RadiSys ARTIC186 X.25 ISA/PCI Adapter

Guide to Operations

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

See *Safety Information* on page 36 before installing or removing an adapter.

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About this Guide

This book contains the following information for the RadiSys ARTIC186 X.25 ISA/PCI Adapter:

- Description of the adapter
- Installation requirements and instructions
- Jumper and switch setting information
- Adapter replacement procedures
- Problem determination procedures
- Optional cables and connector information
- Lists of replacement parts
- Configuration information

Who Should Read This Book

This book is written for an experienced computer operator or a person who sets up, uses, or programs the RadiSys ARTIC186 X.25 ISA/PCI Adapter with IBM-compatible computer products.

Guide contents

The following lists the contents of this Guide.

Chapter		Description
1	Product Description	Describes the features and function of the ISA/PCI Adapter, as well as the support programs and documentation.
2	Installation Requirements and Instructions	Provides information for hardware requirements and instructions for installing the adapters.
3	Replacing the Adapters	Describes how to remove a failing adapter and to install the replacement.
4	Troubleshooting	Lists step-by-step instructions that can help you determine if your adapter is operating properly.
5	Cables and Connectors	Describes the optional cable assemblies that are available for the ARTIC186 X.25 and the connector pin numbers and assignments.

Appendices

The appendices provide additional information about ARTIC186 X.25.

Appendix		Description
A	Configuring for DOS or OS/2 Environments	Includes special configuration information for DOS and OS/2 environments and information on selecting interrupts and shared memory addresses.
B	Notices	Lists notices related to availability of RadiSys products and contact information for license information.

Notational conventions

This manual uses the following conventions:

- The terms *adapter* or *adapters* in this publication refer to the RadiSys ARTIC186 X.25 ISA/PCI Adapter.
- `Screen text and syntax strings appear in this font.`
- All numbers are decimal unless otherwise stated.
- Bit 0 is the low-order bit. If a bit is set to 1, the associated description is true unless otherwise stated.


Notes indicate important information about the product.


Cautions indicate situations that may result in damage to data or the hardware.


Tips indicate alternate techniques or procedures that you can use to save time or better understand the product.


ESD cautions indicate situations that may cause damage to hardware via electro-static discharge.


The globe indicates a World Wide Web address.


Warnings indicate situations that may result in physical harm to you or the hardware.

Where to get more information

You can find out more about RadiSys ARTIC186 X.25 from these sources:

- Operating and installation documentation provided with your personal computer system.
- Reference, service, and diagnostic documentation available for your computer system.
- Operating system-specific information, for example DOS and Windows NT†.
- **World Wide Web**: RadiSys maintains an active site on the World Wide Web. The site contains current information about the company and locations of sales offices, new and existing products, contacts for sales, service, and technical support information. You can also send e-mail to RadiSys using the web site.


When sending e-mail for technical support, please include information about both the hardware and software, plus a detailed description of the problem, including how to reproduce it.

To access the RadiSys web site, enter this URL in your web browser:

`http://www.radisys.com`

Requests for sales, service, and technical support information receive prompt response.

- **Other**: If you purchased your RadiSys product from a third-party vendor, you can contact that vendor for service and support.

Contents

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1 Product Description

The adapters, with supporting software, can be installed in any ISA- or PCI-bus personal computer enabling the computer to perform a wide range of communication services..

The adapters cannot be installed in a PCI slot that supports spread spectrum.

This single port provides a full-duplex synchronous or asynchronous X.21, V.24, or V.35 interface at speeds up to 1.5 Mbps. Synchronous connection to a network is supported through an X.21 or X.21*bis* interface, using the appropriate cabling options.

The adapters have their own microprocessor and memory, which allows the adapter to perform communications functions independent of programs running on the computer.

Part Numbers

Service replacement parts are called field-replaceable units (FRUs). FRUs are ordered by their part numbers. The following lists the part numbers associated with the adapters. For the part numbers of optional components, see *RadiSys Options and Part Numbers* on page 21.

Table 1-1. Part Numbers

Description	Part Numbers
RadiSys ARTIC X.25 ISA Adapter	71G6458
RadiSys ARTIC X.25 PCI Adapter	55H4513
Miscellaneous parts kit (contains 2-position jumper)	53G0719

Features and Functions

The adapters provide:

- An 80C186 microprocessor
- 512 KB or 1 MB (selectable) dynamic random-access memory (RAM)
- 16 KB of read-only memory, providing power-on self-test and diagnostic functions
- A communications port that can, through optional cables, support the X.25 layer through one of the following interfaces:
  - X.21 up to 64,000 bps duplex
  - X.21 *bis*/V.24 (RS-232C) up to 19,200 bps duplex
  - X.21 *bis*/V.35 up to 56,000 bps duplex
- Automatic recognition of the selected interface cable

- Capacity for concurrent support of up to 250 virtual channels
- Multiple card installation capability
- Choice of installation in either a half-length ISA or a PCI slot

Optional Cables

For a listing of cable options offered by RadiSys for the adapters, see *Chapter 5, Cables and Connectors*. The interface requirements determine which cable option is needed.

Specifications

Physical

Table 1-2. Dimensions

Characteristic	Value
Length	174.7 millimeters (6.9 inches)
Width	17.8 millimeters (0.7 inches)
Height	106.7 millimeters (4.2 inches)

Environment

Table 1-3. Environment

Characteristic	State	Value
Air Temperature	Operating	1 to 52°C (33.8 to 125°F)
	Non-Operating	0 to 60°C (32 to 140°F)
Humidity	Operating	5% through 95%

Electrical

The following shows the power used by the base adapter.

Table 1-4. Electrical

Optimum Voltages	Maximum Current
+4.8 V dc to +5.25 V dc	0.95 A
–5.5 V dc to –4.5 V dc	0 mA
+11.3 V dc to +12.7 V dc	10 mA
–10.8 V dc to –13.2 V dc	16 mA

Manuals and Software Support

Manuals and software support (operating-system and diagnostic programs) are available for downloading at:

`http://www.radisys.com/support/artic/`

Installation Requirements and Instructions

2

This chapter provides the following information.

- Hardware requirements
- Instructions for installing the adapters.

Hardware Requirements

The adapters require the following hardware.

- A half-length, 16-bit ISA slot or a half-length, universal, 32-bit PCI slot. The adapters can be installed in any ISA- or PCI-compliant computer.

  - The adapters cannot be installed in a PCI slot that supports spread spectrum.
  - The FCC classification for this product might differ from the FCC classification stated in the manual that came with your system. Use the FCC classification for this product as the FCC classification for your computer.

