

8-Port Asynchronous PCI Adapter Installation and User's Guide

Note

Before using this information and the product it supports, be sure to read the general information under "Product Warranties and Notices" included with your system unit.

Fifth Edition (October 1998)

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Safety Information

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

Handling Static Sensitive Devices

Attention: Static electricity can damage this device and your system unit. To avoid damage, keep this device in its static protective bag until you are ready to install it. To reduce the possibility of electrostatic discharge, follow the precautions listed below:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component-side up.) Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather, as heating reduces indoor humidity and increases static electricity.

About This Book

Use this book with your system unit documentation to install the 8-Port Asynchronous PCI Adapter. Included are device driver install, configure, and verify instructions.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Publications

This book refers to the following publications:

- Your system unit User's Guide
- *AIX Version 3.2 and 4 Asynchronous Communications Guide, order number SC23-2488*

Trademarks

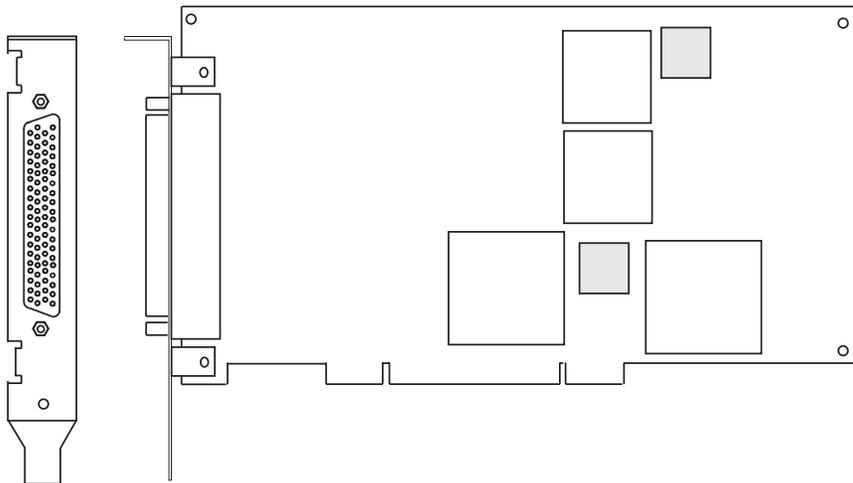
AIX is a registered trademark of International Business Machines Corporation.

Chapter 1. Overview

The 8-Port Asynchronous PCI Adapter (EIA-232E/RS-422A) is a multi-channel intelligent serial communications adapter.

- The adapter contains 128KB of 32-bit, dual-ported, high-speed RAM used to support program code and data buffering.
- The adapter supports a speed of up to 230Kbps (kilobits per second) for each asynchronous port and is run by a 32-bit 20 MHz IDT 3041 processor.

The dual-ported RAM memory is accessible for read and write operations by both the adapter and the system unit. The system unit believes the dual-ported RAM is its own memory and accesses it by the same high-speed memory referencing commands it uses for its internal memory.



Note: Additional information can be found in the Appendices.

Refer to the following sections for cabling and handshaking information:

- Appendix A, "Connectors and Cables" on page A-1
- Appendix B, "Handshaking" on page B-1

Software Requirements

The 8-Port Asynchronous PCI Adapter is supported on AIX Versions 4.1.5 and 4.2.1 (with optional media containing device driver) or on later versions. Please insure this device is supported on your operating system prior to installation. Contact your support representative if you require assistance.

Chapter 2. Preparing for Installation

This section helps you prepare to install your 8-Port Asynchronous PCI Adapter.

The process includes:

- Taking an inventory of your installation materials
- Determining your cable needs
- Installing your device driver software
- Installing your adapter

Note: If AIX is not installed on your system unit, install your adapter before you install the operating system (refer to Chapter 4, “Installing Hardware” on page 4-1). When you install AIX, your device driver software automatically installs.

If AIX is operating on your system, install your device driver software prior to installing your adapter (refer to Chapter 3, “Installing Device Driver Software” on page 3-1).

Inventory

To install the 8-Port Asynchronous PCI Adapter, you need:

- The 8-Port Asynchronous PCI Adapter package
 - The 8-Port asynchronous adapter
 - A 25-pin D-shell wrap plug
 - The 8-Port asynchronous cable with fan-out box or connector assembly for the 8-Port Asynchronous PCI Adapter adapter
- The system unit User's Guide
- A flat-blade screwdriver
- (Optional) media containing device driver

Determining Cable Needs

Go to Appendix A, “Connectors and Cables” on page A-1.

