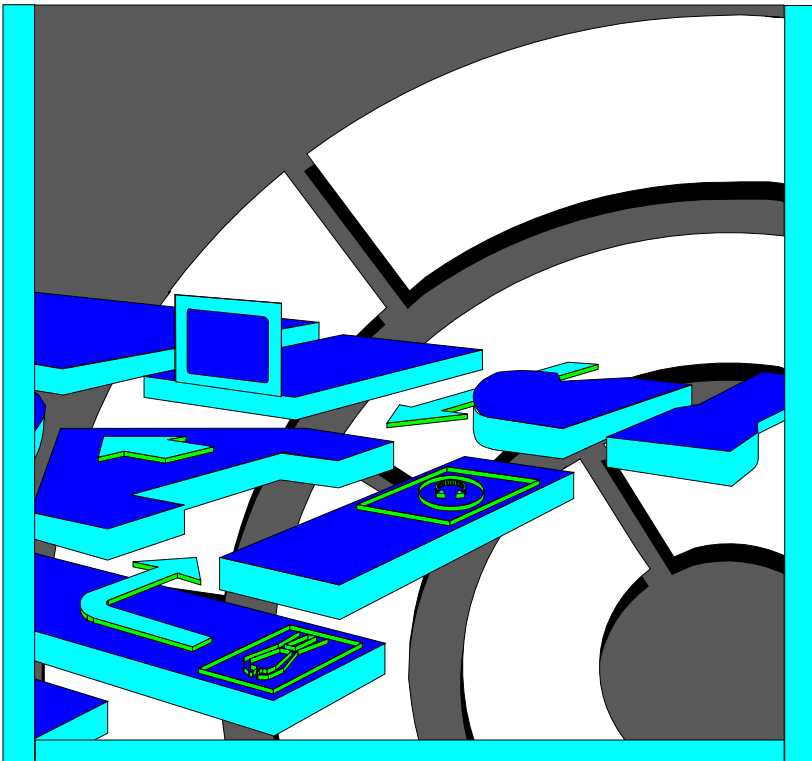


# IBM ARTIC X.25 Interface Co-Processor PCI Adapter

## Guide to Operations





**IBM ARTIC X.25 Interface Co-Processor  
PCI Adapter**

**Guide to Operations**



**Important**

Before using this information and the product it supports, be sure to read all the information in Appendix B, "Notices."

Before installing or removing an adapter, be sure to study the Connect/Disconnect sequence diagram for cables in "Safety Information" on page B-2.

**First Edition (August 1996)**

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## About This Book

This manual contains the following information for the IBM ARTIC X.25 Interface Co-Processor PCI adapter (referred to as the *PCI co-processor adapter* throughout this book):

- A description of the adapter and the optional cables
- Installation requirements and instructions
- Connector information
- Problem determination procedures and a list of field-replaceable units (FRUs)
- Special configuration information.

This manual is written for an experienced computer operator or a person who sets up, uses, or programs the PCI co-processor adapter with IBM computer products.

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## Related Publications

- Operating and installing documentation provided with your personal computer system.
- Reference, service, and diagnostic documentation available for your computer system.
- Operating system-specific information, for example, DOS, OS/2, and so forth.



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## Chapter 1. Product Description

The IBM ARTIC X.25 Interface Co-Processor PCI adapter (called *PCI co-processor adapter* throughout this book), with supporting software, enables the attachment of a PCI-bus-compatible personal computer system to an X.25 Packet-Switched Network so the personal computer system can operate as a packet terminal. Synchronous connection to the network is supported through an interface that can be configured as either X.21 or X.21 *bis* using a selectable optional cable.

The PCI co-processor adapter has its own microprocessor and memory, allowing it to perform communications functions.

---

### Highlights

The PCI co-processor adapter provides:

- 80C186XL microprocessor
- 512KB of dynamic random-access memory (DRAM)
- Communications port that can, through optional cables, support the X.25 layer through any one of the following interfaces:
  - X.21 up to 64KBps duplex
  - X.21 *bis*/V.24 (RS-232C) up to 19.2KBps duplex
  - X.21 *bis*/V.35 up to 56KBps duplex
- Automatic recognition of the selected interface cable
- Capacity for the concurrent support of up to 250 virtual channels
- Multiple card installation capability.

---

## Specifications

### **Size**

Length: 181 mm (7.125 inches)

Width: 17.5 mm (0.7 inches)

Height: 127 mm (5.0 inches)

Weight: 0.15 kg (0.33 lbs)

### **Environment**

- Air temperature:

Operating: 10 to 35°C (50 to 95°F)

Non-Operating: 0 to 60°C (32 to 140°F).

- Humidity:

Operating: 5% through 90%.

### **Electrical**

Optimum Voltages:                      Maximum Current:

+4.8 V dc to +5.25 V dc                  1.2 A

+11.3 V dc to +12.7 V dc                10 mA

-11.3 V dc to -12.7 V dc                16 mA

---

## Adapter Cable Options

The following adapter cables are available as options:

- X.21 Cable (FRU Part Number 16F1865)

The X.21 cable is 3 meters (9.9 feet) long. It has a 37-pin female connector at the adapter end and a 15-pin male connector at the other end.

- X.21 *bis* (V.24) Cable (FRU Part Number 16F1869)

The X.21 *bis* (V.24) cable length is 3 meters (9.9 feet) long. It has a 37-pin female connector on one end and a 25-pin male connector at the other end.

- X.21 *bis* (V.35) Cable (FRU Part Number 16F1871).

The X.21 *bis* (V.35) cable length is 3 meters (9.9 feet) long. It has a 37-pin female connector on one end and a 34-pin male connector at the other end.

**Note:** These are the same cables used on the IBM X.25 Interface Co-Processor/2 adapter on Micro Channel-based personal computer systems and X.25 Interface Co-Processor used on AT-compatible personal computer systems.





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## Chapter 2. Installation

This chapter lists the hardware and software/microcode requirements and provides information for setting up and installing the IBM PCI co-processor adapter.

---

### Installation Requirements

The PCI co-processor adapter requires the following hardware, software, and microcode.

#### Hardware

- The PCI co-processor adapter requires a half-length, 5-volt, 32-bit slot. It can be installed into any PCI-compliant computer.

The Electronic Emission statement in this manual may be different than the Electronic Emission statement in the manual that came with your system. Use the Electronic Emission statement that corresponds to higher emission test limits.

- One of the following electrical interface cables (or equivalent). The cable dimensions are listed under "Adapter Cable Options" on page 1-3.
  - Cable Option X.21
  - Cable Option V.24
  - Cable Option V.35

#### Hardware Tools

- Medium-size flat-blade screwdriver
- Optional:
  - Medium screwstarter
  - 3/16-inch nutdriver
  - 1/4-inch nutdriver.

