS file.
15. Select **OK** when you get the message that the CONFIG.SYS has been successfully updated.
16. Select **Exit** on the Exiting MPTS panel.

    Note: Installation is not complete until you install the OS/2 point enabler. If you have not already installed the point enabler, install it before proceeding to the next step. For information on installing the OS/2 point enabler, see “OS/2 point enabler” on page 20.

17. Shut down and restart your computer to apply the changes.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

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

If you experience problems, see “Chapter 5. Problem solving” on page 23. For information concerning NDIS driver error messages, see “Appendix C. NDIS 2 device driver messages” on page 37.

OS/2 NDIS 2 device driver using other installation programs

This driver is supported only on the IBM ThinkPad® Model 600 series of laptop computers. No other ThinkPad computers support the driver. The driver must be used in conjunction with the OS/2 point enabler (CB_PEOS2.SYS). For information on installing the OS/2 point enabler, see “OS/2 point enabler” on page 20.

Use the following procedure to install the OS/2 NDIS 2 device driver, using other installation programs:

1. Insert the CD-ROM or Diskette 2, Drivers into the appropriate drive.
2. Use your product documentation to install the driver (IBMTRP.OS2) that is located in the root directory on both the CD-ROM and diskette.
3. Modify the parameters if needed. See “Appendix B. NDIS 2 device driver parameters” on page 31 for a list and explanation of parameters.

IBM TCP/IP for OS/2 and Warp Connect are examples of products that provide driver installation programs.

Note: Installation is not complete until you install the OS/2 point enabler. If you have not already installed the point enabler, install it before proceeding to the next step. For information on installing the OS/2 point enabler, see "OS/2 point enabler" on page 20.

4. Shut down and restart your computer to apply the changes.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

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

If you experience problems, see "Chapter 5. Problem solving" on page 23. For information concerning NDIS driver error messages, see "Appendix C. NDIS 2 device driver messages" on page 37.

Windows NT Version 4.0

The following procedure assumes that Windows NT 4.0 is already installed with networking support. We recommend that you install Microsoft® Service Pack 3 or later before installing the driver.

1. Install Card Wizard Version 4.1 or later on your computer. Refer to the documentation that came with Card Wizard for installation instructions.

   Note: If you try to install the driver without Card Wizard, an error message will appear.

2. Log on to Windows NT as an administrator.

   A Wizard dialog box appears to inform you that your card is not configured.

3. Select **Correct**.
4. In the next dialog box, select **OK**.
5. In the Network dialog box, select the **Adapters** tab, and then select **Add**.
6. In the Select Network Adapter dialog box, select **Have Disk...**.
7. Insert the CD-ROM or the diskette that contains the device drivers into the appropriate drive. When prompted, enter the path to the root directory of the CD-ROM or diskette and select **OK**.
8. In the Select OEM Option dialog box, select **IBM Token-Ring PCI Family Adapter**, and then select **OK**.

   The wizard displays several work-in-progress panels, indicating that the driver and its supporting files are being copied to your computer's hard disk drive. After all files are copied, the Network dialog box reappears. The Network Adapters list should display an entry for your new adapter.

9. If you want to change default values for the adapter, perform the following steps. Otherwise, proceed with step 10.
   a. Select the adapter from the Network Adapters list.
   b. Select **Properties**.
   c. Make the necessary changes and select **OK**.

      Note: Make sure that all of the appropriate protocols to connect to network are installed. Consult your network administrator if you are not sure what protocols you need.

10. Select **Close**.

    Note: If TCP/IP is installed as a protocol on the computer, you will now see the TCP/IP configuration panel. Enter all necessary information and select **OK**.

11. In the Network Settings Change dialog box, select **Yes** to restart your computer. You might need to reinstall Microsoft Service Pack 3 due to changes to your services or protocols during installation.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

- The device driver files loaded successfully.
- There are no error messages logged for the IBMTRP service in the Event Viewer.
- The LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, see “Chapter 5. Problem solving” on page 23.

Windows 95 OSR2

There are two different versions of Windows 95 in distribution: the retail release that individuals can purchase, and the OEM Service Release 2 (OSR2) that is found on most computer system preloads. Only Windows 95 OSR2 supports CardBus adapters; no CardBus support is available in the retail release.

To determine what version of Windows 95 you are running, select **Start → Settings → Control Panel**, and then double-click the **System** icon. Look for the version number under the Microsoft Windows 95 text.

- If the number is 4.00.950a or 4.00.950, you are using the retail release of Windows 95.
- If the number is 4.00.950 B, you are using the OSR2 release of Windows 95.

When you insert your CardBus adapter, Windows 95 OSR2 detects the new hardware and displays the Update Device Driver Wizard dialog box. To install the driver that came with your adapter, perform the following steps:

1. Insert the CD-ROM or diskette containing the driver into the appropriate drive.
2. When prompted, enter the path to the driver directory and select **OK**.
3. Windows 95 might prompt you for network names. If so, type your computer’s name and workgroup and select **OK**

   Note: Consult your system administrator if you do not know your computer’s name and workgroup.

4. At this point, the driver files are copied to your computer. Windows might prompt you for the Windows 95 CD-ROM in order to install its default network protocols and services. If so, make sure that the location of your Windows 95 installation files (for example, d:\ or d:\win95 or c:\windows\catroot) appears in the entry and select **OK**.
5. You might also be prompted again for the location of the driver files. If so, enter the path to the driver directory again and select **OK**.

   After the files are copied, a dialog box displays the following message:

   ```
   To finish setting up your new hardware, you must
   restart the computer. Do you want to restart your computer now?
   ```

6. Remove the driver CD-ROM or diskette from the computer and select **Yes**.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

- The device driver files loaded successfully.
- The Device Manager (System control panel applet) reports that the device is working correctly.
- The LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, see “Chapter 5. Problem solving” on page 23.

Windows 98

Windows 98 does not have a device driver that works with the IBM 16/4 Token-Ring CardBus Adapter. You need to install the Windows 98 driver included with your adapter. Use one of the following procedures:

- If the adapter was inserted before Windows 98 was installed, see “Adapter inserted before Windows 98 is installed”.
- If the adapter was inserted after Windows 98 was installed, see “Adapter inserted after Windows 98 is installed” on page 15.

Adapter inserted before Windows 98 is installed

Use this procedure to install the driver if your IBM 16/4 Token-Ring CardBus Adapter was inserted into the computer before Windows 98 was installed.

1. Select **Start → Settings → Control Panel**.
2. In the Control Panel, double-click the **System** icon.
3. In the Systems Properties dialog box, select the **Device Manager** tab.
4. Select the **+** next to Network adapters to expand the list of network adapters.
5. Select the entry labeled **IBM PCI Token-Ring Adapter,NDIS4** and then select **Properties**.
6. In the Properties dialog box for your adapter, select the **Driver** tab.
7. Select **Update Driver**.

   The Update Device Driver Wizard starts. The first page displays the following message

   ```
   This wizard searches for new drivers for:
   IBM PCI Token-Ring Adapter,NDIS4.
   ```
8. Select **Next**.
9. On the next page, select **Search for a better driver for your device**, and then select **Next**.
10. On the next page, specify the driver location:
    - If you are installing the driver from the product CD-ROM, insert the CD-ROM into the CD-ROM drive. Select the **CD-ROM drive** checkbox.
    - If you are installing the driver from a diskette that you built from the CD-ROM or the Web, insert the diskette into the diskette drive. Select the **Floppy disk drives** checkbox.
11. Select **Next**.

    Windows should find an updated device driver on the CD-ROM or diskette.
12. Select **The updated driver (Recommended)**, and then select **Next**.

    The next page of the wizard should confirm that the hardware and device driver are found.
13. Select **Next** to copy the files.

Windows might prompt you for the driver diskette. If so, type the letter of your diskette drive.

Windows might prompt you for the Windows 98 CD-ROM in order to install its default network protocols. If so, make sure that the location of your Windows 98 installation files (for example, d:\ or d:\win98 or c:\windows\catroot) appears in the entry and select **OK**.

