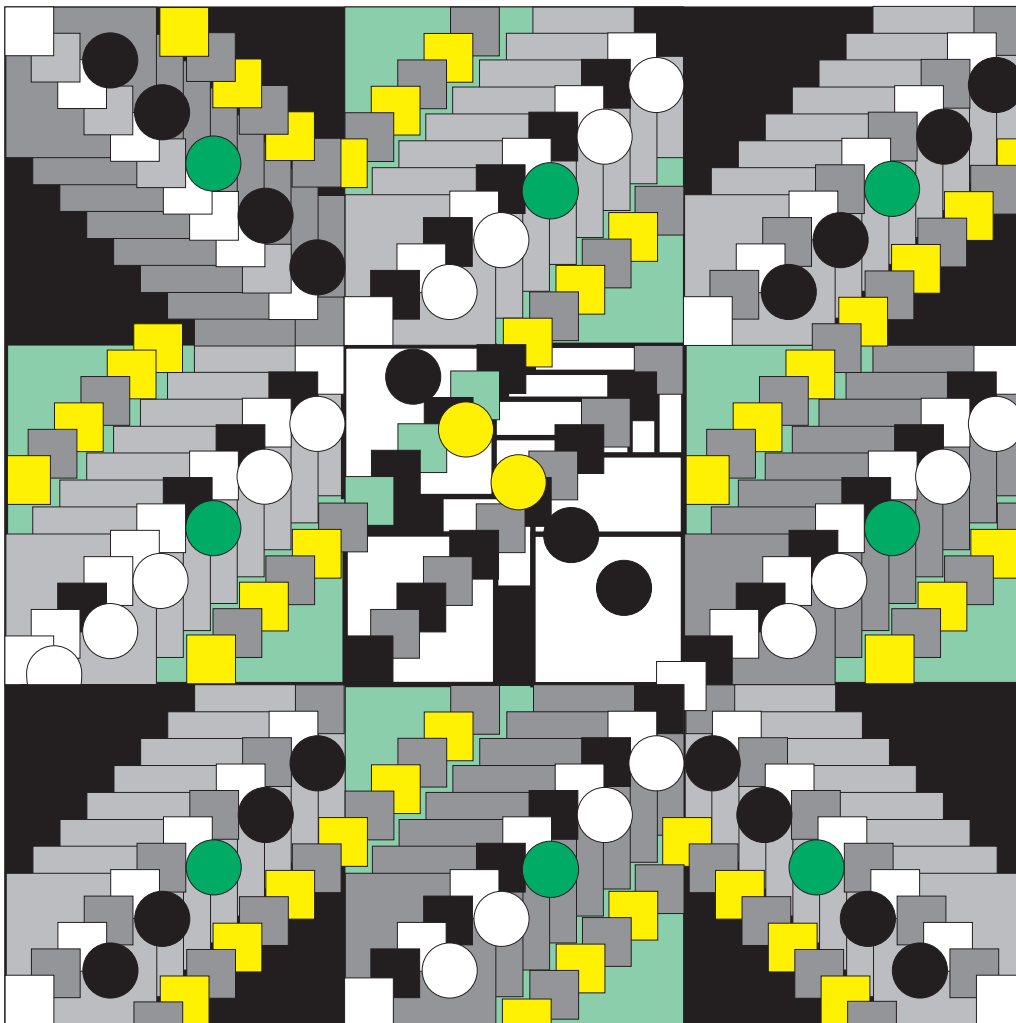


2220 Nways BroadBand Switch  
Models 300, 500, and 501



# Setup Guide





2220 Nways BroadBand Switch  
Models 300, 500, and 501



# Setup Guide

**Important Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page xxi.

**Eighth Edition (March 1999)**

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## Notices

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### European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM can not 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.

---

### Year 2000 Statement

This product is Year 2000 ready. When used in accordance with its associated documentation, it is capable of correctly processing, providing, and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange accurate date data with it.

For more information, refer to:

<http://www.ibm.com/year2000>

---

### Electronic Emission Notices

#### Federal Communications Commission (FCC) Statement

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

harmful interference, in which case the user will be required to correct the interference at his own expense.

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

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

### **Industry Canada Compliance Statement**

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

### **Avis de conformité aux normes d'Industrie Canada**

Cet appareil numérique de la classe A est conforme 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引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

### **Harmonics Compliance (JEIDA)**

This product conforms to the Harmonics Guideline (JEIDA). The input current of this product is less than or equal to 20 A per phase.

### **Korean Communications Statement**

Please note that this device has been certified for business use with regard to electromagnetic interference. If you find this is not suitable for your use, you may exchange it for one of residential use.

### **Taiwanese Class A Warning Statement**

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



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。

---

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Nways  
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Presentation Manager

RETAIN  
Risc System/6000

The following terms, denoted by a double asterisk (\*\*), used in this publication, are trademarks of other companies:

Hayes



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# Product Safety Information

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## General Safety

This product meets the international and IBM safety standards.

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## Safety Notices

See *Safety Notices* located in the *2220 Nways BroadBand Switch Models 300, 500, and 501*; *Safety Information*, GA33-0401 (P/N 80G4908).

---

## Safety Notices for United Kingdom

1. The IBM 2220 Nways BroadBand Switch is manufactured according to the International Safety Standard EN 60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.
  2. The network adapter interfaces housed within the IBM 2220 Nways BroadBand Switch are approved separately, each one having its own independent approval number. These interface adapters, supplied by IBM, do not use or contain excessive voltages. An excessive voltage is one that exceeds 42.4 V peak ac or 60 V dc. They interface with the IBM 2220 Nways BroadBand Switch using Safety Extra Low Voltages (SELV) only. In order to maintain the separate (independent) approval of the IBM adapters, it is essential that other optional cards, not supplied by IBM, do not use mains voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by IBM.
- 

## Service Inspection Procedures

The Service Inspection Procedures help service personnel check whether the 2220 conforms to IBM safety criteria. They have to be used each time the 2220 safety is suspected. The *Service Inspection Procedures* section is located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247). The 2220 areas and functions checked through service inspection procedures are:

1. External covers
2. Safety labels
3. Grounding (earthing)
4. Circuit breaker and protector rating
5. Input power voltage
6. Power-ON indicators
7. Emergency power OFF of the board
8. Cooling.



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## About This Book

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### Who Should Use This Book

The personnel using this manual should be:

- Trained to service the Nways Switch administration station and all the 2220 models.
- Familiar with the Nways Switch administration station service documentation,
- Familiar with the configuration of the 2220.

---

### How To Use This Book

This manual provides procedures for installing any 2220 model and updating and configuring the software already loaded on the Nways Switch administration station. To ensure the most efficient installation:

- Read the instructions carefully before attempting to do them,
- Complete each step before going to the next one,
- Go through the chapters sequentially.

---

### How this Book is Organized

<b>Chapter 1</b>	Presents the procedures to prepare the installation.
<b>Chapter 2</b>	Gives the preliminary verifications required before starting the 2220 installation.
<b>Chapter 3</b>	Gives the specific procedures to install a 2220-501.
<b>Chapter 4</b>	Gives the procedures to connect a 2220 to the main power.
<b>Chapter 5</b>	Gives the procedures to test the 2220 locally.
<b>Chapter 6</b>	Gives the procedures to install the external cables
<b>Chapter 7</b>	Gives the procedures to install the ground brackets
<b>Chapter 8</b>	Gives the procedures to integrate and test the 2220 in the network.
<b>Chapter 9</b>	Gives the procedures to make the 2220 ready for customer.
<b>Chapter 10</b>	Gives the procedures to remove or relocate a 2220.
<b>Chapter 11</b>	Gives the procedures to install or remove an option (MES).
<b>appendix A</b>	Shows the 2220 locations and gives an HONE sheet example

A **glossary**, a **service and customer documentation bibliography**, a **list of abbreviations**, and an **index** are provided at the end of this manual.

---

## Where to Find More Information

For a complete list of the customer and service information manuals, see at the end of this manual. In this *Setup Guide*, references are made to the following publications:

*2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247)

*2220 Nways BroadBand Switch Planning Guide*, GA33-0293

*7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance*, S06H-2298

*IBM 7855 Guide to Operation*, GA33-0160

*IBM 7857 Guide to Operation*, GA13-1839

NAS Setup and Service Guide

## World Wide Web

You can access the latest news and information about IBM network products, customer service and support, and microcode upgrades via the Internet at the URL: <http://www.ibm.com/>

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## Chapter 1. Preparing a 2220 Installation

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## 2220 In The Communications Network

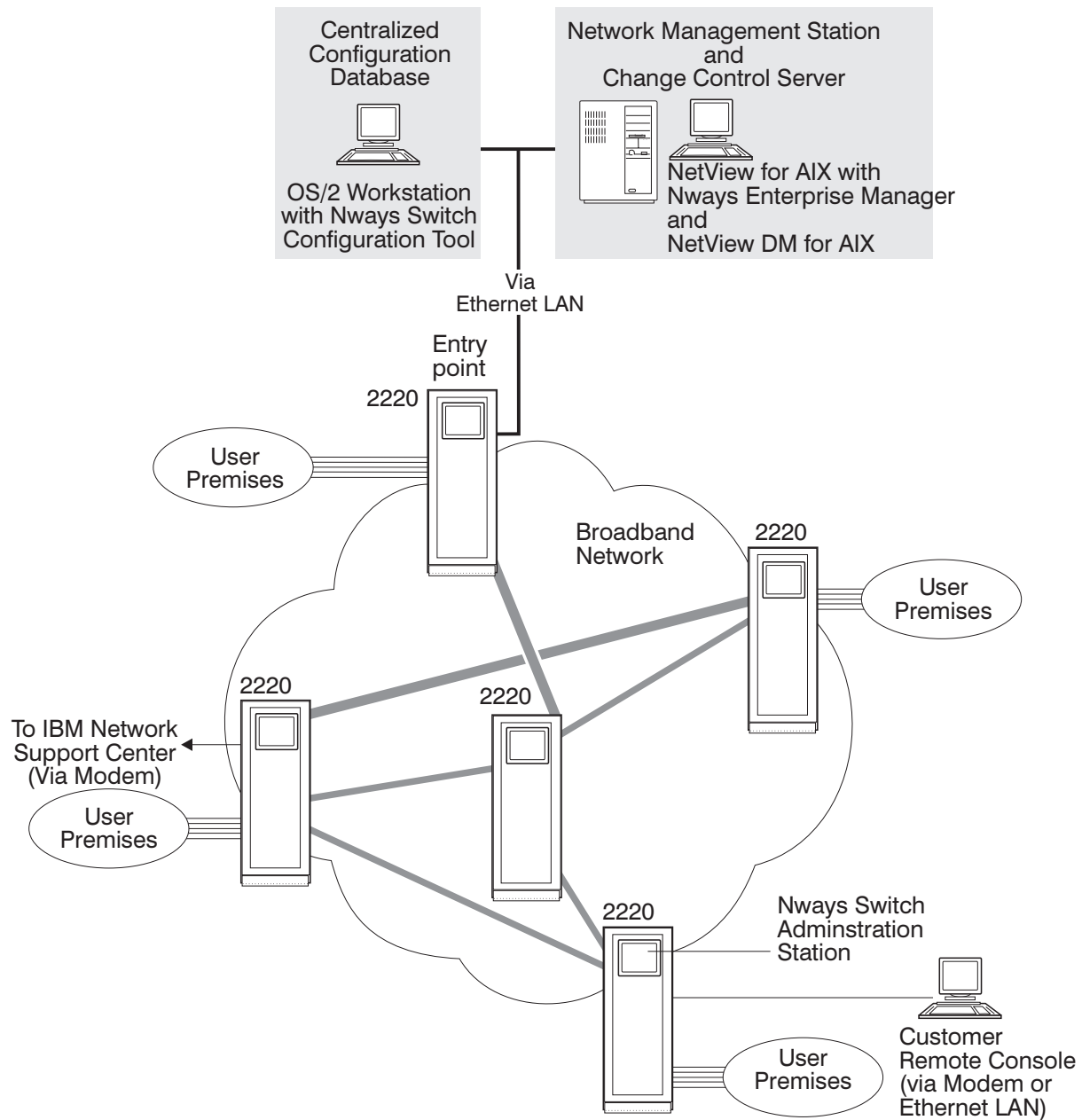


Figure 1-1. Communications Network



---

## 2220 Installation Overview

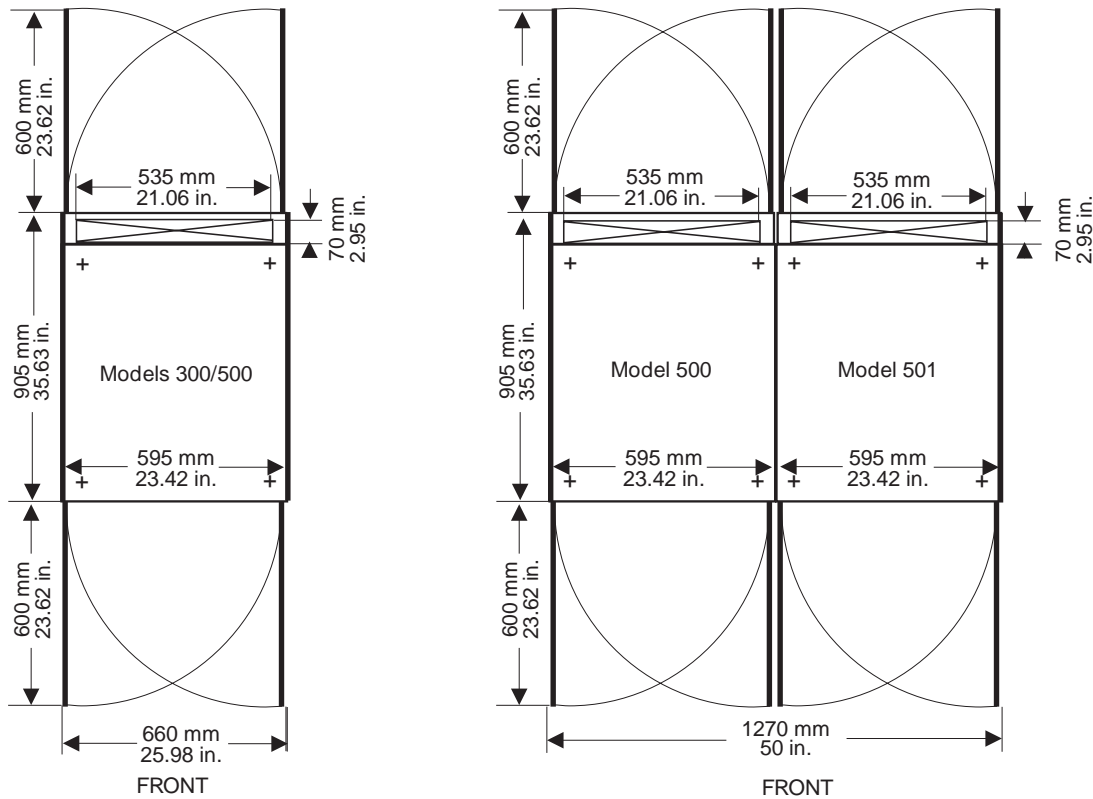
The installation is a 7 part process:

1. Verifying the installation feasibility using a pre-installation checklist.
2. Installing the 2220.
3. Installing the Nways Switch administration station and its modem.
4. Connecting the Nways Switch administration station (NAS) to:
  - a. the 2220
  - b. Its 7855 modem, 7857 modem, or Hayes modem.
  - c. The network management station if you are installing the entry point
5. Testing the 2220.
6. Installing the external cables
7. Testing the links between the 2220 and:
  - a. The network management station
  - b. The Network Support Center
  - c. The change control server

## 2220 Plan View

Doors on the front and rear of a 2220 give access to the inside of the units. A clear path must be provided around the configuration to access covers. Allow enough space for future expansion. Keep a servicing area 0,75 m (2.5 ft) wide at front and back, and at least 0.85 m (2.80 ft) at the right and left sides to install/remove the end covers. The overall height is 1803 mm (71 in.).

## Installation Overview



Legend: + Caster     Cable Exit Area

Figure 1-2. Plan View

## Special Tools/Test Equipment

- Verify that you have an adjustable wrench (PN 454353) to be able to adjust the leveling pads (metric size 24 mm).
- Wrap plugs: refer to *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247), appendix: 'Maintenance Aids' under 'Shipping Group Tools'.

## Installation Time

- The estimated hardware installation time is :
  1. To install a 2220 shipped and installed in an IBM rack:
    - 10 hours for a 2220-300
    - 12 hours for a 2220-500
    - 6 hours for a 2220-501
- The average time for installing the external cables is 2 hours for a 2220-300, 3 hours for a 2220-500, 2 hours for a 2220-501.

## Pre-installation Checklist

The following items describe all the pre-installation requirements which must be satisfied before installing your 2220.

(Place a check mark next to each completed step.)

### 1. In all cases

- a. \_\_\_ Check all items listed on the shipping group bill of material (B/M). Verify that all parts have been received.
- b. \_\_\_ Make sure that all the external cables specified on the cable order form have been received. Report any difference to the IBM sales representative and to the CE branch office.
- c. \_\_\_ Obtain from the SE or customer the hone sheet in order to know how to:
  - 1) Plug the **external cables**
  - 2) Install the **modules** in the logic rack when this rack is received empty.

A sample of this hone sheet is given at the end of this guide, see Appendix C, "Hone Sheet Example" on page C-1.

- d. \_\_\_ Ensure that all the customer and service manuals supplied with the 2220 have been received and updated with TNLs (if any) before beginning installation.
- e. \_\_\_ Make sure that the installation area is in accordance with Figure 1-2 on page 1-4.

Verify that the floor cutout size and location correspond to the plan. If not, inform the customer.

**Note:** If you are installing a 2220 with the seismic hardening feature, refer to Appendix D, "Seismic Hardening Feature Installation" on page D-1. If the installation fit to the wpecifications, install the machines according to the information given in this chapter.

- f. \_\_\_ If the display and keyboard are not installed in the rack, ask the customer to provide a table or desk, big enough to hold the display of the Nways Switch administration station, the keyboard, and the modem.
- g. \_\_\_ A PSN link is available to connect the modem attach to the Nways Switch administration station.
- h. \_\_\_ The Network Support Center is aware of the installation and a PMH is open for this installation.
- i. \_\_\_ A Network operator is available on the site where the network management station is installed. This is to be able to validate the link from the network management station and the 2220 to be installed.
- j. \_\_\_ Familiarize yourself with the installation procedures in this manual. You must also be familiar with the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247) used for troubleshooting.

### 2. If you are installing the management access Nways Switch.

(A management access provides a connection to RISC System/6000)

## Installation Overview

- a. \_\_\_\_ A network management station (RISC System/6000 or equivalent) must be ready and available with the following features:
    - 1) NetView for AIX loaded and operational
    - 2) Nways 2220 Switch Manager loaded and operational
  - b. \_\_\_\_ A LAN (ethernet) port and cable are available to connect the Nways Switch administration station to the network management station.
- 3. If you are installing a 2220-501**
- a. \_\_\_\_ Verify that the 2220-501 can be attached to the 2220-500. This is to avoid any problem in routing the cables between the machines.
  - b. \_\_\_\_ Check that the cables which link the 2220-500 to the 2220-501 are available.

**Go to, Chapter 2, “Starting the 2220 Installation” on page 2-1**

---

## Chapter 2. Starting the 2220 Installation

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Opening The Doors And Covers of a 29 U Rack . . . . .	2-3
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Connecting the 2220 (APC Type A) to the Network Management Station . . . . .	2-10
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## Starting the 2220 Installation

### Notes:

1. All the following procedures applied to the installation of all 2220 models. If you are installing a 2220-500 and a 2220-501 at the same time, do these procedures for both 2220-500 and 2220-501.
2. The 2220 Models 300, 500, and 501 are installed either in a 37 U<sup>1</sup> rack or 29 U rack. In this manual the models are shown installed in a 37 U rack. The 29 U rack is shown only when the procedures for installing are different from the 37 U rack.

## Opening The Doors And Covers of a 37 U Rack

To open the front and rear doors see Figure 2-1 detail B, to remove the side covers see detail A.

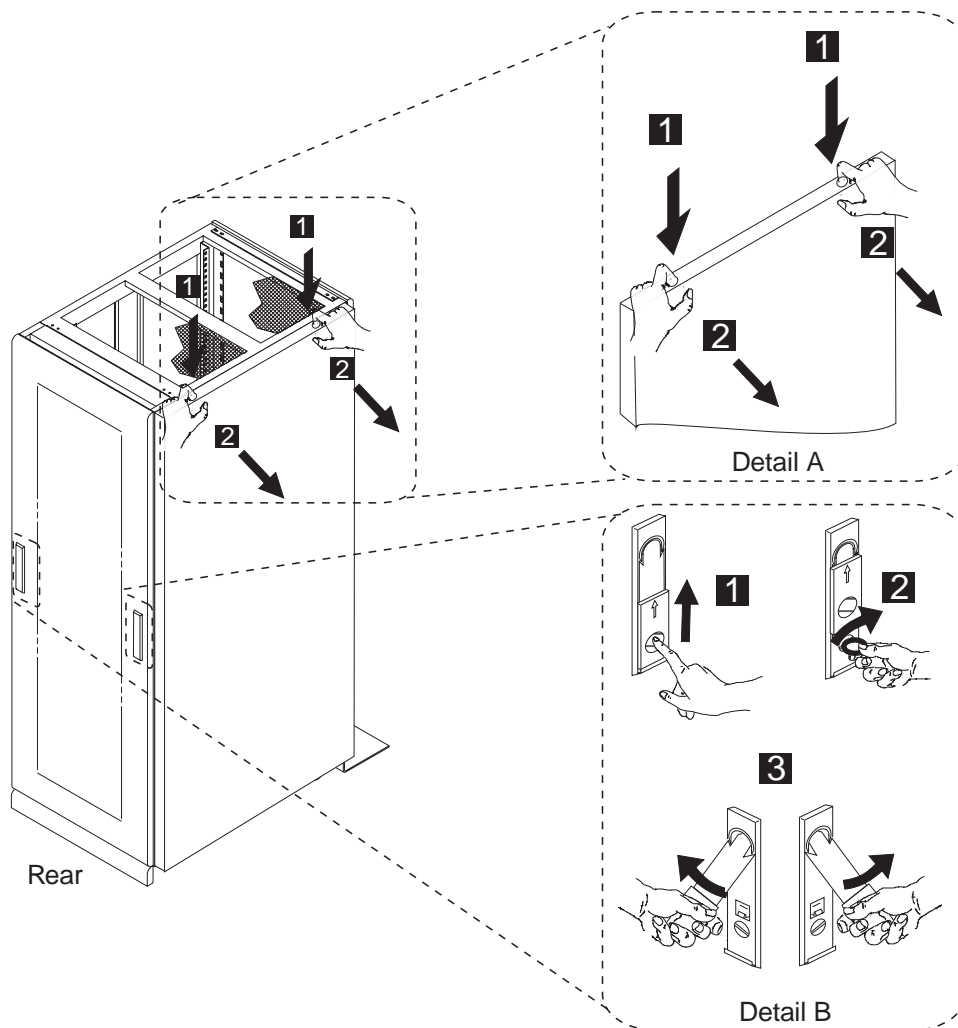


Figure 2-1. Front, Rear Door And Side Cover Latches in 37 U Rack

<sup>1</sup> U means EIA Units (U-units)

---

## Opening The Doors And Covers of a 29 U Rack

To open the front and rear doors, use an Allen wrench (see Figure 2-2 ).

To remove the side covers, loose the four screws inside the 29 U rack (see Figure 2-3 on page 2-4).

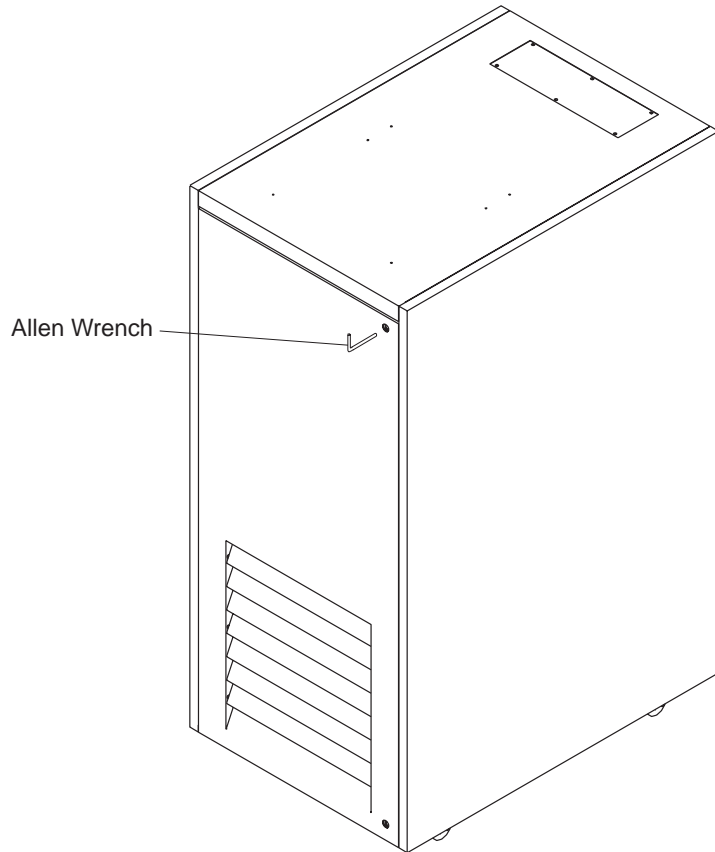


Figure 2-2. Front, and Rear Door Opening for 29 U Rack

## Starting the 2220 Installation

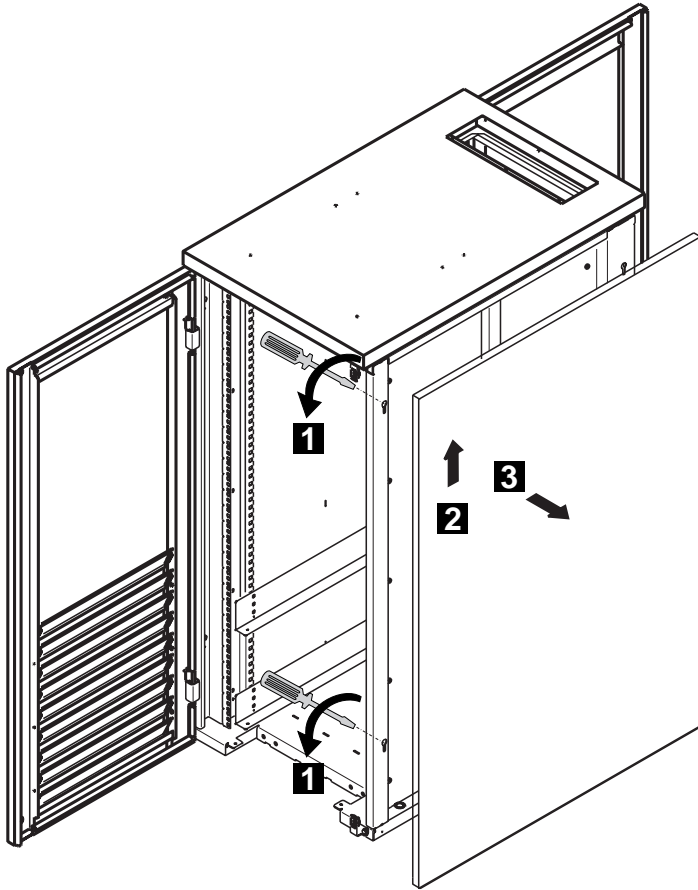


Figure 2-3. Side Cover Removing for 29 U Rack



## Frame Checking

1. \_\_\_\_ Open the front and rear doors (see Figure 2-1 on page 2-2)
2. \_\_\_\_ Locate the control panel on the front side of the machine.
3. \_\_\_\_ Compare the machine serial number on the packing material with that listed on the shipping documents. Report any difference to the IBM branch office, and confirm whether the installation can continue.
4. \_\_\_\_ Check that the serial number **1** stamped on the control panel is the same as on the serial number recorded on the shipping document (see Figure 2-4).

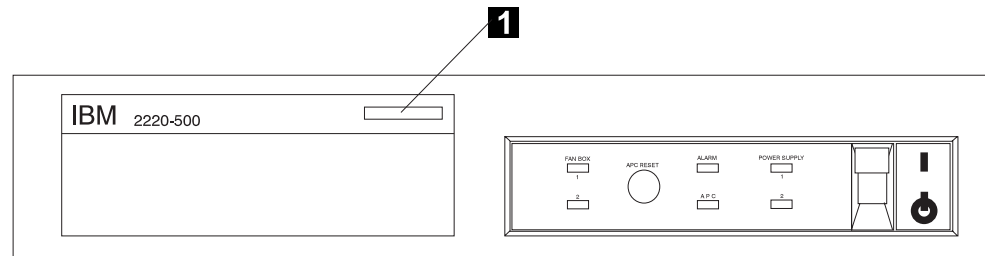


Figure 2-4. 2220 Control Panel

5. \_\_\_\_ Unpack all the boxes received and ensure that all shipping material is removed. Refer to the unpacking instructions attached to the external packing.
6. \_\_\_\_ Inspect the parts carefully for shipping damage. Report any damage in accordance with local procedures.

## Power Checking

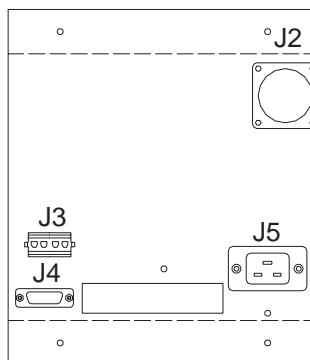
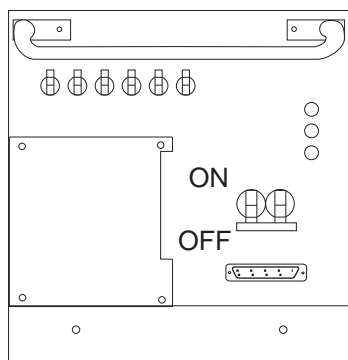
Identify which type of power (A or B) is installed on your machine:

- For AC power, see “ACDC Power Type A” or “ACDC Power Type B.”
- For DC power, see “DC48 Power Type A” on page 2-7 or “DC48 Power Type B” on page 2-7.

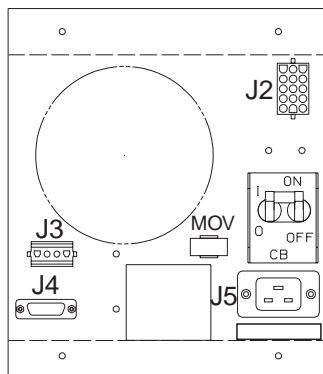
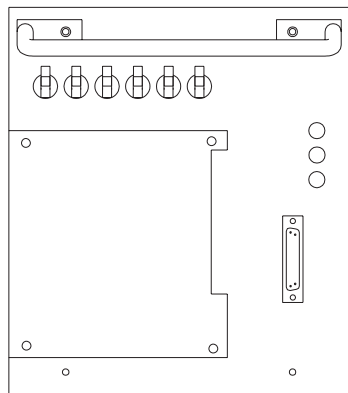
In the following drawings and procedures included in this document only power type B is described. But the same procedures apply to both types of power.

## ACDC Power Types

### ACDC Power Type A

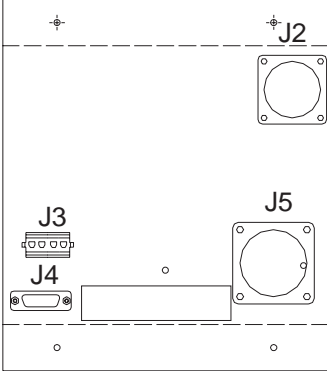
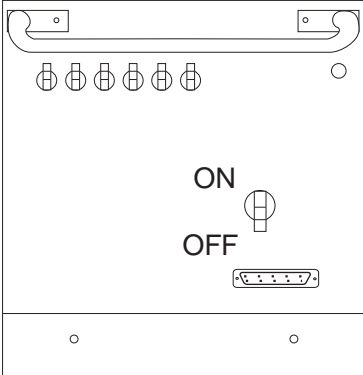


### ACDC Power Type B

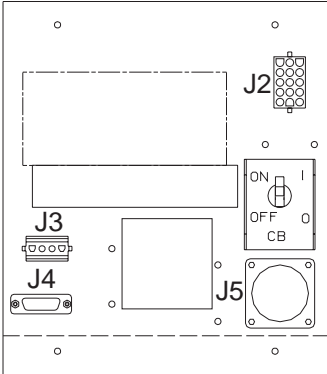
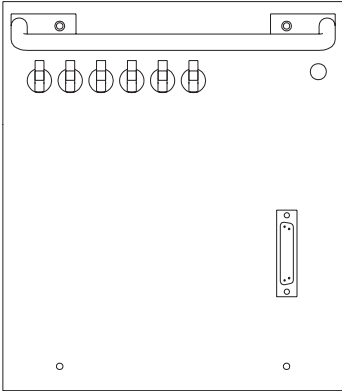


### DC48 Power Types

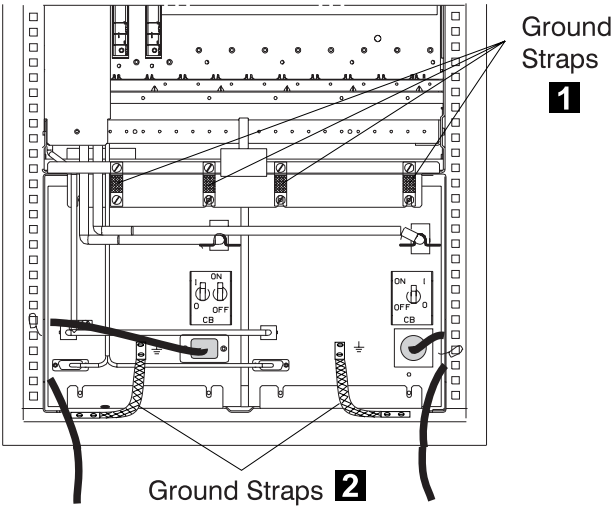
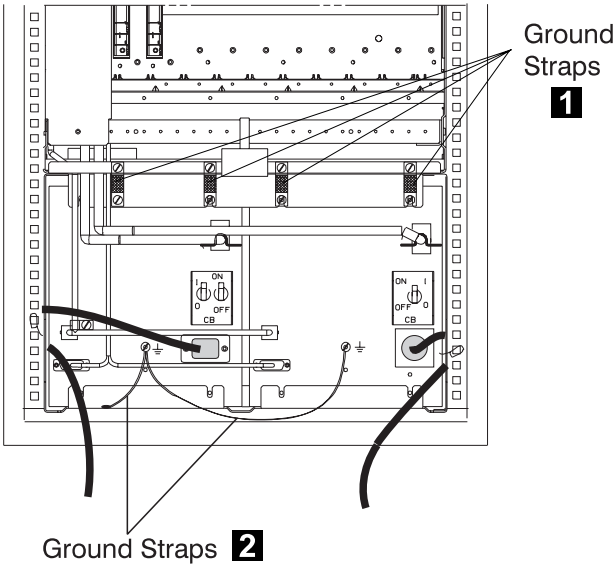
#### DC48 Power Type A



#### DC48 Power Type B



### Ground Straps Types



1. \_\_\_\_ Locate the power rating plate at the rear side of the machine.

## Starting the 2220 Installation

2. \_\_\_\_ Check that the power rating plate data (see Figure 2-5 on page 2-8 and Figure 2-6 on page 2-8) are consistent with the customer's available voltage AC or DC, and the frequency.

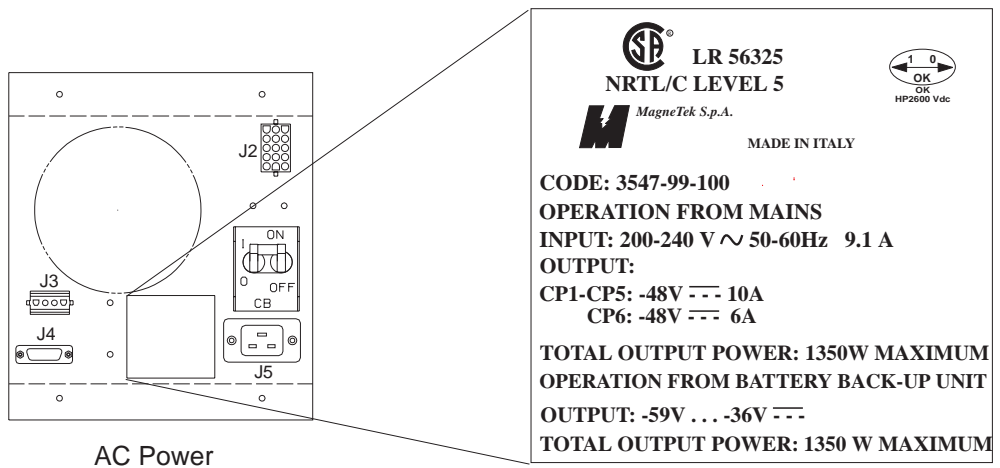


Figure 2-5. ac Power Rating Plate

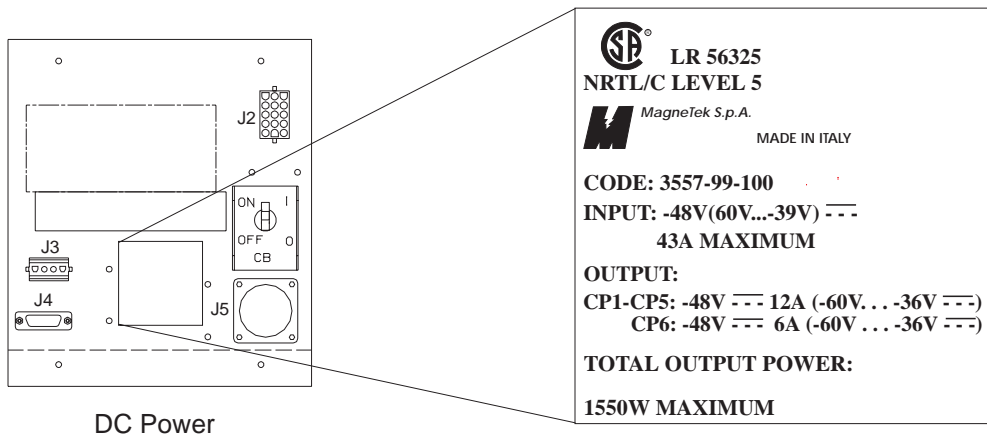


Figure 2-6. dc Power Rating Plate

If Installing	Go To
A 2220-500 or a 2220-500 and a 2220-501	"Installing the 2220-500 Frame" on page 2-9
A 2220-501 only	Chapter 3, "Installing the 2220-501" on page 3-1

## Installing the 2220-500 Frame

**Note:** If the machine has other customer racks on either side, install the side brackets before putting in final position. Go to Chapter 7, “Installing Ground Brackets And Covers (Optional)” on page 7-1, then return to this chapter.

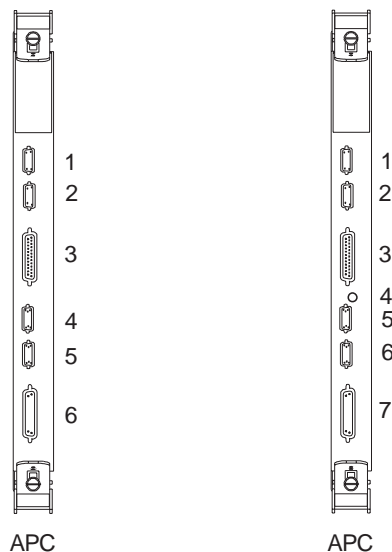
1. \_\_\_\_ Move the 2220-500 to its final position according to the recommendations given in “2220 Plan View” on page 1-3.
2. \_\_\_\_ Using an adjustable wrench, make a leveling pad adjustment.

Do you have to connect the 2220 to a RISC System/6000 (node gateway)?

- **YES**, Go to “Connecting the 2220 to the NMS”
- **NO**, Go to “Installing the NAS” on page 2-11

## Connecting the 2220 to the NMS

Determine the type of the APC installed in your 2220 (type A has six connectors, type B has seven connectors):



APC Type A

APC Type B

Figure 2-7. APC Types

If you have:

- **APC type A**, go to “Connecting the 2220 (APC Type A) to the Network Management Station” on page 2-10.
- **APC type B**, go to “Connecting the 2220 (APC Type B) to the Network Management Station” on page 2-10.

## Connecting the 2220 (APC Type A) to the Network Management Station

In this configuration with the APC type A, only **one type** of connection is **possible**. The 2220 is connected to the network management station using a **10 base T** twisted pair cable.

**Note:** Your network management station can be connected to the 2220 via a Hub. In that case, use the appropriate cable according to the cable characteristics given in the *2220 Nways BroadBand Switch Planning Guide*, GA33-0293, appendix 'Cabling Information'.

1. \_\_\_\_ Obtain the cable shipped with the 2220 (PN 57G7998 for standard cable or PN 80G0705 for plenum cable).
2. \_\_\_\_ Plug this cable from the RISC System/6000 to connector J1 of the APC tailgate.

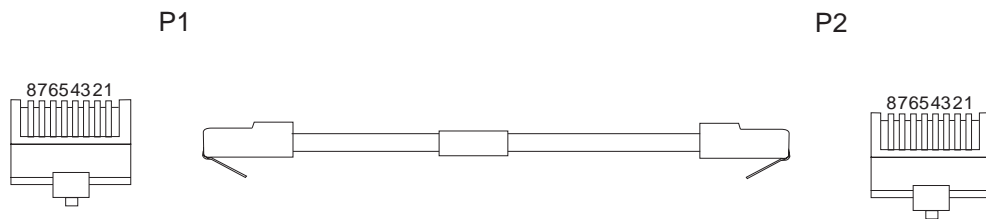


Figure 2-8. 10BaseT Cable

Go to “Installing the NAS” on page 2-11.

## Connecting the 2220 (APC Type B) to the Network Management Station

**Note:** Your network management station can be connected to the 2220 via a Hub. In that case, use the appropriate cable according to the cable characteristics given in the *2220 Nways BroadBand Switch Planning Guide*, GA33-0293, appendix 'Cabling Information'.

In this configuration with APC type B, the 2220 can be connected to the network management station using one of the two cable type:

- **10 base T, twisted pair**
- or **10 base 2, coax**

Cable Type	Length	Part Number	Feature Code
10BaseT	9 m (29 ft 6 in.)	57G7998	5370
10Base2	9 m (29 ft 6 in.)	80G0589	

Obtain the cable shipped with the 2220, and connect as follows:

- **10 base T, twisted pair cable** Plug this cable from the RISC System/6000 to connector J1 of the tailgate.

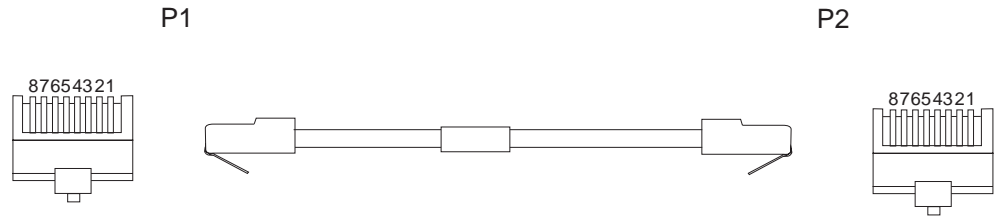


Figure 2-9. 10BaseT Cable

- or **10 base 2, coax cable**. In that case, remove the terminator installed on J2 or J3 of the APC tailgate and then plug this cable from the RISC System/6000 to connector J2 or J3.

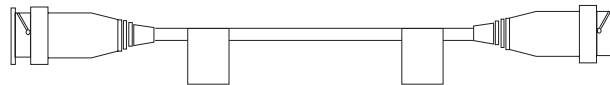


Figure 2-10. 10Base2 Cable

Go to “Installing the NAS.”

## Installing the NAS

### Install the Nways Switch Administration Station

Using the NAS Setup and Service Guide shipped with the machine, install the NAS and then return to this guide and go to:

- **Chapter 3, “Installing the 2220-501” on page 3-1** , If you are installing a 2220 Model 501.
- Otherwise, go to **Chapter 4, “Connecting the 2220 to Main Power” on page 4-1**

## Starting the 2220 Installation



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## Chapter 3. Installing the 2220-501

Installing the 2220-501 Frame . . . . .	3-2
Installing a 2220-501 Shipped in a 37 U Rack . . . . .	3-2
Installing a 2220-501 Shipped in a 29 U Rack . . . . .	3-4
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Grounding Connection . . . . .	3-9
Connecting the 2220-501 to the 2220-500 . . . . .	3-10
Connecting the 2220-501 to the NAS . . . . .	3-15
Connecting the 2220-501 to the NAS and APC Type A . . . . .	3-15
Connecting the 2220-501 to the NAS Type B and APC Type B . . . . .	3-17

### Installing the 2220-501 Frame

If the 2220-501 is installed in:

- A 37 U rack **go to** “Installing a 2220-501 Shipped in a 37 U Rack.”
- A 29 U rack **go to** “Installing a 2220-501 Shipped in a 29 U Rack” on page 3-4.

### Installing a 2220-501 Shipped in a 37 U Rack

1. \_\_\_\_ Decide if you are installing the 2220-501 on the left or on the right of the 2220-500, then obtain from the shipping group the rack to rack EMC kit (PN 43G3127).
2. \_\_\_\_ Remove the left or right side cover of the 2220-500 by pressing the two latches on top of the cover (refer to Figure 2-1 on page 2-2).
3. \_\_\_\_ Remove the four brackets **1** (see Figure 3-1 on page 3-3).
4. \_\_\_\_ If you have received an EMC gasket (this gasket is no more shipped with the new machine), stick the gasket **2** (PN 80G3765) on the 2220-500 frame
5. \_\_\_\_ Refer to Figure 3-2 on page 3-4 Section A and if you are able to install screws **1** and nuts **7**, install four spacers **6** (PN 80G3944) on the external holes of the tubular frame.
6. \_\_\_\_ Move the 2220-501 close to the 2220-500 frame (see Figure 3-1 on page 3-3), and then using an adjustable wrench, make a leveling pad adjustment.

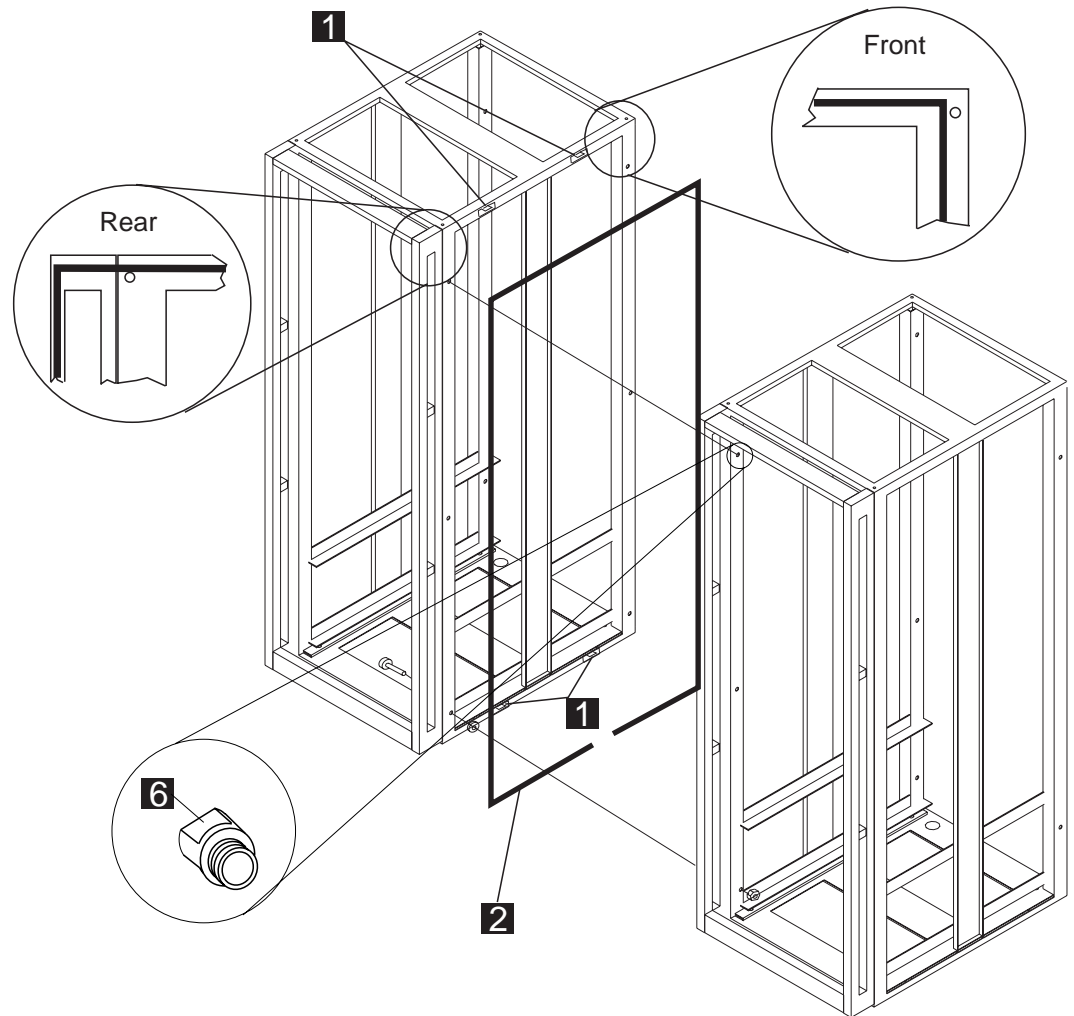


Figure 3-1. Attaching the 2220-501 Frame to the 2220-500 Frame (37 U Rack)

7. \_\_\_\_ See Figure 3-2 on page 3-4, verify on the 2220-500 frame that you are able to install bolts as shown in section A detail **1**. If yes go to step 8, otherwise go to “Power Removal” on page 3-6.
8. \_\_\_\_ Attach the 2220-501 to the 2220-500 using screws **1** (PN 1621609) and nuts **7** (PN 1622404), then go to “Grounding Connection” on page 3-9.

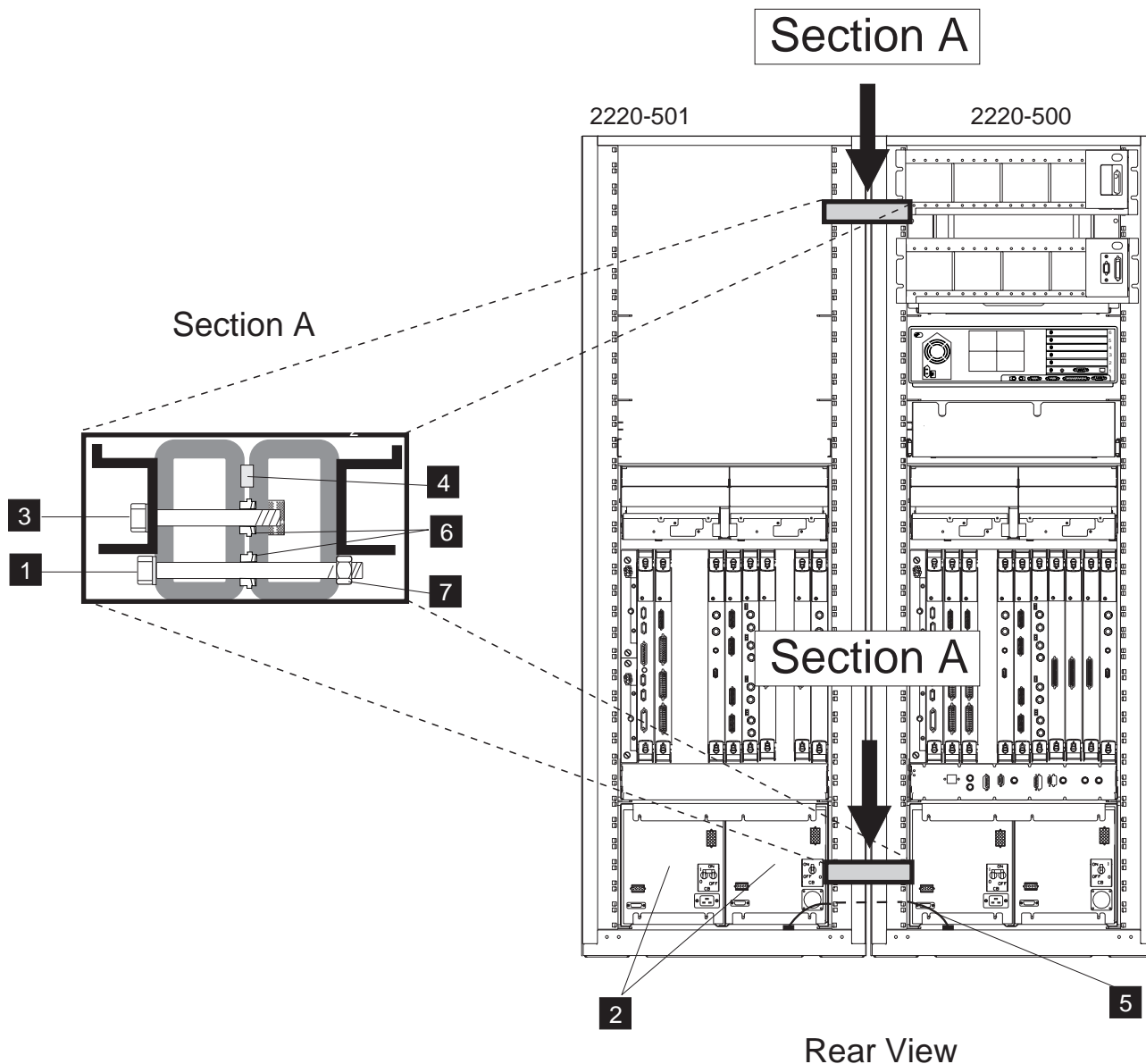


Figure 3-2. Attaching the Frames Together with 37 U Racks

### Installing a 2220-501 Shipped in a 29 U Rack

1. \_\_\_\_ Decide if you are installing the 2220-501 on the left or on the right of the 2220-500.
2. \_\_\_\_ Remove the left or right side cover of the 2220-500 by loosening the screws inside the 29 U rack (refer to Figure 2-3 on page 2-4).
3. \_\_\_\_ Install four spacers (PN 72F0659) on the tubular frame of the 2220-500(see Figure 3-3 on page 3-5).

