X.25 Interface Co-Processor

Guide to Operations

X.25 Interface Co-Processor

Guide to Operations

IBM

Safety

Refer to the Connect/Disconnect Sequence Diagram for Cables on page vi before installing or removing an Adapter.

Note!

Before using this information and the product that it supports, be sure to read the information under “Notices,” starting on page ix.

First Edition (February 1994)

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) described in this publication at any time.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

A form for readers' comments appears at the back of this publication. If the form has been removed, address your comments to:

IBM Corporation
Department 27X
P. O. Box 1328
Boca Raton, Florida 33429-1328 U.S.A.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

International Business Machines Corporation Armonk, New York, 10504

Statement of Limited Warranty (Machine)

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or an IBM authorized reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Machines are subject to these terms only if purchased in the United States or Puerto Rico, or Canada, and located in the country of purchase. If you have any questions, contact IBM or your reseller.

Machine: IBM X.25 Interface Co-Processor

Warranty Period*: This Feature assumes the Warranty period of the IBM host in which it is installed. For all other conditions, the Warranty period is one year.

**Elements and accessories are warranted for three months. Contact your place of purchase for warranty service information.*

Production Status

Each Machine is manufactured from new parts, or new and serviceable used parts (which perform like new parts). In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

The IBM Warranty

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. IBM calculates the expiration of the warranty period from the Machine's Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period, IBM or your reseller will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine. IBM or your reseller will specify the type of service.

For a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Some of these transactions (called "Net-Priced" transactions) may include additional parts and associated replacement parts that are provided on an exchange basis. All removed parts become the property of IBM and must be returned to IBM.

Replacement parts assume the remaining warranty of the parts they replace.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair or replace it (with a Machine that is at least functionally equivalent) without charge. If IBM or your reseller is unable to do so, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user.

Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-IBM-SERV (426-7378)**. In Canada, call IBM at **1-800-465-6666**. You may be required to present proof of purchase.

Depending on the Machine, the service may be 1) a “Repair” service at your location (called “On-site”) or at one of IBM's or a reseller's service locations (called “Carry-in”) or 2) an “Exchange” service, either On-site or Carry-in.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced.

It is your responsibility to:

1. obtain authorization from the owner (for example, your lessor) to have IBM or your reseller service a Machine that you do not own;
2. where applicable, before service is provided —
   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
   b. secure all programs, data, and funds contained in a Machine,
   c. inform IBM or your reseller of changes in a Machine's location, and
   d. for a Machine with exchange service, remove all features, parts, options, alterations, and attachments not under warranty service. Also, the Machine must be free of any legal obligations or restrictions that prevent its exchange; and
3. be responsible for loss of, or damage to, a Machine in transit when you are responsible for the transportation charges.

Extent of Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible may void the warranties.

THESE WARRANTIES REPLACE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. HOWEVER, SOME LAWS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES. IF

THESE LAWS APPLY, THEN ALL EXPRESS AND IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

In Canada, warranties include both warranties and conditions.

Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part (including fundamental breach) or other liability (including negligence and misrepresentation), you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages, IBM is liable only for:

1. bodily injury (including death), and damage to real property and tangible personal property; and
2. the amount of any other actual loss or damage, up to the greater of $100,000 or the charge for the Machine that is the subject of the claim.

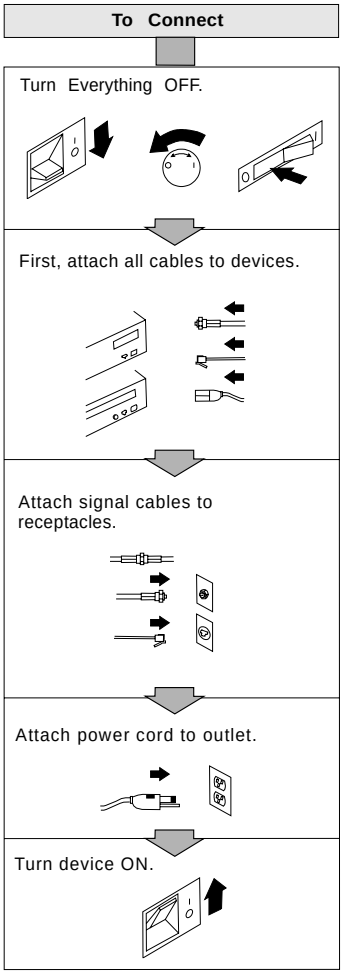
Under no circumstances is IBM liable for any of the following:

1. third-party claims against you for losses or damages (other than those under the first item listed above);
2. loss of, or damage to, your records or data; or
3. economic consequential damages (including lost profits or savings) or incidental damages, even if IBM is informed of their possibility.

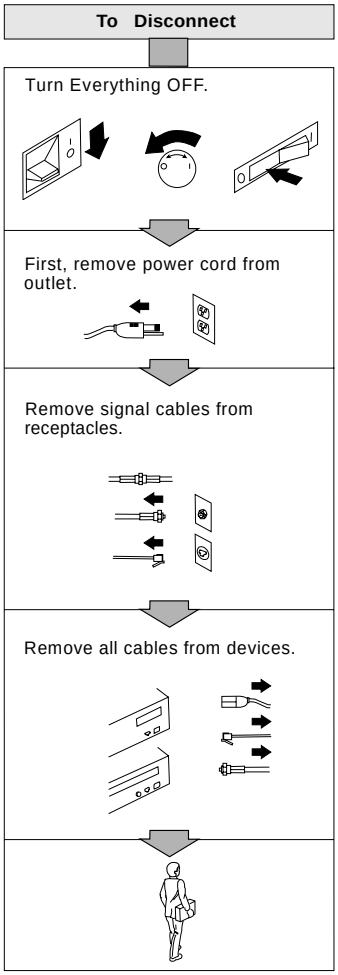
Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

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.

Contents

Statement of Limited Warranty (Machine) iii

Notices ix
Electronic Emission and Connectivity Notices ix
Class A Federal Communications Commission Statement . . ix
Canadian Department of Communications Compliance Statement x
United Kingdom xi
Germany xii
Japan xiii
Korea xiii
Trademarks and Service Marks xiii
Microcode Notice to Customers xiv

Preface xv
Microcode/Diagnostics Diskette Included with this Manual . . xv
Related Publications xvi

Chapter 1. Product Description 1-1
Overview 1-1
Highlights 1-1
Specifications 1-2
Optional Co-Processor Adapter Cables 1-3

Chapter 2. Installation Requirements and Instructions . . . 2-1
Installation Requirements 2-1
Hardware 2-1
Hardware Tools 2-2
Software/Microcode 2-2
Handling Static-Sensitive Devices 2-3
Hardware Installation Instructions 2-4
Option Switch Information 2-5
Installing the X.25 Interface Co-Processor Adapter in the System Unit 2-15
Running Diagnostics to Verify Installation 2-17
Connecting the Optional Co-Processor Adapter Cable . . . 2-17
Software/Microcode Installation 2-18