- One of the following RadiSys ARTIC X.25 Interface Co-Processor electrical interface cables (described in *Chapter 5, Cables and Connectors*).
  - X.21-interface cable
  - V.24-interface cable (X.21*bis*)
  - V.35-interface cable (X.21*bis*)

Hardware Tools

- Medium-size flat-blade screwdriver
- Optional:
  - Medium screw-starter
  - 3/16-inch nutdriver
  - 1/4-inch nutdriver

Handling Static-Sensitive Devices

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

- Keep the adapter in its anti-static bag until you are ready to install it.
- 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 or removing an adapter. Always turn the computer off before removing an adapter from the system unit.
- Do not touch the printed circuit, connector pins, or components. Where possible, hold the adapter by its plastic end pieces or by its edges, but do not touch the metal edge connectors.
- Do not place the adapter on the system unit cover or on a metal table. The cover and metal table increase the risk of damage because they provide a discharge path from your body through the adapter.

Jumper and Switch Locations

The following figure shows the location of the adapter jumpers and switches.

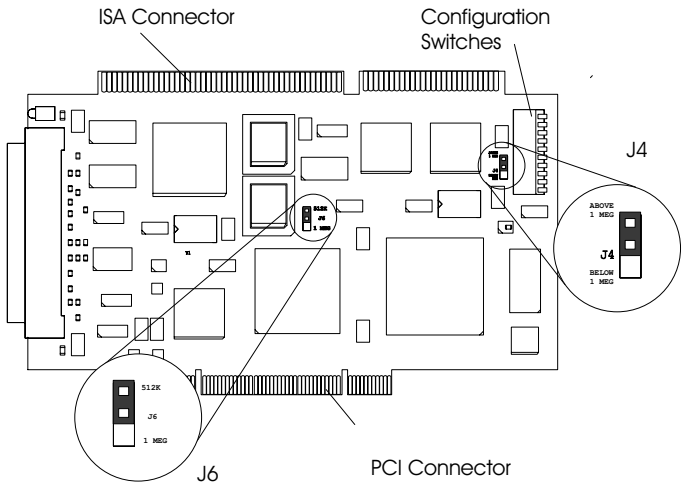


Figure 2-1. Adapter Locations

Installation

The process of installing the adapter consists of the following.

- Setting the jumpers (page 5)
- Setting the switches (page 6)
- Installing the adapter in the system unit (page 9)
- Downloading the operating system support and diagnostic programs (page 12)
- Connecting the optional cable (page 12)
- Installing the microcode and support programs (page 12)
- Setting up configuration files when your operating system is DOS or OS/2 (page 30).

Before You Begin

Review the procedures for handling static-sensitive devices (page 3).

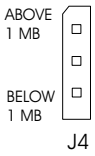
Setting the Load-Region Jumper

The adapters operate with a memory window in either of two memory regions: below 1 MB or above 1 MB. When the adapter is installed in a PCI slot, the load-region jumper must be set to the appropriate setting to identify which region to use.

When the adapter is installed in an ISA slot, the load-region jumper has no effect.

The operating system determines which window can be used. For example, DOS cannot directly access memory devices above 1 MB; however, OS/2†, Windows 98†, and Windows NT† operate in the protected mode and can access memory devices above 1 MB.

The following shows the setting of the load-region jumpers (J4) when the adapter is installed in a PCI slot.



Window below 1 MB: The adapter requests memory resources below 1 MB only. Use this setting if the computer is operating in a DOS environment. This is the factory setting.

Window above 1 MB: The adapter can use any available memory resource, below and above 1 MB. Use this setting for operating systems that operate in the protected mode (such as OS/2, Windows 98, or Windows NT).

Setting the Memory-Size Jumper

The adapters provide two on-card memory size selections; 512 KB and 1 MB.

The adapters are pre-set to 512 KB at the factory.

This jumper must be set to 512 KB to maintain compatibility with existing adapters. The 1 MB setting is useful where applications require more memory and are not concerned with compatibility issues.

The following shows the setting of the memory-size jumper (J6).

This 1 MB adapter memory setting is used only for unique user applications. Do not use this setting if the computer is operating with ARTIC software drivers.

This is the 512 KB factory setting that is used for most applications and pre-existing software drivers. Backward compatibility is maintained at this setting.

Setting the Option Switches

The adapters have a 10-switch configuration block (see Figure 2-1). Switch 4 selects the speed of the processor on the adapter.

The other nine switches select ISA configuration options when the adapter is installed in an ISA slot. When the adapter is installed in a PCI slot, make sure switch 9 is On and switch 10 is Off.

The following are the default switch settings.

	10 (BW)	9 (ED)	8 (C8)	7 (C4)	6 (C2)	5 (C1)	4 (SS)	3 (L4)	2 (L2)	1 (L1)
ISA	On	On	On	On	On	On	On	Off	On	On
PCI	Off	On	On	On	On	On	On	Off	On	On

Switch Number	Factory Setting (ISA Mode)	Factory Setting (PCI Mode)
10	8-bit data bus	16-bit data bus
9	Double-edge connector (16-bit ISA)	16-bit
8+7+6+5	Base address: 02A0h	No effect
4	Speed selector	Speed selector
3+2+1	IRQ 10	No effect

If your installation is using the preset values, proceed to *Installing the Adapters* on page 9.

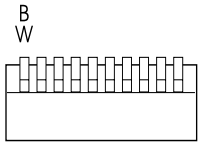
If your installation is not using the preset values, perform each of the following; then continue with *Installing the Adapters* on page 9.

- Setting the Bus Width
- Setting the ISA Connector Type
- Setting the Base I/O Address
- Setting the Speed Selector
- Setting the Interrupt Level

Setting the Bus Width

Switch 10 (BW) sets the width of the data bus. If the adapter is in an 8-bit ISA slot, the bus width must be 8 bits. If the adapter is in a 16-bit slot, the switch can be set to an 8-bit or 16-bit bus width, depending on your application.

When multiple RadiSys ARTIC adapters are installed in ISA slots in the same computer, each one must be set to the same data bus width.

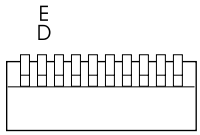


Switch 10 (BS)	Data Bus Width
On	8-bit data (default)
Off	16-bit data

Figure 2-2. Bus-Width Switch

Setting the ISA Connector Type

Switch 9 (ED) specifies the system ISA connector used with the adapter. The 8-bit ISA connector uses a single-edge connector; the 16-bit ISA connector uses a double-edge connector.