Chapter 3. Installing Device Driver Software

This section explains how to install device driver software.

AIX Device Driver Software Installation

1. Be sure you have read Chapter 2, "Preparing for Installation" on page 2-1.
 - Determine if you should install your device driver software first or if you should install your adapter hardware first.
 - If you should install your device driver software first, go to step 2 and continue with this section.
 - If you should install your hardware first, go to Chapter 4, "Installing Hardware" on page 4-1. When you install AIX, your adapter device driver automatically installs.
2. Turn the system unit power on.
3. Log in as **root**.
4. Insert the media containing the device driver software (example: CD-ROM) into the appropriate media device.
5. Type the following
smitty devinst
and press Enter.
6. The Install Additional Device Software screen highlights the "**INPUT device/directory for software**" option.
7. Select or type *your input device*:
 - Press **F4** to display the input device list. Select the *name of the device* (example: CD-ROM) that you are using and press Enter.
-- or --
 - In the Entry Field, type the *name of the input device* you are using and press Enter.
8. The Install Additional Device Software window highlights the **SOFTWARE to install** option.
9. Press **F4** to display the SOFTWARE to install window.

10. Type the following to display the Find window:

/

11. Type the following

`devices.pci.4f111100`

and press Enter. (The system finds and highlights this device driver software.)

12. Press **F7** to select the highlighted device driver software.

Example:

4.2.1.0 `devices.pci.4f111100` ALL

13. Press Enter.

14. The Install Additional Device Software screen displays. Entry data fields are automatically updated. Press Enter to accept the data.

15. The ARE YOU SURE window displays. Press Enter to accept the data.

16. The **COMMAND STATUS** screen appears.

- The term **RUNNING** is highlighted to indicate that the install and configure command is in progress.
- When **RUNNING** changes to **OK**, scroll down to the bottom of the page and locate the Installation Summary.
- After a successful installation, **SUCCESS** appears in the Result column of the summary at the bottom of the page.

17. Remove the installation media from the drive.

18. Press **F10** to exit SMIT.

19. Go to adapter install procedure, Chapter 4, "Installing Hardware" on page 4-1.

Chapter 4. Installing Hardware

This section provides the guidance necessary to install a PCI adapter. Before you begin, be sure you have read “Handling Static Sensitive Devices” on page vii.

Attention: Do not remove the 8-Port Asynchronous PCI Adapter from its anti-static package at this time.

Installing the Adapter

1. Be sure you have read Chapter 2, “Preparing for Installation” on page 2-1.
 - Determine if you should install your adapter hardware first or if you should install your device driver software first.
 - If you should install your adapter hardware first, go to Step 2 and continue with this section.
 - If you should install your device driver software first, go to Chapter 3, “Installing Device Driver Software” on page 3-1 and return here to install your hardware.
2. Refer to the User's Guide that shipped with your system unit to perform the following and return to this document to continue.
 - Shutdown your system unit.
 - Install the PCI adapter in your system unit.

Note: You remove a slot plate and screw to install the adapter. Store the plate, but use the screw to secure the endplate to the system unit chassis. The adapter endplate must be screwed to the system unit chassis to comply with Federal Communications Commission (FCC) rules, Part 15.
3. Connect the 8-Port Asynchronous cable with fan-out box to the adapter.

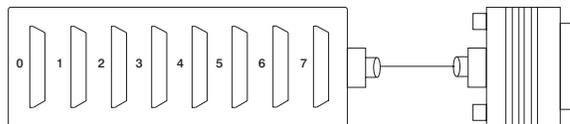


Figure 4-1. 8-Port Asynchronous cable with fan-out Box

4. Connect your external devices.
5. Turn on both your system unit and your display. Follow any instructions on the screen.

Verifying Adapter Available for Use

To verify that your newly installed 8-Port Asynchronous PCI Adapter is available for use, follow the steps below:

1. If necessary, turn your system unit power on.
2. Log in as **root**.
3. At the prompt, type
lsdev -Cc adapter | grep sa
and press Enter.
4. A list of adapters displays. Verify that the 8-Port Asynchronous PCI Adapter is in Available mode. Example:

```
sa0 Available 01-C0 Standard I/O Serial Port 1
sa1 Available 01-D0 Standard I/O Serial Port 2
sa2 Available 04-04 IBM 8-Port Async (PCI) Adapter
```

Note: If the adapter is not available for use, go to “Problem Determination,” Step 2.