## Handling Static-Sensitive Devices

Components for your PCI co-processor adapter can be damaged by static discharges. To prevent this damage, your PCI co-processor adapter is wrapped in an antistatic bag. Observe the following precautions when handling the adapter:

- Keep the adapter in its antistatic bag until you are ready to install the adapter into your personal computer system.
- Make the least possible movement with your body to minimize the electrostatic charges created by contact with clothing fibers, carpets, and furniture.
- If possible, keep one hand on the computer chassis when you are inserting an adapter into or removing an adapter from the system unit; always switch off the power before performing either task.
- *Do not touch the printed circuit.* Where possible, hold the adapter by its edges, but do *not* touch the metal edge connectors.
- Do not place the adapter on the machine cover or on a metal table. Machine covers and metal tables increase the risk of damage because they make a discharge path from your body through the adapter.
- Do not allow the adapter to be touched accidentally by others.

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## Installation Instructions

The hardware installation process for the PCI co-processor adapter includes completing the following procedures:

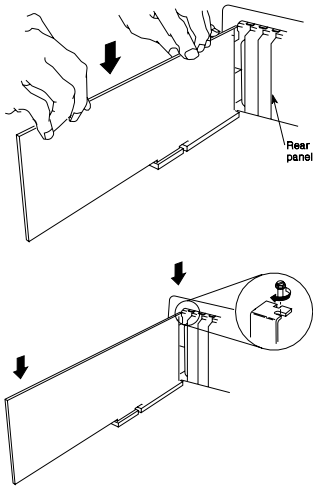
- Installing the PCI co-processor adapter in the system unit (starting on page 2-3)
- Running diagnostics to verify installation (page 2-7)
- Connecting the adapter cable (page 2-8).

## **Step 1: Install the PCI Co-Processor Adapter in the System Unit**

Use the following steps as general information for installing your PCI co-processor adapter. For specific adapter installation instructions, consult the operating manual or the installation and setup manual for your specific personal computer system.

1. Set all power switches to Off.
2. Unplug the power cords from the wall outlets.
3. Remove the cable-retaining brackets from the rear of the system unit and display.
4. Disconnect all cables from the rear of the system unit.
5. Use a flat-blade screwdriver or 1/4-inch nutdriver to remove the cover mounting screws (if present) from the system unit.
6. Remove the system-unit cover.
7. Locate an available PCI expansion slot in your system unit.
8. Use a flat-blade screwdriver or a 3/16-inch nutdriver to remove the screw that holds the expansion-slot cover in place (see the next page). Lift the expansion-slot cover from the system unit.
9. Hold the PCI co-processor adapter (still wrapped in the anti-static bag) in one hand and touch a metal part of your system unit with the other hand. This places your body, the adapter, and the system unit at the same ground potential, thus preventing an accidental static discharge.
10. Carefully remove the adapter from the anti-static bag. Be sure to grasp circuit boards by the edges only; do not touch the component pins or solder joints.

11. Install the adapter by holding it by the top and firmly pressing it into the expansion slot.



12. Align the slot in the card-retaining bracket with the hole in the rear panel of the system unit.
13. Insert and tighten the screw to secure the card-retaining bracket to the rear panel of the system unit.
14. If you have other adapters (or options) to install, do so now. Refer to the Operating and Installation documentation provided with your computer system if more information is required for other adapters or options.
15. Replace the system-unit cover.
16. Reconnect all cables previously removed from the system unit.
17. Plug all power cords into electrical outlets.

## Step 2. Download the Diagnostics and Operating System Support Programs

Diagnostics and support programs for various operating systems are available with the purchase of this card. Specific operating system support programs can be obtained through either the World Wide Web (WWW) or the Bulletin Board System (BBS).

### Downloading from the WWW

Do the following.

1. Using a Web Browser of your choice, open the Universal Resource Locator (URL):  
`http://wwprodso1n.bocaratn.ibm.com/artic/file_rep.html`
2. Select **Diagnostic and Option Diskettes**.
3. Download the appropriate diagnostic diskette and installation information.
4. Go back one page to the **ARTIC File Repository**.
5. Select **Operating System Support**.
6. Select the operating support you want.
7. Download the **Program** file.
8. Download the **Installation and File Creation Instructions** file.
9. Follow the steps in the Installation and File Creation Instructions file for installing and configuring the product support and diagnostics.

### Downloading from the BBS

Do the following.

1. Dial the U.S.A. number **561-443-0134**. Your modem settings should be as follows:

<b>Data Bit</b>	8
<b>Parity Bit</b>	N
<b>Stop Bit</b>	1
2. Select the operating system support or diagnostic diskette you want.

3. Choose the **Transfer Protocol** supported by your communications software.
4. View online or download the **Readme/Instruction** file.
5. Follow the instructions in this file for downloading and installing the program support or diagnostics.

### **Obtaining Operating System Software when WWW/BBS Support Is Unavailable**

For those who are unable to retrieve the files from either the WWW or BBS, support is provided by telephone or E-mail.

For telephone assistance (U.S.A. ONLY), call:

**1-800-426-3333 and ask for ARTIC 160.**

For E-mail assistance, send to:

**artic@vnet.ibm.com**

### **Software/Microcode Installation**

The following software and microcode (or equivalent) are supported:

- One of the following sets of software products:
  - IBM Personal Computer DOS (Version 3.3 or higher)
  - IBM Realtime Interface Co-Processor DOS Support program (Version 1.10 or higher)
  - IBM X.25 Co-Processor Support Program (Version 1.03 or higher)

**or**

- IBM Operating System/2 (OS/2 Version 3.0 or 2.11 with Fix Pack XR-098 or greater)
- IBM Realtime Interface Co-Processor Operating System/2 Support program (Version 1.10 or higher)
- IBM Communication Manager/2 (Version 1.11 or higher)

**Note:** See “Step 2. Download the Diagnostics and Operating System Support Programs” on page 2-5 for other supported operating systems and applications.

- IBM Realtime Control Microcode (ICAAIM.COM)

ICAAIM.COM is the RAM-resident control program for the PCI co-processor adapter and is supplied with the Realtime Interface Co-Processor Support Program for your operating system.

ICAAIM.COM is loaded automatically onto the adapter by either the IBM X.25 Co-Processor Support Program or the IBM Communications Manager/2 product. ICAAIM.COM optionally can be loaded using the Application Loader Utility of either the Realtime Interface Co-Processor DOS Support or the Realtime Interface Co-Processor OS/2 Support program.

See Appendix A, “Special Configuration Information” for important setup information on creating an ICAPARM.PRM file and changing the CONFIG.SYS file. The changes are necessary for the correct operation of your PCI co-processor adapter.