Switch 9 (ED)	Edge-Connector
On	Double-edge connector (default)
Off	Single-edge connector

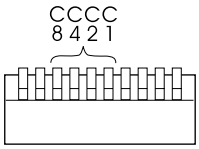
Figure 2-3. ISA Connector Type Switch

Setting the Base I/O Address

Switches 5 through 8 (C1, C2, C4, and C8) select the base I/O address. Each ISA adapter must have a unique I/O address to prevent resource conflicts.

Adapters installed in PCI slots are configured automatically and do not affect the settings for adapters installed in ISA slots.

Record the instance number of the adapter (the first adapter is instance 0) and the base address with the configuration information for your system. Use the lowest base address first.

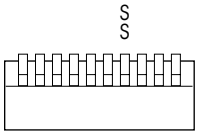


Switches				Base Address	Physical Card Designation
8 (C8)	7 (C4)	6 (C2)	5 (C1)		
On	On	On	On	02A0 (default)	0
On	On	On	Off	06A0	1
On	On	Off	On	0AA0	2
On	On	Off	Off	0EA0	3
On	Off	On	On	12A0	4
On	Off	On	Off	16A0	5
On	Off	Off	On	1AA0	6
On	Off	Off	Off	1EA0	7
Off	On	On	On	22A0	8
Off	On	On	Off	26A0	9
Off	On	Off	On	2AA0	10
Off	On	Off	Off	2EA0	11
Off	Off	On	On	32A0	12
Off	Off	On	Off	36A0	13
Off	Off	Off	On	3AA0	14
Off	Off	Off	Off	3EA0	15

Figure 2-4. Base I/O Address Switches

Setting the Speed Selector

Switch 4 (SS) controls the clock input to the processor on the adapter. When the switch is On, the processor uses a 7.37 MHz clock. When the switch is Off, the processor uses a 14.32 MHz clock.



Switch 4 (SS)	Processor Clock Selected
On	7.37 MHz clock (default)
Off	14.32 MHz clock Compatibility setting

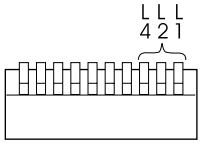
If the adapter is running applications that are sensitive to the speed of the processor (for example, applications using timing loops for program delays), make sure switch 4 is On.

Figure 2-5. Speed Selector Switch

Setting the Interrupt Level

Switches 1 through 3 (L1, L2, and L4) select the interrupt level used by the adapter when it is installed in an ISA expansion slot.

If you install more than one RadiSys ARTIC adapter in ISA slots, set them to the same interrupt level (the RadiSys ARTIC adapters are designed to share the interrupt level with other RadiSys ARTIC adapters).



Switches			Interrupt Level
3 (L4)	2 (L2)	1 (L1)	
On	On	On	3
On	On	Off	4
On	Off	On	7
On	Off	Off	9 (or 2)
Off	On	On	10 (default)
Off	On	Off	11
Off	Off	On	12
Off	Off	Off	15

Some software packages might require different interrupt levels.

Figure 2-6. Interrupt Level Switches

Installing the Adapters

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

To install the RadiSys ARTIC X.25 ISA/PCI Adapter:

1. Turn off the computer and all attached devices.
2. Disconnect the power cords from the wall outlets.
3. Disconnect all cables from the rear of the system unit.
4. Remove the system unit cover.
5. Locate an available expansion slot in your system unit..

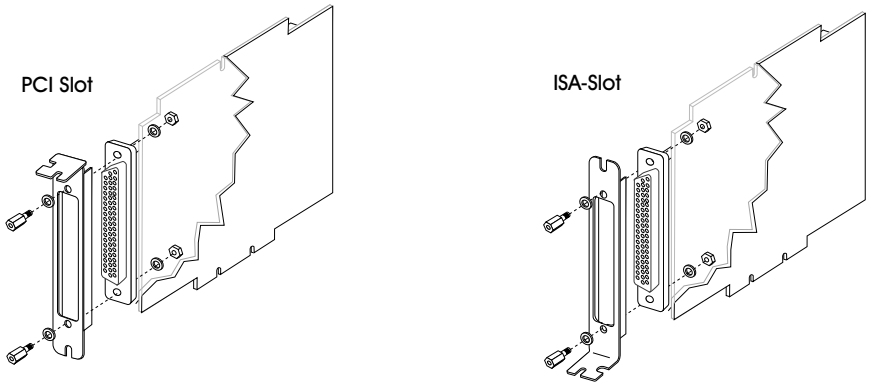
- If you are installing the adapter in a PCI slot and the operating system is DOS or OS/2, make sure the slot is on the primary bus (PCI bus 0). For Windows NT and Windows 98, the adapter can be installed in any available PCI slot.
- The adapters cannot be installed in a PCI slot that supports spread spectrum.

6. Use a screwdriver or nutdriver to remove the screw that holds the expansion-slot cover in place; then remove the expansion-slot cover.
7. With the adapter still wrapped in the anti-static bag, hold it 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, preventing an accidental static discharge.