Chapter 3. Connector Information 3-1
Pin Numbers 3-1
Pin Assignments 3-2

Chapter 4. Problem Determination Procedures 4-1
Overview 4-2
System Unit Diagnostics 4-2
X.25 Interface Co-Processor Diagnostics Test 4-3
Blank Screen, Blinking Cursor, or Non-Decipherable Data . 4-5
Service Parts 4-8
Assembly 1: X.25 Interface Co-Processor 4-8
Assembly 2: Cables and Wrap Plugs 4-9

Chapter 5. Configuration Table 5-1

Appendix A. Special Configuration Information A-1
Creating an ICAPARM.PRM File A-1
Example 1 — For One Co-Processor Adapter A-2
Example 2 — For Multiple Co-Processor Adapters A-3
Changing Your CONFIG.SYS File A-4
Ctrl+Alt+Del Reset Considerations A-5
Selecting an Interrupt Level for the X.25 Interface Co-Processor Adapter A-6
Shared-Memory Considerations A-8

Index X-1

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 product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Corporation
IBM Director of Licensing
208 Harbor Drive
Stamford, Connecticut
United States 06904

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.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

United Kingdom

Notice to United Kingdom Users

This IBM X.25 Interface Co-Processor adapter is intended for installation within personal computer systems that meet the requirements for Safety Extra Low Voltages (SELV). The electrical interface at the X.25 Interface Co-Processor adapter edge connector uses Safety Extra Low Voltages.

The X.25 Interface Co-Processor adapter is approved for connection to United Kingdom public telecommunications systems under the following approval definitions.

Indirect Connection

Adapters that do not bear the logo and approval number of the United Kingdom approval authority, British Approvals Board for Telecommunications (BABT), are approved under General Approval NS/G/1234/J/100003 for indirect connection.

Such adapters may only be connected to UK public telecommunications systems, indirectly, by way of other equipment which is itself type approved for direct connection, such as a type approved modem or multiplexer.

Direct Connection

Adapters that bear the BABT logo and approval number are type approved for direct connection to UK public telecommunications networks when installed and used in accordance with the following conditions of use:

- 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 equipment. Failure to comply with this instruction will invalidate the approval granted for this adapter.

- The power requirements for the X.25 Interface Co-Processor adapter are listed under the electrical specifications section of Chapter 1.
- To maintain the independent approval of the X.25 Interface Co-Processor adapter, it is essential that other optional cards do not use or generate mains voltage or any other hazardous voltage. A hazardous voltage is one that exceeds 42.4 V peak ac or 60 V dc. If there is any doubt, the advice of a competent engineer must be obtained before any other adapters are installed into the host equipment.

Germany

IBM Industriecomputer

Was müssen Sie beim Anschluß des Industriecomputers an einen Modem der DBP Telekom beachten?

- Das ***Zulassungszeichen*** der Deutschen Bundespost (DBP).

  Bringen Sie das beiliegende Schildchen mit der DBP Zulassungsnummer bitte auf der Rückseite des Industriecomputers (IC) an.

- Die ***Allgemeine Anschalteerlaubnis***.

  Dieser IC erfüllt die Bedingungen der Absätze 2.1 bis 2.4 der BMPT Verfügung 163/1991 für die ***Allgemeine Anschalteerlaubnis*** (AAE). Siehe beiliegenden Auszug aus Amtsblatt BMPT 51/91.

  Bitte beachten Sie die übrigen Bestimmungen des Abschnittes 2, Verfügung 163/1991 des Bundesministeriums für Post und Telekommunikation (BMPT). Rückfragen dazu richten Sie an das BMPT.
  Gegebenenfalls ist nach Abschnitt 3 der beiliegenden BMPT Verfügung 162/1991 zu verfahren.

Japan

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Korea

체신부 전자파장해검정규칙 사용자 안내문

이 기기는 업무용으로 전자파장해검정을 받은 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못 구입하였을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

Trademarks and Service Marks

The following terms, **which are denoted by an asterisk (*) in this publication**, are trademarks or service marks of IBM Corporation in the United States and/or other countries:

IBM	Personal System/2
OS/2	Operating System/2
ValuePoint	Micro Channel

Microcode Notice to Customers

Microcode supplied by IBM for the X.25 Interface Co-Processor is protected by copyright. IBM hereby authorizes rightful possessors of the X.25 Interface Co-Processor microcode to install copies of such microcode in X.25 Interface Co-Processor adapters which they own or control. Permission is hereby given to make physical copies and/or to electronically distribute the X.25 Interface Co-Processor microcode only to the extent needed to support the above-described installations.

Permission is also given to make a backup or archival copy of the microcode for each X.25 Interface Co-Processor on which a primary copy is installed.

The IBM copyright notice must be reproduced on each physical copy and must not be removed from any electronically distributed copies. You may not reverse assemble or reverse compile this microcode.

IBM warrants the X.25 Interface Co-Processor, including the original microcode shipped with the X.25 Interface Co-Processor, under the terms of the warranty in effect at the time of your purchase.

Preface

This manual contains the following information for the IBM* X.25 Interface Co-Processor adapter:

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

This manual is written for an experienced computer operator or a person who sets up, uses, or programs the X.25 Interface Co-Processor adapter with IBM computer products.

Microcode/Diagnostics Diskette Included with this Manual

Two sizes (3.5 and 5.25 inches) of the Microcode/Diagnostics diskette (*Realtime Interface Co-Processor: Diagnostic and RCM*) are included with this manual; each contains the same files:

- The Realtime Control Microcode, ICAAIM.COM.

  This file is the RAM-resident control program for the X.25 Interface Co-Processor adapter and provides a realtime multitasking operational environment for supporting applications running on the adapter.

- Customer Level Diagnostics, which are used with Chapter 4, “Problem Determination Procedures.”

- A READ.ME file, which lists programs on the diskette and their functions.

- A HISTORY.FIL file, which contains a history of programs on the diskette with a list of updates.

Related Publications

Related publications are:

- Operating and installation documentation provided with your personal computer system.
- *IBM X.25 Interface Co-Processor: Hardware Maintenance Library*, which is used to isolate and repair any failure of a field-replaceable unit. It provides step-by-step instructions for problem isolation to aid the user in identifying a failing unit. Removal and replacement procedures are presented to complete repair of faulty units.

You may need to use one or more of the following publications for reference with this book:

- For a DOS-based system:
  - Disk Operation System (DOS) documentation
  - *IBM X.25 Co-Processor Support Program User's Guide*
  - *IBM X.25 Co-Processor Support Program Programmer's Reference*
  - *IBM Realtime Interface Co-Processor: DOS Support User's Guide*, which is a soft copy (on diskette) document provided with the Realtime Interface Co-Processor DOS Support program.
- For an OS/2-based system:
  - IBM Operating System/2* (OS/2*) documentation
  - IBM Communication Manager/2 documentation
  - *IBM Realtime Interface Co-Processor: OS/2 Support User's Guide*, which is a soft copy (on diskette) document provided with the Realtime Interface Co-Processor OS/2 Support program.

