Bull

Token–Ring PCI Adapters
Installation and Configuration Guide

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Token–Ring PCI Adapters
Installation and Configuration Guide

Hardware

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Year 2000

The product documented in this manual is Year 2000 Ready.

About This Book

This manual (when used with your system unit documentation) will help you to install the Token Ring Adapter in PCI (Peripheral Component Interconnect) bus computers and attach it to a token ring network.

Who Should Use This Book

It is written for the technician who is to install the adapter and configure the system.

Overview

The manual is organized as follows:

- Introduction
- Hardware Installation
- Software Installation and Configuration
- Error Identifiers
- Connecting to a Network

Related Publications

Cabling Guide for Multiple Bus Systems, 86 A1 70JX

AIX and Related Products Documentation Overview, 86 A2 71WE.

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The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying manuals.

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- 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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This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kindom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Commmunications du Canada

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus meets the requirements of the Canadian Interference–Causing Equipment Regulations.

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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。

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When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

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

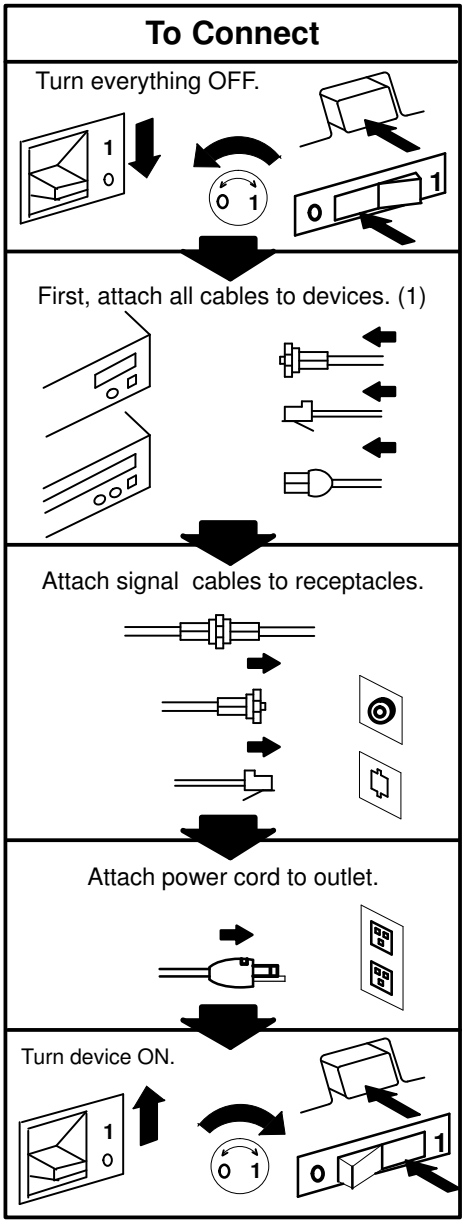
Der Aussteller der Konformitätserklärung ist die Bull Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