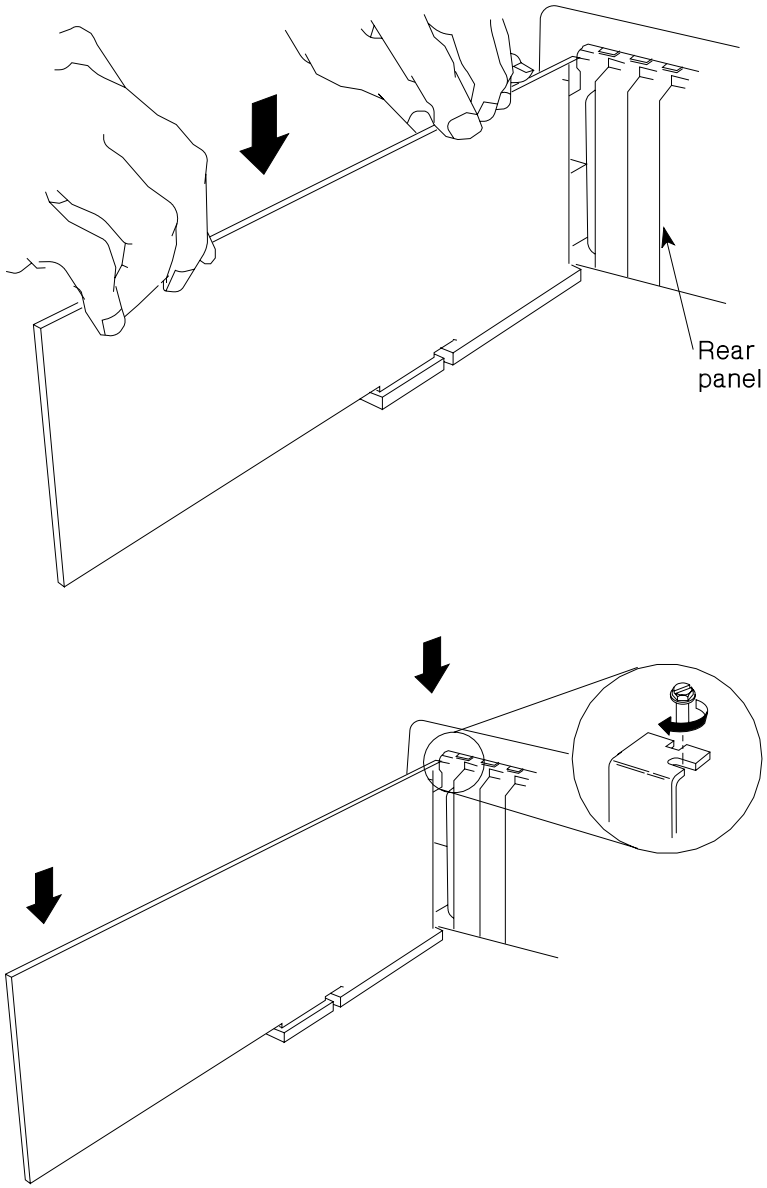
8. Carefully remove the adapter from the anti-static bag. Be sure to grasp circuit boards by the edges only; do not touch the component pins or solder joints.
9. The adapter can be installed in either a PCI or ISA expansion slot, and it is shipped with the adapter bracket already attached.

   Refer to the following figure to make sure the adapter bracket is attached correctly for the PCI or ISA expansion slot being used.

Adapter Bracket Installation



10. Hold the adapter by the top and firmly press it into the expansion slot.



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

Downloading the Diagnostics and Operating System Support Programs

Download the adapter diagnostic and operating-system support programs from:

`http://www.radisys.com/support/artic/`

- For telephone assistance, call: (561) 454-3200.
- For e-mail assistance, send to: artic@radisys.com.

Connecting the Cable

Use the following steps to connect your optional cable. Refer to *Chapter 5, Cables and Connectors* for a listing of RadiSys cable options and a description of cabling requirements..

Do not connect or handle the cables during a lightning storm.

1. Align the connector of the cable with the adapter connector at the rear of the system unit. It can attach to the connector only one way.
2. Firmly press the cable onto the 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 cable.

You have completed the installation of the adapter hardware; continue with *Installing the Microcode and Support Programs* on page 12.

Installing the Microcode and Support Programs

For instructions on installing the required software, see the documentation supplied with the software.

Setting Up for DOS or OS/2

For PCI Installations

If you installed the adapter in a PCI slot and you are running DOS or OS/2, make sure the slot is on the primary bus (PCI bus 0) and that the slot does not support spread spectrum.

If you installed the adapter in a computer that is running DOS or OS/2, you might need to change or create some system files to make sure the adapter operates properly.

For ISA Installation

If you installed the adapter in an ISA slot, you must create an entry in a parameter file.

Go to *Appendix A, Configuring for DOS or OS/2 Environments*.

For PCI Installation

If you installed the adapter in a PCI slot, you do not need to create an entry in a parameter file unless you want to change one of the following adapter parameters.

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

To change the default parameters, go to *Appendix A, Configuring for DOS or OS/2 Environments*.

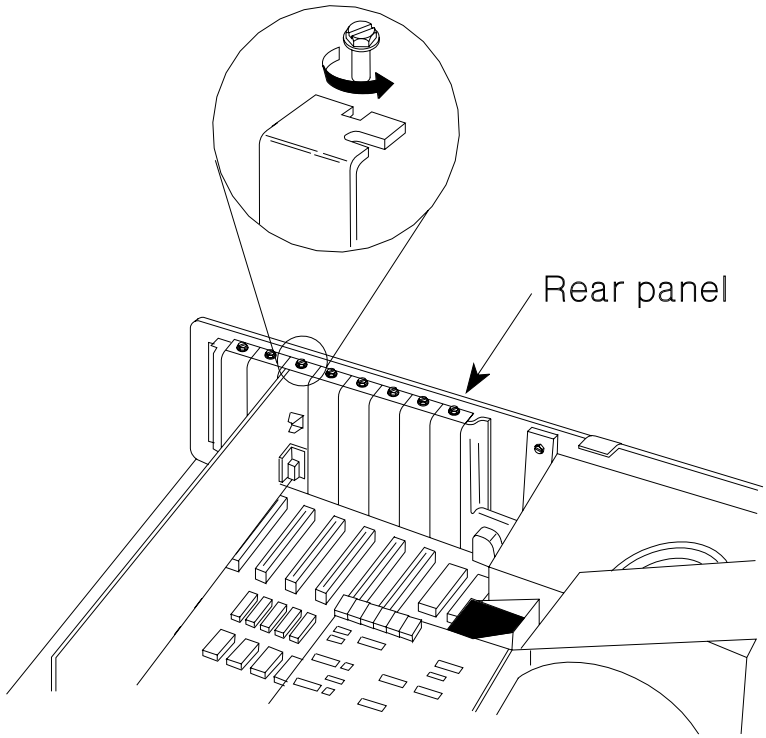
3 Replacing the Adapters

Use these procedures to remove a failing adapter and to install the replacement.

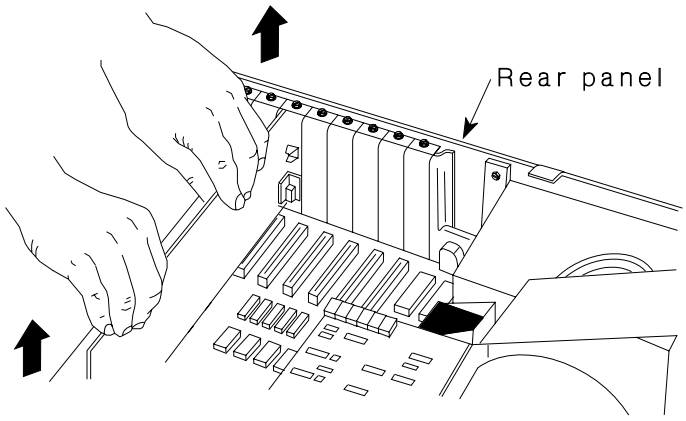
Removing the Adapter

For instructions specific to your computer, refer to the hardware and service information that came with your computer.