Problem Determination

Installation problems are often resolved using a few basic troubleshooting steps:

1. Verify that your adapter is **Available** for use. Go to “Verifying Adapter Available for Use” and return here.
2. Is your adapter on the list?
NO Go to “Verify Software Installation” on page 4-3.
YES Continue to Step 3.
3. Is your adapter in **Available** mode?
NO Go to “Check Cables and Adapter Seating” on page 4-3.
YES Your adapter is recognized by the system and is functioning properly. (Even though the system recognizes your adapter, it is possible to have a configuration problem. If the problem persists, call your support representative.)

Check Cables and Adapter Seating

1. Turn off the system and repeat the Chapter 4, “Installing Hardware” on page 4-1 instructions to make sure the adapter is seated properly and the cable is attached properly.
2. If problems persist, call your support representative.

Verify Software Installation

If you tried “Verifying Adapter Available for Use” on page 4-2 and your adapter was not in the list, it may be because the device driver for your operating system has not yet been installed or did not install successfully.

1. Login as **root**.

2. Type:

```
lslpp -l | grep devices.pci.4f111100
```

and press Enter.

Example output follows:

Fileset	Level	Status	
devices.pci.4f111100.asw	4.2.1.x	COMMITTED	PCI 8-Port Asynchronous
devices.pci.4f111100.com	4.2.1.x	COMMITTED	PCI 8-Port Asynchronous
devices.pci.4f111100.diag	4.2.1.x	COMMITTED	RISC PC PCI Async 8 Port
devices.pci.4f111100.rte	4.2.1.x	COMMITTED	PCI 8-Port Asynchronous
devices.pci.4f111100.rte	4.2.1.x	COMMITTED	PCI 8-Port Asynchronous

Did example type information appear?

NO Go to Step 5 on page 4-4.

YES Continue to Step 3.

3. Are the filesets `devices.pci.4f111100.rte` and `devices.pci.4f111100.asw` installed at a level of 4.1.5.0 or higher?

NO Go to Step 5 on page 4-4.

YES Continue to Step 4.

4. For AIX version 4.1.5, type:

```
lslpp -l devices.mca.ffe1.rte
```

and verify this fileset level is at least 4.1.5.11.

For AIX version 4.2.1 or later, type:

```
lslpp -l devices.common.IBM.cx
```

and verify this fileset level is higher than 4.2.1.0.

5. If the filesets are not installed (or are not installed at the correct level), install the software using either instructions found in Chapter 3, “Installing Device Driver Software” on page 3-1 or in the instructions supplied with your installation media.
6. If your installation problems persist, call your support representative.

Appendix A. Connectors and Cables

The 8-Port Asynchronous (EIA-232E/RS-422A) adapter supports both EIA-232E communications devices and the RS-422A communications devices. Each adapter port can be set by software to support either EIA-232E or RS-422A. The connectors on these adapters look the same but have different signals on the pins when the RS-422A interface is used.

Connectors for the 8-Port Asynchronous Adapter

The 8-Port Asynchronous (EIA-232E/RS-422A) adapter is shipped with a cable and an attached fan-out box or connector box that provides eight DB-25 standard connectors. The pin assignments for the male DB-25 connectors for the EIA-232E interface follow the EIA-232E DTE interface standard. The pin assignments for the male DB-25 connectors for the EIA-232E applications are shown in Table A-1. For RS-422A applications, the DB-25 connector pin assignments can be found in Table A-2 on page A-2.

Signal	Description	Use	Pin Number
GND	Chassis Ground	N/A	Shell
TxD	Transmitted Data	Output	2
RxD	Received Data	Input	3
RTS	Request to Send	Output	4
CTS	Clear to Send	Input	5
DSR	Data Set Ready	Input	6
SG	Signal Ground	Reference	7
DCD	Data Carrier Detect	Input	8
DTR	Data Terminal Ready	Output	20
RI	Ring Indicator	Input	22

Table A-2. DB-25 Connectors for RS-422A Applications

Signal	Description	Use	Pin Number
GND	Chassis Ground	N/A	Shell
TxD _b	Transmitted Data b	Output	2
RxD _b	Received Data b	Input	3
TxD _a	Transmitted Data a	Output	4
RxD _a	Received Data a	Input	5
DSR	Data Set Ready	Input	6
SG	Signal Ground	Reference	7
DCD	Data Carrier Detect	Input	8
DTR	Data Terminal Ready	Output	20

Cables

EIA-232E and RS-422A serial interface cables are shielded, low-capacitance cables that are designed for serial data transmission.

