2212 Access Utility

IBM

Installation
and
Initial Configuration Guide

Third Edition (June 1999)

This edition applies to the IBM 2212 and Access Integration Services, Version 3.3.

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Contents

About This Guide

This guide explains how to set up the IBM 2212, perform initial configuration, and correct some problems that might occur during installation. It is intended to be used by the person responsible for installing the IBM 2212. This person should be familiar with installation and cabling charts.

Safety Precautions

> **DANGER**
>
> Before you begin to install this product, read the safety information in *Caution: Safety Information—Read This First*, SD21-0030. This booklet describes safe procedures for cabling and plugging in electrical equipment.

Note: For translations of safety notices, see "Safety Information" on page B-9.

Hardcopy Publications Shipped with the 2212

These documents are shipped in hardcopy and are also contained on the *Access Integration Services Configuration Tool and Documentation* CD-ROM, SK2T-0435, in softcopy form:

Planning

GA27-4215   *2212 Access Utility Introduction and Planning Guide*

This book explains how the IBM 2212 fits into a network and what features and options it offers.

Installation

GA27-4216   *2212 Access Utility Installation and Initial Configuration Guide*

This booklet explains how to set up the IBM 2212, perform initial configuration, and correct some problems that might occur during installation.

GX27-4048   *2212 Access Utility Hardware Configuration Quick Reference*

This reference card is used for entering and saving configuration information such as IP and MAC addresses.

Configuration

GC30-3830   *Configuration Program User's Guide*

This book discusses how to use the Access Integration Services Configuration Program.

Diagnostics and Maintenance

GY27-0362   *2212 Access Utility Service and Maintenance Manual*

This book provides instructions for diagnosing problems with and repairing the IBM 2212.

Safety

SD21-0030   *Caution: Safety Information—Read This First*

This book provides translations of caution and danger notices applicable to the installation and maintenance of an IBM 2212.

Softcopy Publications Shipped on the CD-ROM

The following list shows the books that support the Access Integration Services program. They are shipped with the IBM 2212 on the *Access Integration Services Configuration Tool and Documentation* CD-ROM, SK2T-0435. Hardcopy versions of the books can be purchased separately.

Operations and Network Management

SC30-3988   *Access Integration Services Software User's Guide*

This book explains how to use the IBM 2212 command-line user interface to configure and monitor the network interfaces and link-layer protocols shipped with the IBM 2212.

SC30-3989   *Access Integration Services Using and Configuring Features*

This book explains how to configure and monitor features of the IBM 2212 such as bandwidth reservation, WAN restoral, and WAN reroute.

SC30-3990   *Access Integration Services Protocol Configuration and Monitoring Reference, Volume 1*

SC30-3991   *Access Integration Services Protocol Configuration and Monitoring Reference, Volume 2*

These books describe how to access and use the Access Integration Services command-line user interface to configure and monitor the routing protocol software shipped with the product.

They include information about each of the protocols that the device supports.

SC30-3682   *Event Logging System Messages Guide*

This book contains a listing of the error codes that can occur, along with descriptions and recommended actions to correct the errors.

Publications on the Internet

The publications that ship in hardcopy and CD-ROM are also available on the World Wide Web at:

`http://www.ibm.com/networking/support/docs.nsf/2212docs`

Ordering IBM Publications

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`http://www.elink.ibmlink.ibm.com/pbl/pbl`

IBM translates many publications into a variety of languages. The publication you need may be available in your language.

Obtaining Updates and Corrections

You can obtain updated versions of the software and product information from IBM's Web pages.

Documentation updates are at:

`http://www.ibm.com/networking/support/docs.nsf/2212docs`

Software updates are at:

`http://www.ibm.com/networking/support/downloads/2212`

Product information and updates are at:

`http://www.networking.ibm.com/2212/2212prod.html`

Summary of Changes

Changes to the IBM 2212 hardware publications include details about:

- The IBM 2212 Models x5x
- the high-performance system card
- 4-port 56K analog modem
- compression/encryption CPCI adapter
- 4-port WAN PMC adapter
- 2-port analog voice CPCIadapters
- T1/J1 and E1 digital modems

Chapter 1. Installing the 2212

Before You Begin

The illustrations in this guide show an IBM 2212 Model 40H as an example. The procedure for installing other models of the IBM 2212 is the same.

To install the IBM 2212:

1. Install the hardware. See "Pre-installation Requirements," and then go to "Begin Installation" on page 1-2 .

2. Establish a connection to the IBM 2212's software as described in Chapter 3, "Accessing the IBM 2212" on page 3-1.

3. Perform an initial configuration of the software. This process is explained in Chapter 4, "Performing the Initial Configuration" on page 4-1.

Pre-installation Requirements

Before installing the IBM 2212, verify that you have:

1. Ordered the optional adapters that you will need and the appropriate cables to go with them. The *2212 Access Utility Introduction and Planning Guide* has details about available options.

2. Obtained and installed the required common carrier equipment and services.

3. Obtained and installed the required LAN equipment and services.

4. Ordered and installed any required cables not included with the IBM 2212 that you will need to set up your network.

5. Obtained and installed the hardware and software required to run the Configuration Program, as described in the *2212 Access Utility Introduction and Planning Guide*.

6. Prepared the Initial Configuration worksheet. This worksheet is in the *2212 Access Utility Introduction and Planning Guide*.

7. Prepared your site physically, ensuring that you meet the necessary power and environmental requirements. See the *2212 Access Utility Introduction and Planning Guide*.

8. Obtained and installed any required accessories, for example, telephone handsets and fax machines, not provided with the IBM 2212 that will be needed to establish your network.

Begin Installation

These instructions explain how to rack-mount and surface-mount the IBM 2212. Models 4xx are 89 mm (3.5 in.) in height.
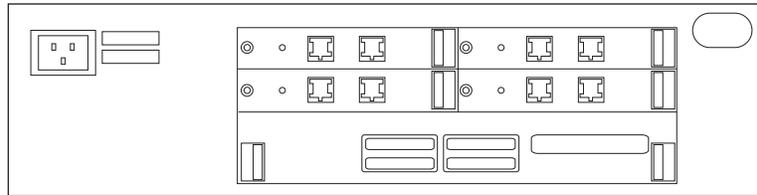
Figure 1-1. Front of IBM 2212, Models 4xx

Models 1xx are 44.4 mm (1.75 in.) in height.
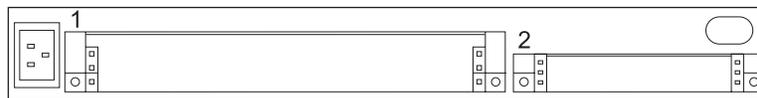
Figure 1-2. Front of IBM 2212, Models 1xx

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1 Unpack and Verify

Unpack the IBM 2212 and verify that, along with this guide, the following items were included:

Documentation

- *Caution: Safety Information–Read This First*
- *IBM 2212 Introduction and Planning Guide*
- *IBM 2212 Service and Maintenance Manual*
- *IBM 2212 Hardware Configuration Quick Reference Card*
- *Configuration Program User's Guide*
- *Access Integration Services Configuration Tool and Documentation* CD-ROM

Hardware

- Service port cable
- Null-modem adapter
- Adhesive-backed feet for surface-mounting the IBM 2212
- Adhesive holder for storing the *Hardware Configuration Quick Reference Card*

   Surface-mounting - continue with step 2a on page 1-3.
   Rack-mounting- go to step 2b on page 1-3.

2a Surface-Mounting the 2212
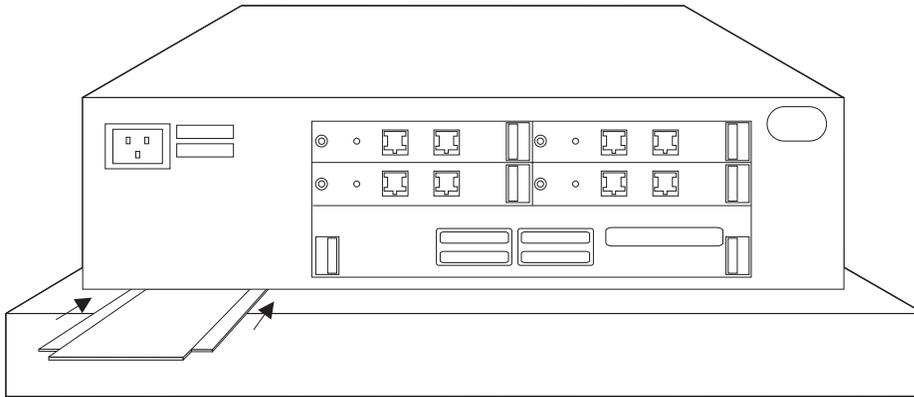
You need the following items:

- Cables, as required
- Four adhesive-backed feet
- Adhesive holder.

Attach the adhesive-backed feet to the bottom four corners and the holder for the *Hardware Configuration Quick Reference Card* to the bottom of the IBM 2212, and then go to step 5 on page 1-5.

2b Rack-Mounting the 2212
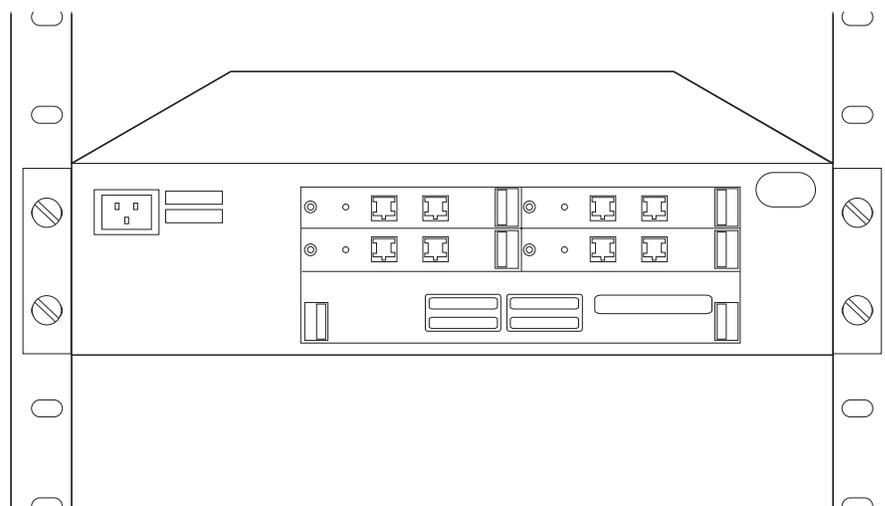
You need the following items:

- Cables, as required
- Four rack-mounting screws
- Adhesive holder
- Screwdriver

Note: If you have a shelf for the rack, install the shelf before continuing.

Continue with step 3 on page 1-4.

3 (Rack-Mounting)
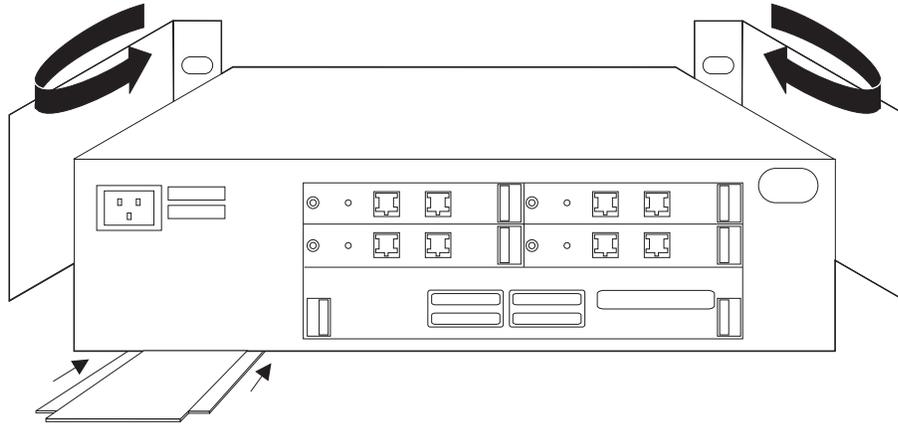
The mounting brackets are shipped with the flanges facing the rear:

1. Remove the two screws on each bracket.
2. Reverse each bracket so that the IBM 2212 can be rack-mounted.
3. Reinstall the screws.

When the brackets are fitted correctly, the bracket on the right side is open over the IBM 2212's air vents.

Attach the holder for storing the *Hardware Configuration Quick Reference Card* to the bottom of the IBM 2212.

If you are attaching the holder to a Model 1xx, allow extra space on the bottom.

4 (Rack-Mounting)
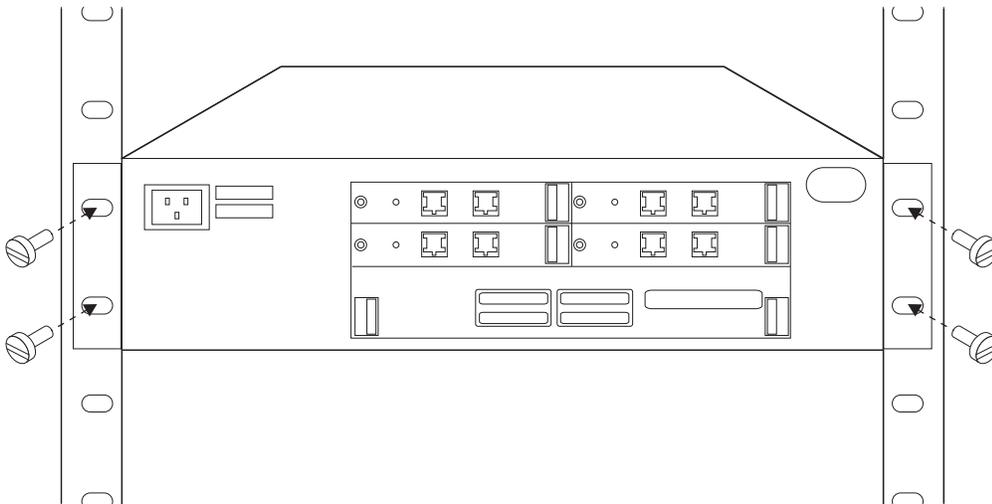
1. Install the rack-mounting screws as shown. These screws come with your rack.

5 (Rack- or Surface-Mounting)
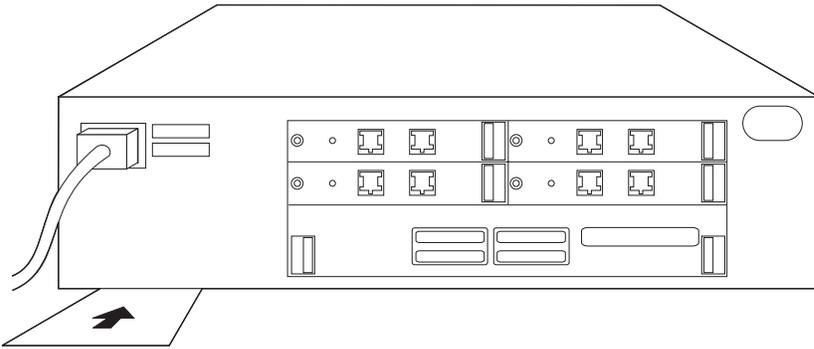
1. Connect the power cord to the IBM 2212 and the power outlet. After three minutes, verify that the system card status green LED is lit. (See Chapter 2, "Problem Solving" on page 2-1 if the system card status green LED is not lit. See "LED Indicators" on page 2-4 for diagrams of the system card and adapter card LEDs.)

2. Ensure that the *Hardware Configuration Quick Reference* card is completed and placed in the holder on the bottom of the IBM 2212.

6 Complete the Setup (Rack- or Surface-Mounting)

1. Connect the modem cable and network cables.

2. Report to the network administrator the phone number of the modem to be used by service for remote access to the IBM 2212. The IBM 2212 is ready to be configured. Go to Chapter 3, "Accessing the IBM 2212" on page 3-1, and then Chapter 4, "Performing the Initial Configuration" on page 4-1.

Chapter 2. Problem Solving

To identify and correct any problems that occur during setup, answer the questions and take the appropriate actions as indicated. The problems listed below will take place before or during the period when the operational code is loaded, if at all. For problems that occur after the operational code is loaded, see pages 2-4 through 2-10.