Chapter 1. Product Description

Overview

The IBM X.25 Interface Co-Processor, with supporting software, enables the attachment of an ISA-bus-compatible (AT-bus) personal computer system to an X.25 Packet-Switched Network so that 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 selectable optional cable.

The X.25 Interface Co-Processor adapter has its own microprocessor and memory, allowing it to perform communications functions.

Highlights

The X.25 Interface Co-Processor adapter provides:

- 80C186 microprocessor
- 512KB of dual-ported, parity-checked memory
- 16KB of read-only memory, providing power-on self test and diagnostic functions
- Communications port that can, through optional cables, support any one of the following interfaces:
  - X.21 *bis* (V.24) up to 19.2Kbps full duplex
  - X.21 *bis* (V.35) up to 56Kbps full duplex
  - X.21 (non-switched) up to 64Kbps full duplex
- Automatic recognition of the selected interface cable
- Capacity for the concurrent support of up to 250 virtual channels
- Multiple card installation capability

Specifications

Physical

Length: 200.0 mm (8.0 inches)

Width: 17.5 mm (0.7 inches)

Height: 101.6 mm (3.9 inches)

Weight: 0.23 kg (0.5 lbs)

Environment

Air temperature:

Operating: 0 to 60°C (32 to 140°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	875 mA
–5.5 V dc to –4.525 V dc	50 mA
+11.3 V dc to +12.7 V dc	25 mA
–11.3 V dc to –12.7 V dc	25 mA

Optional Co-Processor Adapter Cables

The following Co-Processor Adapter Cables are available as options:

- X.21 Cable (Feature Code 6321, Part Number 16F1865)

  The X.21 cable is 2.7 meters (9 feet) long. It has a 37-pin female connector on one end and a 15-pin male connector at the other end.

- X.21 *bis* (V.24) Cable (Feature Code 6322, Part Number 16F1869)

  The X.21 *bis* (V.24) cable length is 2.7 meters (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 (Feature Code 6323, Part Number 16F1871)

  The X.21 *bis* (V.35) cable length is 2.7 meters (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.

Chapter 2. Installation Requirements and Instructions

This chapter lists the hardware and software/microcode requirements and provides information for setting up and installing the IBM X.25 Interface Co-Processor adapter.

Installation Requirements

The X.25 Interface Co-Processor adapter requires the following hardware, software, and microcode.

Hardware

- A full-length slot in one of the following ISA-architecture (AT-bus) computer systems:
  - IBM 7531, 7532, 7537, or 7552 Industrial Computer
  - IBM 8525, 8530, 8535, or 8540 Personal System/2*
  - IBM 6381, 6382, 6384, or 6387 ValuePoint* System

  Note: The FCC statement in this manual may be different than the FCC statement in the manual that came with your system. Use the FCC statement in this manual for the system unit that will contain the X.25 Interface Co-Processor adapter.

- One of the following electrical interface cables (or equivalent). The cable dimensions are listed under “Optional Co-Processor Adapter Cables” on page 1-3.
  - Cable Option X.21 (FC 6321, P/N 16F1865)
  - Cable Option V.24 (FC 6322, P/N 16F1869)
  - Cable Option V.35 (FC 6323, P/N 16F1871)

Hardware Tools

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

Software/Microcode

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 1.03 or higher)
  - IBM X.25 Co-Processor Support Program (Version 1.02 or higher)

  or

  - IBM Operating System/2, OS/2 (Version 2.0 or higher)
  - IBM Realtime Interface Co-Processor Operating System/2 Support program (Version 1.04 or higher)
  - IBM Communication Manager/2 (Version 1.1 or higher)
- IBM Realtime Control Microcode (ICAAIM.COM)

  ICAAIM.COM is the RAM-resident control program for the X.25 Interface Co-Processor adapter and is supplied on the *Realtime Interface Co-Processor: Diagnostic and RCM* diskette, packaged with this document.

  ICAAIM.COM is automatically loaded onto the adapter by either the IBM X.25 Co-Processor Support Program or the IBM Communications Manager/2 product. ICAAIM.COM can optionally 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.

Handling Static-Sensitive Devices

Components for your X.25 Interface Co-Processor adapter can be damaged by static discharges. To prevent this damage, your X.25 Interface Co-Processor 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 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 plastic end pieces or 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.

Hardware Installation Instructions

Record the specifics of your configuration in the Configuration Table on page 5-1 as you proceed through this chapter.

The hardware installation process for the X.25 Interface Co-Processor adapter includes completing the following procedures:

- Reviewing the Option Switch Information (page 2-5)
- Changing the Option Switch Settings, if desired (starting on page 2-6)
- Installing the X.25 Interface Co-Processor Adapter in the System Unit (starting on page 2-15)
- Running Diagnostics to Verify Installation (page 2-17)
- Connecting the Co-Processor Adapter Cable (page 2-17)

Option Switch Information

The X.25 Interface Co-Processor adapter has a 10-position Option Switch; its location is shown in Figure 2-1 on page 2-7. Your X.25 Interface Co-Processor adapter is shipped to you with the Option Switch positions preset to widely-usable settings (shown in Table 2-1 and 2-2). These settings are usable, as is, for many applications. If they are acceptable for your application:

1. First, record the specifics of the switch settings in the Configuration Table on page 5-1. (The information recorded in the configuration table is referenced whenever you run the diagnostics for the X.25 Interface Co-Processor adapter.)
2. Then, skip to the next section, "Installing the X.25 Interface Co-Processor Adapter in the System Unit" on page 2-15.

Table 2-1. Factory Settings of Option Switch SW1

Switch Number	10	9	8	7	6	5	4	3	2	1
ON/OFF	ON	ON	ON	ON	ON	ON	ON	*OFF*	ON	ON

Table 2-2. Function/Configuration of Factory-Set Option Switch

Switch Number(s)	**Function/Configuration**		
1 + 2 + 3	Interrupt Level	=	10
4	Memory Size	=	512KB[1]
5 + 6 + 7 + 8	Card Base Address	=	02A0 Hex
9	Edge-Connector	=	2 Edges
10	Bus-Width	=	8 Bits

Note:

[1] The memory size cannot be changed, which means that switch 4 must always be set to the ON position.

If you are using multiple X.25 Interface Co-Processor cards or you need to make other changes to the configuration information, continue with the switch setting details on the following pages.

Changing the Option Switch Settings

The X.25 Interface Co-Processor adapter's 10-position Option Switch (shown in Figure 2-1 on page 2-7) is preset and usable, as is, for many applications—as explained on the preceding page. Use the information on the following pages if you need to change the settings, which configure the following functions. (Record the specifics of your configuration in the Configuration Table on page 5-1.)

- "Setting the Interrupt Level" on page 2-8
- "Verifying the Memory-Size-Switch Position" on page 2-10
- "Setting the Card I/O Base Address" on page 2-11
- "Setting the Edge-Connector (ED)" on page 2-13
- "Setting the Bus-Width (BW)" on page 2-14.