Grounding

A cable shield is grounded at both ends of the cable. A chassis ground is also available on the shell of the DB-25 connector.

Environment

Good shielding provides reasonable protection against noise (electromagnetic interference, or EMI); nevertheless, route cables away from noise sources if possible. Avoid laying cables in close proximity to transformers, generators, motors, fluorescent lights, or other electrical noise-producing equipment.

Capacitance vs. Length of Run

The total capacitance of a cable affects the integrity of transmitted data. As a general rule, the total capacitance of a cable (including the connectors) should not exceed 2500 pF for baud rates of up to 57,600 (1200 pF for 115K baud and 600 pF for 230K baud). Serial interface cable is usually rated in picofarads per foot (pF/ft). Therefore, if a cable has a capacitance of 50 pF/ft, and the connectors are 100 pF each, the maximum recommended cable length is 46 feet for baud rates of up to 57,600. If the cable is rated at 12.5 pF/ft, the maximum recommended cable length is 184 feet, and 5 pF/ft cable can be run up to 460 feet.

Asynchronous Cable Connectors

The asynchronous cables described below use the same connectors. The connector that attaches to the system has a female 25 pin D shell with sockets. The connector that attaches to the device has a male 25 pin D shell with pins. The figure below shows the ends of the 25 pin connectors. The system end is on the left and the device end is on the right.

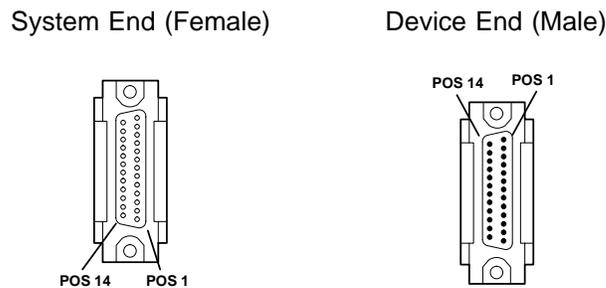


Figure A-1. Asynchronous Cable Connectors

Connecting to a Modem (EIA-232E Application)

System End			Device End	
Signal	Pin		Pin	Signal
GND	Shell		1	GND
TxD	2	_____	2	TxD
RxD	3	_____	3	RxD
RTS	4	_____	4	RTS
CTS	5	_____	5	CTS
DSR	6	_____	6	DSR
SG	7	_____	7	SG
DCD	8	_____	8	DCD
DTR	20	_____	20	DTR
RI	22	_____	22	RI

( Cable Shield)

Figure A-2. Modem Cable

Use a standard straight-through cable (see Figure A-2) to connect the modem to one of the DB-25 connectors on the connector box to ultimately connect the 8-Port Asynchronous (EIA-232E/RS-422A) PCI adapter to a modem.

Connecting to a DTE Device

A DTE device can be a terminal, serial printer, or another system's serial port. To connect a DTE device (8-Port Asynchronous EIA-232E/RS-422A) PCI adapter to a DTE device, a null modem cable or adapter is required.

Appendix B. Handshaking

Software Handshaking (XON/XOFF)

Serial terminals and printers often require only a three-signal connection to the 8-Port Asynchronous PCI Adapter. For device drivers that support XON/XOFF (software) handshaking, the required signal lines are transmitted data (TxD), received data (RxD), and signal ground (SG). Cables must be shielded and the shield must be connected to chassis ground (GND) at both ends of the cable run to remain in compliance with FCC certification requirements. The cable can be used as a null modem cable, that is, transmit data on one end of the cable is connected to receive data at the other end and vice versa. A cable of this type is shown in Figure B-1 for EIA-232E applications.