See "LED Indicators" on page 2-4 for the locations of the LEDs.

On the IBM 2212, are all LEDs off?

Yes: There is no ac source voltage.
1. Disconnect the power cord from the outlet.
2. Check the power source.
3. Ensure that the power cord is attached correctly to the IBM 2212.
4. Reconnect the power cord to the outlet.
If the problem is not corrected, contact your service representative.
No: Go to the next question.

On the IBM 2212, are all system card and service port LEDs on?

Note: If you have a high-performance system card you do not have service port LEDs.

Yes: There is a problem with the bootstrap code. Contact your service representative.
No: Go to the next question.

On the system card, is the system card status yellow LED on and system card status green LED off?

Yes: There is a fault in the card.
1. Disconnect the power cord from the outlet.
2. Reseat the card.
3. Reconnect the power cord to the outlet.
If the problem is not corrected, contact your service representative.
No: Go to the next question.

On the system card, is the service port status yellow LED on and system card status green LED on?

Note: If you have a high-performance system card you do not have service port LEDs.

Yes: Memory tests are in progress.
If the LED remains on, contact your service representative and report that DRAM is defective.
No: Go to the next question.

On the system card, is the system card status green LED off?

> **Yes:** The green LED is switched on by the operational code.
> *If the green LED fails to come on after a few minutes[1], contact your service representative.*
> **No:** Go to the next question.

Are the system card status green and yellow LEDs and service port green and yellow LEDs blinking?

> **Note:** If you have a high-performance system card you do not have service port LEDs.

> **Yes:** Contact your service representative.
> **No:** Go to the next question.

On the system card, is the system card status green LED blinking, the system card status yellow LED on, and the service port green LED on?

> **Note:** If you have a high-performance system card you do not have service port LEDs.

> **Yes:** The operational software cannot be loaded from the hard drive or compact flash.

> The procedure to follow when the yellow system card status LED is on and the green system card status LED is blinking is documented in the first MAP in the *2212 Access Utility Service and Maintenance Manual*. This procedure explains that the code image is corrupted or the hard drive or compact flash is defective, and what to do.
> *If the problem is not corrected after following the procedures in the Maintenance Guide, contact your service representative.*
> **No:** Go to the next question.

On the system card, is any PMC status yellow LED on?

> **Yes:** There is a fault in the PMC card. *Contact your service representative.*
> **No:** Go to the next question.

On the system card, is any integrated WAN port yellow LED on?

> **Yes:** There is a fault in the system card.
> 1. Disconnect the power cord from the outlet.
> 2. Reseat the system card.
> 3. Reconnect the power cord to the outlet.
> *If the problem is not corrected, contact your service representative.*
> **No:** Go to the next question.

On the system card, is the Hard Drive 1 status LED on?

> **Yes:** There is a fault in the compact flash.
> 1. Disconnect the power cord from the outlet.
> 2. Remove the system card.
> 3. Reseat the compact flash.
> 4. Reseat the system cad.
> 5. Reconnect the power cord to the outlet.

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[1] A simple configuration will take 1.5 minutes to load. A more complex configuration or one including APPN will take longer.

| *If the problem is not corrected, contact your service representative.*
| **No:** Go to the next question.

| **On the system card, is the Hard Drive 2 status LED on?**

| **Yes:** There is a fault on the hard drive.
| 1. Disconnect the power cord from the outlet.
| 2. Reseat the system card.
| 3. Reconnect the power cord to the outlet.
| *If the problem is not corrected, contact your service representative.*
| **No:** Go to the next question.

Are any of the slot status yellow LEDs (on the rear of the IBM 2212) on?

Yes: There is a fault in the card that corresponds with the yellow slot status LED that is on.
    1. Disconnect the power cord from the outlet.
    2. Reseat the card.
    3. Reconnect the power cord to the outlet.
If the problem is not corrected, contact your service representative.
No: Go to the next question.

On any adapter, is any port yellow LED on?

Yes: There is a fault in the card.
    1. Disconnect the power cord from the outlet.
    2. Reseat the card.
    3. Reconnect the power cord to the outlet.
If the problem is not corrected, contact your service representative.
No: Go to the next question.

If the problem is not corrected after you follow all the steps above:

Reset the IBM 2212 by following the procedure in "Resetting the IBM 2212" on page A-30. More information about the Reset button is also available in "Reset Button."

If the box still does not boot, and if you have answered **no** *to every question in this list, contact your service representative.*

Reset Button

You can use the Reset button on the IBM 2212 system card to reset the operational software; however, you must press it and hold it for *at least 6 seconds*. If you press it and hold it for *less than 6 seconds*, the memory contents will be dumped if dumping has been enabled via **talk 6** in the command-line interface. (See "Enabling Dumping" on page A-14 for more information.) It will also reboot the IBM 2212 if reboot has been enabled via **talk 6** in the command-line interface. If reboot has *not* been enabled, the IBM 2212 will hang until it has been powered off and on. It is recommended that you always enable reboot on the IBM 2212.

LED Indicators

The IBM 2212 has a number of light-emitting diodes (LEDs) that indicate how the unit is functioning. The following sections describe what each LED indicates.

System Card LEDs

If you have a high-performance system card or a Model x5x, the 4-port WAN PMC Mezzanine, one PCI Mezzanine Card (PMC) adapter slot, each WAN port, and the system card have their own set of green and yellow LEDs. The compact flash and hard drive each have a yellow status LED.

If you have a base system card, the PCI Mezzanine Card (PMC) adapter slot, each integrated WAN port, and the service port on the system card have their own set of green and yellow LEDs. Additionally, the system card has a green and yellow LED for overall system card status.

During a power-on reset (POR), the green and yellow system card status and service port LEDs turn on and blink in different combinations to reflect the component that is being loaded and tested. Once the IBM 2212 has been loaded and tested successfully, the system status card green LED is lit to indicate that the device is operational[2]. The sections that follow reflect problems that can occur after successful load and test.

For more information about problems that can occur before or during operational code load, see page 2-1.
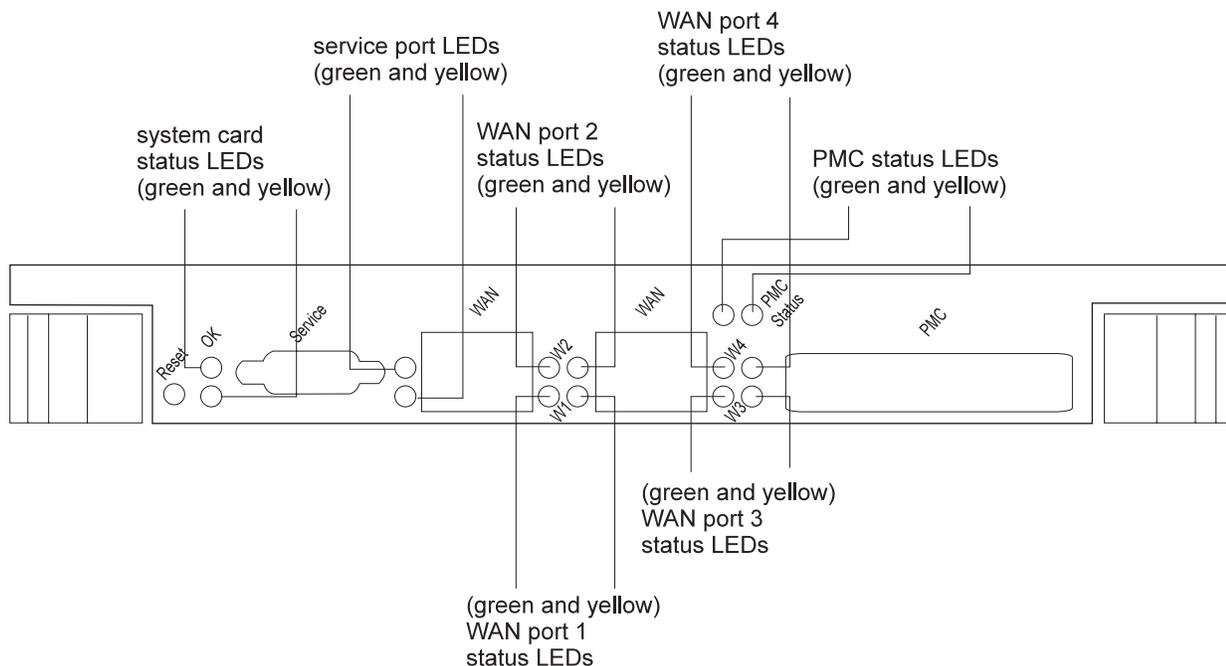
Figure 2-1. Standard System Card LEDs

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[2] A simple configuration will load within 1.5 minutes. More complex configurations or those including APPN will take longer.

WAN port 4 status LEDs
(green and yellow)

WAN port 3 status LEDs
(green and yellow)

WAN port 2 status LEDs
(green and yellow)

WAN port 1 status LEDs
(green and yellow)

Service 1 Service 2 PMC1 WAN 2 WAN 4 PMC2

WAN 1 WAN 3

PMC1 status LEDs
(green and yellow)

PMC2 status LEDs
(green and yellow)

System card status LEDs
(green and yellow)

HD2 status LED (hard file)
(yellow)

HD1 status LED (compact flash)
(yellow)

Reset

| *Figure 2-2. High-Performance System Card LEDs*

Table 2-1 (Page 1 of 2). System card LEDs (Standard and High-Performance)

LED	Color	Meaning
System card status	Green	On - Operating normally.
		Off - Waiting for power on or the operational code to be loaded.
	Yellow	On - Card has a fault.
Service port (standard system card only)	Green	On - Operating normally.
		Off - DRAM may be defective.
	Yellow	On and system card status yellow LED On - Service port defective.
		Off - No problem detected
Hard Drive 1 and 2 (high-performance system card only)	Yellow	HD1 On - The compact flash has a fault.
		HD1 Off - No problem detected.
		HD2 On - The hard drive has a fault.
		HD2 Off - No problem detected.
WAN ports	Green	On - Port is operational.
		Off- Port is not configured or is disabled.

Table 2-1 (Page 2 of 2). System card LEDs (Standard and High-Performance)

LED	Color	Meaning
	Yellow	On - Port has a hardware fault.
		Blinking - The port has an I/O failure.
		Off - No problem detected.
PMC adapters	Green	On - Adapter is operational.
		Off - Adapter is up. No problem detected.
	Yellow	On - Adapter has a hardware fault.
		Blinking - The adapter has an I/O failure.
		Off - Adapter is up. No problem detected.

Adapter Port LEDs

Each adapter port has LEDs to indicate the port's condition as described in the following sections.

Note: There are also LEDs on the rear of the IBM 2212 that indicate the status of the adapter in the corresponding slot. See "Additional Slot-Status LEDs" on page 2-9.

4-Port WAN, ISDN, and 2-Port Token-Ring LEDs
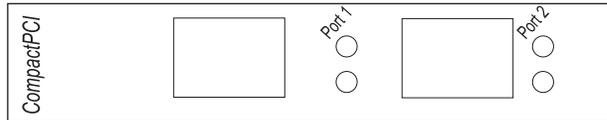
Figure 2-3. Port LEDs for ISDN and Token-Ring Adapters

Table 2-2 (Page 1 of 2). Adapter port LEDs

LEDs	Meaning
4-Port WAN Adapter LEDs	
Green	On - Port is operational.
	Off - Port is not configured or is disabled.
	Note: The 4-port WAN adapter has no yellow LEDs.
ISDN Adapter Card LEDs	
Green	On - Adapter is operational.
	Off - Adapter is not configured or is disabled.
Yellow	On - Adapter has a hardware fault.
	Blinking - Port has an I/O failure.
	Off - No problem detected.
Token-Ring PMC/Adapter Card LEDs	
Green on, yellow off	Adapter is enabled and operational.
Green off, yellow on	Adapter has a hardware fault.

Table 2-2 (Page 2 of 2). Adapter port LEDs

LEDs	Meaning
Green off, yellow blinking	The adapter is closed due to an undetected error. One of the following conditions exists: • The adapter may have been closed by the network administrator. • The **adapter open** operation failed. • The adapter detected a wire fault. Check the cable. • The adapter failed the **auto-removal** test.
Green on, yellow blinking	Adapter has detected beaconing on the Token Ring.
Green blinking, yellow off	Card hardware is operational. The port has been disabled or is not opened into the ring.
Alternating green blink, yellow blink	Waiting for the card to be initialized.
Green off, yellow off	The adapter is not receiving power or is initializing.

2-Port Ethernet Port LEDs
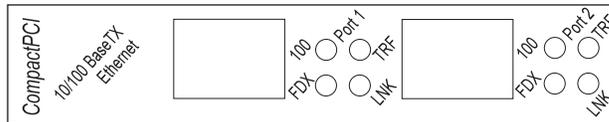
Figure 2-4. Ethernet CPCI Adapter Card LEDs. LEDs for the Ethernet PMC adapter differ.

*Table 2-3. **Ethernet Adapter Port LEDs***

LEDs	Meaning
LNK (green)	Link LED On - The port is successfully connected to an Ethernet segment. Off - A cable is not plugged into the Ethernet port.
TRF (blinking green)	Traffic LED On - Frames are being transmitted or received on the Ethernet port. Off - No frames are being transmitted or received on the Ethernet port.
FDX (green)	Full-duplex LED On - The Ethernet port is running in full-duplex mode. Off - The Ethernet port is running in half-duplex mode.
100 (green)	100-Mbps LED On - The Ethernet port is running in 100-Mbps mode. Off - The Ethernet port is running in 10-Mbps mode.

4-Port Analog 56K Modem LEDs
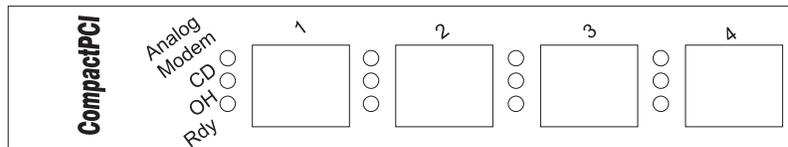
Figure 2-5. 4-Port Analog 56K Modem LEDs

*Table 2-4. **4-Port Analog 56K Modem LEDs***

LEDs	Meaning
Green LED1 - Rdy	On - Adapter is operational.
	Off - Adapter is not configured or is disabled.
Green LED2 - OH	On - The modem is off-hook. Hardware controlled.
Green LED3 - CD	On - The carrier detect is sensed. Hardware controlled.

Compression/Encryption CPCI Adapter LEDs
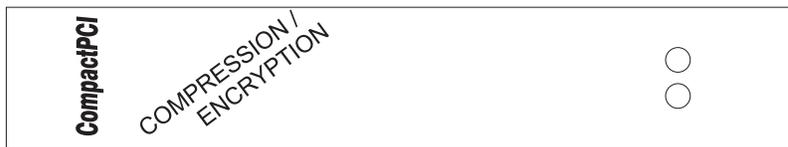
Figure 2-6. Compression/Encryption CPCI Adapter LEDs

Table 2-5. Compression/Encryption CPCI Adapter LEDs

LEDs	Meaning
Green	On - Adapter is enabled.
	Off - Adapter is disabled.
Yellow	On - Adapter has a hardware fault.
	Off - Adapter is disabled.

2-Port Analog Voice CPCI Adapter LEDs
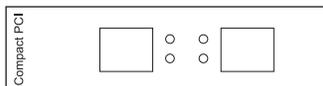
Figure 2-7. Voice Adapter Card LEDs

*Table 2-6. **Voice Adapter Port LEDs***

LEDs	Meaning
Green	On - Adapter is operational.
	Off - Adapter is not configured or is disabled.
Yellow	On - Adapter has a hardware fault.
	Off - No problem detected.