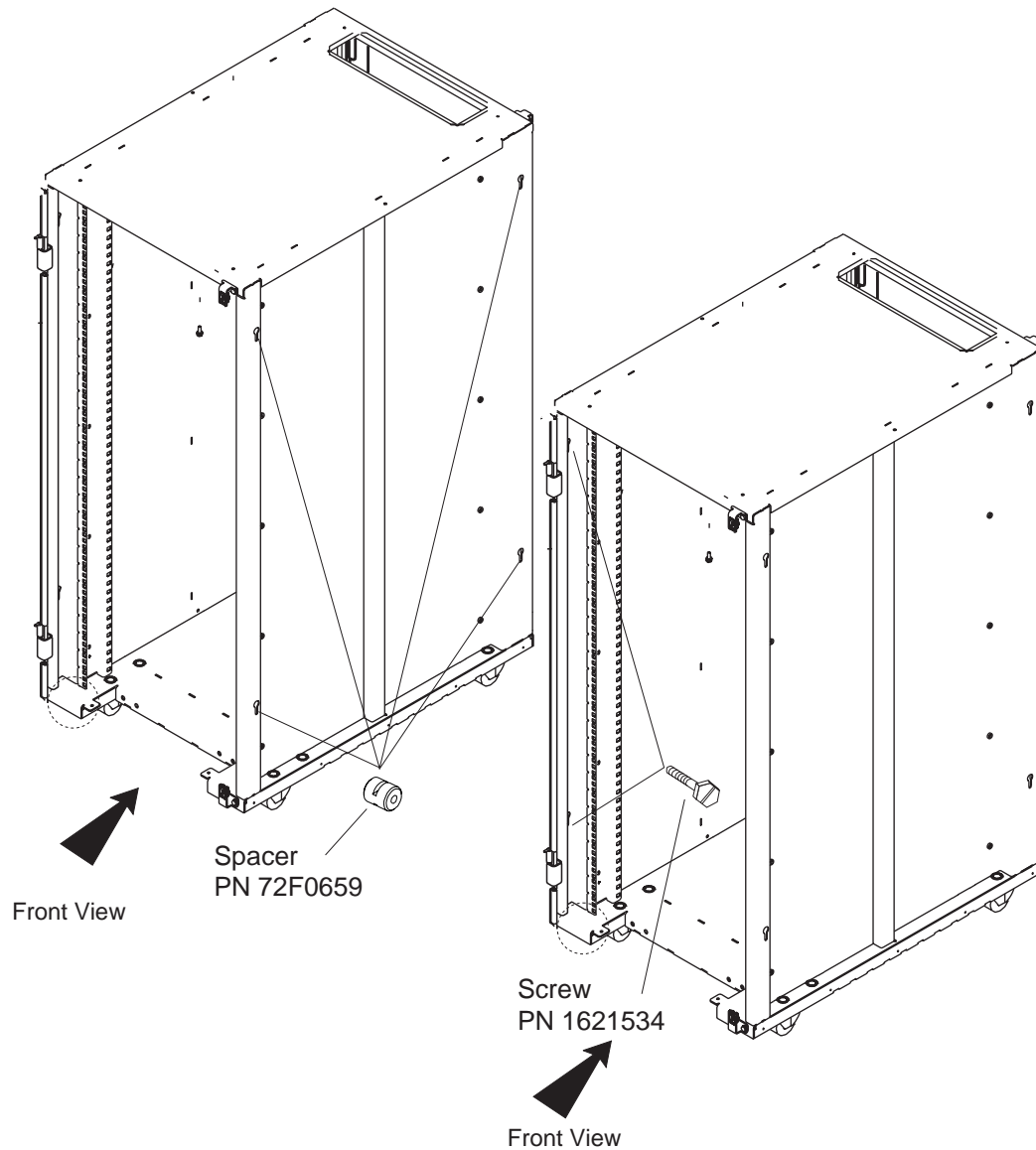


Figure 3-3. Installing the Spacers on the Frame (with 29 U Racks)

4. \_\_\_\_ Move the 2220-501 close to the 2220-500 frame.
5. \_\_\_\_ See Figure 3-4 on page 3-6, verify on the 2220-500 or the 2220-501 frames that you are able to install the screws (PN 1621534) for connecting the two frames. If yes go to Step 6, otherwise go to “Power Removal” on page 3-6.
6. \_\_\_\_ Attach the 2220-501 to the 2220-500 using screws (PN 1621534) , then go to “Grounding Connection” on page 3-9.

## Installing a 2220-501

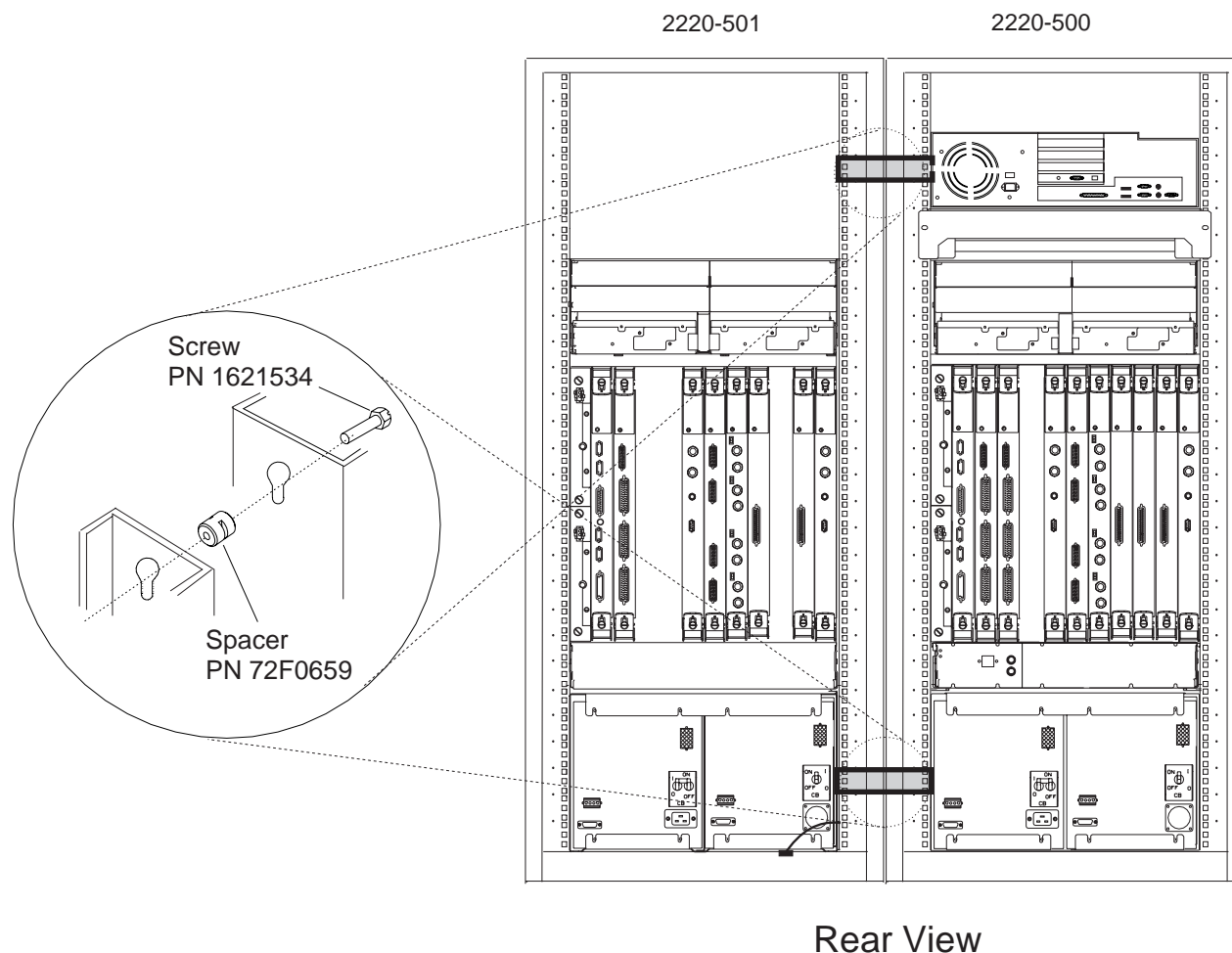
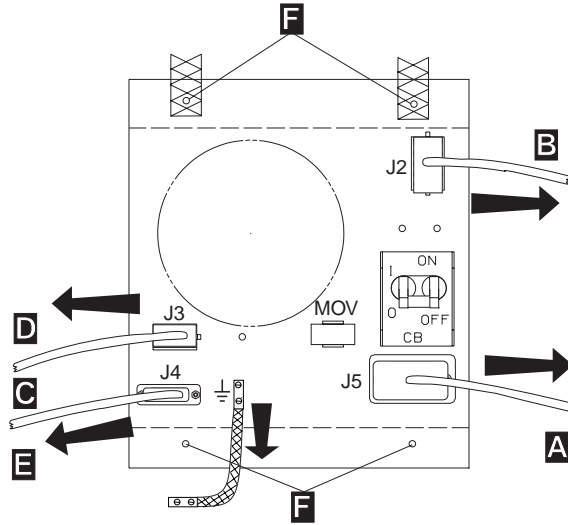


Figure 3-4. Attaching the Frames Together with 29 U Racks

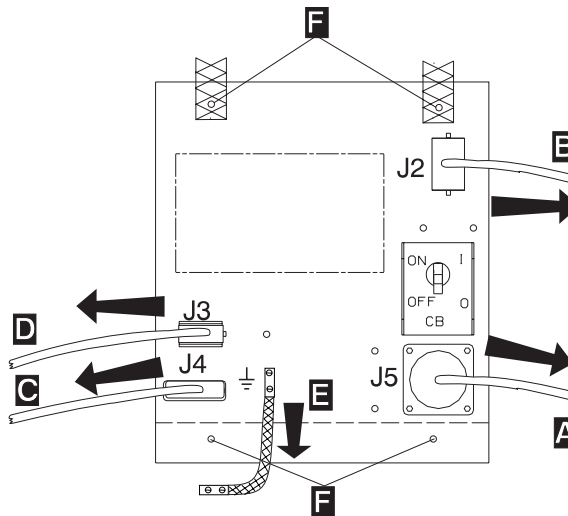
## Power Removal

1. \_\_\_\_ Which power is installed in your 2220-501:
  - **AC**, go to step 2
  - **DC**, go to step 3 on page 3-7
2. \_\_\_\_ Removing the cables from the ac power supply
  - Remove the cables in the following order:
    - a. AC cable from AC plug **A**
    - b. DC cable from the J2 connector **B** (remove the cable retention bracket on the J2 connector)
    - c. Signal cable from the J4 connector **C**
    - d. Control panel cable from the J3 connector **D**
  - Disconnect the earth strap **E** from the ACDC.
  - Remove the four screws **F** that secure the ACDC, and connect the earth straps, then go to Step 4 on page 3-7.



3. \_\_\_\_ Removing the cables from the DC power

- At the rear of the machine, remove the cables in the following order:
  - a. DC cable from DC plug **A**
  - b. DC cable from the J2 connector **B**
  - c. Signal cable from the J4 connector **C**
  - d. Control panel cable from the J3 connector **D**
- Disconnect the earth strap from the DC48 **E**.
- Remove the two screws that secure the DC48 **F**, then go to Step 4.



4. \_\_\_\_ Removing the front bracket (see Figure 3-5 on page 3-8):

- At the front of the machine, remove the screws **G** that secure the powers on the bracket.
- Remove the screws **H** that secure the bracket and remove the bracket **J**.

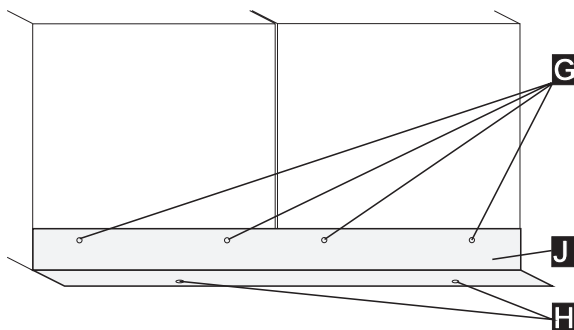


Figure 3-5. Front Bracket Removal

5. \_\_\_\_ Pull out the AC (or DC) power from the power subrack.
6. Refer to Figure 3-6, on the front side of the rack remove the four screws **1** and remove the power subrack from the 2220-501.

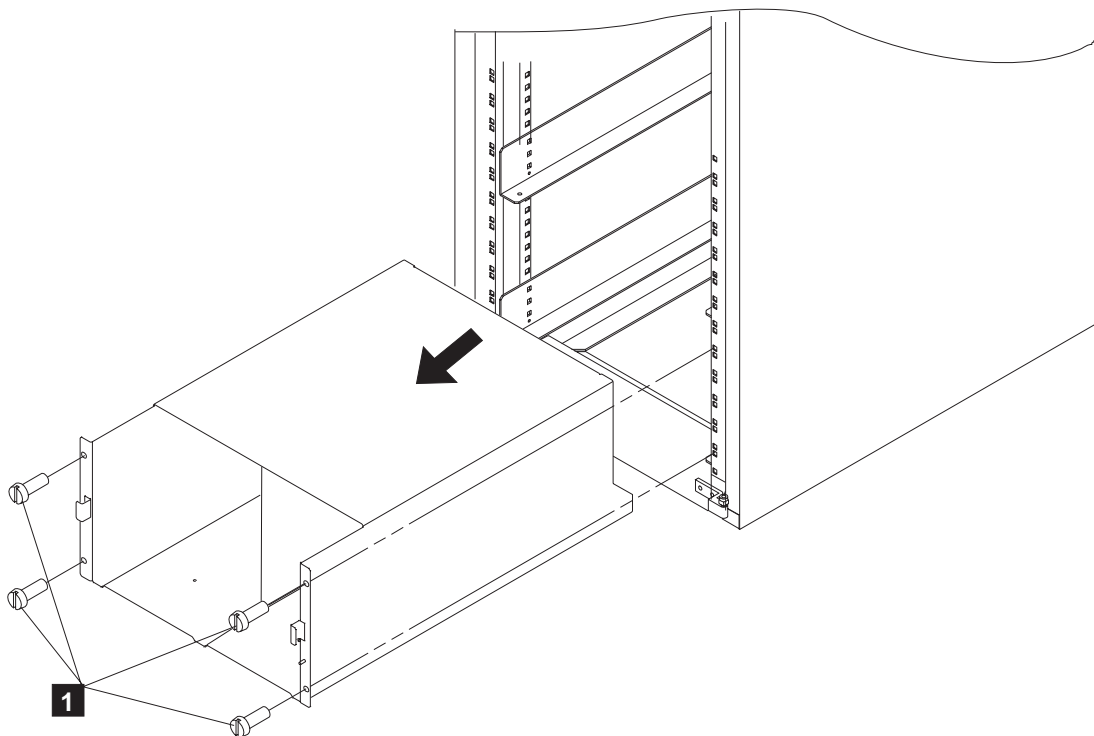


Figure 3-6. Removing the Power Subrack

7. \_\_\_\_ If your are attaching two 37 U racks, **go to Step8** , otherwise **go to Step 9**.
8. \_\_\_\_ On the front and rear sides of the racks install screw **3** (PN 1621604) on the top and on the bottom as shown in Figure 3-2 on page 3-4 (section A), then go to Step 10.
9. \_\_\_\_ On the front and rear sides of the racks install screws (PN 1621634) on the top and on bottom as shown in Figure 3-4 on page 3-6, then go to Step 10.
10. \_\_\_\_ Reinstall the power subrack, the powers, the front bracket, and reconnect the cables on the power supplies (use the information given in Steps 2 on page 3-6, 3 on page 3-7, and 4 on page 3-7).



11. \_\_\_\_ Continue the installation, **go to** “Grounding Connection” on page 3-9.

## Grounding Connection

1. \_\_\_\_ Refer to Figure 3-2 on page 3-4 and install ground wire (PN 43G3132) **5** between the 2220-500 and 2220-501 frames using two screws (PN 43G3084).
2. \_\_\_\_ **Go to** “Connecting the 2220-501 to the 2220-500” on page 3-10.

## Connecting the 2220-501 to the 2220-500

Route and connect the cables between the 2220-501 and the 2220-500 as follows:

1. \_\_\_\_ Remove in the 2220-500 and 2220-501 the two screws **A** from the APC module shield (see Figure 3-7).

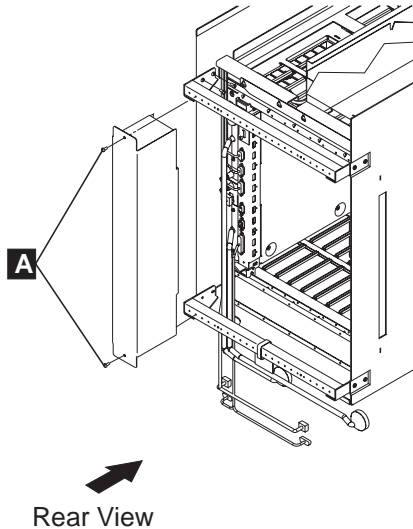


Figure 3-7. APC Cover

Refer to Figure 3-8 on page 3-11 and determine what kind of studs are installed on the switch or switch redrive module's connector:

- **Small studs** **1**, go to **Step 2** and exchange the studs.
  - **Long studs**, **2**, go to **Step 5 on page 3-14**
2. \_\_\_\_ Remove the small studs **1** (PN 80G3720) and replace with the long studs **2** (PN80G3755) shipped with the cables.

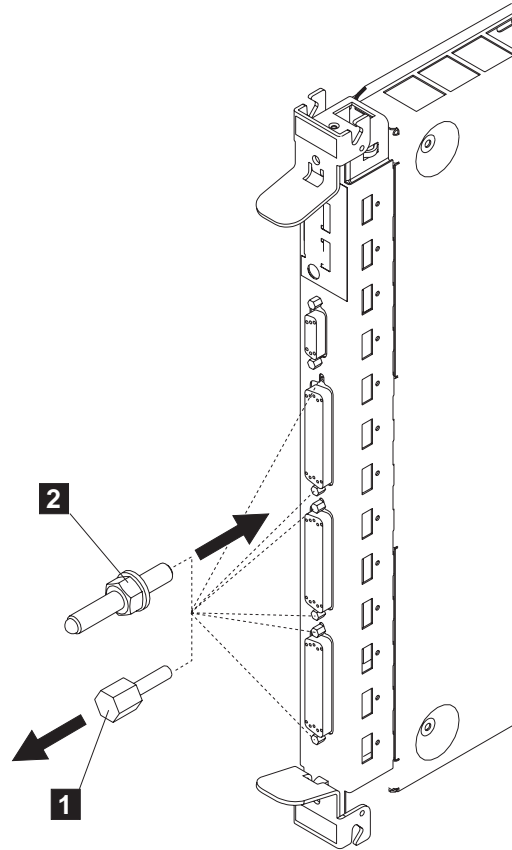


Figure 3-8. Stud Replacement

Refer to Figure 3-9 on page 3-12 and if you are routing the external cables through:

- The upper exit of the frame **1**, go to Step 3 on page 3-12.
 

**Note:** The overhead cover for 37 U rack can be not available with your machine (this cover has been shipped with the old machines only). There is no overhaed cover with 29 U rack.
- The lower exit of the frame **2** or **3**, go to Step 4 on page 3-13.

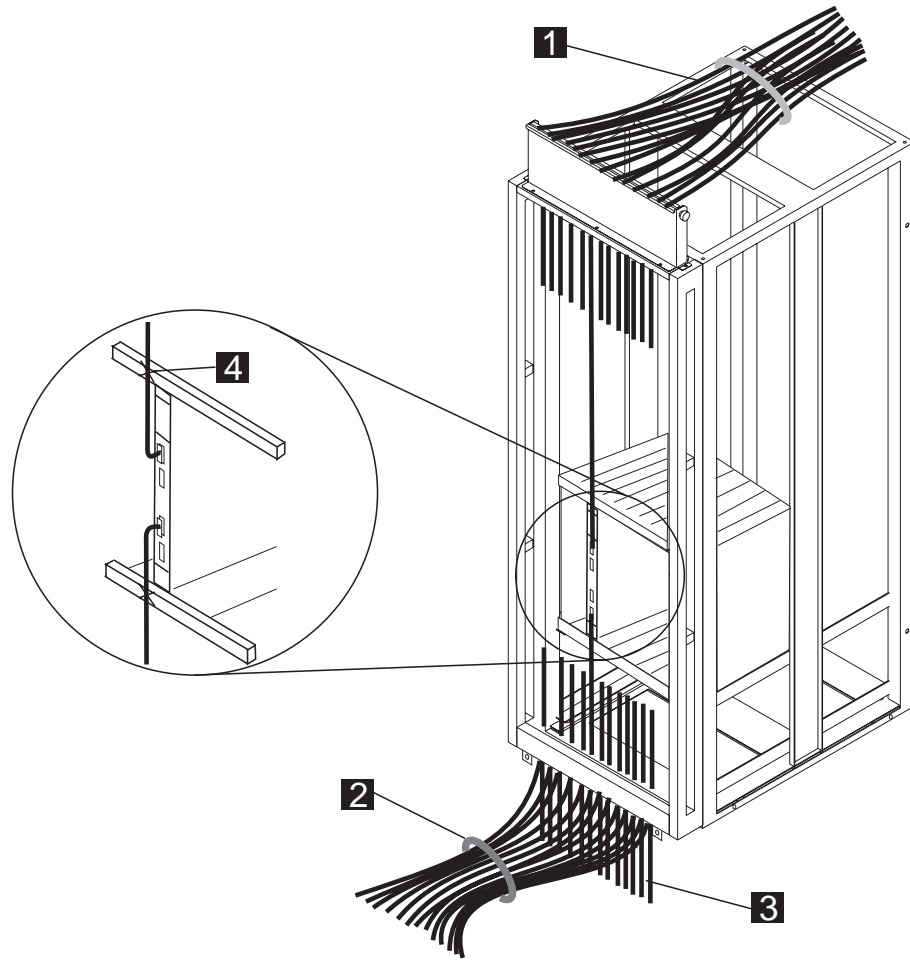


Figure 3-9. Routing the External Cables

**Note:** With the new machines, the overhead cover is no more shipped

3. \_\_\_\_ Refer to Figure 3-10 on page 3-13, and route the inter-machine cables on the bottom of the logic subracks (reference **5**), then go to Step 5 on page 3-14.

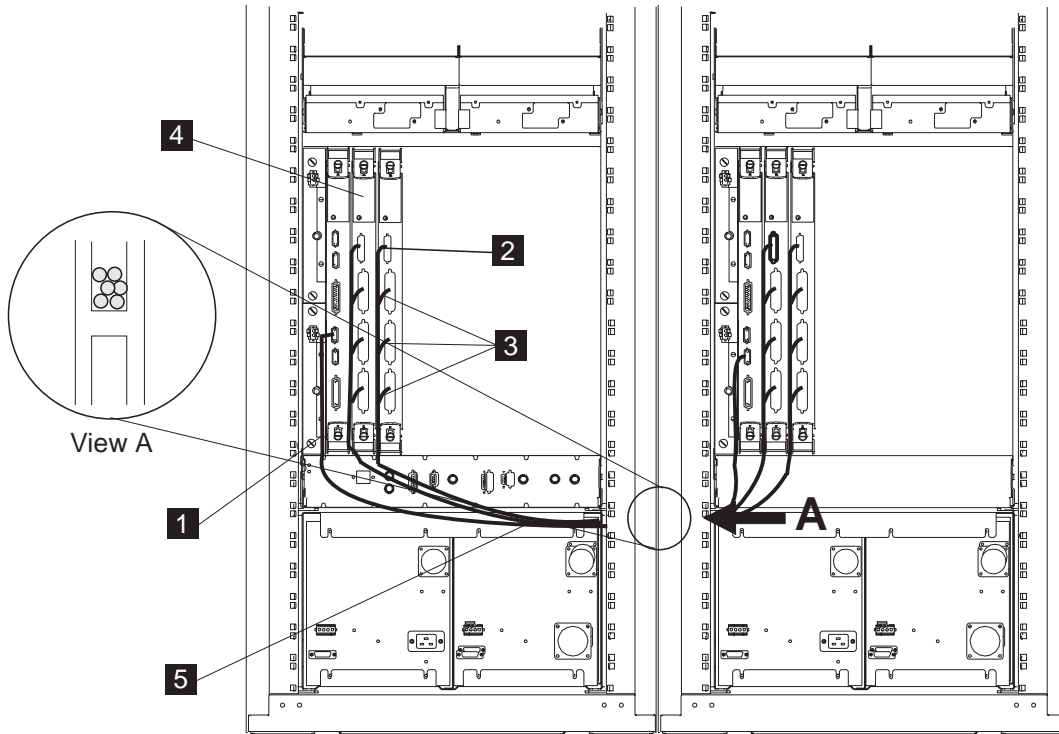


Figure 3-10. Inter Machine Cables Routed On the Bottom of the Logic Subrack

4. \_\_\_\_ Refer to Figure 3-11, and route the inter-machine cables on the top of the logic subracks (reference **5**), then go to Step 5 on page 3-14.

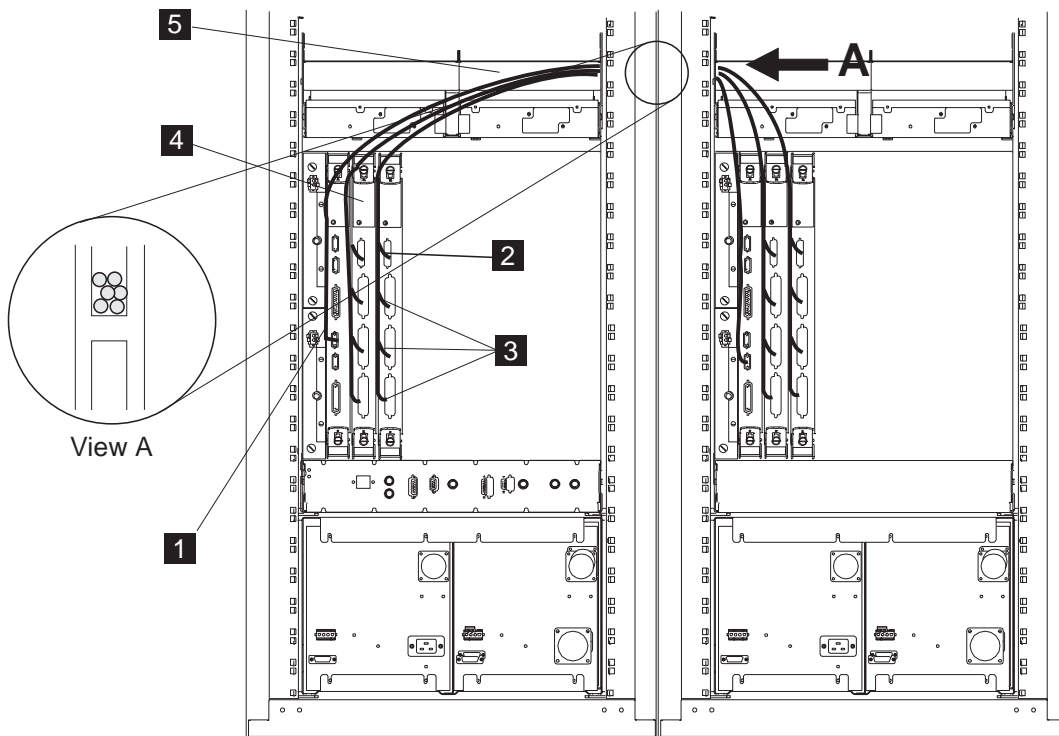


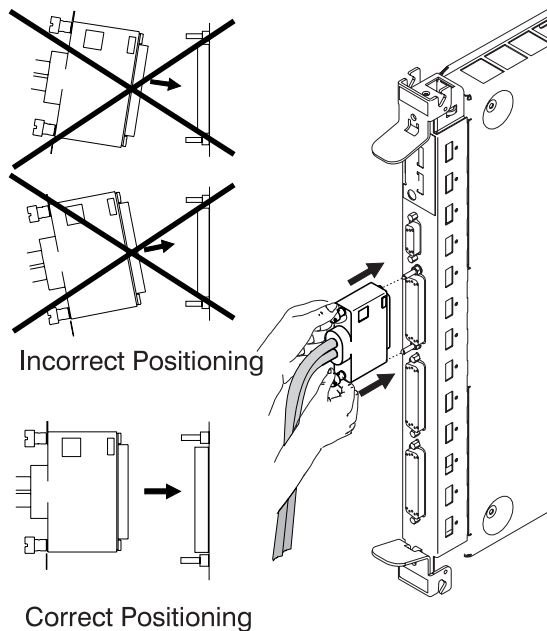
Figure 3-11. Inter Machine Cables Routed On the Top of the Logic Subrack

5. \_\_\_\_ Refer to Figure 3-10 or Figure 3-11 and carefully connect cable **2** (PN 57G8045) from **connector 1** of the switch module to **connector 1** of the switch redrive module.

### Important Note

Cable connectors can be damaged when installing or removing cables on **switch** or **switch redrive** module. Maintain the cables firmly while installing cables on top of the connectors to avoid any effort which can damage the connectors.

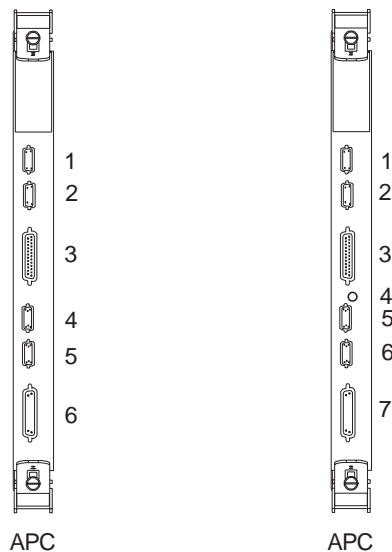
Tighten the screws that secure the cables progressively and alternatively on top and bottom.



6. \_\_\_\_ Connect three cables **3** (PN 57G8065) from **connectors 2, 3, and 4** of the switch module respectively to **connectors 2, 3, and 4** of the switch redrive module. If the optional switch module **4** is plugged in location 10 of the 2220-500, go to Step 7, otherwise go to “Connecting the 2220-501 to the NAS” on page 3-15
7. \_\_\_\_ Resume Step 5 to Step 6 to connect the switch module (plugged in location 10) to the switch redrive module (plugged in location 10 of the 2220-501).
8. \_\_\_\_ Continue the installation, **go to** “Connecting the 2220-501 to the NAS” on page 3-15.

## Connecting the 2220-501 to the NAS

Determine the type of the APC installed in your 2220:



APC Type A

APC Type B

Figure 3-12. APC Types

If you have:

- **APC type A** (with six connectors), go to “Connecting the 2220-501 to the NAS and APC Type A.”
- **APC type B** (with seven connectors), go to “Connecting the 2220-501 to the NAS Type B and APC Type B” on page 3-17.

## Connecting the 2220-501 to the NAS and APC Type A

1. \_\_\_\_ Refer to Figure 3-13 on page 3-16, remove cable **1** (PN 80G0781) plugged between the APC connector 4 (plugged in the 2220-500) and connector J1 of the tailgate. Store this cable in the service drawer.

### Attention

1. To avoid ALARM, do **NOT** connect cable **1** to connector 4 of the APC module of the 2220-501 if you do not have to connect a RS/6000 to connector J1 of the APC tailgate located in the 2220-500. Skip step 2 on page 3-16 and go to step 3 on page 3-16.
2. The APC shipped installed in the 2220-501 can be 'type B' (see Figure 3-12), in that case in step 2 on page 3-16 connect cable **1** to connector 5 of the APC module plugged in the 2220-501.

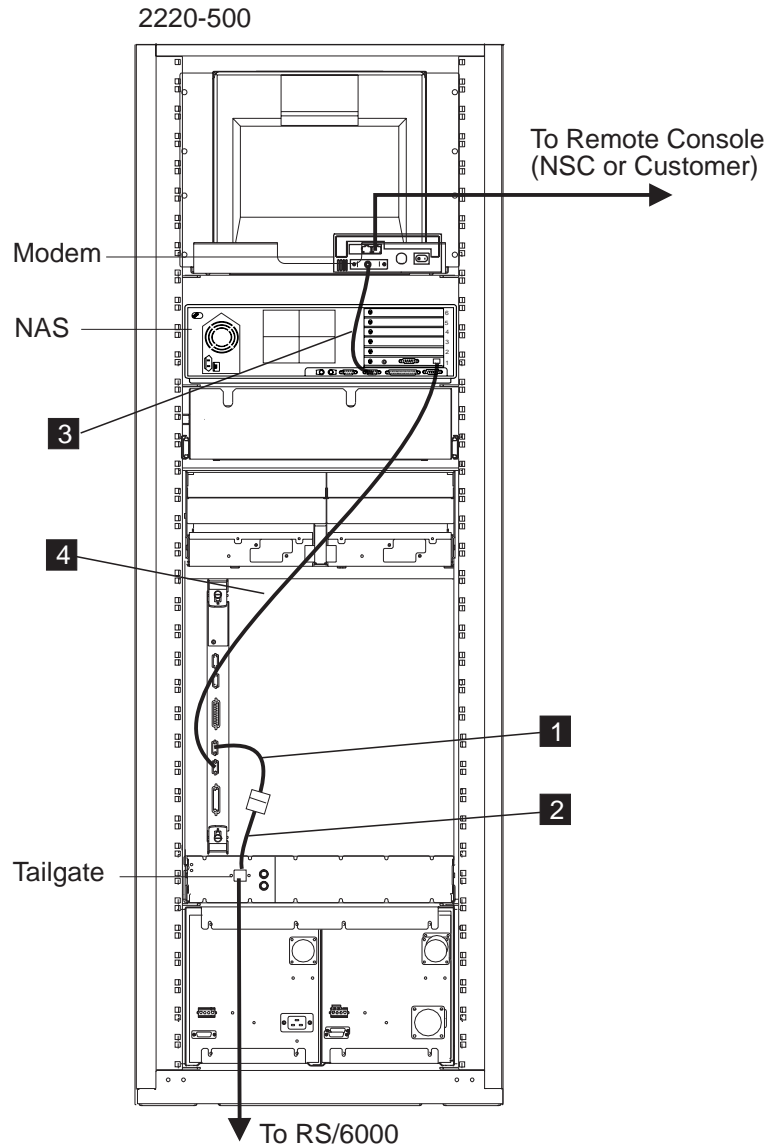


Figure 3-13. Example of NAS (Type 7585) to an APC Type A

2. \_\_\_\_ Refer to Figure 3-14 on page 3-17, obtain from the shipping group cable **1** (PN 80G0782) and plug this cable from connector 4 of the APC module plugged in the 2220-501 and to the connector of cable **2** coming from the APC tailgate of the 2220-500.
3. \_\_\_\_ Connect cable **5** (PN 57G8071) from **connector 4** of the APC module plugged in the 2220-500 to **connector 5** of the APC module plugged in the 2220-501.
4. \_\_\_\_ Reinstall the APC cover using two screws **A** (see Figure 3-7 on page 3-10).



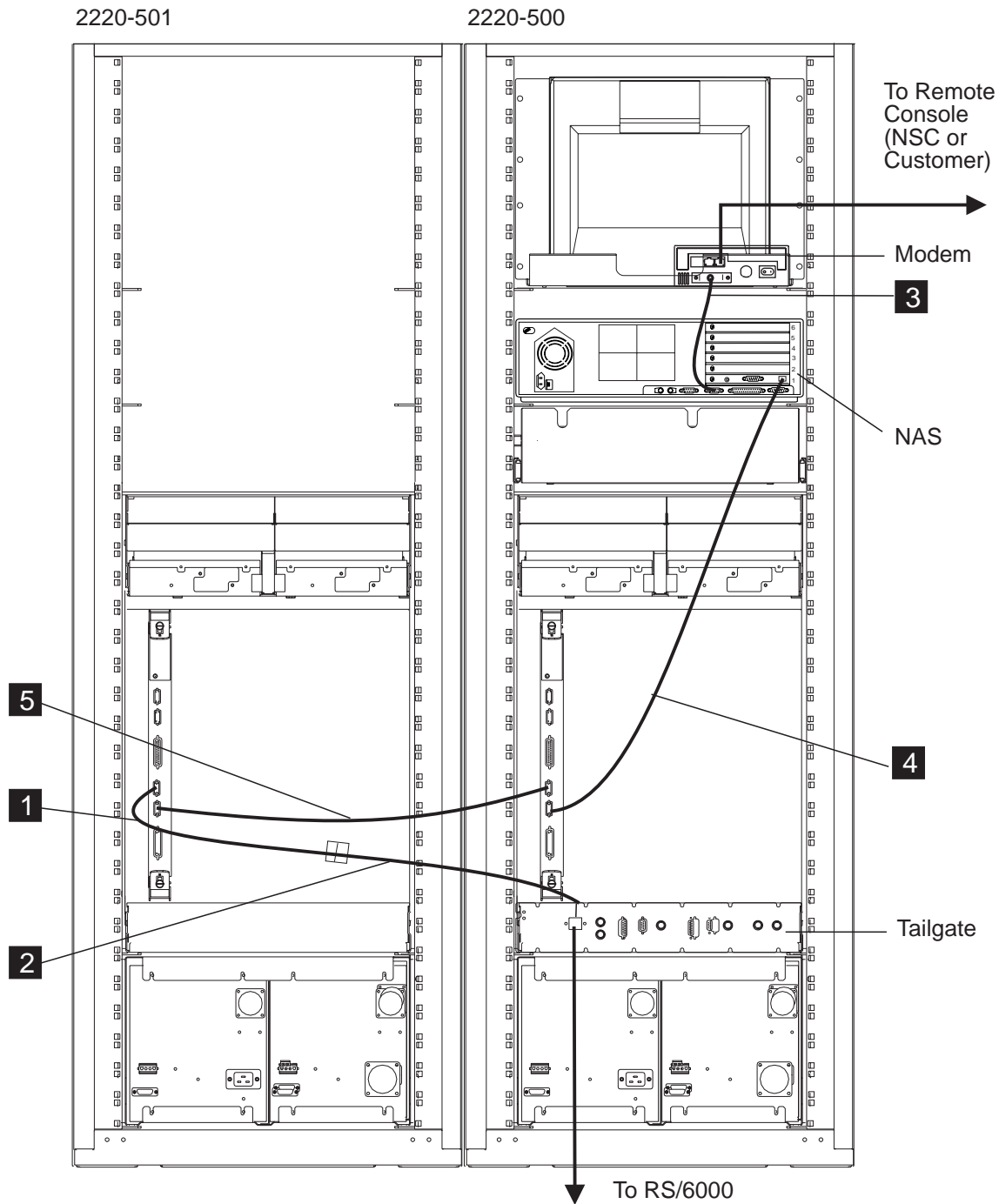


Figure 3-14. Connection of the 2220-501 to the NAS (Type 7585) and APC Type A

Go to Chapter 4, “Connecting the 2220 to Main Power” on page 4-1

## Connecting the 2220-501 to the NAS Type B and APC Type B

1. \_\_\_\_ Connect cable **1** (pn 57G8071) from connector 6 of the APC module plugged in the 2220-501 to connector 5 of the APC module plugged in the 2220-500 (see Figure 3-15 on page 3-18).
2. \_\_\_\_ Reinstall the APC cover using two screws **A** (see Figure 3-7 on page 3-10).

# Installing a 2220-501

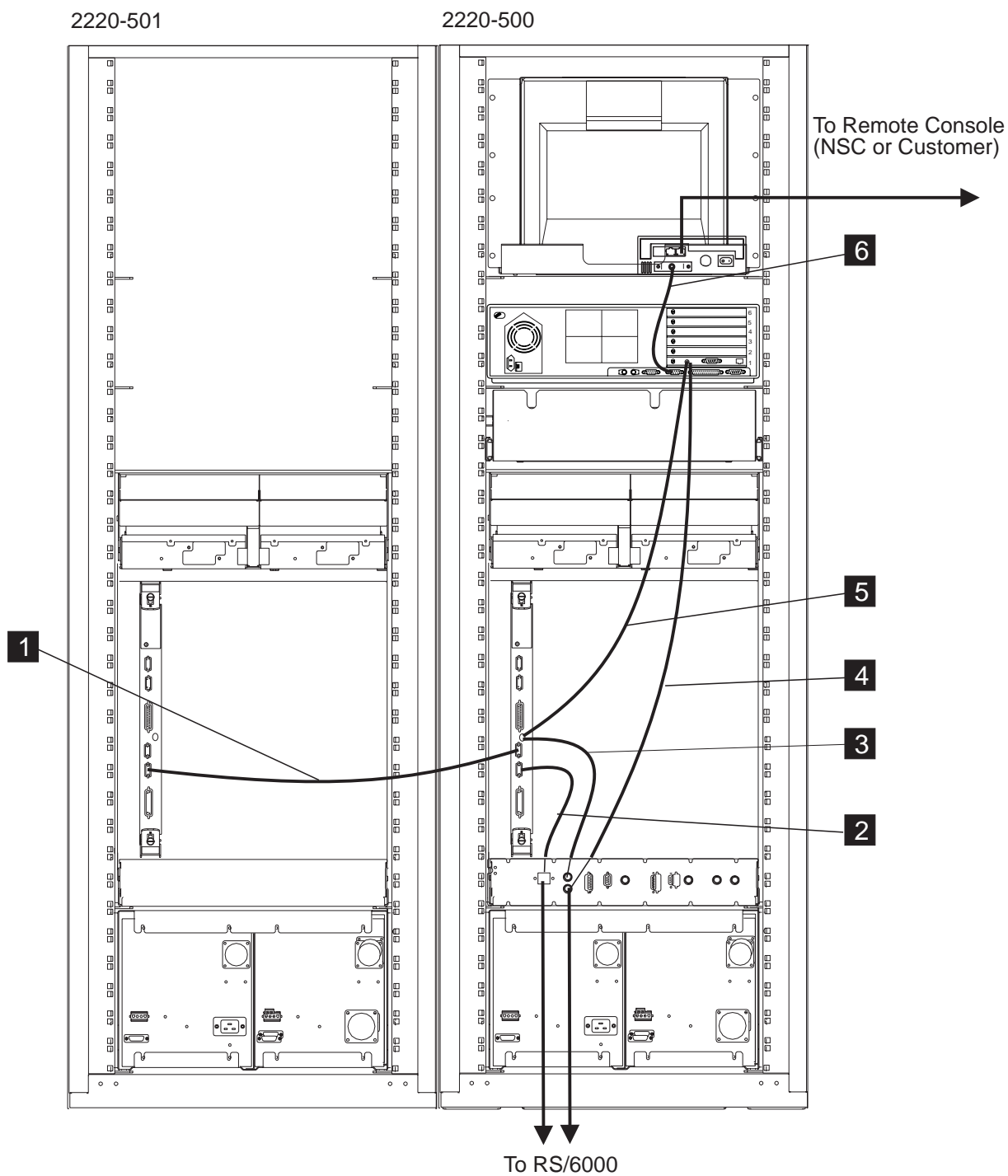


Figure 3-15. Connection of the 2220-501 to the NAS(Type 7585) and APC Type B

Go to Chapter 4, "Connecting the 2220 to Main Power" on page 4-1

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## Chapter 4. Connecting the 2220 to Main Power

Power Description and Load Requirements . . . . .	4-2
Power Attachment Configuration . . . . .	4-2
Measuring the 2220 Power to the Customer Supply . . . . .	4-3
Measuring the Customer's Primary Power . . . . .	4-3
Connecting the 2220 to the Ground . . . . .	4-4
Connecting the 2220 to the Customer's Power . . . . .	4-7
Connecting the 2220 to the AC Power . . . . .	4-7
Connecting the Battery in the AC Power . . . . .	4-7
Connecting the Power Cord . . . . .	4-8
Connecting the 2220 to the DC Power . . . . .	4-10

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### Power Description and Load Requirements

#### Notes:

1. The following procedures apply to both **power 1** and **power 2** attachments and must be performed twice if an AC or DC power 2 attachment is installed on the machine.
2. If you are installing a 2220-500 and a 2220-501 at the same time, connect the 2220-500 first and then resume the same procedures for the 2220-501.
3. If you need to power off a 2220-501 while a 2220-500 is active, ensure that the switch modules are in 'inhibit state'.

### Power Attachment Configuration

#### Power Attachments:

- **Power Supply 1 Attachment:** Single Power Supply The **Power supply 1** can be **ac** or **dc**.
- **Power supply 2 Attachment:** Dual Power Supply Depending on your configuration, this second power is optional and can be an ac or dc.

**Note:** There is no internal relation (or connection) between the two power supplies. Therefore, power supply 2's voltage and frequency can be different from those of the power supply 1.

#### Power Requirements:

- **AC power** input: The standard nominal voltage input to the 2220 is single-phase, 200 to 240 volts for 60 or 50 Hz. The maximum power requirement is 1.82 kVA.
- **DC power** input: The system can operate within the following input DC voltage range:
  - Minimum : -39.0 V.
  - Maximum : -60.0 V.

The maximum power requirement is 1.65 kW.

---

## Measuring the 2220 Power to the Customer Supply

### Measuring the Customer's Primary Power

*CEs are not allowed access to the customer's main power receptacle. The customer or a customer-appointed electrician may have to do some of the work involved in the following procedures, and the CE must ensure that all the steps have been completed.*

1. \_\_\_\_ Switch or ask the customer to switch the 2220 branch circuit breaker to the **ON** position. Perform the following voltage measurements:
  - a. \_\_\_\_ Measure the voltage between the ground pin of the customer's receptacle and the building ground.
  - b. \_\_\_\_ Measure the voltage between the exterior shell of the customer's receptacle and the building ground.

**For any of the previous measurement, if the voltage is greater than 1.0 Vac, notify the customer and do not proceed until the problem is corrected.**

2. \_\_\_\_ Measure the customer's phase-to-neutral. Continue only if the measured value is in accordance with the following:
  - For AC input (for basic or optional power attachment) AC input voltage must be within 180V to 240V.
  - For DC input (for optional power attachment) DC input voltage must be within -39.0V to -60.0V.
3. \_\_\_\_ Switch or ask the customer to switch the branch circuit breaker that feeds the 2220 **to the OFF position.**

## Connecting the 2220 to the Ground

The 2220 frame must be connected permanently to the ground. Connect ground wire **A** (PN 80G3815) on the top or on the bottom of the 2220 frame to the building ground using four screws (PN 43G3084) and four washers (PN 1622348).

**Note:** The ground wire is connected on the top of the frame if the power cable is routed through the upper exit of the frame.

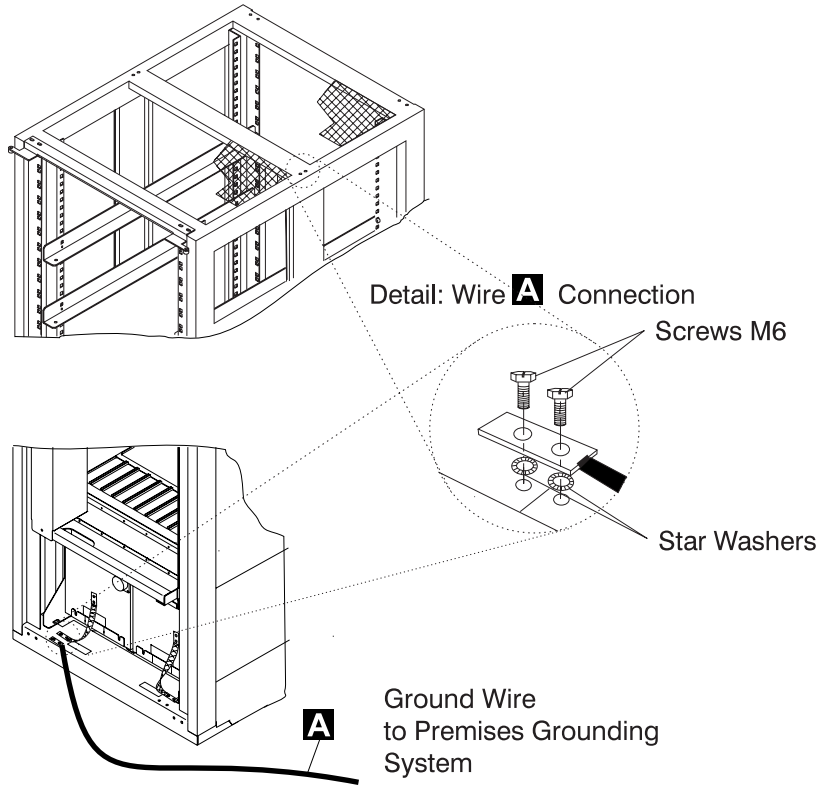


Figure 4-1. Ground Wire Connection in 37 U Rack

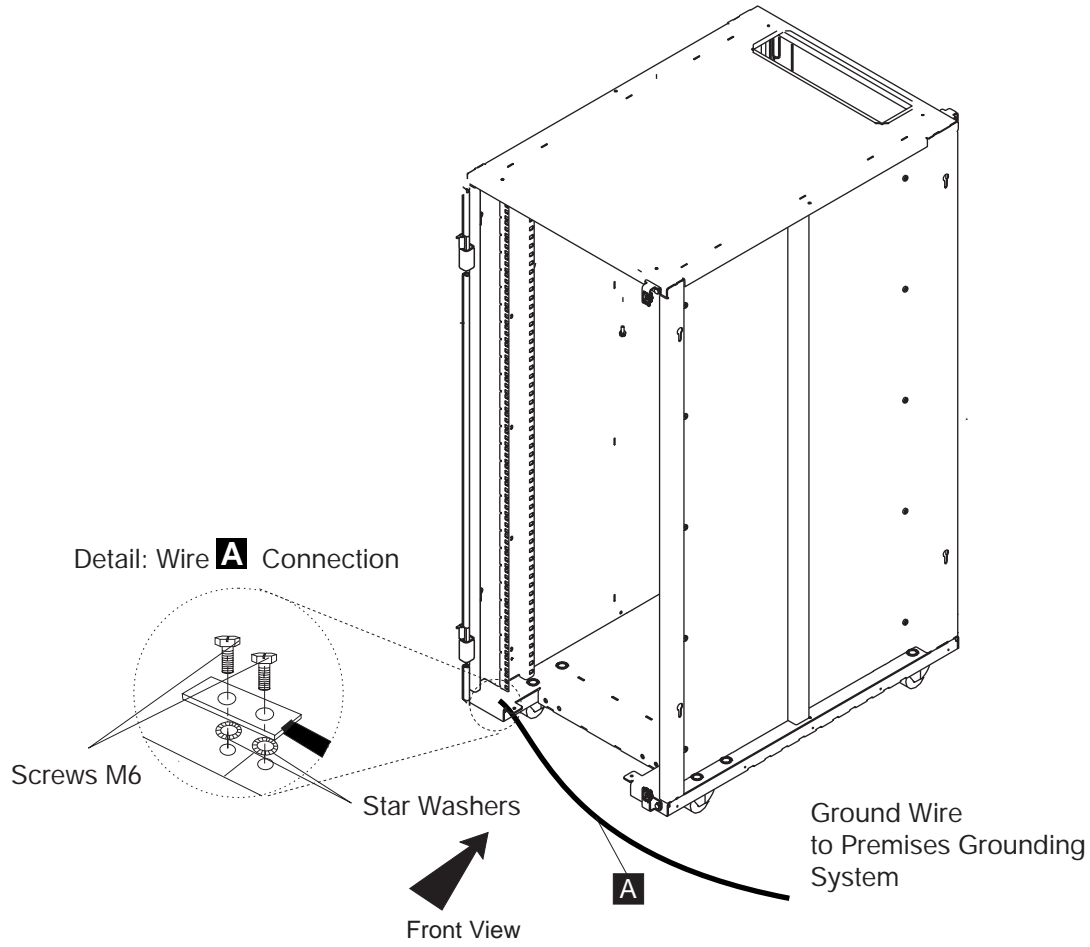


Figure 4-2. Ground Wire Connection in 29 U Rack

# Connecting the 2220 to Main Power

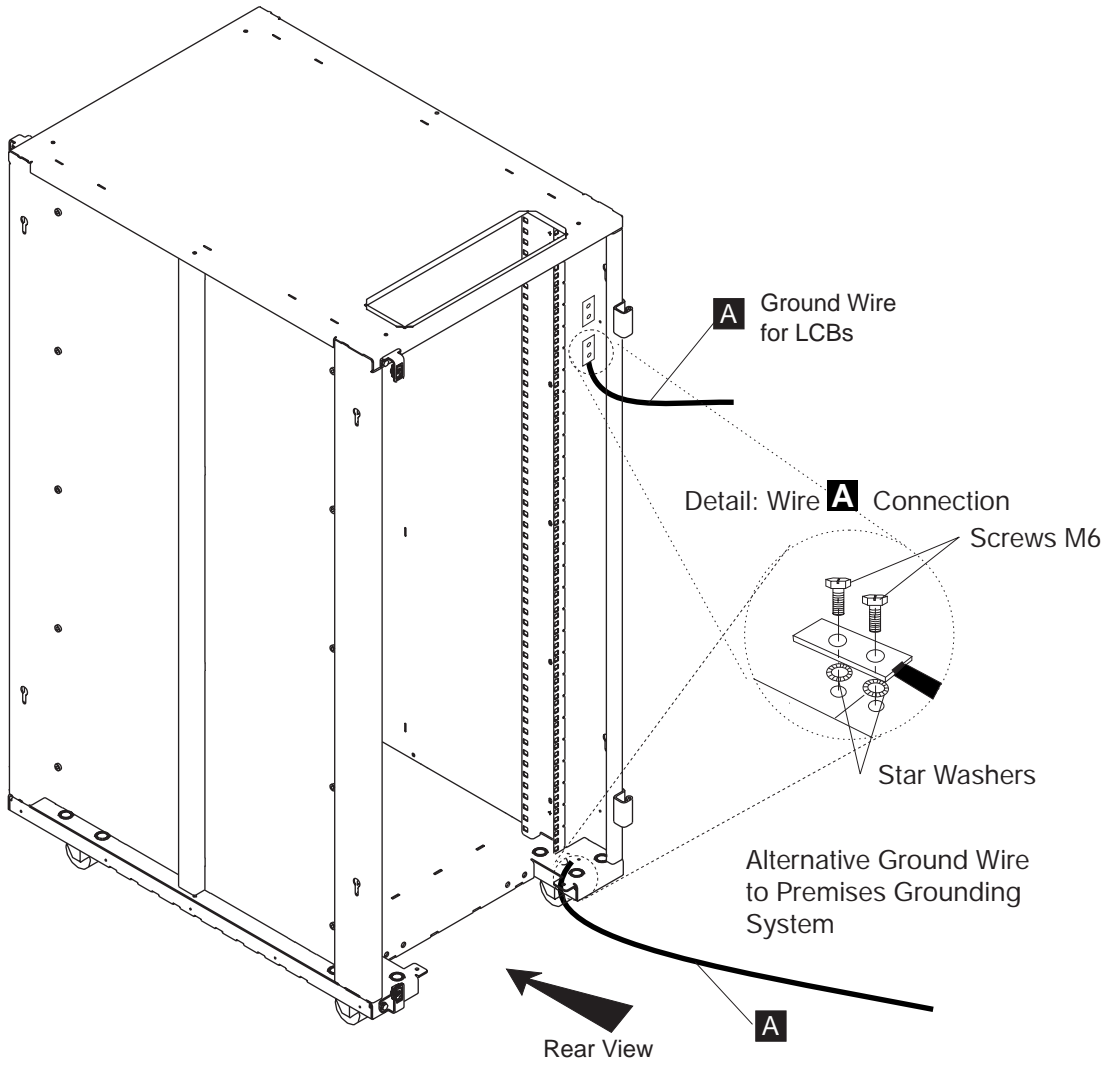


Figure 4-3. LCB and Alternative Ground Wire Connection in 29 U Rack



## Connecting the 2220 to the Customer's Power

If you are connecting:

- An AC power supply, go to “Connecting the 2220 to the AC Power.”
- A DC power supply, go to “Connecting the 2220 to the DC Power” on page 4-10.

## Connecting the 2220 to the AC Power

**Note:** Two types of AC power supplies can be installed, refer to “ACDC Power Types” on page 2-6 to identify your power type.

## Connecting the Battery in the AC Power

1. \_\_\_\_ Ensure that the customer's branch circuit breaker which feeds the power supply is in the **OFF position**, and that CB is switched to **OFF** at the rear of the 2220 ac power supply (see Figure 4-4).