After the files are finished copying, the following message appears:

```
Windows has finished installing an updated driver for your hardware
device.
```

14. Select **Finish** to return to the Adapter Properties page.
15. Select **Close** to return to the Device Manager page.
16. Select **Close** again to complete the process.
17. Reboot your computer to ensure that all components of the driver loaded correctly.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

- The device driver files loaded successfully.
- The Device Manager (System control panel applet) reports that the device is working correctly.
- The LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, see “Chapter 5. Problem solving” on page 23.

Adapter inserted after Windows 98 is installed

Use this procedure to install the driver if your IBM 16/4 Token-Ring CardBus Adapter was inserted into the computer after Windows 98 was installed.

Windows 98 detects new hardware and displays the Add New Hardware Wizard dialog box, which contains the following text:

```
This wizard searches for new drivers for:
IBM PCI Token-Ring Adapter,NDIS4.
```

To install the CardBus adapter driver, perform the following steps:

1. Select **Next** to continue.
2. On the next page, select **Search for a better driver for your device**, and then select **Next**.
3. On the next page, specify the driver location:
   - If you are installing the driver from the product CD-ROM, insert the CD-ROM into the CD-ROM drive. Select the **CD-ROM drive** checkbox.
   - If you are installing the driver from a diskette that you built from the CD-ROM or the Web, insert the diskette into the diskette drive. Select the **Floppy disk drives** checkbox.
4. Select **Next**.

   Windows should find an updated device driver on the CD-ROM or diskette.
5. Select **The updated driver (Recommended)**, and then select **Next**.

   The next page of the wizard should confirm that the hardware and device driver are found.
6. Select **Next** to copy the files.

   Windows might prompt you for the driver diskette. If so, type the letter of your drive.

Windows might also prompt you for the Windows 98 CD-ROM in order to install its default network protocols. If so, make sure that the location of your Windows 98 installation files (for example, d:\ or d:\win98 or c:\windows\catroot) appears in the entry and select **OK**.

After the files are copied, the following message appears:

```
Windows has finished installing the software that your new hardware
device requires.
```

7. Select **Finish**.

   A dialog box displays the following message:

   ```
   To finish setting up your new hardware, you must restart your
   computer. Do you want to restart your computer now?
   ```

8. Remove the diskette or CD-ROM from your computer and select **Yes**.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

- The device driver files loaded successfully.
- The Device Manager (System control panel applet) reports that the device is working correctly.
- The LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, see “Chapter 5. Problem solving” on page 23.

Windows 2000 Professional

Windows 2000 detects new hardware and installs a default driver. The default driver does not work with the IBM 16/4 Token-Ring CardBus Adapter. Use the following procedure to install to the driver included with the adapter.

1. Right-click **My Computer** and select **Properties**.
2. In the System Properties dialog box, select the **Hardware** tab.
3. Select **Device Manager**.
4. In the Device Manager dialog box, click the **+** next to Network adapters to expand the list of adapters.
5. Double-click **IBM PCI Token-Ring Adapter**.
6. In the Properties dialog box for the adapter, select the **Driver** tab.
7. Select **Update Driver**.

   The Update Device Driver Wizard dialog box opens.
8. Select **Next**.
9. On the next page, select **Search for the suitable driver for my device**, and then select **Next**.
10. On the next page, specify the driver location:
    - If you are installing the driver from the product CD-ROM, insert the CD-ROM into the CD-ROM drive. Select the **CD-ROM drive** checkbox.
    - If you are installing the driver from a diskette that you built from the CD-ROM or the Web, insert the diskette into the diskette drive. Select the **Floppy disk drives** checkbox.
11. Select **Next**.

    Windows should find an updated device driver on the CD-ROM or diskette.

    Note: If the wizard does not specify the correct driver location, for example the CD-ROM drive letter or diskette drive letter, perform the following steps:

a. Click the **Back** button twice.
b. Select **Display a list of known drivers**, and then select **Next**.
c. Select **Have Disk** and then specify the location of the driver (the CD-ROM or diskette drive letter).
d. After you select the correct driver, an Update Driver Warning window might appear. If so, click **Yes** to continue.

12. The next page of the wizard should confirm that the hardware and device driver are found. Select **Next** again to copy the files.

    Notes:

    a. Windows might prompt you for the driver diskette. If so, type the letter of your drive.
    b. Windows might also prompt you for the Windows 2000 CD-ROM in order to install its default network protocols. If so, make sure that the location of your Windows 2000 installation files (for example, d:\ or d:\win2000 or c:\windows\catroot) appears in the entry and select **OK**.
    c. A Digital Signature Not Found window might appear that states that the driver is not digitally signed. If so, select **Yes** to continue.

    After the files are copied, the wizard displays the following statement:

    ```
    Windows has finished installing the software for this
    device.
    ```

13. Select **Finish**.
14. Take *one* of the following actions:
    - If prompted to reboot the system, select **Yes**.
    - If not prompted to reboot the system, select **Close** when the Properties dialog box reappears.

Installation is complete. Check for the following conditions to determine if the adapter is working correctly:

- The device driver files loaded successfully.
- The Local Area Connection icon shows that the device is working correctly.
- The LEDs indicate normal operation: Green ON, Amber OFF.

If you experience problems, see “Chapter 5. Problem solving” on page 23.

Remote unattended installation of Windows NT, Windows 95 OSR2, Windows 98, and Windows 2000 Professional

Instructions for this environment are on the IBM 16/4 Token-Ring CardBus Adapter CD-ROM. You can read the instructions with a Web browser. To access the instructions, perform the following steps:

1. Go to *x*:\startcd.htm (where *x* is your CD-ROM drive).
2. Select **CD-ROM (Product Support)**.
3. Select **Downloads**.
4. Select the proper operating system to expand the list of packages.
5. Select **Remote Unattended Install (RUI)**.

Chapter 4. Point enablers and Card and Socket Services

Computers that support CardBus adapters have one or more CardBus slots, referred to here as slots 1 and 2. CardBus controller chip sets such as the TI1250, TI1251, TI1450, and others provide the CardBus interface and control the slots.

In order for communications programs to use a CardBus adapter, the adapter needs to be activated and configured. There is more than one way to activate and configure a CardBus adapter. Each way has its advantages and disadvantages. Point enablers and Card and Socket Services are two of the methods used to activate and configure the IBM 16/4 Token-Ring CardBus Adapter for particular environments.

Point enablers

Point enablers are small programs that activate the CardBus adapter and configure it for use with a device driver. They accomplish their goals with the help of the CardBus controller and are typically designed to support a particular type of controller. You use a point enabler in the DOS and OS/2 environments. Two point enablers are supplied with the IBM 16/4 Token-Ring CardBus Adapter.

Note: When using a point enabler, make sure that the system resources used by the CardBus adapter are different from and do not conflict with other system resources.

Advantage

The advantage of using point enablers is that they use no memory. Point enablers remove themselves from memory after configuring the CardBus adapter.

Disadvantages

The disadvantages of using point enablers include:

- Point enablers do not support hot-plugging of adapters — no hot-add, hot-remove, or hot-swap support.
- If system resource assignment conflicts occur, such as conflicts with physical memory addresses and port I/O addresses, you must manually resolve these conflicts.

DOS point enabler

The DOS point enabler (CBENABLE.EXE) is supported on CardBus-capable models of the IBM ThinkPad laptop computer. Additionally, you must use the IBMTRP.DOS NDIS 2 MAC driver version 2.06 or later in conjunction with the point enabler. The DOS point enabler can configure only a single 16/4 Token-Ring CardBus Adapter and is provided to support adapter diagnostics and remote unattended installation. If necessary, you can use the instructions in this section to modify the DOS point enabler configurations that are already included on the adapter diagnostics and remote unattended install diskette images. For more information about adapter diagnostics, see “Running adapter diagnostics” on page 23. For more information about remote unattended installation, see “Remote unattended installation of Windows NT, Windows 95 OSR2, Windows 98, and Windows 2000 Professional” on page 17.