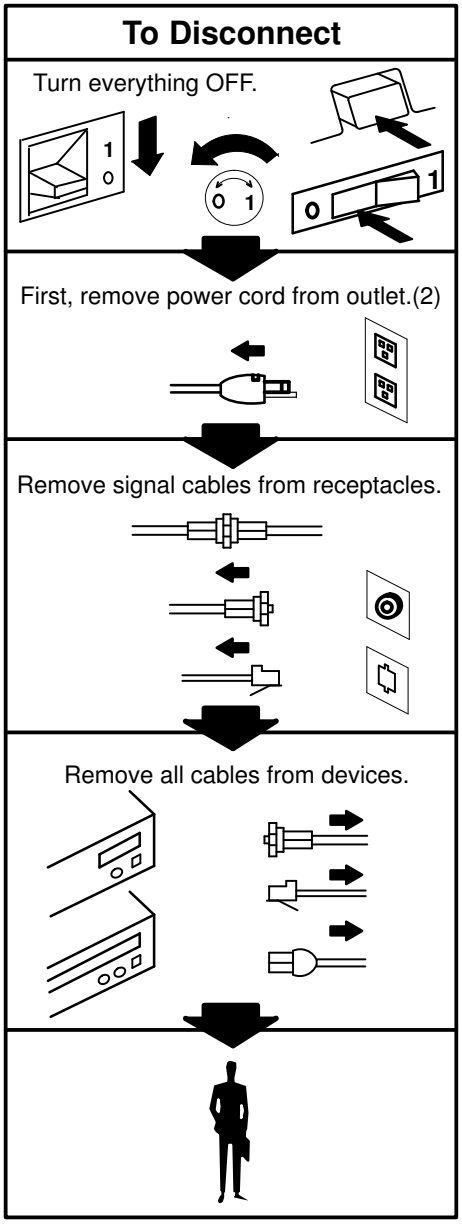
Safety Information

DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hasard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



(1)–In the U.K., by law, the telephone cable must be connected after the power cord.



(2)–In the U.K., by law, the power cord must be disconnected after the telephone line cable.

Table of Contents

Chapter 1. Introduction

This Installation Guide covers the installation and configuration of the Token Ring Adapter in PCI (Peripheral Component Interconnect) computers.

In addition to the board itself (hardware), you must also install device driver software for the operating system, so that programs can communicate with the board.

Components

Type	Designation	Description
8-T	Token Ring PCI Adapter RJ-45 DB9 conversion cable	on page 1-2
B5–J	Token Ring PCI Adapter	on page 1-3
B5–R	Token Ring PCI Adapter	on page 1-3

Software driver and diagnostics are provided on the AIX CD–ROM.

Note: For more information about cables, see ”Connecting to a Network”, on page A-1, and ”LAN Adapters” in *Bull Cabling Guide for Multiple Bus Systems”.*

About the Token Ring PCI Adapter (Type 8–T)

The Token Ring PCI Adapter is a high–performance, token ring local area network (LAN) adapter designed to operate with any computer that supports the Peripheral Component Interconnect (PCI) bus interface.

This adapter supports operation at either 16 million or 4 million bits per second (Mbps) over unshielded twisted–pair (UTP) or shielded twisted–pair (STP) media.

This adapter is particularly well suited for servers and high–end workstations, especially for workstations running I/O–intensive applications on the network. It uses the IEEE–802.5 standard for communications.

Additional features and support include:

- Automatic ring speed selection, which automatically determines and sets the proper ring speed (16Mbps or 4Mbps), simplifying installation and reducing network down time.
- Support of UTP (with on–board filters) and STP media with a single RJ–45 connector, which simplifies installation.
- External status light–emitting diodes (LEDs), providing visual indication of adapter and ring status without disrupting operation.
- Full–duplex enabled for future growth capability.