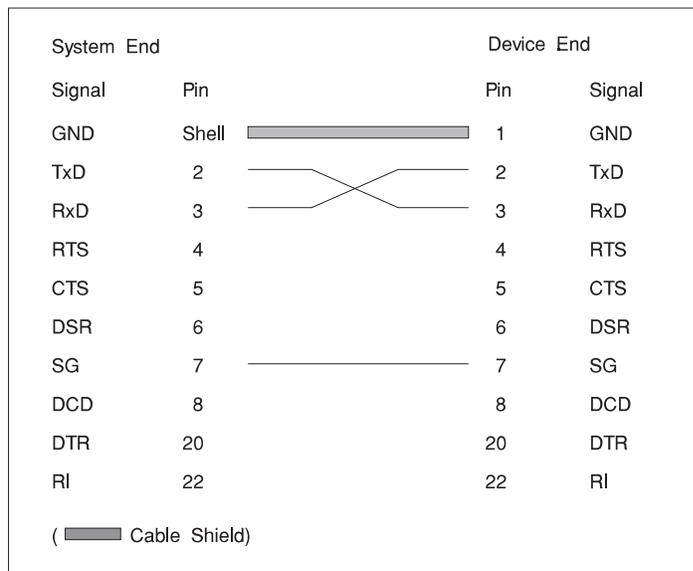


Figure B-1. Simple Terminal/Printer Cable for EIA-232E Applications

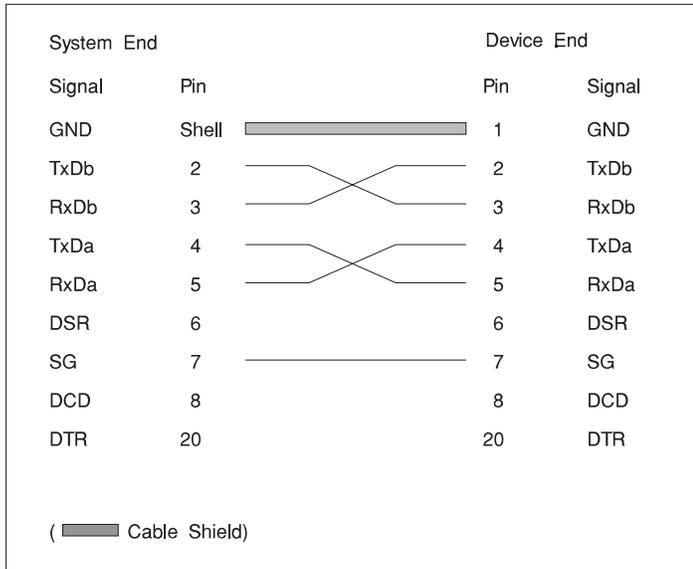


Figure B-2. Simple Terminal/Printer Cable for RS-422A Applications

The cable shown in Figure B-2 is a terminal/printer cable; RS-422A mode signal names are listed. The cable can be used as a null modem cable, that is, transmit data on one end of the cable is connected to receive data at the other end and vice versa. The male DB-25 end plugs directly into most serial terminals and printers without an adapter. The female DB-25 end plugs directly into one of the DB-25 connectors on the connector box assembly.

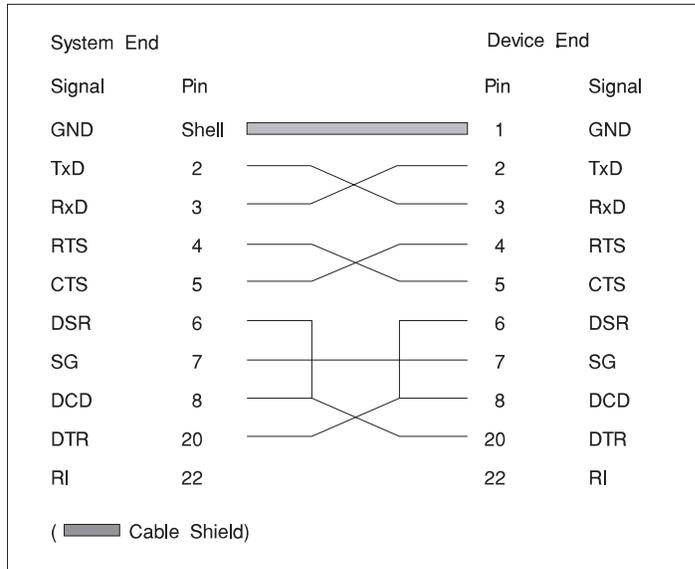


Figure B-3. Terminal/Printer Cable for EIA-232E Applications

The cable shown in Figure B-3 is a terminal/printer cable that can be used for various hardware and software protocols. The cable can be used as a null modem cable, that is, transmit data on one end of the cable is connected to receive data at the other end and vice versa. The male DB-25 end plugs directly into most serial terminals and printers without an adapter. The female DB-25 end plugs directly into one of the DB-25 connectors on the connector box assembly.