Digital Modem LEDs
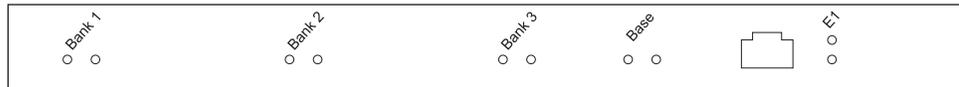
Figure   2-8. Digital Modem Adapter Card LEDs

Table   2-7. **Digital Modem Adapter Port LEDs**

LEDs	Meaning
Green - Bank 1, 2, and 3	On - Card is installed and operational.
Yellow - Bank 1, 2, and 3	On - Card has a hardware fault.
Green and Yellow - Bank 1, 2, and 3	Off - Card is not installed.
Green - base and either T1/J1 or E1	On - Card operating normally.
Yellow - base and either T1/J1 or E1	On - Card has a hardware fault. Off - No problem detected.

Additional Slot-Status LEDs

The LED panel on the rear of the IBM 2212 has one green and one yellow LED per slot. These indicate the condition of the card in the respective slot.
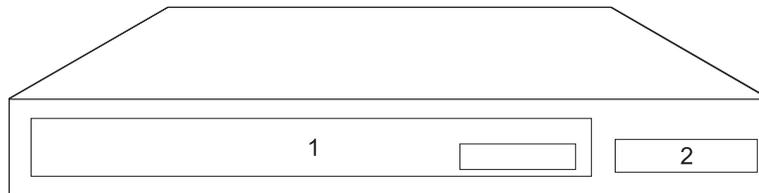
Figure   2-9. Slot Numbering on the IBM 2212, Models 1xx
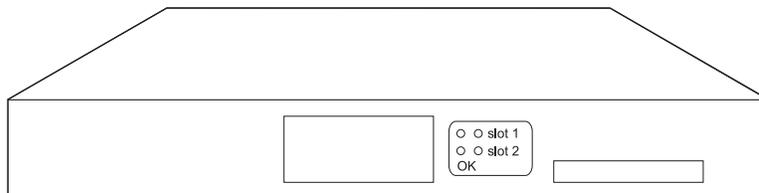
Figure   2-10. Slot Status LEDs on the Rear of the IBM 2212, Models 1xx
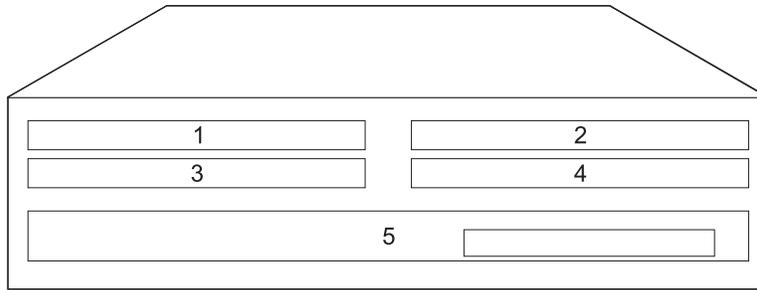
Figure 2-11. Slot Numbering on the IBM 2212, Models 4xx
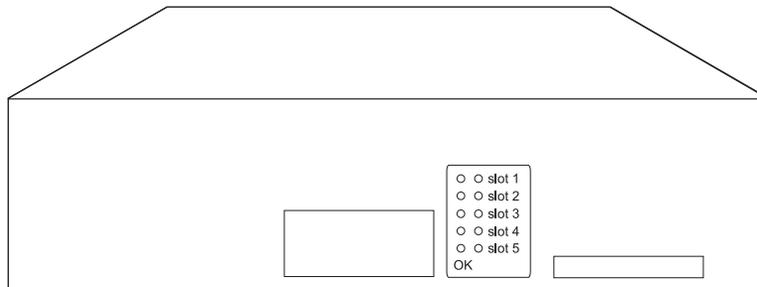
Figure 2-12. Slot Status LEDs on the Rear of the IBM 2212, Models 4xx

Table 2-8. Additional LEDs

LEDs	Meaning
OK (green) - on Yellow - off	Card is operational.
OK (green) - off	Card has a fault.
Yellow - on	See the information on page 2-3 under "Are any of the slot status Yellow LEDs (on the rear of the IBM IBM 2212) on?"
OK (green) - off Yellow - off	No card installed in the slot.

Chapter 3. Accessing the IBM 2212

This chapter explains how to access, either locally or remotely, the IBM 2212's operational and configuration software. The network administrator or the IBM Support Center can access the IBM 2212 locally or remotely for configuration or diagnostics.

Access Methods

The IBM 2212 software must be configured as part of the installation process. Therefore, you have to access the software in one of the following ways:

* Remote dial-in (using telephone lines) through a modem attached to the EIA-232 service port using an ASCII or Serial Line Internet Protocol (SLIP) connection. See Figure 3-2 on page 3-2. "Modem Settings" on page 3-3 lists the modems that have been tested for use with the IBM 2212.

  SLIP is a method for sending IP packets, instead of ASCII data, across a serial link. (You cannot use SLIP to access the bootstrap menus.)

* Locally through a null-modem adapter and serial cables supplied with this product that are attached to the EIA-232 service port using an ASCII or SLIP connection. See Figure 3-1 on page 3-2.

Table 3-1. User Console Attachment Options

Physical Attachment	Line Protocol	Access Protocol	Default IP Addresses
Service port + null modem Service port + external modem	Asynchronous ASCII	ASCII terminal emulation	Not applicable
	SLIP	Telnet	2212 = 10.1.1.2 Workstation = 10.1.1.3
Any IP network interface (not an option for the initial configuration of the IBM 2212)	IP	Telnet	No defaults

An ASCII connection requires an ASCII terminal or a workstation running an ASCII terminal emulator. SLIP requires that Transmission Control Protocol/Internet Protocol (TCP/IP) that supports SLIP be running on your workstation.

Once the IBM 2212 is up and running in the network, you can access the IBM 2212 by Telnetting from a network-connected workstation that is attached to any of the IBM 2212's IP-capable network interfaces. The network interface could be on a LAN adapter or WAN adapter since all of them support IP routing. The Telnet workstation could be locally or remotely connected.
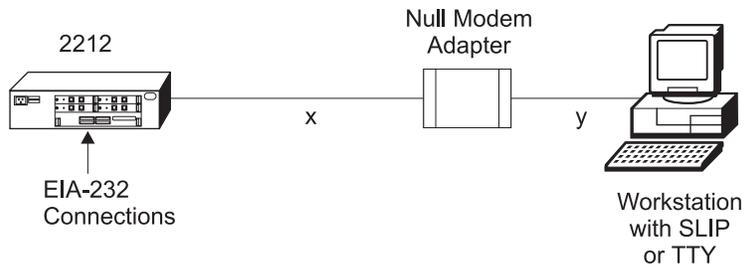
Figure 3-1. Local Terminal Connection to the EIA-232 Service Port
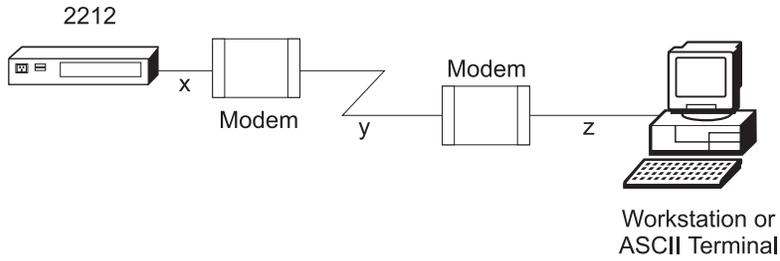
Figure 3-2. Remote Terminal Connection to the EIA-232 Service Port
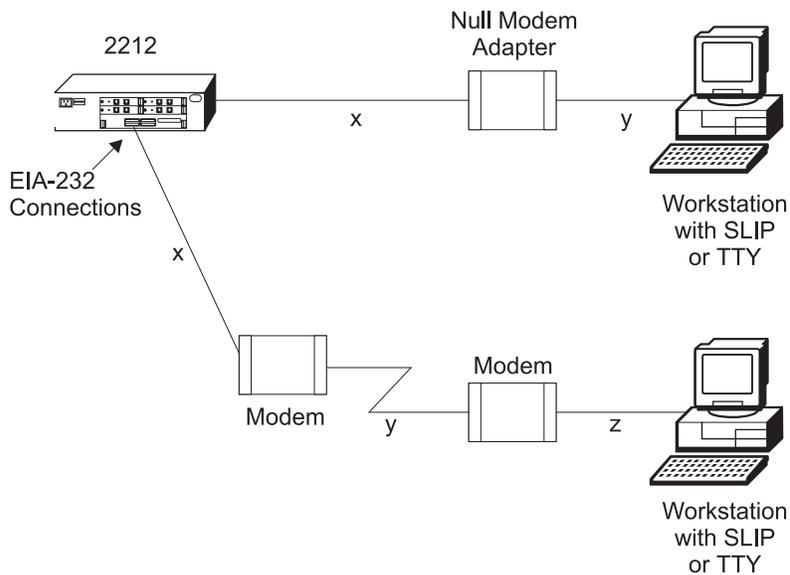
Figure 3-3. Simultaneous Local and Remote Terminal Connection to the EIA-232 Service Port (High-Performance System Card Only)

SLIP Addresses

The default SLIP IP addresses are:

For the workstation:
10.1.1.3

For the IBM 2212:
10.1.1.2

For instructions about installing SLIP, refer to the documentation for your version of TCP/IP.

Service Port Default Settings

These are the default settings for the serial port:

Speed 19.2 Kbps
Parity None
Data Bits 8
Stop Bits 1

You can configure the service port speed for the following bit rates; however, the speed must match the speed configured for the ASCII terminal. See "Changing the Service Port Speed" on page A-12 for instructions on setting the IBM 2212 service port speed.

Note: For the initial configuration of the IBM 2212, you must use 19.2 Kbps. As part of the initial configuration, you can change the line speed of the service port. See "Changing the Service Port Speed" on page A-12.

- 2400
- 9600
- 14 400
- 19 200
- 28 800
- 38 400
- 57 600
- 115 200

Modem Settings

The following modems have been tested for use with the IBM 2212:

- IBM 7852, Model 400
- Zoom/FaxModem 56Kx
- Atlas 33.6 External PC Data/Fax Modem.
- U.S. Robotics 56K Sportster Modem

You can use equivalent modems, with a minimum data transfer rate of 2400 line speed, with the IBM 2212.

For instructions on setting-up these and possibly other modems to operate with your IBM 2212, see the general information technical tips available at:

`http://www.networking.ibm.com/support/2212`

Note: IBM does not endorse or warranty the performance of any particular modem or manufacturer.

Attaching an ASCII Terminal

Attach an ASCII terminal or emulator (with the appropriate emulation software) to provide local or remote access to the IBM 2212. When locally attaching a terminal to the IBM 2212 service port, the speed (baud rate) configured for the service port must match the speed of the connected terminal (x and y in Figure 3-1 on page 3-2). When connecting a IBM 2212 to a remote terminal by two modems

connected by telephone lines (x, y and z in Figure 3-2 on page 3-2), you must comply with the following rules:

- If the modems are running at a speed of 9600 or lower and they do **not** support hardware compression, the IBM 2212 service port speed and the terminal speed must match the modems' line speed.

- If the modems are running at a speed of 9600 or lower and they support hardware compression, the IBM 2212 service port speed and the terminal speed should be higher than the modems' line speed; however, 57 600 and above may be too fast for line speeds below 9600.

- If the modems are running at a speed higher than 9600 and they support hardware compression, the IBM 2212 service port speed and the terminal speed should be higher than the modems' line speed. For modems running at speeds 14 400 to 33 600, it is recommended that the IBM 2212 service port and the terminal be set to 57 600.

ASCII Terminal and Setup Attributes

The DEC VT100 ASCII terminal is supported, as well as devices, such as personal computers, that are configured to emulate it. Configure a VT100 with:

- No parity
- 8-bit word length
- 1 stop bit
- A terminal speed that matches the serial port speed.

The following terminals are also supported:

- IBM 3101 Display Terminal
- IBM 3151 ASCII Display Station
- IBM 3161 ASCII Display Station

Configure these terminals as shown in "Setup Attributes."

Setup Attributes

IBM 3101 Setup Attributes: Use Figure 3-4 to determine the settings for the setup attributes for the IBM 3101 ASCII terminal.
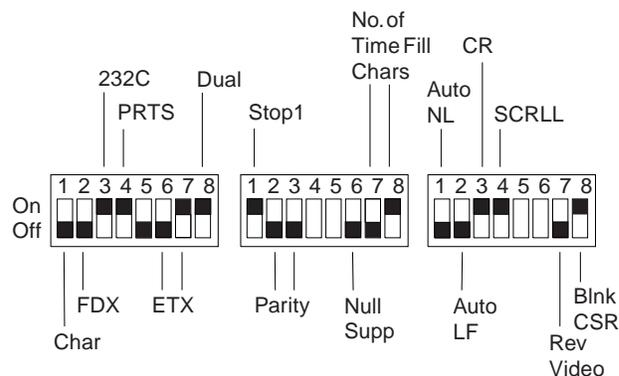
Figure 3-4. Setup Attributes for the IBM 3101 Display Terminal

See page 3-3 for the supported speeds. The terminal speed must match the serial port speed.

IBM 3151 Setup Attributes: Activate setup mode in the IBM 3151 terminal by pressing the **Ctrl** and **Setup** keys. The Ctrl key is located on the lower left of the keyboard. The Setup key is located on the upper right of the keyboard.

Use Table 3-2 to help you determine the settings for the setup attributes. Save the setup information by highlighting the **Save** function using the cursor keys.

Exit by pressing the **Ctrl** and **Setup** keys.

Table 3-2. Setup Attributes for the IBM 3151

Attribute	Setting
Machine Mode	3151
Scroll	JUMP
Auto LF	OFF
Line Wrap	OFF
Operating Mode	ECHO
Word Length (bits)	8
Stop Bit	1
Turnaround Character	CR
Line Control	IPRTS
Break Signal (ms)	500
Send Null Suppress	ON

See page 3-3 for the supported speeds. The terminal speed must match the serial port speed.

IBM 3161 Setup Attributes: Activate setup mode in the IBM 3161 terminal by pressing the **Ctrl** and **Setup** keys. The Ctrl key is located on the lower left of the keyboard. The Setup key is located on the upper right of the keyboard. The terminal displays a setup attribute panel.

Change the attributes by moving the cursor to the various fields and typing over the information in the field. Use Table 3-3 to help you determine the settings for the setup attributes.

Press **Send** to save the attributes on this panel.

Table 3-3. Setup Attributes for the IBM 3161

Attribute	Setting
Machine Mode	3161
Operating Mode	ECHO
Interface	RS-232C
Line Control	IPRTS
Turnaround Character	CR
Stop Bit	1
Word Length (bits)	8
Response Delay (ms)	100
Break Signal (ms)	500

See page 3-3 for the supported speeds. The terminal speed must match the serial port speed.

You now need to set up additional attributes for the 3161. To set up the additional attributes:

1. Press **Select** to display the attribute selection bar.

2. Change the values on the selection bar to match the values in Table 3-4 on page 3-6. To move between selections while on a selection bar, press **Tab**. To change a value for an attribute, press the space bar.

3. Press **Send** to accept the current values for the attributes on the selection bar.

4. Repeat step 2 until you have set all the attributes in Table 3-4.

5. Press **Select** after the last selection bar to exit the 3161 setup function.

Table 3-4. Additional Setup Attributes for the IBM 3161

Attribute	Setting
Enter	Send
Return	Field
New Line	CR
Tab	Field
Line Wrap	On
Auto LF	Off
Send Null	On
Insert	Space
Trace	All
CRT Saver	No
Scroll	On
Print	Viewport
Print Null	On
Print EOL	On
Line End	CR-LF
Send	Line

Bringing Up a Command Line Console

After you have connected your console to the IBM 2212, and have powered on the console and the IBM 2212, you will see a sequence of informational status messages. When you see the prompt `Please press the space bar to obtain the console`, press the space bar to attach the IBM 2212 to your session. The system acknowledges this action with the message `Console granted to this interface`, and by displaying a command prompt after the code loading is complete.

If you are at an IBM 2212 that has never been configured, the system presents the command prompt `Config (only)>`. You can then proceed with the initial configuration. If the IBM 2212 has been configured adequately, the system presents the OPCON command prompt (*).