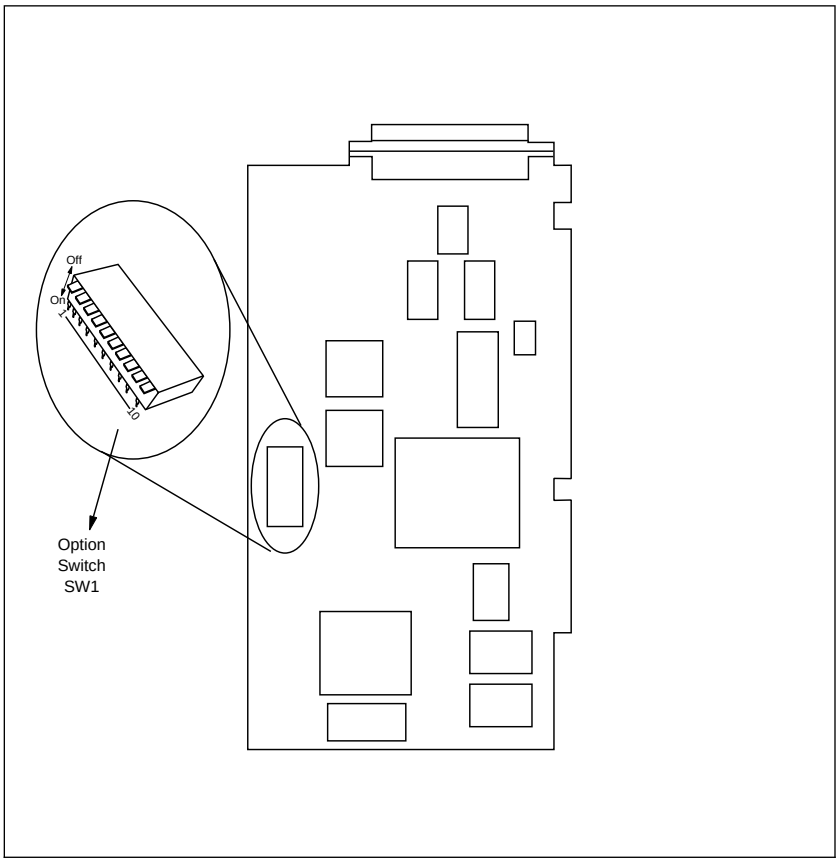


Figure 2-1. Location of Option Switch SW1

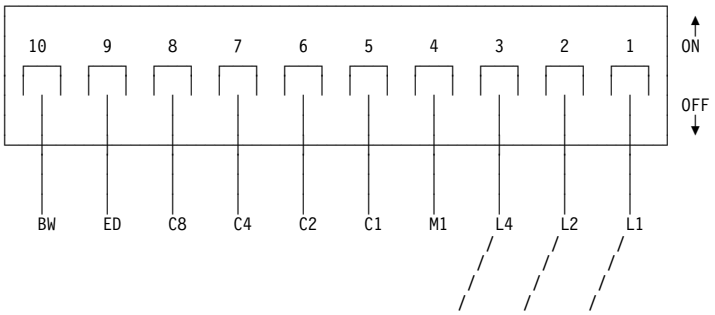
Setting the Interrupt Level

Switch positions 1, 2, and 3 (L1, L2, and L4, as shown in the illustration on the next page) configure the X.25 Interface Co-Processor adapter for any one of eight interrupt priority levels if the expansion slot that will hold the adapter is a two-edge connector. If the expansion slot that will hold the adapter is a one-edge connector, the valid interrupt levels are 3, 4, 7, and 2.

Notes:

1. For an explanation of the edge connector(s), see the note under "Setting the Edge-Connector (ED)" on page 2-13.
2. Interrupt levels 2 and 9 cannot be used on the IBM 8525 Personal System/2 or the IBM 8530 Personal System/2.
3. See "Selecting an Interrupt Level for the X.25 Interface Co-Processor Adapter" on page A-6 for help in choosing an unused interrupt level. Multiple X.25 Interface Co-Processor adapters can use the same interrupt level (if desired).

Interrupt Level Switch Positions

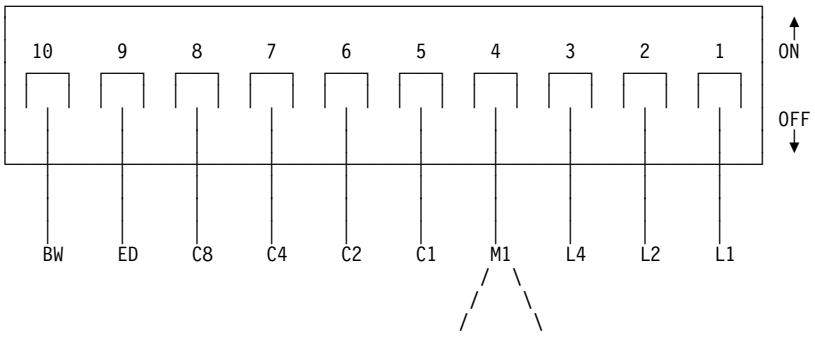


Switch Settings L4	L2	L1	Interrupt Level
ON	ON	ON	3
ON	ON	OFF	4
ON	OFF	ON	7
ON	OFF	OFF	2 or 9
OFF	ON	ON	10
OFF	ON	OFF	11
OFF	OFF	ON	12
OFF	OFF	OFF	15

Verifying the Memory-Size-Switch Position

Switch position 4 (M1, as shown in the following illustration) is factory-set to indicate the size of the RAM installed on the X.25 Interface Co-Processor adapter. Verify that switch position 4 is set to ON to indicate that 512K bytes of RAM is installed on the co-processor adapter card.

Memory Size Switch Position



Switch Setting M1	Memory Size
ON	512KB
OFF	Reserved

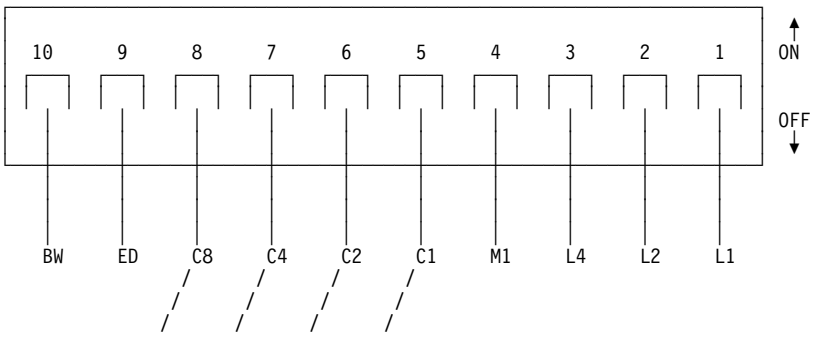
Setting the Card I/O Base Address

When installing more than one co-processor adapter (this may include co-processor adapters other than the X.25 Interface Co-Processor), set a different base I/O address for each adapter. Use the lowest base I/O address (02A0) first.

Set switch positions 5, 6, 7, and 8 (C1, C2, C4, and C8) as indicated on the next page. Record the X.25 Interface Co-Processor number (number 0, for the first X.25 Interface Co-Processor adapter installed) and the base address in your Configuration Table on page 5-1.