### **Step 3: Run Diagnostics to Verify Installation**

Before you continue with the following procedure, see “PCI Co-Processor Adapter Diagnostics Test” on page 4-3 to test the PCI co-processor adapter in an Intel-based, IBM-compatible system. See “Step 2. Download the Diagnostics and Operating System Support Programs” on page 2-5 for information on downloading diagnostics for other supported system unit hardware platforms.

## Step 4: Connect the Optional Adapter Cable

Use the following steps to connect your adapter cable.

**Note:** The optional adapter cables are described on page 1-3.

### DANGER

**Lightning protection. Do not connect or handle the cable during a lightning storm.**

1. Align the connector of the adapter cable with the co-processor adapter connector at the rear of the system unit; it can fit properly only one way.
2. Firmly press the adapter cable onto the co-processor adapter connector.
3. Insert and tighten the screw at each side of the connector on the cable.
4. Connect your device to the other end of the adapter cable.

The PCI co-processor adapter hardware installation is complete.



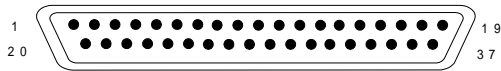
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## Chapter 3. Connector Information

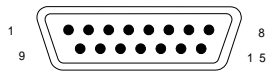
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### Pin Numbers

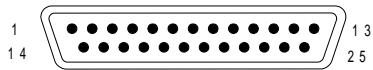
The 37-pin, D-shell, male connector on the PCI co-processor adapter is shown below.



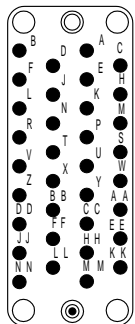
The 15-pin, D-shell, male connector on the optional X.21 (non-switched) adapter cable is shown below.



The 25-pin, D-shell, male connector on the optional X.21 *bis* (V.24) adapter cable is shown below.



The 34-pin male connector on the optional X.21 *bis* (V.35) adapter cable is shown below.



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## Pin Assignments

### X.21 Connector Information

The X.21 pin assignments for the 37-pin connector on the PCI co-processor adapter and the corresponding pin assignments for the 15-pin connector on the optional adapter cable are listed in Table 3-1. (The pin positions on the connector are shown under “Pin Numbers” on page 3-1.)

<b>Signal Name</b>	<b>37-Pin Connector</b>	<b>15-Pin Connector</b>
GND	7	8
T (A)	10	2
C (A)	11	3
R (A)	12	4
I (A)	13	5
S (A)	14	6
T (B)	28	9
C (B)	29	10
R (B)	30	11
I (B)	31	12
S (B)	32	13

## X.21 bis (V.24) Connector Information

The X.21 *bis* (V.24) pin assignments for the 37-pin connector on the PCI co-processor adapter and the corresponding pin assignments for the 25-pin connector on the optional adapter cable are listed in Table 3-2. (The pin positions on the connector are shown under “Pin Numbers” on page 3-1.)

<i>Table 3-2. X.21 bis (V.24) Interface Pin Assignments</i>		
<b>Signal Name</b>	<b>37-Pin Connector</b>	<b>25-Pin Connector</b>
TXD	2	2
RXD	3	3
RTS	4	4
CTS	5	5
DSR	6	6
GND	7	7
CD	8	8
DTR	20	20
RLBT	21	21
RI	22	22
TX CLK IN	24	15
TM	25	25
RX CLK	26	17
LLBT	27	18

**Note:** Pin 27 can be used as either the EIA-232 signal, HRS, or the V.24 signal, LLBT.

### X.21 bis (V.35) Connector Information

The X.21 *bis* (V.35) pin assignments for the 37-pin connector on the PCI co-processor adapter and the corresponding pin assignments for the 34-pin connector on the optional adapter cable are listed in Table 3-3. (The pin positions on the connector are shown under “Pin Numbers” on page 3-1.)

<i>Table 3-3. X.21 bis (V.35) Interface Pin Assignments</i>		
<b>Signal Name</b>	<b>37-Pin Connector</b>	<b>34-Pin Connector</b>
RTS	4	C
CTS	5	D
DSR	6	E
GND	7	B
CD	8	F
RX CLK (B)	16	X
TXD (B)	17	S
TX CLK IN (B)	18	AA
RXD (B)	19	T
DTR	20	H
RI	22	J
RX CLK (A)	34	V
TXD (A)	35	P
TX CLK IN (A)	36	Y
RXD (A)	37	R

---

## Chapter 4. Problem Determination Procedures

This chapter contains step-by-step instructions that can help you determine if your PCI co-processor adapter is operating properly in an Intel-based, IBM-compatible system. See “Step 2. Download the Diagnostics and Operating System Support Programs” on page 2-5 for information on downloading diagnostics for other supported system unit hardware platforms.

**Note:** To test the PCI co-processor adapter after completing the initial installation of it, see “PCI Co-Processor Adapter Diagnostics Test” on page 4-3.

The contents of the chapter are:

- System unit diagnostics (page 4-2)
- PCI co-processor adapter diagnostics (starting on page 4-3)
- Service parts (starting on page 4-22).

If you suspect you have a problem:

- Check electrical connections (that is, cable connections between devices, cable connections between devices and wall outlets, and wall outlet condition).
- Perform diagnostics.

Two groups of tests can be performed when there is a problem with a system unit containing the PCI co-processor adapter.

1. System Unit Diagnostics. These tests are run from a diagnostics diskette provided with the system unit; they examine the system unit and the installed options.
2. PCI Co-Processor Adapter Advanced Diagnostics Version 1.50. These tests are run from the *IBM Realtime Interface Co-Processor: Advanced Diagnostic* diskette; they examine the PCI co-processor adapter.

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## System Unit Diagnostics

For details on performing the system unit diagnostics, see “Problem Determination Procedures” in the operating instructions supplied with your computer system.

The system unit diagnostics will not detect PCI co-processor adapter errors directly, but will aid in isolating the problem.

Run the Realtime Interface Co-Processor diagnostics to determine whether or not you have a PCI co-processor adapter error.

**Note:** If you are unsure of a problem area, perform the system unit diagnostics first, before proceeding with the PCI co-processor adapter diagnostics.

If you encounter problems configuring your PCI co-processor adapter or installing the IBM X.25 Interface Co-Processor PCI device driver for your operating system, you may need to update the BIOS on your computer. Contact your system unit manufacturer for any possible BIOS updates.

The IBM X.25 Interface Co-Processor PCI adapter requests an 8KB memory window under 1MB. If this is not available, the software for the card may not operate correctly.

If you are unable to resolve your problem, contact the ARTIC Technical Support Desk as follows:

- In the USA, call **1-800-237-5511**, and at the Voice Response Unit, enter **0 (ignore all other options)**.
- In Canada, call **1-800-465-2222**.
- For all other locations, call your country specialists.