If the IBM 2212 determines during the boot process that the operational code on the hard drive or compact flash is unusable, it will boot to the service recovery function (`SVC>` prompt). The full operational code is not loaded and only the commands needed to restore the IBM 2212 hard drive or compact flash to an operational state are available. The `SVC>` prompt can also be manually accessed as described in "Accessing the Service Recovery Prompt (SVC>)" on page A-5. See the *Access Integration Services Software User's Guide* for a complete list of the commands.

Managing the Operational and Configuration Software

Operational Software

The IBM 2212 comes from the factory with two copies of its operational software loaded on its hard drive or compact flash and an abbreviated copy (for recovery in case the software or hard drive/compact flash is bad) on the system card flash.

- If the operational software needs an upgrade or replacement, you have to reload it. See "Updating the Operational Code" on page A-26 for instructions on updating the operational software.

- If the operational code on the hard drive or compact flash fails, the recovery version on the system card flash is automatically booted.

- If the IBM 2212 fails when a new version of the operational software is activated, the backup versions can be restored. See "Restoring a Backup Version of Code" on page A-23 for instructions.

- If the bootstrap (stored in system card flash) needs updating, use the procedure in "Updating the Bootstrap Code on System Card Flash" on page A-26.

Configuration Software

The IBM 2212 is capable of storing on its hard drive or compact flash four copies of configuration information for each copy of operational software. You can create binary configuration files using the Configuration Program and upload them to the IBM 2212. You can also do the configuration by attaching an ASCII terminal to the IBM 2212's service port or Telnetting into the IBM 2212 after the initial configuration is complete, and accessing the command-line interface.

Changes to the configuration are activated immediately, after a user-configured timed interval, or at the next restart or reload. See the *Access Integration Services Software User's Guide* to determine the configuration parameters that are activated immediately. See the *Configuration Program User's Guide* for instructions on using the Configuration Program to activate configuration changes at timed-intervals.

Chapter 4. Performing the Initial Configuration

If you have a IBM 2212 with no configuration, or if you have cleared the IBM 2212's configuration, you must perform the steps in this section before you can send an **existing configuration** from the Access Integration Services Configuration Program to the IBM 2212. Refer to Chapter 3, "Accessing the IBM 2212" on page 3-1 for instructions on accessing the IBM 2212's configuration software.

Note: Alternately, you can use the command-line interface to create a full configuration. See the *AIS Software User's Guide, AIS Using and Configuring Features* and *AIS Protocol Configuration and Monitoring Reference, Volumes 1 and 2* for more information.

Setting Up the IBM 2212 Initial Configuration

Note: The following instructions assume that you have used the Access Integration Services Configuration Program to create a full configuration and have stored the configuration file on a workstation on the network. This is the recommended method for configuring the IBM 2212 as explained in "Full Configuration" on page 4-3.

To perform initial configuration on the IBM 2212, you must first establish access to the IBM 2212. You can establish access either locally or remotely as described in "Access Methods" on page 3-1. If your system administrator has filled out the Initial Configuration Worksheet in the *2212 Access Utility Introduction and Planning Guide*, obtain that worksheet now to use as a guide when performing the tasks in this section. Then:

1. Press the space bar to obtain the console.

2. At the `Config Only>` prompt, use the **add device** command to configure the primary LAN or WAN interface. This is the adapter in your IBM 2212 that will connect to the LAN/WAN of the workstation or server on which the IBM 2212's configuration data is located.

   Note: The four integrated WAN ports on the standard system card do not need to be added; they are added automatically by the Access Integration Services software.

   Note: If you have a high-performance system card use the **add device** command to add the 4-port WAN PMC adapter.

   If you plan to use a WAN interface and want to use a data link type other than PPP (which is the default) then you will need to use the `set data link` command to change the data link type.

3. At the `Config only>` prompt, type **qconfig** and press **Enter** to start the Quick Configuration program.

4. Perform an initial configuration to establish the IP address and IP mask for the primary LAN/WAN interface for the IBM 2212 as follows:

   a. **Configure Bridging**

      • Enter **No** to `Configure Bridging?`

   b. **Configure Protocols**

      • Enter **Yes** to `Configure Protocols?`

c. **Configure IP**

1) Enter **Yes** to `Configure IP?`

2) For the LAN/WAN interface that will communicate with the Access Integration Services Configuration Program, enter **Yes** to `Configure IP on this interface?`

3) Enter the IP address at the `IP Address` prompt

4) Enter the IP mask at the `Address Mask` prompt

5) If you have other interfaces, enter **No** to `Configure IP on this interface?`

6) Enter **No** to `Enable Dynamic Routing?`

7) Enter **Yes** to `Define Community with Read_Write_Trap Access?`

Enter the community name that will have Read_Write_Trap access

8) Enter **Yes** to `Save this configuration?`

d. **Configuring IPX and DECnet**

1) Enter **No** to `Configure IPX?`

2) Enter **No** to `Configure DNA?`

e. **Saving the Configuration file**

- Enter **Yes** to `Do you want to write this configuration?`

5. Type **restart** to restart the IBM 2212.

6. Wait for the IBM 2212 to finish reloading. When the loading is finished, you can transfer configuration files that you have created in the Configuration program to the IBM 2212.

7. From the Configuration Program, send the configuration to the IBM 2212. See "Getting a Configuration File from a Workstation to the IBM 2212" on page A-22 for instructions.

After Initial Configuration

Important: After the 2212 is configured and operational, **always** back up the active configuration file. Keeping this file enables you to re-establish the 2212 on the network if the active configuration becomes corrupted.

You can back up the active configuration file by retrieving it and storing it in the workstation on which the Access Integration Services Configuration Program resides. See the *Configuration Program User's Guide* for instructions on retrieving a configuration file.

You can also use the command-line interface to back up a configuration file; however, it will be stored in the IBM 2212 instead of offline in a workstation. See "Backing Up the Active Configuration" on page A-20 for instructions on using the command-line interface to back up a configuration file.

Full Configuration

The initial configuration procedure you have just performed will enable you to access the IBM 2212 over the network if you configured an IP address for it.

The configuration provided by QCONFIG depends upon many default values for parameters, some of which may not be appropriate to your installation. You may need to modify the configuration that you have created using QCONFIG to customize the IBM 2212 to work on your network. You can do this using either of these methods:

- **Configuration Program**

  Here are some of the factors that users cite in favor of the Configuration Program:

  - It enables centralized maintenance of configuration files for multiple IBM 2212's.
  - It provides table-oriented, intuitive organization of data items.
  - It performs more input validation and cross-checking of parameters than the command-line method.
  - In includes online helps for individual data items.

- **Command line interface (OPCON)**

  Here are some of the factors that users cite in favor of the command-line interface:

  - It provides a single integrated method for configuration, dynamic reconfiguration, and monitoring.
  - It is well documented in product publications and IBM "redbooks."
  - It is simple to make and try quick configuration changes.
  - Setting up a user console does not require as many workstation resources or as much time as installing the Configuration Program.

  See the following guides for help creating a full configuration:

  - *Configuration Program User's Guide*
  - *Access Integration Services Software User's Guide*
  - *Access Integration Services Using and Configuring Features*
  - *Access Integration Services Protocol Configuration and Monitoring Reference, Volumes 1 and 2*

Appendix A. Common Tasks

This appendix provides a series of questions and answers dealing with common IBM 2212 installation, operation, and maintenance tasks, with suggestions as to where to find further help in performing them.

Accessing the Bootstrap Menus

Question What are the bootstrap menus? How do I access them?

Answer The bootstrap is microcode running on the IBM 2212 that tests the basic functions of the system card and the hard drive/compact flash, and then loads the operational code. The bootstrap menus display errors detected by the bootstrap and provide system card and hard drive/compact flash problem determination tools, which are used primarily by service personnel.

Accessing the bootstrap menus requires that a console be attached to the IBM 2212 service port, and the boot process be stopped at a specific point.

To access the bootstrap menus:

1. Either unplug and plug the power cord, or type **reload** at the OPCON (∗) prompt on the console.

2. The IBM 2212 will begin its boot process. When the message `<<Press CTRL-C to access menus>>` is displayed, press **Ctrl-C** on the terminal keyboard to stop the boot process. The bootstrap main menu will appear.

Note: You cannot use SLIP to access the bootstrap menus.

See the chapter on "Using the Bootstrap Menus" in the *IBM 2212 Access Utility Service and Maintenance Manual* for more information.

Accessing the OPCON Command Line Interface

Question How do I access OPCON (∗)?

Answer After you have connected your console to the IBM 2212 and have powered on the console and the IBM 2212, you will see a sequence of informational status messages. When you see the prompt `Please press the space bar to obtain the console`, press the space bar to attach the IBM 2212 to your session. The system acknowledges this action with the message `Console granted to this interface`, and by displaying the OPCON command prompt on the console after the code loading is complete.

Note: If you are at an IBM 2212 that has never been configured, the system presents the command prompt `Config (only)>`. Otherwise, you will see the OPCON (∗) prompt.

Accessing OPCON from the Bootstrap Menus

Question How do I access the OPCON command line interface from within the bootstrap?

Answer From the Boot Sequence Selection Menu, select **Normal Boot**, then select **Issue Reset**. The OPCON prompt * is displayed after the system boots.

The command line interface is described in the *Access Integration Services Software User's Guide.*

Accessing OPCON from SVC>

Question How do I access the OPCON command line interface from within the service recovery function (SVC>)?

Answer From the SVC> prompt, type **Bootmode**, then select **3. Normal Boot From Disk** and press **Enter**. Next, type **reboot** and press **Enter**. The OPCON prompt * is displayed after the system boots.

Navigating Through the OPCON Command Line Interface

Question How do I use the commands in the Command Line Interface?

Answer The structure of the interface is shown in Figure A-1 on page A-5.

The *Access Integration Services Software User's Guide* describes the entire command line interface. The basic prompts that you use are the:

- * prompt, which is the OPerating CONsole (OPCON) prompt, the initial entry point to the command line interface
- Config> prompt, which is used for configuration changes
- + prompt, which is known as monitoring or GWCON.
- Config Only> prompt, which is used for initial configuration. The IBM 2212 boots to this prompt if it has not been configured. You cannot access GWCON (+) from the Config Only> prompt.

The basic commands are:

- Type **?** and press **Enter** at any time to view a list of possible commands.
- Type **exit** and press **Enter** to return to the + prompt and to the Config> prompt.
- Press the **Ctrl-p** keys to return to the * prompt.

```
First                    ┌────────┐
Level       ┌───────────▶│ OPCON  │◀──────────────┐
            │            │   *    │                │
            │            └────────┘                │
            │           ┌────┴────┐                │
            │      Talk 5         Talk 6           │
            │           │              │           │
            ▼           ▼              ▼           │
Second    ┌──────────┐  ctrl-p  ┌──────────┐       │
Level     │  GWCON   │──────────│  CONFIG  │       │
          │ process  │          │ process  │       │
          └──────────┘          └──────────┘       │
             Prot 0                Prot 0          │
ctrl-p       │   ▲                ▲   │     ctrl-p
Third   ┌────┘   │                │   └────┐
Level   │      ┌────┐          ┌───────────┐
        └──────│IP> │Exit  Exit│IP Config> │───────┘
               └────┘          └───────────┘
```
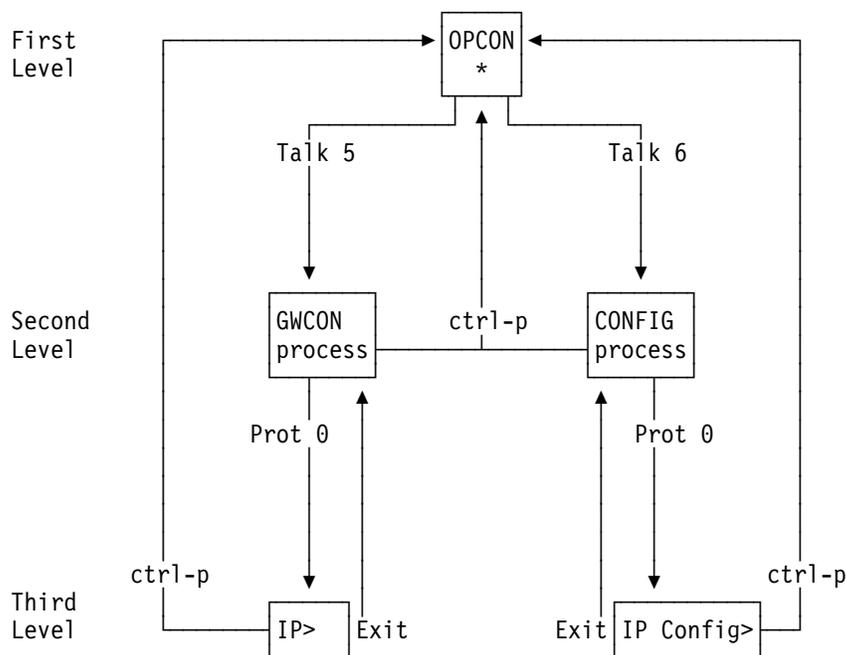
Figure A-1. Structure of the Command Line Interface with the protocol command (Prot) as an example

Accessing the Service Recovery Prompt (SVC>)

Question How do I access the SVC> prompt?

Answer There are two ways depending on whether the IBM 2212 is operating normally, or in recovery mode.

- In normal operational mode, to access the SVC> prompt:

  1. Either unplug and plug the power cord on the IBM 2212, or type **reload** at the OPCON (*) prompt.

  2. Press and **hold** the space bar when you see the message Please press the space bar to obtain the console. The console will display the following message:

     ```
     Please press the space bar to obtain the console.
     Console granted to this interface

     Space bar was pressed during IPL.
     Do you wish to enter the service menu?(Y/N)
     (in 10 seconds, N will be defaulted)

     Service Console
     svc>
     ```

  3. Press **y** within 10 seconds.

     To display a list of available commands, type **?** at the SVC> prompt.

- From the Bootstrap Menus (your IBM 2212 is in recovery mode), to access the SVC> prompt:

  1. Select **Issue Reset**.

2. Press and **hold** the space bar when you see the message `Please press the space bar to obtain the console`. The console will display the following message:

```
Please press the space bar to obtain the console.
Console granted to this interface

Space bar was pressed during IPL.
Do you wish to enter the service menu?(Y/N)
(in 10 seconds, N will be defaulted)

Service Console
svc>
```

3. Press **y** within 10 seconds.

   To display a list of available commands, type **?** at the `SVC>` prompt.

Adapter Tasks

Adapter Status / LED States

Question How do I check the state of the adapters in my IBM 2212?

Answer LEDs on the front and rear of the IBM 2212 indicate the status of the adapter. (See "Adapter Port LEDs" on page 2-6 and "Additional Slot-Status LEDs" on page 2-9.) The *Maintenance Guide* treats problem determination in more detail.

Adding an Adapter After Initial Configuration

| **Note:** The compression/encryption adapter is a coprocessor (cpr) interface, not a
| net interface.
|

Question How do I add an adapter after the IBM 2212 has been initially configured?

Answer Install the adapter using the instructions accompanying the feature. Either use the Configuration Program and download the updated configuration to the IBM 2212, or follow these steps to configure adapters using the IBM 2212's OPCON command line interface (∗ prompt). (The section on FRU exchange in the *IBM 2212 Service and Maintenance Manual* describes the removal and replacement procedure.) Then:

1. Access the OPCON command line interface (∗ prompt). See "Accessing the OPCON Command Line Interface" on page A-3.

2. Type **talk 6** and press **Enter** to reach the `Config>` prompt. If the `Config>` prompt does not appear, press **Enter** again.

3. Type **add device** *type of device* and press **Enter**.

   To see a list of device choices, type **add device ?** and press **Enter**.

   The following two steps do not apply when a dial-circuit device is being added.

4. Enter the device slot number. If you add a PMC adapter or configure a Model 1xF or 1xH, you will not be prompted for a slot number.

5. If you are adding an interface on a single-port adapter, go to step 6. Otherwise, continue with this step.

   Enter the port number. The range of port numbers supported depends on the multi-port adapter type.