Note: See "Shared-Memory Considerations" on page A-8 for help in choosing a memory window.

Card I/O Base Address Switch Positions



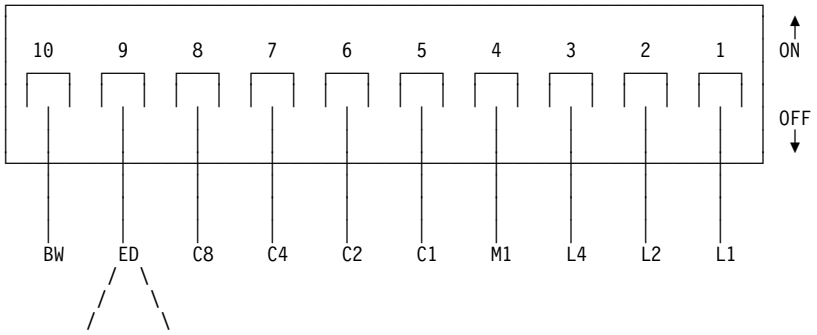
Switch Settings				Base Address (Hex)	Physical Card Designation
C8	C4	C2	C1		
ON	ON	ON	ON	02A0	0
ON	ON	ON	OFF	06A0	1
ON	ON	OFF	ON	0AA0	2
ON	ON	OFF	OFF	0EA0	3
ON	OFF	ON	ON	12A0	4
ON	OFF	ON	OFF	16A0	5
ON	OFF	OFF	ON	1AA0	6
ON	OFF	OFF	OFF	1EA0	7
OFF	ON	ON	ON	22A0	8
OFF	ON	ON	OFF	26A0	9
OFF	ON	OFF	ON	2AA0	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

Setting the Edge-Connector (ED)

Switch position 9, the Edge-Connector switch (ED, as shown in the following illustration), indicates whether a one-edge (62-pin) connector or a two-edge (62-pin and 36-pin) connector is in the expansion slot that will hold your X.25 Interface Co-Processor adapter.

Note: An expansion slot on a planar board that has just one connector (into which the bottom edge of the adapter is to be inserted) is referred to as a “one-edge” connector. Whereas, an expansion slot that has two connectors on the planar board is referred to as a “two-edge” connector—which is the most typical.

Edge-Connector Switch Position



Switch Setting ED	Edge-Connector
OFF	Co-Processor is in one-edge connector expansion slot
ON	Co-Processor is in two-edge connector expansion slot

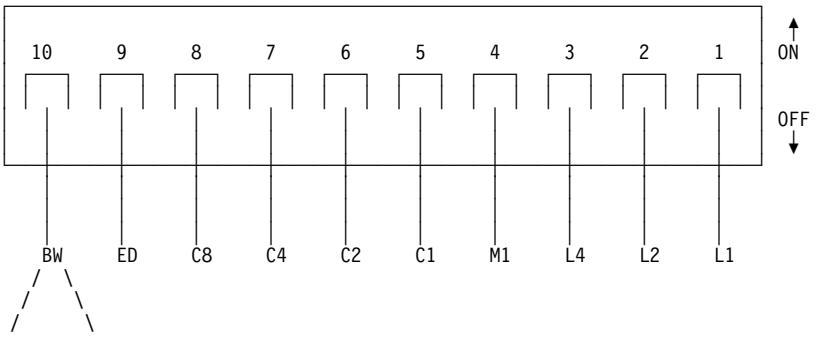
Setting the Bus-Width (BW)

Switch position 10 (BW, as shown in the following illustration) sets the bus width. If the expansion slot that will hold your X.25 Interface Co-Processor adapter has a one-edge connector, set BW for an 8-bit bus width. If the expansion slot has a two-edge connector, BW may be set for an 8-bit or 16-bit bus width, depending on the application.

Notes:

1. For an explanation of the edge connector(s), see the note on the preceding page.
2. Switch 10 should, generally, be set to ON (8-bit bus). A 16-bit bus-width is valid only if the other adapters in your system unit also have 16-bit bus-widths.

Bus-Width Switch Position



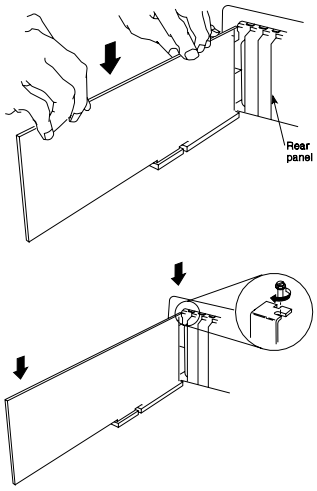
Switch Setting BW	Bus-Width Connector
ON	8-Bit Bus
OFF	16-Bit Bus

Installing the X.25 Interface Co-Processor Adapter in the System Unit

Use the following steps as general information for installing your X.25 Interface 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 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 X.25 Interface 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.

Running Diagnostics to Verify Installation

Before you continue with the following procedure, see “X.25 Interface Co-Processor Diagnostics Test” on page 4-3 to test the X.25 Interface Co-Processor adapter.

Connecting the Optional Co-Processor Adapter Cable

Use the following steps to connect your Co-Processor Adapter Cable.

Note: The optional Co-Processor 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 Co-Processor 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 Co-Processor 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 Co-Processor Adapter Cable.

The X.25 Interface Co-Processor hardware installation is complete.

Software/Microcode Installation

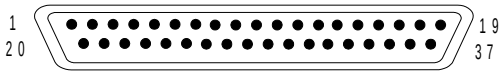
For instructions on installing the required software, as listed under "Software/Microcode" on page 2-2, see the documentation supplied with the applicable software.

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 X.25 Interface Co-Processor adapter.

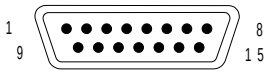
Chapter 3. Connector Information

Pin Numbers

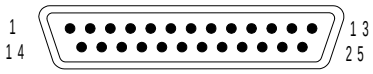
The 37-pin, D-shell, male connector on the X.25 Interface Co-Processor adapter is shown below.



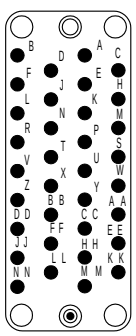
The 15-pin, D-shell, male connector on the optional X.21 (non-switched) Co-Processor Adapter Cable is shown below.



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



The 34-pin, D-shell, male connector on the optional X.21 *bis* (V.35) Co-Processor Adapter Cable is shown below.



Pin Assignments

X.21 Connector Information

The X.21 pin assignments for the 37-pin connector on the X.25 Interface Co-Processor adapter and the corresponding pin assignments for the 15-pin connector on the optional Co-Processor Adapter Cable are listed in Table 3-1. (The pin positions on the connector are shown under “Pin Numbers” on page 3-1.)