---

## PCI Co-Processor Adapter Diagnostics Test

### Notes:

1. You can test the PCI co-processor adapter with or without the 37-pin wrap plug (shown in "Service Parts" on page 4-22). The wrap plug lets you test the electrical interfaces.
2. If at any time during diagnostics testing, you get a screen with non-decipherable data, see the steps under "Blank Screen, Blinking Cursor, or Non-Decipherable Data" on page 4-5. Otherwise, follow the step-by-step procedures.
3. If you receive an error message during any of the tests, record the error message and have the system unit serviced, unless otherwise stated.

During diagnostics testing, instructions appear on the screen. Follow the instructions as they appear.

1. Set the Power switch on the system unit to Off.
2. Insert your copy of the *IBM Realtime Interface Co-Processor: Advanced Diagnostics* diskette into diskette drive A.
3. Set the Power switch on the system unit to On.

A screen similar to the following should appear.

```
IBM REALTIME INTERFACE CO-PROCESSOR
AND X.25 INTERFACE CO-PROCESSOR
ADVANCED DIAGNOSTICS
Version X.XX (C) Copyright IBM Corp 19XX

SELECT AN OPTION

0  RUN DIAGNOSTIC ROUTINES
9  EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED
?
```

#### **DOES YOUR SCREEN LOOK SIMILAR TO THIS ONE?**

---

- NO** If you have a blank screen, a blinking cursor, or non-decipherable data, continue to the next page. Otherwise, repeat the diagnostics for your personal computer system to verify that your system unit is functioning correctly. If your system unit is functioning correctly, your *IBM Realtime Interface Co-Processor: Advanced Diagnostics* diskette may be defective.
- YES** Press **0** (RUN DIAGNOSTIC ROUTINES); then press Enter and continue on page 4-5.



## Blank Screen, Blinking Cursor, or Non-Decipherable Data

If your screen is completely blank or has a blinking cursor or non-decipherable data, do the following:

1. Set the Power switch on the system unit to Off.
2. If only one co-processor adapter is installed, repeat the diagnostics for your personal computer system to verify that your system is functioning correctly. If your system is functioning correctly, stop the procedures and replace the co-processor adapter that is installed.

**Note:** For instructions on removing (and replacing) a co-processor adapter, see the "Removal and Replacement Procedures" on page 4-17.

If more than one co-processor adapter is installed, remove all the adapters; then continue with the following step.

3. Insert your copy of the *IBM Realtime Interface Co-Processor: Advanced Diagnostics* into diskette drive A, if previously removed.
4. Set the Power switch on the system unit to On.

The screen that appears should look similar to the screen on page 4-4.

### DOES THE SCREEN LOOK SIMILAR TO THE ONE SHOWN ON PAGE 4-4?

---

**NO** Repeat the diagnostics for your personal computer system to verify that your system unit is functioning correctly. If your system unit is functioning correctly, your *IBM Realtime Interface Co-Processor: Advanced Diagnostics* diskette may be defective.

**YES** Press **0** (RUN DIAGNOSTIC ROUTINES); then press Enter and continue to the next page.

A screen similar to the following may appear.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT CARD	CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS ADAPTER

ARE ALL REALTIME INTERFACE  
CO-PROCESSORS RECOGNIZED  
(Y/N)?

**DOES YOUR SCREEN MATCH THE ONE ABOVE?**

**NO** Continue to the next page.

**YES** Do the following:

- If all your co-processor adapters have been removed, turn off your system and continue with step 2 below.
- If more than one co-processor adapter is installed in your system, turn off your system and do the following:
  1. Remove all of the installed co-processor adapters.
  2. Re-install and test one co-processor adapter at a time by doing the following. (Replace the adapter that causes the failure.)
    - a. Re-install the adapter.
    - b. Then restart the diagnostics (see page 4-4).

**Note:** You may return to this page with only one adapter installed; in this case, continue with the following.

- If only one co-processor adapter is installed, press **N** and then Enter; continue on page 4-15.

A screen similar to the following may appear.

```
IBM REALTIME INTERFACE CO-PROCESSOR
AND X.25 INTERFACE CO-PROCESSOR
CARD ADDR = 02A0
WERE YOU DIRECTED HERE FROM THE PROBLEM ISOLATION CHARTS
BECAUSE THE YELLOW LIGHT WAS BLINKING
(Y/N)?
```

**DOES YOUR SCREEN LOOK SIMILAR TO THIS ONE?**

---

**NO** Continue to the next page.

**YES** Replace the co-processor adapter.

**Configuration Screen**

Configuration information for all installed co-processor adapters should appear on the screen. If a screen with an error message appears, follow the instructions on the screen.

**Notes:**

1. The Realtime Interface Co-Processor Advanced Diagnostics are configured to test up to a maximum of four co-processor adapters (including the PCI co-processor adapter) at a time. If you have more than four adapters, ensure that only four at a time are installed.
2. The following screen is only a representation of the configuration screen that should be displayed. Your screen may differ, depending on your co-processor adapter configuration.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT CARD	CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS ADAPTER
0	Y	02A0		10	32	1 V24/V35 X21

ARE ALL REALTIME INTERFACE  
CO-PROCESSORS RECOGNIZED  
(Y/N)?

**DOES A “Y” APPEAR IN THE SECOND (PRESENT) COLUMN  
FOR EACH CO-PROCESSOR ADAPTER INSTALLED?**

**NO** Press **N**; then press Enter and go to page 4-15.

**YES** Press **Y**; then press Enter and continue to the next page.

**Configuration Check**

The message at the bottom of the screen should appear. Compare the displayed configuration information in each column to make sure all your installed co-processor adapters are listed.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT		CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS	
CARD							ADAPTER	
0	Y	02A0	512		10	32	1	V24/V35 X21

ARE ALL REALTIME INTERFACE  
CO-PROCESSORS RECOGNIZED  
(Y/N)?

CHECK THE REALTIME INTERFACE  
CO-PROCESSOR CONFIGURATION  
-> PRESS ENTER

**DOES THE CONFIGURATION INFORMATION IN EACH COLUMN  
MATCH THE SETTINGS IN YOUR CONFIGURATION?**

---

**NO** Continue to the next page.

**YES** Press Enter and continue to page 4-10 to perform a complete diagnostic checkout.

If an error is displayed in the **PWR ON ERR** column, replace the co-processor adapter that caused the failure and rerun the PCI co-processor adapter diagnostics (page 4-4).

Otherwise, check the settings of the switches on the adapters, as explained in Chapter 3, "Connector Information."

If the switches are wrong, correct them and repeat the PCI co-processor adapter diagnostics.

If the switches are set correctly but the configuration shown on your display is wrong, replace the co-processor adapter associated with the incorrect configuration; then rerun the PCI co-processor adapter diagnostics (page 4-4).