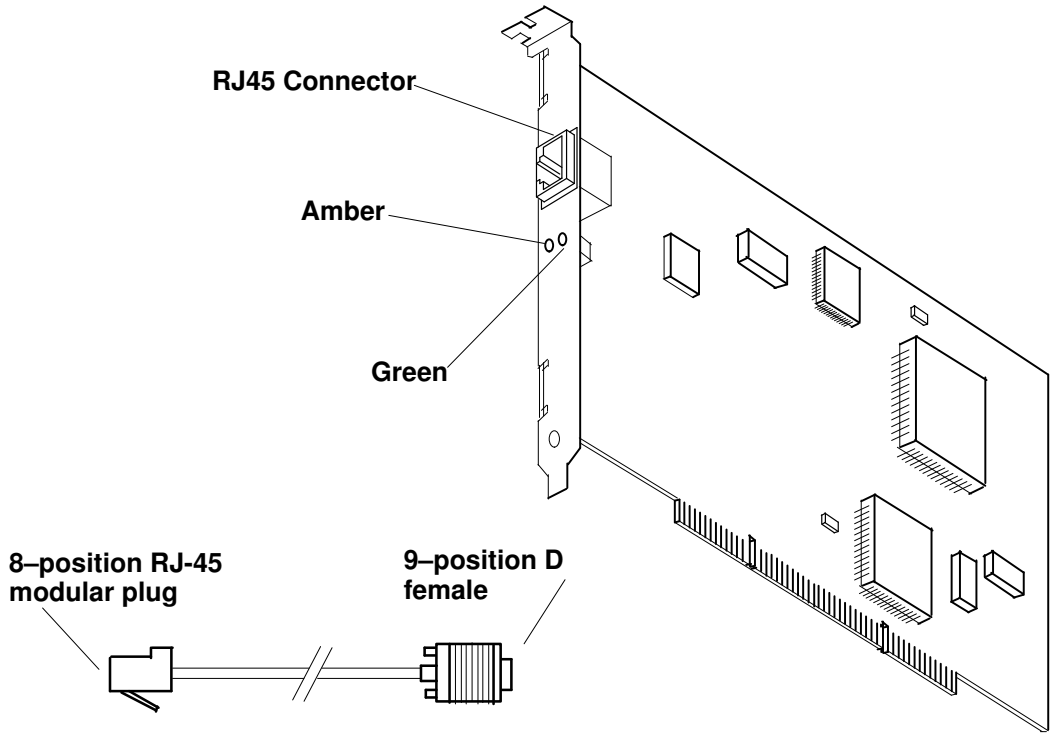


Figure 1. Type 8-T Token Ring PCI Adapter and associated Conversion cable

About the Token Ring PCI Adapter (Type B5–J and B5–R)

The Token-Ring PCI Adapter is a 32-bit, bus-master, token ring adapter for the Peripheral Component Interconnect (PCI) bus architecture.

This adapter supports connection to a token–ring network that is wired unshielded twisted–pair (UTP) or shielded twisted–pair (STP) cabling.

Additional features and support include:

- Automatic ring speed detection.
- Support UTP and STP cabling with both an RJ–45 connector and a 9–pin D–Shell connector.
- External status light–emitting diodes (LEDs), providing visual indication of adapter and ring status without disrupting operation.
- Support for full–duplex, token-ring LAN operation.