Table 3-1. X.21 Interface Pin Assignments

Signal Name	37-Pin Connector	15-Pin Connector
GND	7	8
ID	9	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 X.25 Interface Co-Processor adapter and the corresponding pin assignments for the 25-pin connector on the optional Co-Processor Adapter Cable are listed in Table 3-2. (The pin positions on the connector are shown under “Pin Numbers” on page 3-1.)

Table 3-2. X.21 bis (V.24) Interface Pin Assignments

Signal Name	37-Pin Connector	25-Pin Connector
TXD	2	2
RXD	3	3
RTS	4	4
RTS	5	5
DSR	6	6
GND	7	7
CD	8	8
ID	9	7
ID	15	7
DTR	20	20
RLBT	21	21
CI	22	22
TX CLK	24	15
TI	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 X.25 Interface Co-Processor adapter and the corresponding pin assignments for the 34-pin connector on the optional Co-Processor Adapter Cable are listed in Table 3-3. (The pin positions on the connector are shown under "Pin Numbers" on page 3-1.)

Table 3-3. X.21 bis (V.35) Interface Pin Assignments

Signal Name	37-Pin Connector	34-Pin Connector
RTS	4	C
CTS	5	D
DSR	6	E
GND	7	B
CD	8	F
ID	15	B
RX CLK (B)	16	X
TXD (B)	17	S
TX CLK (B)	18	AA
RXD (B)	19	T
DTR	20	H
CI	22	J
RX CLK (A)	34	V
TXD (A)	35	P
TX CLK (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 X.25 Interface Co-Processor adapter is operating properly.

Note: To test the X.25 Interface Co-Processor adapter after completing the initial installation of it, see “X.25 Interface Co-Processor Diagnostics Test” on page 4-3.

The contents of the chapter are:

- Overview (page 4-2)
- System unit diagnostics (page 4-2)
- X.25 Interface Co-Processor diagnostics (starting on page 4-3)
- Service parts (starting on page 4-8)

Overview

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

- 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 may be performed when there is a problem with a system unit containing the X.25 Interface 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. X.25 Interface Co-Processor Diagnostics. These tests are run from the *IBM Realtime Interface Co-Processor: Diagnostic and RCM* diskette, provided with this manual; they examine the X.25 Interface Co-Processor adapter.

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 X.25 Interface Co-Processor errors directly, but will aid in isolating the problem.

Run the Realtime Interface Co-Processor diagnostics to determine whether or not you have an X.25 Interface Co-Processor error.

Note: If you are unsure of a problem area, perform the system unit diagnostics first, before proceeding with the X.25 Interface Co-Processor diagnostics.

X.25 Interface Co-Processor Diagnostics Test

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

Notes:

1. If at anytime 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.
2. If you receive an error message during any of the tests, record the error message and have the system unit serviced, unless otherwise stated.
3. Refer to the Configuration Table on page 5-1 to verify switch settings during the test.

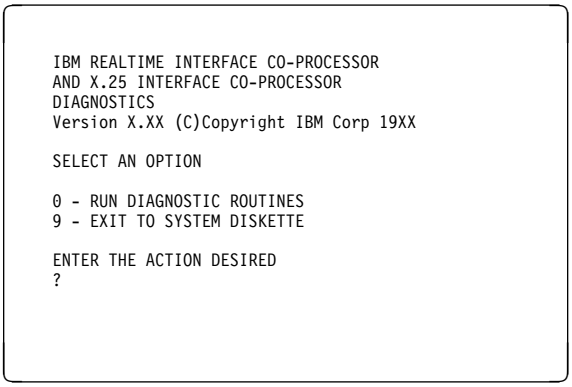
To begin the diagnostics procedures for the co-processor adapter, do the following:

1 Set the system unit's Power switch to Off.

2 Insert the *IBM Realtime Interface Co-Processor: Diagnostic and RCM* diskette into diskette drive A.

3 Set the system unit's Power switch to On and continue on the next page.

A screen similar to the one shown below should appear.



DOES YOUR SCREEN LOOK SIMILAR TO THE ONE ABOVE?

NO If you have a blank screen, a blinking cursor, or non-decipherable data, continue to the next page.

Otherwise, run the diagnostics for your system unit to verify that your personal computer system is functioning correctly. If your computer system is functioning correctly, your *IBM Realtime Interface Co-Processor: Diagnostic and RCM* diskette may be defective.

YES Press **0** (RUN DIAGNOSTIC ROUTINES); then press **Enter** and continue on page 4-6.

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 have your system unit serviced.

   If more than one co-processor adapter is installed, remove all co-processor adapters; then continue with the following step.
3. Insert your copy of the *IBM Realtime Interface Co-Processor: Diagnostic and RCM* 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 SCREEN 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: Diagnostic and RCM* diskette may be defective.

YES Reinstall and test one co-processor adapter at a time by doing the following. (Replace the adapter that causes the failure.)

1. Turn off your system.
2. Re-install the adapter.
3. Restart the diagnostics, beginning on page 4-3.

A screen similar to the following one should appear. If a screen with an error message appears, follow the instructions on the screen; otherwise, verify the information on the screen with the information in the configuration table on page 5-1.

Note: The following screen is only a representation of the screen that should be displayed. Your screen may differ, depending on your co-processor adapter(s) configuration.

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

PRESENT CARD		CARD ADDR	STG SIZE KB	PWR ON ERR	LVL	BUS	PORTS	ADAPTER
0	Y	02A0	512		10	8	1	V24/V35 X21
1	Y	06A0	512		11	8	1	V24/V35 X21

VERIFY THE CONFIGURATION.
IS THE CONFIGURATION CORRECT
(Y/N)?

If your screen configuration is not correct or an error is displayed in the **PWR ON ERR** column, press **N**; then press **Enter** and follow the instructions that will appear on the screen.

If your screen configuration is correct, press **Y** and then **Enter**. You have loaded the diagnostics successfully. Continue with the tests to perform a complete diagnostic checkout; proceed to the next page.

The tests are performed in sequence.

Follow the steps and instructions that will appear on the screen. When the tests are completed with no errors, a screen similar to the SELECT AN OPTION screen (shown on page 4-4) will appear.

If the test stays in a loop and continues to run beyond 150 seconds, have the system unit serviced.

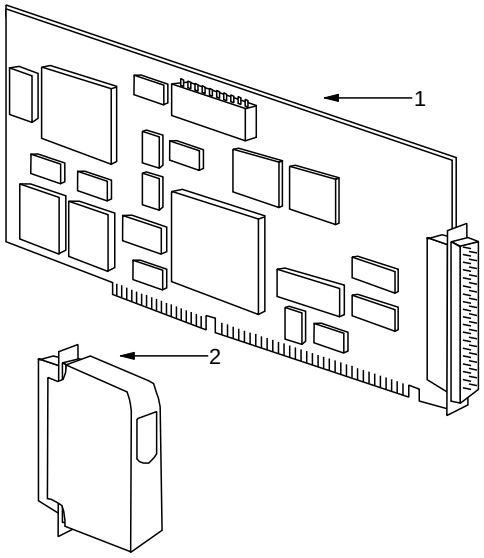
Upon completion of the diagnostics test, set the system unit's Power switch to Off.