1. Turn off the computer.
2. Disconnect the power cords from the electrical outlets.
3. Disconnect all cables from the rear of the system unit.
4. Remove the system unit cover.
5. Open the card retainer by loosening the screw.
6. Remove the adapter retaining screw.



7. Grasp the adapter by the top corners and lift straight up.



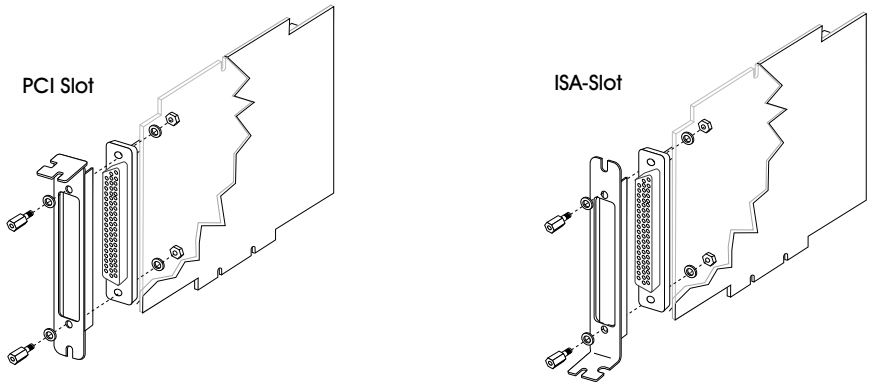
Installing a New Adapter

The following are general adapter replacement steps. For instructions specific to your computer, refer to the hardware and service information that came with your computer.

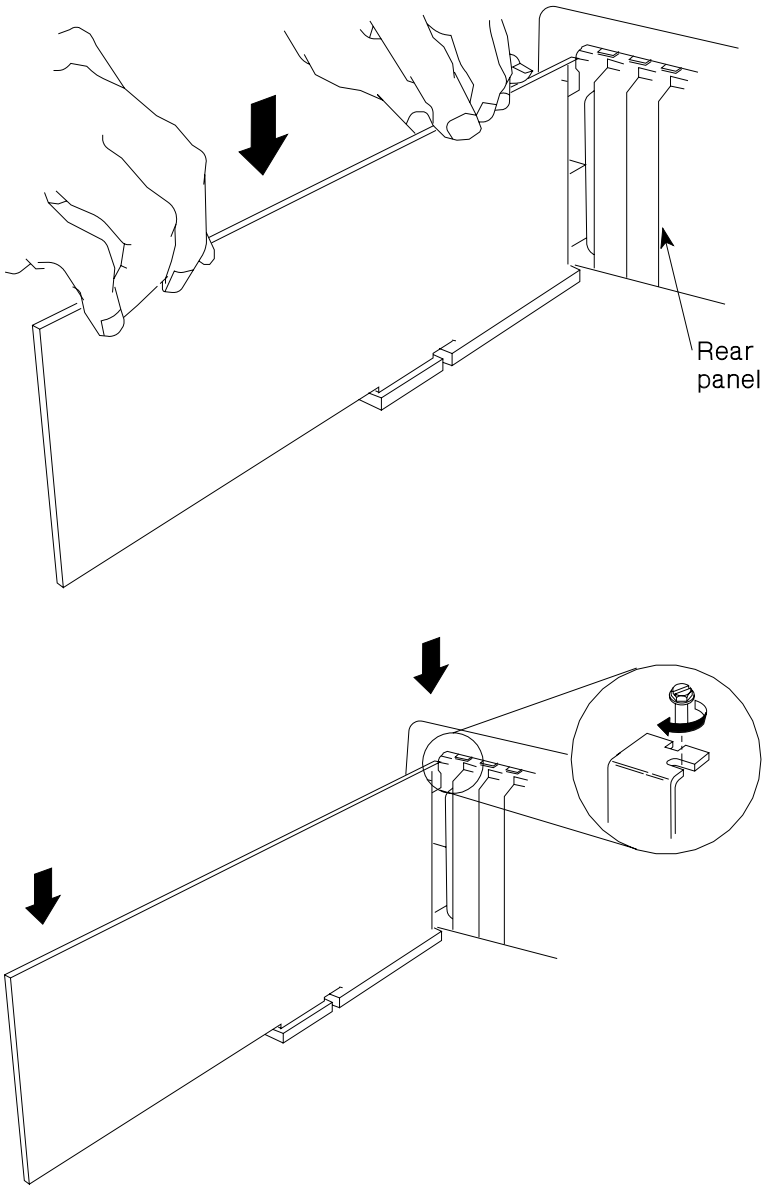
To install a new adapter:

1. Set the jumpers and switches on the new adapter to match the adapter you are replacing.
2. Refer to the following figure to make sure the adapter bracket is attached correctly for the PCI or ISA expansion slot being used.

Adapter Bracket Installation



3. Hold the adapter by the top, insert it into the expansion slot, and press it firmly into place.



4. Align the slot in the card-retaining bracket with the hole in the rear panel of the system unit.
5. Insert and tighten the screw to secure the card-retaining bracket to the rear panel of the system unit.
6. Reinstall the system unit cover.
7. Reconnect all cables previously removed from the system unit.
8. Reconnect all power cords into electrical outlets.

4 Troubleshooting

This chapter contains step-by-step instructions that can help you determine if your adapter is operating properly.

- To test the adapter, refer to the diagnostic information. A text file (ICADIAG.TXT) containing the instructions is part of the diagnostic packages on the Web.
- For part numbers associated with the adapters, see *Part Numbers* on page 1. For part numbers of options used with the adapters, see *RadiSys Options and Part Numbers* on page 21.

If you suspect you have a problem, do the following.

1. Check the following:
   - Cable connections between devices
   - Cable connections between devices and wall outlets
   - Wall outlet condition
2. Perform the diagnostic tests.

Problem Determination

For system testing information, refer to the documentation supplied with your computer.

If you performed the diagnostic tests because of a suspected communications problem and the diagnostic program completed the testing without indicating an error, check the following:

- The computer or device at the other end (make sure that it is operating properly)
- Any intermediate communication device, such as a modem
- The communication cable

If you are unsure of a problem area, perform the system-unit diagnostics first before proceeding with the RadiSys ARTIC diagnostics.

Diagnostic Wrap Plugs

Diagnostic wrap tests are performed at the connector on the adapter and at the connector on the end of the cable. The diagnostic program prompts you when to install the wrap plug.