6. Make a note of the interface number to which this port is assigned and the net number. If you configure a WAN interface and wish to use a data-link type other than PPP, you must use the **set data-link** *data-link type* command to change the data-link type to any of the data-link protocols available on your IBM 2212 (frame relay, X.25, and SDLC for example).

7. Enter at the `Config>` prompt **net** *net number* to access interface-unique configuration commands. Refer to the *Access Integration Services Software User's Guide* for a description of the supported interface commands.

   | **Note:** This step does not apply to the compression/encryption
   | adapter. At the `Config>` prompt, enter **enable coprocessor**
   | to enable the compression/encryption adapter.

8. Enter **exit** after configuring the interface.

   | **Note:** This step does not apply to the compression/encryption
   | adapter.

9. Use the **protocol** command at the `Config>` prompt to configure protocols on the interface. Refer to Volume 1 and Volume 2 of the *Access Integration Services Protocol Configuration and Monitoring Reference* for a description of the supported commands for each protocol.

10. Enter **exit** to get the `Config>` prompt.

11. Repeat steps 3 on page A-6 through 10 if you have a multi-port adapter and you want to have more than one interface defined on the adapter.

12. Enter **write** to save your changes.

13. Press **Ctrl-p** to return to the OPCON (*) prompt.

14. Enter **restart** at the OPCON (∗) prompt.

Adding an Adapter at Initial Configuration

| **Note:** The compression/encryption adapter is a coprocessor (cpr), not a net interface.

Question How do I add an adapter to the software configuration when the IBM 2212 is being initially configured?

Answer First, perform installation of the 2212 and install any additional adapters into the 2212. (The section on 2212 FRU Exchange in the *IBM 2212 Service and Maintenance Manual* describes the removal and replacement procedure.)

When the IBM 2212 is initially installed, it does not have any software configuration. The operating system will put you at the `Config only>` prompt.

| **Note:** These steps create only the interface. Use the **net** command to configure characteristics unique to that interface (for example, T/R, Ethernet, PPP, FR, SDLC, X.25). (If the device is a coprocessor, then use the **enable coprocessor** command to enable the coprocessor.) You also need to use the **protocol** command to configure protocols on the interface.

| If you configure a WAN interface and you want to use a data-link type other than PPP, use the **set data-link** *data-link type* command to change the data-link type to any of the data-link protocols available on your IBM 2212 (frame relay, X.25, and SDLC for example).

1. Enter **add device** *type of device*

   To see a list of device choices, type **add device ?**.

   If you are adding a dial-circuit device, go to 4. Otherwise, continue with the following step.

2. Enter the device slot number. If you add a PMC adapter or configure a Model 1xF or 1xH, you will not be prompted for a slot number.

3. If you are adding an interface on a single-port adapter, go to step 4. Otherwise, continue with this step.

   Enter the port number. The range of port numbers supported depends on the multi-port adapter type.

4. Make a note of the interface number to which this port is assigned and the net number.

5. At the `Config>` prompt enter **net** *net number* to access interface-unique configuration commands. Refer to the *Access Integration Services Software User's Guide* for a description of the supported interface commands.

   | **Note:** This step does not apply to the compression/encryption adapter. At the `Config>` prompt, enter **enable coprocessor** to enable the compression/encryption adapter.

6. Enter **exit** after configuring the interface.

> **Note:** This step does not apply to the compression/encryption adapter.

7. Use the **protocol** command to configure protocols on the interface. Refer to Volume 1 and Volume 2 of the *Access Integration Services Protocol Configuration and Monitoring Reference* for a description of the supported commands for each protocol.

8. Repeat steps 1 through 4 if you have a multi-port adapter and you want to have more than one interface defined on that adapter.

9. Enter **write** to save the changes.

10. **Restart** the IBM 2212 to make the configuration changes active.

Disabling an Adapter Port

Question How do I disable a configured adapter port to prevent the operational code from bringing up the adapter?

Answer

1. Access the OPCON command line interface (∗ prompt). See "Accessing the OPCON Command Line Interface" on page A-3.

2. Enter **talk 6** to reach the Config> prompt. If the Config> prompt does not appear, press **Enter** again.

3. Type **list device**.

4. Make a note of the interface number of the port you wish to disable.

5. Enter **disable interface** *interface number*.

> **Note:** For the compression/encryption adapter, type **disable coprocessor** *coprocessor number* and press **Enter**.

6. Type **write** to save your changes. The next time the 2212 is rebooted, the interface will be disabled.

You can also disable an adapter port from the GWCON (+) prompt. It will remain disabled until you restart or reload the IBM 2212 or resume traffic.

1. Access the OPCON command line interface (∗ prompt). See "Accessing the OPCON Command Line Interface" on page A-3.

2. Enter **talk 5** to reach the + prompt. If the + prompt does not appear, press **Enter** again.

3. Enter **disable interface** *interface number*. The configuration changes take place immediately.

> **Note:** For the compression/encryption adapter, type **disable coprocessor** *coprocessor number* and press **Enter**. The configuration changes take place immediately.

For details of this procedure, refer to the *Access Integration Services Software User's Guide*.

Displaying the Error Logging System (ELS) Messages for an Interface

Question How do I display ELS messages?

Answer

1. At the OPCON prompt (*), enter the **talk 5** command. The GWCON (+) prompt will be displayed.

2. At the + prompt, type **event**. The ELS> prompt will be displayed.

3. At the ELS> prompt, type **display subsystem** *subsystem_name*. For example, to display the errors logged for a Token-Ring interface, type ELS> **display subsystem tkr all**. To get a list of subsystem names, type **display subsystem ?**. Also refer to the *Access Integration Services Software User's Guide*.

4. Press **Ctrl-p** to display the OPCON (*) prompt.

5. Enter **talk 2**. The messages will begin to scroll by on the screen. To interpret the messages, use the ELS Messages Guide, which is on the *Access Integration Services Configuration Tool and Documentation* CD-ROM.

6. Press **Ctrl-p** to exit talk 2.

Enabling an Adapter Port

Question How do I enable a configured adapter port that was disabled using **disable interface** from the Config> prompt (in "Disabling an Adapter Port" on page A-9)?

Use this procedure to enable the port the next time that you reboot the IBM 2212.

Answer

1. Access the OPCON command line interface (* prompt).

2. Type **talk 6** and press **Enter** to reach the Config> prompt. If the Config> prompt does not appear, press **Enter** again.

3. Type **list device**.

4. Make a note of the interface number of the port you wish to enable.

5. Type **enable interface** *interface number*.

   Note: For the compression/encryption adapter, enter **enable coprocessor** *coprocessor number*.

6. Type **write** to save your changes. The next time the 2212 is rebooted, the interface will be enabled.

For details of this procedure, refer to the *Access Integration Services Software User's Guide*.

Removing and Deleting an Adapter

Question How do I remove and delete an adapter from the configuration?

Answer

1. Access the OPCON command line interface (∗ prompt).

2. Type **talk 6** and press **Enter** to reach the `Config>` prompt. If the `Config>` prompt does not appear, press **Enter** again.

3. Type **list device** and press **Enter**.

4. Write down the interface numbers of all the interfaces configured for the adapter you wish to delete.

5. Type **delete interface** *interface number* for each interface you recorded.

   Note: For the compression/encryption adapter, enter **delete coprocessor** *coprocessor number*.

   Note: The system *renumbers* the interfaces after an interface is deleted. Therefore, if you are deleting more than one interface, the interfaces will be renumbered each time you delete one. For example, if there are 0 through 7 interfaces on your IBM 2212, and you wish to delete Token-Ring interface 4 and Token-Ring interface 5, after you delete interface 4, the system will renumber what was previously interface 5 to interface 4.

6. Type **write** and press **Enter** to save your changes.

7. Type **restart** and press **Enter** to make the configuration changes active.

   For details of this procedure, refer to the *Access Integration Services Software User's Guide*.

Resume Traffic on an Adapter Port

Question How do I resume traffic on a configured adapter port (that was disabled in "Suspend Traffic on an Adapter Port" on page A-12 or "Disabling an Adapter Port" on page A-9)?

Answer

1. Access the OPCON command line interface (∗ prompt).
2. Type **talk 5** and press **Enter** twice to reach the + prompt.
3. Type **interface**.
4. Make a note of the interface number of the adapter port you wish to enable.
5. Type **test** *interface number*.

   Note: If you use the **test** command to enable an interface that has been configured at the `Config>` prompt (from **talk 6**) as disabled, when you reboot the IBM 2212, the interface will be disabled again. Therefore, you should use the `Config>` **enable interface** command to ensure that the interface is enabled the next time a reboot does occur.

For details of this procedure, refer to the *Access Integration Services Software User's Guide*.

Running Diagnostics

Question How do I run diagnostics on a particular adapter?

Answer From the service recovery function (SVC> prompt) or the OPCON command-line interface (∗ prompt), type **diags**.

Suspend Traffic on an Adapter Port

Question How do I disable a configured adapter port to suspend traffic?

Answer

1. Access the OPCON command line interface (∗ prompt).
2. Type **talk 5** and press **Enter** twice to reach the + prompt.
3. Type **interface** and press **Enter**.
4. Make a note of the interface net number of the adapter port that you want to disable.
5. Type **disable interface** *net number* and press **Enter**.

   Note: For the compression/encryption adapter, enter **disable coprocessor** *coprocessor number*.

6. Press the **Ctrl-p** keys to return to the ∗ prompt.

Changing the Service Port Speed

Question How do I change the service port's speed?

Answer

The IBM 2212 service port is shipped with the speed set to 19.2 Kbps. To change the service port speed, perform the following steps:

1. Either Telnet into the IBM 2212 over one of its network interfaces, or attach an ASCII terminal to the IBM 2212 service port as described in Chapter 3, "Accessing the IBM 2212" on page 3-1.

   - If you Telnet into the IBM 2212, use the procedure in 3 for the OPCON (∗) prompt.

   - If you attach an ASCII terminal to the service port you can use the following procedure.

2. Access either the SVC> prompt (see "Accessing the Service Recovery Prompt (SVC>)" on page A-5) or the OPCON (∗) prompt (see "Accessing the OPCON Command Line Interface" on page A-3).

3. Take **one** of the following actions, depending on which version of operational code you have loaded and prompt you accessed:

   - If you have installed either AIS V3.2, AIS V3.3, or later operational code, from the SVC> prompt, type **baudrate** and press **Enter**. You will be prompted for the rest of the information.

   - If you have installed AIS V3.2 operational code, from the OPCON (∗) prompt:

| a. Type **talk 6** and press **Enter** to reach the Config> prompt.
| If the Config> prompt does not appear, press **Enter** again.

| b. From the Config> prompt, type **set baudrate** and enter the
| speed.

| • If you have installed AIS V3.3 or later operational code, from the
| OPCON (∗) prompt:

| a. Type **talk 6** and press **Enter** to reach the Config> prompt.
| If the Config> prompt does not appear, press **Enter** again.

| b. From the Config> prompt, depending on the service port
| speed you want to change, type either **set baudrate**
| **service1** or **set baudrate service2**.

| c. Enter the speed.

| **Note:** You must reconfigure the speed of the ASCII terminal to
| match the service port speed to enter any further commands.

Disabling Dumping

Question How do I disable dumping of memory contents on the IBM 2212?

Answer You can set the IBM 2212 to dump the contents of memory to the hard
drive if the IBM 2212 contains one, or a network server attached to the
same LAN as the IBM 2212 in the unlikely event of a complete system
failure. If dumping is enabled, using this selection will cause the IBM
2212 **not** to dump at the next system failure. The following sections
describe the various methods for disabling dumping on the IBM 2212.

Disable Dumping from OPCON

To disable dumping:

1. Type **talk 6** or **t 6** at the OPCON (*) prompt and press **Enter** to reach the
   Config> prompt. If the Config> prompt does not appear, press **Enter** again.

2. Type **disable dump-memory** or **dis dump** at the Config> prompt and press
   Enter.

3. You will be prompted by the following message to confirm:

       Disable system memory dumping? [no]: **yes**

Disable Dumping from SVC> Prompt

You can also disable dumping from the SVC> prompt.

1. Access the Service Recovery Interface as described on page "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. At the SVC> prompt, type **dump** and press **Enter**.

3. You will be prompted for the rest of the information as shown in the following example.

   ```
   Dump is currently enabled.
   Do you want to disable dump (Y/N)?  Y
   ```

Enabling Dumping

Question How do I enable dumping of memory contents on the IBM 2212?

Answer You can set the IBM 2212 to dump the contents of memory without intervention from anyone in the unlikely event of a complete system failure.

You can configure the IBM 2212 to dump memory locally to the hard drive if the IBM 2212 contains one, or dump it over the network to a file on a LAN-attached server if you preconfigured it to do so. It can also be configured to dump once and stop, dump three times and stop, or dump continuously. Once the dump is successful, the IBM 2212 attempts to restart. Depending upon the failure of the IBM 2212, it cannot always restart. In this case, you should restart it manually and call a service person who will dial into the IBM 2212 to determine the nature and the causes of the failure.

The following sections describe the various methods for enabling dumping on the IBM 2212.

Enable Dumping from OPCON

To enable dumping, enter the following commands at the Config> prompt.

1. Enable system rebooting by typing **enable reboot-system**.

2. Type the **set dump save-mode** and **set dump enable-mode** commands to change or keep the current settings.

3. Type the **set dump target** command to specify where the system memory contents will be written. Valid targets are the IBM 2212 hard file, if one is present, or a remote host on a LAN. If the target is a remote host on a LAN, then IP and TFTP parameters of both the local LAN interface and the remote host are required, along with whether or not the file is to be transferred via TFTP as compressed or uncompressed data. You will be prompted for the information as shown in the following examples.

4. To enable dumping, type **enable dump-memory** at the Config> prompt. You will see the message:

   ```
   Current System Dump Status:
     System dump is currently enabled.
     Number of existing dump files:  3
   ```

If you wish to delete the existing dump files, issue the **delete dump-files** command.

```
Config> set dump save-mode

Current System Dump Settings:
   Re-enable System Dump following the next system dump.
   Save the last 3 (most recent) dump files.

Do you want to change system dump save-mode to
save the first (initial) dump files ? (Yes, No): [No] Yes

Current System Dump Settings:
   Re-enable System Dump following the next system dump.
   Save the first 3 (initial) dump files, then disable system dump.

Current System Dump Status:
   System dump is currently enabled.
   Number of existing dump files:  2

Config> set dump enable-mode

Current System Dump Settings:
   Disable System Dump following the next system dump.
   Save the last 3 (most recent) dump files.

Do you want to change system dump enable-mode to
re-enable System Dump following the next system dump ? (Yes, No): [No] Yes

Current System Dump Settings:
   Re-enable System Dump following the next system dump.
   Save the last 3 (most recent) dump files.

Current System Dump Status:
   System dump is currently enabled.
   Number of existing dump files:  2

Config> set dump target

Current System Dump Target Settings:

   Dump Target:  Remote Host on Network
   Local Interface Settings:
     Device Type:  Ethernet
     Slot Number:  1
     Port Number:  1
      IP address:  9.9.9.6
     Net Mask:  255.255.255.0
   Remote Host Settings:
     IP address:  15.110.33.99
     Remote Filename:  /oracle/appndmp
     Remote file will be compressed and "0.cmp", "1.cmp", or "2.cmp" will be
     appended to the end of the filename.

Do you want to change the System Dump Target ? (Yes, No): [No] Yes
Enter Dump Target (D-Disk or N-Network): [N]? N
Setting Dump Target to "Network".
Set or Change settings for dumping to the Network ? (Yes, No): [No] Yes
Enter Local LAN Interface Type (E-Eth or T-Tkr): [E]?
```

```
                          Enter Slot Number (1-5): [1]?
                          Enter Port Number (1-2): [1]?
                          Enter Local IP Address: [9.9.9.6]? 15.110.33.99
                          Enter Local Netmask: [255.255.255.0]? 255.255.248.0
                          Enter Remote IP Address: [15.110.33.99]?
                          Remote Path and File name:  /oracle/appndmp
                          Enter Path and File name (32 chars max):
                          Enter File Compression Mode (C-Comp or U-Uncomp): [C]? U
                          Do you want to save your changes ? (Yes, No): [No] Yes

                           New System Dump Target Settings:

                             Dump Target:  Remote Host on Network
                             Local Interface Settings:
                               Device Type:  Ethernet
                               Slot Number:  1
                               Port Number:  1
                               IP address:  15.110.33.99
                               Net Mask:  255.255.248.0
                             Remote Host Settings:
                               IP address:  15.110.33.99
                               Remote Filename:  /oracle/appndmp
                               Remote file will be uncompressed and "0.unc", "1.unc", or "2.unc" will be
                               appended to the end of the filename.
```

Enable Dumping from SVC> Prompt

You can also enable dumping from the SVC> prompt. Access the Service Recovery
Interface as described in "Accessing the Service Recovery Prompt (SVC>)" on
page A-5. Then, type **dump** and press **Enter**. You will be prompted for the rest of
the information, as shown in the following example.

```
svc> dump
This command enables or disables system dump and
selects the dump target as disk or remote host.

Dump is currently enabled.
Do you want to disable dump ?
n
Dump is currently enabled.
Dump Target:  Remote Host on Network.
Enter Dump Target (Disk or Network or  to keep current value):

Remote Host settings:
 IP address:  9.9.9.1
 Remote Filename:  /tmp/dump_to_host
 Remote file will be compressed and "0.cmp", "1.cmp", or "2.cmp" will be
 appended to the end of the filename.

Do you want to set or change the remote dump parameters ?
y
Press  to save current setting.

Enter IP address (0.0.0.0 form):
15.110.33.99
Enter remote path and filename (32 chars max):
/oracle/appndmp
```

```
Enter Remote File Compression Mode (Compressed or Uncompressed):
Compressed
Remote Host settings:
 IP address:  15.110.33.99
 Remote Filename:  /oracle/appndmp
 Remote file will be compressed and "0.cmp", "1.cmp", or "2.cmp" will be
 appended to the end of the filename.

Do you want to save the new network dump parameters ?
y
Remote Host settings:
 IP address:  15.110.33.99
 Remote Filename:  /oracle/appndmp
 Remote file will be compressed and "0.cmp", "1.cmp", or "2.cmp" will be
 appended to the end of the filename.

You must reboot in order for these changes to take effect.
```

Entering Vital Product Data

Question How do I enter vital product data (VPD) information?