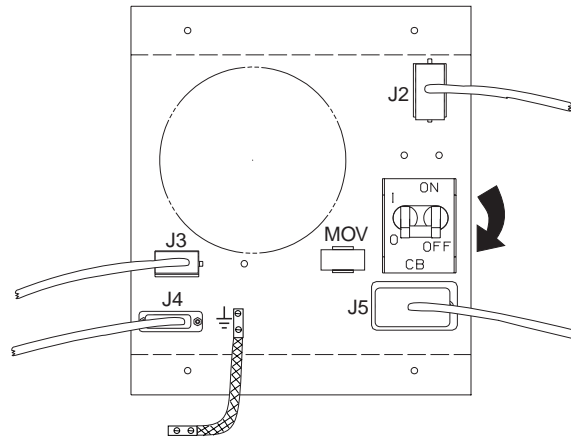


Figure 4-4. AC Power

2. \_\_\_\_ In front of the AC power supply, remove the 4 screws **K** and the grid.

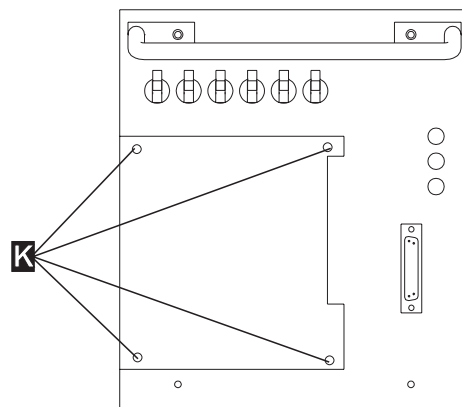


Figure 4-5. AC Power Grid

3. \_\_\_\_ Connect the cable connector to the battery (see Figure 4-6 on page 4-8).

## Connecting the 2220 to Main Power

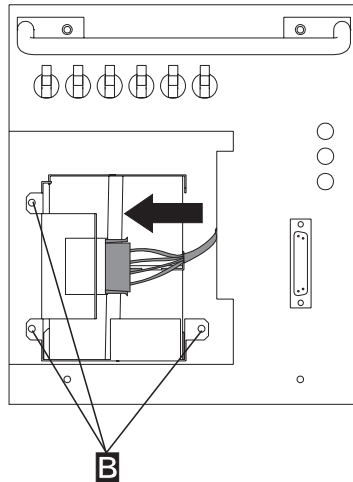


Figure 4-6. Battery Plug

4. \_\_\_\_ Reinstall and secure the grid using the 4 screws **A** (see Figure 4-5 on page 4-7). If you have a second power supply, repeat Step 1 on page 4-7 to Step 4.

## Connecting the Power Cord

1. \_\_\_\_ If power supply 2 is installed before routing the power cables, identify these cables using label PN 811825.
2. \_\_\_\_ Plug the power cable **1** to connector J5 of the ac power supply (see Figure 4-7).

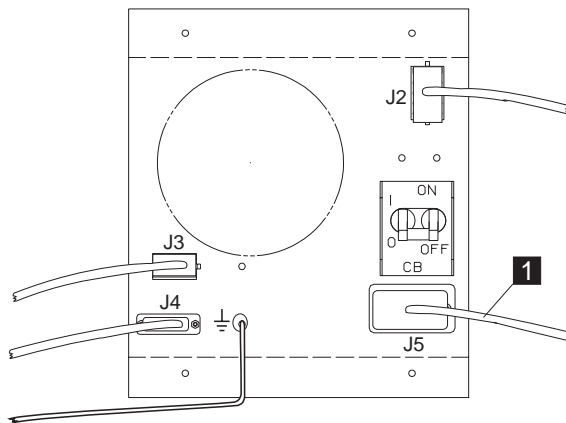


Figure 4-7. AC Power Plug

3. \_\_\_\_ Route the power cable **1** to the customer's power socket, and insert the power plug into the customer's main socket (see Figure 4-8 on page 4-9).  
**Note:** The power cable can be routed through the upper exit of the rack (see Figure 6-1 on page 6-2 routing **1**), in that case install the overhead cover as shown in Figure 6-2 on page 6-3 and route the power cable through this cover.
4. \_\_\_\_ Fasten the power cable in place using two tie clamps **3** (PN 1159519).

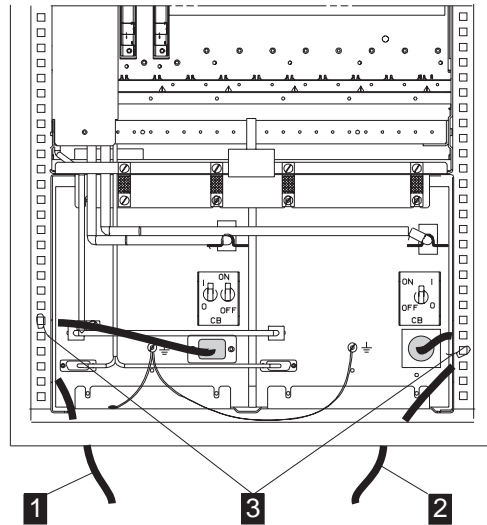


Figure 4-8. Power Cable Routing

**Note:** Other type of ground straps **2** can be installed on your machine, refer to Figure 4-9.

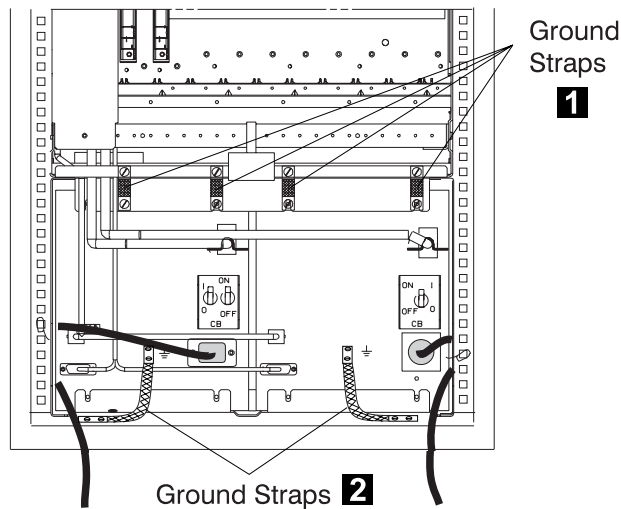


Figure 4-9. Ground Straps

If you have to connect DC power, go to: “Connecting the 2220 to the DC Power” on page 4-10. Otherwise, go to Chapter 5, “Testing the 2220 Locally” on page 5-1.

### Connecting the 2220 to the DC Power

**Note:** Two types of DC power supplies can be installed, refer to “DC48 Power Types” on page 2-7 to identify your power type.

A label "FOR DC USE ONLY" at the edge of the dc cable indicates that this cable must be connected to a dc power input.

1. \_\_\_\_ If power supply 2 installed and before routing the power cables, label these cables using PN 811825.
2. \_\_\_\_ Ensure that the customer's branch circuit breaker which feeds the power supply is in the **OFF position**, and that CB is switched to **OFF** at the rear of the 2220 DC power supply (see Figure 4-10).

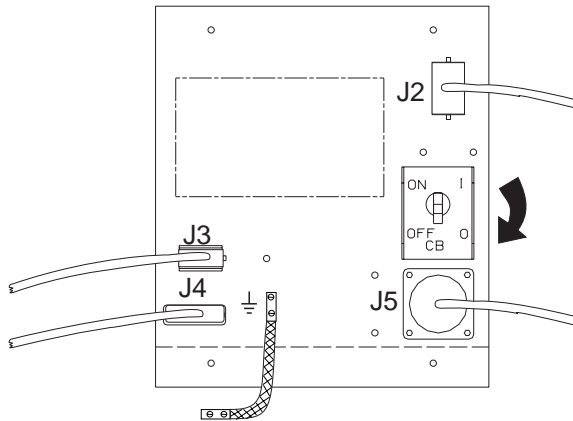


Figure 4-10. DC Power

3. \_\_\_\_ Plug and secure the power cable **1** to connector J5 of the DC power supply (see Figure 4-11).

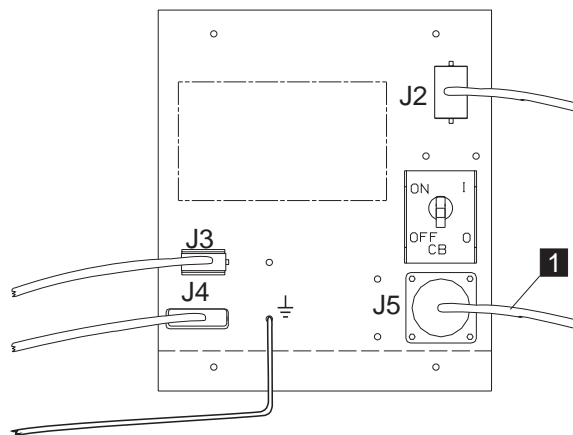


Figure 4-11. DC Power Plug

4. \_\_\_\_ Route the power cable **2** (PN 51G7934) to the customer's power socket (see Figure 4-12 on page 4-11).

**Note:** The power cable can be routed through the upper exit of the rack (see Figure 6-1 on page 6-2 routing **1**), in that case install the overhead cover as shown in Figure 6-2 on page 6-3 (if present) and route the power cable through this cover.

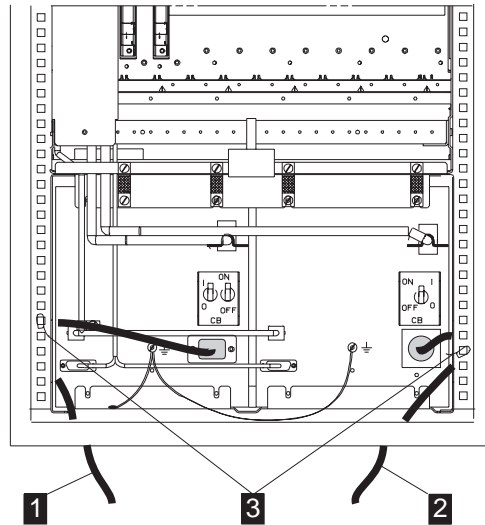


Figure 4-12. Power Cable Routing

**Note:** Other type of ground straps can be installed on your machine, refer to Figure 4-9 on page 4-9.

5. \_\_\_\_ Connect the cable wires as follows:
  - a. Green Yellow to the ground
  - b. Wire (0) to the (+)
  - c. Wire (-48v) to the (-)
6. \_\_\_\_ Fasten the power cable in place using two tie clamps **3** (PN 1159519).

**Go to Chapter 5, “Testing the 2220 Locally” on page 5-1**

## Connecting the 2220 to Main Power

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# Chapter 5. Testing the 2220 Locally

- Checking the 2220 Power Status . . . . . 5-2
- Checking the 2220 Power On Self Test . . . . . 5-4
- Powering Up the Nways Switch Administration Station . . . . . 5-4
- Running the 2220 Diagnostics . . . . . 5-5

**Note:** For any unexpected status during the following procedures, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247), and then call your Network Support Center if necessary.

### Checking the 2220 Power Status

#### 1. \_\_\_\_ Powering the 2220 ON

**Note:** Depending on your configuration, only the power supply 1 can be installed (ac or dc).

- a. \_\_\_\_ Ensure that all circuit protectors (CP1 to CP6) are set to the ON position (up).
- b. \_\_\_\_ Ask the customer, or turn the branch circuit breakers that feed the 2220 to the **ON** position.
- c. \_\_\_\_ Turn the main circuit breakers (CBs) to **ON**.

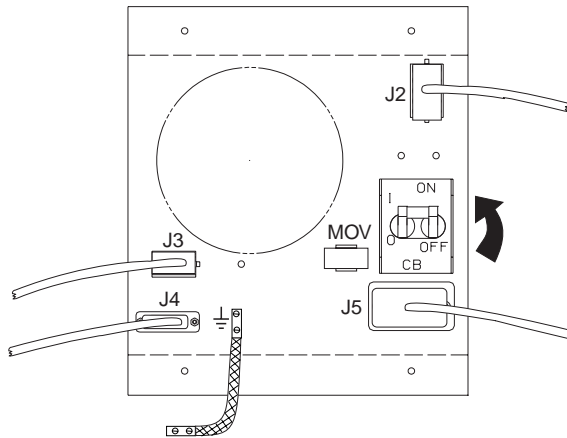


Figure 5-1. ACDC Power Supply

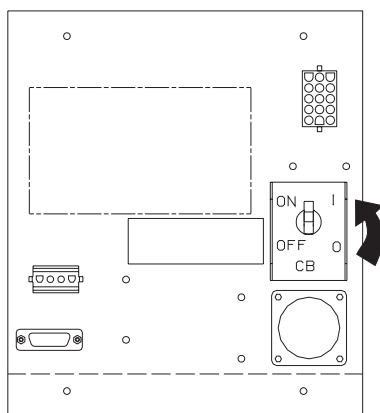


Figure 5-2. DC48 Power Supply

#### 2. \_\_\_\_ Verifying the power and fan statuses

**Note:** If the power supply 2 is not installed, do not care about the status of the leds number 2 (see Figure 5-3 on page 5-3).

- a. \_\_\_\_ From the control panel turn on the power switch.



- b. \_\_\_\_ The green leds **1** for power supply 1 and **2** for power supply 2 must be **ON**.
- c. \_\_\_\_ Verify that the two yellow leds, marked FAN BOX 1 and 2, on the control panel are OFF. If a LED is ON, it indicates that the corresponding fan number is in error.

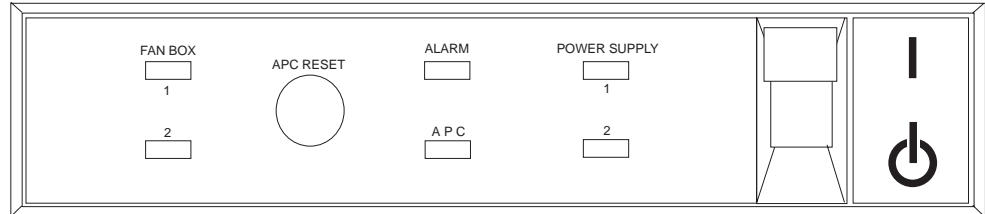


Figure 5-3. Control Panel

If you have only one power supply installed, go to “Checking the 2220 Power On Self Test” on page 5-4, otherwise, go to step 3.

3. \_\_\_\_ **Verifying the dual power feature**

- a. \_\_\_\_ While the machine is power on, switch off the circuit breaker of one of the power supply.
- b. \_\_\_\_ Verify that the dc distribution is correct by checking the green leds on the modules, they must be on.
- c. \_\_\_\_ Switch on the circuit breaker of power supply where you dropped the cb, and resume the same operations for the other power supply.

---

## Checking the 2220 Power On Self Test

1. \_\_\_\_ **Verifying the Status of the 2220**

On the control panel (see Figure 5-3 on page 5-3), verify that the **yellow** led for the ALARM is **OFF**. If OFF, go to "Powering Up the Nways Switch Administration Station," otherwise go to step 2 and verify the status of the modules installed in the 2220.

2. \_\_\_\_ **Verifying the Status of the Modules**

Check that all the **green** leds of the modules plugged in the machine are **ON**:

- a. \_\_\_\_ The **APC** led on the control panel (if this led is OFF, press the APC RESET switch, if the led is still OFF see note below).
- b. \_\_\_\_ The **adapters** and **clocks** leds on the front of the machine (see Figure A-10 on page A-12).
- c. \_\_\_\_ The **LICs** and **switches** leds on the rear of the machine (see Figure A-12 on page A-13).

**Note:** If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

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## Powering Up the Nways Switch Administration Station

**Attention:** If two Ethernet adapter cards are installed in the Nways Switch administration station and if the network management station is not connected to the second adapter, you will get the warning message **0265**. Do not investigate this problem and bypass the error message by pressing 'F1'.

1. \_\_\_\_ Open the cover on the front side of the Nways Switch administration station.
2. \_\_\_\_ Power on the NAS and its display, when the initialization is completed the following screen is prompted:

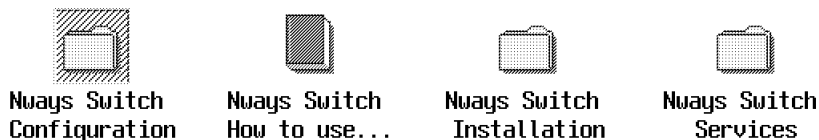


Figure 5-4. Primary Panel

## Running the 2220 Diagnostics

1. \_\_\_\_ Double click on **Nways Switch Services** icon.

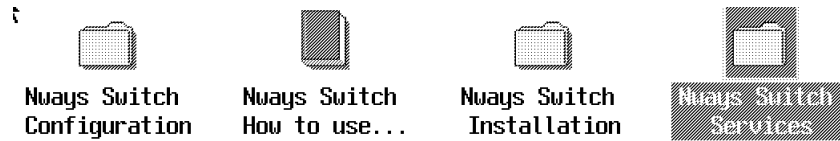


Figure 5-5. Primary Panel

2. \_\_\_\_ Double click on **Nways Switch Resource Control (Local)** icon.

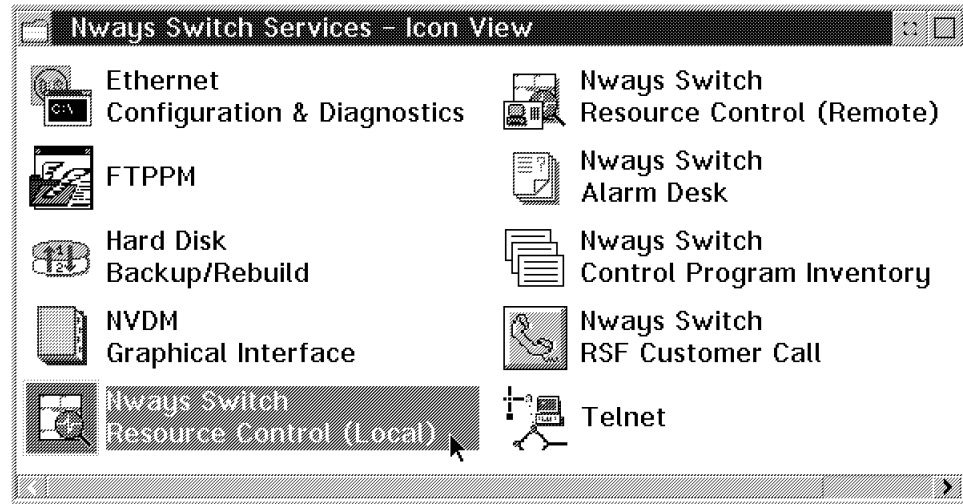


Figure 5-6. Nways Switch Resource Control Panel

3. \_\_\_\_ Click on **OK**
4. \_\_\_\_ Click on **View, Expanded Tree View**, and wait until all lights are green and triangles disappear.

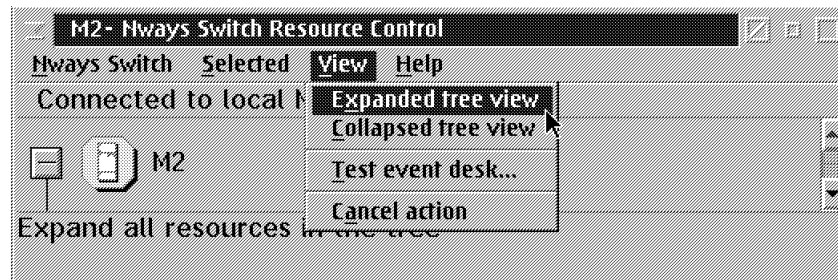


Figure 5-7. Resources Expanded View

5. \_\_\_\_ On the **Node Resources** window, using the right button on the mouse, click on **Rack A** or **expansion rack** (if you are installing a 2220-501) to select the resource, then using the left button, click on the resource selected, a popup window is displayed, click on **Start Test**.

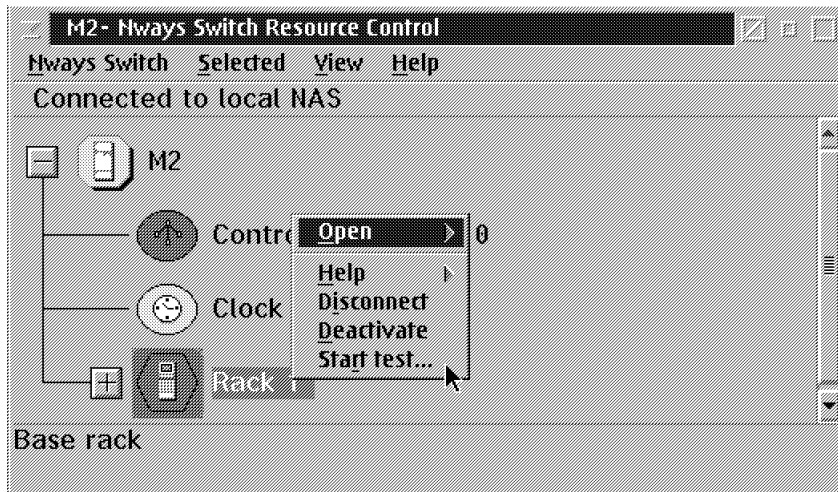


Figure 5-8. Rack Test Panel

6. \_\_\_\_ The **Test Selection** window is displayed. If needed, you can modify the **Cycle count** and the **Wrap Plug** default parameters (one cycle takes about 5 minutes, it depends on the configuration), click on **Start**.

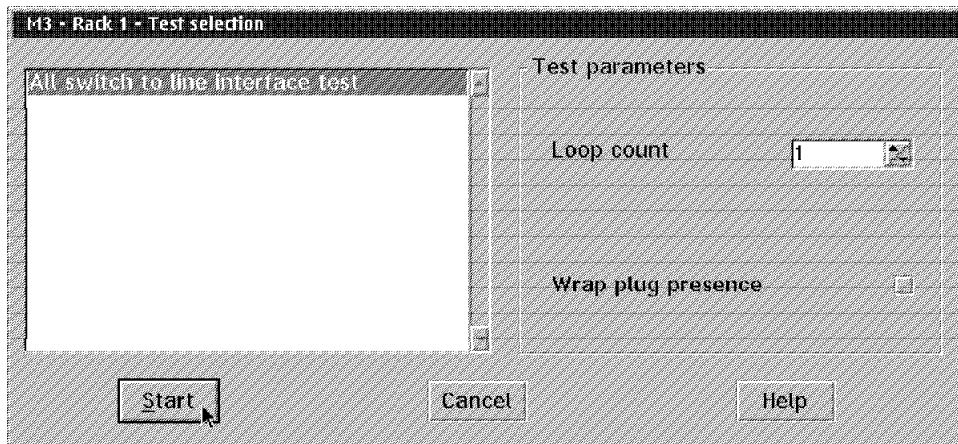


Figure 5-9. Selection Panel

7. \_\_\_\_ The following warning message is displayed, Click on **Yes**.

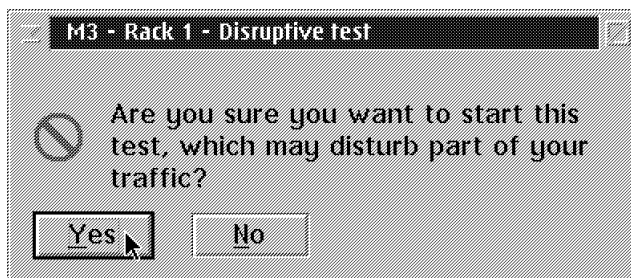


Figure 5-10. Warning Message

8. \_\_\_\_ The **Test Event Desk** window is displayed showing the status of the test (running, started, stop test in progress, or complete). Wait for the status

**complete.** If any error, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

Resource type	Status	Loop count	Error count	Local date and time
Rack A	Complete	1		1994/11/02-14:00:43

Figure 5-11. Test Event Desk Panel

9. \_\_\_\_ To exit, click on the icon in the upper left corner of the window, then click on **close**.

**Go to Chapter 6, “Installing External Cables” on page 6-1**



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## Chapter 6. Installing External Cables

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Installing Cables For LIC 511 . . . . .	6-4
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### Cable Routing

**Note:** If you are not familiar with the system component location, see “Component Location” on page A-6.

If the external cables are routed through:

- The **upper exit** of the 2220 extension frame (routing **1**), go to “Installing the Overhead Cover on Top of 37 U Rack (Optional)” on page 6-3.

**Note:** The overhead cover for 37 U rack can be not available with your machine, if not present or if you install a 2220 in 29 U rack go to “Installing Cables For LIC 511” on page 6-4 .

- The **lower exit** of the 2220 extension frame without using a raised floor (routing **2**), or using a raised floor (routing **3**), go to “Installing Cables For LIC 511” on page 6-4.

To satisfy the EMC constraints, route the cables according to the following drawing and use clamps PN 5270166 and PN 1159519 **4** to maintain the cables.

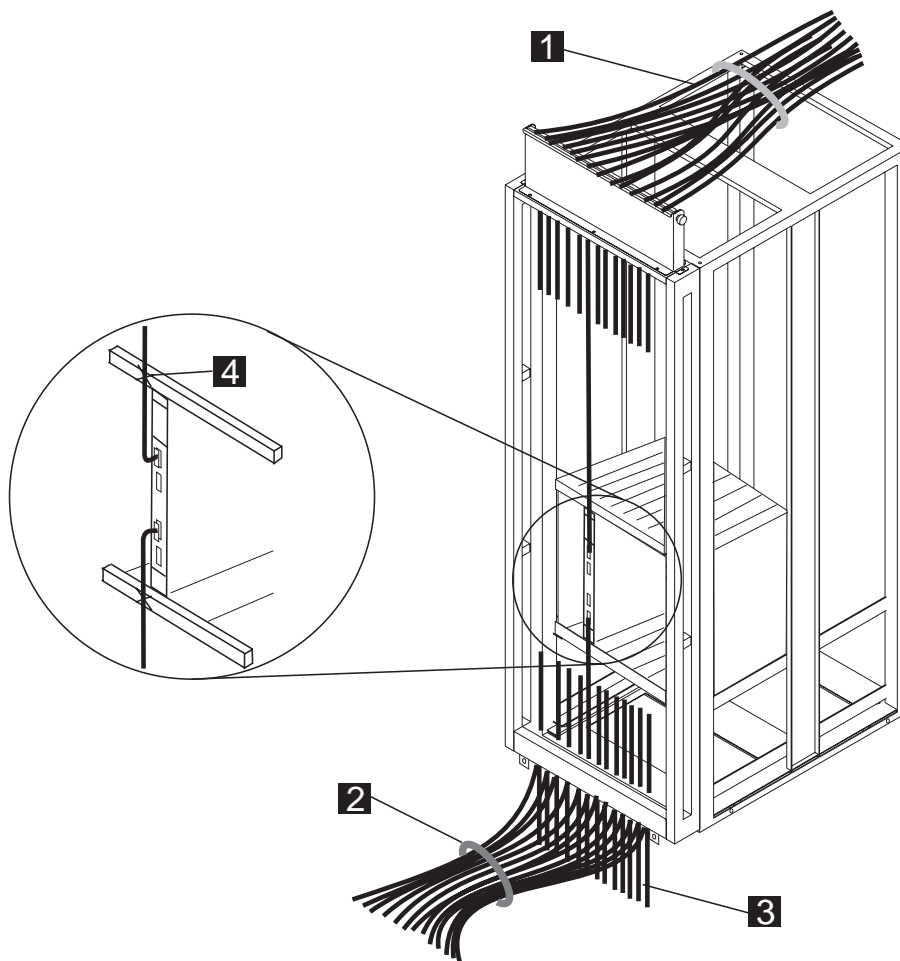


Figure 6-1. Cable Routings



## Installing the Overhead Cover on Top of 37 U Rack (Optional)

1. \_\_\_\_ Refer to Figure 6-2, remove cover **1** from the top of the rack extender located at the rear side of the 2220 frame.
2. \_\_\_\_ Obtain from the shipping group the upper cover set (PN 43G3107).
3. \_\_\_\_ Install bracket **2** in place of the cover **1** using the screws previously removed in Step 1.
4. \_\_\_\_ Route all the external cables through the upper exit area of the cable extension and arrange the cables along the bracket **2** to minimize the opening size between brackets **2** and **3** (for cable references see the following chapters in this document).
5. \_\_\_\_ Then, when all cables are routed slide bracket **3** into bracket **2** and secure using knobs **4**.

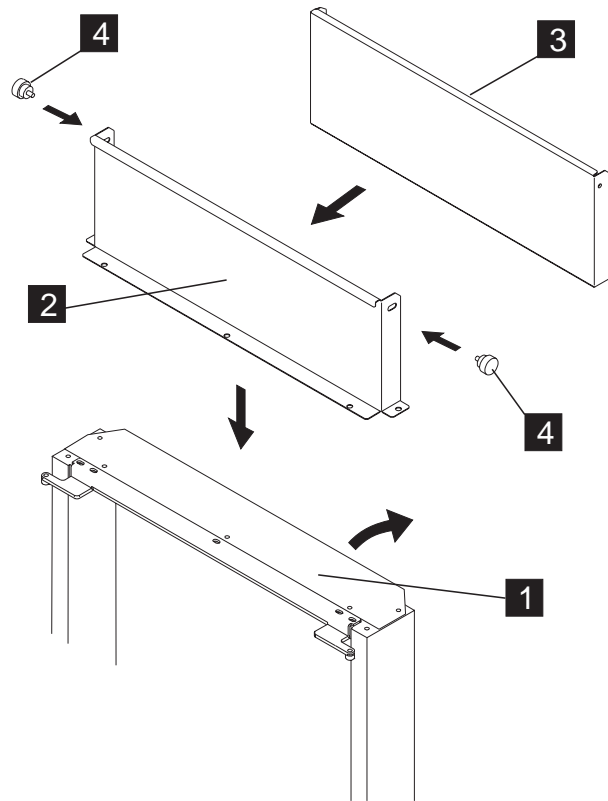


Figure 6-2. Overhead Cover Installation

### Installing Cables For LIC 511

Obtain (from the customer) the Hone sheets , where all the information required to install the LCBs and cables is recorded.

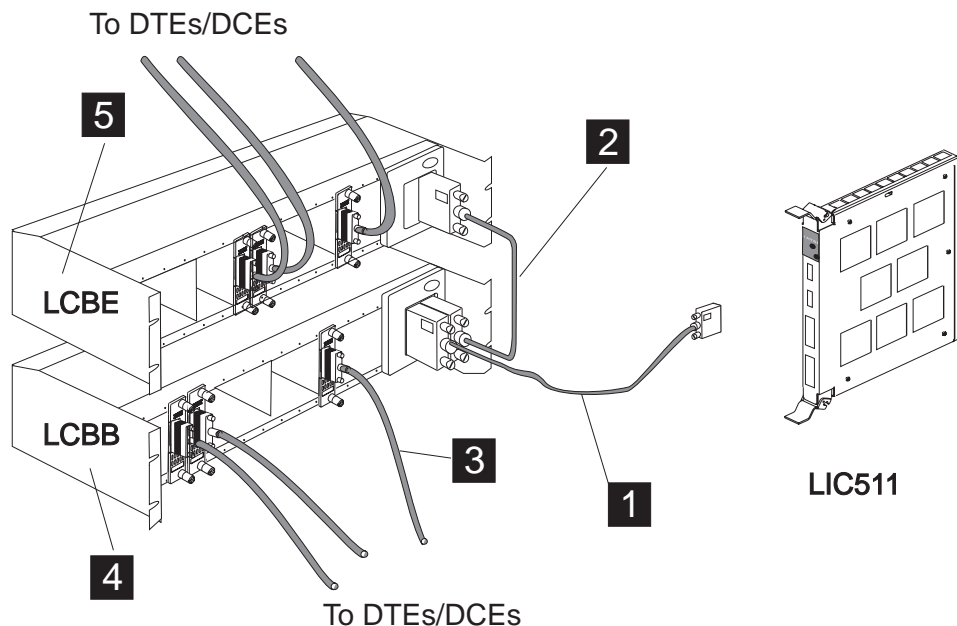


Figure 6-3. External Cables Connected to LIC 511 and LCBs

There are **two** types of **Line Connection Box (LCB)**:

1. The **Line Connection Box Base 4** (LCBB)
2. The **Line Connection Box Expansion 5** (LCBE)

**Note:** Two LCBs can be installed in the 2220-300 or 2220-500 (two LCBBs or one LCBB and one LCBE). For LCB location in a 37 U rack see Figure 6-5 on page 6-6, for location in 29 U rack see Figure 6-6 on page 6-6.

The **LIC 511** is connected to the DTE/DCE using the following cables:

1. Cable **1** used to connect the LIC 511 to the LCBB (see “Installing the Cables From LIC 511-to-LCBB” on page 6-10 for details of the installation).
2. Cable **2** used to connect the LCBBs to the LCBEs (see “Installing the LCBs and Cable from the LCBB to LCBE” on page 6-5 for details of the installation).
3. Cable **3** used to connect the LCBB/LCBE ARC location to the DTE/DCE (see “Installing the Cables From the ARCs to the DTE/DCE” on page 6-12 for details of the installation).

## Installing the LCBs and Cable from the LCBB to LCBE

The LCBs can be installed in a 2220-500, 2220-501, or in a customer's rack, install the LCBs in the rack-mount as follows:

1. \_\_\_\_ **Unpack** the LCB and obtain the different labels which will be used to identify the LCB and cables (at the end of the installation, save the unused labels for further needs).

If you are installing the LCB in the frame of the 2220-500 or 2220-501, go to Step 2, otherwise go to Step 5 on page 6-6.

2. \_\_\_\_ From the rear of the 2220-500 or 2220-501 remove cover **A** if you are installing a LCBB and (or) remove cover **B** if you are installing a LCBE.

**These covers are present only on 37 U rack.**

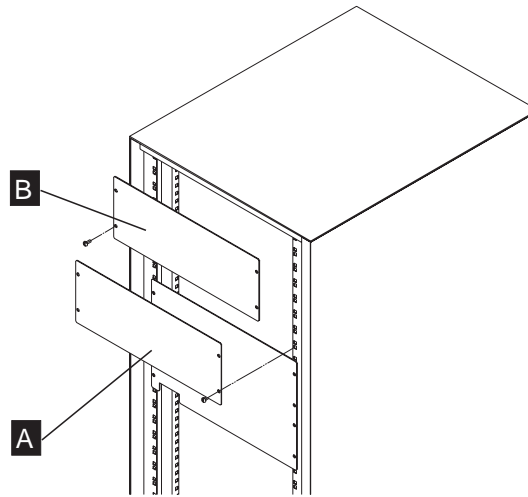


Figure 6-4. Removing Covers at the Rear of 37 U Rack

3. \_\_\_\_ **Install** the LCBB in location **A** , and the LCBE (if any) in location **B** :
  - Refer to Figure 6-5 on page 6-6 for LCBs installed in a 37 U rack.
  - Refer to Figure 6-6 on page 6-6 for LCBs installed in a 29 U rack.

## Installing External Cables

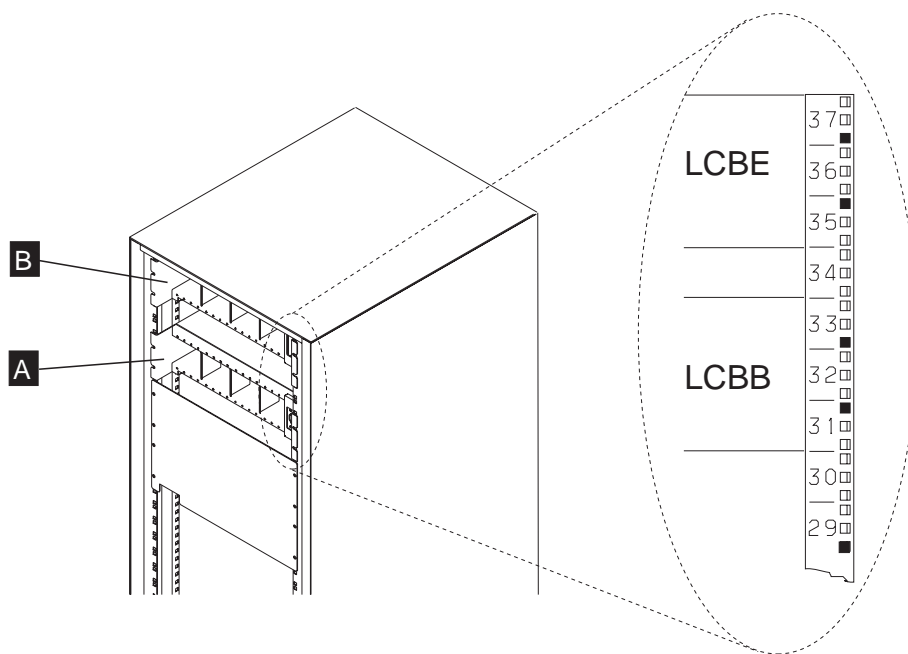


Figure 6-5. LCBs Installation in 37 U Rack

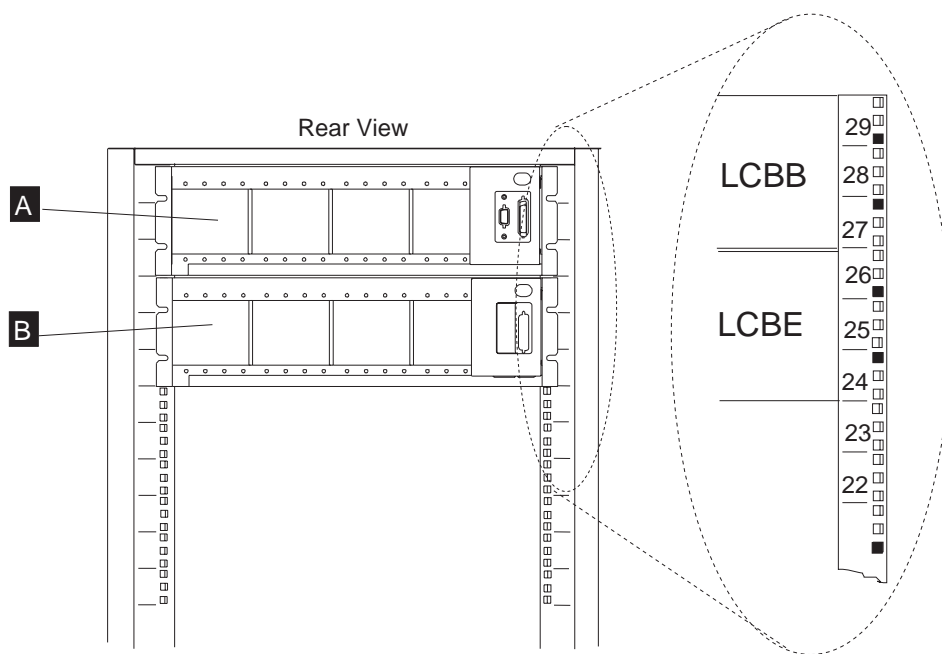


Figure 6-6. LCBs Installation in 29 U Rack

4. \_\_\_\_ Then go to Step 6.
5. \_\_\_\_ Start **installing** the LCBs **from the bottom** of the customer's rack. The LCBE is always installed on top of its associated LCBB (see Figure 6-11 on page 6-8).
6. \_\_\_\_ **Install** and **fasten** the LCB in the 19 in. rack-mount using the four screws provided with the rack parts.

**Note:** These screws also provide proper grounding of the LCB if the frame of the rack is connected to the premises ground system.

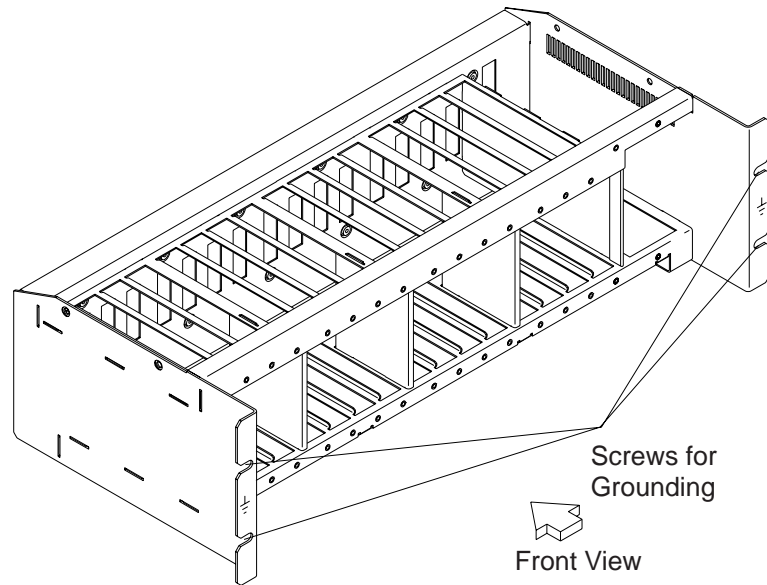


Figure 6-7. LCB Grounding via Screws.

Is the rack frame connected to the ground ?

- **Yes**, go to Step 8 on page 6-8.
- **No**, go to Step 7.

7. \_\_\_\_ Connect a ground wire as follows: of the LCB to the premises ground system.

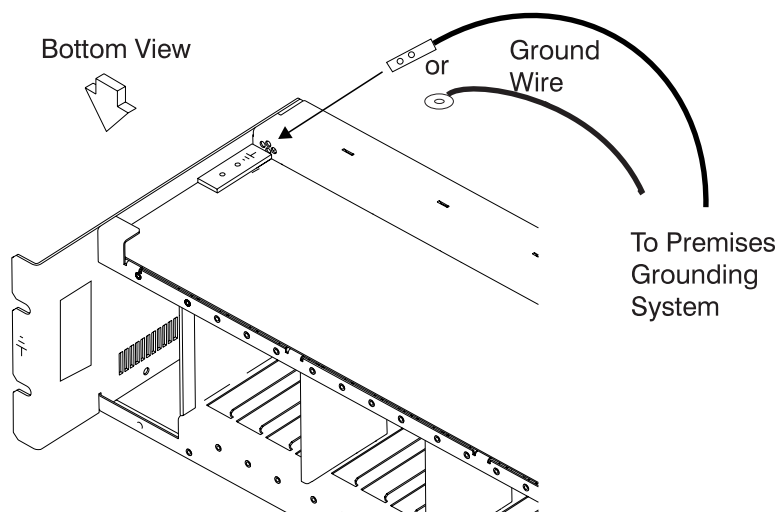


Figure 6-8. LCB Grounding via Ground Wire

Two types of connection can be done, standard (refer to Figure 6-9 on page 6-8), or 'Bellcore' connection (refer to Figure 6-10 on page 6-8).

## Installing External Cables

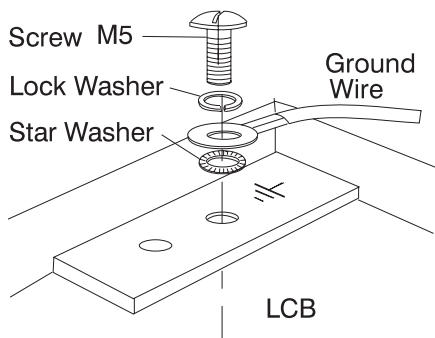


Figure 6-9. Standard Ground Connection

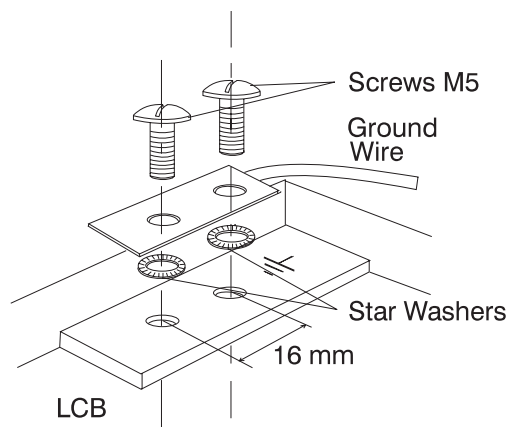


Figure 6-10. Bellcore Ground Connection

8. \_\_\_\_ Using the label PN 80G0744, **identify** the LCB by recording the following information:
  - a. The **2220 name**.
  - b. The **LCB number/location** (up to 25 characters).
  - c. The **LIC 511 connector location**
9. \_\_\_\_ **Stick** the label on the LCB (see detail A **3** in Figure 6-11).

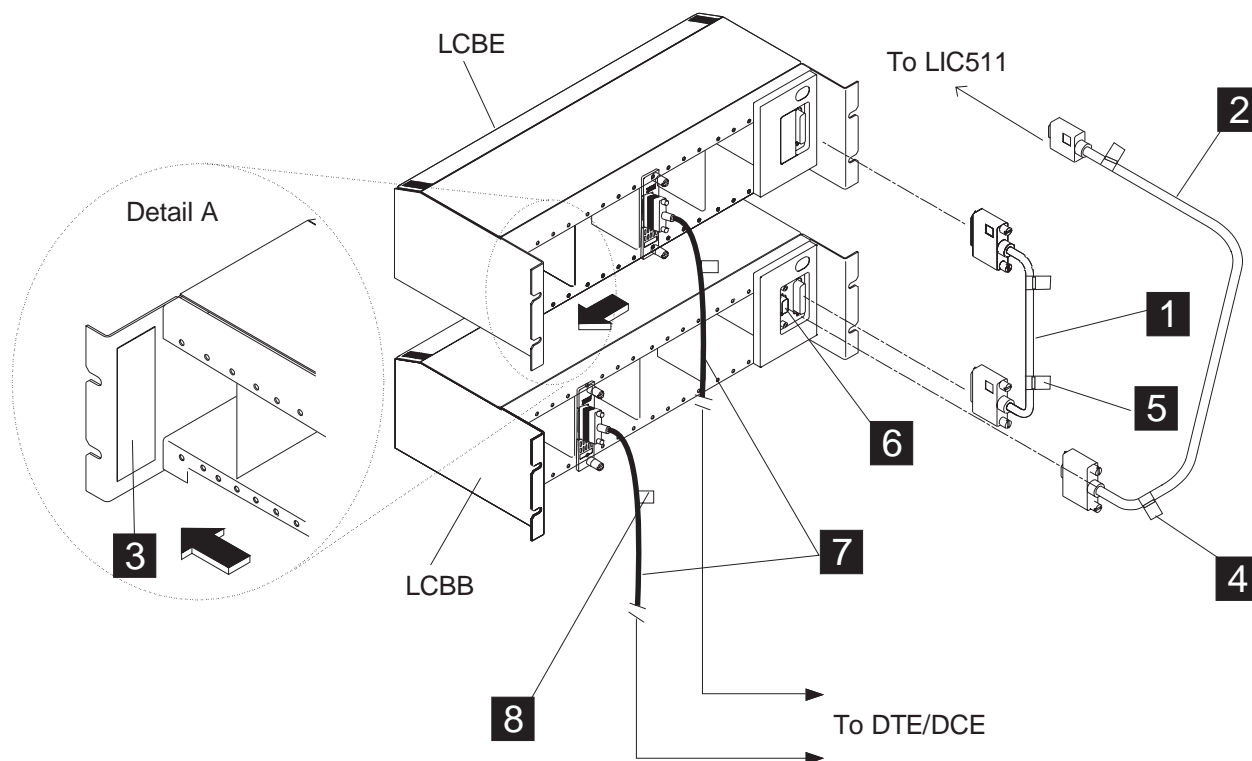


Figure 6-11. Cables Installation and Labelling

10. \_\_\_\_ If you have installed one LCBE, **install** cable **PN 17G5789** between the LCBB and the LCBE. This cable is part of the LCBE shipping group (see cable **1** in Figure 6-11).

## Installing the Cables From LIC 511-to-LCBB

Install the LIC 511 to LCBB cables (see cable **2** in Figure 6-11 on page 6-8) as follows:

1. \_\_\_\_ **Obtain** (from the shipping group) the low/medium speed line attachment cables ordered by the customer, see tables below.

<i>Table 6-1. LIC511 Attachment Standard Cables</i>			
<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number World-Wide</b>	<b>Part Number World-Wide Except Canada</b>
1 (3)	5620	58G5601	58G5705
5 (50)	5622	58G5603	58G5707
105 (330)	5625	80G3993	58G5710

2. \_\_\_\_ Using two labels PN 80G0743, **identify** the cables by recording the following information:
  - a. The **2220 name**.
  - b. The **LCB number/location** (up to 25 characters).
  - c. The **LIC 511 connector location**.
3. \_\_\_\_ **Stick** the labels **4** on the two leads of the cable at about 220 mm (9 in.) from the edges.
4. \_\_\_\_ **Connect** the cable **2** from the LCBB connector **6** to the LIC 511 connector according to the Hone sheet (see Appendix C, "Hone Sheet Example" on page C-1).

**Notes:**

- a. If you need to plug/unplug the cable connectors (on the LIC 511 or LCB side), wait at least five seconds between each operation.
- b. For the LIC 511 location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13.



## Installing the ARCs

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the ARCs ordered by the customer, see Figure 6-12.

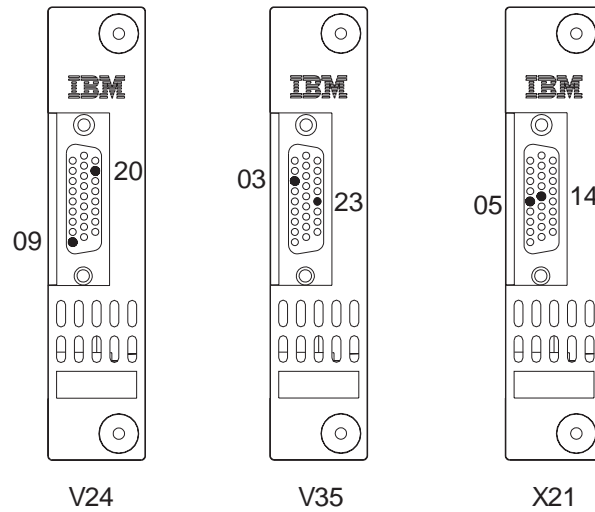


Figure 6-12. ARC Type

2. \_\_\_\_ **Install** the ARCs in position +0 to +14 for the LCBB and +16 to +30 for the LCBE (see Figure 6-13).

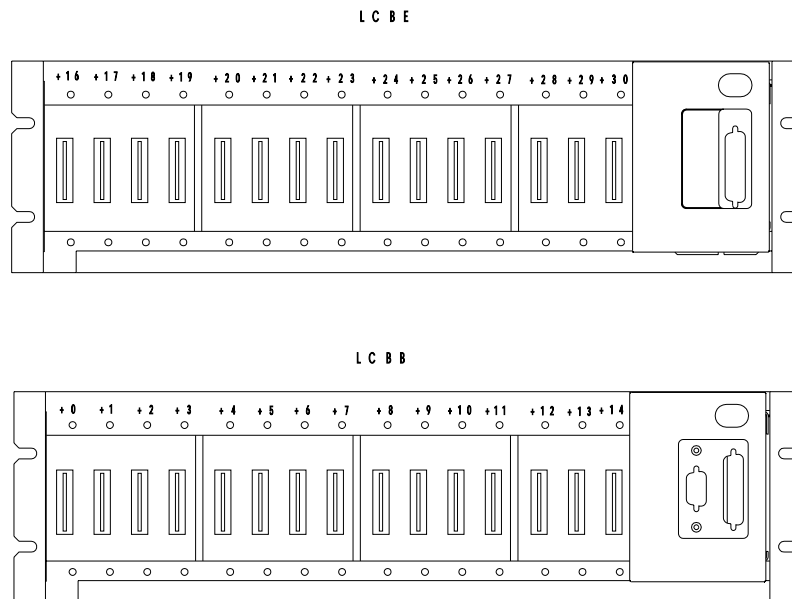
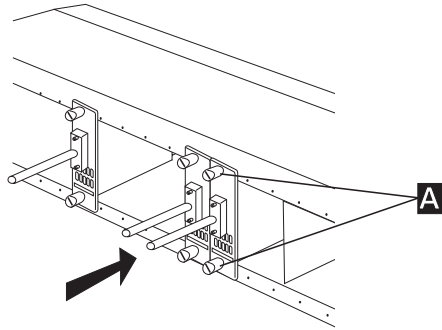


Figure 6-13. ARC Location in the LCBB and LCBE

3. \_\_\_\_ **Tighten** screws **A** to secure the ARCs in their locations.

## Installing External Cables



## Installing the Cables From the ARCs to the DTE/DCE

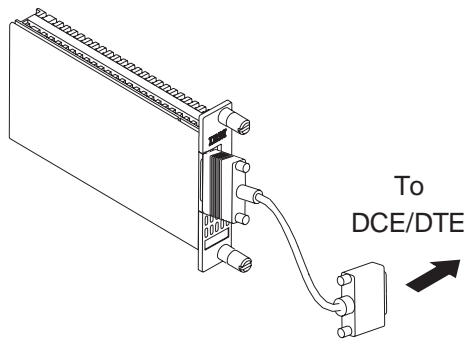


Figure 6-14. ARC and Cable

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1), install the cables **7** (see Figure 6-11 on page 6-8) as follows:

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the cables ordered by the customer, see tables below.

ARC Type	To	Feature Code	Cable Length m (ft)	Cable Part Number
V.24	DTE	5641	15 (50)	80G3725
V.24	DCE	5642	5 (16)	58G5613
		5643	12 (40)	58G5615

<i>Table 6-3. ARC V.35 and Standard Cables</i>				
<b>ARC Type</b>	<b>To</b>	<b>Feature Code</b>	<b>Cable Length m (ft)</b>	<b>Cable Part Number</b>
V.35 (1)	DTE	5651	15 (50)	80G3726
V.35 (2)	DCE	5652	5 (16)	58G5623
		5653	15 (50)	58G5625

**Note:**

1. For a **French DTE**, the DTE adapter (part number 58G5998 / FFB/M 80G1164) must be connected between the cable and the DTE.
2. For a **French DCE**, the DCE adapter (part number 58G5965 / FFB/M 80G1169) must be connected between the cable and the DCE.

<i>Table 6-4. ARC X.21 and Standard Cables</i>				
<b>ARC Type</b>	<b>To</b>	<b>Feature Code</b>	<b>Cable Length m (ft)</b>	<b>Cable Part Number</b>
X.21	DTE	5631	15 (50)	58G5636
X.21	DCE	5632	5 (16)	58G5633
		5633	15 (50)	58G5635
X.21 (transfix)	DCE	5634	5 (16)	58G5637
		5635	15 (50)	58G5638

<i>Table 6-5. Cable Wrap Plug</i>	
<b>Cable Description</b>	<b>Cable Wrap Plug Part Number</b>
V.24 cable to attach a 2220 to a DCE	61F4522
V.24 cable to attach a 2220 to a DTE	80G3745
V.35 cable to attach a 2220 to a DCE	61F4526
V.35 cable to attach a 2220 to a DTE	80G3746
X.21 cable to attach a 2220 to a DCE	61F4529
X.21 cable to attach a 2220 to a DTE	61F4530

## Installing External Cables

ARC Type	Description	Cable Length m (ft)	Feature Code	Part Number
V.24	ARC V.24 (cassette only)		5024	
	V.24 cable to attach 2220 to DCE	5 (16)	5042	58G5613
	V.24 cable to attach 2220 to DCE	12 (40)	5043	58G5615
	24 cable to attach 2220 to DTE	15 (50)	5045	80G3725
V.35	ARC V.35 (cassette only)		5035	
	V.35 cable to attach 2220 to DCE	5 (16)	5052	58G5623
	V.35 cable to attach 2220 to DCE	15 (50)	5053	58G5625
	V.35 cable to attach 2220 to DTE	15 (50)	5055	80G3726
X.21	ARC X.21 (cassette only)		5021	
	X.21 cable to attach 2220 to DCE	5 (16)	5072	58G5633
	X.21 cable to attach 2220 to DCE	15 (50)	5073	58G5635
	X.21 cable to attach 2220 to DTE	15 (50)	5075	58G5636
	X.21 cable to attach 2220 to DCE (transfix, France only)	15 (50)	5077	58G5638

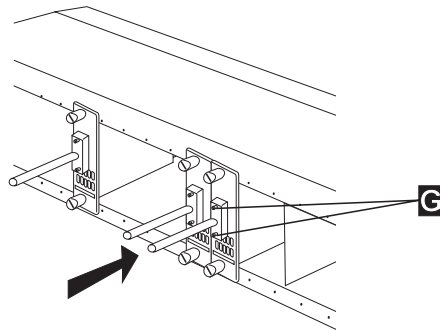
**Important Note:** With an ARC (feature 5021, 5024, or 5035) an associated cable has to be ordered. ARC or cable feature code alone can be ordered for parts replacement purposes.