The wrap plug needed for the cable wrap test depends on the cable option. For wrap-plug part numbers, see *RadiSys Options and Part Numbers* on page 21.

5 Cables and Connectors

This chapter contains cable and connector information.

Cable Information

The following RadiSys ARTIC X.25 Interface Co-Processor cables are available as options:

- Option X.21

  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.

- Option V.24 (X.21*bis*)

  The V.24 cable is 3 meters (9.9 feet) long. It has a 37-pin female connector at the adapter end and a 25-pin male connector at the other end.

- Option V.35 (X.21*bis*)

  The V.35 cable is 3 meters (9.9 feet) long.

  It has a 37-pin female connector at the adapter end and a 34-pin male connector at the other end.

RadiSys Options and Part Numbers

Table 5-1 shows the cable options and wrap plugs associated with each interface.

The cables have two part numbers: a feature part number and a field-replaceable unit (FRU) part number. Use the feature part number when first ordering the option; use the FRU part number when ordering the part as a service replacement.

Cable options (feature part number) usually include the cable wrap plug. However, the wrap plug for the connector on the adapter must be ordered separately.

Table 5-1. Option Part Numbers

	Part Number		
Description	**FRU**	**Feature**	**Wrap Plug**
X.21 Cable	16F1887	16F1865	16F1890
V.24 Cable	16F1888	16F1869	16F1891
V.35 Cable	16F1889	16F1871	16F1861

Pin Numbering and Signal Assignments

X.21 Connector

The following shows pin numbering and signal assignments for the 37-pin, D-shell, female connector and the 15-pin, D-shell, male connector on the X.21 (non-switched) adapter cable.

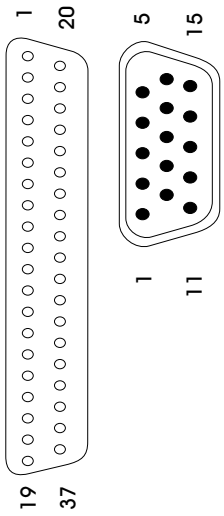


Table 5-1. X.21 Interface Connector

	Connector	
Signal Name	**37-Pin**	**15-Pin**
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

V.24 Connector

The following shows pin numbering and signal assignments for the 37-pin, D-shell, female connector and the 25-pin, D-shell, male connector on the V.24 cable.

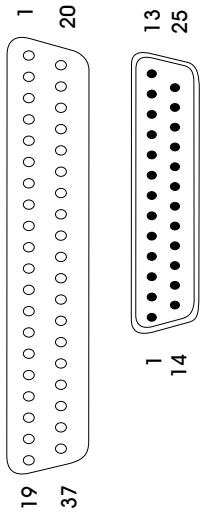


Table 5-2. V.24 Interface Connector

	Connector	
Signal Name	**37-Pin**	**15-Pin**
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

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

V.35 Connector

The following shows pin numbering and signal assignments for the 37-pin, D-shell, female connector and the 34-pin male connector on the V.35 cable.

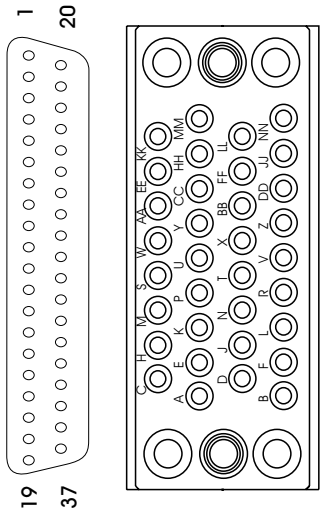


Table 5-3. V.35 Interface Connector

	Connector	
Signal Name	**37-Pin**	**34-Pin**
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

Cabling Recommendations

The following cabling recommendations apply to any cables designed for use with the RadiSys ARTIC X.25 ISA Adapter. Correct operation of any interface depends on several factors that must be considered when making the cable:

- Unshielded twisted-pair wire might be adequate for some low-noise installations; however, shielded twisted-pair wire is recommended for most installations.
- In areas of high electrical noise, shielded twisted-pair cable should be used to increase noise immunity. Shielded twisted-pair cable also helps eliminate interference from the base adapter.
- The shield should be connected to the metal housing on the D-shell connectors to provide a low-impedance path to ground for noise.
- The maximum cable lengths supported for the various communications protocols are:

Protocol	Length (meters)	Length (feet)
X.21	122	400
V.24	15.2	50*
V.35	15.2	50

* At 19 kbps the maximum capacitance of the cable cannot exceed 120 pF. This might limit cable length.

Physical Characteristics

Typical physical characteristics for cables are listed below. Consult cable manufacturer catalogs for more information.

- 24 AWG, copper conductor, twisted-pair telephone cable, approximately 120-ohms impedance
- DC resistance (single conductor), 23.7 ohms/1000 meters
- Shunt capacitance, 16 pF/foot

Configuring for DOS or OS/2 Environments

A

This appendix contains special configuration information for DOS and OS/2 environments and information on selecting interrupts and shared memory addresses. If you are using another operating system, refer to the information that came with the operating-system support programs that you downloaded from the Web.

If you installed the adapter in a computer running DOS or OS/2, you might need to create or change some system files to make sure the adapter operates properly. If you answer *yes* to either of the following questions, continue with the instructions in this appendix. Otherwise, you have completed the installation.

- Did you install the adapter in an ISA slot?
- If you installed the adapter in a PCI slot, do you want to change one of the following?
  - MAXTASK (Maximum Task Number) = 10h
  - MAXPRI (Maximum Task Priority) = 10h
  - MAXQUEUE (Maximum Task Queue Number) = 50h
  - MAXTIME (Maximum Task Timer Number) = 32h

Considerations Before Beginning

Review the following sections before beginning configuration in *Configuring the Adapter for DOS or OS/2* on page 30.

ICAPARM.PRM File

The ICAPARM.PRM file is a simple text file that defines the ARTIC adapters to the ARTIC support programs and the operating system. It is located in the same directory in which you installed the support programs (for OS/2 with Communications Manager/2 (CM/2), the file is in the CMLIB directory).

The file is not created or modified by any installation programs. If you need to add an entry, you must edit the file manually.

You can create or edit the file using any editor that can create a plain ASCII file (such as the system editors that come with DOS and OS/2).

ISA Logical Card Considerations

The base I/O address for the ISA adapter is set through the configuration switches (see page *Setting the Base I/O Address* on page 7). However, you can change the logical-card numbering of an ISA adapter by changing the relative position of its entry in

ICAPARM.PRM. The last entry has the highest logical card number. Refer to *Multiple RadiSys ARTIC Adapters Considerations* on page 29 for information.