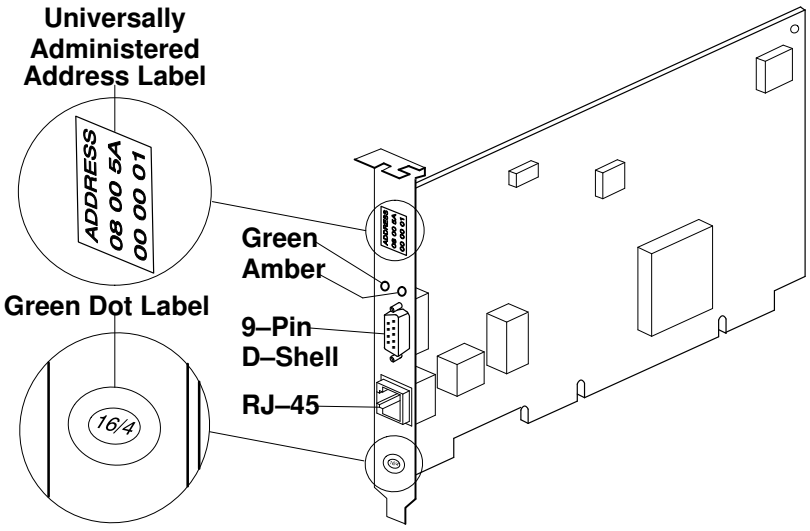


Figure 2. Type B5–J Token Ring PCI Adapter

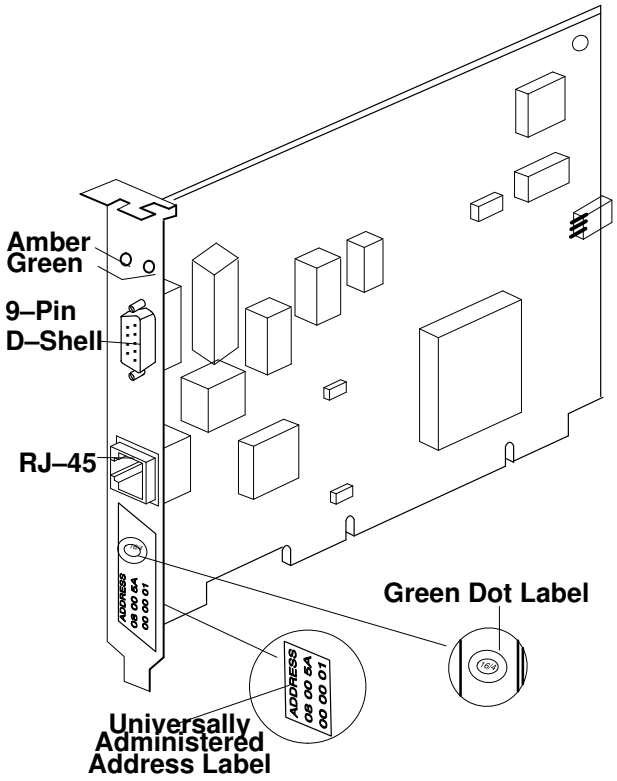


Figure 3. Type B5–R Token Ring PCI Adapter

PCI Token-Ring Adapter Specifications

Item	Description
Bit rate	4Mbps or 16Mbps set manually or automatically sensed
Modes	Half or full duplex
Busmaster	Yes
Connector information	RJ–45 and 9–pin D–shell
Cables	
For STP	Token-Ring RJ–45 STP Adapter cable or Token-Ring 9–pin D–Shell Network Adapter Cable
For UTP	Standard UTP Adapter cable with an RJ–45 connector on one end for the adapter and the appropriate connector for the wall outlet on the other end.

Chapter 2. Hardware Installation

This section provides instructions for installing the Token-Ring Adapter in PCI (Peripheral Component Interconnect) computers.

Token-Ring PCI Adapter Installation

1. Turn off your computer's power and remove the cover (refer to your computer's manual for instructions on cover removal and option board installation and cautions)
2. Locate an available PCI slot in your computer and remove the external slot plate (you will need to loosen the thumbscrew to do this).
3. Plug the adapter into a PCI slot, making sure that the "fork" is in the position under the endplate thumbscrew. Tighten the thumbscrew.
4. Screw the connector into the board's endplate. Do not over-tighten the screws.
5. Replace your computer's cover.
6. Reconnect the power cable to the system; then turn on the power.

Warning: Token ring adapters contain static–sensitive components. Always touch a grounded surface to discharge static electricity before handling the adapter.

Chapter 3. Software Installation and Configuration

Software Delivery

The Token Ring PCI packages are parts of the AIX delivery. They contain the following LPPs (Licensed Program Products).

1. Common Token Ring Software. One file is needed:

   For AIX 4.2

   ```
   devices.mca.8fc8.com
   ```

   For AIX 4.3

   ```
   devices.common.IBM.tokenring.rte
   ```

2. Driver, methods and specific utilities

   For 8–T type adapter. One file is needed:

`devices.pci.14101800.rte`	driver, methods and specific utilities.

   For B5–J and B5–R type adapters. Two files are needed:

`devices.pci.14103e00.rte`	driver, methods and specific utilities.
`devices.pci.14103e00.diag`	diagnostics.

Software Installation

1. Turn the computer on.
2. Log in as root.
3. Insert the media containing the device driver software into the appropriate media device, for example, CD–ROM drive.
4. Enter:

   ```
   smit cfgmgr
   ```

   and press Enter.

   The `Install/Configure Devices Added After IPL` screen is displayed. The ”INPUT device/directory for software” option is highlighted. The cursor is positioned on the entry field where you will identify the input device you are using.
5. Press F4 to display a list of input devices you can select.
6. Select the device by moving the cursor to the appropriate media type and pressing Enter.

   The device or directory you selected is now displayed in the ”INPUT device/directory for software” option on the `Install/Configure Devices Added After IPL` screen.
7. Press Enter to execute the software installation command.

   The COMMAND STATUS screen is displayed. The status will change from Running to OK when the software installation is complete.

Note: If an error message is displayed on the COMMAND STATUS screen, verify that the adapter card is seated properly. If the card is secure, refer to the documentation that came with your computer for information on running hardware diagnostics.