The CONFIG.SYS file invokes the DOS point enabler. You must add a DEVICE= statement to the CONFIG.SYS file to configure the adapter. Additionally, the

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DEVICE= statement invoking the point enabler must precede the DEVICE= statement that loads the IBMTRP.DOS device driver.

The following table displays the parameters you can specify in the DOS point enabler DEVICE= statement:

Parameter	Explanation	Default value
SLOT=*n*	Specifies the CardBus slot containing the adapter to configure. SLOT=1 refers to the first socket found and SLOT=2 refers to the second socket found. On many IBM ThinkPads, SLOT=1 is the topmost slot.	SLOT=1
MEM=*n*	Specifies the physical memory address block mapping. This mapping is only used during execution of the enabler. It is unmapped before the enabler finishes executing.	MEM=D0000
IO=*n*	Specifies the port I/O address block assignment	IO=F200
IRQ=*n*	Some early CardBus-capable IBM ThinkPads (ThinkPad 760 models) may require the addition of this parameter on the DEVICE= line of the DOS point enabler. The value specifies the requested IRQ level for the CardBus adapter to use. A possible value for *n* is any available IRQ level in the range 0x3 - 0xF.	N/A

The following are examples of CONFIG.SYS `device=` statements to use in various situations:

To configure a single IBM 16/4 Token-Ring CardBus Adapter installed in either of the system's CardBus slots, using the default parameters:

```
DEVICE=CBENABLE.EXE
```

Two IBM 16/4 Token-Ring CardBus Adapters, one installed in each of the system's CardBus slots. To configure the adapter installed in the second slot, specifying the parameters to use:

```
DEVICE=CBENABLE.EXE /SLOT=2 /MEM=D4000 /IO=F100
```

OS/2 point enabler

The OS/2 point enabler (CB_PEOS2.SYS) operation is supported only on the IBM ThinkPad Model 600 series of laptop computers. This point enabler can be used only with the IBMTRP.OS2 NDIS 2 MAC driver Version 2.04 or later.

To use the OS/2 point enabler, you must add a separate `DEVICE=` statement in the CONFIG.SYS file for each IBM 16/4 Token-Ring CardBus Adapter to configure. The `DEVICE=` statements for the point enablers must precede the `DEVICE=` statement that loads the NDIS 2 device driver (IBMTRP.OS2).

The following table displays the parameters you can specify in the OS/2 point enabler DEVICE= statement:

Parameter	Explanation	Default value
SLOT=*n*	Specifies the expansion socket containing the adapter to configure. SLOT=1 refers to the top socket. SLOT=2 refers to the bottom socket.	SLOT=1

Parameter	Explanation	Default value
MEM=*n*	Specifies the physical memory address block mapping	MEM=D0000
IO=*n*	Specifies the port I/O address assignment	IO=5000

The following are examples of CONFIG.SYS `device=` statements to use in various situations:

To configure a single IBM 16/4 Token-Ring CardBus Adapter installed in either expansion slot, using the default parameters:

```
DEVICE=CB_PEOS2.SYS
```

To configure two IBM 16/4 Token-Ring CardBus Adapters using the default parameters for the adapter installed in the top expansion socket, and specifying the parameters for the adapter installed in the bottom expansion socket:

```
DEVICE=CB_PEOS2.SYS
DEVICE=CB_PEOS2.SYS /SLOT=2 /MEM=C8000 /IO=F200
```

To configure two IBM 16/4 Token-Ring CardBus Adapters, specifying the parameters for both:

```
DEVICE=CB_PEOS2.SYS /SLOT=1 /MEM=D4000 /IO=F200
DEVICE=CB_PEOS2.SYS /SLOT=2 /MEM=C8000 /IO=F100
```

Card and Socket Services

Socket Services

Socket Services is a BIOS-type interface that provides a way to gain access to the CardBus sockets (slots) of a computer. It identifies how many sockets your computer has and detects the insertion or removal of a CardBus adapter while the computer is switched on. It has an interface to Card Services. Socket Services is part of the PCMCIA Specification.

The manufacturer of the computer usually provides the Socket Services device driver, because the driver must understand the computer's BIOS and PCMCIA controller.

Card Services

When Socket Services detects that the CardBus adapter is inserted, this software management interface allows automatic allocation of system resources, such as memory, interrupts, slots, and I/O ports.

Card Services requires Socket Services. The Card Services interface is usually provided with the operating system.

Advantages

The advantages of using Card and Socket Services include:

- Ability to insert and remove PC Cards without computer reconfiguration and without damaging the electrical contacts
- Automatic allocation of system resources
- Automatic configuration of your CardBus adapter when used with your token-ring software in Autoset mode

Disadvantage

The disadvantage of using Card and Socket Services is that it is a stay-resident program that uses system memory. The amount of memory it uses varies, according to the type of CardBus adapter support and the drivers used.

Chapter 5. Problem solving

This chapter contains procedures that help you troubleshoot problems and optimize the performance of your IBM 16/4 Token-Ring CardBus Adapter.

Starting the troubleshooting process

If you cannot successfully install the adapter or the adapter does not operate properly, refer to the following table. Locate the symptom that best describes the problem.

Symptom	Solution
Problem with adapter operation	See “Running adapter diagnostics”.
Problem indicated by the LEDs	See “Understanding the LEDs” on page 24.
Problem with loading the drivers	See “Solving problems with driver installation” on page 25.
Unable to communicate with the network	See “Solving an adapter communication problem” on page 25.

Running adapter diagnostics

Notes:

1. If your adapter came with the CD-ROM titled *IBM 16/4 Token-Ring CardBus and PCI Management Adapters Installation and CD-ROM Guide*, you can either build a diagnostic diskette to use for running diagnostics or use the CD-ROM to run diagnostics. To use the CD-ROM, your computer must have a bootable CD-ROM drive. The CD-ROM option allows you to perform diagnostics on a computer that does not have a diskette drive.
2. If your adapter came with the CD-ROM titled *IBM 16/4 Token-Ring CardBus Adapter Installation and CD-ROM Guide*, you cannot use the CD-ROM to perform diagnostics.

To create a diagnostic diskette, download and run the DIAGDISK.EXE located on the adapter CD-ROM. Perform the following procedure:

1. Insert a blank, high-density diskette into your diskette drive (usually drive A).
2. Point your Web browser to *x*:\startcd.htm on the CD-ROM (where *x* is your CD-ROM drive).
3. Select **CD-ROM (Product Support)** and then select **Downloads**.
4. Select **Diagnostics** to download the executable.
5. Run the executable to create the diagnostic diskette.

Use the following procedure to run diagnostics:

Attention: To avoid potentially erroneous results, you should always perform a power-on reboot of your computer before running the diagnostics.

1. Insert the diagnostic diskette in drive A and reboot your computer.
2. At the DOS Boot Menu, select **IBM Cardbus adapter family extended diagnostics for 16 Mb/s and 4 Mb/s**.

   If the system will not boot with the CardBus adapter installed, but will boot without the adapter, go to step 6 on page 24.

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3. If your computer has more than one CardBus adapter installed, a selection menu displays the universally administered address for each adapter. Use the cursor keys or the mouse to select the CardBus adapter to test.
4. Connect the CardBus adapter to the network and press the **Enter** key to select **Test**.

   There are two test options: wrap test and on-ring test.

   - The wrap test tests the adapter and cable through the hub or concentrator, or through a wrap plug attached to the cable.
   - For the on-ring test, the adapter must be connected to a network with other adapters, so the ring speed of the network can be automatically sensed. If the adapter is the only one in the network, the on-ring test will fail.
5. Select the option for the test to perform.
6. If the test indicates that there is no CardBus adapter in the system, or that diagnostics cannot be run, perform the following steps:
   - Check that the CardBus adapter is correctly seated in the slot.
   - Make sure that the LEDs blink alternately amber and green after you power up your computer.
   - See Table 3 for LED states.
   - Run the CardBus adapter diagnostics again. If the tests are completed successfully, and your computer still is not communicating, contact your network administrator.
7. If an error does not occur during the wrap test and on-ring test, the CardBus adapter is ready for use. Exit the diagnostic program, and follow the directions for reactivating the computer.