Answer You can enter VPD information from the SVC> prompt. See "Accessing the Service Recovery Prompt (SVC>)" on page A-5. Then, type **vpd** and press **Enter**. You will be prompted for the rest of the information.

Getting Up-to-Date IBM 2212 Information

Question How can I find the most current information about the IBM 2212?

Answer Point your Web browser to:
http://www.networking.ibm.com/2212/2212prod.html

Getting Software Updates from the Web

Question How can I find the most current IBM 2212 code from the web?

Answer Point your Web browser to:
http://www.networking.ibm.com/support/downloads/2212

Download the files onto your server. Use the TFTP procedure (see "Transferring Files Using TFTP" on page A-23) or Zmodem procedure (see "Transferring Files Using Zmodem" on page A-26) to load them onto the IBM 2212.

Interface Tasks

Displaying the Status of An Interface

Question How do I display the status of an interface?

Answer

1. To check the status of the interface, access the OPCON prompt (∗).
   (See "Accessing the OPCON Command Line Interface" on
   page A-3)

2. Type **talk 5** and press **Enter**.

3. Type **interface** and press **Enter** to determine the interface number
   associated with the I/O port.

4. Type **interface #** and press **Enter**. The status of the interface,
   including error counts, will be displayed.

Displaying a List of Configured Interfaces

Question How do I display a list of configured interfaces?

Answer

1. Access the OPCON prompt (∗). (See "Accessing the OPCON
   Command Line Interface" on page A-3)

2. Type **talk 6** and press **Enter** to reach the `Config>` prompt. If the
   `Config>` prompt does not appear, press **Enter** again.

3. Type **list dev** and press **Enter**.

4. Press **Ctrl-p** to return to the OPCON (*) prompt.

Displaying the Operational State of the Interfaces

Question How do I display the state of an interface (for example, up, down,
disabled)?

Answer

1. Access the OPCON prompt (∗). (See "Accessing the OPCON
   Command Line Interface" on page A-3)

2. Type **talk 5** and press **Enter** to reach the + (monitoring) prompt. If
   the + prompt does not appear, press **Enter** again.

3. Type **configuration** and press **Enter**.

4. Press **Ctrl-p** to return to the OPCON (*) prompt.

Verifying IP Connectivity

Question How do I verify that a given IP address is accessible from the IBM 2212?

Answer

1. Access the command line interface (the * prompt).

2. Type **talk 5** and press **Enter** twice to reach the + prompt.

3. Type **protocol** and press **Enter**.

4. Type **ip** and press **Enter**. The prompt changes to IP>.

5. Type **ping** *IP address value* and press **Enter**. Press **Enter** to stop the ping process.

6. Type **exit** at the IP> prompt and press **Enter**. The prompt changes to +.

7. Press **Ctrl-p** to return to the OPCON (*) prompt.

Managing Operational Code and Configuration Files

To help you manage operational software upgrades and configurations, the IBM 2212 has a software change management feature. This utility enables you to determine which operational software file and configuration file are active while the IBM 2212 is running. It also has a service recovery interface that enables you to perform many of the same tasks.

Reconfiguring

You might find it difficult to detect problems caused by configuration errors. A configuration error can initially appear to be a hardware problem because the 2212 will not start or data will not flow through a port. In addition, problems with configuration may not result in an error initially; an error may occur only when specific conditions are encountered or when heavy network traffic occurs.

If you cannot resolve a problem after making a few changes to your configuration or after restoring the active configuration file, it is recommended that you generate a new configuration. Too many changes to a configuration often compound the problem, whereas you can usually generate and test a new configuration within a few hours.

Backing Up the Active Configuration

Question How do I use the OPCON command-line interface to backup the active configuration?

Answer You can backup the active configuration file by using the command-line interface to copy a configuration file to an available bank, and then lock the bank to protect the file. To do so, issue the following commands:

1. From the OPCON prompt *, type **talk 6** and press **Enter** to reach the `Config>` prompt. If the `Config>` prompt does not appear, press **Enter** again.

2. At the `Config>` prompt:

   a. Type **boot** and press **Enter**.

   b. Type **copy configuration** and press **Enter**. You will be prompted for the following information as shown in the example.

      - Source bank (A or B)

      - Source configuration file (1, 2, 3, or 4). Up to four configuration files can be associated with each bank.

      - Destination bank (A or B)

      - Destination for configuration file (1, 2, 3, or 4)

      ```
      Boot config> copy config

      Copy FROM Bank number? A
      Copy FROM Config number? 1
      Copy TO Bank number? B
      Copy TO Config number? 1
      ```

   c. To prevent the device from overwriting the selected configuration, type **lock** and press **Enter**.

      You will be prompted for the source bank (A or B) and the source configuration file. These locations are the destination bank and the configuration you specified in the step 2b.

   d. Optionally, you can use the **add** command to add a description of the backup configuration file.

Checking the Software and Configuration File Level

Question How do I check the level of software loaded on my IBM 2212?

Answer To check the **level of the operational software image** stored in the IBM 2212, access the `Boot config>` prompt or the `SVC>` prompt, and then type **describe**. The Product ID, microcode version number, release number, maintenance number, PTF, Feature, and RPQ numbers and the date of the operational software image are displayed.

To display **information on a configuration file** loaded on the IBM 2212, access the `Boot config>` prompt or the `SVC>` prompt, and then type **list**. For each configuration file that is loaded, its bank, internal location (for example, CONFIG 1), version, and level is displayed.

Copying a File Using the Copy Command

Question How do I copy a load image or configuration file from one bank in the IBM 2212 to another?

Answer

The **copy** command allows you to copy a load image or configuration file from one location on the hard drive or compact flash to another. This command allows you to change the status as well. The file that you copy always receives the status of the storage area that it is copied to.

From the OPCON (∗) prompt:

1. At the OPCON (∗) prompt, type **talk 6** and press **Enter**. The Config> prompt will be displayed.

2. At the Config> prompt, type **boot** and press **Enter**. The Boot config> prompt will be displayed.

3. At the Boot config> prompt, to copy a configuration file, type the following commands:

   ```
   Boot config> copy config

   Copy FROM Bank number? A
   Copy FROM Config number? 1
   Copy TO Bank number? B
   Copy TO Config number? 1
   ```

   To copy a load image, at the Boot config> prompt, type **copy load**. You will be prompted for the source bank (A or B) and destination bank (A or B).

From the SVC> prompt:

1. Access the SVC> prompt. (See "Accessing the Service Recovery Prompt (SVC>)" on page A-5).

2. At the SVC> prompt and press **Enter**, type **copy**. You will be prompted for the rest of the information, as shown in the following example.

```
svc>copy
        BankA ---+--------- Description ----------+------ Date -------+
  IMAGE - PENDING                                     10 Feb 1998 17:46
  CONFIG 1 - AVAIL                                    10 Feb 1998 17:46
  CONFIG 2 - AVAIL                                    09 Jan 1998 10:40
  CONFIG 3 - AVAIL                                    06 Jan 1998 15:46
  CONFIG 4 - PENDING *                                02 Jan 1998 11:51
+------ BankB -----------+--Description ----------+------ Date -------+
  IMAGE - AVAIL                                       14 Feb 1998 15:38
  CONFIG 1 - AVAIL    *                               03 Feb 1998 14:43
  CONFIG 2 - AVAIL                                    22 Jan 1998 13:43
  CONFIG 3 - AVAIL                                    06 Jan 1998 17:25
  CONFIG 4 - AVAIL                                    26 Jun 1998 09:48

Load or Config? c
Enter source bank : a
Enter source config <1-4>: 3
Enter destination bank : b
Enter destination config <1-4>: 3
/hd0/sys0/CONFIG2 --> /hd0/sys1/CONFIG2
Copy configuration commmand successful!
```

If you copy an image, the same rules apply except that image files can be copied only from bank to bank. These steps describe how the copy of an image affects the image that was previously in the bank:

1. The copy overwrites the image that was previously in the bank.

2. The copy acquires the status of the image that was previously in the bank.

Erasing Files

Question How do I erase the contents of a bank in the IBM 2212?

Answer

To erase a file, at the `Boot config>` prompt or the `SVC>` prompt, type **erase** and press **Enter**, and then follow the prompts.

If you select a file to erase with a status of CORRUPT or NONE, the erase option is discontinued.

Note that the following rules apply to erasing files from the IBM 2212:

- Image files that are not ACTIVE can be erased anytime
- ACTIVE image files *cannot* be erased
- ACTIVE configuration files *cannot* be erased

Getting a Configuration File from a Workstation to the IBM 2212

Question How do I get a file from the workstation on which the configuration program is running to the IBM 2212?

Answer To get a configuration file from the workstation on which the configuration program is running to the IBM 2212, you have the following options:

- Attach the workstation to an IP network that can be used to reach the IBM 2212.

  In this case, the workstation must be running TCP/IP and the communications feature of the configuration program is used to establish direct communications between the configuration program and the IBM 2212. When you use the Send option of the configuration program's communications feature, the configuration data is sent to the IBM 2212 using SNMP packets. After all of the configuration data has been sent, you can use the communication feature's restart router option. This causes the IBM 2212 software to be reloaded and initialized using the new configuration data immediately. Alternately, you can use the communication feature's timed config option to set a time when the IBM 2212 will be reloaded with the new configuration.

- Attach the workstation to the same IP network as the IBM 2212. In this case, the workstation must be running TCP/IP and support TFTP in addition to the configuration program. To transfer a configuration file from the workstation to the IBM 2212, see "Transferring Files Using TFTP" on page A-23.

- Attach the workstation to the IBM 2212's service port. In this case, you can either use TFTP over SLIP (which requires TCP/IP to be running on the workstation) or Zmodem to transfer to the IBM 2212

configuration files which were created by the configuration program and stored on the workstation. The TFTP and Zmodem functions are not part of the configuration program support. They are separate applications which must be available on the workstation. To transfer a configuration file from the workstation to the IBM 2212 using TFTP, see "Transferring Files Using TFTP." To use Zmodem to transfer a configuration file from the workstation to the IBM 2212, see "Transferring Files Using Zmodem" on page A-26.

- If the workstation cannot communicate with the IBM 2212 directly using one of the options described previously, use some mechanism (such as diskette) to get configuration files created by the configuration program to a network server that is attached to the same IP network as the IBM 2212, or to a PC that is attached to the IBM 2212's service port. In the first case, use TFTP to transfer the configuration files from the network server to the IBM 2212. In the second case, use TFTP over SLIP or Zmodem to transfer the configuration files from a PC to the IBM 2212.

Restoring a Backup Version of Code

Question How do I restore a backup version of operational code or a configuration file?

Answer You can restore the backup version of code from either the `Boot Config>` prompt or the `SVC>` prompt. Use the `SVC>` prompt when you cannot access the normal operational console.

1. To access the `Boot Config>` prompt, at the OPCON prompt (*), type **talk 6** and press **Enter** to reach the `Config>` prompt. If the `Config>` prompt does not appear, press **Enter** again. At the `Config>` prompt, type **boot** and press **Enter**.

   To access the `SVC>` prompt, use the procedure described on page "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. At either prompt, type the **set** command, press **Enter**, and follow the prompts to select the previously active code bank and configuration.

3. From the `Boot Config>` prompt, type **reload** and press **Enter**. From the `SVC>` prompt, type **reboot** and press **Enter**.

Transferring Files Using TFTP

Question How do I TFTP operational code and configuration files onto the IBM 2212?

Answer Use TFTP to transfer software code loads and configuration files from a workstation or server to the IBM 2212. You will need to substitute your own values for the IP address and path, which are given as examples. The number of bytes received is also an example. You can use TFTP from the `SVC>` prompt or the OPCON (*) prompt as described in the following sections.

   Note: You transfer the files to banks within the IBM 2212. The banks represent the directories that have been created automatically; you do not have to be concerned about transferring the files to a particular directory within the IBM 2212.

TFTP File Transfer using the Operating Software

1. From the OPCON prompt (*), type **talk 6** and press **Enter** to reach the Config> prompt. If the Config> prompt does not appear, press **Enter** again.

2. Type **boot** and press **Enter**. The Boot config> prompt is displayed.

3. To get the software code load, type **tftp get load mod** and press **Enter**. To get a configuration file, type **tftp get config** and press **Enter**.

   You cannot overwrite a currently active bank image or configuration file.

4. When prompted, specify the IP address of the TFTP server.

5. When prompted, specify the path/file name for the code load or config file.

6. When prompted, specify the bank in which you want the code load or config file written. If you are transferring a config file, you are prompted for the config file (1 through 4) in which you want to transfer the configuration data.