ARC Type	ARC Wrap Plug Part Number
V.24	80G3742
V.35	80G3743
X.21	80G3744

Cable Description	Cable Wrap Plug Part Number
V.24 cable to attach a 2220 to a DCE	61F4522
V.24 cable to attach a 2220 to a DTE	80G3745
V.35 cable to attach a 2220 to a DCE	61F4526
V.35 cable to attach a 2220 to a DTE	80G3746
X.21 cable to attach a 2220 to a DCE	61F4529
X.21 cable to attach a 2220 to a DTE	61F4530

2. \_\_\_\_ Using two labels PN 80G0745 **8**, **identify** the cables by recording the following information:
  - a. The **2220 name**.
  - b. The **LCB number/location** (up to 25 characters).
  - c. The **LIC 511 connector location**.
  - d. The **ARC position** (+0 to +14 or +16 to +30).
  - e. The **symbolic line name** (up to eight characters)
3. \_\_\_\_ **Stick** the labels **8** on the two leads of the cable at about 220 mm (9 in.) from the edges.

4. \_\_\_\_ **Install** the cable into the ARC position (+0 to +14 for the LCBB, or +16 to +30 for the LCBE). See Figure 6-13 on page 6-11 and tighten screws **G** to secure the cables with the ARCS.



5. \_\_\_\_ Plug the other edge of cables to the DCEs or DTEs according to the ARC type (see Figure 6-11 on page 6-8). The **adapters** (PN 58G5965 and PN 58G5998) plugged between the cable and the DCE/DTE are optional. They are country dependant (see the following notes):
- a. If you are connecting a **V.35 DCE (ARC 3A1 or 3A2)** to a **French modem**, connect one **adapter (PN 58G5965)** between the modem and the cable (see Figure 6-15). Connect **connector 1** to the  **cable** and **connector 2** to the **modem**.

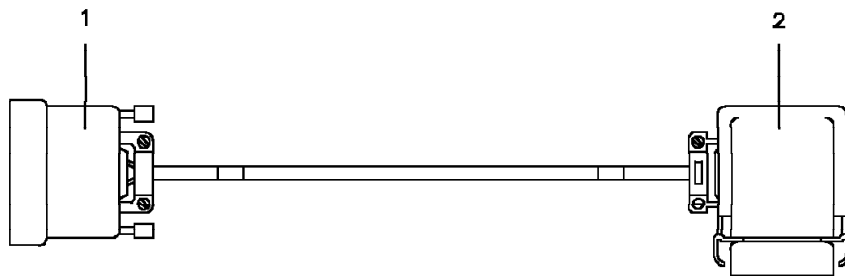


Figure 6-15. Adapter for ARC 3A1 or 3A2 (PN 58G5965)

- b. If you are connecting a **V.35 DTE (ARC 3B)** to a **French terminal**, connect one **adapter (PN 58G5998)** between the terminal and the cable (see Figure 6-16). Connect **connector 1** to the  **cable** and **connector 2** to the **terminal**.

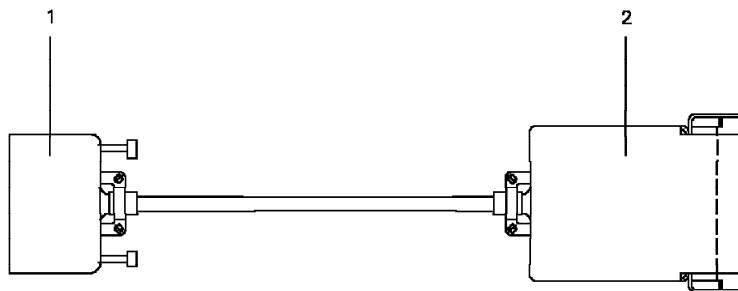


Figure 6-16. Adapter for ARC 3B (PN 58G5998)

## Installing Cables for LIC 512 and LIC 522

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1):

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages and then go to step 2 on page 6-17.

<i>Table 6-9. LIC512 V.35 Standard Cables</i>					
Cable Type	To	Length m (ft)	Feature Code	Part Number	
				World-Wide Except U.S. and Canada	World-Wide
V.35 (see note 1)	DTE	15 (50)	5210	80G0854	80G3954
V.35 (see note 2)	DCE	15 (50)	5214	57G8006	80G3951
<b>Note:</b> <ol style="list-style-type: none"> <li>1. For a <b>French DTE</b>, the DTE adapter (Part Number 58G5998 / FFB/M 80G1164) must be connected between the cable and the DTE.</li> <li>2. For a <b>French DCE</b>, the DCE adapter (Part Number 58G5965 / FFB/M 80G1169) must be connected between the cable and the DCE.</li> </ol>					

<i>Table 6-10. LIC512 X.21 Standard Cables</i>				
Cable Type	To	Length m (ft)	Feature Code	Part Number
X.21	DTE	10 (33)	5216	80G2202
X.21	DCE	10 (33)	5217	80G2213
X.21 TRANSFIX	DCE	2 (7)	5229	80G2219

<i>Table 6-11. LIC522 V.35 Standard Cables</i>					
Cable Type	To	Length m (ft)	Feature Code	Part Number	
				World—Wide Except U.S. and Canada	World—Wide
V.35 (see note 1)	DTE	15 (50)	5210	80G0854	80G3954
V.35 (see note 2)	DCE	15 (50)	5214	57G8006	80G3951
<b>Note:</b> <ol style="list-style-type: none"> <li>1. For a <b>French DTE</b>, the DTE adapter (Part Number 58G5998 / FFB/M 80G1164) must be connected between the cable and the DTE.</li> <li>2. For a <b>French DCE</b>, the DCE adapter (Part Number 58G5965 / FFB/M 80G1169) must be connected between the cable and the DCE.</li> </ol>					

<i>Table 6-12. LIC522 V.36 and X.21 Standard Cables</i>				
<b>Cable Type</b>	<b>To</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
V.36	DTE	15 (50)	5271	80G0813
V.36	DCE	15 (50)	5276	80G0819
X.21	DTE	10 (33)	5216	80G2202
X.21	DCE	10 (33)	5217	80G2213
X.21 TRANSFIX	DCE	2(7)	5229	80G2219

2. \_\_\_\_ **Connect** the cables to the LIC (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
3. \_\_\_\_ **Connect** the other end of the cable to the DCE or DTE, depending on the cable type.

### Installing Cables for LIC 513, 515, and 523

According to the Hone sheet received (see Appendix C, "Hone Sheet Example" on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2.

<i>Table 6-13. LIC513 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

<i>Table 6-14. LIC515 Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

<i>Table 6-15. LIC523 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

2. \_\_\_\_ **Connect** the cables to the LIC 51X (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).



## Installing Cables for LIC 514

According to the Hone sheet received (see Appendix C, "Hone Sheet Example" on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2.

<i>Table 6-16. LIC514 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
RJ-48 T1	15 (50)	5241	57G8020
RJ-45 J1 (Note 1)	15 (50)	5245	57G8042
DB15	15 (50)	5243	57G8023

**Notes:**

- a. Japan only, shipment triggered by the Japan country code.
  - b. RJ48 and DB15 cables can function in DS1 or DSX1 mode.
2. \_\_\_\_ **Connect** the cables to the LIC 514 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

### Installing Cables for LIC 516

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2.

<i>Table 6-17. LIC516 Cables</i>				
Cable Type	Length m (ft)	Feature Code	Part Number	
			World—Wide Except Germany	World—Wide
E1	15 (50)	5260	57G8029	80G3983

2. \_\_\_\_ **Connect** the cables to the LIC 51X (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

### Installing Cables for LIC 517

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2.

<i>Table 6-18. LIC517 Standard Cables</i>			
Cable Type	Length m (ft)	Feature Code	Part Number
JJ-20	15 (50)	5735	80G0823

2. \_\_\_\_ **Connect** the cables to the LIC 51X (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

## Installing Cables for LIC 530

According to the Hone sheet received (see Appendix C, "Hone Sheet Example" on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 2.

Cable Type	To	Length m (ft)	Feature Code	Part Number
HSSI	DTE	15 (50)	5281	57G8040
HSSI	DCE	15 (50)	5283	57G8044
HSSI	DTE/DCE	15 (50)	5706	80G0596

2. \_\_\_\_ **Connect** the cables to the LIC 530 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
3. \_\_\_\_ **Connect** the other end of the cable to the DCE or DTE, depending on the cable type (refer to the previous tables).

## Installing Cables for LIC 544 and 546

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 2.

*Table 6-20. LIC544 Standard Cables*

Cable Type	Length m (ft)	Feature Code	Part Number
RJ-48 T1	15 (50)	5241	57G8020
RJ-45 J1 (Note 1)	15 (50)	5245	57G8042
DB15	15 (50)	5243	57G8023

**Note:** For Japan only, shipment is triggered by the Japan country code.

*Table 6-21. LIC546 Standard Cables*

Cable Type	Length m (ft)	Feature Code	Part Number
E1	15 (50)	5260	57G8029

2. \_\_\_\_ Refer to Table 6-22 and Figure 6-17 on page 6-23, obtain labels PN 80G2223 from shipping group and record manually the LIC position (1 to 8) on these labels **X**. On the first Y cable (PN 80G2225) to be plugged into LIC connector 1, stick the labels **A** (1) and (2) on the cable leads identified respectively as (Port A) and (Port B). Identify the corresponding external cables with labels **B** (1 and 2). Repeat the same procedures for the other cables using labels from (3) to (8).

*Table 6-22. Identifying Cables Plugged on LIC 544 or 546*

LIC Connectors Positions	Y Cables (80G2225)		External Cables (B)
	LIC Connector	Port A (A)	
		Port B (A)	
1	1	1	1
		2	2
2	2	3	3
		4	4
3	3	5	5
		6	6
4	4	7	7
		8	8

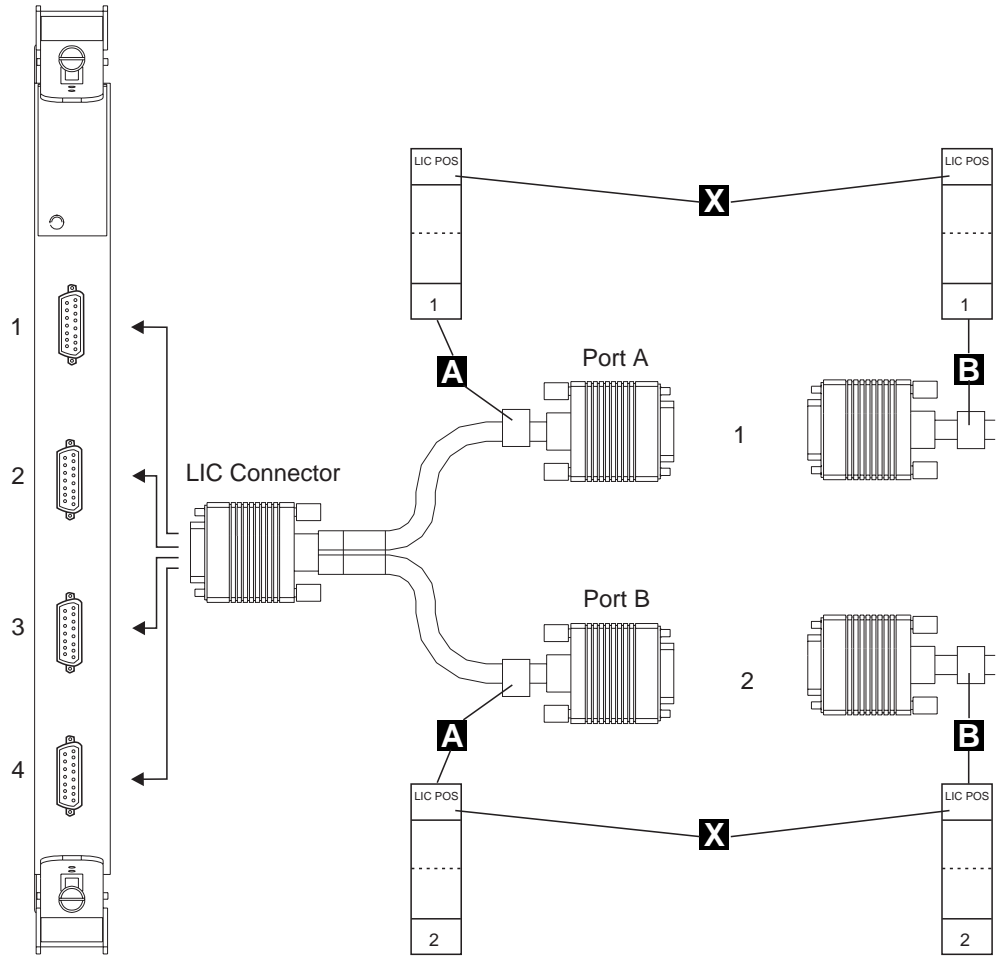


Figure 6-17. Identifying the Cables Connected to LIC 544 or 546

## Installing Cables for LIC 545

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see table in the following pages then go to step 2

*Table 6-23. LIC545 Standard Cables*

Cable Type	Length m (ft)	Feature Code	Part Number
BNC (75 ohms)	15 (50)	5250	80G0714

2. \_\_\_\_ Refer to Table 6-24 and Figure 6-18 on page 6-25, obtain labels PN 80G2224 from shipping group and record manually the LIC position (1 to 8) on these labels **X**. On the first Y cable to be plugged into LIC connector 1, stick the labels **A** (1-R) and (1-T) on the cable leads identified as (Port A-R) and (Port A-T) and (2-R) (2-T) on cable leads (Port B-R) and (Port B-T). Identify the corresponding external cables with labels **B** (1-R) (1-T) and (2-R) (2-T). Repeat the same procedures for the other cables using labels from (3-R) (3-T) to (8-R) (8-T).

*Table 6-24. Identifying Cables Plugged on LIC 545*

LIC Connectors Position	Y Cables (80G2226)		External Cables (B)
	LIC Connector	Port A-R (A) Port A-T (A) Port B-R (A) Port B-T (A)	
1	1	1-R	1-R
		1-T	1-T
		2-R	2-R
		2-T	2-T
2	2	3-R	3-R
		3-T	3-T
		4-R	4-R
		4-T	4-T
3	3	5-R	5-R
		5-T	5-T
		6-R	6-R
		6-T	6-T
4	4	7-R	7-R
		7-T	7-T
		8-R	8-R
		8-T	8-T

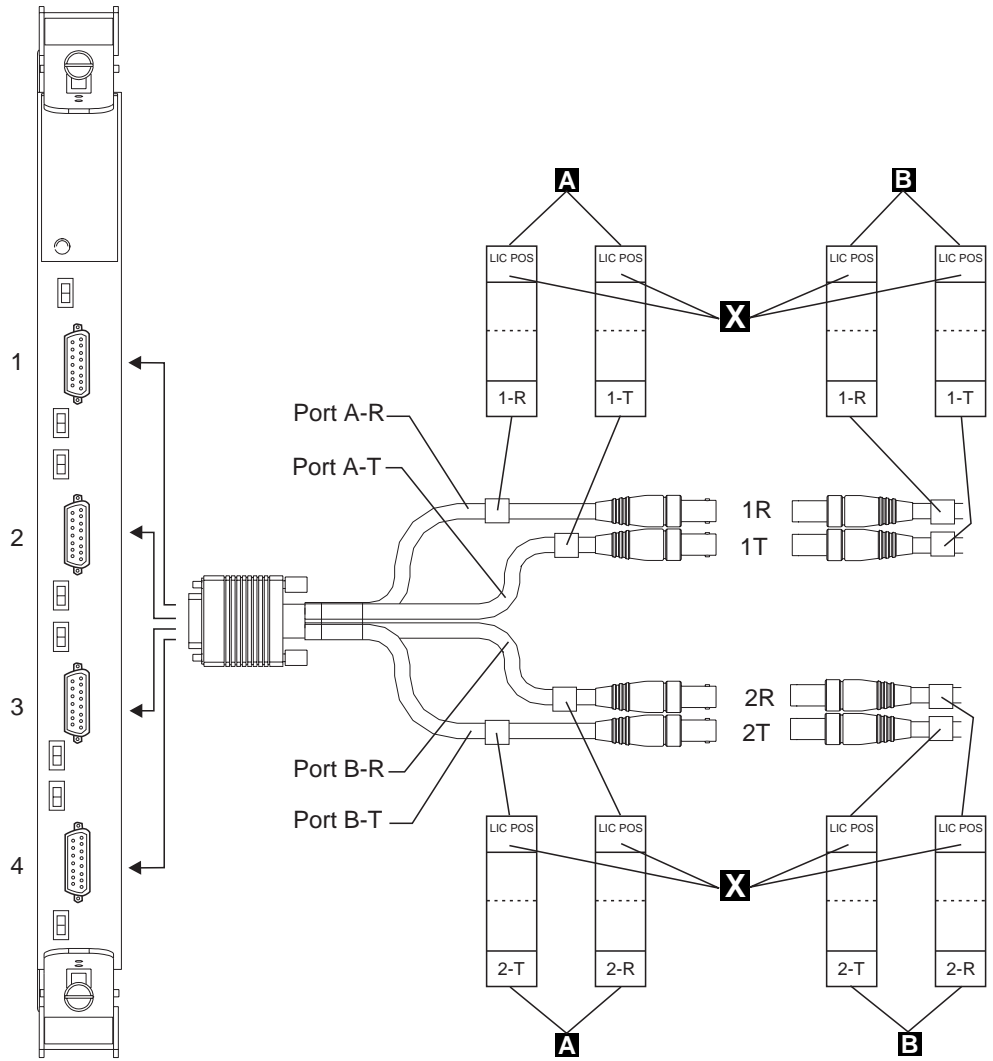


Figure 6-18. Identifying the Cables Connected to LIC 545

### Installing Cables for LIC 551, 552, and 553

According to the Hone sheet received (see Appendix C, "Hone Sheet Example" on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 2.

<i>Table 6-25. LIC551 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

<i>Table 6-26. LIC552 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

<i>Table 6-27. LIC553 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

2. \_\_\_\_ **Connect** the cables to the LIC 553 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

**Note:** If you need to unplug a LIC, wait 10 seconds before reinstalling the LIC.



## Installing Cables for LIC 554, 555, and 556

According to the Hone sheet received (see Appendix C, "Hone Sheet Example" on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 3.
2. \_\_\_\_ **Remove** plastic caps installed on cables

<i>Table 6-28. LIC554 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
Optical cable	10 (40)	5720	19G4757

<i>Table 6-29. LIC555 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
Optical cable	10 (40)	5720	19G4757

<i>Table 6-30. LIC556 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
Optical cable	10 (40)	5710	19G4866

3. \_\_\_\_ **Connect** the cables to the LIC 55X (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

## Installing Cables for LIC 562

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 3.
2. \_\_\_\_ **Remove** plastic caps installed on cables

<i>Table 6-31. LIC562 Standard Cables</i>			
<b>Cable Type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>
BNC (75 ohms)	15 (50)	5250	80G0714

3. \_\_\_\_ **Connect** the cables to the LIC 562 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

## Installing Cables for LIC 563

According to the Hone sheet received (see Appendix C, “Hone Sheet Example” on page C-1).

1. \_\_\_\_ **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables below and go to step 3.
2. \_\_\_\_ **Remove** plastic caps installed on cables

<i>Table 6-32. LIC563 Cables</i>				
<b>Cable type</b>	<b>Length m (ft)</b>	<b>Feature Code</b>	<b>Part Number</b>	
			<b>World—Wide Except Germany</b>	<b>World—Wide</b>
E1	15 (50)	5260	57G8029	80G3983

3. \_\_\_\_ **Connect** the cables to the LIC 563 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).

---

## Chapter 7. Installing Ground Brackets And Covers (Optional)

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Installing the Ground Brackets on a 2220-500 and 2220-501 Installed in 37 U Rack . . . . .	7-4

## Installing Ground Brackets

**Note:** These ground brackets are no more shipped with the new 2220 installed in 37 U rack. **There is no ground brackets with 29 U rack.** If these ground brackets are not present **go to** Chapter 8, “Integrating and Testing the 2220 In The Network” on page 8-1.

---

## Installing the Ground Brackets on a 2220-500 Installed in 37 U Rack

**Note:**

1. \_\_\_\_ Obtain from the shipping group the following kits:
  - a. The stabilizer, two thumbscrews, and a wrench (kit PN 43G3125), or the stabilizer (PN 80G3881) and two screws (PN 1621561).
  - b. Rear bracket and screws (kit PN 43G3094).
  - c. Left and right brackets (kit PN 43G3096).
2. \_\_\_\_ Install the stabilizer **4** using two thumbscrews. Before securing the ground plate screws, push down on the plate to give it maximum contact with the floor.
3. \_\_\_\_ Tighten the screws using wrench **5** If you are routing the cables through the bottom of the 2220 without a raised floor, do not install the rear bracket **3** and go to step 5.
4. \_\_\_\_ Install the rear bracket **3** using the two screws shipped with the bracket.
5. \_\_\_\_ Install the left bracket **2** (item A) and right bracket **1** (item B) using ten screws (PN 43G3122).

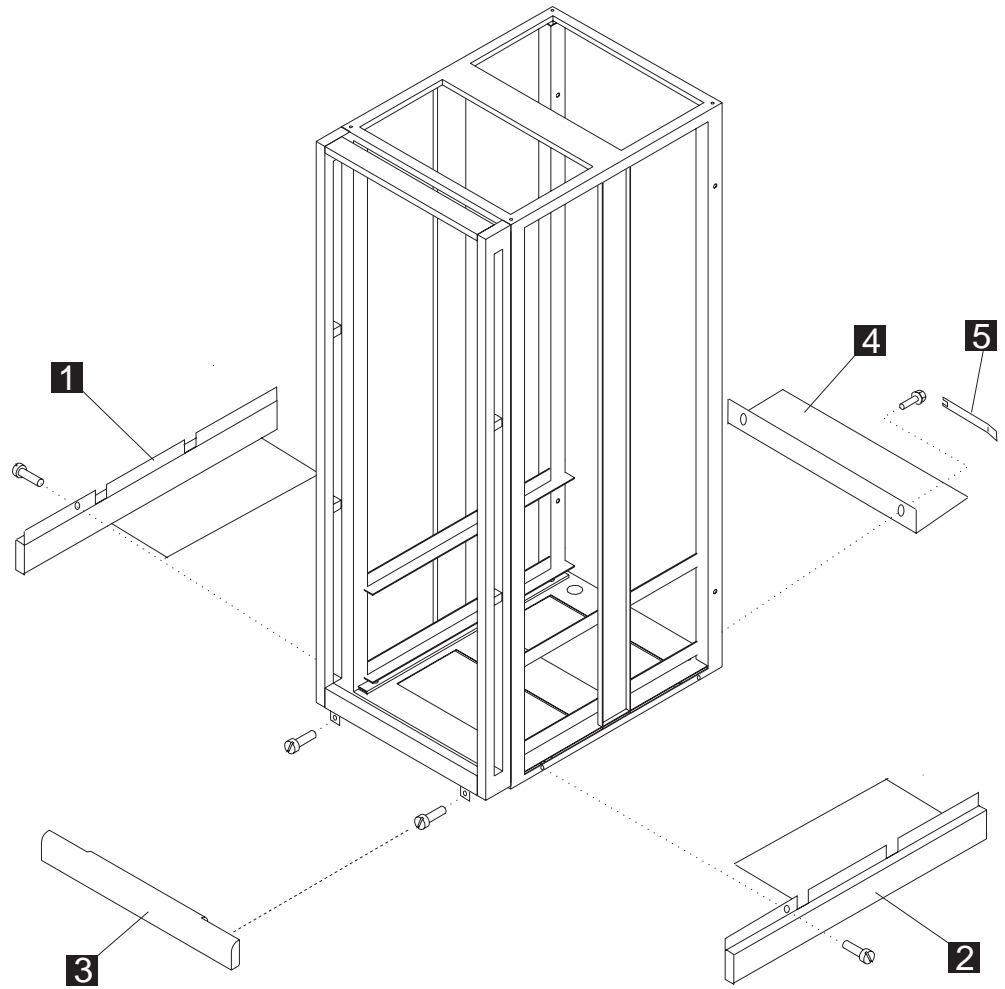


Figure 7-1. Ground Brackets in 37 U Rack

### Installing the Ground Brackets on a 2220-500 and 2220-501 Installed in 37 U Rack

1. \_\_\_\_ Obtain from the shipping group the following kits:
  - a. Two stabilizers, four thumbscrews, and a wrench (kit PN 43G3125), or two stabilizers (PN 80G3881) and four screws (PN 1621561).
  - b. Two rear brackets and screws (kit PN 43G3094).
  - c. Left and right brackets (kit PN 43G3096).
2. \_\_\_\_ Install the stabilizers **4** using two thumbscrews. Before securing the ground plate screws, push down on the plate to give it maximum contact with the floor.
3. \_\_\_\_ Tighten the screws using wrench **5** If you are routing the cables through the bottom of the 2220 without a raised floor, do not install the rear brackets **3** and go to step 5 on page 7-2.
4. \_\_\_\_ Install the rear brackets **3** using the two screws shipped with the bracket.
5. \_\_\_\_ Install the left bracket **2** (item A) and right bracket **1** (item B) using ten screws (PN 43G3122).

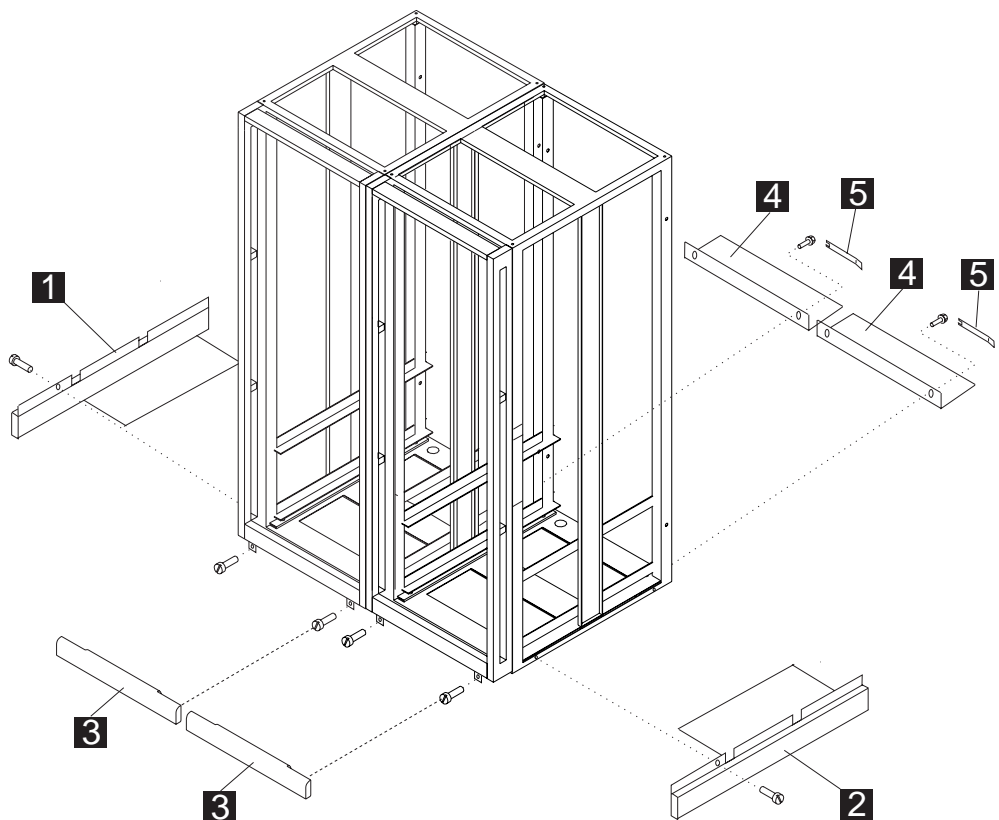


Figure 7-2. Ground Brackets on a 2220-500 and 2220-501 Installed in 37 U Rack

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## Chapter 8. Integrating and Testing the 2220 In The Network

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## Customizing The NAS System Files

The Nways Switch Installation Program is used to customize the IP parameters from the data imported with the configuration file.

If the network configuration database has been produced **locally** on the **NAS**, during the following procedures in step 6 on page 8-3, press **Enter** to use the IMCFG.ZIP recorded on the disk. If it has been produced on a **remote station**, ask your customer to have it on diskette (one diskette must be used for each Nways Switch).

**Note:** The configuration file name is by default IMCFG.ZIP if the customer specified another name, enter this name.

1. \_\_\_\_ Double click on **Nways Switch Installation** icon

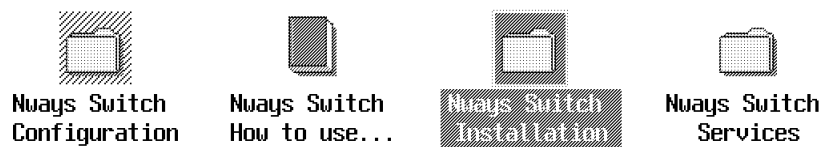


Figure 8-1. Nways Switch Primary Window

2. \_\_\_\_ Double click on **Nways Switch Installation Program** icon (see Figure 8-2).



Figure 8-2. Installation Panel

If you are installing a **2220-500** , go to step 5 on page 8-3 If you are installing a **2220-501** (or a 2220-500 and a 2220-501) , go to step 3 on page 8-3



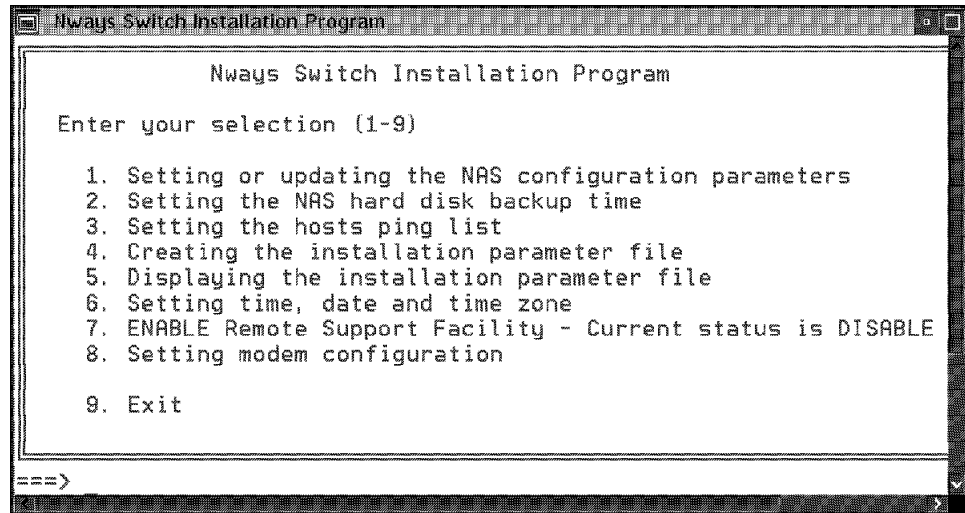


Figure 8-3. Installation Program Main Menu

3. \_\_\_\_ On the command line, enter **EXPRACK** and press **enter**.
4. \_\_\_\_ Enter the **serial number** of the expansion rack. This number is recorded on the control panel (see Figure 2-4 on page 2-5).
5. \_\_\_\_ Select option **1** and press **enter**
6. \_\_\_\_ Press **Enter** if the config file name is IMCFG and is available on the disk, otherwise specify the name and the path of the config file. For example A:\CNFG.ZIP. if the file name is CNFG and recorded on the diskette.
7. \_\_\_\_ If the config file is recorded on a diskette, enter **Yes** to save on the disk.
8. \_\_\_\_ Then according to the information provided by the customer enter the **Change Control Server name** and the IP address (if prompted) and press **enter**.
 

**Note:** The data is key sensitive and the name must be the name specified in the change control server NVDM6000 application.
9. \_\_\_\_ Enter the new **date and time**.
10. \_\_\_\_ Enter the **time zone** according to the location.
11. \_\_\_\_ Verify the host ping list and **add** any other host if required.
 

**Note:** The list has been produced according to the information imported with the network configuration database (NCT output).
12. \_\_\_\_ Enter **End** and press **Enter** (or any other key).
13. \_\_\_\_ Enter the **backup time** according to the customer choice then press **enter**.
 

**Note:** Enter **NONE** if the customer do not want to use this option.
14. \_\_\_\_ Enter the **number** corresponding to your modem installed, then press **Enter**. If SLIP is running, re-select the modem type and press **enter**.
 

**Note:** At that time, all the sensitive information are copied from the primary to the secondary hard disk.
15. \_\_\_\_ Verify the status of the RSF facility: it can be ENABLE or DISABLE. This information is given on the line of option **7** of the installation program. If the

## Integrating and testing the 2220 In The Network

current status is not the customer choice, select option **7** then press **Enter** to change from enable to disable or reverse.

16. \_\_\_\_ enter **9** to exit.

17. \_\_\_\_ Double click on **Retain Telephone Directory**

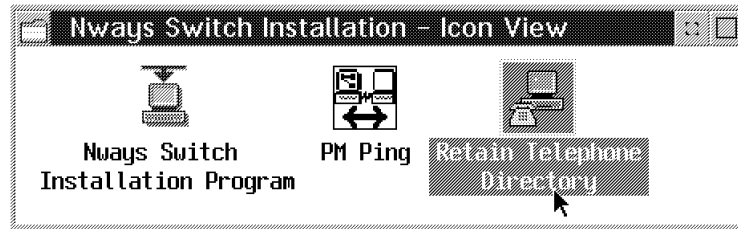


Figure 8-4. Nways Switch Installation Folder

18. \_\_\_\_ enter the **telephone numbers**, then click on **Close**.



Figure 8-5. Telephone Numbers for RETAIN

19. \_\_\_\_ Power **OFF** then power **ON** the 2220 to load the TCP/IP addresses in the adapters.

20. \_\_\_\_ Double click on **Nways Switch Services**.

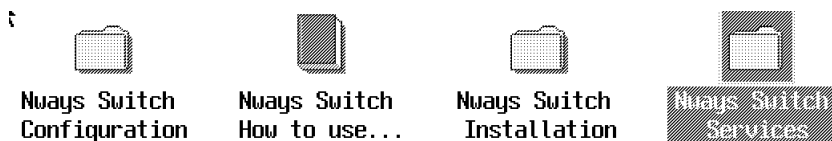


Figure 8-6. NAS Desktop

21. \_\_\_\_ Double click on **Nways Switch Resource Control (Local)**.

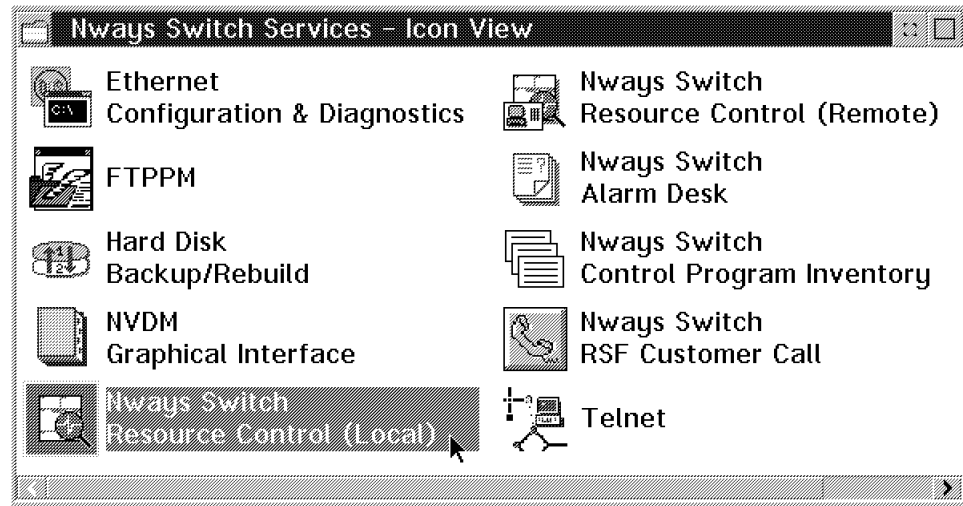


Figure 8-7. Nways Switch Services Folder

22. \_\_\_\_ Click on the **Switch**, click on **Selected** and click on **Restart Nways Switch and NAS (new configuration)**. The NAS and the 2220 are reinitialized.

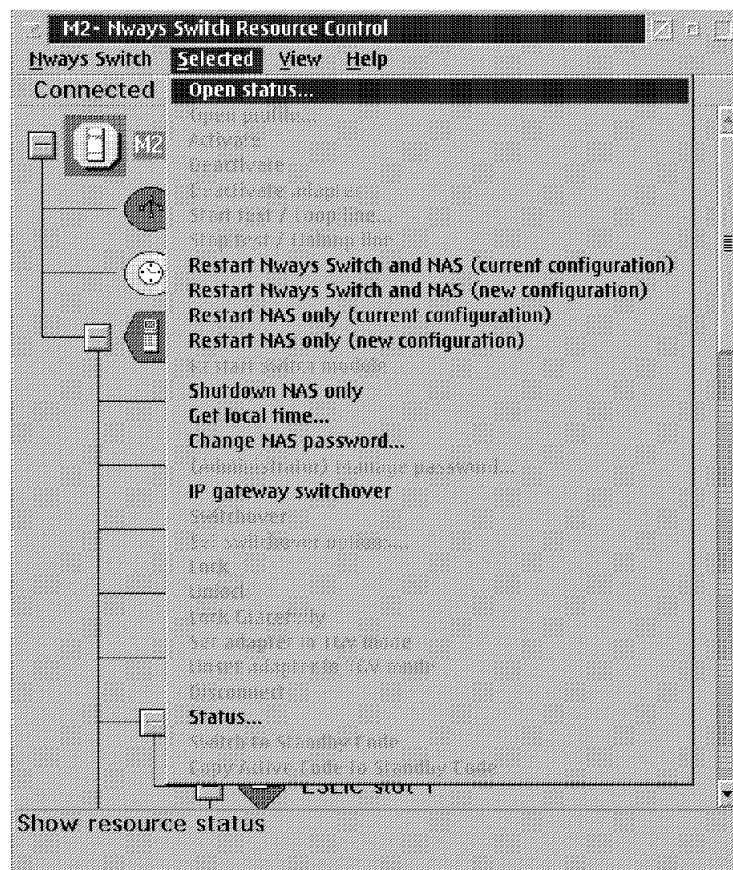


Figure 8-8. NAS and Switch Activation

## Password Initialization

1. \_\_\_\_ Double click on **Nways Switch Services**

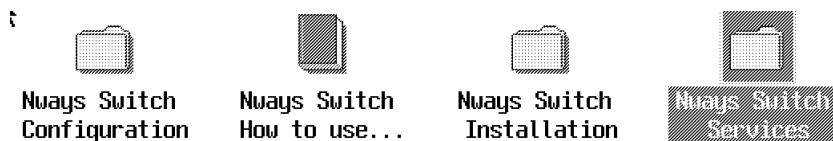


Figure 8-9. Nways Switch Desktop

2. \_\_\_\_ Double click on **Nways Switch Resource Control (Remote)**

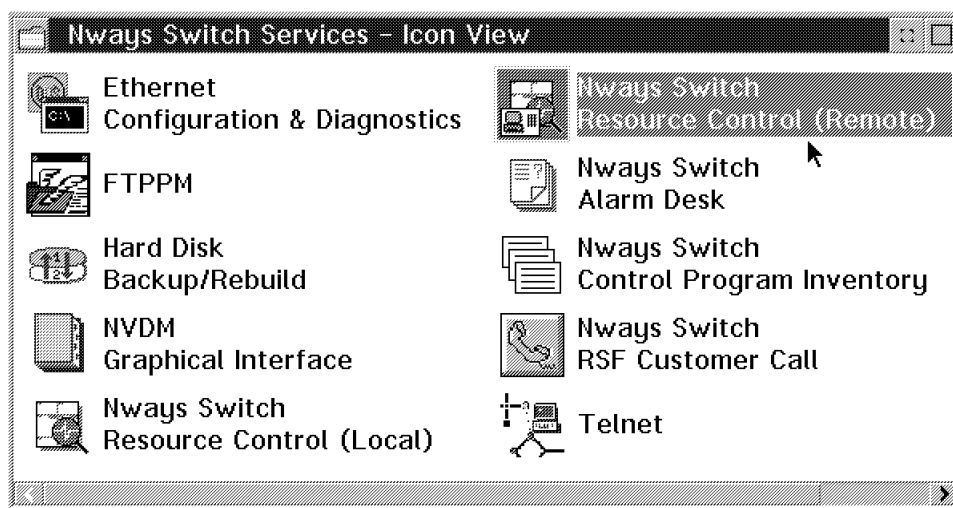


Figure 8-10. Nways Switch Control (Remote)

3. \_\_\_\_ Enter the host name, User Name: **operator**, and password: **Soleil**, then click on **Logon**.

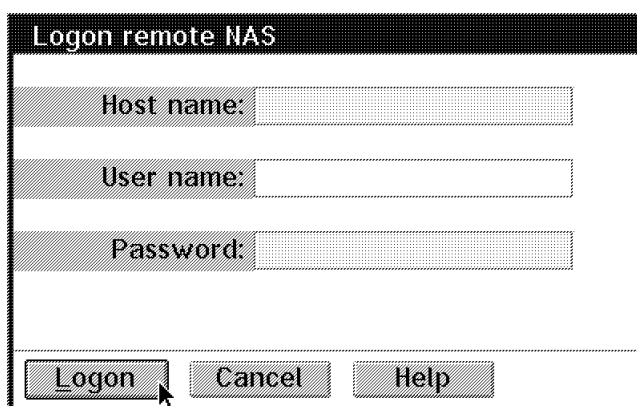


Figure 8-11. Logon Remote NAS

4. \_\_\_\_ Click on **Selected**, double click on **Change NAS password...**

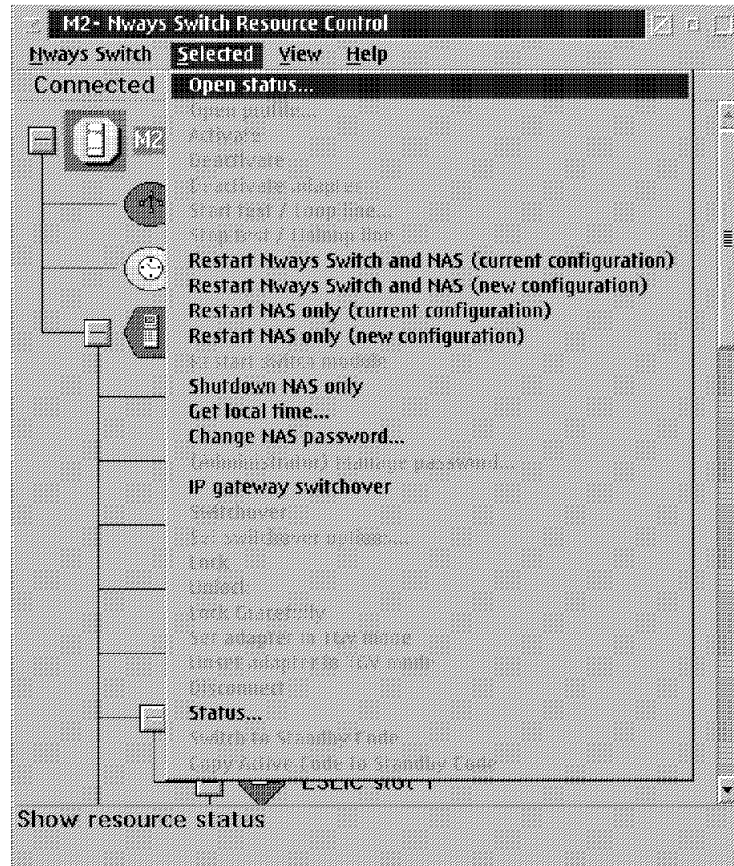


Figure 8-12. Nways Switch Resource Control

5. \_\_\_\_ Enter the host name, User Name: **operator**, and **soleil** for: Password, New password, and Verify Password. This is not to change the passwords but to create the **administrator** and **IBM** profiles. Then, click on **OK**.

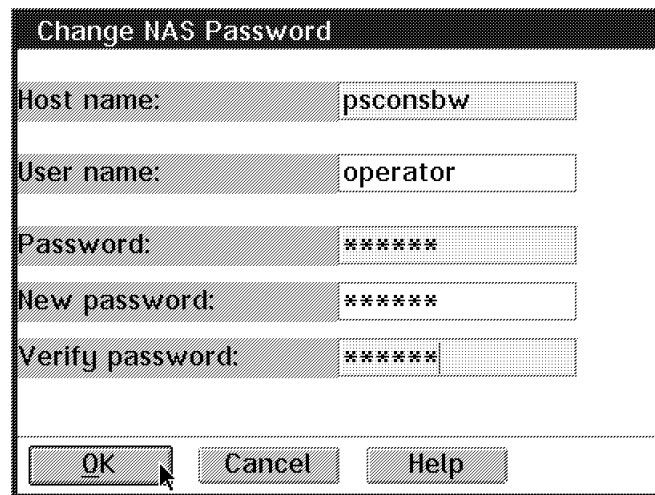


Figure 8-13. Change NAS Password

6. \_\_\_\_ When completed, click on **OK** and exit from the function.

## Testing the Link Between the NAS and RETAIN

1. \_\_\_\_ Double click on **Nways Switch Services**

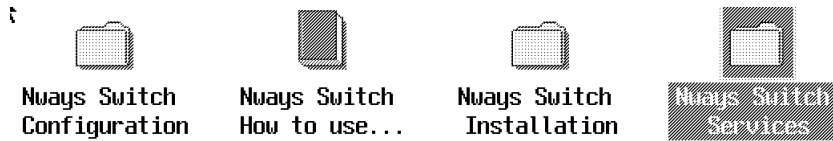


Figure 8-14. Nways Switch Desktop

2. \_\_\_\_ Double click on **Nways Switch RSF Customer Call**

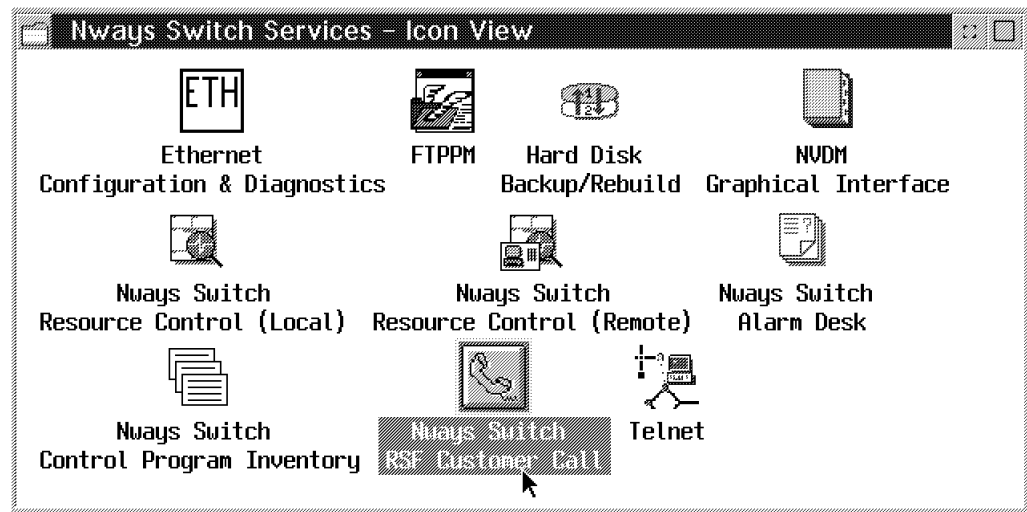


Figure 8-15. Customer Call

3. \_\_\_\_ Enter a text "Test for installation", then press **F7** and hit any key to send. The call to RETAIN will be done within 2 to 3 minutes and a "call status" window is displayed.

**Note:** When the connection test is over, contact your 2220 RETAIN country representative to check that the "test PMH" is successfully open and contains accurate data. And then, ask to close this PMH to clean the queue.

## Testing the Link Between the NAS and the Network Support Center

### Locally on the NAS

1. \_\_\_\_ When the NAS and the modem are initialized, press simultaneously **Ctrl + Esc** keys.
2. \_\_\_\_ Double click on **SLIP Dial-in**

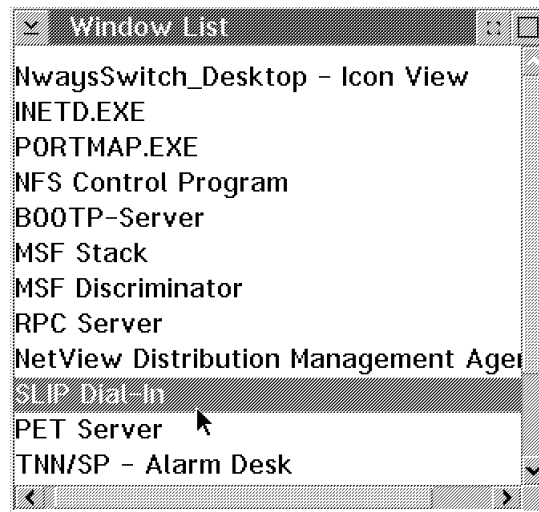


Figure 8-16. Nways Switch Window List

3. \_\_\_\_ Verify that the SLIP driver is running as shown in Figure 8-17. If you do not have this message an error message is displayed (see Figure 8-18 on page 8-10). As recommended verify that the modem is properly configured and connected.

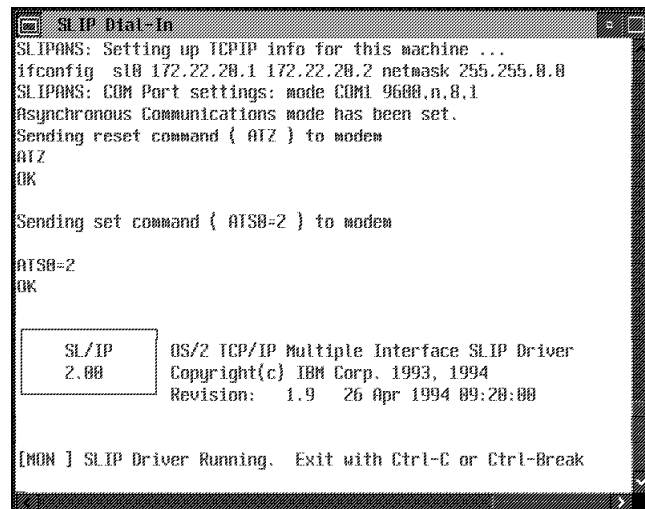


Figure 8-17. SLIP Driver Correct Status

## Integrating and testing the 2220 In The Network

```
SLIP Dial-In
SLIPANS: Setting up TCPIP info for this machine ...
ifconfig sl0 172.22.20.1 172.22.20.2 netmask 255.255.0.0
SLIPANS: COM Port settings: mode COM1 9600,n,8,1
Asynchronous Communications mode has been set.
Sending reset command ( ATZ ) to modem
WAITFOR: timed out
***** Can't send AT-command ATZ to modem *****
Please make sure that :
1) The modem is powered ON
2) The modem is connected to Serial port 1
3) The modem is connected to telephone line
4) The modem has AT-command set enabled
Press ENTER when done
```

Figure 8-18. SLIP Driver Error Status

4. \_\_\_\_ Using the 'Installation Program', display the information file, double click on **Nways Switch Installation** icon

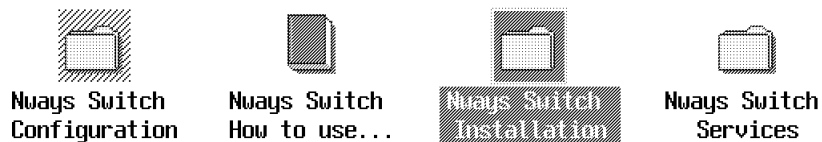


Figure 8-19. Nways Switch Primary Window

5. \_\_\_\_ Double click on **Nways Switch Installation Program** icon (see Figure 8-2 on page 8-2).



Figure 8-20. Installation Panel

6. \_\_\_\_ Select option 5.



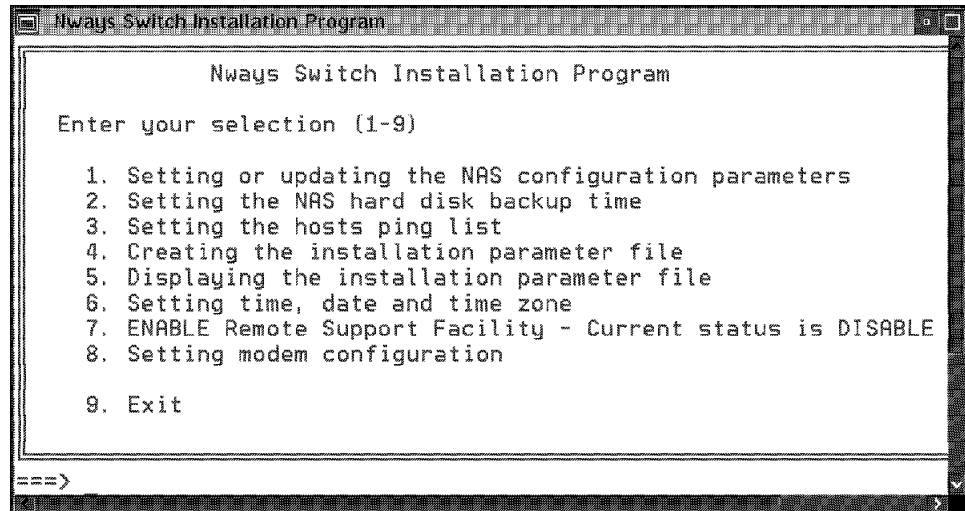


Figure 8-21. Installation Panel Selection

7. \_\_\_\_ Record the following information:
  - a. The NAS IP Address on Switched Attachement:
  - b. The Caller IP Address on Switched Attachement:
  - c. The NAS Switched Line telephone number:

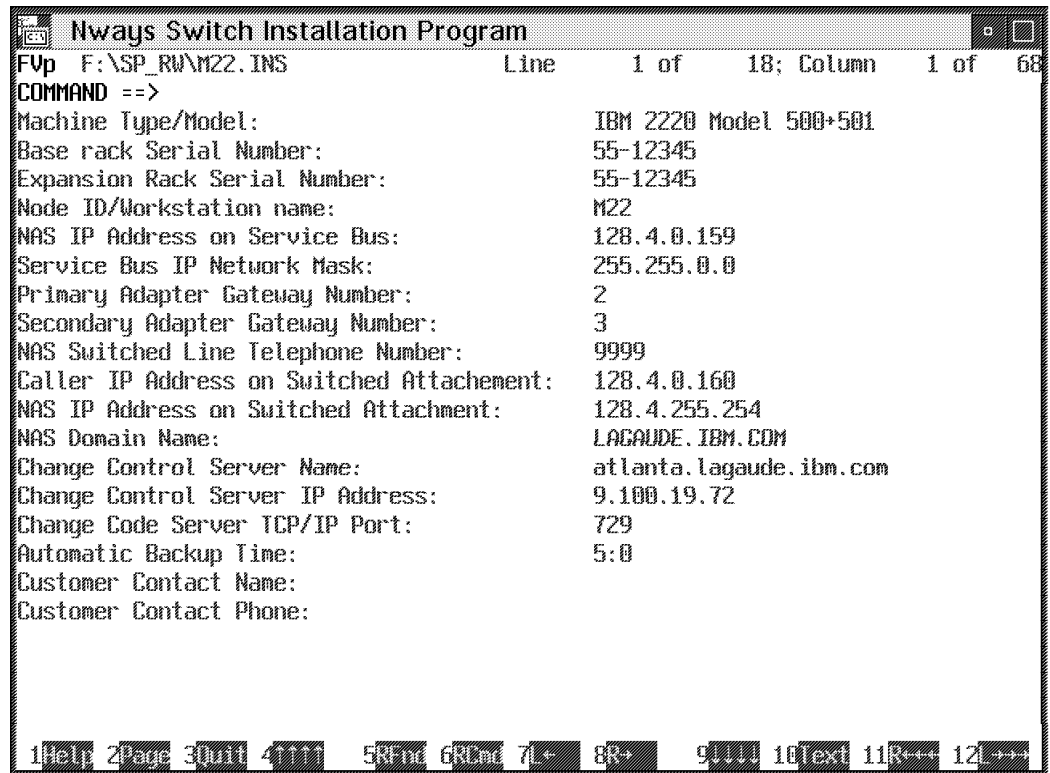


Figure 8-22. Installation Parameter Display

8. \_\_\_\_ Then, call the Network Support Center and communicate the information recorded in step 7.