If you performed these diagnostics tests because of a suspected communications problem and have successfully completed the tests without an error message, additional testing may be required on the following:

- Host computer, industrial computer, or device you are trying to communicate with (such as a printer)
- Communications link
- Attached communications devices (such as a modem)
- Communications cable.

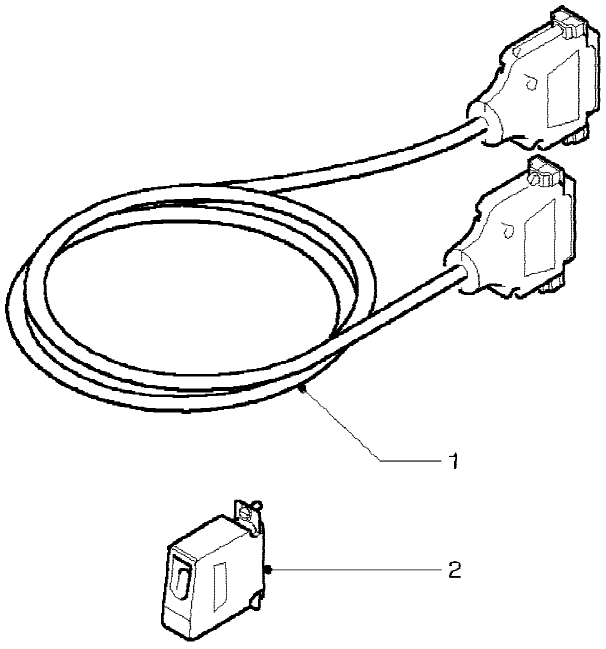
If no problems are found, have the system unit serviced.

Service Parts
Assembly 1: X.25 Interface Co-Processor



Asm–Index	Part Number	Units	Description
1–1	71G6458	1	X.25 Interface Co-Processor with memory
–2	16F1884	1	IBM X.25 Interface Co-Processor 37-pin Wrap Plug

Assembly 2: Cables and Wrap Plugs



Asm–Index	Part Number	Units	Description
2–1	16F1887	1	Cable Option X.21
–1	16F1888	1	Cable Option V.24
–1	16F1889	1	Cable Option V.35
–2	16F1890	1	Wrap Plug X.21
–2	16F1891	1	Wrap Plug V.24
–2	16F1861	1	Wrap Plug V.35

Chapter 5. Configuration Table

Description	Co-Processor Adapter			
	0	1	2	3
Interrupt Level (L1, L2, L4)	Level ___	Level ___	Level ___	Level ___
Memory Size (M1)	512KB ___	512KB ___	512KB ___	512KB ___
I/O Base Address (C1, C2, C4, C8)	Hex ___	Hex ___	Hex ___	Hex ___
Edge Connector (ED)	One ___ Two ___	One ___ Two ___	One ___ Two ___	One ___ Two ___
Bus Width (BW)	8 ___ 16 ___	8 ___ 16 ___	8 ___ 16 ___	8 ___ 16 ___

Notes:

Appendix A. Special Configuration Information

This appendix contains information about the following:

- Creating an ICAPARM.PRM file
- Changing your CONFIG.SYS file
- Ctrl+Alt+Del reset considerations
- Selecting an interrupt level for the X.25 Interface Co-Processor adapter
- Shared-memory considerations

Creating an ICAPARM.PRM File

After your software is installed, you must create a special parameter file (ICAPARM.PRM) to indicate how to initialize the X.25 Interface Co-Processor adapter. 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, see 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 that you create with a text editor and contains a single line of parameters for each Realtime Interface Co-Processor installed, including each X.25 Interface 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.

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:

```
              #  02A0  00  60  10  10  10  10  0F  E010  $

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

Field Number	Description
1	Beginning-Record Delimiter. If a '#' is not present, the line will be treated as a comment.
2	Base I/O Address of the X.25 Interface Co-Processor adapter. Range 02A0–3EA0h in 400h (1KB) increments.
3	Shared Memory Address, Meg value. Range 00–0Fh. (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 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.
5	Maximum Task Number on the adapter. Range 00–F8h; set to 10h.
6	Maximum Task Priority. Range 01–FFh; set to 10h.
7	Maximum Task Queue Number. Range 00–FEh; set to 10h.

8 Maximum Task Timer Number. Range 00–FEh; set to 10h.

9 and 10 System Unit Address to invoke an adapter reset. Use the values shown: 0Fh, E010h

11 End-Record Delimiter. Value ';' or '$'. If this is the last adapter in the ICAPARM file, then set to '$'; otherwise set to ';'.

Example 2 — For Multiple Co-Processor Adapters

The following example shows an ICAPARM.PRM file for four co-processor adapters:

```
            #  02A0  00  60  10  10  10  10  0F  E010  ;
            #  06A0  00  61  10  10  10  10  0F  E010  ;
            #  0AA0  00  62  10  10  10  10  0F  E010  ;
            #  0EA0  00  63  10  10  10  10  0F  E010  $

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

Field Number	Description
2	Base I/O Address of each X.25 Interface Co-Processor adapter. Each adapter must have a different Base I/O Address.
4	Shared Memory Address, Page Value. Each adapter must use a different memory window address. In this case, the four adapters are using C0000h, C2000h, C4000h, and C6000h, respectively.

Note: For an explanation of the other fields, see the field descriptions under “Example 1 — For One Co-Processor Adapter” on page A-2.

Changing Your CONFIG.SYS File

If OS/2 and Communications Manager/2 (CM/2) are being used, then 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

In some rare cases, issuing a reset by pressing the Ctrl+Alt+Del keys will not reset the X.25 Interface Co-Processor adapter. This can be remedied by changing the ICAPARM.PRM file that the Realtime Interface Co-Processor DOS Support or OS/2 Support program uses. The ICAPARM.PRM file contains an address that the adapter uses to determine if a Ctrl+Alt+Del has been issued. This address on some ISA-bus machines is different from the default address of 0x0FE010. To overcome this difference, here is an example of how your ICAPARM.PRM file entries should be changed:

```
An existing entry where Ctrl+Alt+Del will not reset the card:
   #02A0  00 60 10 10 10 70 0F E010;

A new entry where Ctrl+Alt+Del will NOW reset the card:
   #02A0  00 61 10 10 10 70 0C 0000;
```

Two parameters were changed in the preceding example:

- The 60h was changed to 61h.

  With this value set at 60h, the adapter would be using the shared memory address of C00000h. This value was changed to 61h to move the shared memory address to C2000h.

- The 0F E010h was changed to 0C 0000h.

  With this value changed to 0C 0000h, the adapter will reset if the system unit addresses this area in RAM. Your adapter has been moved away from this area, and no other cards should be set to use it—thereby ensuring a reset when a Ctrl+Alt+Del is issued.

Selecting an Interrupt Level for the X.25 Interface Co-Processor Adapter

A Realtime Interface Co-Processor (ARTIC) adapter, which includes the X.25 Interface 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.