The entries for ISA adapters must occur after any entries for PCI adapters.

Interrupt Level Considerations

When the adapter is installed in an ISA slot, it can be configured to operate on one of several hardware interrupt levels.

- For optimal performance, each RadiSys ARTIC adapter installed in an ISA slot should have its own unique interrupt level.
- If that is not practical, place all ARTIC co-processor adapters on a single, shared interrupt level.
- If neither of the preceding configurations is available, choose an interrupt level that can be shared with a non-ARTIC adapter.

Although the hardware on non-ARTIC adapters might allow interrupt sharing, the supporting software might not.

To assist in selecting an interrupt level for the adapter, the following lists some standard devices and the interrupt levels (IRQ) typically assigned. These values might not apply to all computers.

Table 5-2. Devices and Their Typical Interrupt Levels

Device	Interrupt Level
System timer	IRQ 0
Keyboard	IRQ 1
DCC/2 interrupt control[1]	IRQ 2
3270 Connection adapter	IRQ 2
Token Ring adapter[4]	IRQ 2 or 3
PC Network adapter	IRQ 2 or 3
Alternate serial port (COM2-COM8)	IRQ 3
Multi-protocol adapter	IRQ 3 or 4 (3 and 4 in synchronous modes)
3363 optical disk adapter	IRQ 3, 7, 10 or 11
Primary serial port (COM1)	IRQ 4
Disk[1]	IRQ 14
Disk[2]	IRQ 5
Alternate parallel port[1]	IRQ 5
Diskette	IRQ 6
Streaming tape adapter	IRQ 6
Primary parallel port	IRQ 7[5]
3119 adapter/A	IRQ 7
High-speed adapter/A	IRQ 7
3117 scanner adapter/A	IRQ 7
Realtime clock[1]	IRQ 8
Auxiliary device (mouse)[1,3]	IRQ 12
Math co-processor exception[1]	IRQ 13

1 80286 or above system only

2 8088 systems only

3 In ISA-bus machines, the auxiliary pointing device (mouse port) cannot share interrupts with an adapter.

4 ISA-bus machines

5 Many printers are polled rather than interrupt driven.

Multiple RadiSys ARTIC Adapters Considerations

For installation with multiple RadiSys ARTIC co-processor adapters, you might need to make more than one entry in the ICAPARM.PRM file. Consider the following rules when modifying or adding entries for an adapter.

- Each ISA adapter must have an entry.
- PCI adapters do not require an entry unless you are changing a parameter default.
- If present, entries for PCI adapters must occur before any entries for ISA adapters.

- For ISA adapters, changing the relative position of its entry in the ICAPARM.PRM file changes the logical-card numbering of the adapter.
- For PCI adapters, the logical card number is fixed and matches its physical card number.
- The last entry has the highest logical card number.

Example of Entries for Multiple Adapters

The following example shows an ICAPARM.PRM file for a computer with two ISA and two PCI adapters installed. (For an explanation of the fields, see the field descriptions under *Adding an ISA Adapter Entry* on page 31 or *Adding a PCI Adapter Entry* on page 32.)

```
Field Number  1   2    3   4   5   6   7   8   9   10    11
              #  0001  00  00  10  10  10  32  0F  E010  ;
              #  06A0  00  6F  20  20  20  20  0F  E010  ;
              #  02A0  00  6E  10  10  50  32  0F  E010  $
```

In this example, four adapters are installed. The first PCI adapter uses the default values and does not have an entry. The two PCI adapters (physical card 0000 and 0001) are assigned to logical card 0 and 1, respectively. The ISA adapter at address 06A0 is assigned to logical card 2, and the ISA adapter at address 02A0 is assigned to logical card 3.

Configuring the Adapter for DOS or OS/2

The following sections contain important adapter configuration information based on the operating system being used.

Creating an ICAPARM.PRM File for DOS or OS/2

If the ICAPARM.PRM file does not exist, create the file in the appropriate directory as follows.

- For OS/2 with CM/2: C:
- For DOS and OS/2 without CM/2: C:*your_artic_dir*

Editing the ICAPARM.PRM File for the DOS Environment

Depending on whether you install the adapter in an ISA or a PCI slot, refer to the appropriate section for instructions.

- If you install the adapter in an ISA slot, go to *Adding an ISA Adapter Entry* on page 31.
- If you install the adapter in a PCI slot, go to *Adding a PCI Adapter Entry* on page 32.

When you are finished, save the file.

Editing the ICAPARM.PRM File for the OS/2 Environment

1. If you are using OS/2 you will need to modify a DEVICE statement in the CONFIG.SYS file.

   If You Are Using OS/2 Without CM/2

   Make the following change to the CONFIG.SYS file and save the file:

   Change:

   ```
   DEVICE=C:\your_artic_dir\ICARICIO.SYS
   ```

   To:

   ```
   DEVICE=C:\your_artic_dir\ICARICIO.SYS
   C:\your_artic_dir\ICAPARM.PRM
   ```

   If You Are Using OS/2 With CM/2

   Do the following:

   A. Install CM/2. (CM/2 must be installed before performing step b. If it is not installed first, the install program will undo your change to the CONFIG.SYS file.)

   B. After the CM/2 installation completes, make the following change to the CONFIG.SYS file and save the file.

      Change:

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

      To:

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

   If CM/2 is reconfigured, you must change CONFIG.SYS again.

2. Depending on whether you install the adapter in an ISA or a PCI slot, refer to the appropriate section for instructions.

   - If you install the adapter in an ISA slot, go to *Adding an ISA Adapter Entry* on page 31.
   - If you install the adapter in a PCI slot, go to *Adding a PCI Adapter Entry* on page 32.

3. When you are finished, save the file.

Adding an ISA Adapter Entry

When you install the adapter in an ISA slot, you must create an entry in the parameter file (ICAPARM.PRM) to select how the system will initialize the adapter.

Example of an Entry for a Single ISA Adapter

The following example shows an ICAPARM.PRM file you can use when a single ISA ARTIC adapter is installed in your computer.

```
Field Number  1   2    3   4   5   6   7   8   9   10    11
              #  02A0  00  60  10  10  10  10  0F  E010  $
```

Field Number	Description
1	Beginning-Record Delimiter. The number symbol (#) denotes the start of a parameter line. If the '#' is not present, the line will be treated as a comment.
2	Base I/O Address of the adapter. Range 02A0–3EA0h in 400h (1 KB) increments. This value must match the address selected in the configuration switches.
3	Shared Memory Address, Meg value. Range 00–0Fh. The support programs only support a value of 00h. (See Field 4).
4	Shared Memory Address, Page Value. Range 60–6Fh. Used with Meg Value (Field 3) to define the shared memory window used by the adapter to communicate with the system. The Page Value is the memory offset in 8 KB increments. Table 5-3 shows the address selection for each Page Value.