### From the Network Support Center Console

The following procedures give an example to the Network Support Center to validate the link to the 2220 installed.

1. \_\_\_\_ Double click on **SLIP Start**
2. \_\_\_\_ Then follow the prompts to record the new customer information:
  - a. The Node name
  - b. The NAS switched line telephone number.
  - c. The caller IP address on switched attachment
  - d. The NAS IP address on switched attachment
3. \_\_\_\_ Select the option 4 'Lets dial up new' to call the modem.
4. \_\_\_\_ During this connection, the customer information contained in the nodename.inf are transfered on your remote station.
5. \_\_\_\_ Select Redial to reconnect to the new customer and check the parameters recorded.

## Testing the Link Between the NAS and the Servers

The purpose of this procedure is to establish and validate the link between the 2220 and the following servers:

1. Network Support Center
2. Network management station
3. Change control server
1. \_\_\_\_ Double click on **Nways Switch Installation** icon

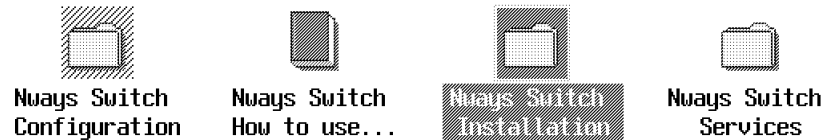


Figure 8-23. Nways Switch Primary Window

2. \_\_\_\_ Double click on **Nways Switch PM Ping** icon

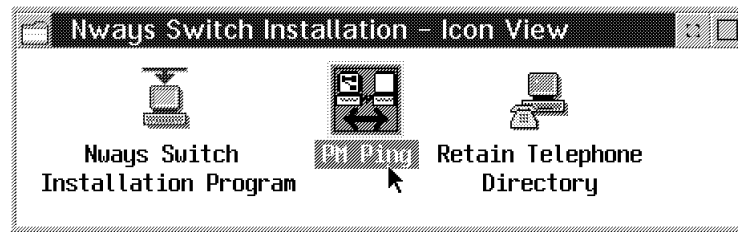


Figure 8-24. Installation Panel

3. \_\_\_\_ Click on **Ping\_All**, click on **Start**

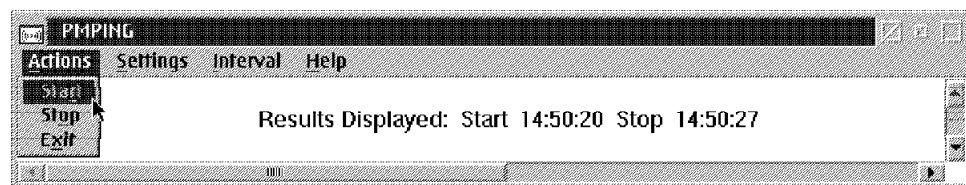


Figure 8-25. Ping All

4. \_\_\_\_ The following screen is displayed which gives the response to the ping command send by the NAS to the servers.

**Note:** The command is sent to the servers which have been defined in the config file and imported in the configuration data base. The information displayed gives:

- The TCP/IP address
- The name server
- The response time

## Integrating and testing the 2220 In The Network

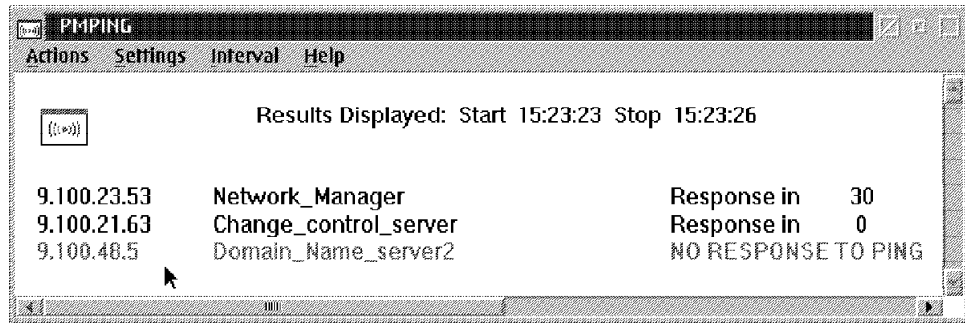


Figure 8-26. Ping All

## Chapter 9. Making the 2220 Ready For Customer

1. **Save** the configuration parameters on the backup hard disk:

a. \_\_\_\_ Double click on **Nways Switch Services**

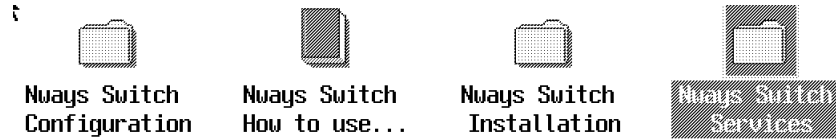


Figure 9-1. Nways Switch Desktop

b. \_\_\_\_ Double click on **Hard Disks Backup/Rebuild**

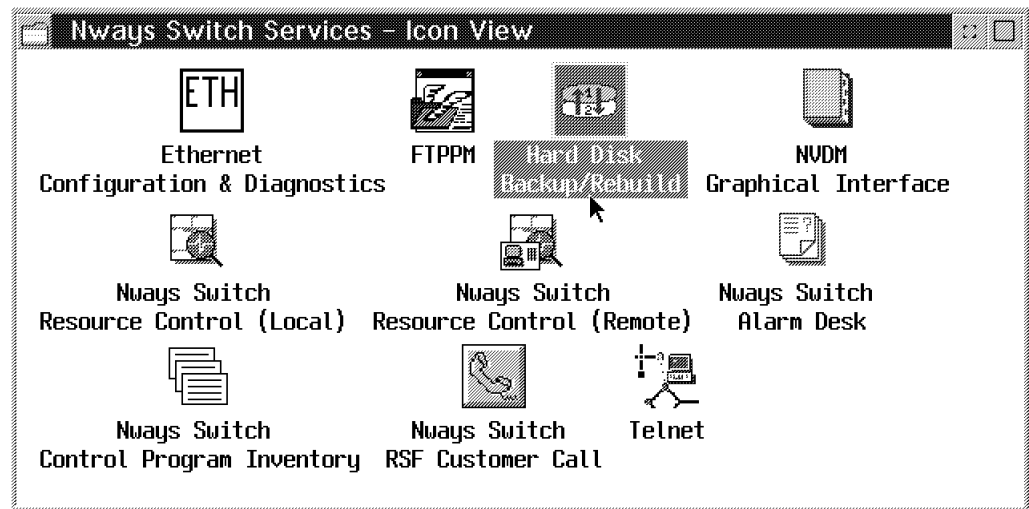


Figure 9-2. Nways Switch Services

c. \_\_\_\_ Double click on **First Disk Backup**, the configuration parameters are being saved on the second hard disk.

**Note:** This procedure takes several minutes and "Backing Up database" windows are displayed. When the saving is finished, the "Hard Disks Backup/Rebuild" window is again displayed.

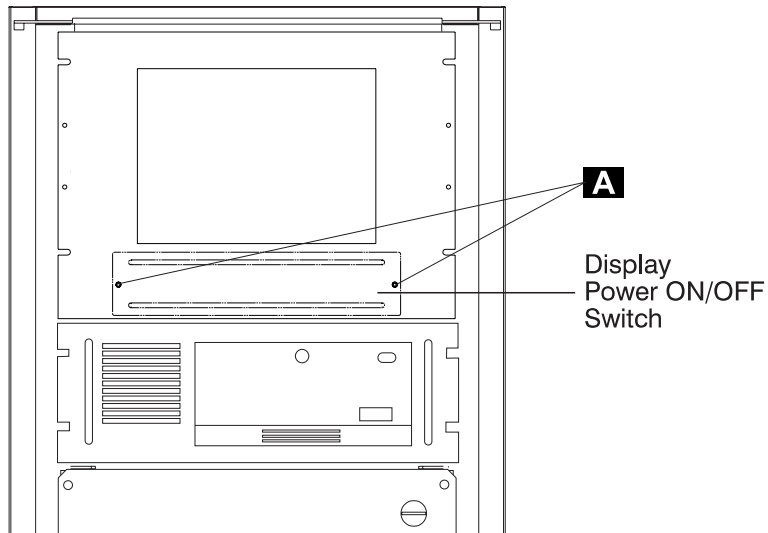


Figure 9-3. Hard Disks Backup/Rebuild

2. \_\_\_\_ **Recommend** to the customer to change the passwords for security reasons. The default user names and passwords are: (Operator, Soleil), and (Administrator, Suprpwd).

## Integrating and Testing the 2220 in the Network

3. \_\_\_ **Ensure** that all internal covers, shields, and parts previously removed are re-installed.
4. \_\_\_ **Place** in the service drawer located in the 2220-300 or 2220-500 frame below the NAS (see Figure A-1 on page A-2): .
5. If you have a display type B (7573), go to step 6, otherwise go to step 10
6. \_\_\_ **Remove** the front cover plate by unscrewing the two screws **A** .
7. \_\_\_ **Switch OFF** the display using the power ON/OFF switch located under the front panel.



8. Reinstall the front cover plate and secure it using the two screws **A** .
9. Go to Step 11.
10. \_\_\_ **Switch OFF** the display of the NAS.
11. \_\_\_ **Close** the external doors, and **Clean up** the installation area.

---

## Chapter 10. Removing or Relocating a 2220

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Disconnecting the External Cables . . . . .	10-2
Disconnecting Inter-Machine Cables Between the 2220-500 and 2220-501 . . . . .	10-3
Preparing Machines for Shipment . . . . .	10-3

---

### Before Removing the 2220

Verify that the Network Support Center is aware of the relocation or removal of the 2220 (this implies to modify the network configuration in the other 2220 installed in the network).

The sales branch office must determine if packaging materials and instructions are required and must obtain applicable bill(s) of material. This should normally be ordered 90 days before the anticipated removal date.

**Note:** In the U.S.A the CE orders this package.

It may be necessary for the customer, or a customer-appointed electrician to do all or some of the work involved in the following steps. The CE must ensure that all of the following steps have been completed.

*Go through the following procedures sequentially.*

---

### Disconnecting the Mainline Power

1. \_\_\_\_ **Switch** the main circuit breaker CB **OFF** at the ac or dc power box. (See Figure 10-1, or Figure 10-2 if the optional power feature is installed).

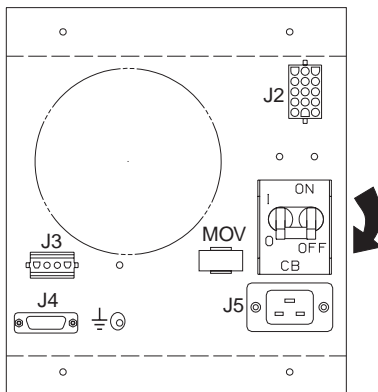


Figure 10-1. AC Power Supply

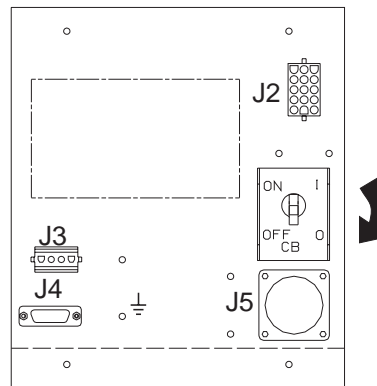


Figure 10-2. DC Power Supply

2. \_\_\_\_ Ensure that the customer's branch-circuit breakers feeding the 2220 receptacle are **turned OFF**.
3. \_\_\_\_ Unplug the 2220 main power cable, or ask the customer to disconnect the 2220 power cable from its ac power receptacle (or dc power if any).
4. \_\_\_\_ Coil the disconnected power cable inside the 2220.

---

### Disconnecting the External Cables

1. \_\_\_\_ If the machines are being relocated, label and remove all cables from the adapters.

**Note:** It is advisable to disconnect the cables, starting at the top of the gate and working down.

2. \_\_\_\_ Disconnect the cables connected to the NAS and the 7855 modem.



If you are removing a 2220-501, **go to** “Disconnecting Inter-Machine Cables Between the 2220-500 and 2220-501” on page 10-3, otherwise **go to** “Preparing Machines for Shipment” on page 10-3

---

## Disconnecting Inter-Machine Cables Between the 2220-500 and 2220-501

Disconnect the following inter-machine cables, see Figure 3-10 on page 3-13 or Figure 3-11 on page 3-13. ):

1. \_\_\_\_ Cable (PN 57G8071) from location 4 of the APC module plugged in the 2220-500 to location 5 of the APC module plugged in the 2220-501.
2. \_\_\_\_ Cable (PN 57G8045) from location 1 of the switch module to location 1 of the switch redrive module.
3. \_\_\_\_ The three cables (PN 57G8065) from locations 2, 3, and 4 of the switch module respectively to locations 2, 3, and 4 of the switch redrive module.

### Physically Remove the 2220-501 Frame from the 2220-500 Frame

1. If your 2220 is installed:
  - In a 37 U rack go to Step 2.
  - In a 29 U rack go to Step 4
2. \_\_\_\_ Remove the frame-to-frame screws nuts and washers (see Figure 3-1 on page 3-3). Put these parts into an envelope. Write the part number 43G3127 on the envelope, and place it in the shipping group.
3. \_\_\_\_ Remove the end cover on the right side of the 2220-501. Loosen the four retaining screws using a 5/16" socket from inside the machine. Then lift the cover from the slotted holes on the frame and pull it towards you. Go to Step 6.
4. \_\_\_\_ Remove the frame-to-frame screws and spacers (see Figure 3-3 on page 3-5).
5. \_\_\_\_ Remove the end cover on the right side of the 2220-501. Loosen the four retaining screws from inside the machine. Then lift the cover from the slotted holes on the frame and pull it towards you. Go to Step 6.
6. \_\_\_\_ Re-install the end cover at the right side of the 2220-500.

---

## Preparing Machines for Shipment

1. \_\_\_\_ Re-install all parts removed from frames, covers, and doors.
2. \_\_\_\_ Pack the machine using the pack/unpack instructions.
3. \_\_\_\_ Pack the customer's parts and documentation in one package and label it: "Customer Package".
4. \_\_\_\_ Pack other parts and all maintenance documentation in another package and label it: "Maintenance Package". Hold for use by IBM Service Representative.
5. \_\_\_\_ Coil all removed cables and store them along side the machine.
6. \_\_\_\_ Complete the removal records according to existing procedures. Inform the IBM Branch Office that the machines are ready for shipment.

## Removing a 2220

## Chapter 11. Installing and Removing Options

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### Nways Switch administration station

For installing or removing options concerning the Nways Switch administration station, use the

- *7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance*, S06H-2298, or
- *7585 P02 Industrial Computer PCI/ISA: Information, Installation, Operation, Hardware Maintenance*, S76H-3792

and follow the installation instructions given in chapter 'Installing Options'.

---

## Installing an Active Remote Connector (ARC)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None.

#### BMs to be Installed

- ARC, depends on the ARC type:

FFBM	Feature Code	Feature Name
80G4359	5021	ARC X21
80G4360	5024	ARC V24 (Japan excepted)
80G4474	5024	ARC V24 (Japan only)
80G4361	5035	ARC V35

- ARC Wrap Plug: (Only when the first ARC of this type to be installed in the machine).

FFBM	Feature Code	Feature Name
80G1431	5021	Wrap Plugs X21
80G1419	5024	Wrap Plugs V24
80G1429	5035	Wrap Plugs V35

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions. before negotiating
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine that all the parts have been received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration tree**.

**Programming**

None

**Purpose and Description****Purpose**

Provide an additional low speed (V24, V35, or X21) interface.

**Description**

Install an ARC in a LCBB or LCBE.

**Installation Time**

<b>BM Installed</b>	<b>Machine Hours</b>	<b>System Hours</b>	<b>Nb of CE</b>
see table	0.0	0.0	1

**Tools/Materials Required**

None

---

### INSTALLATION

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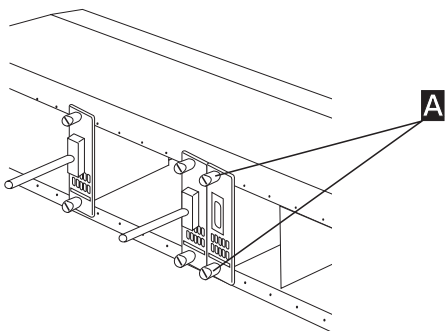
## Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

## Details of Installation

### Installing the ARC in the LCB.

- \_\_\_ 1. According to the Hone Plugging sheet:
  - Locate the LCBB or LCBE where you have to install the new ARC
  - Locate the ARC position (+0 to +14 for the LCBB, or +16 to +30 for the LCBE).
- \_\_\_ 2. Insert the new ARC into the line connection box.
- \_\_\_ 3. Tighten screws **A** to secure the ARC.



### Connecting the Cable to the ARC.

Go to “Installing / Removing External Cables” on page 11-102, follow the instructions on step “Installing the Cables From the ARC to the DTE/DCE.” on page 11-108, then return here and go to next step.

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the new installed resource icon is green. details. Check with the customer, if the new configuration is loaded in the 2220, before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### **Saving Wrap Plug.**

Wrap plug, if received with the MES, should be secure in a safe place for further use.

**Go to “After Installation or Removal.” on page 11-112 .**

---

# Removing an Active Remote Connector (ARC)

---

### *BEFORE INSTALLATION*

---

## Machines Affected

2220 all models with ARC feature code 5631, 5632, 5633, 5634, 5635, 5641, 5642, 5643, 5651, 5652 or 5653.

*This feature should only be applied on the machine serial for which it is specified.*

## Related BMs and ECs

None

## BMs to be Installed

**80G2863** Remove an ARC V24 (DTE) with 15 m cable, or  
Remove an ARC V24 (DCE) with 5 m cable (Japan excepted), or  
Remove an ARC V24 (DCE) with 5 m cable (Japan only), or  
Remove an ARC V24 (DCE) with 12m cable (Japan excepted), or  
Remove an ARC V24 (DCE) with 12m cable (Japan only), or  
Remove an ARC V35 (DTE) with 15m cable, or  
Remove an ARC V35 (DCE) with 5m cable, or  
Remove an ARC V35 (DCE) with 15m cable, or  
Remove an ARC X21 (DTE) with 15 m cable, or  
Remove an ARC X21 (DCE) with 5 m cable, or  
Remove an ARC X21 (DCE) with 15 m cable, or  
Remove an ARC X21 (DCE Transfix) with 5 m cable, or  
Remove an ARC X21 (DCE Transfix) with 15 m cable.

## Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Inform the network operator that you are going to remove an hardware feature.

## Programming

None



## Purpose and Description

**Purpose:**

Remove a low speed (V24/V35 or X21) interface.

**Description:**

Remove an ARC from a LCBB or LCBE.

## Installation Time

BM Installed	Machine Hours	System Hours	Nb of CE
80G2863	0.0	0.0	1

## Tools/Materials Required

None

---

### INSTALLATION

---

## Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

## Details of Installation.

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, click on the **resource**, then click on status and verify that the status is '**not active**'.

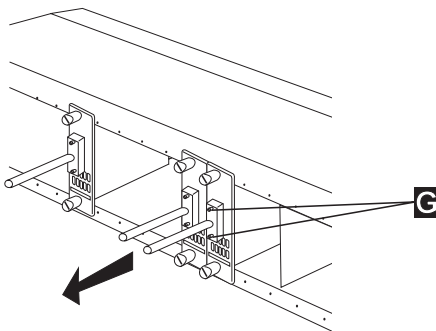
**Note:** If the resource is active, ask the operator to disable the resource.

### Identifying the ARC.

- \_\_\_ 1. According to the Hone Plugging sheet
  - Locate the LCBB or LCBE from where you have to remove an ARC.
  - and the ARC that you have to remove
  - locate the ARC to be removed

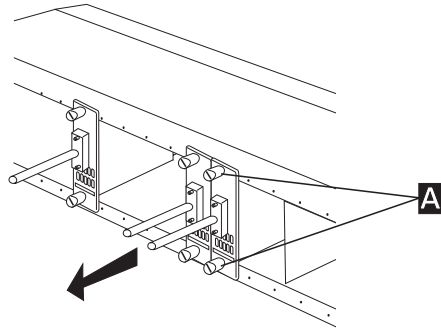
### Removing the Cable.

- \_\_\_ 1. Loosen the two knobs **G** which secure the cable in the ARC.
- \_\_\_ 2. Remove the cable.



### Removing the ARC.

- \_\_\_ 1. Loosen the two knobs **A** which secure the ARC in the line connection box (LCB).
- \_\_\_ 2. Remove the ARC from the line connection box.



- \_\_\_ 3. At the ARC cable end, loose the screws which secure it in the DTE or DCE.
- \_\_\_ 4. Remove the ARC cable and adapter (if any).

**Go to “After Installation or Removal.” on page 11-112 .**

---

# Installing a Line Connection Box (LCBB or LCBE)

---

### BEFORE INSTALLATION

---

## Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

## Related BMs and ECs

Depending on the configuration, you can have to install a LIC 511, LIC 511-to-LCBB cable, or LCBB-to-LCBE cable.

## BMs to be Installed

FFBM	Feature Code	Feature Name
80G1443	5600	Line connection box base
80G1444	5610	Line Connection box expansion

## Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

## Programming

None.

## Purpose and Description

**Purpose**

Install a LCB

**Description:**

Install a LCBB or a LCBE

## Installation Time

BM Installed	Machine Hours	System Hours	Nb of CE
See table.	1.0	0.0	1

## Tools/Materials Required

None

---

## INSTALLATION

---

### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation

#### Installing the LCBB or LCBE.

1. \_\_\_ **Unpack** the LCB and obtain the different labels which will be used to identify the LCB and cables (at the end of the installation, save the unused labels for further needs).

If you are installing the LCB in the frame of the 2220-500 or 2220-501, go to Step 2, otherwise go to Step 5 on page 11-13.

**Note:** Only 2 LCB's can be installed in the 2220-300, 2220-500 or 2220-501

2. \_\_\_ From the rear of the 2220-500 or 2220-501 remove cover **A** if you are installing a LCBB and (or) remove cover **B** if you are installing a LCBE.

**These covers are present only on 37 U rack.**

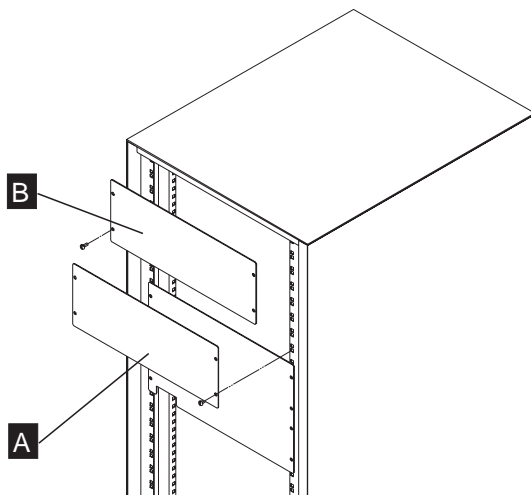


Figure 11-1. Removing Covers at the Rear of 37 U Rack

3. \_\_\_ **Install** the LCBB in location **A**, and the LCBE (if any) in location **B**:
  - Refer to Figure 11-2 on page 11-13 for LCBs installed in a 37 U rack.
  - Refer to Figure 11-3 on page 11-13 for LCBs installed in a 29 U rack.

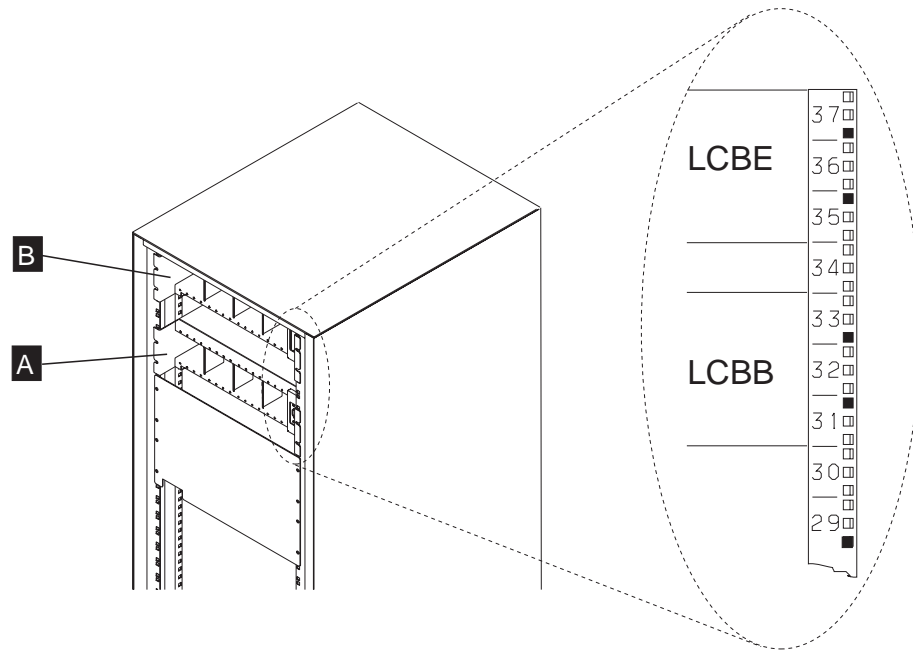


Figure 11-2. LCBs Installation in 37 U Rack

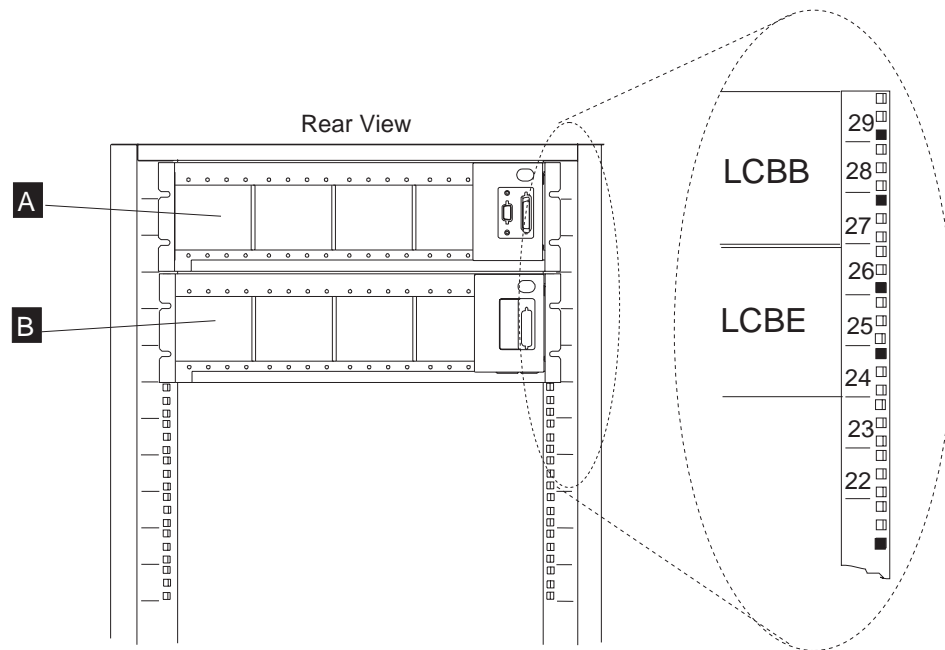


Figure 11-3. LCBs Installation in 29 U Rack

- \_\_\_ 4. \_\_\_ Then go to Step 6.
- \_\_\_ 5. \_\_\_ Start **installing** the LCBs **from the bottom** of the customer's rack. The LCBE is always installed on top of its associated LCBB (see Figure 6-11 on page 6-8).
- \_\_\_ 6. \_\_\_ **Install** and **fasten** the LCB in the 19 in. rack-mount using the four screws provided with the rack parts.

## Installing and Removing Options

**Note:** These screws also provide proper grounding of the LCB if the frame of the rack is connected to the premises ground system.

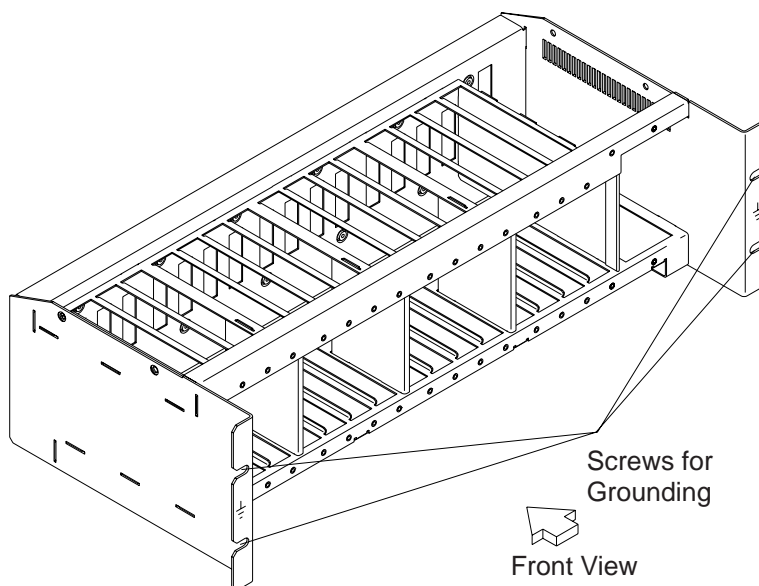


Figure 11-4. LCB Grounding via Screws.

Is the rack frame connected to the ground ?

- **Yes**, go to Step 8 on page 11-15.
- **No**, go to Step 7.

\_\_\_ 7. \_\_\_ Connect a ground wire as follows: of the LCB to the premises ground system.

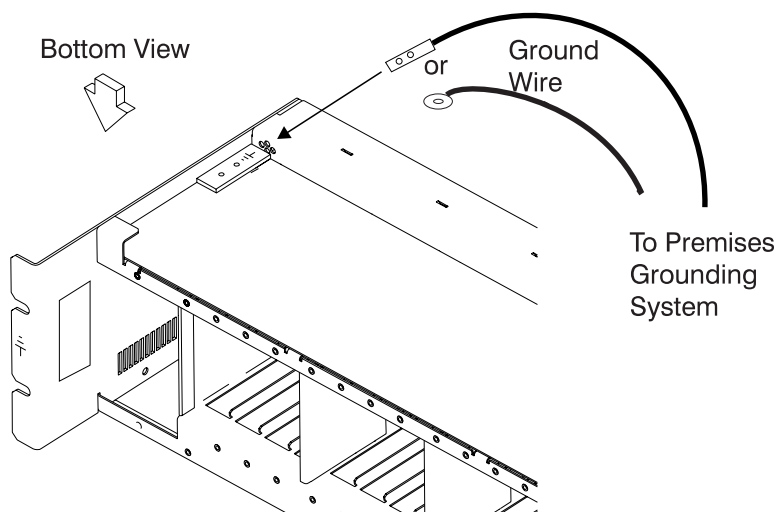


Figure 11-5. LCB Grounding via Ground Wire

Two types of connection can be done, standard (refer to Figure 11-6 on page 11-15), or 'Bellcore' connection (refer to Figure 11-7 on page 11-15).



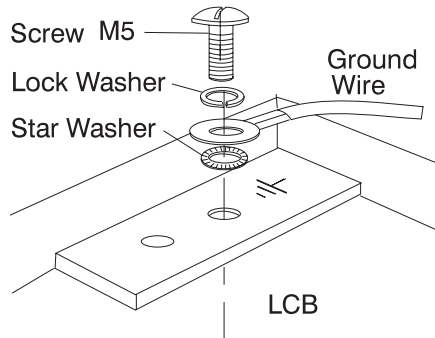


Figure 11-6. Standard Ground Connection

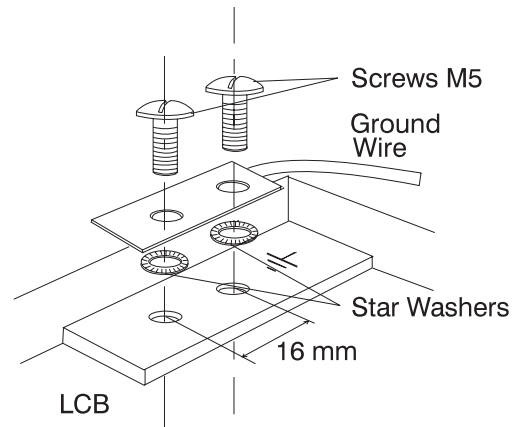


Figure 11-7. Bellcore Ground Connection

8. Using the label (PN 80G0744), **identify** the LCB by recording the following information:
  - a. The **2220 name**.
  - b. The **LCB number/location** (up to 25 characters).
  - c. The **LIC 511 connector location**
9. **Stick** the label on the LCB (see detail **A** in Figure 11-8).
10. If you have installed one LCBE, **install** cable (PN 17G5789) between the LCBB and the LCBE. This cable is part of the LCBE shipping group (see cable **1** in Figure 11-8).

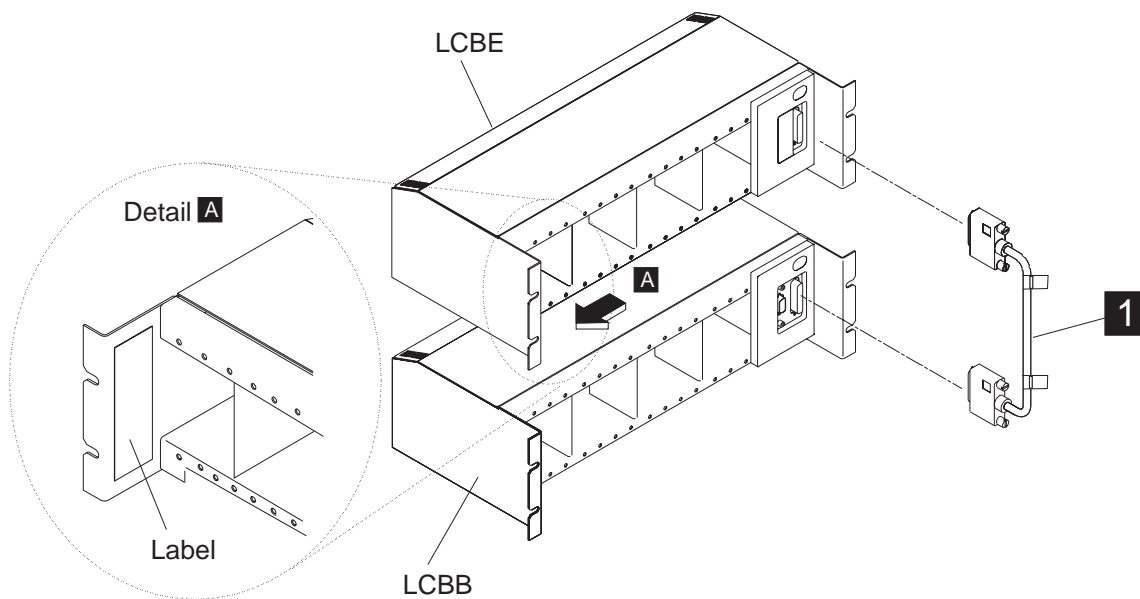


Figure 11-8. LCB Labelling and Connecting LCBB to LCBE.

### Installing the LIC 511.

Go to “Installing a Line Interface Coupler (LIC)” on page 11-22, follow the instructions from “Locating the LIC Module.” on page 11-25 to “Installing the LIC Module.” on page 11-25, then return here and go to next step.

### Installing the cable from the LIC 511 to the LCBB.

Go to “Installing / Removing External Cables” on page 11-102, follow the instructions on step “Installing the Cables From LIC 511-to-LCBB.” on page 11-107, then return here and go to next step.

### Installing the ARCs.

Go to “Installing an Active Remote Connector (ARC)” on page 11-2, follow the instructions from step “Installing the ARC in the LCB.” on page 11-4 to step “Connecting to the DCE or DTE.” on page 11-109, then return here and go to step “Verifying the Resource Status..”

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the new installed resource icon is green. details. Check with the customer, if the new configuration is loaded in the 2220 before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

Go to “After Installation or Removal.” on page 11-112 .

---

## Removing a Line Connector Box (LCBB or LCBE)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models with LCBB feature code 5600 or LCBE feature code 5610.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

Remove the associated cables and the LIC 511 if specified.

#### BM to be Installed

**80G2863** Remove a line connection box base, or  
Remove a line Connection box expansion.

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

#### Programming

None.

#### Purpose and Description

**Purpose:**

Remove a LCBB or LCBE

**Description:**

Remove the ARCs, cables and LCB.

#### Installation Time

BM Installed	Machine Hours	System Hours	Nb of CE
80G2863	1.0	0.0	1

#### Tools/Materials Required

None

## INSTALLATION

### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation.

#### Verifying the Resource Status.

1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
2. Double click on **Nways Switch Resource Control** icon.
3. Click on **View, Expanded Tree View**, click on the **resource** (LIC 511), then click on status and verify that the status is '**not active**'.

**Note:** If the resource is active, ask the operator to disable the resource.

#### Removing the LCBB or LCBE cable.

If you are removing:

- A **Line Connection Box Base (LCBB)**, remove cable **1** between the LCBB and the LIC 511 and if you have to remove the LIC 511, go to "Removing the LIC 511" on page 11-19, otherwise go to "Removing the ARCs and LCB." on page 11-20.
- A **Line Connection Box Expansion (LCBE)**, remove cable **2** between the LCBB and the LCBE and go to "Removing the ARCs and LCB." on page 11-20.

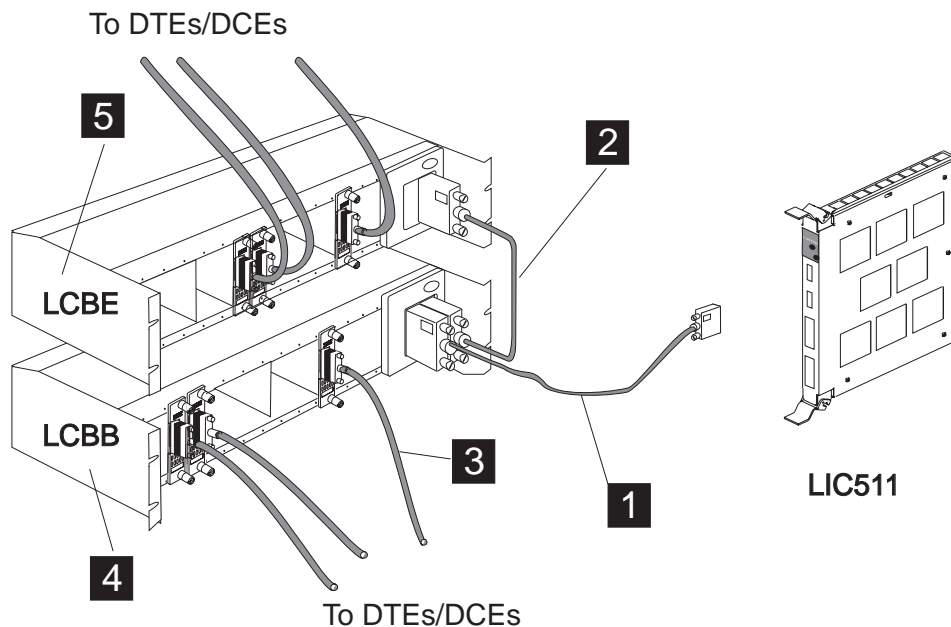


Figure 11-9. LCCB and LCBE Cables

If you are removing a LCBB, go to step “Removing the LIC 511” on page 11-19, otherwise go to step “Removing the ARCs and LCB.” on page 11-20.

## Removing the LIC 511

### 1. Locate the LIC module

Using the label stick on top of the board, determine the module location (see Figure A-12 on page A-13).

### 2. Remove the LIC 511

- \_\_\_ a. Refer to Figure 11-10.
- \_\_\_ b. Loosen the screws on the latches.
- \_\_\_ c. Unlock the latches as shown
- \_\_\_ d. Remove the LIC 511 from its location
- \_\_\_ e. Store the module in a safe place.

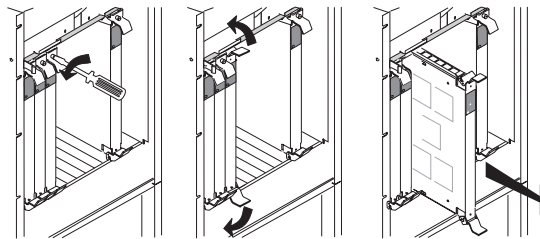
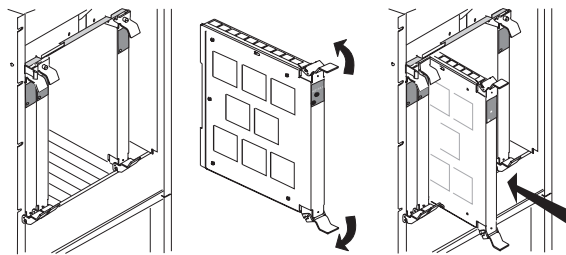


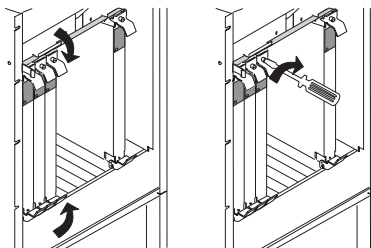
Figure 11-10. Removing a LIC 511

### 3. Insert a dummy module

- \_\_\_ a. Slide the dummy module in its location.



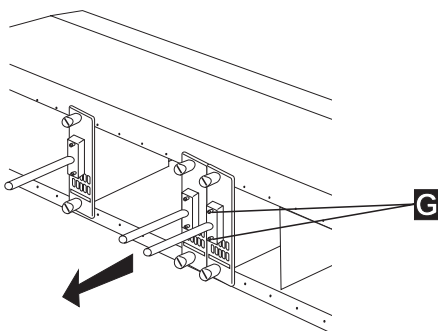
- \_\_\_ b. Tighten the screws on the dummy module.



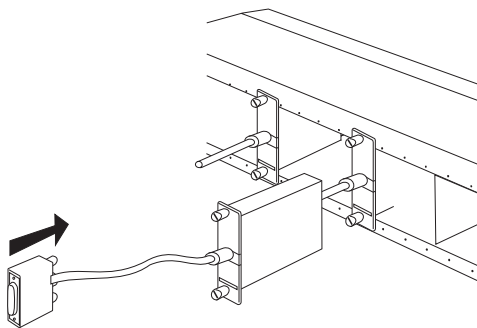
## Installing and Removing Options

### Removing the ARCs and LCB.

1. Loosen the two knobs **A** which secure the ARCs in the LCB.
2. Remove the ARC from the LCB.



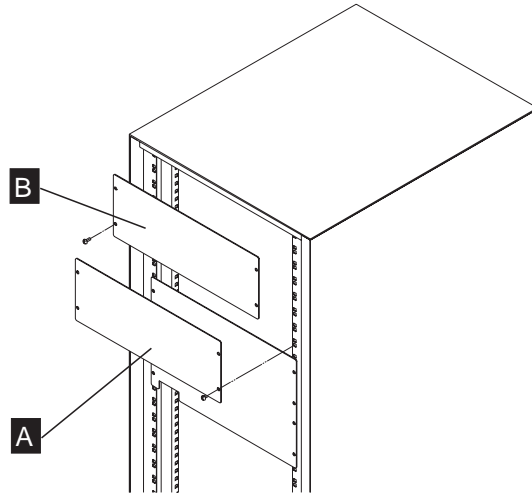
3. At the ARC cable end, loose the screws which secure it in the DTE or DCE. Remove the ARC cable and adapter (if any).
4. Remove the LCBB or LCBE by removing the four screws which secured the LCB in the rack.



If you are removing the LCB from the frame of a 2220-500 or 2220-501, go to “Installing the Cover,” “After Installation or Removal.” on page 11-112 .

### Installing the Cover.

1. Install and fasten a cover (PN 80G3718) using four screws (PN 43G3122), at the location, **A** or **B** you have removed a LCBB or LCBE.



Go to “After Installation or Removal.” on page 11-112 .

---

### Installing a Line Interface Coupler (LIC)

---

#### *BEFORE INSTALLATION*

---

#### Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

- LIC , depends of the type of interface:

FFBM	Feature Code	Feature Name
03K5448	5562	LIC 562 - J2 Multi Access / Sub Rate
08J5367	5563	LIC 563- 2 E1 (120 Ohm, European ISDN standard) and 2 Trunk backup ISDN
08J5365	5567	LIC 567 - E1 (120-Ohm terminating Impedance) 4 Trunks
80G1147	5513	LIC 513 - T3
80G1149	5514	LIC 514 - T1 / J1
80G1151	5515	LIC 515 - E1 (75-Ohm terminating impedance)
80G1153	5516	LIC 516 - E1 (120-Ohm terminating impedance)
80G1173	5522	LIC 522 - V35 / V36 / X21.
80G1155	5523	LIC 523 - E2 / E3 / JT2.
80G1160	5530	LIC 530 - HSSI E3 / JT2.
80G1440	5511	LIC 511 - V24 / V35 / X21 (RVX).
80G4382	5517	LIC 517 - 2 Mbps JJ-20 4 ports
80G4383	5544	LIC 544 - T1 Or J1 8 ports
80G4384	5545	LIC 545 - E1 (75-Ohm terminating Impedance) 8 ports
80G4385	5546	LIC 546 - E1 (120-Ohm terminating Impedance) 8 ports
80G4387	5551	LIC 551 - ATM DS3 (45 Mbps) 2 ports or trunks
80G4388	5552	LIC 552 - ATM E3 (34 Mbps) 2 ports or trunks
80G4389	5553	LIC 553 - ATM OC3 1 Port (155 Mbps)
80G4390	5554	LIC 554 - ATM SONET/SDH Long Range SMF (155Mbps)
80G4781	5555	LIC 555 - ATM SONET/SDH Short Range SMF (155Mbps)
80G4660	5556	LIC 556 - ATM SONET/SDH MMF (155Mbps)



- Wrap Plug: (Only when the first LIC of this type to be installed in the machine).

FFBM	Feature Code	Feature Name
80G4506	5511	Wrap Plugs LIC 511
80G1146	5522	Wrap Plugs LIC 522
80G1148	5513/5515/ 5523/5545/ 5551/5552/ 5553.	Wrap Plugs LIC 513 / 515 / 523 / 545 / 551 /552 / 553 / 562
80G1150	5514/5516/ 5544/5546/ 5563/5567	Wrap Plugs LIC 514 / 516 / 544 / 546 / 563 / 567
80G1161	5530	Wrap Plugs LIC 530
80G4495	5556	Wrap Plugs LIC 556
80G4496	5554	Wrap Plugs LIC 554
80G5092	5555	Wrap Plugs LIC 555
80G5139	5517	Wrap Plugs LIC 517

### Optional FFB/M

If you received the FFB/M providing the external cable associated to the LIC module to be installed, you have to install this cable at the same time. (See “Installing / Removing External Cables” on page 11-102 and “Installing the Cables From LIC 511-to-LCBB.” on page 11-107).

### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Ensure that the associated adapter plugged on the front side is compatible with the LIC to be installed.

LIC	Adapter Type	LIC	Adapter Type
511	LSA type 2 or 3.	545	LSA type 3.
513	HSA type 1, 2 or 3.	551	ATMA type 1 or 2.
514	LSA type 1 or 2.	552	ATMA type 1 or 2.
515	LSA type 1 or 2.	553	ATMA type 1 or 2.
516	LSA type 1 or 2.	554	ATMA type 1 or 2.
517	LSA type 2.	555	ATMA type 1 or 2.
522	LSA type 2 or 3.	556	ATMA type 1 or 2.
523	HSA type 1, 2 or 3.	562	LSA type 3.
530	HSA type 1, 2 or 3.	563	LSA type 3.
544	LSA type 3.	567	LSA type 3.
546	LSA type 3.		

## Installing and Removing Options

- \_\_\_ 4. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 5. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 6. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

## Programming

None.

## Purpose and Description

### Purpose

Increase the 2220 connectivity.

### Description

Install a LIC module for high or low speed lines. External cables can be installed at the same time

## Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
see table	0.3	0.0	1

## Tools/Materials Required

None

---

**INSTALLATION**


---

**Safety**

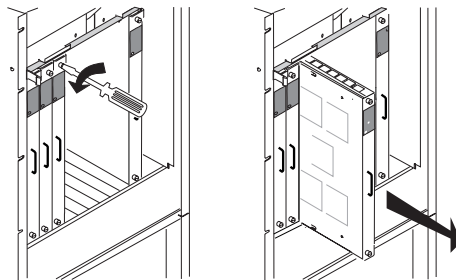
Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Locating the LIC Module.**

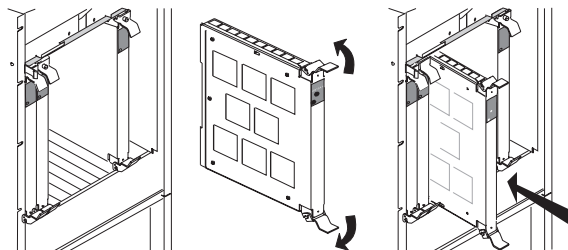
- Using the label stick on top of the board and according to the Hone sheet, identify the location where the LIC has to be installed (see Figure A-12 on page A-13).

**Removing the Dummy Module.**

- \_\_\_ 1. Loosen the screws on the latches.
- \_\_\_ 2. Remove the dummy module from its location
- \_\_\_ 3. Store the dummy module in a safe place.

**Installing the LIC Module.**

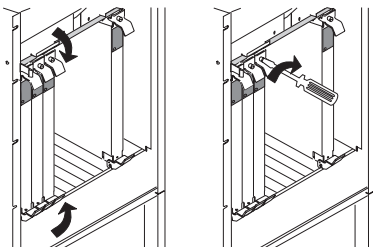
- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the module in its location.



- \_\_\_ 3. Secure the module by locking the latches.
- \_\_\_ 4. Tighten the screws on the latches.
- \_\_\_ 5. Check that the green LED of the LIC comes ON. If not, check the LIC installation.

## Installing and Removing Options

**Note:** If you need to unplug a LIC 553, 554, 555, or 556, wait 10 seconds before reinstalling the LIC.



**Note:** If you received the external cable compatible to the LIC installed, install this cable (refer to “Installing / Removing External Cables” on page 11-102), then go to step “Verifying the Resource Status.”

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the icon of the LIC installed is green

**Note:** The wrap plug or the external cable must be plug on the connector of the LIC, otherwise the LIC is detected in error (red icon).

- \_\_\_ 4. Click on the **resource**, click on **open** and **status** or **profile**. The resource status should be: 'Disabled - Idled - Unlocked'. The information displayed in the resource profile screen depends on the resource type, verify the LIC type.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

- \_\_\_ 5. Ask the customer to import the new config and reboot the NAS.

**Go to “After Installation or Removal.” on page 11-112 .**

---

## Removing a Line Interface Coupler (LIC)

---

### *BEFORE INSTALLATION*

---

#### Machines Affected

2220 all models with LIC feature code 5511, 5512, 5513, 5514, 5515, 5516, 5522, 5523, 5530, 5553, 5554, 5555, 5556, 5562, 5563, or 5567.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

**80G1165** Remove a LIC 511 V24 / V35 / X21 (RVX) or  
 Remove a LIC 512 V24 / V35 / x21 or  
 Remove a LIC 513 T3 or  
 Remove a LIC 514 T1 / J1 or  
 Remove a LIC 515 E1 (75-Ohm terminating impedance) or  
 Remove a LIC 516 E1 (120-Ohm terminating impedance) or  
 Remove a LIC 517 JJ-20 TTC (2 Mbps) or  
 Remove a LIC 522 V35 / V36 / X21 or  
 Remove a LIC 523 E2 / E3 / JT2 or  
 Remove a LIC 530 HSSI E3 / JT2 or  
 Remove a LIC 544 T1 / J1 or  
 Remove a LIC 545 E1 (75-Ohm terminating impedance) or  
 Remove a LIC 546 E1 (120-Ohm terminating impedance) or  
 Remove a LIC 551 ATM DS3 2 Ports (45 Mbps) or  
 Remove a LIC 551 ATM E3 2 Ports (34 Mbps) or  
 Remove a LIC 553 ATM OC3 1 Port (155 Mbps) or  
 Remove a LIC 554 ATM SONET/SDH L R SMF (155Mbps) or  
 Remove a LIC 555 ATM SONET/SDH S R SMF (155Mbps) or  
 Remove a LIC 556 ATM SONET/SDH MMF (155Mbps) or  
 Remove a LIC 562 J2 Multi Access / Sub rate or  
 Remove a LIC 563 2 E1 (120 Ohms, European ISDN standard) and 2  
 trunk backup ISDN or  
 Remove a LIC 567 E1 (120-Ohm terminating impedance).

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

## Installing and Removing Options

### Programming

None.

### Purpose and Description

#### Purpose

Remove a LIC

#### Description

Remove a LIC

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1165	0.3	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**


---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Verifying the Resource Status.**

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, click on the **lines** connected to the LIC, then click on open, status and verify that the status is '**Locked**'.

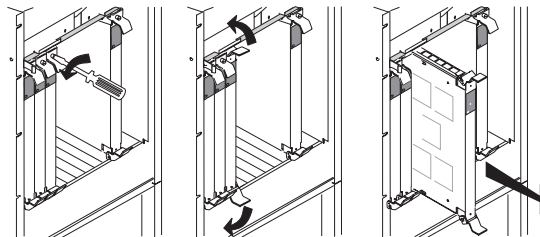
**Note:** If the lines are 'Unlocked', ask the network operator to lock the lines associated to the LIC.