### Co-Processor Adapter Test

Your screen should look similar to the following.

**Note:** This screen is only a representation of the screen that should be displayed. Your screen may differ, depending on your co-processor adapter configuration.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT CARD	CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS ADAPTER
0	Y 02A0	512		10	32	1 V24/V35 X21
1	Y 06A0	512		11	32	1 V24/V35 X21

SELECT A CARD 0, 1, 2, 3  
OR 9 TO EXIT TO MAIN MENU  
?

**DO YOU WANT TO TEST A CO-PROCESSOR ADAPTER SHOWN AS PRESENT ON THE DISPLAYED SCREEN?**

**Note:** A co-processor adapter is present if a “Y” appears in the second (Present) column.

**NO** Press **9**; then press Enter to terminate the diagnostics test.

**YES** Type the card number (0, 1, 2, or 3—displayed in the first column) of the adapter you want to test. Then press Enter and continue to the next page.

The message at the bottom of the screen is displayed. The co-processor adapter being tested is highlighted.

**Note:** If the test continues to run beyond 150 seconds, replace the co-processor adapter being tested.

IBM REALTIME INTERFACE CO-PROCESSOR AND X.25 INTERFACE CO-PROCESSOR									
PRESENT		CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS		
CARD								ADAPTER	
0	Y	02A0	512		10	32	1	V24/V35 X21	
1	Y	06A0	512		11	32	1	V24/V35 X21	

TESTS RUNNING. TAKES UP TO 150 SECONDS  
A B C D E F G H I J K L M  
\* 3F 3F \* \* \* \* \* \* \* \* \* \*

If an error code is displayed, record the card address and the error code; then go to page 4-12. Otherwise, continue on page 4-13.

## FRU and Error Code Table

Use the information in the following table to identify the failing FRU (field replaceable unit). Part numbers for FRUs are listed in “Service Parts” on page 4-22.

**Note:** Without manual intervention, the diagnostics take two or three minutes to run. If the diagnostic tests run for more than one minute for any routine, suspect a faulty base card.

Error Code Range	Replace
00–85	Base card
87–FF	Base card
86	Interface cable
LED (always On, always Off, or blinking) <sup>1</sup>	Base card
<b>Note:</b> <sup>1</sup> When the system is powered on, the LED should come on for a few seconds and then go off and remain off.	



## Interface Test

A screen similar to the following is displayed for the interface test.

IBM REALTIME INTERFACE CO-PROCESSOR AND X.25 INTERFACE CO-PROCESSOR								
PRESENT		CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS	
CARD							ADAPTER	
0	Y	02A0	512		10	32	0	V.24
							1	V.35
							2	X.21

EXTERNAL WRAP TESTS  
SELECT FROM THE PORTS COLUMN AN  
INTERFACE (0-2) TO BE TESTED  
OR PRESS 9 TO SKIP EXTERNAL WRAP TESTS?

**Note:** You can test the PCI co-processor adapter with or without the 37-pin wrap plug (shown in “Cables and Wrap Plugs” on page 4-23). The wrap plug lets you test the electrical interfaces.

## **DO YOU WANT TO TEST AN INTERFACE (V.24, V.35, OR X.21)?**

---

**Note:** You can test the PCI co-processor adapter with or without the 37-pin wrap plug (shown in “Cables and Wrap Plugs” on page 4-23). The wrap plug lets you test the electrical interfaces.

**NO** Press **9**; then press Enter and go to page 4-10.

**YES** Press one of the following numbers (displayed in the Ports column):

**0** to test the V.24 interface

**1** to test the V.35 interface.

**2** to test the X.21 interface.

Continue on page 4-14.

Questions will be displayed on your screen. Answer the questions and respond to the prompts.

If you are instructed to remove the cable and connect a wrap plug to the card, be sure you connect the interface co-processor wrap plug to the co-processor adapter being tested.

**Note:** The cable wrap plug connects to the cable only.

Do the following if you receive an error code:

1. Record the co-processor adapter card address.
2. Record the error code.
3. See page 4-12.

Otherwise, upon completion of the interface test, continue on the next page.

When the tests have completed for the interface being tested, the message at the bottom of the following screen is displayed.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT		CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS	
CARD							ADAPTER	
0	Y	02A0	512		10	32	0 1 2	V.24 V.35 X.21

INTERFACE X WAS JUST TESTED WITH NO ERRORS  
DO YOU WANT TO TEST ANOTHER INTERFACE  
(Y/N)?

**Note:** "Interface X" refers to the interface tested (V.24, V.35, or X.21).

#### **DO YOU WANT TO TEST ANOTHER INTERFACE?**

---

**NO** Press **N**; then press Enter. Go to page 4-10.

**YES** Press **Y**; then press Enter. Go to page 4-13.

#### **Co-Processor Adapter Not Recognized**

The message at the bottom of the screen will be displayed.

IBM REALTIME INTERFACE CO-PROCESSOR  
AND X.25 INTERFACE CO-PROCESSOR

PRESENT		CARD ADDR	STG SIZE KB	PWR ON ERR	L V L	B U S	PORTS	
CARD							ADAPTER	
0	Y	02A0	512		10	32	1	V24/V35 X21

ARE ALL REALTIME INTERFACE  
CO-PROCESSORS RECOGNIZED  
(Y/N)? N

IS THE UNRECOGNIZED CARD  
THE ONE YOU WANT TO TEST  
(Y/N)?

**Note:** An unrecognized co-processor adapter will not have an entry on the screen.

**DO YOU WANT TO TEST AN UNRECOGNIZED CO-PROCESSOR ADAPTER?**

---

**NO** Press **N**; then press Enter and go to page 4-8.

**YES** Set the Power switch on the system unit to Off. Continue to the next page.

Use the following steps if you have an unrecognized co-processor adapter.

1. Set the power switch on the system unit to Off, if you have not already done so.
2. Remove the covers to gain access to the unrecognized co-processor adapter.

3. Insert your copy of the *IBM Realtime Interface Co-Processor: Advanced Diagnostic* diskette into the diskette drive, if previously removed.
4. When the system is powered on (step 5), observe the yellow light emitting diode (LED) on the unrecognized co-processor adapter.  
**Note:** The LED should come on for a few seconds and then go off and remain off.
5. Set the Power switch on the system unit (and expansion unit, if attached) to On.
6. Respond to the screen prompts that brought you to the previous screen.

---

**IS THE LED NEVER “ON,” CONTINUOUSLY “ON,” OR BLINKING?**

---

**YES** Replace the co-processor adapter and rerun the PCI co-processor adapter diagnostics.

**NO** You have completed the problem-isolation procedures. Set the system unit's power switch to OFF.

If you still suspect a problem, check the entire system for loose or damaged connectors.

If you have followed these procedures and still have not solved the problem, request technical assistance.