   If an error occurs, record any messages that appear, record the LED sequences, and contact your network administrator.

   Note: This procedure does not verify that the data rate of the device driver setting matches the data rate of the LAN segment.

Understanding the LEDs

The LEDs on the adapter cable connector provide useful information for monitoring the status of the CardBus adapter and for solving problems. If the green LED is on and the amber LED is off, the adapter is operating correctly. If the amber LED is blinking and the green LED is on, a problem with the adapter has been detected. Table 3 indicates the sequence that displays when the you start the computer and the adapter reaches the open state successfully. Some of the states might be too brief to observe.

Table 3. Startup sequence of LED states

Amber	Green	Explanation
Blinking	Blinking	• Slow blink. The adapter is waiting for initialization. • Fast blink. The adapter has detected a wake-up frame and is attempting to wake up the system.
Off	Off	The adapter initialization is in progress, or the computer is powered off.
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 has been opened, this state indicates that the adapter has been closed under software control.

Table 3. Startup sequence of LED states (continued)

Amber	Green	Explanation
Off	On	The adapter is open and operating correctly.

Table 4 lists LED states that indicate problems.

Table 4. Problems shown by LED states

Amber	Green	Explanation	Action
On	Off	The adapter self-diagnostic tests failed or there is a problem with the adapter.	Go to “Running adapter diagnostics” on page 23 to test the adapter.
Blinking	Off	The adapter is closed due to one of the following conditions: • The adapter open failed. • The adapter detected a wire fault. • The adapter failed the auto-removal test.	Perform the following procedures, as appropriate: 1. Go to “Solving an adapter communication problem”. 2. Verify that the adapter is configured correctly. 3. If other stations on the network are having problems communicating, contact your network administrator.
Blinking	On	The adapter has detected beaconing or a hard error.	Go to “Solving an adapter communication problem”
On	On	The adapter has failed before running the self-diagnostic tests.	Go to “Running adapter diagnostics” on page 23 to test the adapter.

See “Glossary of Terms and Abbreviations” on page 51 for definitions of the terms used in Table 4.

Solving an adapter communication problem

If the CardBus adapter cannot communicate on the network, but other stations on the network can communicate, perform the following steps:

1. Verify that the adapter is in the socket and that the cable and the CardBus adapter are connected.
2. Verify that theadapter is firmly seated in the expansion slot.
3. Verify that the setting for the adapter’s Data Rate option matches the data rate of the network. If your adapter is not the first station on the ring, verify that the data rate is set to AutoSense. Run the software configuration again to determine the current setting.
4. Replace the adapter cable with one that is known to be good.

Solving problems with driver installation

If you have a problem with installing a driver, perform the following procedure.

1. Make sure that you correctly followed the instructions for installing the CardBus adapter.
2. In the following table, locate the row that describes the computer’s operating system or network application and perform the recommended actions.

Environment	Message Type and Action
OS/2 with MPTS	Check LANTRAN.LOG, usually found in the subdirectory \IBMCOM, for messages. LAN Server users can use the NET ERROR function to view the error log. • Message prefix LA1 or reference to IBMTRP: See Appendix C. NDIS 2 device driver messages.
Other 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 NDIS 2	See Appendix C. NDIS 2 device driver messages.
Windows NT	Check for messages from the IBMTRP service using the Windows NT Event Viewer tool.

Contacting IBM product support

You can call the following telephone numbers for product support:

1-800-237-5511	IBM Support Services (U.S. only)
1-800-772-2227	IBM HelpCenter® (U.S. only)
1-800-565-3344	HelpPC (Canada)

Customers outside the U.S. and Canada should contact their place of purchase.

Downloading code from the Web

You can download the latest code from the following location on the Web:

`http://www.ibm.com/networking/support`

Tech tips and frequently asked questions

To find tips about specific hardware and software situations, go to *x*:\startcd.htm on the CD-ROM (where *x* is your CD-ROM drive).

Other performance enhancements

There is a white paper on this subject at the following Web site:

`http://www.ibm.com/networking/per/per10.html`

Appendix A. CD-ROM content and software packages

The CD-ROM contains CardBus adapter drivers, supporting applications, publications, technical tips, and frequently asked questions related to the IBM 16/4 Token-Ring CardBus Adapter.

A navigational tool is provided to assist you in accessing the contents of the CD-ROM. You can launch this tool by opening the file *x*:\startcd.htm (where *x* is your CD-ROM drive) in a Web browser. You can obtain release date information from the CD-ROM by selecting **CD-ROM (Product Support)**.

However, the IBM Networking Web site might offer more current information. If you have Internet access, you can obtain the most current drivers and information by selecting **IBM Networking Web Site (Product Support)**.

The Web download packages and CD-ROM contain the following items:

- A user's guide and a features guide in HTML and PDF format. See "Product documentation" on page 28.
- Self-expanding PACKAGE and IMAGE files.
- Device drivers that can be installed directly from the CD-ROM during the device driver install process. They are located in the following directories:

Operating System	Directory
Windows NT 4.0	\(root)
Windows 95 OSR2	\(root)
Windows 98	\(root)
Windows 2000 Professional	\(root)
OS/2	\OS2

Table 5 lists packages that are available on the Web and on the CD-ROM. Table 6 on page 28 lists diskette images that are available on the Web and on the CD-ROM. You can obtain them by using the navigational tool already mentioned. Select the Web link for the latest version of the file, or select the CD-ROM link to copy the file directly from the CD-ROM. The files are located on the CD-ROM at *x*:\download (where *x* is your CD-ROM drive).

Software packages

The package files can be executed to expand the files to a hard disk, or to a diskette where noted with an asterisk (*). The directory structure is maintained as it exists on the CD-ROM.

Table 5. Software packages

Package	Description	Executable
CD-ROM	Complete CD-ROM content	CDIMAGE.EXE
Device Drivers (*)	OS/2 (NDIS 2) Windows 95 OSR2/98/NT 4.0/2000	OS2NDISP.EXE PC99LOGO.EXE
Documentation - HTML and PDF	User's Guide Features Guide	USERCB.EXE FEATURES.EXE
LAN Adapter Management Agents	OS/2 Windows 95/98/NT/2000	DMIOS2.EXE DMIWIN.EXE

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Table 5. Software packages (continued)

Package	Description	Executable
Tivoli Management Agents (*)	Windows 3.x Windows 9x Windows NT OS/2 NetWare 3.x NetWare 4.x and 5.x	TMAW3X.EXE TMAW9X.EXE TMAWNT.EXE TMAOS2.EXE TMANW3X.EXE TMANW4_5.EXE

Diskette images

Run these diskette image files to create diskettes. Each image file will create a single diskette.

Table 6. Diskette images

Image	Description	Executable
CID for OS/2	Configuration, Installation, and Distribution diskette	CID.EXE
Diagnostics	Diagnostics diskette	DIAGDISK.EXE
LAN Adapter Management Agents	OS/2 - Diskette 1 OS/2 - Diskette 2 Windows 95/98/NT/2000 - Diskette 1 Windows 95/98/NT/2000 - Diskette 2 Windows 95/98/NT/2000 - Diskette 3	DMIOS2A.EXE DMIOS2B.EXE DMIWINA.EXE DMIWINB.EXE DMIWINC.EXE
RUI	Remote Unattended Install diskette for Windows 95/98/NT/2000	RUI.EXE

Product documentation

Complete product documentation is available for downloading from the CD-ROM and the Web in both PDF and HTML formats. The HTML version can also be viewed directly from your Web browser. Five documents are provided on the CD-ROM — a user's guide for each of the three IBM Token-Ring PCI Management Adapters, a user's guide for the IBM 16/4 Token-Ring CardBus Adapter, and a features guide. Each user's guide includes hardware and software installation instructions, troubleshooting tips, device driver parameters, and error messages. The The *IBM Token-Ring Features Guide* provides detailed information about LAN Adapter Management Agent, Route Switching, and Class of Service.