**Locating the LIC Module and Removing Cables.**

- \_\_\_ 1. Using the label stick on top of the board and according to the hone sheet received, identify the LIC location (see Figure A-12 on page A-13).
- \_\_\_ 2. Using the label on the front of the LIC, check the LIC type to verify if you are removing the right LIC.
- \_\_\_ 3. Loosen the screws (if present) which secure the cable(s).
- \_\_\_ 4. Remove the cable(s).

**Removing the LIC module.**

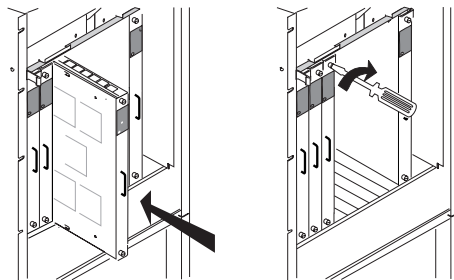
- \_\_\_ 1. Loosen the screws on the latches.
- \_\_\_ 2. Unlock the latches as shown
- \_\_\_ 3. Remove the module from its location



## Installing and Removing Options

### Installing a Dummy Module.

1. Slide the dummy module in its location.
2. Tighten the screws on the dummy module.



### Updating the Configuration.

1. The resource is now 'not installed' and the corresponding icon is blue.
2. To delete the resource from the display, ask the customer to import the new config and reboot the NAS.

Go to “After Installation or Removal.” on page 11-112 .



---

## Installing a Trunk/Port Adapter (TPA)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G1437	5440	High Speed Adapter Type 2 (HSA2)
80G1438	5445	Low Speed Adapter Type 2 (LSA2)
80G4380	5450	ATM Adapter Type 1 (ATMA)
80G4381	5460	Low Speed Adapter Type 3 (LSA3)
80G4484	5446	High Speed Adapter Type 3 (HSA3)
80G5090	5451	ATM Adapter Type 2 (ATMA2)

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

## Installing and Removing Options

### Programming

None

### Purpose and Description

#### Purpose

Provide adapter to a 2220:

- to support additional high speed or low speed LICs or
- dedicated control point function.

#### Description

Install a LSA2, LSA3, HSA2, HSA3, ATMA or ATMA2.

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
See table.	0.5	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**

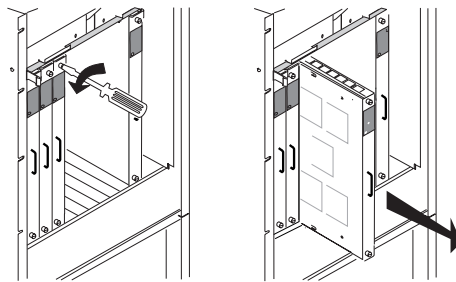

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**Safety**

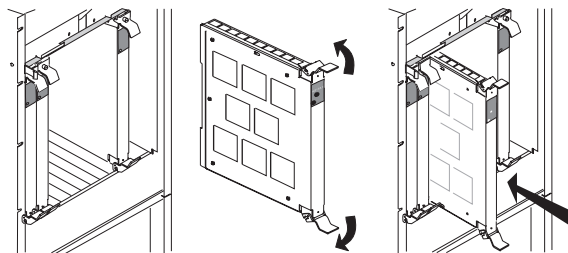
Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Removing the Dummy Module.**

- \_\_\_ 1. Using the label stick on top of the board and according to the hone sheet, locate the dummy module to be removed (see Figure A-12 on page A-13).
- \_\_\_ 2. Loosen the screws on the dummy module.
- \_\_\_ 3. Remove the dummy module from its location
- \_\_\_ 4. Store the dummy module in a safe place.

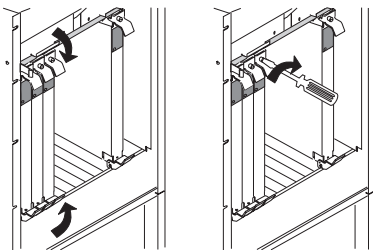
**Inserting the TPA Module.**

- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the module in its location.



- \_\_\_ 3. Secure the module by locking the latches.
- \_\_\_ 4. Tighten the screws on the latches.
- \_\_\_ 5. Check that the green LED of the TPA comes ON.

## Installing and Removing Options



**Note:** If you received a MES for installing a LIC, go to “Installing a Line Interface Coupler (LIC)” on page 11-22 and then go to step “Verifying the Resource Status..”

### Verifying the Resource Status.

- 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- 2. Double click on **Nways Switch Resource Control** icon.
- 3. Click on **View, Expanded Tree View**, and verify that the resources installed are green. details. Check with the customer, if the new configuration is loaded in the 2220 before to go further.

**Note:** If the LIC is installed at the same time, the wrap plug or the external cable must be plug on the connector of the LIC, otherwise the TPA is detected in error (red icon).

- 4. Click on the **resource**, click on **open** and **status** or **profile**. The resource status should be: 'Disabled - Idled - Locked'. The information displayed in the resource profile screen depends on the resource type, example AT LSA2 means: adapter type - low speed adapter type 2.

**Note:** For any unexpected status or message, go to the start page of the 2220 *Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

Go to “After Installation or Removal.” on page 11-112 .

---

## Removing a Trunk/Port Adapter (TPA)

---

### *BEFORE INSTALLATION*

---

#### Machines Affected

2220 all models with a TPA feature code 5440, 5445, 5446, 5450, 5451, or 5460.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

**80G1165** Remove High Speed Adapter Type 2 (HSA2) or Type 3 (HSA3), or Remove Low Speed Adapter Type 2 (LSA2) or Type 3 (LSA3), or Remove ATM Adapter Type 1 (ATMA) or Type 2 (ATMA2).

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Ensure from the customer or the network operator that the status of the TPA to be removed is **Administrative Lock** in the **Active Node Configuration**,
- \_\_\_ 5. Ensure that the LIC associated to this TPA has been removed prior to remove the adapter (slot 1 to 8, see Figure A-13 on page A-13).

#### Programming

None.

#### Purpose and Description

##### **Purpose**

Remove a TPA

##### **Description**

Remove a LSA2, LSA3, HSA2, HSA3, ATMA or ATMA2.

## Installing and Removing Options

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1165	0.5	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**


---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Verifying the Resource Status.**

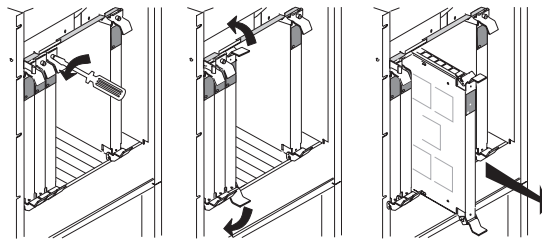
- \_\_\_ 1. According to the Hone sheet received, identify the TPA to be removed (see Figure A-11 on page A-12).
- \_\_\_ 2. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 3. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 4. Click on **View, Expanded Tree View**, click on the **Lines** associated to the TPA, then click on open, status and verify that the lines are **'Locked'**.

**Note:** If the lines are **Unlocked**, ask the network operator to lock the lines.

- \_\_\_ 5. Deactivate the TPA/LIC.

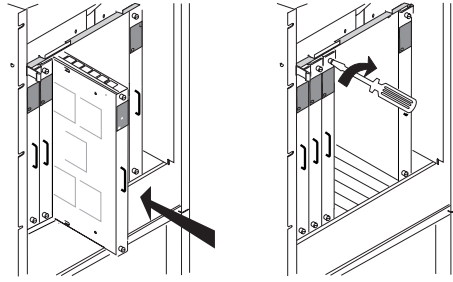
**Removing the TPA Module.**

- \_\_\_ 1. Locate the TPA module (see Figure A-12 on page A-13).
- \_\_\_ 2. Loosen the screws on the latches.
- \_\_\_ 3. Unlock the latches as shown
- \_\_\_ 4. Remove the module from its location

**Installing a Dummy Module.**

- \_\_\_ 1. Slide the dummy module in its location.
- \_\_\_ 2. Tighten the screws on the dummy module.

## Installing and Removing Options



### Updating the Configuration.

- \_\_\_ 1. The resource is now 'not installed' and the corresponding icon is blue.
- \_\_\_ 2. To delete the resource from the display, ask the customer to import the new config and reboot the NAS.

**Go to “After Installation or Removal.” on page 11-112 .**



---

## Installing a Voice Server Adapter (VSA)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G1439	5400	Voice Server Adapter

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If it is the first VSA module to be installed in the 2220, ensure that the Nways Switch Control Program loaded on the Nways Switch administration station supports the VSA feature.
- \_\_\_ 4. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 5. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 6. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

#### Programming

None.

## Installing and Removing Options

### Purpose and Description

#### Purpose

Allows the voice channel routing through a 2220

#### Description

Plug a VSA module able to handle up to 20 voice channels

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1439	0.5	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**

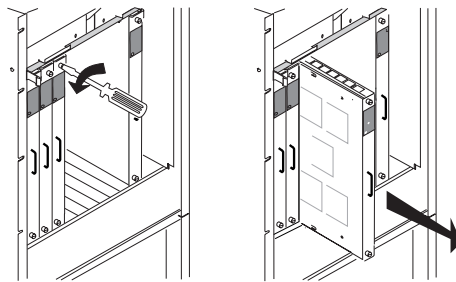

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**Safety**

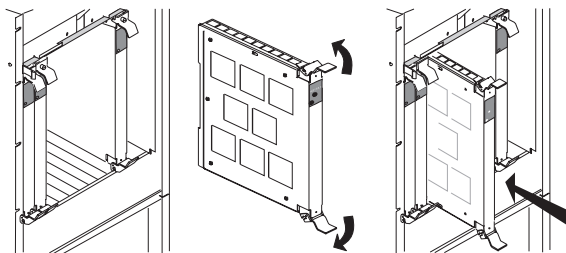
Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Removing the Dummy Module.**

- \_\_\_ 1. Using the label stick on top of the board and according to the hone sheet, locate the dummy module to be removed (see Figure A-12 on page A-13).
- \_\_\_ 2. Loosen the screws on the dummy module
- \_\_\_ 3. Remove the dummy module from its location
- \_\_\_ 4. Store the dummy module in a safe place.

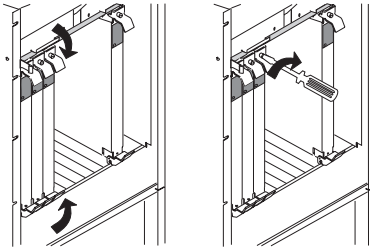
**Installing the VSA Module.**

- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the module in its location.



- \_\_\_ 3. Secure the module by locking the latches.
- \_\_\_ 4. Tighten the screws on the latches.

## Installing and Removing Options



- \_\_\_ 5. Check that the green LED of the VSA comes ON.

**Note:** If you received a VSE module, go to “Installing a Voice Server Extension (VSE)” on page 11-45 then go to step “Verifying the Resource Status..”

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the resources installed are green. details. Check with customer, if the new configuration is loaded in the 2220, before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Go to “After Installation or Removal.” on page 11-112 .**

---

## Removing a Voice Server Adapter (VSA)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models with a VSA feature code 5400.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BM to be Installed

**80G1165** Remove a Voice Server Adapter

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Ensure from the customer or the network operator that the status of the VSA to be removed is **Administrative Lock**. in the **Active Node Configuration**,
- \_\_\_ 5. You may have to remove the associated VSE module.

#### Programming

None.

#### Purpose and Description

Remove a VSA

#### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1165	0.5	0.0	1

#### Tools/Materials Required

None

---

### INSTALLATION

---

## Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

## Details of Installation.

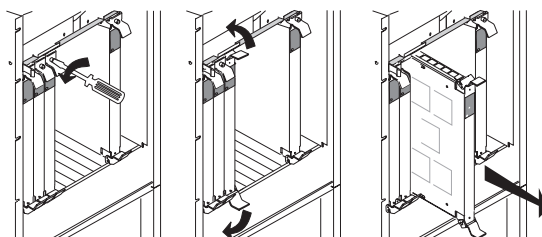
### Verifying the Resource Status.

- \_\_\_ 1. According to the Hone sheet received, identify the location of the VSA module to be removed (see Figure A-11 on page A-12).
- \_\_\_ 2. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 3. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 4. Click on **View, Expanded Tree View**, click on the **resource**, then click on status and verify that the status is '**not active**'.

**Note:** If the resource is active, ask the operator to disable the resource.

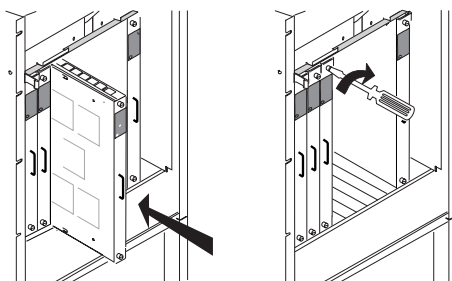
### Removing the VSA module.

- \_\_\_ 1. Locate the VSA module
- \_\_\_ 2. Loosen the screws on the latches
- \_\_\_ 3. Unlock the latches as shown
- \_\_\_ 4. Remove the module from its location



### Installing a Dummy Module.

- \_\_\_ 1. Slide the dummy module in its location.
- \_\_\_ 2. Tighten the screws on the dummy module.



Go to “After Installation or Removal.” on page 11-112 .

---

## Installing a Voice Server Extension (VSE)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G1441	5501	LIC 501 - Voice Server Extension type 1 (VSE1)
80G1442	5502	LIC 502 - Voice Server Extension type 2 (VSE2)

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

#### Programming

None.

### Purpose and Description

**Purpose:**

Increase the number of voice channels to be handle by one VSA (up to 140)

**Description:**

Install a Voice Server Extension (VSE1 or VSE2)

- VSE1 provides 60 additional voice channels
- VSE2 provides 120 additional voice channels

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
See table.	0.5	0.0	1

### Tools/Materials Required

None



---

**INSTALLATION**


---

**Safety**

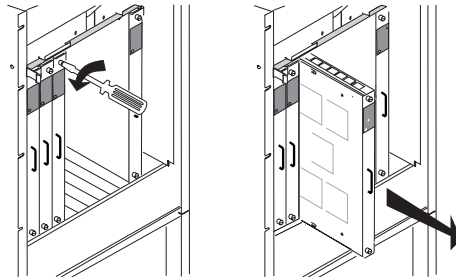
Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Locating the VSE Module.**

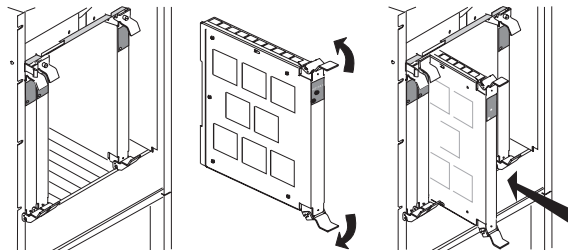
- Using the label stick on top of the board and according to the hone sheet, identify the module location (see Figure A-12 on page A-13).

**Removing the Dummy Module.**

- \_\_\_ 1. Loosen the screws on the dummy module
- \_\_\_ 2. Remove the dummy module from its location
- \_\_\_ 3. Store the dummy module in a safe place.

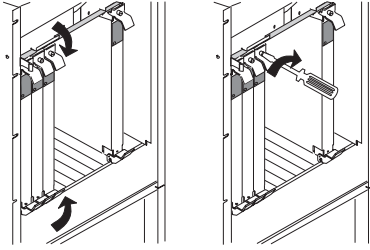
**Installing the VSE Module.**

- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the module in its location.



- \_\_\_ 3. Secure the module by locking the latches.
- \_\_\_ 4. Tighten the screws on the latches.

## Installing and Removing Options



- \_\_\_ 5. Check that the green LED of the VSE comes ON.

### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the resources installed are green. If not click on the resource, then click on **status** to obtain more details. Check with the customer, if the new configuration is loaded in the 2220 before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247). .

**Go to “After Installation or Removal.” on page 11-112**

---

## Removing a Voice Server Extension (VSE)

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models with a VSE1 feature code 5501 or a VSE2 feature code 5502.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

**80G1165** Remove a LIC 501 - Voice Server Extension type 1 (VSE1)  
Remove a LIC 502 - Voice Server Extension type 2 (VSE2)

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Ensure from the customer or the network operator that the status of the TPA to be removed is **Administrative Lock**. in the **Active Node Configuration**,

#### Programming

None.

#### Purpose and Description

##### **Purpose:**

Decrease the number of voice channels handle by one VSA module.

##### **Description:**

Remove a Voice Server Extension (VSE1 or VSE2)

#### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1165	0.2	0.0	1

### Tools/Materials Required

None

---

### INSTALLATION

---

### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation.

#### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, click on the **resource**, then click on status and verify that the status is **'not active'**.

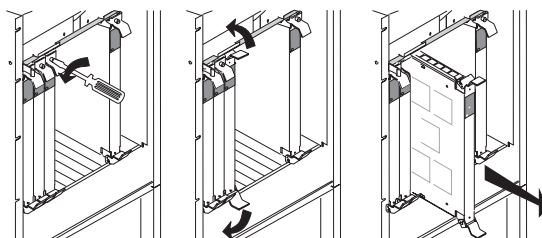
**Note:** If the resource is active, ask the operator to disable the resource.

#### Locating the VSE module.

Using the label stick on top of the board and according to the hone sheet, locate the VSE module (see Figure A-12 on page A-13).

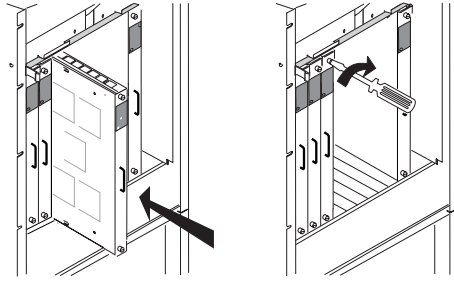
#### Removing the VSE module.

- \_\_\_ 1. Loosen the screws on the latches.
- \_\_\_ 2. Unlock the latches as shown
- \_\_\_ 3. Remove the module from its location



#### Installing a Dummy Module.

- \_\_\_ 1. Slide the dummy module in its location.
- \_\_\_ 2. Tighten the screws on dummy module



Go to “After Installation or Removal.” on page 11-112 .

---

# Installing a Switch or Switch Redrive Module (SW/SWRD)

---

### BEFORE INSTALLATION

---

## Machines Affected

2220 all models without a duplex switch feature.

*This feature should only be applied on the machine serial for which it is specified.*

## Related BMs and ECs

None

### Concurrent FFB/Ms:

If the duplex switch is to be installed, the 2220 must have:

- Two AC or DC power supplies. See “Installing the Optional AC Power Supply” on page 11-73 or “Installing the Optional DC48 Power Supply” on page 11-88,
- Two clocks. See “Installing a Clock or Clock Redrive Module (CLK/CLKRD)” on page 11-62, and
- (if present) two control points.

**Note:** If you install a second switch in a 2220-500 attached to a 2220-501, a second switch redrive module must be installed in the 2220-501.

## BMs to be Installed

FFBM	Feature Code	Feature Name
80G1166	5340	Second Switch Module (for 2220-500).
80G1168	5341	Second Switch Redrive Module (for 2220-501).
80G1167	5350	Second Switch Module (for 2220-300).

## Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, “2220 Power Consumption” on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

## Programming

None.

## Purpose and Description

### Purpose

Improve the reliability of the 2220 in case of switch failure.

### Description

Install a switch module in a 2220-300 or 2220-500, or switch redrive in a 2220-501.

## Installation Time

BM installed	Machine Type	Machine Hours	System Hours	Nb of CE
80G1166	2220-300	0.5	0.0	1
80G1168	2220-500			
80G1167	2220-501			

## Tools/Materials Required

None

---

## INSTALLATION

---

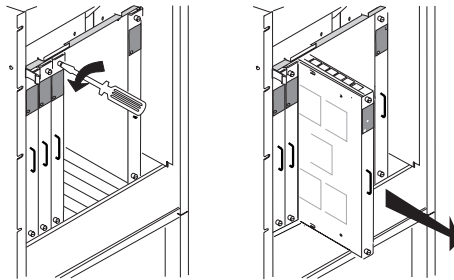
### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation

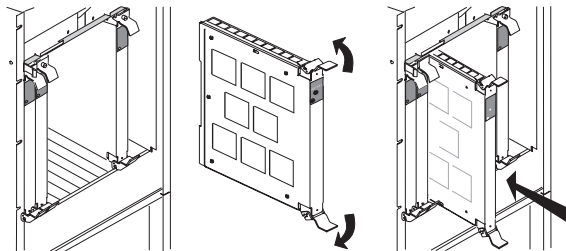
#### Removing the Dummy Module.

- \_\_\_ 1. Locate the switch module slot **10** in the rear side of the machine (see Figure A-12 on page A-13 and Figure A-13 on page A-13).
- \_\_\_ 2. Loosen the screws on the dummy module.
- \_\_\_ 3. Remove the dummy module from its location
- \_\_\_ 4. Store the dummy module in a safe place for further use.



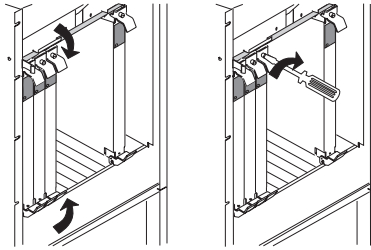
#### Installing the Switch Module.

- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the switch module in location **10**



- \_\_\_ 3. Secure the module by locking the latches.
- \_\_\_ 4. Tighten the screws on the latches.





- \_\_\_ 5. Check that the switch led is green after POST completion.

If you are installing a switch module in a 2220-500 attached to a 2220-501, using the same procedures install the switch redrive module in the 2220-501, then go to “Installing Cables Between the 2220-500 and 2220-501..” Otherwise, go to “Verifying the Resource Status.” on page 11-56 .

### Installing Cables Between the 2220-500 and 2220-501.

**Note:** If the external cables are routed through the upper exit of machine, route the inter-machine cable along the bottom of the logic subrack (refer to Figure 3-10 on page 3-13).

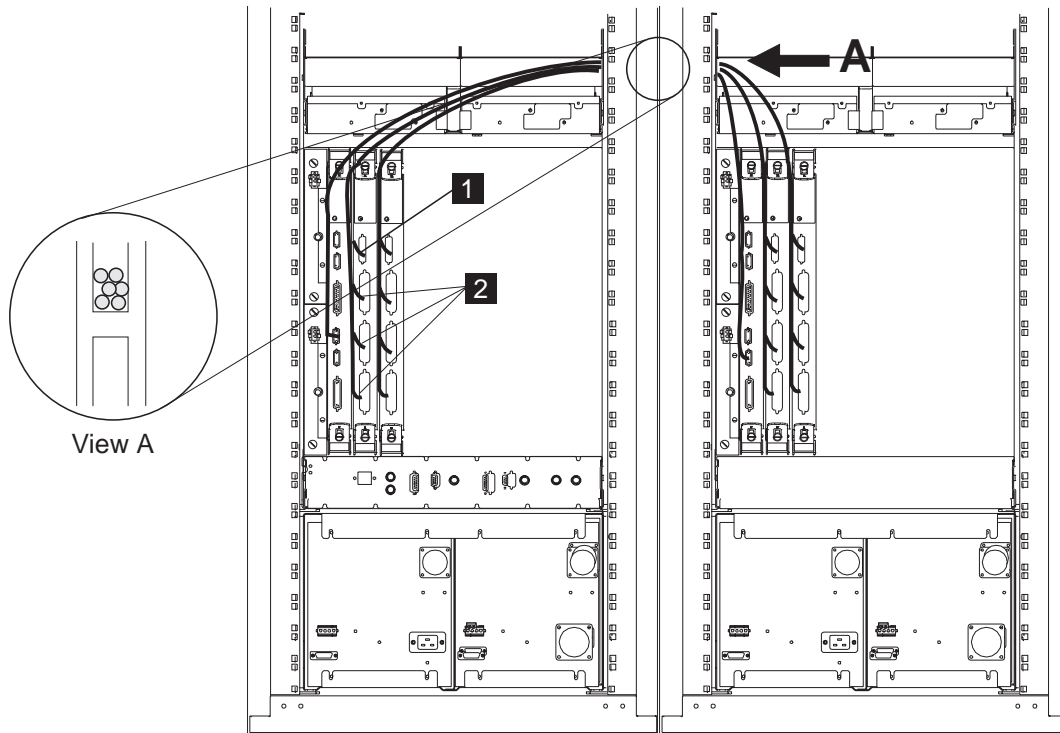


Figure 11-11. Cable Routing Between the Switch and Switch Redrive Modules

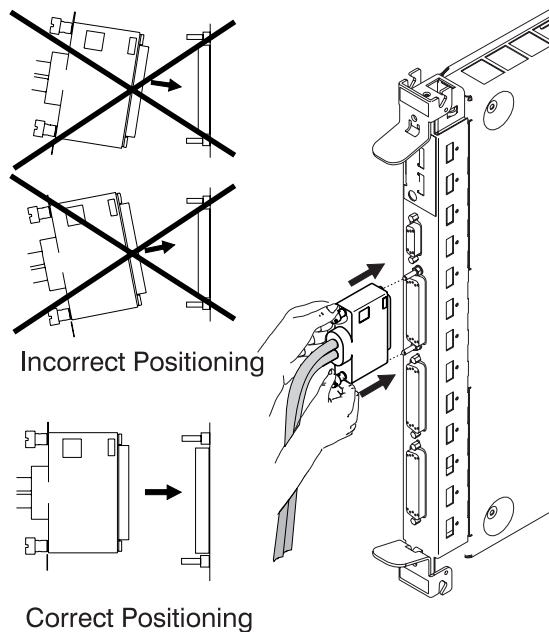
- \_\_\_ 1. Connect cable **1** (PN 57G8045) from **connector 1** of the switch module to **connector 1** of the switch redrive module.
- \_\_\_ 2. Connect three cables **2** (PN 57G8065) from **connectors 2, 3, and 4** of the switch module respectively to **connectors 2, 3 , and 4** of the switch redrive module.

## Installing and Removing Options

### Important

Cable connectors can be damaged when installing cables on **switch** or **switch redrive** module. connectors to avoid any effort which can damage the connectors.

- Carefully connect the cables.
- Tighten the connector screws (tighten them progressively and alternatively on top and bottom).



### Verifying the Resource Status.

1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
2. Double click on **Nways Switch Resource Control** icon.
3. Click on **View, Expanded Tree View**, and verify that the resources installed are green details. Check with the customer, if the new configuration is loaded in the 2220 before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Go to “After Installation or Removal.” on page 11-112 .**

---

## Removing a Switch or Switch Redrive Module (SW/SWRD)

---

### BEFORE INSTALLATION

---

#### Machines Affected

- 2220-500 with a Second Switch module feature code 5340 or
- 2220-501 with a Second Switch Redrive module feature code 5341 or
- 2220-300 with a Second Switch module feature code 5350.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

##### Concurrent FFB/Ms

If the duplex switch is to be removed:

- The second clock. See “Removing a Clock or Clock Redrive Module (CLK/CLKRD)” on page 11-66, and
- (if present) The second control point

should be removed too.

**Note:** If 2220-501 is attached to a 2220-500 the second switch redrive module must be removed in the 2220-501.

#### BMs to be Installed

**80G1462** Remove Second Switch Module (for 2220-500), or  
Remove Second Switch Redrive Module (for 2220-501), or  
Remove Second Switch Module (for 2220-300).

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

#### Programming

None.

#### Purpose and Description

##### Purpose

Remove a switch module

## Installing and Removing Options

### Description

Remove a switch module

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1462	0.3	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**

---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation****Verifying the Resource Status.**

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, click on the **resource**, then click on status and verify that the status is '**not active**'.

**Note:** If the resource is active, ask the operator to disable the resource.

- If you are removing a switch redrive module in a 2220-501 proceed,
- Otherwise, go to "Locating and Removing the Switch and/or Switch Redrive Module." on page 11-60.

**Removing Cables Between the 2220-500 and 2220-501.**

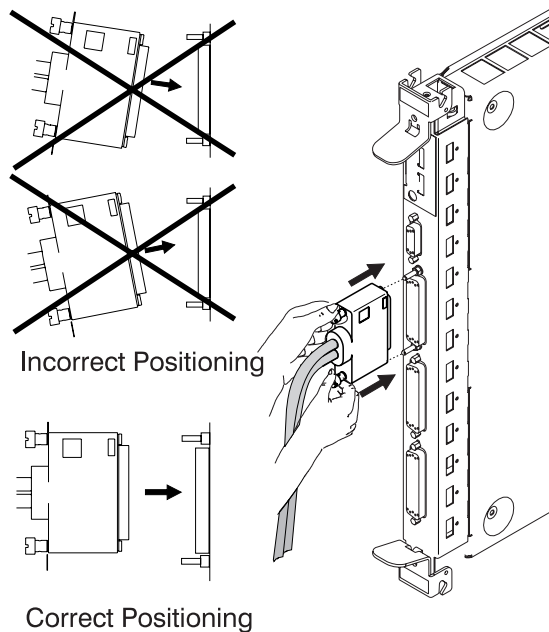
- \_\_\_ 1. Locate the SWITCH and SWITCH REDRIVE modules in position **10** (see Figure A-12 on page A-13).
- \_\_\_ 2. Remove cable **1** (PN 57G8045) from **connector 1** of the switch module to **connector 1** of the switch redrive module.
- \_\_\_ 3. Remove three cables **2** (PN 57G8065) from **connectors 2, 3, and 4** of the switch module respectively to **connectors 2, 3, and 4** of the switch redrive module.

## Installing and Removing Options

### Important

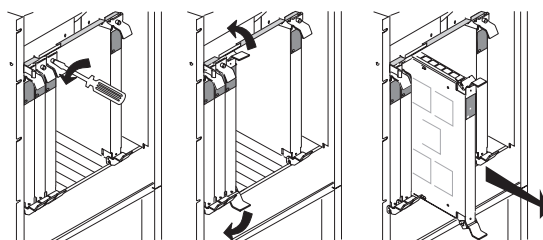
Cable connectors can be damaged when removing cables on **switch** or **switch redrive** module. connectors to avoid any effort which can damage the connectors.

- Loosen the screws that secure the cables progressively and alternatively on top and bottom.
- Remove the cables.



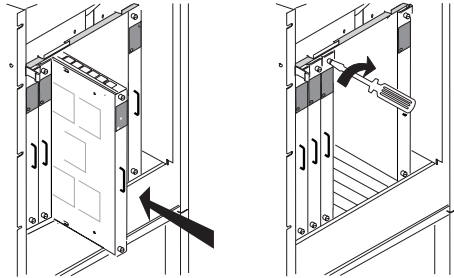
### Locating and Removing the Switch and/or Switch Redrive Module.

1. Locate the SWITCH module in position **10** (see Figure A-12 on page A-13).
2. Loosen the screws on the latches.
3. Unlock the latches as shown
4. Remove the switch module from its location



### Installing a Dummy Module.

- \_\_\_ 1. Slide the dummy module in location **10** .
- \_\_\_ 2. Tighten the screws on the dummy module.



### Updating the configuration.

- \_\_\_ 1. Ensure the switch and/or switch redrive icon is blue.
- \_\_\_ 2. Ask the customer to delete the resource from the active configuration.

Go to “After Installation or Removal.” on page 11-112 .

---

# Installing a Clock or Clock Redrive Module (CLK/CLKRD)

---

### BEFORE INSTALLATION

---

## Machines Affected

2220-300 or 2220-500 without or with only one clock and model 2220-501 without or with only one clock redrive installed.

*This feature should only be applied on the machine serial for which it is specified.*

## Related BMs and ECs

### Concurrent FFB/Ms

When installing a second clock, you have to install concurrently the second switch, power, and control point. If you are installing a clock redrive in the 2220-501, a clock is required in the 2220-500.

## BMs to be Installed

FFBM	Feature Code	Feature Name
80G1162	5355	Clock Module (2220-300, 2220-500)
80G1163	5356	Clock Redrive Module (2220-501)

## Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. If your 2220 has an AC power supply, verify that the maximum power consumption is not reach (see Appendix B, "2220 Power Consumption" on page B-1). If yes, notify the customer that this new feature can not be installed.
- \_\_\_ 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.



## Programming

None.

## Purpose and Description

### Purpose

Allow the clocking of the network on external PBx.

### Description

Install a clock module

## Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1162 or 80G1163	0.3	0.0	1

## Tools/Materials Required

None

---

## INSTALLATION

---

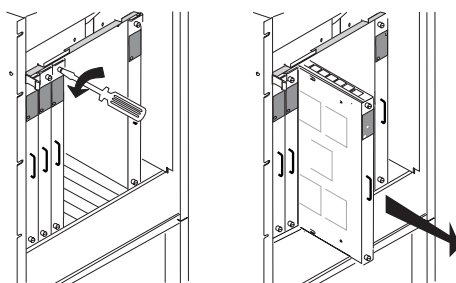
### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation

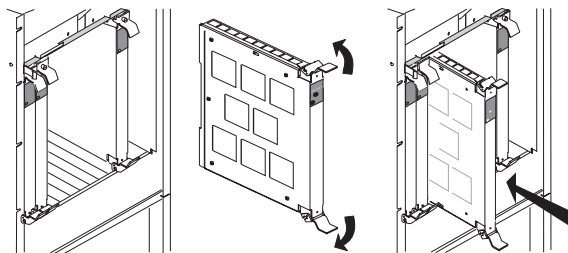
#### Removing the Dummy Module.

- \_\_\_ 1. Locate the Clock module position **9** for the first clock module and **11** when installing the second clock module (see Figure A-10 on page A-12).
- \_\_\_ 2. Loosen the screws on the dummy module.
- \_\_\_ 3. Remove the dummy module from location **9** or **11**, then store it on a safe place for further use.

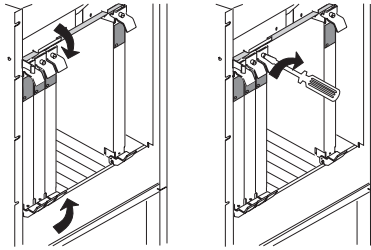


#### Installing the Clock Module.

- \_\_\_ 1. Position the latches as shown.
- \_\_\_ 2. Slide the clock module in location **9** or **11**.



- \_\_\_ 3. Secure the module by locking the latches. Then, tighten the screws on the latches.



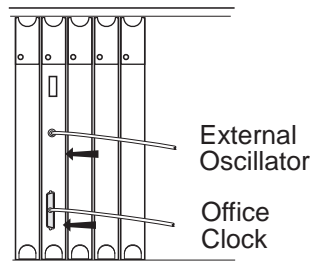
- \_\_\_ 4. Check that the clock led is green after POST completion.

**Is the External Clock Tailgate installed?**

- **YES**, go to “Installing Cables.”
- **NO**, go to “Verifying the Resource Status.”

### Installing Cables.

- \_\_\_ 1. Get the cables coming from the office clock tailgate, coiled between the deflectors.
- \_\_\_ 2. Connect the external oscillator and office clock cables on the clock module (Refer to the label on the connectors), then tighten the screws.



### Verifying the Resource Status.

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, and verify that the resources installed are green. details. Check with the customer, if the new configuration is loaded in the 2220 before to go further.

**Note:** For any unexpected status or message, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247). **Go to “After Installation or Removal.” on page 11-112 .**

---

## Removing a Clock or Clock Redrive Module (CLK/CLKRD)

---

### *BEFORE INSTALLATION*

---

#### Machines Affected

- 2220-300 or 2220-500 with one or two clock modules feature code 5355 or
- 2220-501 with one or two clock redrive modules feature code 5356.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

**80G1165** Remove Clock Module (2220-300, 2220-500), or Clock Redrive Module (2220-501)

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

#### Programming

None.

#### Purpose and Description

Remove a clock module or a clock redrive module

#### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1165	0.3	0.0	1

#### Tools/Materials Required

None

---

**INSTALLATION**


---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

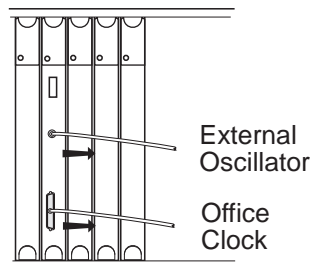
**Details of Installation****Verifying the Resource Status.**

- \_\_\_ 1. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 2. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 3. Click on **View, Expanded Tree View**, click on the **resource**, then click on status and verify that the status is '**not active**'.

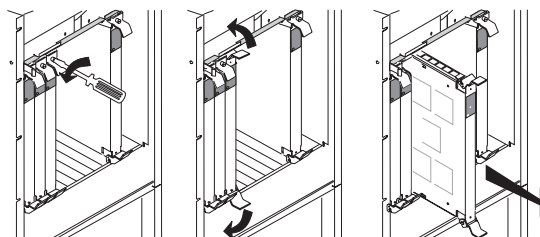
**Note:** If the resource is active, ask the operator to disable the resource.

**Locating the Clock Module.**

- \_\_\_ 1. Locate the clock module position **9** for the first clock module and **11** for the second (see Figure A-10 on page A-12).
- \_\_\_ 2. Loosen the screws which secure the cable.
- \_\_\_ 3. Remove the cable.

**Removing the Clock Module.**

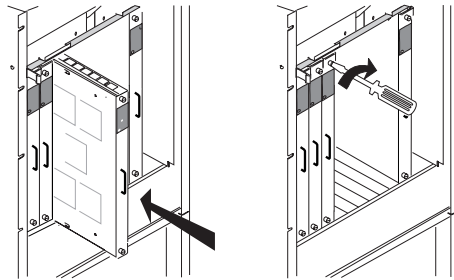
- \_\_\_ 1. Loosen the screws on the latches.
- \_\_\_ 2. Unlock the latches as shown
- \_\_\_ 3. Remove the clock module from location **9** and/or **11**



## Installing and Removing Options

### Installing a Dummy Module.

- \_\_\_ 1. Slide the dummy module in location **11**.
- \_\_\_ 2. Tighten the screws on the dummy module.



### Updating the configuration.

- \_\_\_ 1. Ensure the switch and/or switch redrive icon is blue.
- \_\_\_ 2. Ask the customer to delete the resource from the active configuration.

Go to “After Installation or Removal.” on page 11-112 .

---

## Installing the Office Clock Tailgate.

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220-300 or 2220-500 with one or two clock module (FC 5355) installed.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

##### Prerequisites

FC 5355 - Clock Feature (Qty 1 or 2)

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G4379	5100	Office Clock Tailgate (2220-300, 2220-500)

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

#### Programming

None.

#### Purpose and Description

##### Purpose

Allow the clocking of the network on external PBx.

##### Description

Install the office clock Tailgate.

#### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G4379	0.3	0.0	1

## Installing and Removing Options

### Tools/Materials Required

None



---

**INSTALLATION**


---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Details of Installation.****Removing the Dummy Office clock Tailgate**

**On the front of the machine.**

- \_\_\_ 1. Locate the Clock module position **9** and **11** (see Figure A-1 on page A-2).

**Note:** Clock module position **11** is not mandatory.

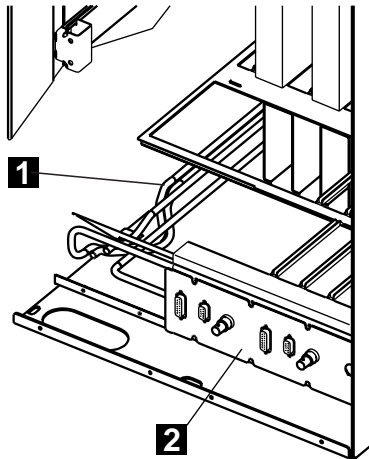
**On the rear side of the machine.**

- \_\_\_ 2. Locate the dummy office clock tailgate (see Figure A-1 on page A-2).
- \_\_\_ 3. Remove the four top screws and Loosen the four bottom screws fastening the Dummy office clock tailgate. Then,
- \_\_\_ 4. Remove the dummy office clock tailgate, keep the 4 top screws for further use.

**Installing the Office Clock Tailgate.**

**On the rear side of the machine.**

- \_\_\_ 1. Position the office clock tailgate, then route the four **1** cables to the front of the machine, on the left side under the air flow deflectors.
- \_\_\_ 2. Install the office clock tailgate **2**, using the four top screws. Then,
- \_\_\_ 3. tighten the top and bottom screws.

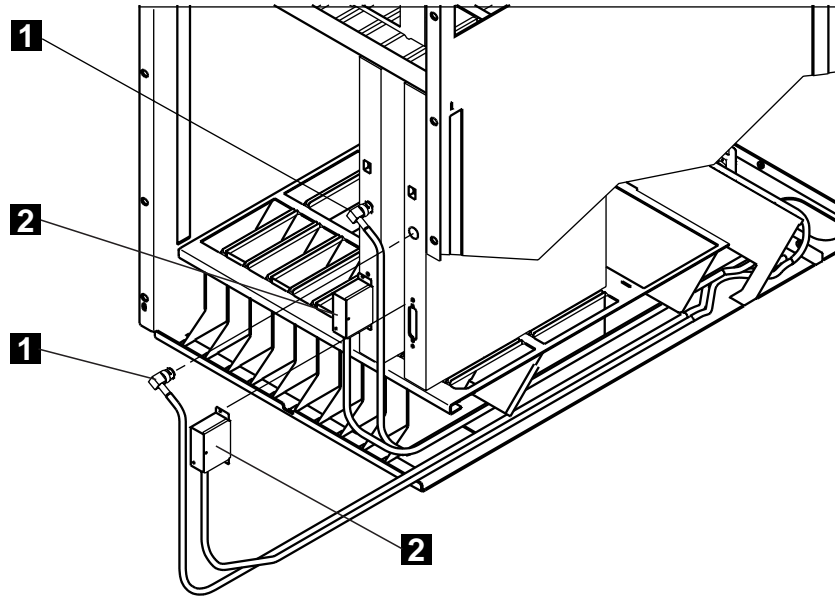


**On the front side of the machine.**

- \_\_\_ 4. Connect the external oscillator **1** and office clock **2** cables to the clock module(s) (Refer to labels on the connectors), then tighten the screws.

## Installing and Removing Options

**Note:** If the second clock module is not present, coil the cables not used, between the deflectors.



Go to “After Installation or Removal.” on page 11-112 .

---

## Installing the Optional AC Power Supply

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all simplex models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

##### Concurrent FFB/M

One of the following FFB/M must be received with the MES, it provides the power cord which is country dependant.

FFBM	Countries Codes
80G1394	649, 781, 896 with specify code 9891 (Moisture)
80G1395	896 with specify code 9986 and 9891 (Moisture)
80G1396	896 with specify code 9986 and 9893 (No locking)
80G1397	896 with specify code 9986 and 9892 (Locking)
80G1398	619, 621, 629, 631, 640, 649, 663, 681, 683, 731, 733, 735, 760, 781, 791, 799, 811, 815, 818, 829, 843, 856, 858, 871, 896 with specify code 9986 and 9892 (No locking)
80G1399	649, 760, 781, 896 with specify code 9892 (Locking)
80G1400	615, 652, 808, 864
80G1401	655, 758, 772, 835,
80G1402	756
80G1403	796
80G1404	620, 627, 643, 666, 678, 680, 725, 738, 744, 752, 754, 764, 778, 802, 805, 823, 833, 834, 848, 851, 866, 883
80G1405	591, 610, 612, 614, 618, 624, 644, 664, 668, 693, 702, 706, 724, 726, 742, 748, 750, 757, 762, 766, 768, 774, 777, 786, 788, 794, 806, 820, 821, 822, 824, 826, 832, 838, 840, 846, 849, 850, 852, 862, 865
80G1406	616, 672
80G1407	613, 661, 813, 869

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G1170	5500	AC/DC Power Supply

## Installing and Removing Options

### Preparation

- 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- 3. If the first power installed in the machine is a DC power (-48 V), refer to Appendix B, "2220 Power Consumption" on page B-1 and verify that the power consumption of your machine do not exceed the maximum load supported by the AC power to be installed.
- 4. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- 5. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

### Programming

None.

### Purpose and Description

**Purpose:**

Improve the reliability of the machine in case of power failure by providing a second power supply.

**Description:**

This installation instruction gives you the procedures to install the optional AC power. This installation can be done while the customer operations are running.

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1170	1.0	0.0	1

### Tools/Materials Required

None

---

**INSTALLATION**


---

**Safety**

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Note:** *CEs are not allowed access to the customer's main power receptacle. The customer or a customer-appointed electrician may have to do some of the work involved in the following procedures, and the CE must ensure that all the steps have been completed.*

**Details of Installation****Power Checking.**

- \_\_\_ 1. Locate the power rating plate on the rear side of the ac power supply.
- \_\_\_ 2. Check that the power rating plate data (see Figure 11-12) are consistent with the customer's available AC voltage and the frequency. The standard voltage input to the 2220 is single-phase, 200 to 240 volts 60 Hz, or 200 to 240 volts 50 Hz.

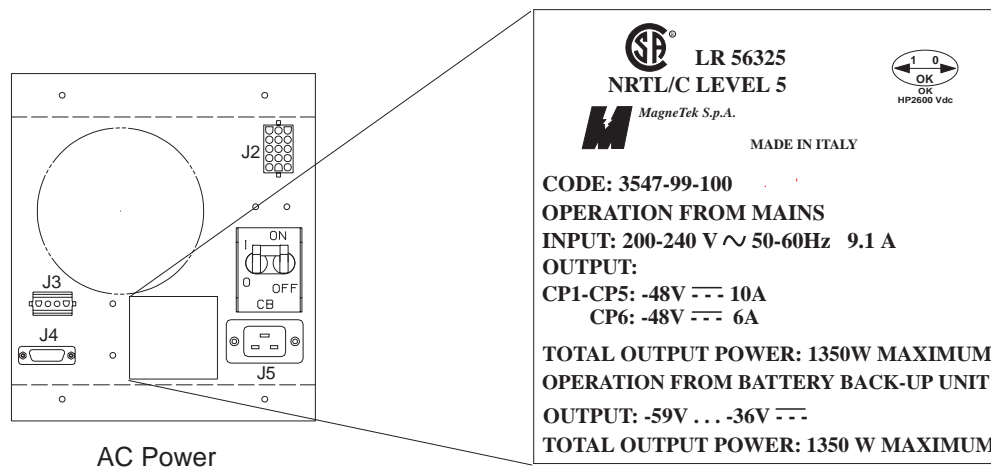


Figure 11-12. ac Power Rating Plate

**Checking the Customer's Primary Power.**

- \_\_\_ 1. Switch or ask the customer to switch the 2220 branch circuit breaker, to be used for the second power, to the **ON** position.
- \_\_\_ 2. Perform the following voltage measurements: (*All voltage values should be less than 1.0 Vac.*)
  - \_\_\_ a. Measure the voltage between the ground pin of the customer's receptacle and the building ground.
  - \_\_\_ b. Measure the voltage between the exterior shell of the customer's receptacle and the building ground.

## Installing and Removing Options

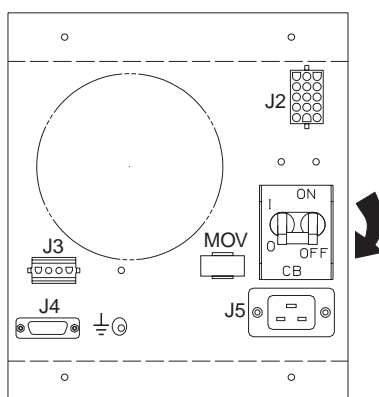
- \_\_\_ c. (World Trade only) Measure the voltage between the neutral of the customer's receptacle (if present) and the building ground.

**For any of the previous measurement, if the voltage is greater than 1.0 Vac, notify the customer and do not proceed until the problem is corrected.**

- \_\_\_ 3. Measure the customer's phase-to-neutral. **If the AC input voltage is not within 180V to 260V, notify the customer and do not proceed until the problem is corrected.**
- \_\_\_ 4. Switch or ask the customer to switch the branch circuit breaker that feeds the 2220 **to the OFF position.**

### Preparing the AC Power Supply.

- \_\_\_ 1. Unpack the AC Power Supply, put the main CB **OFF**



- \_\_\_ 2. At the rear of the AC power supply, remove the 4 screws **K** and the grid.

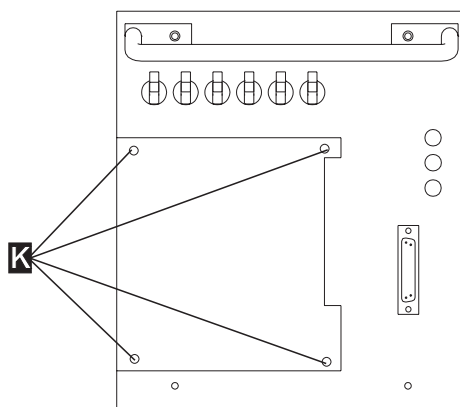
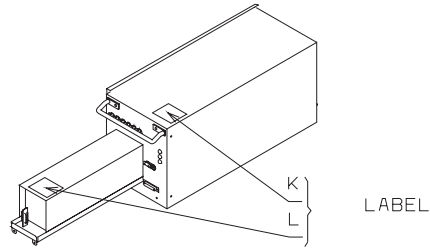


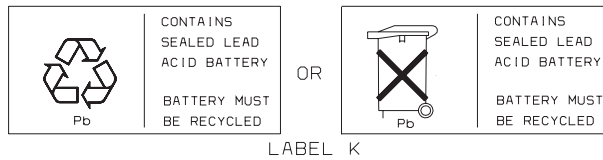
Figure 11-13. AC Power Grid

- \_\_\_ 3. Unpack the battery, stick the label K and L on the power supply and battery according to country

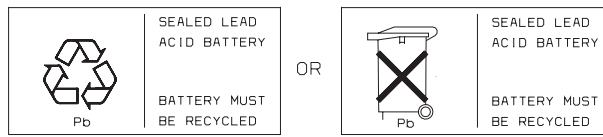


PN 57G7958

PN 57G7959

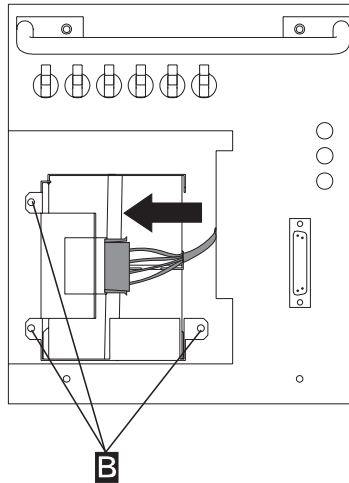


LABEL K



LABEL L

- \_\_\_ 4. Install the battery in the power supply and secure using three screws **B**.
- \_\_\_ 5. Connect the cable connector to the battery

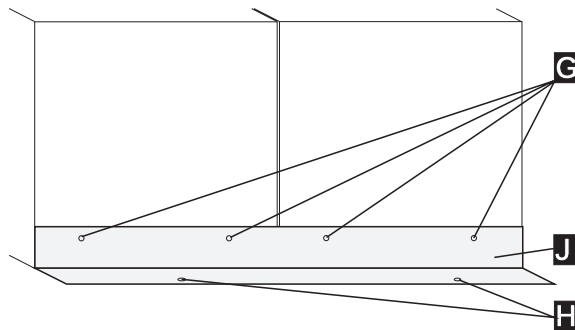


- \_\_\_ 6. Reinstall and secure the grid using the 4 screws **K** (see Figure 11-13 on page 11-76).

**Removing the Cover and Brackets.**

- \_\_\_ 1. At the front of the machine remove the screws **G** and **H** which secure the bracket and remove the bracket **J**.

## Installing and Removing Options



- 2. At the rear of the machine locate the dummy cover **A** installed in location **B**. Refer to Figure 11-14,
- 3. Cut the tie wrap **C** to release cables **D**.
- 4. Remove the four screws **E** and remove cover **A** by the front side of the machine.

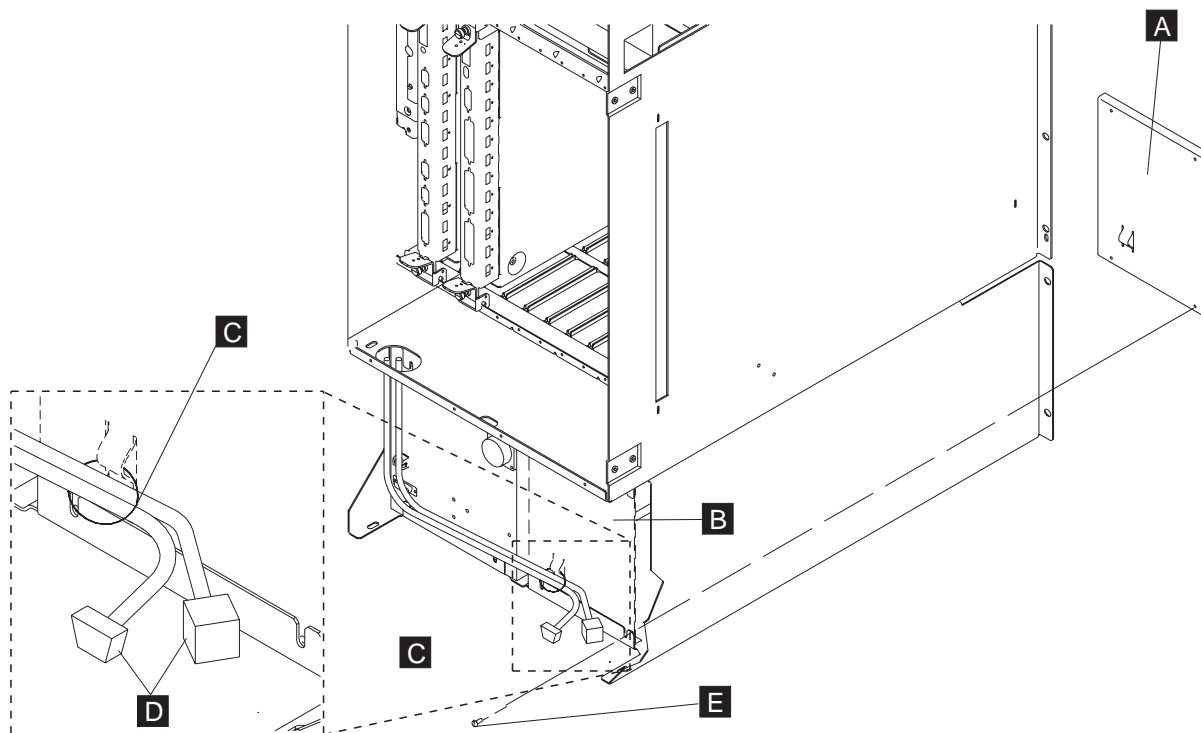


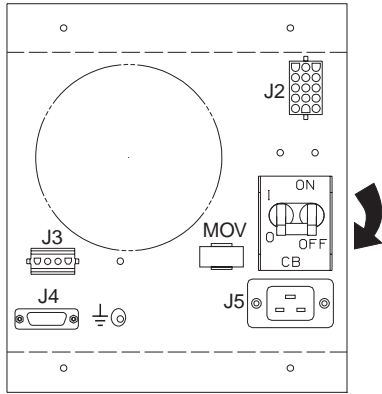
Figure 11-14. Power Location (Rear View)

### Installing the AC Power Supply.

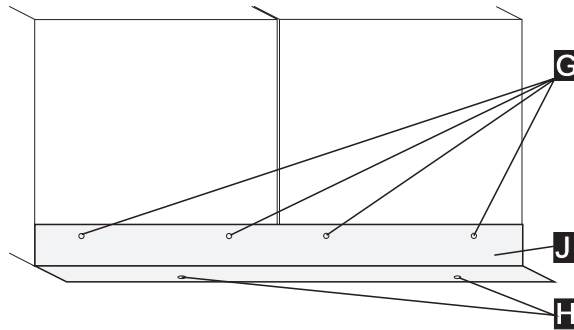
#### Note

Be sure that the ac power supply that you want to install has its CB in OFF position.