   The following example shows a software code load:

```
  * talk 6
  Config> boot
  Boot config>tftp get load mod
Boot config>tftp get load mod
+------ BankA -----------+--------- Description ----------+------ Date -------+
  IMAGE - AVAIL                                            10 Aug 1998 16:03
  CONFIG 1 - AVAIL   *    cc_158e                          10 Aug 1998 16:06
  CONFIG 2 - NONE                                          10 Aug 1998 16:49
  CONFIG 3 - NONE
  CONFIG 4 - NONE
+------ BankB -----------+--------- Description ----------+------ Date -------+
  IMAGE - ACTIVE                                           10 Aug 1998 13:23
  CONFIG 1 - AVAIL        cc_158e                          10 Aug 1998 13:23
  CONFIG 2 - ACTIVE  *    cc_158e                          11 Aug 1998 10:21
  CONFIG 3 - NONE                                                            |
  CONFIG 4 - NONE                                                            |
  +-----------------------+-------------------------------+------------------
  * - Last Used Config     L - Config File is Locked

 Auto-boot mode is enabled.
Specify the server IP address (dotted decimal): [1.2.3.4] 10.10.10.99
Specify the remote modules directory: :(/u/bin/) /tftpboot/2212a
Select the destination bank: (A,B): [A] a
TFTP SW load modules
  get:   /tftpboot/2212a/LML.ld
  from:  10.10.10.99
  to:    bank A.
TFTP transfer of /hd0/sys0/LML.ld complete, size=6318 status: OK
TFTP transfer of /hd0/sys0/os.ld complete, size=740936 status: OK
TFTP transfer of /hd0/sys0/snmp.ld complete, size=243980 status: OK
TFTP transfer of /hd0/sys0/sysext.ld complete, size=154409 status: OK
TFTP transfer of /hd0/sys0/initblk.ld complete, size=66022 status: OK
TFTP transfer of /hd0/sys0/tkflash.ld complete, size=131558 status: OK
TFTP transfer of /hd0/sys0/diags.ld complete, size=228496 status: OK
TFTP transfer of /hd0/sys0/router.ld complete, size=5849916 status: OK
TFTP transfer of /hd0/sys0/router.ld complete, size=5849916 status: OK
TFTP transfer of /hd0/sys0/nstation.ld complete, size=632700 status: OK
TFTP transfer of /hd0/sys0/appn.ld complete, size=3004451 status: OK
TFTP transfer of /hd0/sys0/tn3270e.ld complete, size=142874 status: OK
```

```
TFTP transfer of /hd0/sys0/encrypt.ld complete, size=1867 status: OK
TFTP transfer of /hd0/sys0/LMX.ld complete, size=1044 status: OK

Operation completed successfully.
Boot config>
```

7. Type **set** and press **Enter** to cause the bank and config file that you just transferred the code load or configuration data into to become active at the next reload/restart. You will be prompted for the destination source bank and configuration file. Until you reload the IBM 2212, the state of the bank is pending.

8. Type **reload** and press **Enter** if you transferred new operational code. Type **restart** if you transferred a new configuration file.

TFTP File Transfer using the Service Recovery Interface (SVC)

Use the Service Recovery Interface (SVC>) to transfer new software onto the IBM 2212 only if you are replacing the hard drive or compact flash, or the software on both banks A and B is corrupted and you are replacing it. To use TFTP at the SVC> prompt, follow these steps:

1. Access the SVC> prompt. See "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. Type **interface** and press **Enter** to define the IBM 2212 LAN interface and IP address over which to transfer the files.

3. At the SVC> prompt, type **TFTP** and press **Enter**.

4. Specify whether you want to TFTP a software code load (load) or a configuration file (config). You will be prompted for the rest of the information. The following example shows a software code load.

```
svc>tftp

-------BankA-------+---------- Description -------+------ Date -------+
  IMAGE - PENDING                                 10 Feb 1998 17:46
  CONFIG 1 - AVAIL                                10 Feb 1998 17:46
  CONFIG 2 - AVAIL                                09 Jan 1998 10:40
  CONFIG 3 - AVAIL                                06 Jan 1998 15:46
  CONFIG 4 - PENDING *                            02 Jan 1998 11:51
+------ BankB -------+--------- Description ----------+------ Date -------+
  IMAGE - AVAIL                                   03 Feb 1998 14:42
  CONFIG 1 - AVAIL    *                           03 Feb 1998 14:43
  CONFIG 2 - AVAIL                                22 Jan 1998 13:43
  CONFIG 3 - AVAIL                                06 Jan 1998 17:25
    CONFIG 4 - AVAIL                                26 Jun 1998 09:48
  +-----------------------+-----------------------------+----
Load or Config?
Specify the server IP Address:  1.1.1.4
Specify the remote directory:   /u/2212/swload
Enter destination bank : b

tftping load modules... please be patient.
```

5. Type **set** and press **Enter** to cause the bank and config file that you just transferred the code load or configuration data into to become active at the next reboot. You will be prompted for the destination source bank and configuration file. Until you reload the IBM 2212, the state of the bank is pending.

6. Type **reboot** and press **Enter**.

Transferring Files Using Zmodem

Question How do I use Zmodem to transfer operational code and configuration files onto the IBM 2212?

Answer

Access the SVC> prompt. From the SVC> prompt, type **zmodem** and press **Enter**. You will be prompted to specify the bank for the image files or the bank and the config number for the configuration files that you transfer. The interface for transferring is designed so that you cannot overwrite any ACTIVE file.

For transfers via modem, each load module must be separately named and transferred individually.

Note: When using Zmodem to transfer a multiple load module image (several files ending in .ld), **_you must_** transfer each of the modules one by one to get the entire load module image.

When an entire load image has transferred, the status of the bank will change from CORRUPT to AVAIL. Transfer file LML.ld first. Unless you see an information message ERROR WRITING FILE appear, assume each individual transfer has been successful.

Updating the Bootstrap Code on System Card Flash

Question How do I update the bootstrap code stored on system card flash?

Answer

1. Access the SVC> prompt as described on page "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. Type the **writeboot** command and press **Enter** to write the bootstrap to system card flash from the specified software load bank.

3. Type **reboot** and press **Enter**.

Updating the Operational Code

Question How do I update the operational code?

Answer **To update operational code when the IBM 2212 is operating normally:**

1. Access the OPCON prompt (∗). See "Accessing the OPCON Command Line Interface" on page A-3.

2. From the OPCON prompt (∗), type **talk 6** and press **Enter** to reach the Config> prompt. If the Config> prompt does not appear, press **Enter** again.

3. At the Config> prompt, type **boot** and press **Enter**. The Boot config> prompt will be displayed.

4. At the Boot config> prompt, type **TFTP get load mod** and press **Enter** to get an operational load image from a server to the IBM 2212. See "TFTP File Transfer using the Operating Software" on

page A-24 for instructions on using TFTP. The operational code on the hard drive or compact flash will be updated.

To update operational code when the IBM 2212 is operating in recovery mode:

To update the operational code on hard drive or compact flash, from the SVC> prompt, type **TFTP** and press **Enter** to get an operational load image from a server to the IBM 2212. See "TFTP File Transfer using the Operating Software" on page A-24 for instructions on using TFTP from SVC>.

To update the operational code on system card flash:

1. Access the SVC> prompt as described on page "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. Type the **writeos** command and press **Enter** to write the a new version of operational code to the system card flash from the specified software load bank. The system prompts you for the bank from which to write the operational code.

3. Type **reboot** and press **Enter**.

Using the Configuration Program's Communications Feature to Manage Configuration Files

Question How do I use the Configuration Program's communications feature and Send option to manage configuration files?

Answer For optimal configuration management, it is recommended that you use the Configuration Program and its configuration database to manage all your IBM 2212 configuration files.

The design of change management facilitates good control of the configuration files. Keeping the ACTIVE file and the file that is stored in the configuration database the same assures that a copy of the ACTIVE file is always available.

When you use the Send option of the Configuration Program's communications feature to send a new configuration to the IBM 2212, the new configuration is written to the ACTIVE bank and overwrites the file located in the position just below the currently ACTIVE configuration. The new configuration is PENDING if a time is set for a reset. If the configuration file is sent without a specified time for the reset to occur, it gets AVAIL status.

For example, suppose that CONFIG 2 is ACTIVE. The new configuration file is written to CONFIG 3. It has a status of PENDING if a reset time is associated with it; if not, it has a status of AVAIL.

If the file has a status of PENDING, CONFIG 2 becomes AVAIL and CONFIG 3 becomes ACTIVE when a reset occurs. The next file that is sent from the Configuration Program will be placed in CONFIG 4. If a reset time is associated with the file, it will have the PENDING status and will become ACTIVE when the next reset occurs. If another file is then sent, it is placed in CONFIG 1 because the currently ACTIVE file is now in CONFIG 4. This arrangement results in a circular queue.

If the downloaded file has a status of AVAIL, a reset does not change its status. If another file is sent down, it overwrites that file because the

ACTIVE file has not changed and the newly downloaded file always occupies the location just behind the ACTIVE file.

Example of Sending a File from the Configuration Program

For example, suppose that this is the view of the software that is displayed by the **list** command:

```
Boot Config> list

BANK A                          BANK B
 IMAGE - ACTIVE                  IMAGE - AVAIL
  CONFIG 1 - ACTIVE               CONFIG 1 - AVAIL
  CONFIG 2 - AVAIL                CONFIG 2 - AVAIL
  CONFIG 3 - NONE                 CONFIG 3 - AVAIL
  CONFIG 4 - NONE                 CONFIG 4 - NONE
```

The Configuration Program sends a config file to BANK A, CONFIG 2. If you use the restart router option of the Configuration Program's communications feature, the IBM 2212 performs a reset immediately and reinitializes using the new configuration.

After these actions, the IBM 2212 configuration looks like this:

```
BANK A                          BANK B
 IMAGE - ACTIVE                  IMAGE - AVAIL
  CONFIG 1 - AVAIL                CONFIG 1 - AVAIL
  CONFIG 2 - ACTIVE               CONFIG 2 - AVAIL
  CONFIG 3 - NONE                 CONFIG 3 - AVAIL
  CONFIG 4 - NONE                 CONFIG 4 - NONE
```

CONFIG 1 has become AVAIL and CONFIG 2 has become ACTIVE.

If the Configuration Program were now used to send down a new configuration to the IBM 2212 and the file were not marked to be loaded at any specified time, the view of the software in the IBM 2212 would look like this:

```
BANK A                          BANK B
 IMAGE - ACTIVE                  IMAGE - AVAIL
  CONFIG 1 - AVAIL                CONFIG 1 - AVAIL
  CONFIG 2 - ACTIVE               CONFIG 2 - AVAIL
  CONFIG 3 - AVAIL                CONFIG 3 - AVAIL
  CONFIG 4 - NONE                 CONFIG 4 - NONE
```

After this action, CONFIG 3 is AVAIL. The new configuration file has been loaded in this location.

Note: You should exercise caution here because any on-board configuration changes could result in overwriting the CONFIG 3 file. Because the configuration file in CONFIG 3 was sent down without any time specified for resetting the server, it is currently not in use. It can be overwritten either when another file is sent from the Configuration Program or when a file is saved using the **write** command from the command line interface. You can use the **copy** command to move it to another location to protect it (see "Copying a File Using the Copy Command" on page A-21) or use the **lock** command to keep the configuration file from being overwritten.

Viewing the Files

Question   How do I display the state of the operational software image and configuration files stored on the IBM 2212?

Answer   To use the **change management tool in the command line interface** to view the operational software image and the configuration files, follow these steps:

1. From the OPCON prompt (*), type **talk 6** and press **Enter** to reach the `Config>` prompt. If the `Config>` prompt does not appear, press **Enter** again.

2. Type **boot** and press **Enter**. You will see the prompt `Boot config>`.

3. Type **list** and press **Enter**. You will see a list similar to this one:

```
Boot config> list

BANK A                          BANK B
 IMAGE - ACTIVE                  IMAGE - AVAIL
  CONFIG 1 - ACTIVE               CONFIG 1 - AVAIL
  CONFIG 2 - AVAIL                CONFIG 2 - AVAIL
  CONFIG 3 - NONE                 CONFIG 3 - NONE
  CONFIG 4 - NONE                 CONFIG 4 - NONE
```

Each bank represents one image of the operational code. The images stored in BANK A and BANK B are stored on the hard drive or compact flash. The Configs represent the configuration files that are stored with each bank. *IMAGE* refers to the status of the operational software and *CONFIG* refers to the status of the configuration files.

The possible IMAGE and CONFIG status:

ACTIVE   This file is currently loaded in active memory and is running on the IBM 2212.

> **Note:**   The status of this file can be changed only by resetting the IBM 2212. *If a config or an image is active, it is locked and cannot be overwritten or erased.*

AVAIL   This is a valid file that can be made active.

CORRUPT   This file was damaged or was not loaded onto the IBM 2212 hard drive or compact disk completely.

PENDING   This file will be loaded and become active the next time the IBM 2212 is reloaded.

LOCAL   This file will become active at the next reset. This reset will cause the currently ACTIVE file to become PENDING. LOCAL is a status that makes a file ACTIVE only for one reset of the IBM 2212.

Only one bank at a time contains an ACTIVE image. Only one configuration file is ACTIVE and it must be within the ACTIVE bank.

To use the **Service Recovery Interface** (`SVC>`), to view the operational software and configuration files, follow these steps:

1. Access the `SVC>` prompt as described on page "Accessing the Service Recovery Prompt (SVC>)" on page A-5.

2. Type **list**. See step 3 in the previous section for an explanation of the information displayed on the terminal. You can also type **describe** at the SVC> prompt and press **Enter** to identify the levels of code on your IBM 2212.

Resetting the IBM 2212

Question How do I reset the operational software on the IBM 2212?

Answer The IBM 2212 operational software can be reset in the following ways:

- Unplug and replug the IBM 2212 power cord.

- Press and **hold for 6 seconds** the reset button on the system card. The IBM 2212 will behave as if it has been powered off and back on: component tests are run and the operational code is reloaded.

  Note: If you press the reset button and **hold it for less than 6 seconds**, the memory contents will be dumped if dumping has been enabled via **talk 6** in the command-line interface. It will also reboot the IBM 2212 if reboot has been enabled via **talk 6** in the command-line interface. If reboot has **not** been enabled, the IBM 2212 will hang until it has been powered off and on. It is recommended that reboot always be enabled on the IBM 2212.

- Both the OPCON (*) prompt and Config only> prompt support the **reload** and **restart** commands. From either prompt, type **reload** or **restart** and press **Enter**.

  The **reload** command causes the IBM 2212 to behave as if it has been powered off and back on: system card and hard drive or compact flash component tests are run and the operational code is reloaded.

  The **restart** command activates configuration changes, operational code is not reloaded and diagnostic tests are not run. You cannot use **restart** to initialize a new version of the operational code.

  Note: The Config only> prompt appears when no config file is active. Lack of an active config file indicates that an active configuration has become corrupted or that the IBM 2212 is not configured.

- From the Bootstrap Menus, choose the issue reset option. The issue reset option on the Bootstrap Menus causes the IBM 2212 to behave as if it has been powered off and back on: system card and hard drive or compact flash component tests are run and the operational code is reloaded.

- At the SVC> prompt, type **reboot** and press **Enter**. This causes the IBM 2212 to test the system card and hard drive or compact flash components and reload the operational software on the hard drive or compact flash.

  Note: The software that is loaded and interface the IBM 2212 boots to are determined by the current boot mode setting. To change the boot mode setting, access the SVC> prompt and use the

bootmode command. (See "Accessing the Service Recovery Prompt (SVC>)" on page A-5.)

Running Quick Configuration

Question How do I run the Quick Configuration program?

Answer First, make sure each adapter has been added. See "Adding an Adapter at Initial Configuration" on page A-8. Then, at the `Config (only)` or `Config>` prompt, enter **qc**.

Viewing Hardware and Software Vital Product Data

Question How do I view vital product data (VPD)?

Answer

1. Access the OPCON (∗) prompt. (See "Accessing the OPCON Command Line Interface" on page A-3.)

2. At the OPCON prompt, type **talk 6** and press **Enter**.

3. Type **list vpd** and press **Enter** to view the IBM 2212 hardware and software VPD.

Appendix B. Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Subject to IBM's valid intellectual property, or other legally protectable rights, 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. The evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the user's responsibility.

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The shielded power cord that accompanies the IBM 2212 Access Utility and the shielded cable that accompanies the digital modem adapter (T1: PN 30L6571, E1: PN 30L6572, and J1: 30L6573), if present, are required to comply with FCC Class A, Industry Canada Class A, EN 55022 Class A, CISPR22 Class A, and VCCI Class A emission requirements. Consult your IBM authorized dealer for a replacement shielded power cord or shielded digital modem adapter cable if needed. IBM cannot accept responsibility for any interference caused by using an unshielded power cord or unshielded digital modem adapter cable.

Federal Communications Commission (FCC) Class A Statement

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 (T1 digital modem adapter, IBM PN 30L6571) and a shielded power cord (IBM part numbers 6952303 and 6952304 for 125 volts; IBM part numbers 1838578 and 1838579 for 250 volts) must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Class A Emission Compliance Statement

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

Avis de conformité aux normes d'Industrie Canada

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

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 (VCCI). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を
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CISPR22 Compliance Statement

This product has been tested and found to comply with the limits for Class A
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55022. The limits for Class A equipment were derived for commercial and industrial
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accept responsibility for any interference caused by using an unshielded power
cord.