---

**Removal and Replacement Procedures**

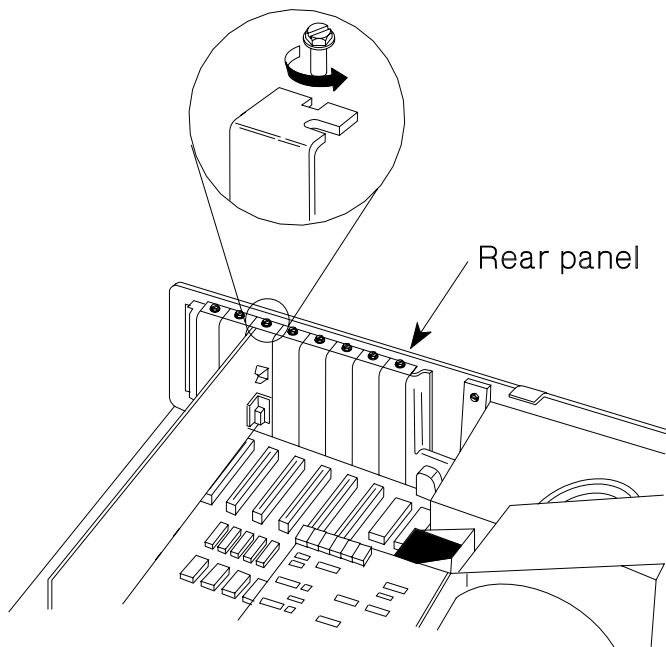
Use the procedures in this section to remove a failing co-processor adapter and to install a replacement.

## Co-Processor Adapter Removal

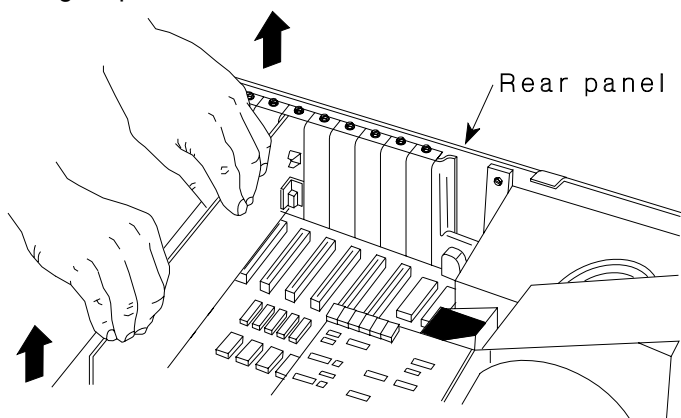
**Note:** The following steps are an example of co-processor adapter removal. For specific adapter removal instructions, consult your IBM Personal Computer Hardware Maintenance and Service book or your IBM Industrial Computer Maintenance Information manual for the computer you are servicing.

1. Set all power switches to Off.
2. Unplug the power cords from the wall outlets.
3. Remove the cable-retaining brackets from the rear of the system unit and display.
4. Disconnect all cables from the rear of the system unit.
5. Use a flat-blade screwdriver or 1/4-inch nutdriver to remove the cover mounting screws from the rear of the system unit.
6. Remove the system-unit cover.
7. Open the card retainer by loosening the screw.

8. Remove the co-processor adapter mounting screw.



9. Grasp the co-processor adapter by the top corners and lift straight up.



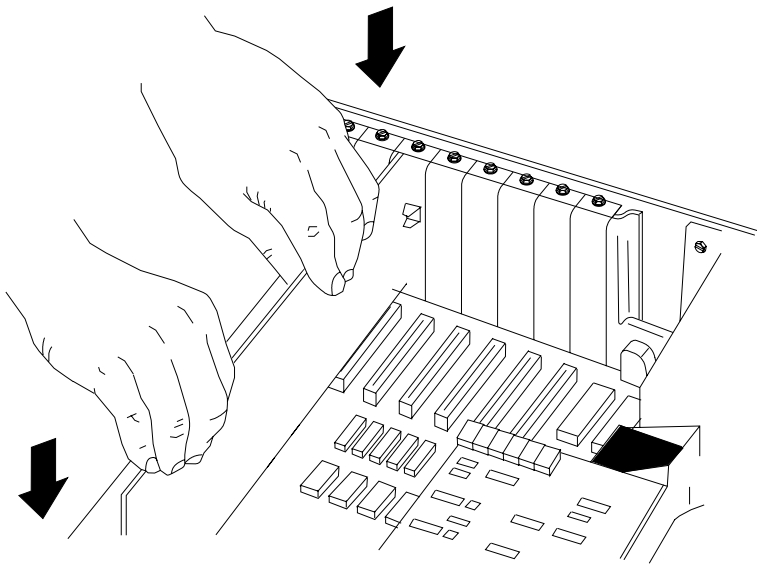
## Co-Processor Adapter Replacement

**Note:** The following steps are an example of co-processor adapter replacement. For specific adapter replacement instructions, consult your IBM Personal Computer Hardware Maintenance and Service book or your IBM Industrial Computer Maintenance Information manual for the computer you are servicing.

1. Make any necessary switch or jumper settings before installing the co-processor adapter.
2. Insert the co-processor adapter in an expansion slot.