8. Remove the installation media from the drive.
9. Press F10 to exit SMIT.
10. At the prompt, enter:

```
shutdown -Fr
```

and press Enter.

This will shut down and reboot your system. This is a necessary final step in the installation process. AIX will configure your adapter card automatically when the system reboots. No additional procedures are required.

You can check the successful installation with the **lsdev** command, which lists the adapters installed on the system.

For instance:

#lsdev –Ct 14101800

```
tok0    Available 04-01     IBM PCI Token ring Adapter (14101800)
```

Adapter Configuration

The following procedure allows you to configure a Token Ring PCI adapter, and in case of problem with autosense, to select the specific ”RING speed”.

Procedure

1. Enter the SMIT fast path:

   ```
   smit tok
   ```

   Note: Depending on your environment, you access SMIT in ASCII mode or AIXwindows mode. The following steps apply to both interfaces.

2. Select **Adapter.**

The SMIT panel for this selection resembles the following figure.

```
                                  Adapter
Move cursor to desired item and press Enter.

        List All Token ring Adapters
        Change / Show Characteristics of a Token ring Adapter
        Generate Error Report
        Trace a Token ring Adapter
```

3. Select **Change/Show Characteristics of a Token Ring Adapter**.

The SMIT panel for this selection resembles the following figure.

```
                            Token ring Adapter
Move cursor to desired item and press Enter.

     Move cursor to desired item and press Enter.

      tok0  Available  04-01     IBM PCI Token ring Adapter (14101800)

F1=H
F5=U
F9=S
     F1=Help                     F2=Refresh                  F3=Cancel
     F8=Image                    F10=Exit                    Enter=Do
```

4. Make a selection from the available Token Ring adapter. If no adapters are displayed or if they are in a defined state, check the configuration and setup again.

When the appropriate Token Ring adapter is selected, a SMIT panel resembling the following figure will be displayed:

```
          Change / Show Characteristics of a Token Ring Adapter
Type or select values in entry fields.
Press Enter AFTER making all the desired changes.

                                                  [Entry Fields]

 Token Ring Adapter                              tok0
 Description                                     IBM PCI Tokenring Adap
 Status                                           Available
 Location                                         04-01
 TRANSMIT queue size                              [96]                    +#
 HARDWARE RECEIVE queue size                      [32]                    +#
 PRIORITY TRANSMIT queue size                     [32]                    +#
 RING speed                                      [autosense]              +
 Full Duplex                                      [no]                    +
 Receive ATTENTION MAC frame                      [no]                    +
 Receive BEACON MAC frame                         [no]                    +
 Enable ALTERNATE TOKEN RING address              [no]                  . +
 ALTERNATE TOKEN RING address                     [Ox]                  . +
 Apply change to DATABASE only                    no                      +

F1=Help          F2=Refresh          F3=Cancel          F4=List
F5=Undo          F6=Command          F7=Edit            F8=Image
F9=Shell         F10=Exit            Enter=Do
```

SMIT Field Definitions for Token Ring Adapter

The following is a summary of the Token Ring attributes and values shown on the SMIT Change / Show Characteristics of a Token Ring Adapter.

Token Ring Adapter
Identifies the logical name of the adapter. The value of this field cannot be changed.

Description Provides a short text description of the adapter. The value of this field cannot be changed.

Status Indicates the current status of the adapter. Possible values are available, indicating that the adapter is configured in the system and ready to use, and defined, indicating that the adapter is defined to the system but not configured.

Location The location code for an adapter consists of two pairs of digits with the format AA–BB where AA identifies the location code of the drawer containing the adapter card and BB identifies both the I/O bus and slot containing the card.

TRANSMIT queue size
Indicates the number of transmit requests that can be queued for x transmission by the device driver. Valid values range from 32 through 160. The default value is 60.

HARDWARE RECEIVE queue size
Indicates the size of the adapter's receive queue. Valid values range from 32 through 160. The default value is 32.

PRIORITY TRANSMIT queue size

Only available on type 8–T adapters.

Indicates the size of the adapter's priority transmit queue. Valid values range from 32 through 160. The default value is 32.

RING speed Indicates the speed of the ring. Valid values are 4, 16 and autosense. The default value is autosense.