To access the download versions, perform the following procedure:

1. Insert the CD-ROM into the CD-ROM drive of your computer and point your Web browser to *x*:\startcd.htm (where *x* is your CD-ROM drive).
2. Select **CD-ROM (Product Support)** and then **Downloads**.
3. Select **Target Operating System** and then select **User's Guide** or **Features Guide**.
4. Select the package name that appears.
5. Select **Save as...** and choose the path to the directory where you want to copy the package file.
6. Select **OK** to download the package file.
7. Go to the directory where the package was stored and run the package file to expand the files.

The user's guide in PDF format is stored in the file USERGUID.PDF. The features guide in PDF format is stored in the file FEATURE.PDF. The corresponding HTML versions are in USERGUID.HTM and FEATURE.HTM.

To view the documentation directly from the CD-ROM, insert the CD-ROM into the CD-ROM drive of your computer and point your Web browser to *x*:\startcd.htm (where *x* is your CD-ROM drive). Select **CD-ROM (Product Support)** and then the documentation that you want to view.

Appendix B. NDIS 2 device driver parameters

The following table describes the NDIS 2 device driver parameters. For sample PROTOCOL.INI files, see Figure 5 on page 36 and Figure 6 on page 36.

Table 7. DOS and OS/2 NDIS device driver parameters in PROTOCOL.INI

Parameter	Explanation
NetAddress	Use this parameter to specify a locally administered address for the adapter. The address must be enclosed in double quotes (“ ”) and be unique among all the addresses on the network. The adapter can be known on the network by its universally administered address (the address encoded in the adapter’s memory at the factory) or a locally administered address (a unique, user-assigned address). The universally administered address is the default value. **Valid values:** ″400000000000″ to ″7FFFFFFFFFFF″ in hex
DataRate	Used for configuring the ring speed of the adapter. It is recommended for servers that the DataRate be set to M16 or M4, and clients be set to Auto. This parameter is ignored for 100 Mbps network operation. **Valid values:** **AUTO** AutoSense — automatic ring-speed detection. **Note:** The adapter will not function with AutoSense if it is the first one on the ring. AutoSense is not designed for changing ring speed while the adapter is operational. It is usually necessary to reload the driver. **M16** 16-Mbps ring-speed operation. **M4** 4-Mbps ring-speed operation. The default is AUTO.
EnableTxEofInt	This parameter specifies whether the Transmit End of Frame Interrupt is enabled. **Valid values:** **Yes** Indicates that the interrupt will be recognized by the interrupt handler. **No** Indicates that the interrupt will not be recognized by the interrupt handler. This value is preferable in some environments (such as a server environment) to reduce the number of times the interrupt handler is invoked. This can result in reduced CPU utilization and increased performance. The default is Yes.
MaxTransmits (OS/2 only)	This parameter specifies the maximum number of transmit queue entries. The value should be set high enough to accommodate the sum of all MaxTransmits for all protocol drivers using the adapter concurrently. **Valid values:** 1 to 128 The default is 31.

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Table 7. DOS and OS/2 NDIS device driver parameters in PROTOCOL.INI (continued)

Parameter	Explanation
MaxTxFrameSize (OS/2 only)	This parameter specifies the maximum frame size that can be transmitted on the LAN. The parameter value serves as an upper limit. The actual maximum frame size might be smaller. The maximum frame size supported by the NDIS device driver is the lesser of the following values: • The value of this MaxTxFrameSize parameter • Total Receive Buffer Area (see the MinRcvBuffs parameter) • The physical frame size capacity of the network (4500 bytes for 4-Mbps token rings and 18 200 bytes for 16-Mbps and 100-Mbps token rings) Do not count the 4 bytes of FCS defined for a frame when setting this parameter value. In some environments, performance can be increased by operating server and client at larger frame sizes. Protocol frame size should be adjusted if this parameter is changed. **Note:** Some token-ring switches support a maximum frame size of 4500 bytes. **Valid values:** 14 to 18 000 The default is 4500.
MinRcvBuffs (OS/2 only)	This parameter specifies the minimum number of receive buffers that are allocated. The Total Receive Buffer Area for the adapter is calculated using the following formula: Total Receive Buffer Area = MinRcvBuffs × RcvBuffSize **Note:** To receive the maximum length frame that is supported by the attached network, the Total Receive Buffer Area must be larger than the maximum frame size that is allowed for the network, which is 4500 bytes for 4-Mbps token rings and 18 000 bytes for 16-Mbps and 100-Mbps token rings). A smaller Total Receive Buffer Area will use less system memory but will correspondingly reduce the size of the largest frame that can be received by the NDIS device driver. The maximum frame size supported by the driver can be further limited by the MaxTxFrameSize parameter. **Valid values:** 1 to 512 The default is 20.
RcvBuffSize (OS/2 only)	This parameter specifies the size of each receive buffer. **Valid values:** 256 to 18 000 The default is 2252.
FullDuplex	This parameter permits the device driver to activate token-ring full-duplex operation if supported by the network. The MaxTxFrameSize parameter may need to be adjusted separately, depending on network requirements. **Valid values:** **Yes** Permits full-duplex operation. **No** Prohibits full-duplex operation. The default is Yes.

Table 7. DOS and OS/2 NDIS device driver parameters in PROTOCOL.INI (continued)

Parameter	Explanation
LoopBack	Determines whether or not the adapter will copy a frame that it is transmitting if the destination address is recognized by the adapter. **Valid values:** **Yes** Indicates that transmit frames whose destination is this adapter will be transmitted and then received by the adapter. **No** Indicates that transmit frames whose destination is this adapter must be looped back by the protocol stack. The default is No.
TxPriMax	This parameter specifies the value of the maximum token access priority that will be allowed for frames sent on the high-priority transmit channel. High-priority transmit frames whose Frame Control priority value exceeds the value of this parameter will have their token access priority reduced to the value specified by this parameter. Frame Control is a field in the IEEE 802.2 Logical Link Control (LLC) header. **Valid values:** 0 to 6 The default is 6.
TxPriThresh	This parameter specifies the frame priority value that will be used to transmit on the adapter's high-priority transmit queue. IEEE 802.2 LLC frames that contain a frame priority setting (in the Frame Control field) that is equal to or greater than the value of this parameter are treated as high-priority frames. **Valid values:** 1 to 6 The default is 1.
LLCOnly	This parameter indicates whether only LLC frames should be copied by the adapter when it is running in promiscuous copy mode. If this parameter is set to Yes, no MAC frames will be copied while in promiscuous copy mode. **Valid values:** **Yes** Copy only LLC frames. **No** Copy all frames on the ring. The default is No.
EOIDelay (OS/2 only)	This parameter should always be set to zero. It is intended for debug use. **Valid values**: 0 to 10 The default is 0.

Table 7. DOS and OS/2 NDIS device driver parameters in PROTOCOL.INI (continued)

Parameter	Explanation
RTSWMode (OS/2 only)	This parameter indicates whether the driver should enable code that attempts to send routable traffic directly to a destination rather than through the router. This can improve the performance of these connections and reduce the workload at the router. If the value is Disable, all routable frames will be sent through the router. **Valid values**: **Auto** Automatically determines whether to use Peer or Client mode. **Peer** Communicates with a peer destination station to establish a direct path. **Client** Uses an MSS server to determine the direct path. **Disable** Deactivates the route switching function for this adapter. The default is Disable.
RTSWTableSize (OS/2 only)	This parameter specifies the number of entries allowed in the route table for route switching support. This should be set equal to or greater than the number of remote stations that this station will send data to using routable frames (for example, TCP/IP). If it is set too low, some of the traffic that could be sent directly will instead be sent through the router. **Valid values**: 16, 32, 64, 128, 256, 512, 1024 The default is 16.
RTSWSubnetMask (OS/2 only)	This parameter contains a character string specifying the IP Subnet Mask for the IP subnet to which this adapter will attach. This value is entered as an IP dotted decimal value, for example, 255.255.255.0. This is a mandatory parameter when the RTSWMode parameter is set to Auto or Peer. **Valid values**: *xxx.xxx.xxx.xxx* A dotted-decimal IP network number (15 characters maximum). **Disable** When not in use. The default is Disable.
RTSWHoldingTime (OS/2 only)	This parameter specifies the Route Switching information holding time value. This determines how often a remote station must refresh its Route Switching information which pertains to this station. **Valid values**: 2 to 20 The default is 20.