3. Press down firmly on the co-processor adapter to seat the connector.

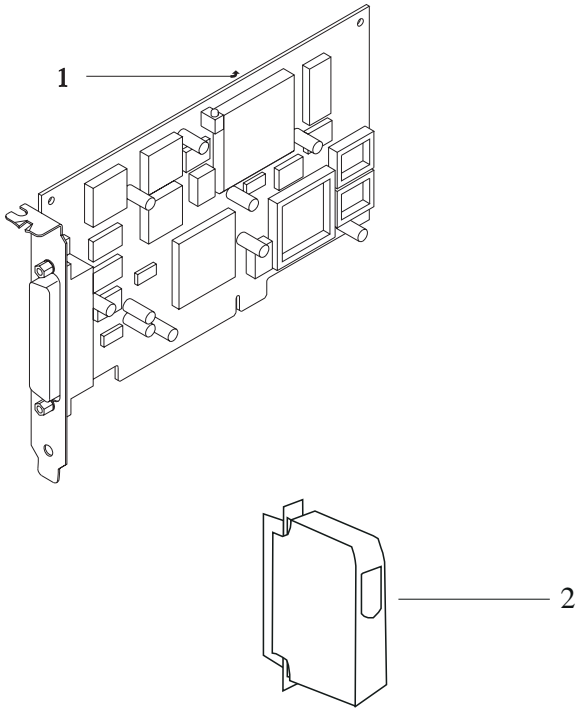


4. Install the co-processor adapter's mounting screw.
5. Install the system unit's cover.

---

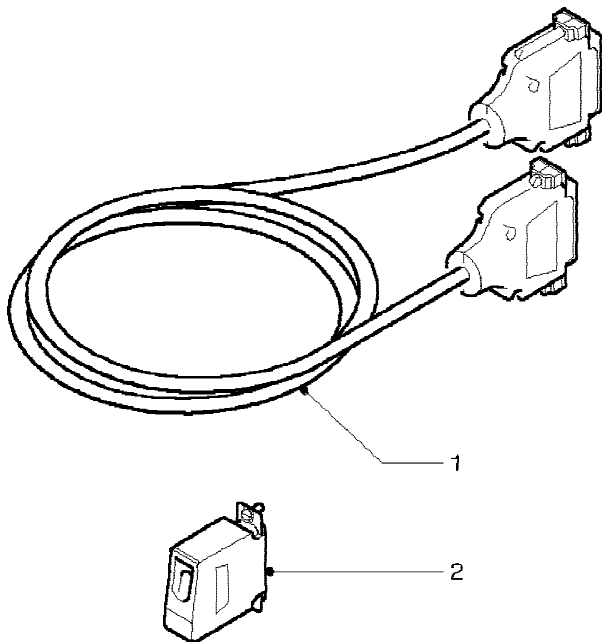
## Service Parts

### Assembly 1: PCI Co-Processor Adapter



Asm-Index	Part Number	Units	Description
1-1	55H4513	1	PCI co-processor adapter with memory
-2	16F1884	1	PCI co-processor adapter 37-pin Wrap Plug (P/N 07F3132)

## Assembly 2: Cables and Wrap Plugs



Asm-Index	Part Number	Units	Description
2-1	16F1887	1	Cable Option X.21 (P/N 07F3151)
-1	16F1888	1	Cable Option V.24 (P/N 07F3161)
-1	16F1889	1	Cable Option V.35 (P/N 07F3171)
-2	16F1890	1	Wrap Plug X.21 (P/N 07F3153)
-2	16F1891	1	Wrap Plug V.24 (P/N 07F3163)
-2	16F1861	1	Wrap Plug V.35 (P/N 07F3173)



---

## Appendix A. Special Configuration Information

**Note:**

This appendix contains special configuration information for DOS and OS/2. If you are using another operating system, see “Step 2. Download the Diagnostics and Operating System Support Programs” on page 2-5.

This appendix contains information about the following.

- Creating an ICAPARM.PRM file
  - Adding an entry to the ICAPARM.PRM file for the PCI co-processor adapter
  - Base I/O address considerations
- Changing your CONFIG.SYS file
- Ctrl+Alt+Del reset considerations
- Selecting an interrupt level for the PCI co-processor adapter
- Shared-memory considerations.

---

### Creating an ICAPARM.PRM File

After your software is installed, you can create a special parameter file (ICAPARM.PRM) to change the defaults for PCI co-processor adapter initialization. This is the same file used for the Realtime Interface Co-Processor Multiport and Multiport, Model 2 adapters. (For a detailed description of this file, refer to the *IBM Realtime Interface Co-Processor OS/2 Support: User's Guide* or the *IBM Realtime Interface Co-Processor DOS Support: User's Guide*.)

ICAPARM.PRM is a small file you create with a text editor and contains a single line of parameters for each Realtime Interface Co-Processor installed, including each PCI co-processor adapter. The following two examples—for one adapter installed and for multiple adapters installed—will work satisfactorily in most cases. All values are specified in hexadecimal (h).

## Adding an ICAPARM.PRM File Entry for the PCI Co-Processor Adapter

The only time you need to add an entry to the ICAPARM.PRM file for the PCI co-processor adapter is if you want to change the following standard hex default values. All other fields are ignored for the PCI co-processor adapter.

- MAXTASK (Maximum Task Number) = 10h
- MAXPRI (Maximum Task Priority) = 10h
- MAXQUEUE (Maximum Task Queue Number) = 50h
- MAXTIME (Maximum Task Timer Number) = 32h.

## Base I/O Address Considerations

The base I/O address for PCI adapters can present a problem for ICAPARM.PRM entries: the values are entirely up to the PCI BIOS. Since the lowest valid ARTIC I/O address prior to PCI is 02A0, the values 0000–00FFh are used to identify PCI adapters. The lowest nibble is divided further into two 4-bit fields. The upper 4 bits define which PCI adapter (=0 for ARTIC PCI); the lower 4 bits define a particular adapter instance. Therefore, the values 0000, 0001,... 000*n* represent physical PCI adapters 0 through *n*, where *n* corresponds to the index values for the adapter in the PCI BIOS Find Device call. Note, however, that the logical card numbering can be reversed by changing the order of physical ICAPARM.PRM entries. (“Example 2 — for Multiple Co-Processor Adapters” on page A-4 shows an example of this.)

## Example 1 — for One Co-Processor Adapter

The following example shows an ICAPARM.PRM file that can be used if you have one co-processor adapter installed in your system unit:

```
# 0000 00 00 10 10 10 10 0F E010 $
```

Field Number 1 2 3 4 5 6 7 8 9 10 11

### **Field**

#### **Number Description**

- |          |   |
|----------|---|
| <b>1</b> | Beginning-Record Delimiter. If a # is not present, the line will be treated as a comment.   |
| <b>2</b> | Logical card number of the PCI co-processor adapter. Range 00–FFh.  |
| <b>3</b> | Shared Memory Address, Meg value.<br>00 for the IBM ARTIC X.25 Interface Co-Processor PCI adapter<br>Range 00–0Fh for all other Intel 186 ARTIC adapters.<br>(See Field 4).   |
| <b>4</b> | Shared Memory Address, Page Value.<br>00 for the IBM ARTIC X.25 Interface Co-Processor PCI adapter<br>Range 60–6Fh for all other Intel 186 ARTIC adapters.<br>Used with Meg Value (Field 3) to define the shared memory window used by the adapter to communicate with the system unit. The Page Value is the memory offset in 8KB increments. A Meg Value of 00h and a Page Value of 60h gives a window address of C0000h. |
| <b>5</b> | Maximum Task Number on the adapter. Range 00–F8h; set to 10h.   |
| <b>6</b> | Maximum Task Priority. Range 01–FFh; set to 10h.  |
| <b>7</b> | Maximum Task Queue Number. Range 00–FEh; set to 10h.  |
| <b>8</b> | Maximum Task Timer Number. Range 00–FEh; set to 10h.  |

- 9 and 10** System Unit Address to call an adapter reset. Use the values shown: 0Fh, E010h. (Not supported on the PCI co-processor adapter.)
- 11** End-Record Delimiter. Value ';' or '\$'. If this is the last adapter in the ICAPARM file, set to '\$'; otherwise, set to ';'.