Full Duplex Indicates wheter the adapter is operating in full–duplex (value=yes) or half–duplex (value=no) mode.

The default value is no.

Receive ATTENTION MAC frame

Setting this attribute to the yes value places attention MAC frames received by the adapter in the receive queue for the application to read. If you specify the no value, the ATTENTION MAC frames are ignored. The default value is no.

Receive BEACON MAC frame

Setting this attribute to the yes value places the BEACON MAC frames received by the adapter in the receive queue for the application to read. If you specify the no value, the BEACON MAC frames are ignored. The default value is no.

Enable ALTERNATE TOKEN RING address

Setting this attribute to the yes value indicates that the address of the adapter, as it appears on the LAN network, is the one specified by the ALTERNATE TOKEN RING address attribute. If you specify the no value, the unique adapter address written in a ROM on the adapter card is used. The default value is no.

ALTERNATE TOKEN RING address

Allows the adapter unique address, as it appears on the LAN network, to be changed. The value entered must be a Token Ring address of 12 hexadecimal digits and must not be the same as the address of any other token ring adapter. There is no default value. This field has no effect unless the Enable ALTERNATE TOKEN RING address attribute is set to the yes value, in which case this field must be filled in. To change the alternate Token Ring address, enter 0x followed by the 12–digit address. All 12 hexadecimal digits, including leading zeros, must be entered.

Note: Token Ring addresses use a big–endian/MSB/non–canonical form. Token Ring frames are defined by the sequence in which the frames are transmitted on the medium. For network addresses, this means that the Individual/Group (I/G) bit is transmitted first, followed by the Universal/Local (U/L) administered bit, and the address is defined accordingly.

Apply change to DATABASE only

Indicates whether or not the configuration changes being made should be applied only to the database or to both the database and the current device operation. For devices that are in use and cannot be changed this allows the database to be changed for the device so that the changes take effect the next time the system is rebooted.

Chapter 4. Error Identifiers

Traces

The trace hook identifiers for the Token Ring PCI Adapter are:

Events	8–T	B5–J and B5–R
transmit events	0x2A7	0x2DA
receive events	0x2A8	0x2DB
error	0x2A9	–
other events	0x2AA	0x2DC

To start the traces, you can use:

- the **trace** command:

  ```
  #trace -j 2DA -a
  ```

- the smit interface:

  #`smit trace` and choose the sub–menu ”Start Trace” then select the ADDITIONAL event IDs to trace, and give the hook id.

To stop the traces, you can use:

- the **trcstop** command:

  ```
  #trcstop
  ```

- the smit interface:

  #smit trace and choose the sub–menu ”Stop Trace”

To generate a trace report, you can use:

- the **trcrpt** command

  ```
  #trcrpt
  ```

- the smit interface

  `#smit trace` and choose the sub–menu ”Generate a Trace Report” screens allow you to customize your report.

Error Identifiers for the Error Log

8–T Type Adapters

Error Identifiers	Description
STOK_ADAP_CHECK	Token Ring adapter check.
STOK_ADAP_OPEN	Hardware error opening adapter.
STOK_DMAFAIL	System/Token Ring adapter DMA error.
STOK_BUS_ERR	Token Ring detected a bus error.
STOK_DUP_ADDR	Duplicate station address.
STOK_MEM_ERR	Memory allocation denied.
STOK_PIO_ERR	Token Ring detected a PIO error.
STOK_RCVRY_EXIT	Successful exit of Network Recovery Mode.
STOK_RING_SPEED	Beaconing during insertion process.
STOK_RMV_ADAP	Remove adapter cmd received.
STOK_WIRE_FAULT	Wire fault.
STOK_AUTO_RMV	Auto removal.

Error Identifiers	Description
STOK_TX_TIMEOUT	Token Ring transmit timeout.
STOK_CTL_ERR	Token Ring ioctl timeout.