Table 7. DOS and OS/2 NDIS device driver parameters in PROTOCOL.INI (continued)

Parameter	Explanation
TCPPortRangeN (OS/2 only)	This represents a set of parameters which designates the transmit frame priority value for a specified TCP port range. *N* is 1, 2, 3, 4, or 5. The format of this 9-digit hexadecimal string is: *PortNumber PortNumber PriorityValue* where each *PortNumber* is a four-character hex value and *PriorityValue* is a one-character hex value. The two *PortNumber* fields define a starting and ending value that make up a range, with the starting value less than or equal to the ending value. **Valid values**: **PortNumber** 0x0000 to 0xFFFF **PriorityValue** 1 to 6 There is no default for this parameter.
UDPPortRangeN (OS/2 only)	This represents a set of parameters which designates the transmit frame priority value for a specified UDP port range. N is 1, 2, 3, 4, or 5. The format of this 9-digit hexadecimal string is: *PortNumber PortNumber PriorityValue* where each *PortNumber* is a four-character hex value and *PriorityValue* is a one-character hex value. The two *PortNumber* fields define a starting and ending value that make up a range, with the starting value less than or equal to the ending value. **Valid values**: **PortNumber** 0x0000 to 0xFFFF **PriorityValue** 1 to 6 There is no default value for this parameter.

```
;Protocol Manager Section
[PROT_MAN]
   Drivername = PROTMAN$

;Section A:  Protocol Driver (IBM TCP/IP V1.2 for DOS)
[TCPIP_nif]
   Drivername = TCPIP$
   Bindings = IBMTRP_NIF

;Section B: NDIS Device Driver
[IBMTRP_NIF]
   Drivername = IBMTRP$
   NetAddress = "400000000000"
   DataRate = "M16"
   EnableTxEofInt = "Yes"
   FullDuplex = "Yes"
   TxPriMax = 6
   TxPriThresh = 1
   LLCOnly = "No"
```

Figure 5. Sample PROTOCOL.INI file for a DOS station configured for TCP/IP

```
;Protocol Manager Section
[PROT_MAN]
   Drivername = PROTMAN$

;Section A:  Protocol Driver (IBM TCP/IP V1.2 for OS/2)
[TCPIP_nif]
   Drivername = TCPIP$
   Bindings = IBMTRP_NIF

;Section B: NDIS Device Driver
[IBMTRP_NIF]
   Drivername = IBMTRP$
   NetAddress = "400000000000"
   DataRate = "M16"
   EnableTxEofInt = "Yes"
   MaxTransmits = 31
   MaxTxFrameSize = 4500
   MinRcvBuffs = 20
   RcvBuffSize = 2252
   FullDuplex = "Yes"
   TxPriMax = 6
   TxPriThresh = 1
   LLCOnly = "No"
   EOIDelay = 0
   RTSWMode = "Disable"
   RTSWTableSize = 16
   RTSWSubnetMask = "Disable"
   RTSWHoldingTime = 20
```

Figure 6. Sample PROTOCOL.INI file for an OS/2 station configured for TCP/IP

Appendix C. NDIS 2 device driver messages

This appendix contains messages that can be received from the NDIS device driver. These messages can come from DOS and OS/2 message files. The messages are either displayed or logged to a file.

The term *Port nnnnnnnn* appears in several messages. It is used to identify the adapter's instance and bears ***no*** relationship to the physical slots in the computer. If this is the only adapter, the number will be 00000000.

LA10001 IBM PCI Token-Ring Adapter, Version *xx*

Explanation: Information only.

User Action: None.

LA10002 The IBM PCI Token-Ring Adapter UAA (BIA) is *xx*.

Explanation: Information only.

User Action: None.

LA10003 The IBM PCI Token-Ring Adapter is using an LAA of *xx*.

Explanation: Information only.

User Action: None.

LA10004 Revision level *xx* of the adapter is incompatible with this driver version.

Explanation: The Revision ID of the adapter is not one that is supported by this version of the device driver. This correlation is enforced to ensure an appropriate match between the hardware and the device driver software.

User Action: Contact your support personnel for assistance. You might need to upgrade your adapter, use a different version of the device driver, or do both.

LA10005 A device driver initialization error occurred (failure code *xx*).

Explanation: An unexpected error occurred during initialization of the device driver.

User Action: Shut down the computer correctly and switch OFF the power to the machine. Restart the computer by switching it ON again. If the error persists, contact your support personnel.

LA10006 The configuration parameter *xx* was specified incorrectly. Its default value will be used.

Explanation: The value of a configuration parameter was incorrectly specified.

User Action: Edit the configuration file (or rerun the configuration program) to specify the correct value within the allowed range. Check the adapter installation instructions for additional information.

LA10007 The configuration parameter values have forced the internal data blocks to exceed the allowed limit.

Explanation: The combination of configuration parameters being used requires more than the 64-KB memory area that is available for this adapter instance to hold its internal control information.

User Action: Lower the value of the MaxTransmits or MinRcvBuffs parameters from their current setting to reduce the amount of control block storage required by the device driver. Shut down and restart the computer to activate this configuration change.

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LA10008 Unable to register interrupt level *xx* for this adapter.

Explanation: The hardware interrupt level assigned to this adapter was not able to be registered (*hooked*) by the device driver.

User Action: Check the configuration of your computer, looking for other devices that are assigned the same interrupt level as this adapter. Try removing the conflicting device from the machine and restarting the computer to see if the problem is resolved. If so, determine whether the conflicting device can be left out of the machine, or whether the machine can be reconfigured to resolve the conflict. Note that in most PCI machines, the PCI BIOS assigns certain system resources to the devices found in the computer, including the interrupt level.

LA10010 A hardware failure occurred while attempting to open the adapter.

Explanation: A hardware error was detected when opening the adapter for network operation.

User Action: Run the diagnostics program to isolate the problem, and contact your support personnel. If no problem was identified by the diagnostics, check that the cable is attached securely to both the adapter and the network interface (wall plate). Switch the computer OFF and then ON again to restart the machine. If the problem persists, contact your support personnel.

LA10011 A possible lobe wire failure was detected while attempting to insert into the network.

Explanation: The adapter is not correctly connected to the token-ring network.

User Action: Check that the cable is securely attached to both the adapter and to the token-ring network. You might need to contact your local network administrator to ensure that the cabling in the building is intact and that the network concentrator to which you are attached is operational. If the error persists, try using a different cable.

LA10012 A signal loss condition was detected while attempting to insert into the network.

Explanation: The token-ring network is not functioning correctly.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10013 The lobe wire connected to the adapter is not attached to the network.

Explanation: The adapter is not correctly connected to the token-ring network.

User Action: Check that the cable is securely attached to both the adapter and to the token-ring network. You might need to contact your local administrator to ensure that the cabling in the building is intact and that the network concentrator to which you are attached is operational. If the error persists, try using a different cable.

LA10014 The configured data rate for the adapter does not match that of the network.

Explanation: The operational speed of the token-ring network does not match the configured speed of the adapter.

User Action: Change the setting of the DataRate configuration parameter to match the speed of the network to which the adapter is attached. Your local network administrator should be able to tell you which speed to use.

Setting the DataRate parameter value to Auto will allow the adapter to automatically determine the correct speed setting to use when connecting to the network, provided that this is not the only adapter active on the Token Ring.