### Example 2 — for Multiple Co-Processor Adapters

The following example shows an ICAPARM.PRM file for 2 ISA and 2 PCI co-processor adapters in an ISA/PCI system:

```
# 0001 00 00 10 10 10 32 0F E010 ;
# 06A0 00 6F 20 20 20 20 0C E010 ;
# 0000 00 00 10 10 50 32 0F E010 ;
# 02A0 00 6E 10 10 50 32 0C E010 $
```

Field Number 1 2 3 4 5 6 7 8 9 10 11

In this example, the second physical PCI adapter has been assigned logical card 0, and the first physical PCI adapter has been assigned logical card 2. The other two adapters have been interspersed in logical card order.

**Note:** For an explanation of the fields, see the field descriptions under “Example 1 — for One Co-Processor Adapter” on page A-3.



---

## Changing Your CONFIG.SYS File

If OS/2 and Communications Manager/2 (CM/2) are being used, one line of the CONFIG.SYS file must be modified (using a text editor) to specify the location of the ICAPARM.PRM file. Change CONFIG.SYS as follows, but substitute your specific drive paths:

Change: `DEVICE=C:\CMLIB\ICARICIO.SYS`

To: `DEVICE=C:\CMLIB\ICARICIO.SYS C:\CMLIB\ICAPARM.PRM`

**Note:** Make this change after CM/2 is configured. Later, if CM/2 is configured again, do not have it replace the CONFIG.SYS file. However, if you must let CM/2 change CONFIG.SYS to add new devices, just edit CONFIG.SYS again to replace the ICAPARM.PRM parameter.

---

## Ctrl+Alt+Del Reset Considerations

The PCI co-processor adapter does not detect a Ctrl+Alt+Del reset operation.

---

## Selecting an Interrupt Level for the PCI Co-Processor Adapter

A Realtime Interface Co-Processor (ARTIC) adapter, which includes the PCI co-processor adapter, can be configured to operate on several hardware interrupt levels. An ARTIC adapter and its software can support shared interrupts. Note that even though some other hardware adapters support interrupt sharing, their supporting software does not. The interrupt level for the PCI co-processor adapter is assigned by PCI BIOS.



---

## **Appendix B. Notices**

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

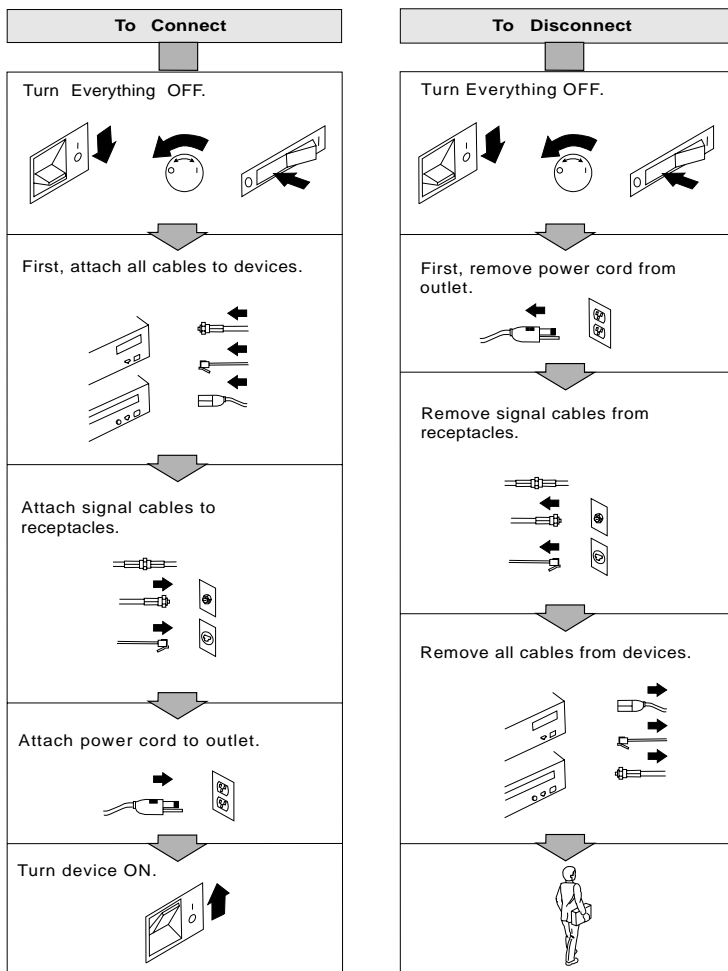
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IBM Corporation  
Purchase, NY 10577

## Safety Information



**DANGER:** Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving, or opening the covers of this product or attached devices.



Note: In the UK, by law, the telephone cable must be connected after the power cord.

Note: In the UK, by law, the power cord must be disconnected after the telephone line cable.

## Notice to United Kingdom Users

### The United Kingdom Telecommunications Act 1984

This apparatus is approved under General Approval number

NS/G/1234/J/100003

for indirect connections to public telecommunications systems in the United Kingdom.

It is a condition of approval that the current drawn by the total of all adapter cards installed within the Host environment, together with any auxiliary apparatus, does not exceed the power specification as stated in the Technical Reference Material of the host apparatus. Other usage will invalidate the approval of this adapter card if as a result it ceases to comply with safety requirements. The power requirements for the adapter are in "Specifications" on page 1-2.

To maintain the independent approval of this adapter, it is essential that other optional cards, not supplied by IBM, do not use mains voltages or any other excessive voltages. An excessive voltage is one that exceeds 42.4V peak ac or 60V dc. If you have any doubt, seek advice from a competent engineer before installing other adapters into the Host apparatus.

---

## **Required Electronic Emission and Connectivity Notices**

### **Class A Federal Communications Commission Statement**

#### **Federal Communications Commission (FCC) Statement**

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

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

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

## **Industry Canada Compliance Statement**

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

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

## **European Union (EU) Electromagnetic Compatibility Directive**

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.

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.

## **Germany**

### **Zulassungsbescheinigung laut Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995**

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

Der Aussteller der Konformitätserklärung ist die:

International Business Machines  
ARTIC Hardware Development  
P.O. Box 1328  
Boca Raton FL 33429-1328  
U.S.A.

Informationen in Hinsicht EMVG Paragraph 3, Abs. 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse A.
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EN 55022 Klasse A Geräte bedürfen folgender Hinweise:

Nach dem EMVG:

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

Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Nach der EN 55022:

"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."

Anmerkung:

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



## Japan

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in commercial and industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, and so on.

Read the instructions for correct handling.

## Korea

Please note that this device has been approved for business purpose with regard to electromagnetic interference. If you find this is not suitable for your use, you may exchange it for a non-business purpose one.

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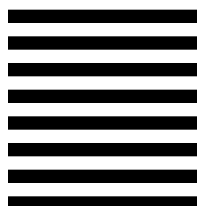
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