B5–J and B5–R Type Adapters

Error Identifiers	Description
CSTOK_PERM_HW	Adapter failed to initialize.
CSTOK_RCVRY_ENTER	Entered Network Recovery Mode.
CSTOK_EISR	Error Interrupt Status Register.
CSTOK_RCVRY_EXIT	Successful exit of Network Recovery Mode.
CSTOK_PIO_ERR	Token Ring detected a PIO error.
CSTOK_ADAP_CHECK	Token Ring adapter initialization failure.
CSTOK_ADAP_OPEN	Hardware error opening adapter.
CSTOK_DMAFAIL	System/Token Ring adapter DMA error.
CSTOK_BUS_ERR	Token Ring detected a bus error.
CSTOK_DUP_ADDR	Duplicate station address.
CSTOK_MEM_ERR	Memory allocation denied.
CSTOK_RING_SPEED	Beaconing during insertion process.
CSTOK_RMV_ADAP	Remove adapter cmd received.
CSTOK_WIRE_FAULT	Wire fault.
CSTOK_AUTO_RMV	Auto removal.
CSTOK_TX_ERR	Token Ring transmit error.
CSTOK_RX_ERR	Token Ring receive error.
CSTOK_TX_TMOUT	Token Ring transmit timeout.
CSTOK_CMD_TMOUT	Token Ring ioctl timeout.
CSTOK_ASB_ERR	Token Ring mac command failed.
CSTOK_CMD_ERR	Token Ring adapter command failed.
CSTOK_RCVRY_TERM	Failed open due to ring speed mismatch.
CSTOK_AUTO_FAIL	Failed open, autosense but only one on ring.

Appendix A. Connecting to a Network

The recommended cable for connecting the adapter to the network is the Token Ring RJ–45 Shielded Twisted Pair (STP) Adapter Cable or the Token Ring Unshielded Twisted Pair (UTP) Cable. The RJ–45 DB9 Conversion Cable is for use in conjunction with the Token Ring Network PC Adapter Cable.

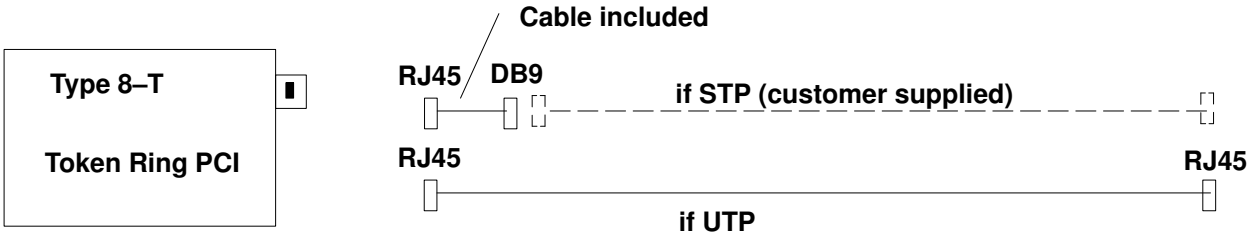


Figure 4. The Adapter Connections (type 8–T)

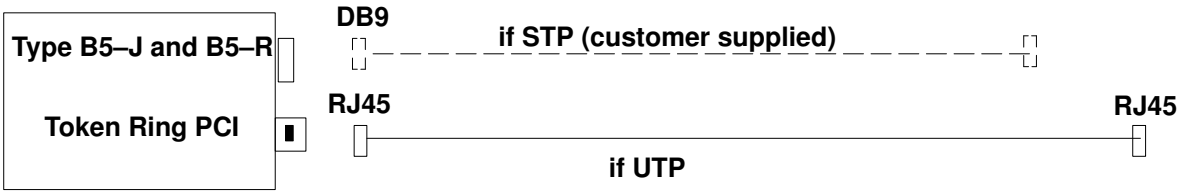


Figure 5. The Adapter Connections (type B5–J)