This message is relevant for 4-Mbps or 16-Mbps operation only.

Consult the adapter installation instructions for additional information on setting the DataRate parameter.

LA10015 An adapter timeout occurred while attempting to insert into the network.

Explanation: The token-ring network is not functioning correctly.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10016 A ring failure condition was detected while attempting to insert into the network.

Explanation: The token-ring network is not functioning correctly.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10017 A ring beaconing condition was detected while attempting to insert into the network.

Explanation: The token-ring network is not functioning correctly.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10018 A duplicate network address was detected while attempting to insert into the network.

Explanation: The address specified for the NetAddress configuration parameter is being used by another adapter (or ring station) on the network.

User Action: Modify the configuration file to change the NetAddress parameter value being used for this adapter, or remove the NetAddress parameter to allow the adapter's universally administered address to be used.

Contact your local network administrator for assistance with choosing a new NetAddress parameter value, or with having the conflicting adapter removed from the same token-ring network as this adapter.

LA10019 A ring parameter failure occurred while attempting to insert into the network.

Explanation: The token-ring network is not functioning correctly.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10020 The adapter was forced to remove itself while attempting to insert into the network.

Explanation: The token-ring network rejected the attempt by this adapter to connect to it.

User Action: Contact your local network administrator to determine the status of your network, or try connecting again at a later time.

LA10021 A hardware failure occurred while attempting to open the adapter.

Explanation: A hardware error was detected when opening the adapter for network operation.

User Action: Run the diagnostics program to isolate the problem, and contact your support personnel. If no problem was identified by the diagnostics, check that the cable is attached securely to both the adapter and the network interface (wall plate). Switch the computer OFF and then ON again to restart the machine. If the problem persists, contact your support personnel.

LA10022 A hardware failure occurred while attempting to open the adapter.

Explanation: A hardware error was detected when opening the adapter for network operation.

User Action: Run the diagnostics program to isolate the problem and contact your support personnel. If no problem was identified by the diagnostics, check that the cable is attached securely to both the adapter and the network interface (wall plate). Switch the computer OFF and then ON again to restart the machine. If the problem persists, contact your support personnel.

LA10023 The adapter cannot be opened in AutoSense mode if it is the only active station on the network.

Explanation: The adapter DataRate configuration parameter is set to Auto (which is also the default value if the parameter is not specified), but the adapter is the first station to open on the token-ring network.

User Action: This adapter is designed to not open onto the attached token-ring network if it is configured to use AutoSense detection and if it would have been the first active ring station.

The possible remedies are to try to connect again at a later time when at least one other ring station is active on the network (such as a network server), or to change the configuration value so that the DataRate parameter is set to a specific ring-speed value of M16 or M4 and restart the computer.

Note that setting a specific value of M16 or M4 for the DataRate parameter will cause this adapter to establish the operational speed of the token-ring network if it is still the first active ring station.

This message is relevant for 4-Mbps or 16-Mbps operation only.

Check the adapter installation instructions for additional information on setting the DataRate parameter.

LA10024 The adapter attempted to perform a Remote Program Load but failed monitor contention.

Explanation: The adapter was opened as a Remote Program Load (RPL) client, but was unable to locate an RPL server on the network.

User Action: Make sure that there is an active Remote Program Load server on the network and that it is configured to recognize this adapter's address.

LA10025 A network protocol error occurred while attempting to operate the adapter in full duplex mode.

Explanation: The adapter was unable to successfully communicate with a token-ring switch when attempting to open for full-duplex operation.

User Action: Check that your full-duplex switch is functioning correctly and that the adapter is correctly connected to it. If this problem persists, contact your support personnel.

LA10026 Unable to automatically change to *xx* Mbps operation. Please reboot the computer.

Explanation: The adapter attempted to open at one speed, but found the Token Ring operating at another speed. The configuration parameters used during initialization processing, notably the maximum frame size, preclude reliable operation at the new speed, so all additional attempts to open the adapter will be rejected. Rebooting the computer allows the new speed to be factored into the initialization processing without requiring a configuration change in most cases.

User Action: Shut down and restart the computer. Normally, no explicit configuration changes are required to begin operating at the current operational speed of the Token Ring. Optionally, you might be able to change the value of the configuration parameter that specifies the maximum frame size to a value of 4500 or less to eliminate the need to reboot the computer for a similar situation in the future.

LA10027 The adapter opened for token ring, *xx* Mbps, half duplex.

Explanation: Information only.

User Action: None.

LA10028 The adapter opened for token ring, *xx* Mbps, full duplex.

Explanation: Information only.

User Action: None.

LA10033 Adapter analysis code is *xx*.

Explanation: Information only.

User Action: None.

LA10034 Adapter full-duplex operation has now been activated.

Explanation: Information only.

User Action: None.

LA10042 A device driver initialization error occurred (failure code *xx*).

Explanation: An unexpected error occurred during initialization of the device driver.

User Action: Shut down the computer and switch OFF the power to the machine. Restart the computer by switching it ON again. If the error persists, contact your support personnel.

LA10043 No adapter instances recognized by this device driver were found in PROTOCOL.INI.

Explanation: The PROTOCOL.INI file does not have a section defined by the correct DRIVERNAME= line anywhere within it.

User Action: If you intend to run this device driver, make sure to define a valid network configuration in the PROTOCOL.INI file. If you do not intend to run this device driver, remove its DEVICE= statement from the CONFIG.SYS file.

LA10044 The NDIS 2.0 Protocol Manager could not be opened.

Explanation: An unexpected error occurred when the program attempted to open the Protocol Manager.

User Action: Check the drive and directory to ensure that the Protocol Manager is located in the path specified in the CONFIG.SYS file. If this error persists, consider reinstalling the NDIS 2.0 network support software.

LA10045 Could not find the PROTOCOL.INI file image.

Explanation: An unexpected error occurred when the program attempted to read the PROTOCOL.INI file image through interaction with the Protocol Manager.

User Action: Check the drive and directory to ensure that the Protocol Manager is located in the path specified in the CONFIG.SYS file. Verify that a valid PROTOCOL.INI file exists in the proper location. If this error persists, consider reinstalling the NDIS 2.0 network support software.

LA10046 The required DRIVERNAME parameter was not found in PROTOCOL.INI.

Explanation: The parameter specifying the driver name (DRIVERNAME) was not found in the PROTOCOL.INI file. This parameter is required.

User Action: Change PROTOCOL.INI to specify the proper information.

LA10047 The NetAddress value in PROTOCOL.INI is invalid and will be ignored.

Explanation: The value specified for the network address parameter in PROTOCOL.INI is not valid for one of the following reasons:

- Invalid local station address
- Too long
- Too short
- Contains non-hexadecimal characters
- Not enclosed in double quotation marks

User Action: Remove or correct the NetAddress configuration parameter value. A valid value for this parameter is 12 characters long and must be enclosed in double quotation marks. For token-ring adapters, the locally administered address must be within the hex range 400000000000 to 7FFFFFFFFFFF.

Make sure not to set the corresponding group address bit, which is the high-order bit in token-ring addressing notation.

LA10048 An unrecognized parameter *xx* was found in PROTOCOL.INI.

Explanation: An unrecognized parameter was found while processing a section of the PROTOCOL.INI file defined for this device driver.

User Action: Correct the parameter name or remove it from PROTOCOL.INI. Refer to the installation manual that came with your adapter for more information on the configuration parameters.

LA10049 The configuration parameter *xx* was specified incorrectly. Its default value will be used.

Explanation: An invalid value was specified for a configuration parameter in the PROTOCOL.INI file. A default value has been substituted.

User Action: Change the PROTOCOL.INI file to specify a valid value for the configuration parameter that is in error. Refer to the installation manual that came with the adapter for more information on the allowable settings for this particular parameter.

The device driver has proceeded with its initialization using a predetermined default value for this parameter.

LA10050 The NDIS 2.0 device driver was not able to register with the Protocol Manager.

Explanation: An unexpected error occurred when the program attempted to register an adapter with the Protocol Manager.