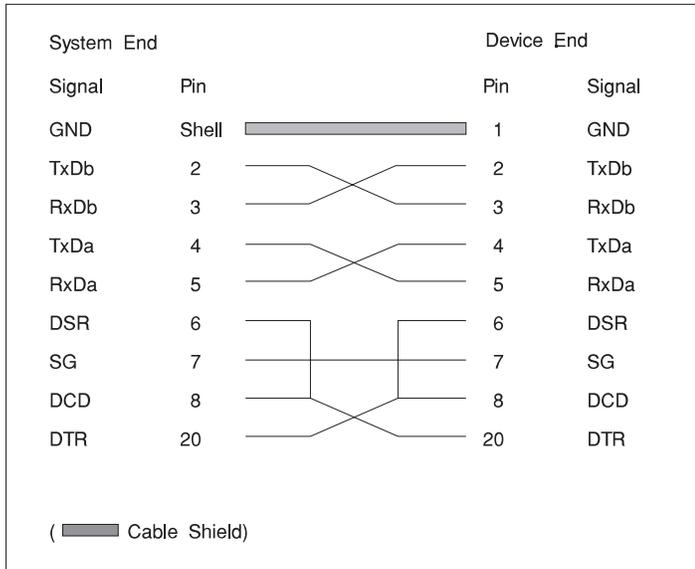


Figure B-4. Terminal/Printer Cable for RS-422A Applications

The cable shown in Figure B-4 is a terminal/printer cable; the RS-422A mode signal names are listed. The cable can be used as a null modem cable, that is, transmit data on one end of the cable is connected to receive data at the other end and vice versa. The male DB-25 end plugs directly into most serial terminals and printers without an adapter. The female DB-25 end plugs directly into one of the DB-25 connectors on the connector box assembly.

Hardware Handshaking (Ready/Busy)

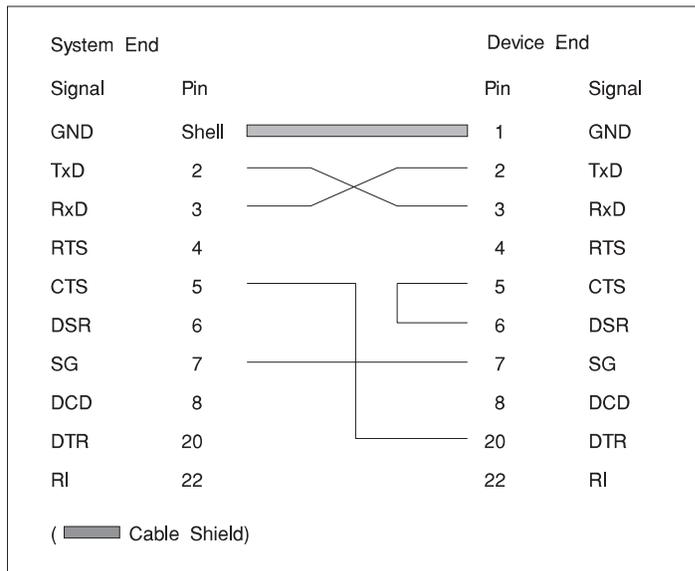


Figure B-5. Terminal/Printer Cable with DTR Handshaking EIA-232E Applications

Most terminals and printers use data terminal ready (DTR) for ready/busy hardware handshaking. The cable shown in Figure B-5 supports this method and can be custom built.

Instead of using DTR, some printers use a control signal called supervisory send data (SSD) on pin 11. For SSD, connect CTS on the female DB-25 side to pin 11 of the male DB-25 instead of connecting to pin 20. Other printer manufacturers may use different methods of flow control. Consult your printer's documentation for specific wiring requirements.

Appendix C. Communications Statements

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

Federal Communications Commission (FCC) Statement

Note: The 8-Port Asynchronous PCI Adapter has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. Neither the provider nor the manufacturer are 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.

Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, New York 10504
Telephone: (919) 543-2193



Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

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 Kingdom 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 Communications du Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

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

VCCI Statement

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

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information 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.

Radio Protection for Germany

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 Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.



Part Number: 08L0510



Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

08L0510