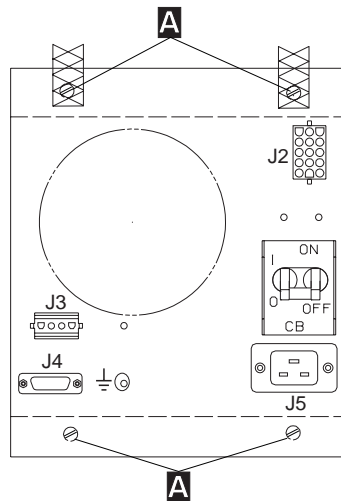




- \_\_\_ 1. Slide from the front of the machine the AC power in its location.
- \_\_\_ 2. Reinstall the bracket **J** and secure it with the two screws previously removed **H**.
- \_\_\_ 3. Secure the AC on the bracket with two screws **G**



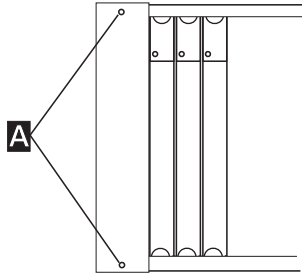
- \_\_\_ 4. At the rear secure the power supply with four screws **A** (with the 2 ground trap on the top).



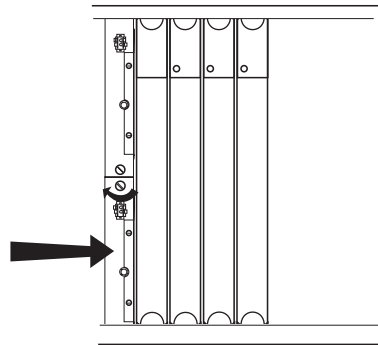
## Installing and Removing Options

### Installing the DCD2 Module.

- \_\_\_ 1. At the rear of the machine loosen the 2 screws **A** which secure the cover, and remove it.
- \_\_\_ 2. Locate the DCD2 that you have to install (see Figure A-13 on page A-13).

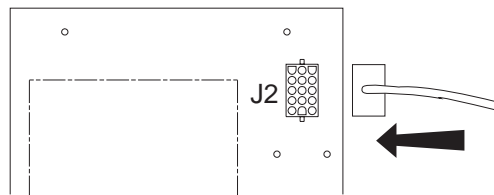


- \_\_\_ 3. Remove the dummy card plugged in the DCD2 location.
- \_\_\_ 4. Insert the DCD2 module and secure it by screwing the knob.



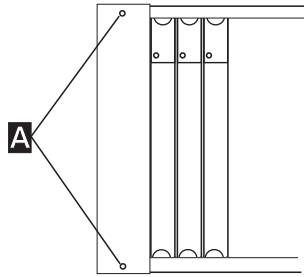
### Routing the DCD2 Cable.

- \_\_\_ 1. Route the cable from the DCD2 to the AC power supply,
- \_\_\_ 2. Plug it to the DCD2 in position J1, and
- \_\_\_ 3. to the AC power supply (connector J2).



### Installing the Cover on the DCD2 Module.

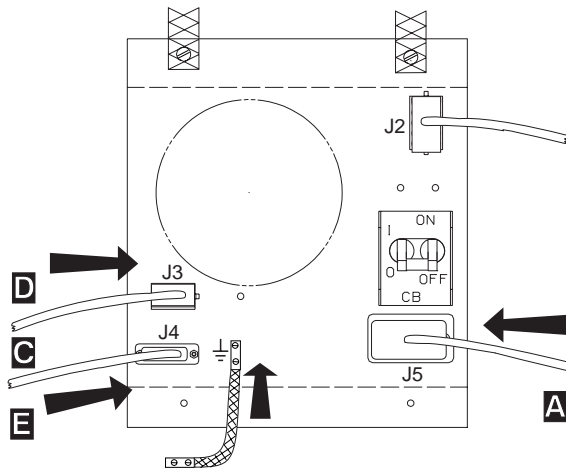
- \_\_\_ 1. Reinstall the cover and secure it using the screws **A** previously removed.



### Connecting the Cables.

**Note:** Cables **C**, **D**, and strap **E** are already installed in the machine and connected to the power supply 1.

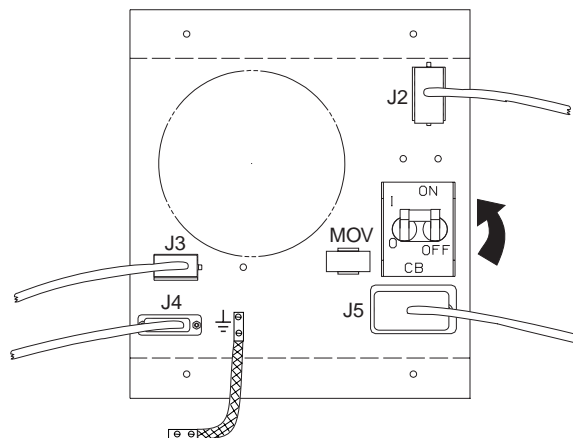
- \_\_\_ 1. Connect the ground strap **E** to the AC power supply.
- \_\_\_ 2. Connect the cables as follows:
  - \_\_\_ a. EPO cable **D** to J3 connector.
  - \_\_\_ b. Signal cable **C** to J4 connector
  - \_\_\_ c. Power cable **A** to AC plug J5 (provided by a concurrent FFB/M)
  - \_\_\_ d. Route and plug this cable **A** to the customer's power socket.



### Powering the New AC Power Supply.

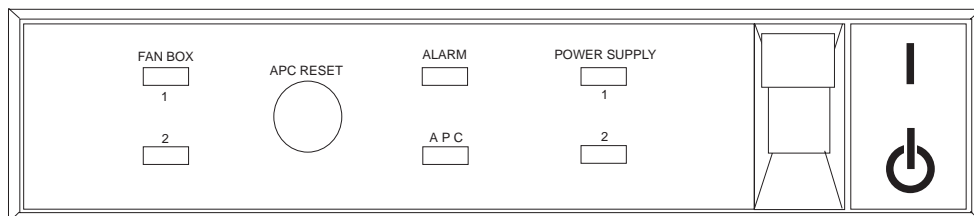
- \_\_\_ 1. At the front of the machine, on the AC that you have installed switch the main CB ON.

## Installing and Removing Options



### Verifying the Resource Status.

- \_\_\_ 1. On the new AC power installed (front), the **Battery Exchange Required** LED (Yellow) must be **OFF**:
  - If not, check the battery connection.
  - If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).
- \_\_\_ 2. On the 2220 control panel, the **Power Supply 2** LED (Green) must be **ON**:
  - If not, check the AC installation.
  - If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).



- \_\_\_ 3. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 4. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 5. Click on **View, Expanded Tree View**, and verify that the **Power 2** icon is Green. If not click on the resource, then click on **status** to obtain details. Check with the customer, if the new configuration is loaded in the 2220 before to go further. If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Go to “After Installation or Removal.” on page 11-112 .**

---

## Removing the Optional AC Power Supply

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all models with the AC power supply 2 feature code 5500.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

Remove AC/DC Power Supply 2.

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.

#### Programming

None.

#### Purpose and Description

##### **Purpose:**

Remove the optional AC power supply

##### **Description:**

This installation instruction gives you the procedures to remove the optional AC power and its associated DCD module.

#### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1455	1.0	0.0	1

#### Tools/Materials Required

None

---

### INSTALLATION

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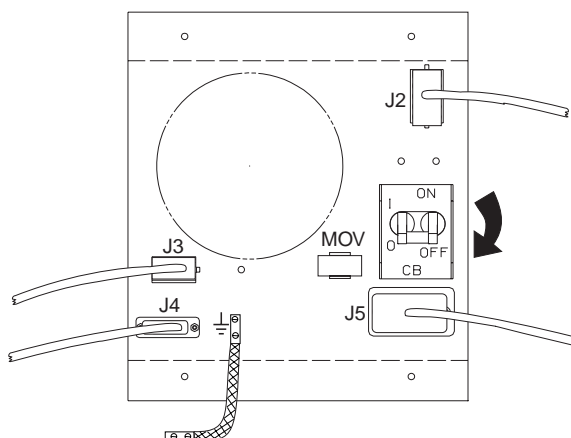
## Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

## Details of Installation

### Powering OFF the AC Power Supply 2.

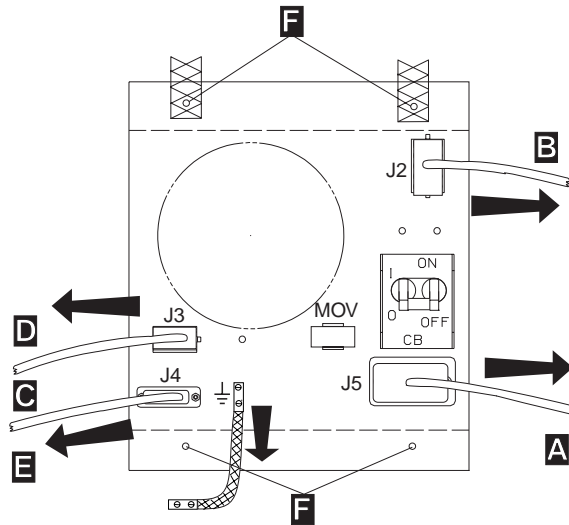
- \_\_\_ 1. Ensure that the basic power supply is **ON**.
- \_\_\_ 2. Locate the customer's circuit breaker which controls the AC power to be removed.
- \_\_\_ 3. Switch off the circuit breaker.
- \_\_\_ 4. On front of the machine, remove the cover on top of the power supply area (see Figure A-1 on page A-2).
- \_\_\_ 5. Locate the optional AC power supply (power input 2) (see Figure A-1 on page A-2).
- \_\_\_ 6. Switch the main CB OFF.



### Disconnecting the Cables.

- \_\_\_ 1. Unplug the AC cable from the customer's plug.
- \_\_\_ 2. At the rear of the machine remove the cables in the following order:
  - \_\_\_ a. AC cable **A** from AC plug
  - \_\_\_ b. DC cable **B** from the J2 connector
  - \_\_\_ c. Signal cable **C** from J4 connector
  - \_\_\_ d. EPO cable **D** from J3 connector
- \_\_\_ 3. Disconnect the ground strap **E** from the AC.

- \_\_\_ 4. Remove the four screws which secure the AC **F**.



**Removing the AC Power Supply 2.**

- \_\_\_ 1. At the front of the machine remove the screws **G** which secure the AC power supply.
- \_\_\_ 2. Remove the screws **H** which secure the bracket and remove the bracket **J**.
- \_\_\_ 3. Pull out the AC power supply.

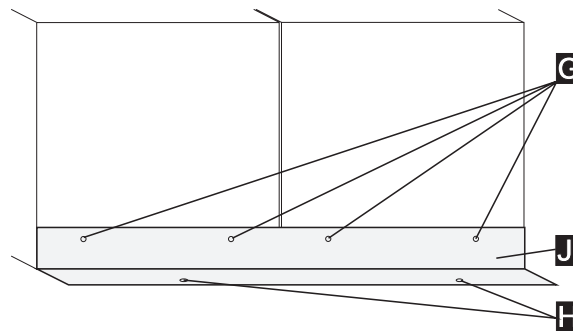


Figure 11-15. Power retention bracket (Front view).

**Installing The Dummy Cover and Bracket.**

- \_\_\_ 1. Refer to Figure 11-16 on page 11-86, at the rear of the machine install dummy cover **A** (80G0633) in location **B** using four screws **E** (PN 4796653).
- \_\_\_ 2. Using tie wrap **C** (PN 1159519) tighten cables **D** to the hook.
- \_\_\_ 3. Refer to Figure 11-15, at the front of the machine using screws **G** and **H** reinstall the bracket **J**.

## Installing and Removing Options

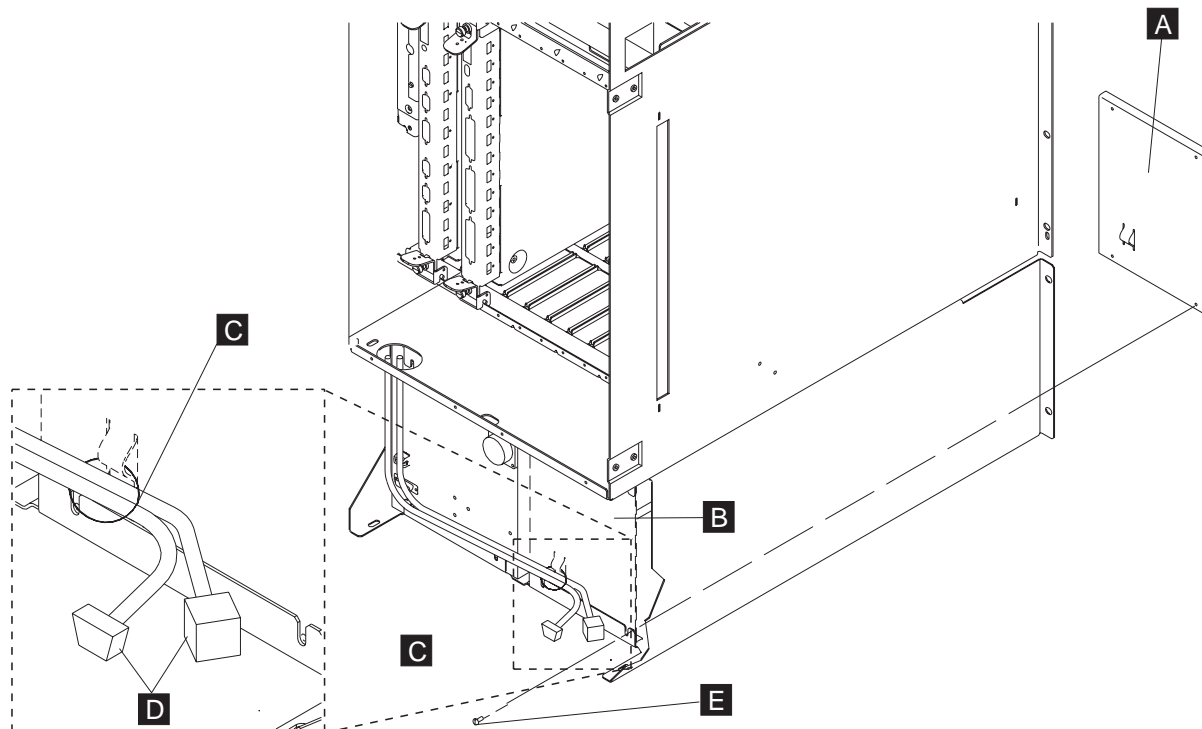
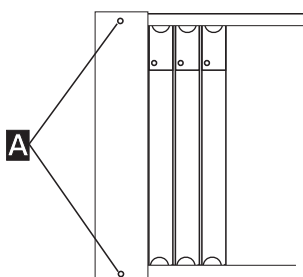


Figure 11-16. Power Location (Rear View)

### Accessing the DCDC2 Module.

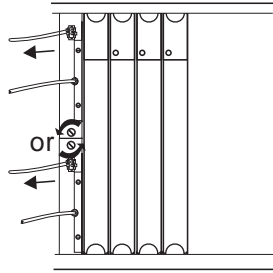
- 1. At the rear of the machine loosen the 2 screws which secure the cover, and remove it.
- 2. Locate the DCD2 (bottom DCD module) that you have to remove (see Figure A-12 on page A-13 and Figure A-13 on page A-13).



### Removing the DCD Module.

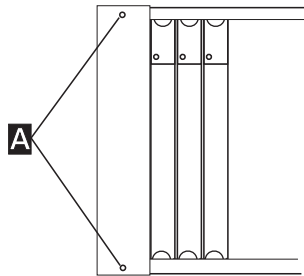
- 1. Unscrew the knob and pull out the DCD2 module and its cable.
- 2. Plug a dummy module (PN 80G0632) into the DCD2 location.





**Installing the DCD Cover.**

- \_\_\_ 1. Reinstall the cover and secure it using the screws **A** previously removed.



Go to “After Installation or Removal.” on page 11-112 .

---

## Installing the Optional DC48 Power Supply

---

### BEFORE INSTALLATION

---

#### Machines Affected

2220 all simplex models.

*This feature should only be applied on the machine serial for which it is specified.*

#### Related BMs and ECs

None

#### BMs to be Installed

FFBM	Feature Code	Feature Name
80G1171	5520	48V DC Power Supply

#### Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.
- \_\_\_ 3. Obtain the Hone plugging sheet (provided by SE) or ask to the customer.
- \_\_\_ 4. Ensure from the customer or the network operator that the new hardware is configured in the **Active Node Configuration**, status should be **Administrative Lock**.

**Note:** Non-installed hardware icon is displayed in "blue" in the **Configuration Tree**.

#### Programming

None.

#### Purpose and Description

##### **Purpose**

Improve the reliability of the machine in case of power failure by providing a second DC power supply.

##### **Description:**

This installation instruction gives you the procedures to install the optional DC power and its associated DCD module.

### Installation Time

BM installed	Machine Hours	System Hours	Nb of CE
80G1171	1.0	0.0	1

### Tools/Materials Required

None

## INSTALLATION

### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Note:** *CEs are not allowed access to the customer's main power receptacle. The customer or a customer-appointed electrician may have to do some of the work involved in the following procedures, and the CE must ensure that all the steps have been completed.*

### Details of Installation

#### DC Power Checking.

1. Locate the power rating plate on the rear side of the dc power supply.
2. Check that the power rating plate data (see Figure 11-17) are consistent with the customer's available DC voltage.

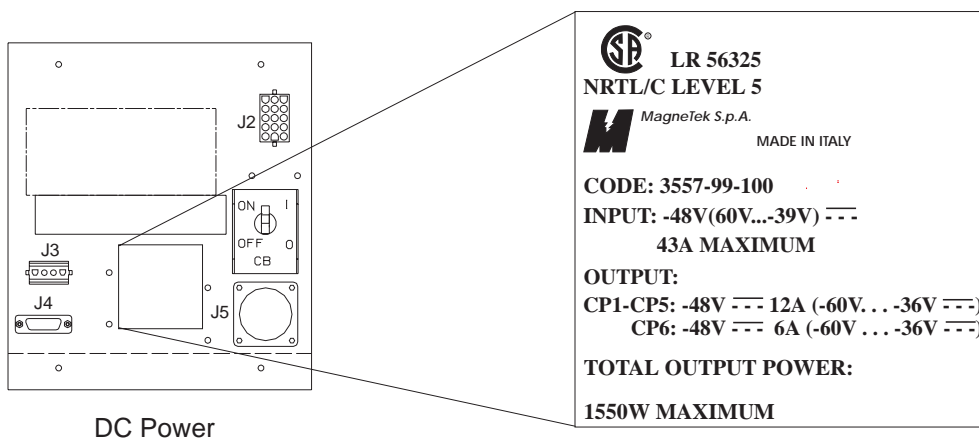


Figure 11-17. dc Power Rating Plate

#### Checking the Customer's Primary Power

##### DC Power Requirements

The system can operate within the following DC voltage range:

- Minimum : -39.0 V.
- Maximum : -60.0 V.

1. Switch or ask the customer to switch the 2220 branch circuit breaker to the **ON** position.
2. Perform the following voltage measurements. *(It is recommended to use high-voltage probes to make these measurements. All voltage values should be less than 1.0 Vac).*

- \_\_\_ a. Measure the voltage between the ground pin of the customer's receptacle and the building ground.
- \_\_\_ b. Measure the voltage between the exterior shell of the customer's receptacle and the building ground.
- \_\_\_ c. (World Trade only) Measure the voltage between the neutral of the customer's receptacle (if present) and the building ground.

**For any of the previous measurement, if the voltage is greater than 1.0 Vac, notify the customer and do not proceed until the problem is corrected.**

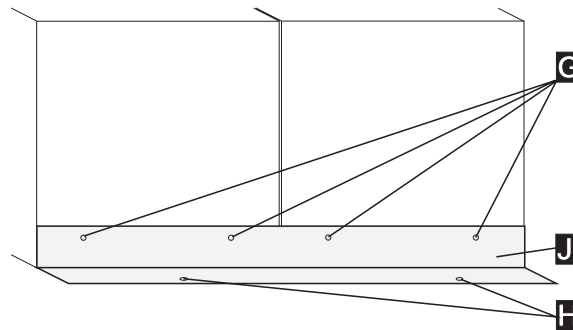
- \_\_\_ 3. Measure the customer's phase-to-neutral.

**If the DC input voltage is not be within -39.0V to -60.0V, notify the customer and do not proceed until the problem is corrected.**

- \_\_\_ 4. Switch or ask the customer to switch the branch circuit breaker that feeds the 2220 to the **OFF** position.

### Removing the Cover and Brackets

- \_\_\_ 1. At the front of the machine remove the screws **G** and **H** which secure the bracket and remove the bracket **J**.



- \_\_\_ 2. At the rear of the machine locate the dummy cover **A** installed in location **B**. Refer to Figure 11-18 on page 11-92.
- \_\_\_ 3. Cut the tie wrap **C** to release cables **D**.
- \_\_\_ 4. Remove the four screws **E** and remove cover **A** by the front side of the machine.

## Installing and Removing Options

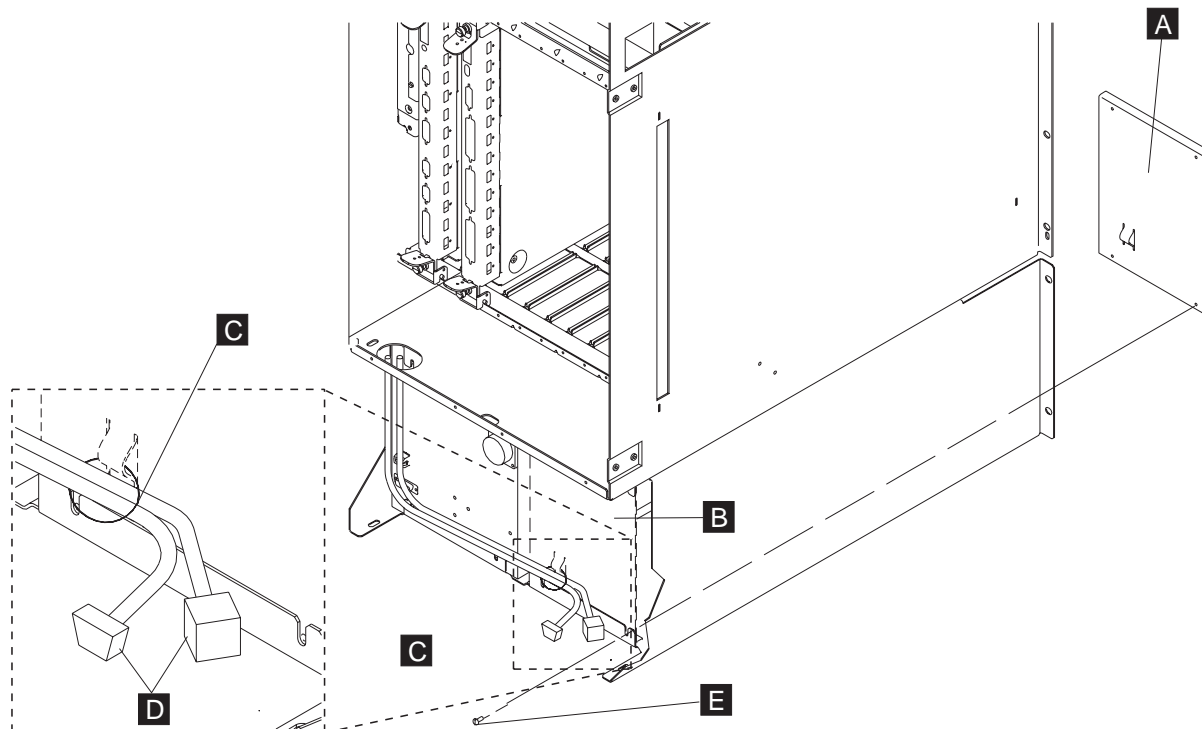
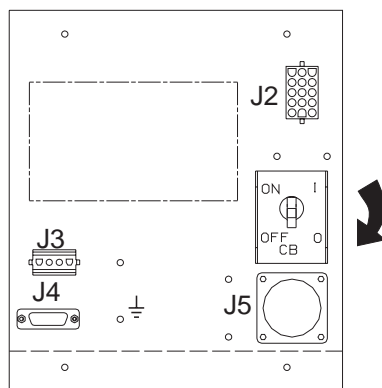


Figure 11-18. Power Location (Rear View)

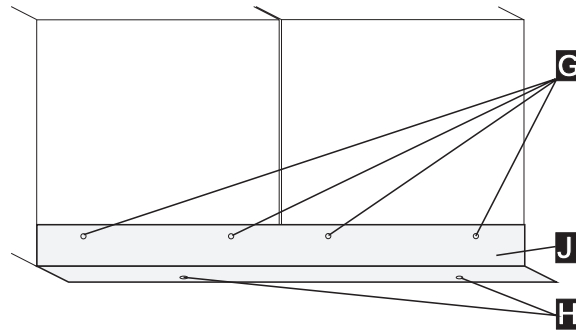
### Installing the DC Power Supply 2

#### Note

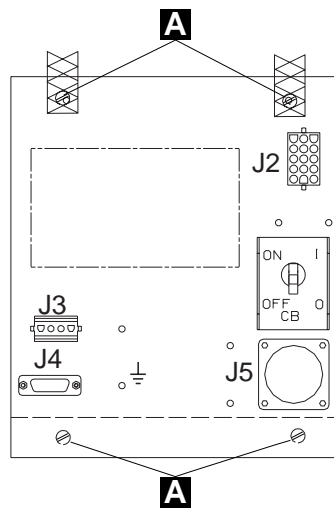
Be sure that the DC48 that you want to install has its CB in OFF position.



- \_\_\_ 1. On the front of the machine insert the DC power supply 2.
- \_\_\_ 2. Reinstall the bracket **J** and secure it with the two screws previously removed **H**.
- \_\_\_ 3. Secure the DC48 on the bracket with two screws **G**

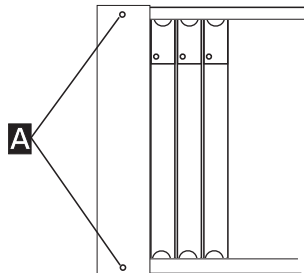


- \_\_\_ 4. At the rear of the machine secure the DC48 using four screws **A** (With the 2 ground traps on top).



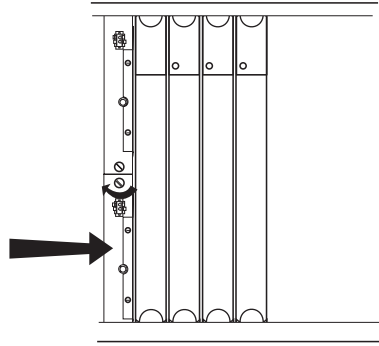
**Installing the DCD2 Module**

- \_\_\_ 1. At the rear of the machine loosen the 2 screws **A** which secure the cover, and remove it.
- \_\_\_ 2. Locate the DCD2 that you have to install (see Figure A-13 on page A-13).

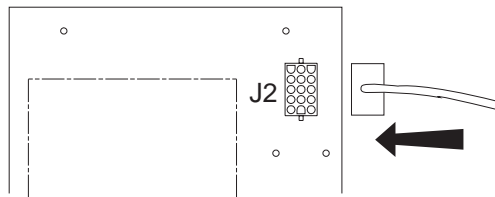


- \_\_\_ 3. Remove the dummy card plugged in the DCD2 location.
- \_\_\_ 4. Insert the DCD2 and secure it by screwing the knob.

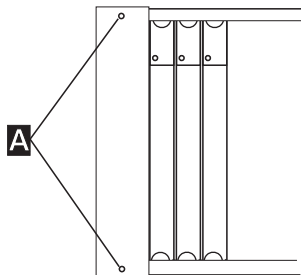
## Installing and Removing Options



- \_\_\_ 5. Route the cable from the DCD2 to the DC power supply
- \_\_\_ 6. Plug the it to the DCD2 module (Connector **J1**), and
- \_\_\_ 7. to the DC power supply (Connector **J2**)



- \_\_\_ 8. Reinstall the cover and secure it using the screws **A** previously removed.



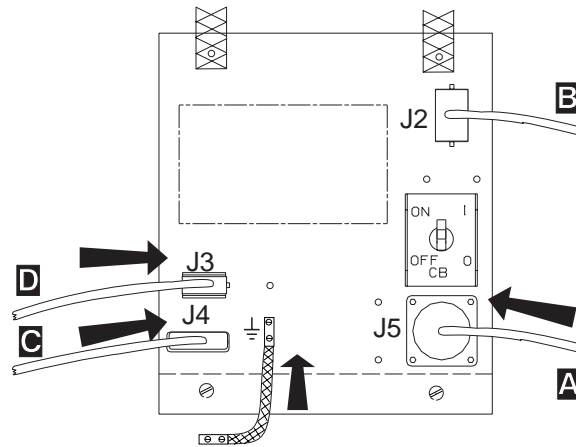
### Connecting the Cables

**Note:** Cables **C**, **D**, and strap **E** are already installed in the machine and connected to the power supply 1.

- \_\_\_ 1. Connect the ground strap **E** to the DC48 power supply
- \_\_\_ 2. Connect the cables as follows:
  - \_\_\_ a. EPO cable **D** to J3 connector
  - \_\_\_ b. Signal cable **C** to J4 connector
  - \_\_\_ c. DC cable **A** to DC plug
- \_\_\_ 3. Route cable **A** to the customer's receptacle.
- \_\_\_ 4. Connect the cable wires as follows:
  - \_\_\_ a. Wire (0) to the (+)
  - \_\_\_ b. Wire (-48v) to the (-)

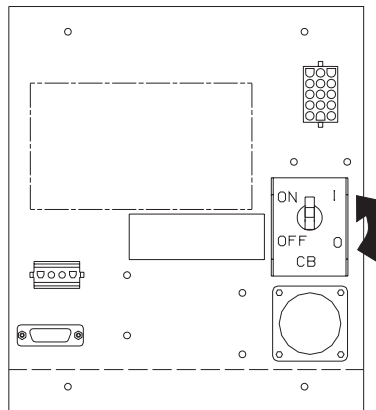


- \_\_\_ c. Green Yellow to the ground
- \_\_\_ 5. Fasten the power cable in place using two tie clamps (PN 1159519).



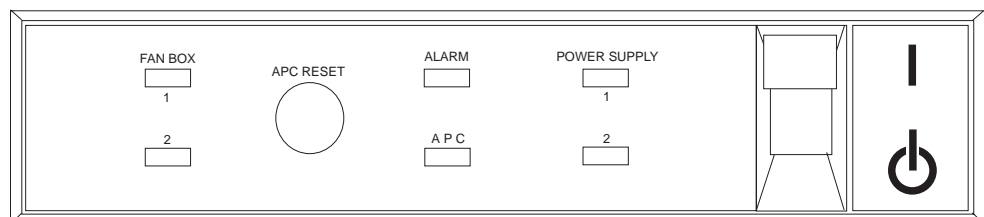
### Powering the DC Power Supply 2

- \_\_\_ 1. At the front of the machine, on the DC48 that you have installed switch the main CB ON.



### Verifying the Resource Status.

- \_\_\_ 1. On the 2220 control panel, the **Power Supply 2** LED (Green) must be **ON**
  - If not, check the DC installation.
  - If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).



## Installing and Removing Options

- \_\_\_ 2. On the Nways Switch administration station, double click on **Nways Switch Services** icon.
- \_\_\_ 3. Double click on **Nways Switch Resource Control** icon.
- \_\_\_ 4. Click on **View, Expanded Tree View**, and verify that the **Power 2** icon is Green. details. Check with the customer, if the new configuration is loaded in the 2220 before to go further. If the problem persists, go to the start page of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Go to “After Installation or Removal.” on page 11-112 .**

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## Removing the optional DC48 Power Supply

---

### **BEFORE INSTALLATION**

---

This installation instruction gives you the procedures to remove the optional DC power and its associated DCD module.

### **Machines Affected**

2220 all models with a DC power supply 2 feature code 5520.

*This feature should only be applied on the machine serial for which it is specified.*

### **Related BMs and ECs**

None

### **BMs to be Installed**

**80G1455** Remove 48V DC Power Supply 2

### **Preparation**

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

### **Programming**

None.

### **Purpose and Description**

#### **Purpose**

Remove the optional dc power supply

#### **Description:**

Remove the dc backup power supply and its DCD module.

### **Installation Time**

BM installed	Machine Hours	System Hours	Nb of CE
80G1455	1.0	0.0	1

### **Tools/Materials Required**

None

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## INSTALLATION

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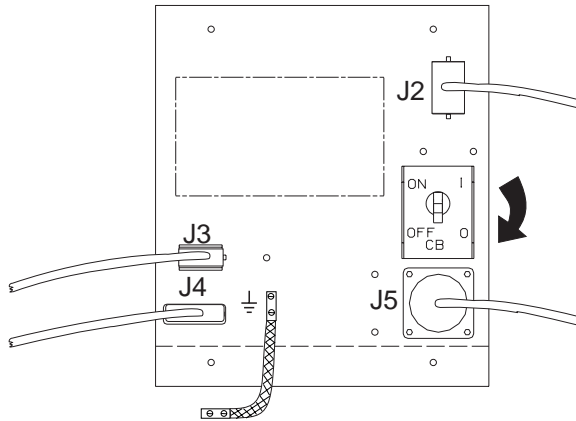
### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

### Details of Installation

#### Switch OFF the DC Power Supply 2

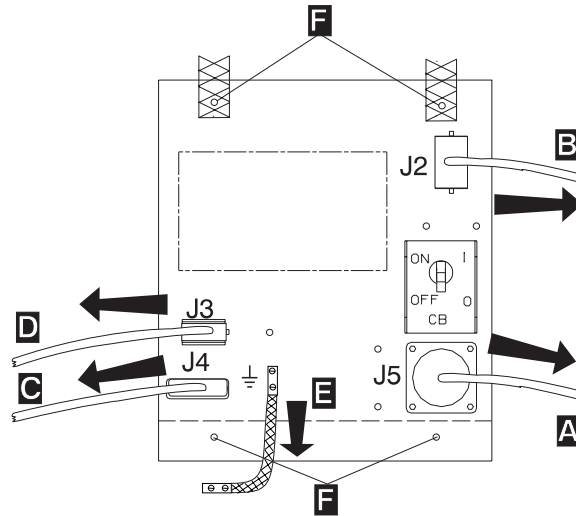
- \_\_\_ 1. Ensure that the basic power supply is **ON**.
- \_\_\_ 2. Locate the customer's circuit breaker which controls the DC power to be removed.
- \_\_\_ 3. Switch OFF the customer's circuit breaker.
- \_\_\_ 4. Disconnect the DC cable from the customer's receptacle.
- \_\_\_ 5. On front of the machine, remove the cover on top of the power supply area (see Figure A-1 on page A-2).
- \_\_\_ 6. Locate the optional DC48 power supply (power input 2) that you have to remove (see Figure A-1 on page A-2)
- \_\_\_ 7. Switch its main CB OFF.



#### Disconnecting the Cables

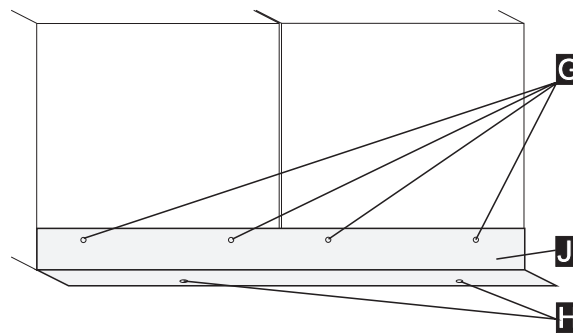
- \_\_\_ 1. At the rear of the machine remove the cables in that order:
  - \_\_\_ a. DC cable **A** from DC plug
  - \_\_\_ b. DC cable **B** from the J2 connector
  - \_\_\_ c. Signal cable **C** from J4 connector
  - \_\_\_ d. EPO cable **D** from J3 connector
- \_\_\_ 2. Disconnect the ground strap from the DCxx **E**.
- \_\_\_ 3. Remove the four screws which secure the DCxx **F**.

**Note:** Leave cables **C**, **D**, and strap **E** in the machine as there are part of cables used to connect the power supply 1.



## Removing the DC Power Supply

1. At the front of the machine remove the screws **G** which secure the DC48 on the bracket.
2. Remove the screws **H** which secure the bracket and remove the bracket **J**.
3. Pull out the DCDC.
4. Reinstall the bracket and secure it with the screws previously removed.



## Installing The Dummy Cover and Bracket

1. Refer to Figure 11-19 on page 11-100, at the rear of the machine install dummy cover **A** (80G0633) in location **B** using four screws **E** (PN 4796653).
2. Using tie wrap **C** (PN 1159519) tighten cables **D** to the hook.
3. Refer to Figure 11-20 on page 11-100, at the front of the machine using two screws **G** and **H** reinstall the bracket **J**.

## Installing and Removing Options

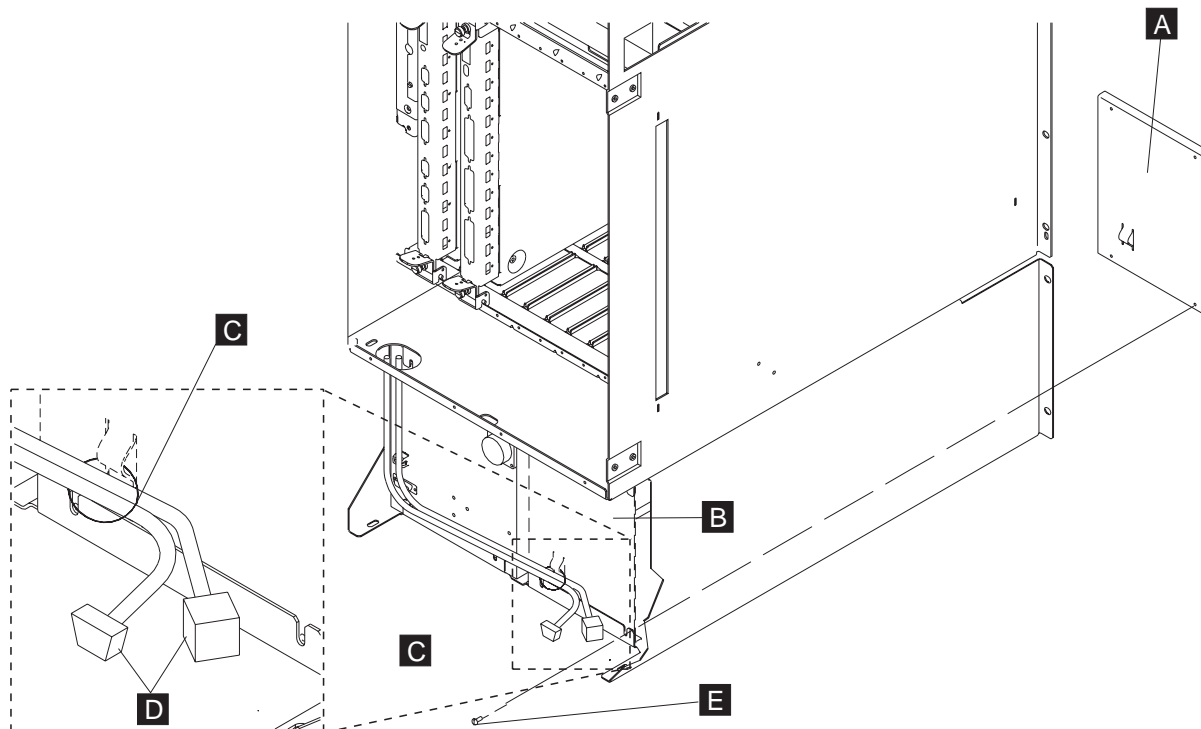


Figure 11-19. Power Location (Rear View)

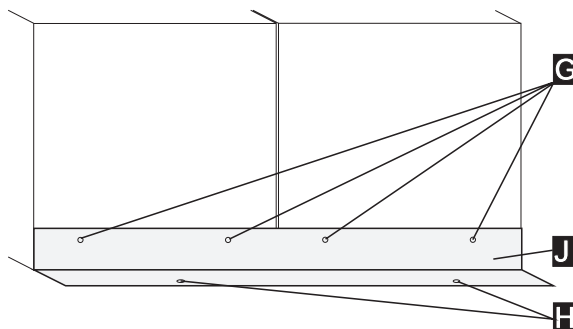
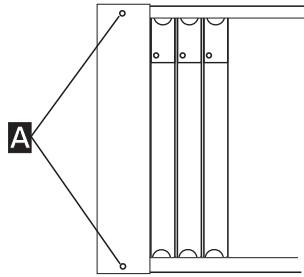


Figure 11-20. Front bracket

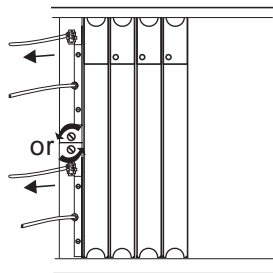
### Removing the DCD cover

- 1. At the rear of the machine loosen the 2 screws **A** which secure the cover, and remove it.
- 2. Locate the DCD2 that you have to remove (see Figure A-12 on page A-13 and Figure A-13 on page A-13).



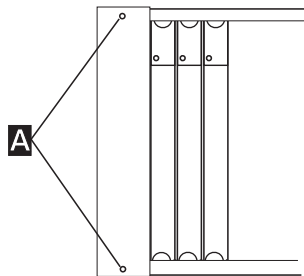
### Removing the DCD2 Module

- \_\_\_ 1. Unscrew the knob and pull out the DCD2 module and its cable.
- \_\_\_ 2. Plug a dummy card (PN 80G0632) into the DCD2 location.



### Reinstalling the DCD Cover

- \_\_\_ 1. Reinstall the cover and secure it using the screws **A** previously removed.



Go to “After Installation or Removal.” on page 11-112 .

---

### Installing / Removing External Cables

---

#### *BEFORE INSTALLATION*

---

#### **Machines Affected**

2220 all models.

#### **Related BMs and ECs**

None

#### **BMs to be Installed**

Refer to tables in the following pages.

<b>FFBM</b>	<b>Feature Code</b>	<b>Feature Name</b>
80G4362	5040	V24 ARC to DCE 0.6m
80G4363	5041	V24 ARC to DCE 1.2m
80G4364	5042	V24 ARC to DCE 5m
80G4365	5043	V24 ARC to DCE 12m
80G4366	5044	V24 ARC to DTE 15m
80G4367	5050	V35 ARC to DCE 0.6m
80G4368	5051	V35 ARC to DCE 1.2m
80G4369	5052	V35 ARC to DCE 5m
80G4370	5053	V35 ARC to DCE 15m
80G4371	5055	V35 ARC to DTE 15m
80G4372	5070	X21 ARC to DCE 0.6m
80G4373	5071	X21 ARC to DCE 1.2m
80G4374	5072	X21 ARC to DCE 5m
80G4375	5073	X21 ARC to DCE 15m
80G4376	5075	X21 ARC to DTE 15m
80G4377	5076	X21 ARC to Transfix DCE 5m (France only)
80G4378	5077	X21 ARC to Transfix DCE 15m (France only)
80G1100	5210	LIC512/522 (V35) to DTE Cable 15 m.
80G4839	5210	LIC512/522 (V35) to DTE Cable 15 m (US & Canada)
80G1101	5211	LIC512/522 (V35) to DTE Cable 30 m.
80G4840	5211	LIC512/522 (V35) to DTE Cable 30 m (US & Canada).
80G1102	5212	LIC512/522 (V35) to DTE Cable 70 m.
80G4841	5212	LIC512/522 (V35) to DTE Cable 70 m (US & Canada).
80G1103	5213	LIC512/522 (V35) to DTE Cable 100 m.
80G4842	5213	LIC512/522 (V35) to DTE Cable 100 m (US & Canada).
80G1104	5214	LIC512/522 (V35) to DCE Cable 15 m.
80G4836	5214	LIC512/522 (V35) to DCE Cable 15 m (US & Canada).



FFBM	Feature Code	Feature Name
80G1105	5215	LIC512/522 (V35) to DCE Cable 30 m.
80G4837	5215	LIC512/522 (V35) to DCE Cable 30 m (US & Canada).
80G1106	5216	LIC512/522 (X21) to DTE Cable 10 m.
80G1107	5217	LIC512/522 (X21) to DCE Cable 10 m.
80G1108	5218	LIC512/522 (X21 Transfix) to DCE Cable 10 m.
80G1110	5220	LIC512/522 (X21) to DTE Cable 30 m.
80G1111	5221	LIC512/522 (X21) to DTE Cable 70 m.
80G1112	5222	LIC512/522 (X21) to DTE Cable 100 m.
80G1114	5224	LIC512/522 (X21) to DCE Cable 30 m.
80G1115	5225	LIC512 (V35) to DTE Cable 2 m.
80G4838	5225	LIC512 (V35) to DTE Cable 2 m (US & Canada).
80G1116	5226	LIC512 (V35) to DCE Cable 2 m.
80G4835	5226	LIC512 (V35) to DCE Cable 2 m (US & Canada).
80G1117	5227	LIC512/522 (X21) to DTE Cable 2 m.
80G1118	5228	LIC512/522 (X21) to DCE Cable 2 m.
80G1119	5229	LIC512/522 (X21 Tranfix) to DCE Cable 2 m.
80G1120	5241	LIC514 (RJ-48 T1) Cable 15 m (Japan excepted).
80G1121	5242	LIC514 (RJ-48 T1) Cable 30 m (Japan excepted).
80G1191	5243	LIC514 (DB15) Cable 15 m.
80G1192	5244	LIC514 (DB15) Cable 30 m.
80G4446	5245	LIC514 (RJ-48 J1) Cable 15 m (Japan only).
80G4447	5246	LIC514 (RJ-48 J1) Cable 30 m (Japan only).
80G1122	5250	LIC513/515/523/553 (BNC75 T3) Cable 15 m.
80G1123	5251	LIC513/515/523/553 (BNC75 T3) Cable 30 m.
80G1124	5252	LIC513/515/523/553 (BNC75 T3) Cable 70 m.
80G1125	5253	LIC513/515/523/553 (BNC75 T3) Cable 100 m.
80G1126	5254	LIC513/515/523/553 (BNC75 T3) Cable 122 m.
80G1127	5260	LIC516 (DB15 ISO) Cable 15 m.
80G1128	5261	LIC516 (DB15 ISO) Cable 30 m.
80G1129	5262	LIC516 (DB15 ISO) Cable 70 m.
80G1130	5263	LIC516 (DB15 ISO) Cable 100 m.
80G1131	5264	LIC516 (DB15 ISO) Cable 122 m.
80G1132	5280	LIC530 (HSSI) to DTE Cable 2 m.
80G1135	5281	LIC530 (HSSI) to DTE Cable 15 m.
80G1134	5282	LIC530 (HSSI) to DCE Cable 2 m.
80G1133	5283	LIC530 (HSSI) to DCE Cable 15 m.
80G1136	5290	LIC513/523 (Redundant Trunk) Cable 15 m.
80G1137	5291	LIC513/523 (Redundant Trunk) Cable 30 m.
80G1138	5292	LIC513/523 (Redundant Trunk) Cable 70 m.

## Installing and Removing Options

FFBM	Feature Code	Feature Name
80G1139	5293	LIC513/523 (Redundant Trunk) Cable 100 m.
80G1140	5294	LIC513/523 (Redundant Trunk) Cable 122 m.
80G1142	5370	2220 to Risc System/6000 Cable.
80G1183	5270	LIC522 (V36) to DTE Cable 2 m.
80G1184	5271	LIC522 (V36) to DTE Cable 15 m.
80G1185	5272	LIC522 (V36) to DTE Cable 30 m.
80G1186	5273	LIC522 (V36) to DTE Cable 70 m.
80G1187	5274	LIC522 (V36) to DTE Cable 100 m.
80G1188	5275	LIC522 (V36) to DCE Cable 2 m.
80G1189	5276	LIC522 (V36) to DCE Cable 15 m.
80G1190	5277	LIC522 (V36) to DCE Cable 30 m.
80G1191	5243	LIC514 Cable 15 m.
80G1192	5244	LIC514 Cable 30 m.
80G1193	5706	LIC530 (HSSI) to DTE/DCE Cable 15 m.
80G4391	5710	LIC556 (Optical Interface Multiple Mode Duplex) Cable 10 m.
80G4392	5715	LIC556 (Optical Interface Multiple Mode Duplex) Cable 40 m.
80G4393	5720	LIC554/555 (Optical Interface Single Mode FCPC) Cable 10 m.
80G4394	5725	LIC554/555 (Optical Interface Single Mode FCPC) Cable 40 m.
80G1195	5375	2220 to Risc System/6000 Plenum Cable (US Only).
80G1196	6821	LIC511 to LCBB Plenum Cable 7 m (US Only).
80G1197	6822	LIC511 to LCBB Plenum Cable 15 m (US Only).
80G1198	6823	LIC511 to LCBB Plenum Cable 35 m (US Only).
80G1199	6824	LIC511 to LCBB Plenum Cable 70 m (US Only).
80G1347	6825	LIC511 to LCBB Plenum Cable 100 m (US Only).
80G1348	6830	LIC512/522 (V35) to DTE Plenum Cable 15 m (US only).
80G1349	6831	LIC512/522 (V35) to DTE Plenum Cable 30 m (US only).
80G1350	6832	LIC512/522 (V35) to DTE Plenum Cable 70 m (US only).
80G1351	6833	LIC512/522 (V35) to DTE Plenum Cable 100 m (US only).
80G1352	6834	LIC512/522 (V35) to DCE Plenum Cable 15 m (US only).
80G1353	6835	LIC512/522 (V35) to DCE Plenum Cable 30 m (US only).
80G1360	6850	LIC522 (V36) to DTE Plenum Cable 15 m (US only).
80G1361	6851	LIC522 (V36) to DTE Plenum Cable 30 m (US only).
80G1362	6852	LIC522 (V36) to DTE Plenum Cable 70 m (US only).
80G1363	6853	LIC522 (V36) to DTE Plenum Cable 100 m (US only).
80G1364	6854	LIC522 (V36) to DCE Plenum Cable 15 m (US only).
80G1365	6855	LIC522 (V36) to DCE Plenum Cable 30 m (US only).
80G1390	6860	LIC512/522 (X21) to DTE Plenum Cable 10 m (US only).
80G1366	6861	LIC512/522 (X21) to DCE Plenum Cable 10 m (US only).
80G1368	6863	LIC512/522 (X21) to DTE Plenum Cable 30 m (US only).

FFBM	Feature Code	Feature Name
80G1369	6864	LIC512/522 (X21) to DTE Plenum Cable 70 m (US only).
80G1370	6865	LIC512/522 (X21) to DTE Plenum Cable 100 m (US only).
80G1372	6867	LIC512/522 (X21) to DCE Plenum Cable 30 m (US only).
80G1373	6870	LIC530 (HSSI) to DTE Plenum Cable 15 m (US only).
80G1374	6871	LIC530 (HSSI) to DCE Plenum Cable 15 m (US only).
80G1375	6872	LIC530 (HSSI) to DTE/DCE Plenum Cable 15 m (US only).
80G1376	6875	LIC513/515/523/553 (BNC75 T3) Plenum Cable 15 m (US only).
80G1377	6876	LIC513/515/523/553 (BNC75 T3) Plenum Cable 30 m (US only).
80G1378	6877	LIC513/515/523/553 (BNC75 T3) Plenum Cable 70 m (US only).
80G1379	6878	LIC513/515/523/553 (BNC75 T3) Plenum Cable 100 m (US only).
80G1380	6879	LIC513/515/523/553 (BNC75 T3) Plenum Cable 122 m (US only).
80G1381	6880	LIC513/523 (Redundant Trunk) Plenum Cable 15 m (US only).
80G1382	6881	LIC513/523 (Redundant Trunk) Plenum Cable 30 m (US only).
80G1383	6882	LIC513/523 (Redundant Trunk) Plenum Cable 70 m (US only).
80G1384	6883	LIC513/523 (Redundant Trunk) Plenum Cable 100 m (US only).
80G1445	6884	LIC513/523 (Redundant Trunk) Plenum Cable 122 m (US only).
80G1386	6890	LIC514 (RJ-48 T1) Plenum Cable 15 m (US only).
80G1387	6891	LIC514 (RJ-48 T1) Plenum Cable 30 m (US only).
80G1388	6892	LIC514 (DSX-1) Plenum Cable 15 m (US only).
80G1389	6893	LIC514 (DSX-1) Plenum Cable 30 m (US only).
80G1412	5620	LIC511 to LCBB Cable 1 m.
80G1413	5621	LIC511 to LCBB Cable 7 m.
80G1414	5622	LIC511 to LCBB Cable 15 m.
80G1415	5623	LIC511 to LCBB Cable 35 m.
80G1416	5624	LIC511 to LCBB Cable 70 m.
80G1417	5625	LIC511 to LCBB Cable 105 m.
80G1164	-	Adapter V35 DTE Cable (France only)
80G1169	-	Adapter V35 DCE Cable (France only)
80G2863	-	To remove any of the above feature.

## Preparation

- \_\_\_ 1. Familiarize yourself with the purpose and details of these installation instructions before negotiating machine time with the customer.
- \_\_\_ 2. Check all the items and count the parts listed on the B/M(s) to be installed to determine whether all the parts were received.

## Installing and Removing Options

### Programming

None.

### Purpose and Description

#### Purpose

Install or remove external cables

#### Description:

Install or remove external cables

### Installation Time

BM installed:	Machine Hours	System Hours	Nb of CE
See above table.	0.1	0.0	1

### Tools/Materials Required

None

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## INSTALLATION

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### Safety

Review the **Safety Notices** and the **Safety Inspection Procedures** located at the beginning of the *2220 Nways BroadBand Switch Service Guide*, SY33-2121 (P/N 02L4247).

**Note:** If you are not familiar with the system component location, see “Component Location” on page A-6.

### Details of Installation

#### Selecting the External Cable Installation.

Depending on the cable to be installed or removed go to:

- “Installing the Cables From LIC 511-to-LCBB.” for LIC 511 cables.
- “Installing the Cables From the ARC to the DTE/DCE.” on page 11-108, for ARC cables.
- “Installing Cables for LIC 512.” on page 11-110, for LIC 512 cables.
- “Installing Cables for LIC 522.” on page 11-110, for LIC 522 cables.
- “Installing Cables for LIC 513, 514, 515, 516, and 523.” on page 11-110, for LIC 513, 514, 515, 516 , or 523 cables.
- “Installing Cables for LIC 530.” on page 11-111, for LIC 530 cables.
- “Installing the RISC System/6000 Cables.” on page 11-111, for RISC System/6000 cables.

#### Installing the Cables From LIC 511-to-LCBB.

Install the LIC 511-to-LCBB cables (see cable **2** in Figure 11-21 on page 11-108) as follows:

- \_\_\_ 1. **Obtain** (from the shipping group) the low/medium speed line attachment cable ordered by the customer, see the following tables and go to step 2.
- \_\_\_ 2. Using two labels PN 80G0743, **identify** the cable by recording the following information:
  - \_\_\_ a. The **2220 name**.
  - \_\_\_ b. The **LCB number/location** (up to 25 characters).
  - \_\_\_ c. The **LIC 511 connector location**.
- \_\_\_ 3. **Stick** the labels **4** on the two leads of the cable at about 220 mm (9 in.) from the edges.
- \_\_\_ 4. **Connect** the cable **2** from the LCBB connector **6** to the LIC 511 connector according to the Hone sheet (see “Module, LIC, and Cable Locations” on page C-2).