User Action: Check the drive and directory to ensure that the Protocol Manager is located in the path specified in the CONFIG.SYS file. If this error persists, consider reinstalling the NDIS 2.0 network support software.

LA10051 The configuration parameter values have forced the internal data blocks to exceed the allowed limit.

Explanation: The combination of configuration parameters being used requires more than the 64-KB memory area that is available for this adapter instance to hold its internal control information.

User Action: Lower the value of the MaxTransmits or MinRcvBuffs parameters in the PROTOCOL.INI file to reduce the amount of control block storage required by the device driver. Shut down and restart the computer to activate this configuration change.

LA10053E (DOS Only)
Device Driver could not initialize. Failure code: *xx*

Explanation: The device driver was not able to initialize itself. This is most often caused by conflicts between the device driver and other resources in the system.

User Action: Record this message number and the failure code and contact your support personnel for assistance.

LA10054E (DOS Only)
No adapters supported by %1 were found or adapters were not correctly configured by the machine and its BIOS.

Explanation: The device driver was not able to find any adapters that it knows about. Either the adapter is not installed in the computer, the adapter is malfunctioning, or the system BIOS has not correctly configured the adapter.

User Action: Record this message number and contact your support personnel for assistance.

LA10055E (DOS Only)
No adapters initialized correctly. *xx* adapters were found in the machine.

Explanation: The device driver was able to find the stated number of adapters. However, none of the adapters were successfully initialized. This message is often displayed along with one or more other messages from the device driver.

User Action: Record this message number as well as any other messages from the device drivers along with any specific failure codes in the messages and contact your support personnel for assistance.

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Federal Communications Commission (FCC) Statement

IBM 16/4 Token-Ring CardBus Adapter

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 or 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.
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Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

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Avis de conformité aux normes d'Industrie Canada

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Hinweis zur Elektromagnetischen Verträeglichkeit (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 product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

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
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取扱説明書に従って正しい取り扱いをして下さい。

Electronic Emission Notices for UTP Media

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 or the FCC Rules. These limits are design 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.

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 Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité aux normes d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du 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.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richlinie 89/336).

Dieses Gerät ist berechtigt in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse A.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

EN 50082-1 Hinweis: “Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 50082-2 festgelegt), dann kann es dabei eventuell gestört werden. In solch einem Fall ist der Abstand bzw. die Abschirmung zu der industriellen Störquelle zu vergrößern.”

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den IBM Handbüchern angegeben, zu installieren und zu betreiben.

Japanese Voluntary Control Council for Interference (VCCI) Statement

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

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Taiwanese Emission Notice for All Cable Types

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Machine IBM 16/4 Token-Ring CardBus Adapter (PN 34L4899)

Warranty Period* Lifetime

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2. where applicable, before service is provided —
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   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
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Glossary of Terms and Abbreviations

This glossary defines terms and abbreviations used in this manual. If you do not find the term you are looking for, refer to the index or to the *IBM Dictionary of Computing*, SC20-1699 (New York/ McGraw-Hill, Inc., 1994).

A

access unit. A unit that allows multiple attaching devices access to a token-ring network at a central point such as a wiring closet or in an open work area.

adapter address. Twelve hexadecimal digits that identify a LAN adapter.

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

alert. For IBM LAN management products, a notification indicating a possible security violation, a persistent error condition, or an interruption or potential interruption in the flow of data around the network. See also *network management vector transport*. In SNA, a record sent to a system problem management focal point to communicate the existence of an alert condition. In the NetView program, a high-priority event that warrants immediate attention. This data base record is generated for certain event types that are defined by user-constructed filters.

attach. To make a device a part of a network logically.

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

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

B

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

C

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

configuration. The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term may refer to a hardware configuration or a software configuration. The devices and programs that make up a system, subsystem, or network. See also *system configuration*.

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

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

D

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

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

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

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

F

fastpath transmit. An alternative programming interface to the adapter that provides higher transmit throughput.

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

fixed disk drive. Synonym for hard disk drive.

frame. The unit of transmission in some LANs, including the IBM Token-Ring Network and the IBM PC Network. It includes delimiters, control characters, information, and checking characters. On a token-ring network, a frame is created from a token when the

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token has data appended to it. On a token-bus network (IBM PC Network), all frames including the token frame contain a preamble, start delimiter, control address, optional data and checking characters, end delimiter, and are followed by a minimum silence period. A housing for machine elements. In synchronous data link control (SDLC), the vehicle for every command, every response, and all information that is transmitted using SDLC procedures. Each frame begins and ends with a flag.

H

hard disk drive. A stand-alone disk drive that reads and writes data on rigid disks and can be attached to a port on the system unit. Synonymous with fixed disk drive, hard drive.

hot plugging. The ability to remove your adapter as long as you have shut down all the applications using the adapter. When you insert your adapter again, you can restart those applications.

I

initialize. In a LAN, to prepare the adapter (and adapter support code, if used) for use by an application program.

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

insert. To make an attaching device an active part of a LAN.

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

interrupt. A suspension of a process, such as execution of a computer program, caused by an external event and performed in such a way that the process can be resumed. To stop a process in such a way that it can be resumed. In data communication, to take an action at a receiving station that causes the sending station to end a transmission. A means of passing processing control from one software or microcode module or routine to another, or of requesting a particular software, microcode, or hardware function.

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

L

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

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 Client. IBM LAN Client is a protocol stack that operates in protected mode in the DOS TCP/IP, Novell IPX Client, NetBIOS, and IEEE 802.2 environments.

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

M

MAC frame. Frames used to carry information to maintain the ring protocol and for exchange of management information.

medium access control (MAC) protocol. In a local area network, the part of the protocol that governs communication on the transmission medium without concern for the physical characteristics of the medium, but taking into account the topological aspects of the network, in order to enable the exchange of data between data stations.

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

Micro Channel. The architecture used by IBM Personal System/2 computers, Models 50 and above. This term is used to distinguish these computers from personal computers using a PC I/O channel, such as an IBM PC, XT, or an IBM Personal System/2 computer, Model 25 or 30.

N

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

node. Any device, attached to a network, that transmits and/or receives data. An endpoint of a link, or a junction common to two or more links in a network. In a network, a point where one or more functional units interconnect transmission lines.

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

O

open. To make an adapter ready for use. A break in an electrical circuit. To make a file ready for use.

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

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

P

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

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

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

port. An access point for data entry or exit. A connector on a device to which cables for other devices such as display stations and printers are attached. Synonymous with *socket*.

protocol. A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components. A specification for the format and relative timing of information exchanged between communicating parties.

R

random access memory (RAM). A computer's or adapter's volatile storage area into which data may be entered and retrieved in a non-sequential manner.

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

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

ring network. A network configuration in which a series of attaching devices is connected by unidirectional transmission links to form a closed path. A ring of an IBM Token-Ring Network is referred to as a LAN segment or as a token-ring network segment.

S

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

shallowmode. A new mode that allows the workstation to assist the adapter in the reception of information from the token ring. When chosen, fastpath transmit is used as well.

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

socket. Synonym for *port (2)*.

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

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

T

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

token. A sequence of bits passed from one device to another on the token-ring network that signifies permission to transmit over the network. It consists of a starting delimiter, an access control field, and an end delimiter. The access control field contains a bit that indicates to a receiving device that the token is ready to accept information. If a device has data to send along the network, it appends the data to the token. When data is appended, the token then becomes a frame. See *frame*.

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

token-ring network. A ring network that allows unidirectional data transmission between data stations

by a token-passing procedure over one transmission medium so that the transmitted data returns to and is removed by the transmitting station. The IBM Token-Ring Network is a baseband LAN with a star-wired ring topology that passes tokens from network adapter to network adapter. A network that uses a ring topology, in which tokens are passed in a sequence from node to node. A node that is ready to send can capture the token and insert data for transmission. A group of interconnected Token Rings.

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

U

universally administered address. The address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique. Contrast with *locally administered address*.

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

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