Table 5-3. Page Value to Memory Address Assignment

Page Value	Address Range	Page Value	Address Range
60	C0000-C1FFF	68	D0000-D1FFF
61	C2000-C3FFF	69	D2000-D3FFF
62	C4000-C5FFF	6A	D4000-D5FFF
63	C6000-C7FFF	6B	D6000-D7FFF
64	C8000-C9FFF	6C	D8000-D9FFF
65	CA000-C9FFF	6D	DA000-D9FFF
66	CC000-C9FFF	6E	DC000-D9FFF
67	CE000-CFFFF	6F	DE000-DFFFF

5	Maximum Task Number on the adapter. Range 00–F8h; the default is 10h.
6	Maximum Task Priority. Range 01–FFh; the default is 10h.
7	Maximum Task Queue Number. Range 00–FEh; the default is 50h.
8	Maximum Task Timer Number. Range 00–FEh; the default is 32h.
9 and 10	System Memory Address to invoke an adapter reset after a soft reset of the system (Ctrl+Alt+Del keys). • If you want the adapter to reset after Ctrl+Alt+Del, use 0Fh E010h • If you want the adapter to continue to operate without resetting after Ctrl+Alt+Del, use 00h 0000h
11	End-Record Delimiter. Value ";" or "$". If this is the last entry, set it to "$"; otherwise set it to ";" and refer to *Multiple RadiSys ARTIC Adapters Considerations* on page 29.

Adding a PCI Adapter Entry

PCI adapters do not require an entry in ICAPARM.PRM. They use the default values unless specified otherwise. However, if you are changing a default value, all entries for PCI adapters must occur before entries for ISA adapters.

PCI Physical Card Number Considerations

The base I/O address for the ISA adapter is set through the configuration switches. However, the PCI adapter is identified through its physical card number.

The physical card number is a 16-bit number, represented as four hexadecimal characters. The first byte is 00h. The second byte is divided into two 4-bit fields. The upper four bits define the type of PCI adapter (0 is for ARTIC adapter); the lower four bits define the particular instance of the adapter (0 is the first instance). Therefore, the values 0000, 0001,... 000*n* represent physical PCI adapters 0 through *n*, where *n* corresponds to the index value for the adapter in the PCI BIOS Find Device call.

For PCI adapters, the logical card number is set to the same number as its physical card number, regardless of its entry position in the ICAPARM file. For more information on logical card numbering, refer to *Multiple RadiSys ARTIC Adapters Considerations* on page 29.

Example of an Entry for a Single PCI Adapter

The following example shows an ICAPARM.PRM file you can use when a single PCI ARTIC adapter is installed in your computer.

```
Field Number  1   2     3   4   5   6   7   8   9   10    11
              #  0000   00  00  10  10  10  10  0F  E010  $
```

Field Number	Description
1	Beginning-Record Delimiter. The number symbol (#) denotes the start of a parameter line. If a # is not present, the line is treated as a comment.
2	Physical card number of the adapter. The range is 0000–000Fh. This number represents the instance of the adapter. For more information, see *PCI Physical Card Number Considerations* on page 33.
3	Shared Memory Address, Meg Value. For PCI adapters, this field is used as a positional value only; it does not affect adapter configuration. Set to 00h.
4	Shared Memory Address, Page Value. For PCI adapters, this field is used as a positional value only; it does not affect adapter configuration. Set to 00h.
5	Maximum Task Number on the adapter. Range 00–F8h; default is 10h.
6	Maximum Task Priority. Range 01–FFh; default is 10h.
7	Maximum Task Queue Number. Range 00–FEh; default is 50h.
8	Maximum Task Timer Number. Range 00–FEh; default is 32h.
9 and 10	System Memory Address to invoke an adapter reset after a soft reset of the system (Ctrl+Alt+Del keys). For PCI adapters, this field does not control the adapter reset; the hardware determines how the adapter reacts to a soft reset.
11	End-Record Delimiter. Value ';' or '$'. If this is the last adapter in the ICAPARM file, set it to '$'; otherwise, set it to ';' and refer to *Multiple RadiSys ARTIC Adapters Considerations* on page 29.

Notices

B

This appendix includes the notices listed in the table below.

When reading this file online, you can immediately view any notice by placing the mouse cursor over a notice name and clicking.

General Conditions

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RadiSys Corporation
5445 NE Dawson Creek Drive
Hillsboro, OR 97124
(561) 454-3200

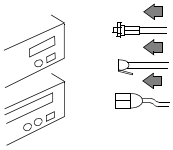
Safety Information

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 covrs of this product or attached devices.

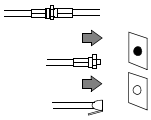
To connect:

Turn everything OFF

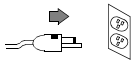
First, attach all cables to devices.



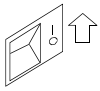
Attach signal cables to receptacles



Attach power cord to outlet.



Turn device ON.

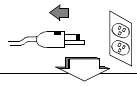


In the UK, by law, the telphone cable must be connected *after* the power cord.

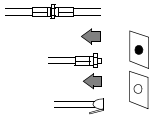
To disconnect:

Turn everything OFF

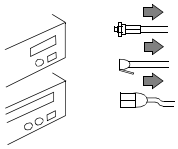
First, remove power cord from outlet.



Remove signal cables from receptacles.



Remove all cables from devices.



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

Required Electronic Emission and Connectivity Notices

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. RadiSys 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 complies with the Canadian ICES-003.

Cet appareil numérque de la classe A conform à la norme NMB-003 du Canada.

United Kingdom

Notice to United Kingdom Users

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

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.

RadiSys 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-RadiSys option cards.

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

Attention

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

If the Ethernet port is connected, 100 ohm category 5 shielded twisted-pair Ethernet cable must be used to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment.

RadiSys cannot accept responsibility for any interference caused by other-than-recommended cables and connectors.

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:

ARTIC Hardware Development
5445 NE Dawson Creek Drive
Hillsboro, OR 97124

Informationen in Hinsicht EMVG Paragraph 3, Abs. 2:

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

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.

Japanese Voluntary Control Council for Interference (VCCI) Statement

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

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