Interpreting the Adapter Label

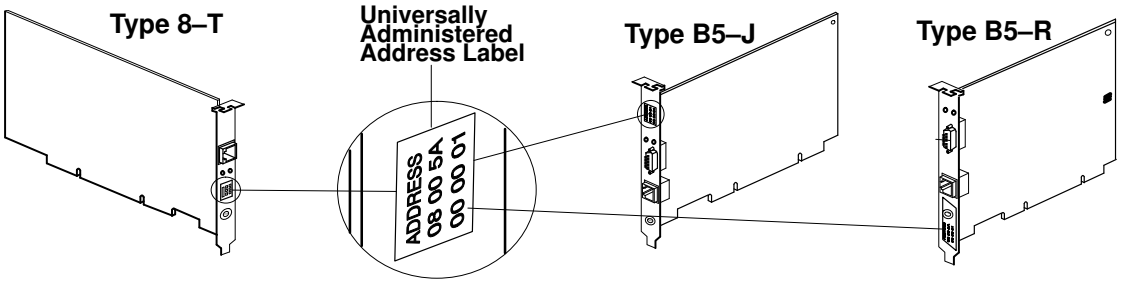


Figure 6. The Adapter Label

The universally administered address label contains the adapter's universally administered address. This is the media access control (MAC) address that was encoded in the adapter memory at the factory.

This 12–digit hexadecimal address is recorded on the label in 2–digit increments from left to right, starting on the first row.

In the illustration, the universally administered address is X'0800 5A00 0001' in non–canonical format, with the most significant bit (MSB) first. The universally administered address is unique and is used by network software to distinguish the adapter from others on the network. If you would prefer the adapter to be known on the network by a locally administered address, you must configure the adapter's device driver or protocol driver to use a locally administered address.

Interpreting the Adapter LEDs

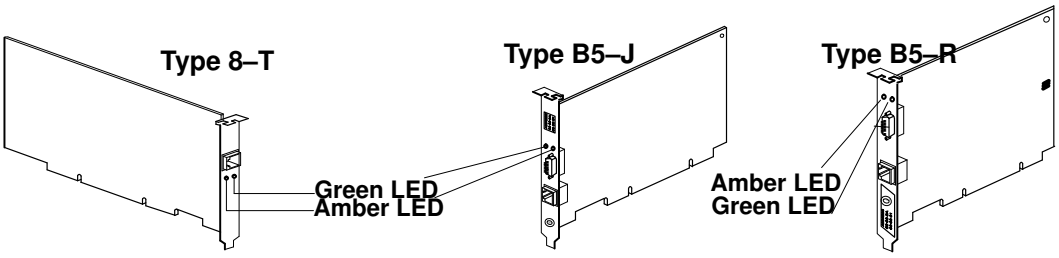


Figure 7. The Adapter LEDS

The Token Ring PCI Adapter LEDs provide information useful for monitoring the status of the adapter and for problem solving.

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 steady, the adapter has detected a potential problem.

In the following table, the first four LED states indicate the sequence that will be displayed when the computer is started and the adapter reaches the open state successfully. Some of those states may be too brief to observe. The last three LED states listed in the table indicate problems.

Amber	Green	Description
Blinking	Blinking	The adapter is waiting for initialization.
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 is open, this state indicates that the adapter has closed.
Off	On	The adapter is open and operating correctly.
On	Off	The adapter self–diagnostic tests failed or there is a problem with the adapter.
Blinking	Off	The adapter is closed. One of the following conditions exists: – The adapter open failed. – The adapter detected a wire fault. – The adapter failed the auto–removal test.
Blinking	On	The adapter has detected beaconing or a hard error.
On	On	The adapter has failed.

The following definitions are of terms referred to in the table:

Auto-removal A state in which a token ring adapter removes itself from the network to perform self–tests to determine whether it is the cause of a hard error. If the tests are successful, the adapter will reattach itself to the network.

Beaconing A state that a token ring adapter enters after it detects a hard error. The adapter reports the error condition to the other devices on the network. Beaconing can result in the adapter removing itself from the network (auto–removal) to determine whether it is the cause of the hard error.

Hard error An error condition on a network that requires removing the source of the error or reconfiguring the network before the network can resume reliable operation.

Initialization An action during which the adapter is prepared for use after its computer is booted. During initialization, the adapter runs its self–diagnostic tests.

Open A state in which the adapter has established connection with other devices on the ring.

Wire fault An error condition caused by a break or a short–circuit in the cable segment that connects the adapter to its access unit.

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