For the best performance, however, each ARTIC adapter in the system unit should have its own unique interrupt level. If this is not possible, the next best configuration is to place all ARTIC adapters in the system on a single interrupt level. If neither of these configurations is possible, the last choice is to choose an interrupt level that must be shared with a non-ARTIC adapter.

To assist in configuring the X.25 Interface Co-Processor adapter interrupt level, following is a list of adapters and their typical interrupt levels (IRQ).

These values may not apply to all systems, but may be helpful as guidelines.

System timer	IRQ 0	
Keyboard	IRQ 1	
[1]DCC/2 interrupt control	IRQ 2	
Alternate serial port	IRQ 3	(COM2-COM8)
Primary serial port	IRQ 4	(COM1)
[2]Disk	IRQ 5	
[1]Alternate parallel port	IRQ 5	
Diskette	IRQ 6	
Primary parallel port	IRQ 7	(Note: many printers are polled rather than interrupt driven)
[1]Realtime clock	IRQ 8	
[1,3]Auxiliary device (mouse)	IRQ 12	
[1]Math coprocessor exception	IRQ 13	
[1]Disk	IRQ 14	
3270 Connection adapter	IRQ 2	
[4]Token Ring adapter	IRQ 2 or 3	
[5]Token Ring adapter	IRQ 2, 3, 10, 11	
PC Network adapter	IRQ 2 or 3	
3119 adapter/A	IRQ 7	
High speed adapter/A	IRQ 7	
3117 scanner adapter/A	IRQ 7	
3363 optical disk adapter	IRQ 3, 7, 10 or 11	
Streaming tape adapter	IRQ 6	
Multiprotocol adapter	IRQ 3 or 4 (3 & 4 in synchronous modes)	

[1] 80286 or above systems only

[2] 8088 systems only

[3] In ISA-bus machines, the auxiliary device (planar mouse port) cannot share interrupts with an X.25 Interface Co-Processor adapter.

[4] ISA-bus machines only

[5] Micro Channel machines only

Shared-Memory Considerations

To assist in configuring the shared-memory address window for the X.25 Interface Co-Processor adapter, here is a list of adapters and their typical memory addresses. These values may not apply to all systems, but may be helpful as guidelines.

640KB RAM	00000-9FFFF
Display Buffers	A0000-BFFFF
System Board ROM	F0000-FFFFF
PC Network adapter	CC000-CFFFF
PC Network II adapter	D0000-D7FFF (ROM)
	CC000-CDFFF (Primary RAM)
	DC000-DDFFF (Alternate RAM)
EGA adapter	C0000-C3FFF
Token Ring adapter	D8000-DBFFF (Primary RAM)
	CC000-CDFFF (Primary ROM)
	D4000-D7FFF (Alternate RAM)
	DC000-DDFFF (Alternate ROM)
VGA Display adapter	C6800-CA7FF
Advanced 3278/9 emulator adapter	CE000-CFFFF (Adapter 0)
	D0000-D1FFF (Adapter 1)
	D2000-D3FFF (Adapter 2)
	D4000-D5FFF (Adapter 3)

Index

A

adapter cables
  connecting 2-17
  description of 1-3

B

base address, card I/O,
  setting 2-11
bus-width, setting 2-14

C

cables, adapter, optional
  connecting 2-17
  description of 1-3
card I/O base address, setting 2-11
CONFIG.SYS, changing A-4
configuration
  option switch information 2-5
  special information A-1
  table 5-1
connector information 3-1
Ctrl+Alt+Del reset
  considerations A-5

D

diagnostics
  diskette xv
  procedures 4-3
  system unit 4-2
  X.25 Interface Co-Processor 4-3

E

edge-connector switch, setting 2-13
electrical safety information vi
example of ICAPARM.PRM
  file A-2, A-3

F

factory settings for option
  switch 2-5
field-replaceable units 4-8
FRUs 4-8

H

handling static-sensitive
  devices 2-3
HISTORY.FIL file xv

I

ICAAIM.COM, realtime control
  microcode xv, 2-2
ICAPARM.PRM file
  creating an A-1
  example of A-2, A-3
installation
  cable, adapter 2-17
  instructions for hardware 2-4,
    2-15, 2-17
  option switch settings 2-6
  requirements 2-1
    hardware 2-1
    software/microcode 2-2
    tools 2-2
  software/microcode 2-18
  X.25 Interface
    Co-Processor 2-15

interrupt level
  selecting an A-6
  settings for 2-8

M

memory size, verifying 2-10
memory, shared,
  considerations A-8
microcode/diagnostics diskette,
  content xv

O

option switch
  factory settings of 2-5
  location 2-6
  settings 2-6
optional co-processor adapter cables
  connecting 2-17
  description of 1-3

P

parts, listing of 4-8
PDPs (problem determination proce-
  dures) 4-1
pin assignments
  X.21 3-2
  X.21 (V.24) 3-3
  X.21 (V.35) 3-4
pin numbers 3-1
position
  bus-width switch 2-14
  card I/O base address
    switches 2-11
  edge-connector switch 2-13
  interrupt level switches 2-8
  memory size switch 2-10
problem determination
  procedures 4-1, 4-3
problem isolation charts
  blank screen, blinking cursor, or
    non-decipherable data 4-5
product description
  highlights 1-1
  optional co-processor adapter
    cables 1-3
  overview 1-1
  specifications 1-2
publications, related xvi

R

READ.ME file xv
realtime control microcode,
  ICAAIM.COM xv, 2-2
related publications xvi
requirements, installation 2-1
reset considerations A-5

S

safety information, electrical vi
service parts 4-8
settings, X.25 Interface Co-
  Processor switch SW1 2-11
shared-memory considerations A-8
special configuration
  information A-1
specifications, adapter 1-2
start, problem determination 4-3
static-sensitive devices,
  handling 2-3
switches, option 2-6
system unit diagnostics 4-2

T

testing the X.25 Interface Co-
  Processor 4-3

V

V.24 pin
  assignments 3-3
  numbers 3-1
V.35 pin
  assignments 3-4
  numbers 3-1

X

X.21 connector information 3-2

Readers' Comments — We'd Like to Hear from You

X.25 Interface Co-Processor

Guide to Operations

Part Number 06H1845

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	□	□	□	□	□

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	□	□	□	□	□
Complete	□	□	□	□	□
Easy to find	□	□	□	□	□
Easy to understand	□	□	□	□	□
Well organized	□	□	□	□	□
Applicable to your tasks	□	□	□	□	□

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? □ Yes □ No

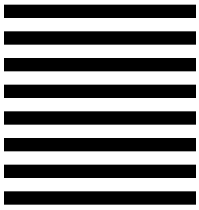
When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name _____ Address _____

Company or Organization _____ _____

Phone No. _____ _____

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Department 27X
PO BOX 1328
BOCA RATON, Florida, U.S.A. 33429-1328

Fold and Tape **Please do not staple** Fold and Tape

Readers' Comments — We'd Like to Hear from You

IBM®

Part Number: 06H1845

Printed in U.S.A.

Print Block 06H1842