Warning: 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.

Taiwanese Class A Warning Statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策•

European Union (EU) Electromagnetic Compatibility Statement

Operation with Unshielded Cables on RJ-45 or RJ-11 Ports

This product is in conformity with the protection requirements of EU Council
Directive 89/336/EEC on the approximation of the laws of the Member States
relating to electromagnetic compatibility. IBM cannot accept responsibility for any
failure to satisfy the protection requirements resulting from a non-recommended
modification of the product, including the fitting of non-IBM option cards.

The shielded cable that accompanies the digital modem adapter and a shielded power cord are required to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Consult your IBM authorized dealer for a replacement shielded power cord if needed. IBM cannot accept responsibility for any interference caused by using an unshielded power cord.

Warning: 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.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richlinie 89/336)

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

Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

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

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: 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."

EN 50082-1 Hinweis: "Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 50082-2 festgelegt), dann kann es dabei eventuell gestört werden. In solch einem Fall ist der Abstand bzw. die Abschirmung zu der industriellen Störquelle zu vergrößern."

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

Operation with Shielded Twisted Pair Category 5 Cable on RJ-45 and RJ-11 Ports

Except when the FXS, FXO, or E&M Voice/Fax CPCI feature cards are installed, the IBM 2212 Access Utility is an EN-55022 Class B product with properly shielded and terminated Category 5 cables and connectors attached to those adapters with RJ-45 and RJ-11 connectors. Otherwise, it is EN-55022 Class A. The FXS, FXO, and E&M Voice/Fax CPCI feature cards are EN-55022 Class A devices.

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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

Telecommunication Notices

The product bears the Telecom CE mark (CE 168 X) for ISDN Basic Rate complying with I-CTR3 (Bridging measures) as per the European directive 91/263/EEC (TTE directive). The product bears the Telecom CE mark (CE 168 X) for: V.24/V.28, V.36 and X.21 electrical interfaces complying with NET 1 and with NET 2 physical level. ISDN Basic Rate complying with I-CTR3 (Bridging measures) as per the European directive 91/263/EEC (TTE directive).

FCC Part 68 Compliance Information:

Features and optional adapters for the IBM 2212 comply with Part 68 of the FCC rules. The label included on the adapter tray contains, among other information, the FCC registration number and Ringer Equivalence Number (REN), if applicable for this equipment. If requested, provide this information to your telephone company.

The IBM 2212 adapters include:

- 2-Port ISDN BRI-U CPCI Adapter, with interface code 021S5, service code 6.0F, and jack type RJ-45.

- 1-Port ISDN PRI T1/J1 CPCI Adapter, with interface code 04DU9-1SN, service code 6.0F, and jack type RJ-48C.

- 2-Port ISDN PRI T1/J1 CPCI Adapter, with interface code 04DU9-1SN, service code 6.0F, and jack type RJ-48C.

- T1/J1 Digital Modem Adapter with interface code 04DU9-1SN, service code 6.0N, and jack type RJ-48C.

- 4-Port Analog 56K Modem Adapter with REN # 3.8B and jack type RJ-11.

- 2-Port Analog FXO Voice Adapter with REN # 0.9B and jack type RJ-11.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In

most, but not all areas, the sum of the RENs of all devices should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.

If the IBM 2212 causes harm to the telephone network, the Telephone Company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.

This equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporate commission for information.)

If trouble is experienced with this equipment, for repair or warranty information, in the United States, call IBM at **1-800-IBM-SERV**. In Canada, call IBM at **1-800-465-6600**.

No repairs can be performed by the customer.

Note: The sum of the RENs of all devices applies to each line.

Industry Canada Information:

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

- The Ringer Equivalence Number for the IBM 2212, 4-Port Analog 56K Modem Adapter is: 1.0
- The Ringer Equivalence Number for the IBM 2212, 2-Port Analog FXO Voice Adapter is: 0.4

AVIS: L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministére n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de reparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particuliérement importante dans les régions rurales.

AVERTISSEMENT: L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

AVIS: L'indice d'équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminau qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excéde pas 5.

- L'indice d'équivalence de la sonnerie pour la carte modem 56 k à 4 ports analogiques de l'IBM 2212 est 1.0
- L'indice d'équivalence de la sonnerie pour la carte vocal FXO à 2 ports analogiques de l'IBM 2212 est 0.4

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Safety Information

⚠ **Danger:** Before you begin to install this product, read the safety information in *Caution: Safety Information—Read This First*, SD21-0030. This booklet describes safe procedures for cabling and plugging in electrical equipment.

⚠ **Caution:** This unit contains a non-replaceable lithium battery. The unit should be returned to the nearest IBM-authorized dealer for proper disposal.

⚠ **Gevaar:** Voordat u begint met de installatie van dit produkt, moet u eerst de veiligheidsinstructies lezen in de brochure *PAS OP! Veiligheidsinstructies—Lees dit eerst,* SD21-0030. Hierin wordt beschreven hoe u electrische apparatuur op een veilige manier moet bekabelen en aansluiten.

⚠ **Waarschuwing:** Deze eenheid bevat een lithiumbatterij die niet kan worden verwijderd. U kunt de gebruikte eenheid voor verwerking als kkein chemisch afval terugbrengen naar een geautoriseerde IBM-dealer.

⚠ **Perigo:** Antes de começar a instalar este produto, leia as informações de segurança contidas em *Cuidado: Informações Sobre Segurança—Leia Isto Primeiro,* SD21-0030. Esse folheto descreve procedimentos de segurança para a instalação de cabos e conexões em equipamentos elétricos.

⚠ **Perigo:** Esta unidade contém uma bateria de Lítio não-substituível. A unidade deve ser retornada à IBM; entre em contato com o atendimento (011) 889-8986 para obter informações de como enviá-la pelo correio.

危險：安裝本產品之前，請先閱讀
"Caution: Safety Information–Read
This First" SD21-0030　手冊中所提
⚠ 供的安全注意事項。　這本手冊將會說明
使用電器設備的纜線及電源的安全程序。

注意：

⚠ 本部件带的锂电池不可更换。所以，应将它退回到与您最近的 IBM
授权经销商处，以便妥善处理。

⚠️ Opasnost: Prije nego sto pŏcnete sa instalacijom produkta, pročitajte naputak o pravilima o sigurnom rukovanju u Upozorenje: Pravila o sigurnom rukovanju - Prvo pročitaj ovo, SD21-0030. Ovaj privitak opisuje sigurnosne postupke za priključrivanje kabela i priključivanje na električno napajanje.

Pozor

⚠️ Ova jedinica sadrži litijevu bateriju koja se ne zamjenjuje. Stoga, radi ispravnog uklanjanja, jedinicu treba vratiti najbližem IBM ugovornom partneru.

⚠️ **Upozornění**: než zahájíte instalaci tohoto produktu, přečtěte si nejprve bezpečnostní informace v pokynech „Bezpečnostní informace" č. 21-0030. Tato brožurka popisuje bezpečnostní opatření pro kabeláž a zapojení elektrického zařízení.

Pozor:

⚠️ Tato jednotka obsahuje nevyměnitelnou lithiovou baterii. Jednotka musí být zlikvidována v souladu s místními předpisy.

⚠️ **Fare!** Før du installerer dette produkt, skal du læse sikkerhedsforskrifterne i *NB: Sikkerhedsforskrifter—Læs dette først* SD21-0030. Vejledningen beskriver den fremgangsmåde, du skal bruge ved tilslutning af kabler og udstyr.

⚠️ **Litiumbatteri:** Denne enhed indeholder et litiumbatteri. Batteriet må ikke udskiftes. Enheden skal kasseres i overensstemmelse med gälig.ldende miljøbestemmelser for litiumbatterier.

⚠️ **Gevaar** Voordat u begint met het installeren van dit produkt, dient u eerst de veiligheidsrichtlijnen te lezen die zijn vermeld in de publikatie *Caution: Safety Information - Read This First*, SD21-0030. In dit boekje vindt u veilige procedures voor het aansluiten van elektrische appratuur.

⚠️ **Waarschuwing:**Deze eenheid bevat een lithiumbatterij die niet kan worden verwijderd. U kunt de gebruikte eenheid voor verwerking als klein chemisch afval terugbrengen naar een geautoriseerde IBM-dealer.

⚠️ **VAARA:** Ennen kuin aloitat tämän tuotteen asennuksen, lue julkaisussa *Varoitus: Turvaohjeet—Lue tämä ensin*, SD21-0030, olevat turvaohjeet. Tässä kirjasessa on ohjeet siitä, miten sähkölaitteet kaapeloidaan ja kytketään turvallisesti.

⚠️ **Varoitus:** Tämä yksikkö sisältälitiumpariston, jota ei voi vaihtaa. Yksikkö tulee palauttaa valtuutetulle IBM-jälleenmyyjälle, joka huolehtti sen asianmukaisesta hävityksestä.

⚠ **Danger:** Avant d'installer le présent produit, consultez le livret *Attention : Informations pour la sécurité — Lisez-moi d'abord* SD21-0030, qui décrit les procédures à respecter pour effectuer les opérations de câblage et brancher les équipements électriques en toute sécurité.

⚠ **Pile au lithium:** Cette unité contient une pile au lithium non remplaçable. Pour la mise au rebut de cette pile, renvoyez l'unité à votre partenaire commercial IBM.

⚠ **Vorsicht:** Bevor mit der Installation des Produktes begonnen wird, die Sicherheitshinweise in *Achtung: Sicherheitsinformationen—Bitte zuerst lesen,*, Form SD21-0030. Diese Veröffentlichung beschreibt die Sicherheitsvorkehrungen für das Verkabeln und Anschließen elektrischer Geräte.

⚠ **Achtung:** Diese Einheit enthält eine Lithiumbatterie, die nicht ausgetauscht werden kann. Diese Einheit sollte zur ordnungsgemässen Entsorgung an den zuständigen IBM Händler zurückgegeben werden.

⚠ **Vigyázat:** Mielôtt megkezdi a berendezés üzembe helyezését, olvassa el a *Caution: Safety Information— Read This First,* SD21-0030 könyvecskében leírt biztonsági információkat. Ez a könyv leírja, milyen biztonsági intézkedéseket kell megtenni az elektromos berendezés huzalozásakor illetve csatlakoztatásakor.

Figyelem!

⚠ A készülék lítium eleme nem cserélhető. Kérjük az elemet a legközelebbi IBM disztribútornál leadni.

⚠ **Pericolo:** prima di iniziare l'installazione di questo prodotto, leggere le informazioni relative alla sicurezza riportate nell'opuscolo *Attenzione: Informazioni di sicurezza — Prime informazioni da leggere* in cui sono descritte le procedure per il cablaggio ed il collegamento di apparecchiature elettriche.

⚠ **Attenzione:** All'interno di questa unità è contenuta una batteria al litio non sostituibile. Per lo smaltimento, riportare tale unità al più vicino rivenditore IBM.

⚠ 危険： 導入作業を開始する前に、安全に関する
小冊子SD21-0030 の「最初にお読みください」
(Read This First)の項をお読みください。
この小冊子は、電気機器の安全な配線と接続の
手順について説明しています。

注意

⚠ このユニットには取り外しのできないリチュウム・バッテリーが使われています。ユニットを廃棄する時は最寄のＩＢＭ製品取扱いディーラーにユニットごとお持ちください。

위험: 이 제품을 설치하기 전에 반드시
"주의: 안전 정보–시작하기 전에"
(SD21-0030) 에 있는 안전 정보를
읽으십시오.

주의:

본 장치에는 대체 불가능한 리튬 배터리가 포함되어 있습니다. 적절한
폐기를 위해 본 장치는 가까운 IBM 공인 딜러사에 반납하셔야 합니다.

Fare: Før du begynner å installere dette produktet, må du lese sikkerhetsinformasjonen i *Advarsel: Sikkerhetsinformasjon — Les dette først*, SD21-0030 som beskriver sikkerhetsrutinene for kabling og tilkobling av elektrisk utstyr.

ADVARSEL: Denne enheten inneholder et litumbatteri som ikke kan byttes ut. Når enheten skal kastes, bør den leveres hos en autorisert IBM-forhandler.

Uwaga:
Przed rozpoczęciem instalacji produktu należy zapoznać się z instrukcją:
"Caution: Safety Information - Read This First", SD21-0030.
Zawiera ona warunki bezpieczeństwa przy podłączaniu do sieci elektrycznej
 i eksploatacji.

Uwaga:

Jednostka ta posiada niewymienialną baterię litową. Jednostka
powinna zostać zwrócona do najbliższego przedstawiciela firmy
IBM w celu właściwej likwidacji.

Perigo: Antes de iniciar a instalação deste produto, leia as informações de segurança *Cuidado: Informações de Segurança — Leia Primeiro*, SD21-0030. Este documento descreve como efectuar, de um modo seguro, as ligações eléctricas dos equipamentos.

CUIDADO: Esta unidade contém uma bateria de lítio não substituível. A unidade deve ser enviada ao concessionário autorizado IBM mais próximo, para destruição de acordo com as normas apropriadas.

ОСТОРОЖНО: Прежде чем инсталлировать этот
продукт, прочтите Инструкцию по технике безо-
пасности в документе "Внимание: Инструкция по
технике безопасности -- Прочесть в первую очередь",
SD21-0030. В этой брошюре описаны безопас-
ные способы каблирования и подключения элект-
рического оборудования.

Внимание:

В устройстве - несъемная литиевая батарейка. Для
утилизации верните его ближайшему дилеру IBM.

⚠ Nebezpečenstvo: Pred inštaláciou výrobku si prečítajte
bezpečnosté predpisy v
Výstraha: Bezpeč osté predpisy - Prečítaj ako prvé,
SD21 0030. V tejto brožúrke sú opísané bezpečnosté
postupy pre pripojenie elektrických zariadení.

Výstraha:

⚠ Táto jednotka obsahuje nevymenite nú lítiovú batériu. Táto jednotka
by mala byť vrátená najbližšiemu autorizovanému obchodnému
zástupcovi na vhodné použitie.

⚠ Pozor: Preden zaènete z instalacijo tega produkta
preberite poglavje: ´Opozorilo: Informacije
o varnem rokovanju-preberi pred uporabo,"
SD21-0030. To poglavje opisuje pravilne
postopke za kabliranje,

Svarilo:

⚠ Ta enota vsebuje nezamenljivo litijevo baterijo. Enoto je treba vrniti
najbližjemu IBM-ovemu pooblaščenemu trgovcu, ki bo poskrbel za
pravilno odlaganje.

⚠ **Peligro:** Antes de empezar a instalar este producto, lea la información de
seguridad en *Atención: Información de Seguridad — Lea Esto Primero,* SD21-0030.
Este documento describe los procedimientos de seguridad para cablear y enchufar
equipos eléctricos.

⚠ **Peligro:** Esta unidad contiene una batería de litio no reemplazable. La
unidad debería devolverse al distribuidor autorizado IBM más próximo para su
correcta eliminación.

⚠ **Varning — livsfara:** Innan du börjar installera den här produkten bör du läsa
säkerhetsinformationen i dokumentet *Varning: Säkerhetsföreskrifter— Läs detta
först,* SD21-0030. Där beskrivs hur du på ett säkert sätt ansluter elektrisk
utrustning.

⚠ **Varning:** Enheten innehåller ett litiumbatteri som inte kan bytas ut. Enheten
får inte kastas bland vanlight avfall utan måste returneras till närmaste
IBM-återförsäljare för omhändertagande.

危險：

　　開始安裝此產品之前，請先閱讀安全資訊。

注意：

⚠ 　　請先閱讀 - 安全資訊 SD21-0030

　　此冊子說明插接電器設備之電纜線的安全程序。

⚠️

注意：

本單元含有無法更換的鋰電池。廢棄時的正確處置方式，是將本
單元送至最近且經 IBM 授權的經銷商。

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2212 Access Utility
Installation
and
Initial Configuration Guide

Publication No. GA27-4216-02

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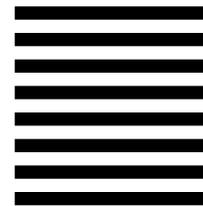Company or Organization

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