**Note:** For the LIC 511 location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13.

## Installing and Removing Options

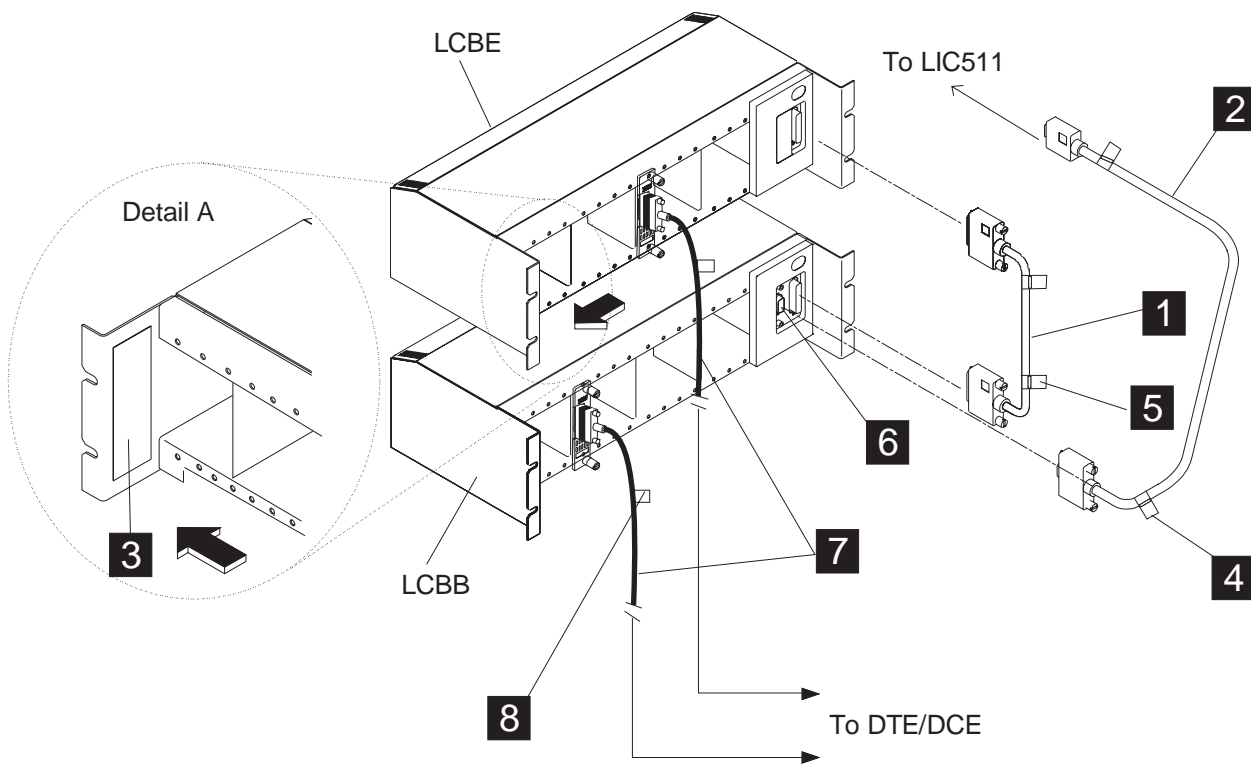


Figure 11-21. Cables Installation and Labelling

Go to “After Installation or Removal.” on page 11-112.

### Installing the Cables From the ARC to the DTE/DCE.

According to the Hone sheet (see “ARC and Cable Locations” on page C-4), install the ARC/cables

#### Identifying the ARC Cable.

- \_\_\_ 1. Identify the ARC cable, using two labels PN 80G0745, by recording the following information:
  - \_\_\_ a. The **2220 name**.
  - \_\_\_ b. The **LCB number/location** (up to 25 characters).
  - \_\_\_ c. The **LIC 511 connector location**.
  - \_\_\_ d. The **ARC position** (+0 to +14 or +16 to +30).
  - \_\_\_ e. The **symbolic line name** (up to eight characters)
- \_\_\_ 2. **Stick** the labels on the two leads of the cable at about 220 mm (9 in.) from the edges.

#### Connecting the cable to the ARC.

- \_\_\_ 1. Plug the cable to the ARC, and
- \_\_\_ 2. Tighten the screws **G**.

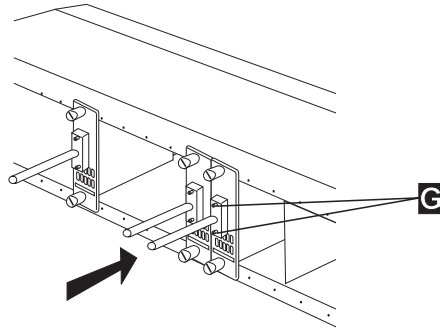


Figure 11-22. ARC Cable Connection

**Connecting to the DCE or DTE.**

**Go To**

- If you are connecting a **ARC V35** to a **French modem**, go to step 1.
- If you are connecting a **ARC V35** to a **French terminal**, go to step 5.
- Otherwise, go to step 9 on page 11-110.

- \_\_\_ 1. Plug the ARC Cable into the **connector 1** of the adapter cable (PN 1749352), then
- \_\_\_ 2. Tighten the screws.
- \_\_\_ 3. Plug **connector 2** to the **modem**.



Figure 11-23. Adapter Cable for ARC V35 DCE (PN 58G5965)

- \_\_\_ 4. Go to step "Verifying the Resource Status." on page 11-4
- \_\_\_ 5. Plug the ARC Cable into the **connector 1** of the adapter cable (PN 65X9899), then
- \_\_\_ 6. Tighten the screws.
- \_\_\_ 7. Plug **connector 2** to the **terminal**.

## Installing and Removing Options

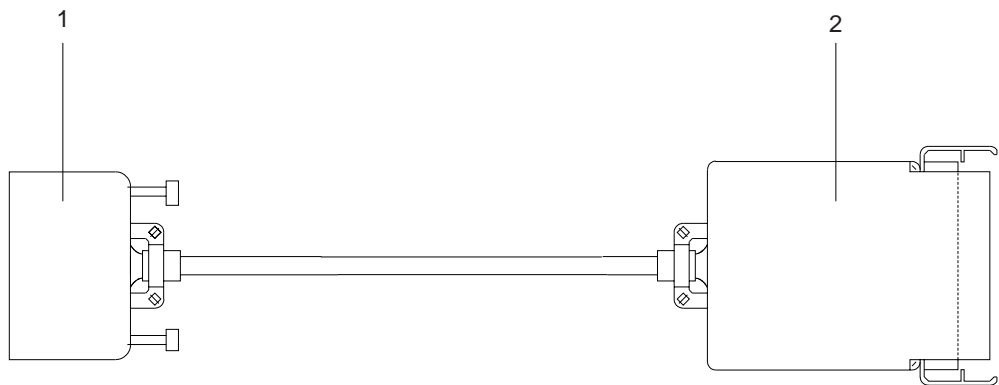


Figure 11-24. Adapter Cable for ARC V35 DTE (PN 58G5998)

- \_\_\_ 8. Go to step “Verifying the Resource Status.” on page 11-4
- \_\_\_ 9. Plug the end of the ARC cable into the DTE or DCE
- \_\_\_ 10. Tighten the screws.

**Go to "End of instruction".**

### Installing Cables for LIC 512.

According to the Hone sheet received (see “Module, LIC, and Cable Locations” on page C-2):

- \_\_\_ 1. **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages, then go to step 2.
- \_\_\_ 2. **Connect** the cables to the LIC 512 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
- \_\_\_ 3. **Connect** the other end of the cable to the DCE or DTE, depending on the cable type.

**Go to “After Installation or Removal.” on page 11-112.**

### Installing Cables for LIC 522.

According to the Hone sheet received (see “Module, LIC, and Cable Locations” on page C-2):

- \_\_\_ 1. **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages, then go to step 2.
- \_\_\_ 2. **Connect** the cables to the LIC 522 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
- \_\_\_ 3. **Connect** the other end of the cable to the DCE or DTE, depending on the cable type.

**Go to “After Installation or Removal.” on page 11-112.**

### Installing Cables for LIC 513, 514, 515, 516, and 523.

According to the Hone sheet received (see “Module, LIC, and Cable Locations” on page C-2).

- \_\_\_ 1. **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2 on page 11-111.



- \_\_\_ 2. **Connect** the cables to the LIC 51X (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
- \_\_\_ 3. **Connect** the other end of the cable to the DCE or DTE, depending on the cable type (refer to the previous tables).

**Go to “After Installation or Removal.” on page 11-112.**

**Installing Cables for LIC 530.**

According to the Hone sheet received (see “Module, LIC, and Cable Locations” on page C-2).

- \_\_\_ 1. **Obtain** (from the 2220 shipping group) the LIC cables ordered by the customer, see tables in the following pages then go to step 2.
- \_\_\_ 2. **Connect** the cables to the LIC 530 (for location, refer to Figure A-12 on page A-13 and Figure A-13 on page A-13).
- \_\_\_ 3. **Connect** the other end of the cable to the DCE or DTE, depending on the cable type (refer to the previous tables).

**Go to “After Installation or Removal.” on page 11-112.**

**Installing the RISC System/6000 Cables.**

The 2220-300 or 2220-500 is connected to the network management station using one of the two cable type:

- **10 base T, twisted pair**
- **or 10 base 2, coax**

**Note:** These cables can be standard or plenum (see tables below).

- \_\_\_ 1. Obtain the cable shipped the MES.
- \_\_\_ 2. Connect as follows:
  - **10 base T, twisted pair cable** Plug this cable from the RISC System/6000 to connector J1 of the tailgate.

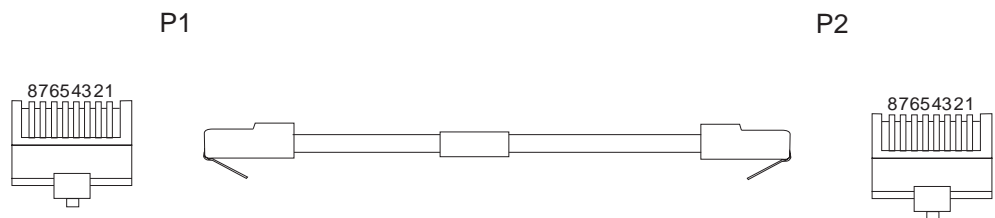


Figure 11-25. 10BaseT Cable

- **10 base 2, coax cable.** In that case, remove the terminator installed on J2 or J3 of the APC tailgate and then plug this cable from the RISC System/6000 to connector J2 or J3.

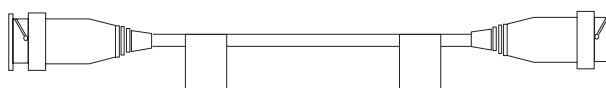


Figure 11-26. 10Base2 Cable

**Go to “After Installation or Removal.” on page 11-112.**

### After Installation or Removal.

#### Field Updating

None.

#### Publications Update

None.

#### Parts Disposition

- **Purchased Machines:** Refer to the parts ownership matrix to determine the correct owner of removed/unused parts. All parts determined to be the property of IBM should be processed as stated in the rental machine directions below.
  - For EMEA/APG/AG Areas, refer to *Hardware and General Service Code Description*
  - For Domestic Areas, return parts to the customer.
- **Rental Machines:** Provide all parts to the IBM branch office for potential return in accordance with existing return, recovery, and reclamation programs.

#### Machine Records

- Install the new **MACHINE HISTORY** supplied.
- Report installation and quality to existing procedures.

---

## Appendix A. Locations

2220-300 and 2220-500 Locations (Front View) in 37 U Rack . . . . .	A-2
2220-300 and 2220-500 Locations (Rear View) in 37 U Rack . . . . .	A-3
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## 2220-300 and 2220-500 Locations (Front View) in 37 U Rack

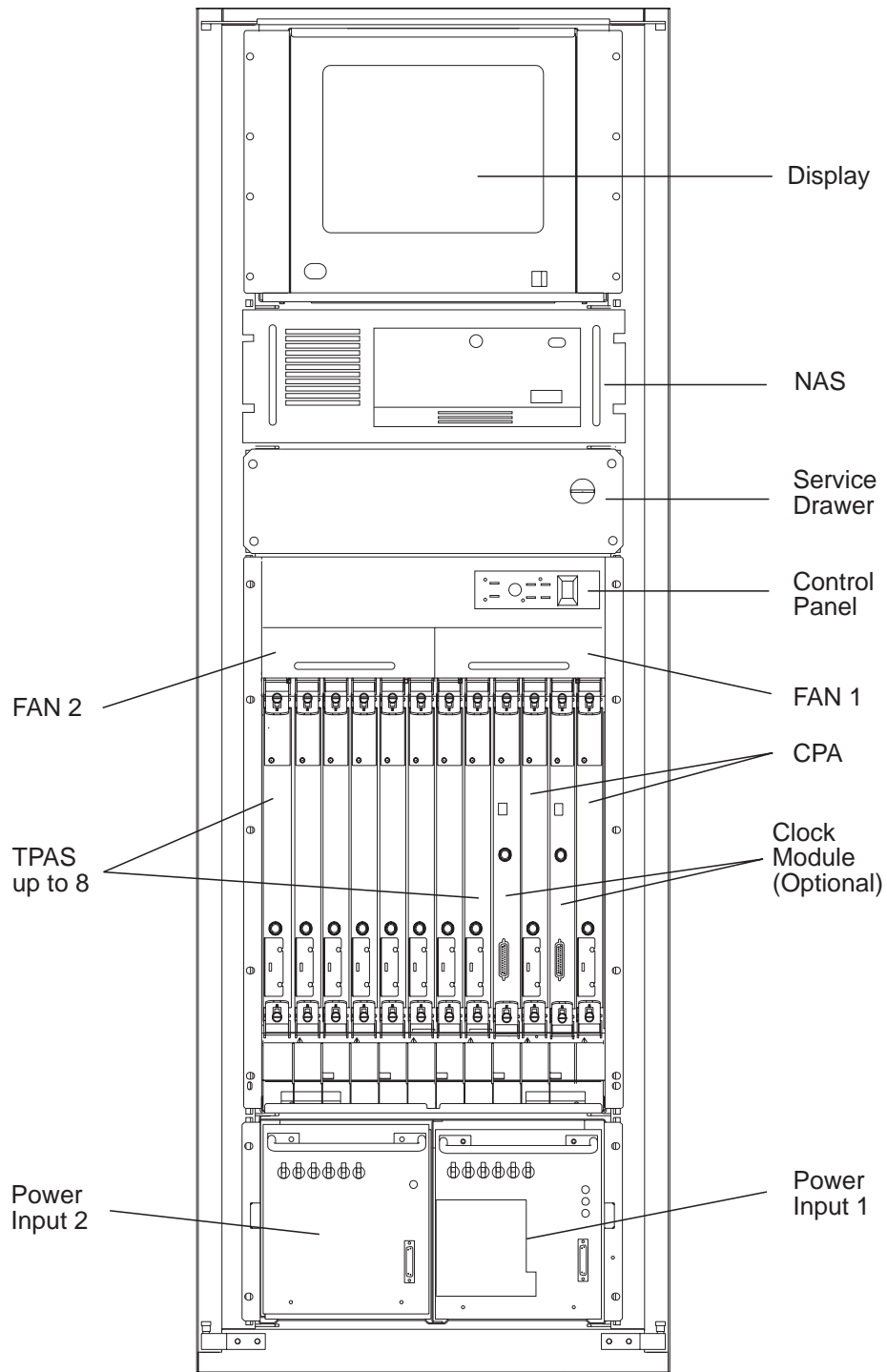


Figure A-1. 2220-300 and 2220-500 Front View (Adapter Side) in 37 U Rack

## 2220-300 and 2220-500 Locations (Rear View) in 37 U Rack

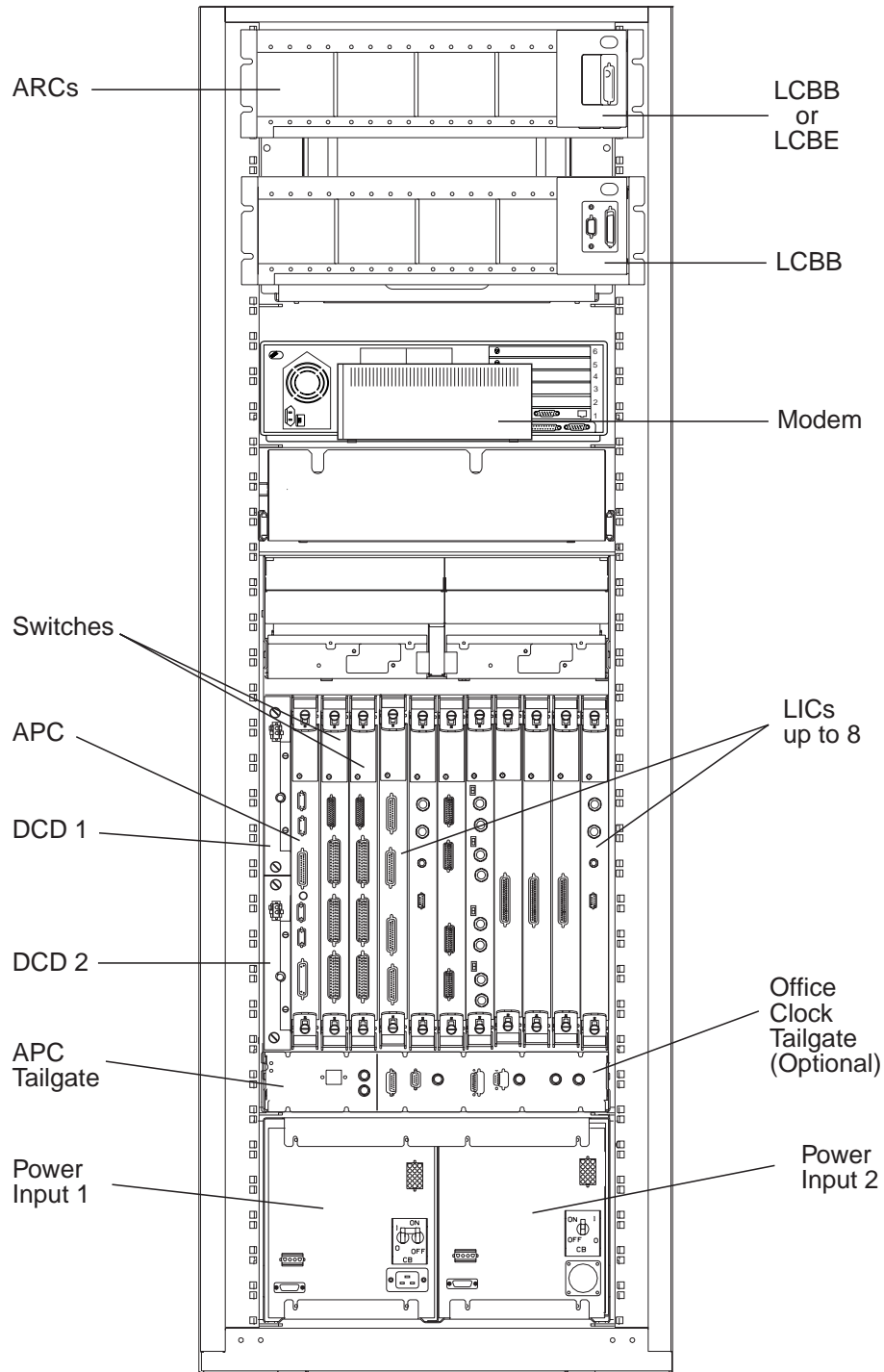


Figure A-2. 2220-300 and 2220-500 Rear View (LIC Side)

## 2220-300 and 2220-500 Locations (Front View) in 29 U Rack

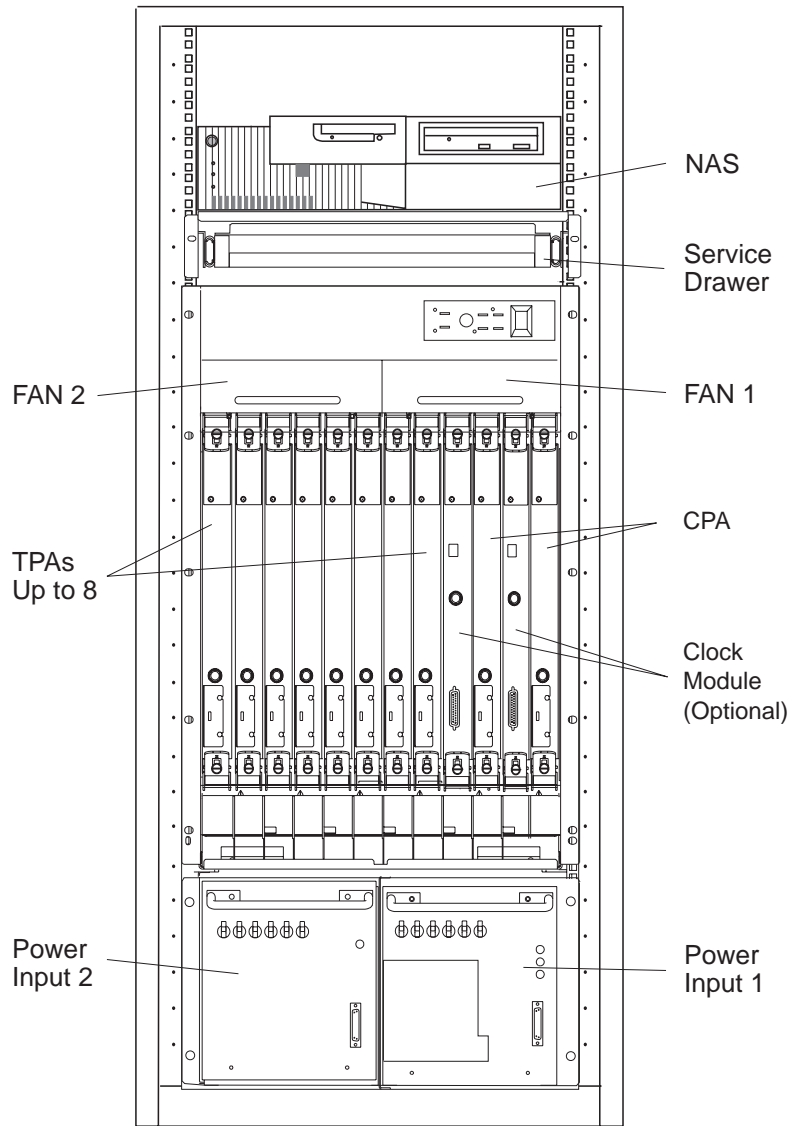


Figure A-3. 2220-300 and 2220-500 Front View (Adapter Side) in 29 U Rack

## 2220-300 and 2220-500 Locations (Rear View) in 29 U Rack

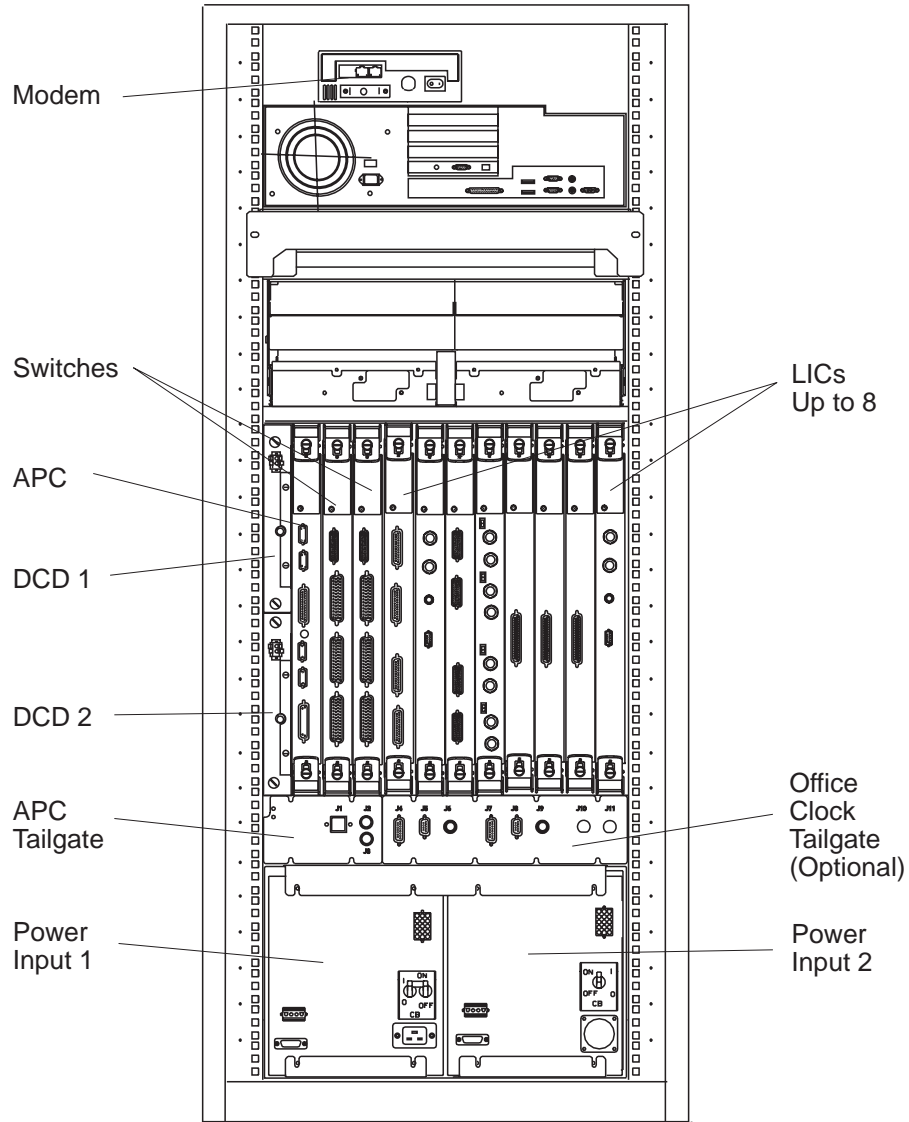


Figure A-4. 2220-300 and 2220-500 Rear View (LIC Side) in 29 U Rack

# Component Location

## 2220-300/2220-500/2220-501 Rack Example

**Note:** For the 2220-501 the rack identification is 'B'.

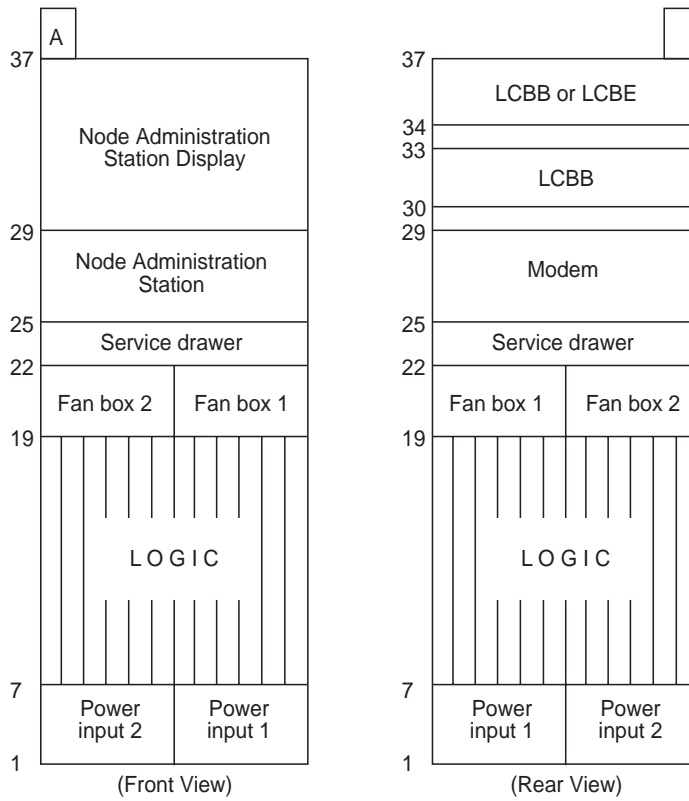


Figure A-5. 2220-300 and 2220-500 Physical Layout in 37 U Rack



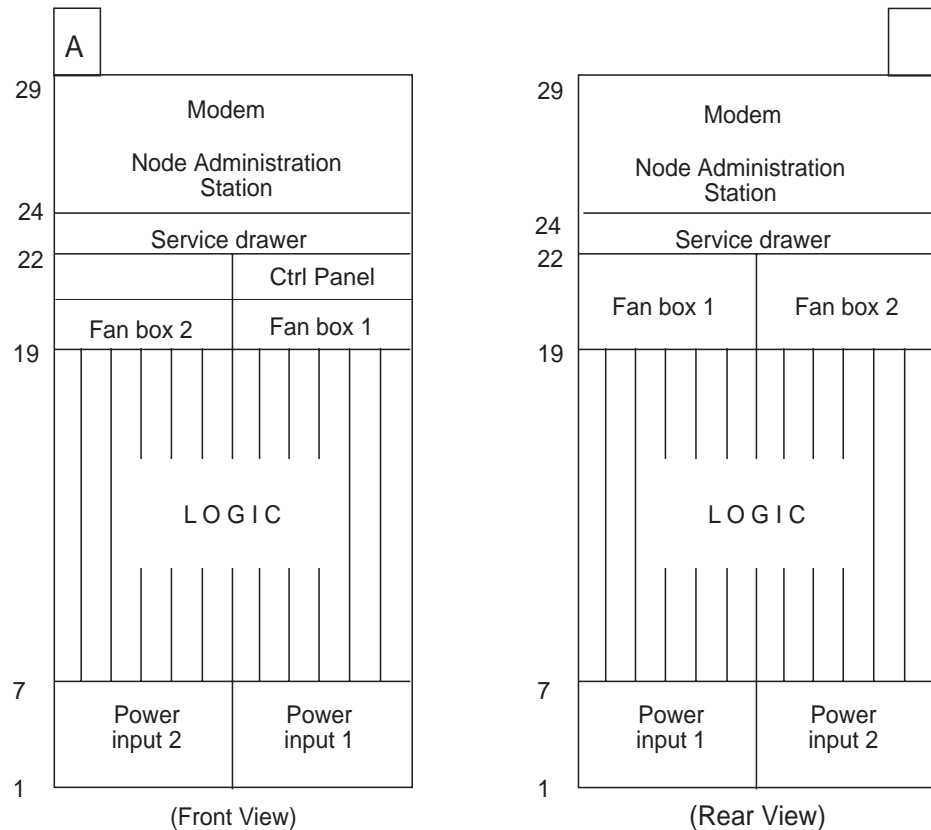


Figure A-6. 2220-300 and 2220-500 Physical Layout in 29 U Rack

Each component is located using:

- **Rack identification (RR)** Letters A, B ,.. for rack. The rack identifier is installed at the top of each rack at installation time.
- **Front or rear side location** of the rack(S) Letter F or R.
- **Unit location (UU)** This is the vertical location, it uses the EIA Units of the rack. A vertical label divided in U unit is stucked on front and rear of the rack.
- **Horizontal location (HH)**
  - For modules (1 to 12 see Figure A-10 on page A-12 and Figure A-12 on page A-13).
  - For power, fan (letter R for right and L for left)
- **Cables and connectors location (JJJ)** 3 digits are used (ie. J01).

See “Module Connector Positions” on page A-9.

**Note:** When a unit can not be identified using the previous system location, a specific unit numbering is used to identify unique unit (starting from 99, 98, 97,...).

---

## Format of Location identifier

RR	S	UU	HH	JJJ

This label format will be used to identify external cables.

# Module Connector Positions

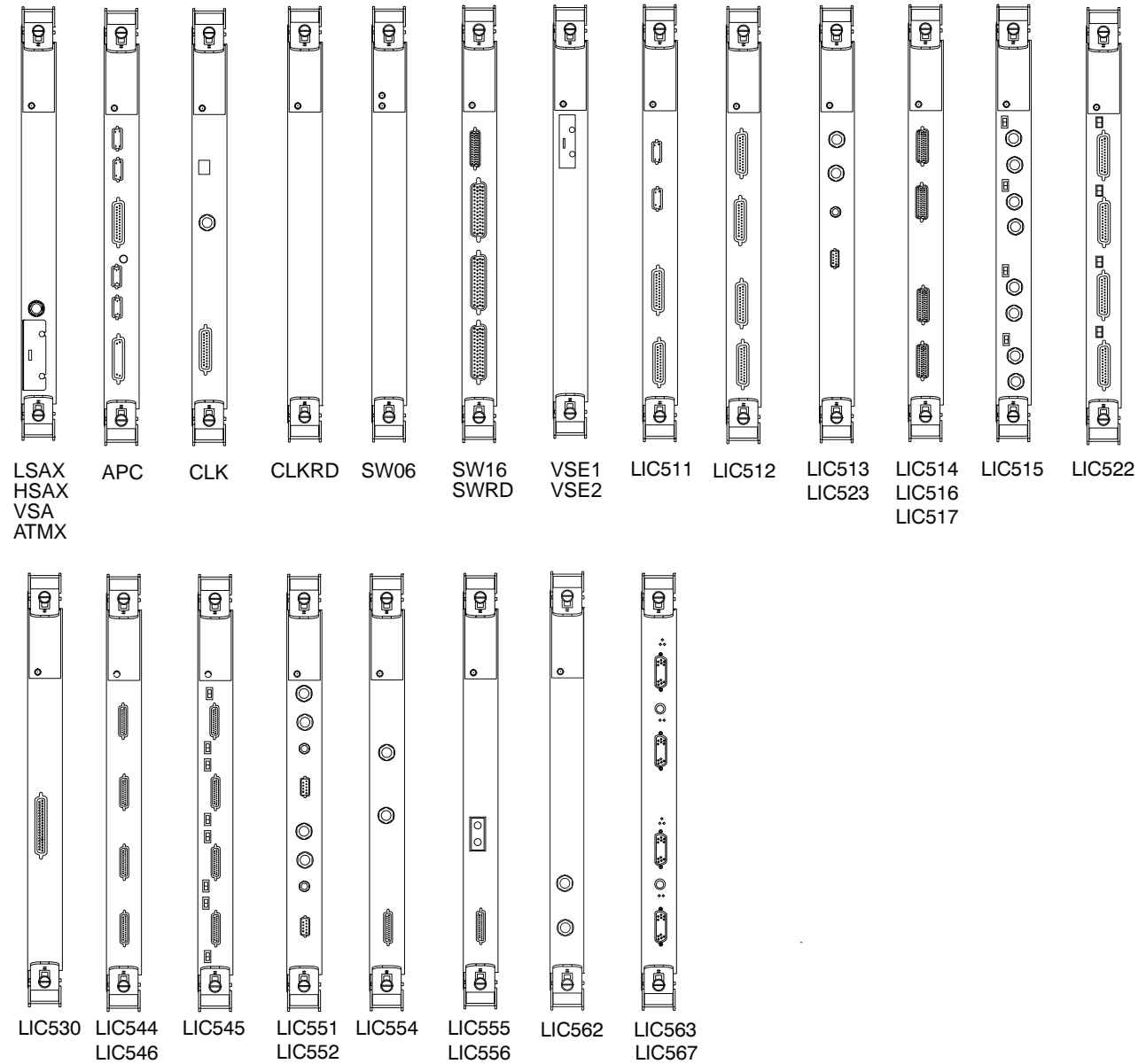


Figure A-7. Module Connector Positions

## Warning

On the **APC** module, **connector 4** could be missing depending on the EC level of the module. In that case, connectors are identified from 1 to 6.

## 2220-300/2220-500 Unit Identification Examples

**Note:** For the 2220-501 a subset of this identification will be used as some units in this model are missing. The rack identification is a 'B'.

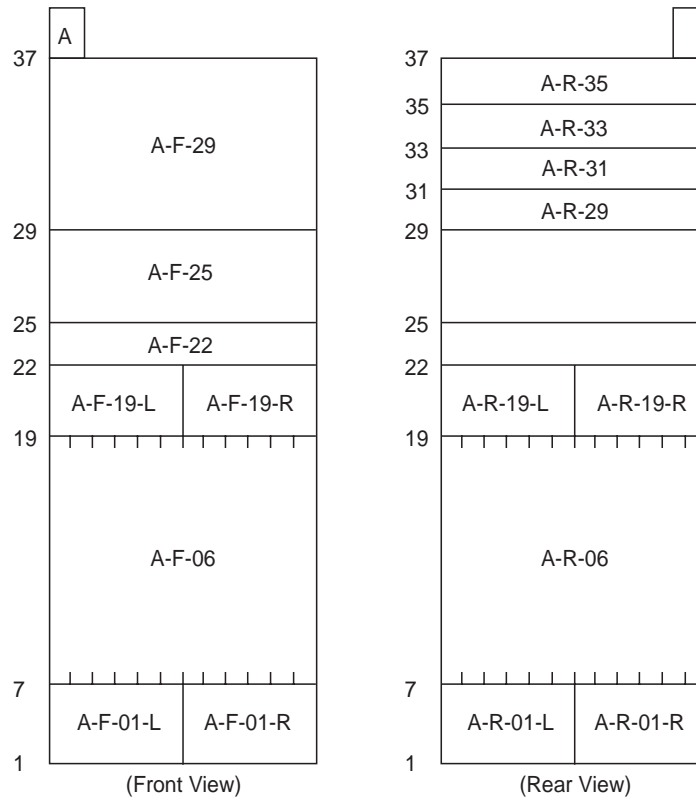


Figure A-8. 37 U Rack identification

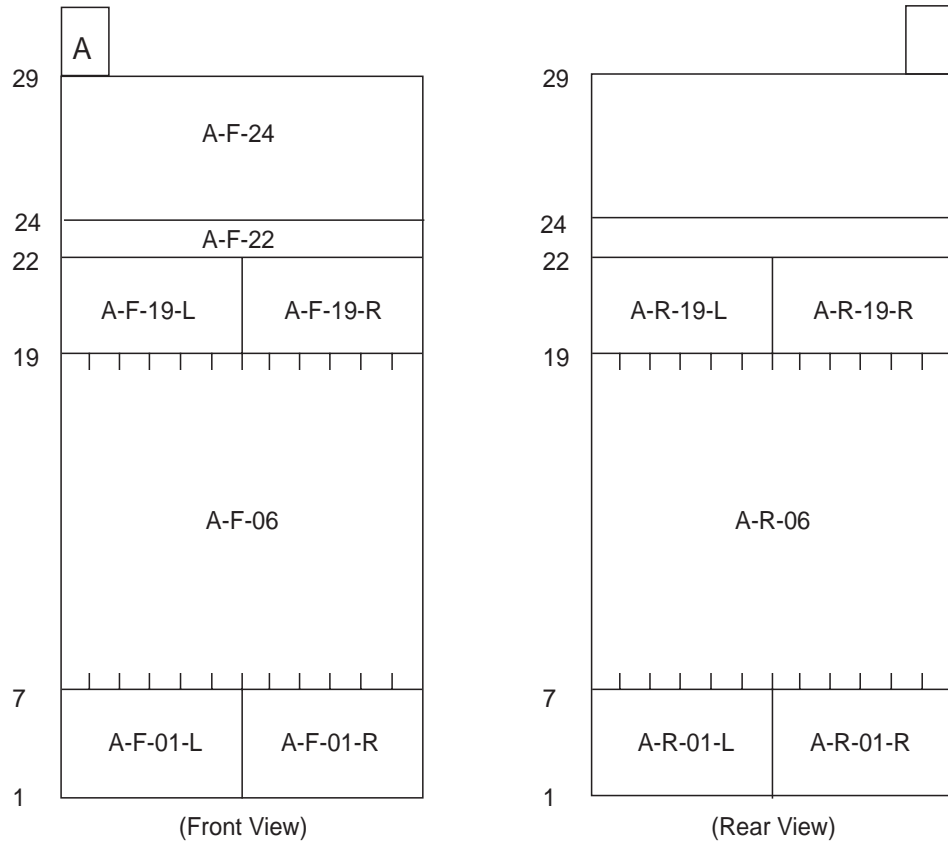


Figure A-9. 29 U Rack identification

<i>Table A-1. Examples of location for 2220-300/2220-500</i>					
Component	Location				
	RR	S	UU	HH	JJJ
Power input 1	A	F	01	R	
Fan box 2	A	F	19	L	
TPA position 2	A	F	07	02	
LIC position 4	A	R	07	04	
Connector 4 on LIC type 515 in slot 5	A	R	07	05	004

# Logic Subrack Locations

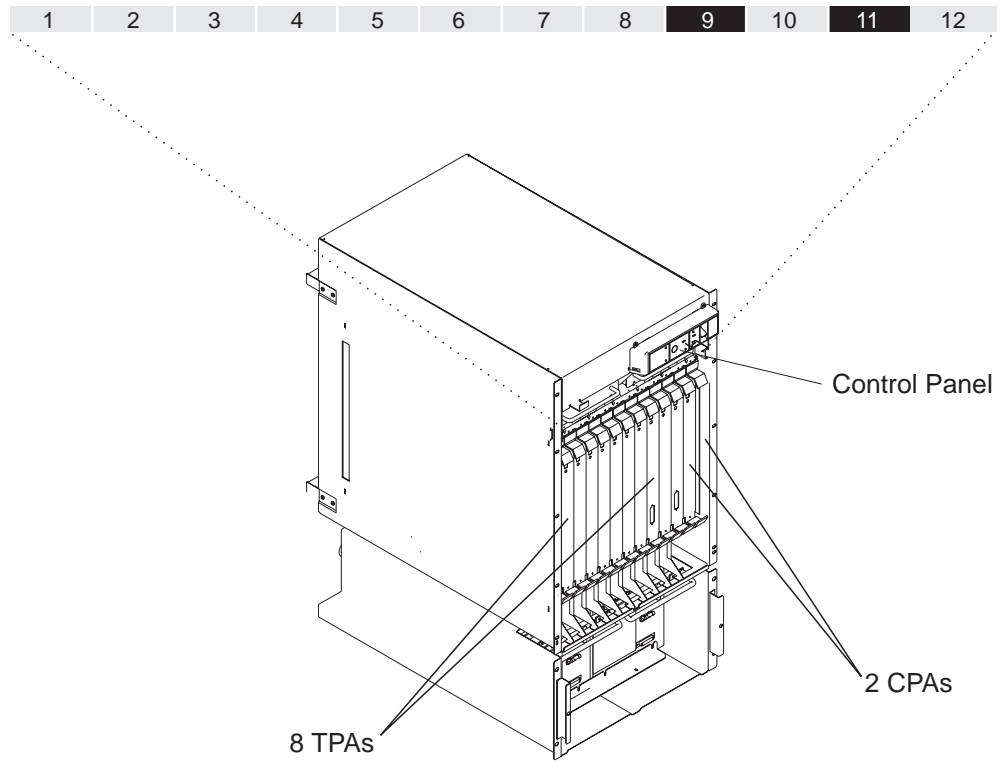


Figure A-10. 2220 Label (Front View Adapter Side)

Colors Legend: **Light Violet** = HSTPA, LSTPA, CPA - **Dark Violet** = clock.

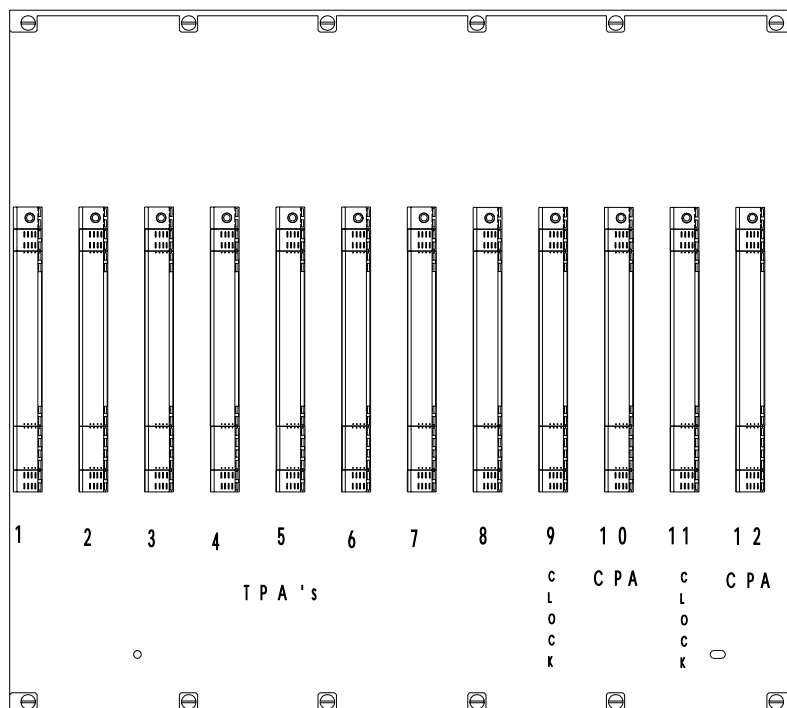


Figure A-11. 2220 Empty Board Module Location (Front View, Adapter Side)

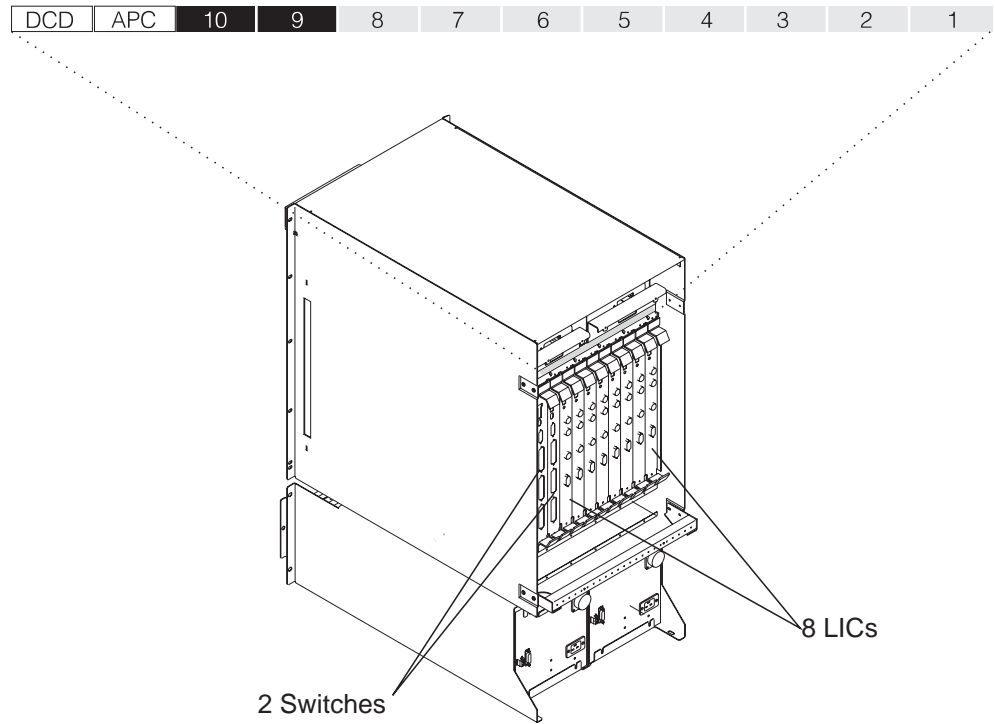


Figure A-12. 2220 Labels (Rear View, LIC Side)

Colors Legend: **Light Blue** = LIC, **Dark Blue** = SW, **White** = DCD and APC

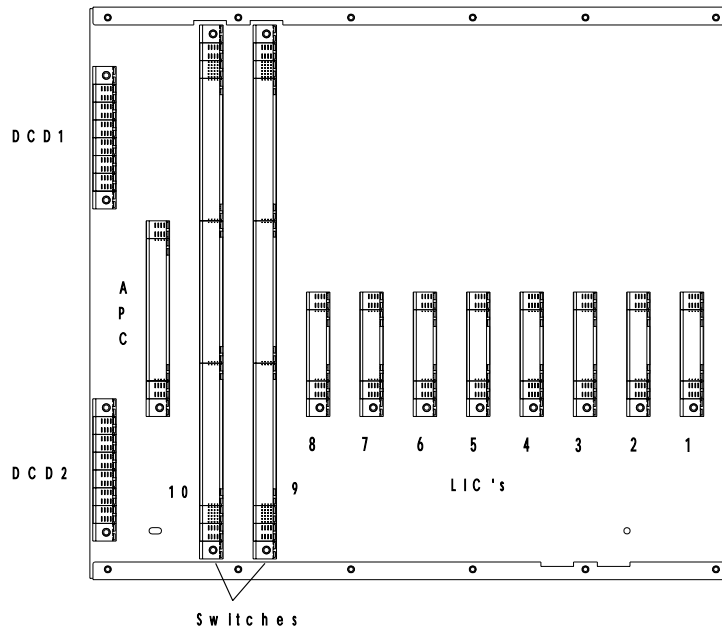


Figure A-13. 2220 Empty Board Module Location (Rear View, LIC Side)

## AC and DC Power Assemblies

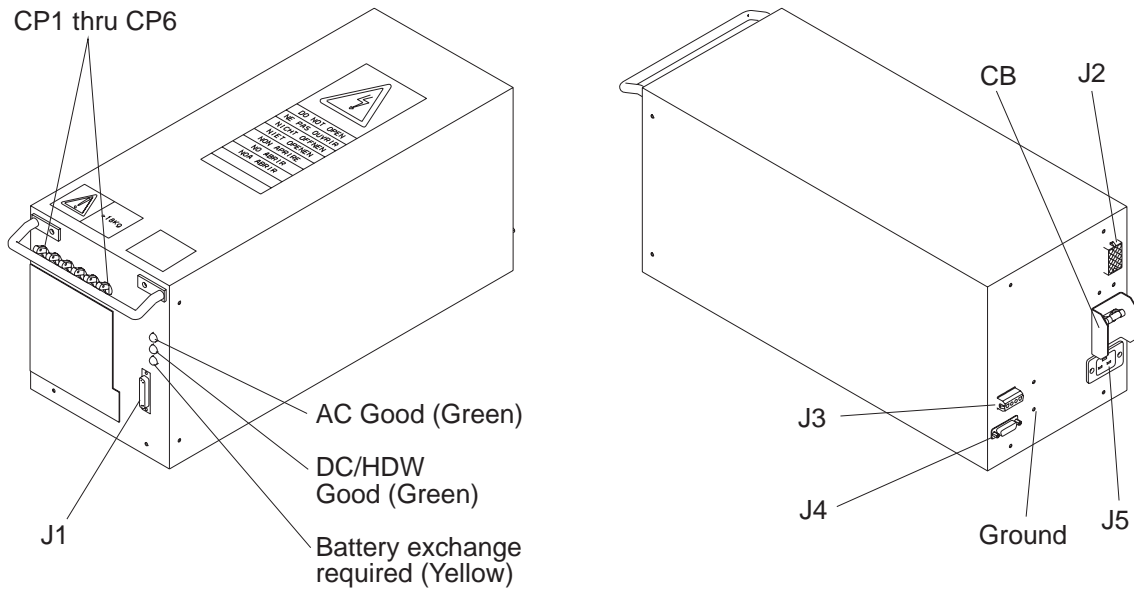


Figure A-14. AC Power Supply (Front and Rear Sides)

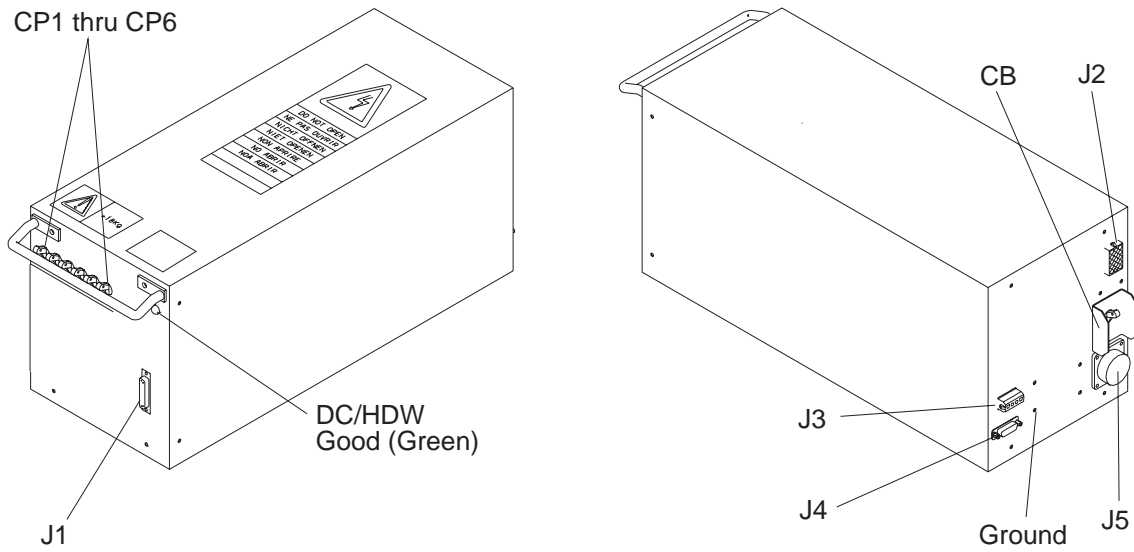


Figure A-15. DC Power Supply (Front and Rear Sides)



---

## Control Panel

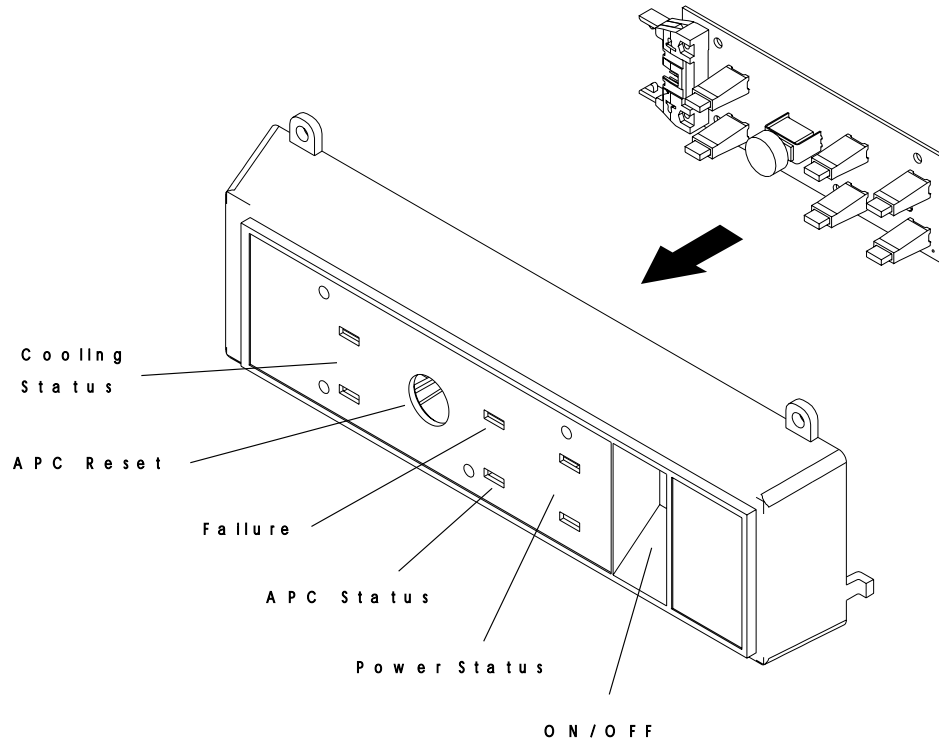


Figure A-16. Control Panel

---

## Fan Box Assembly

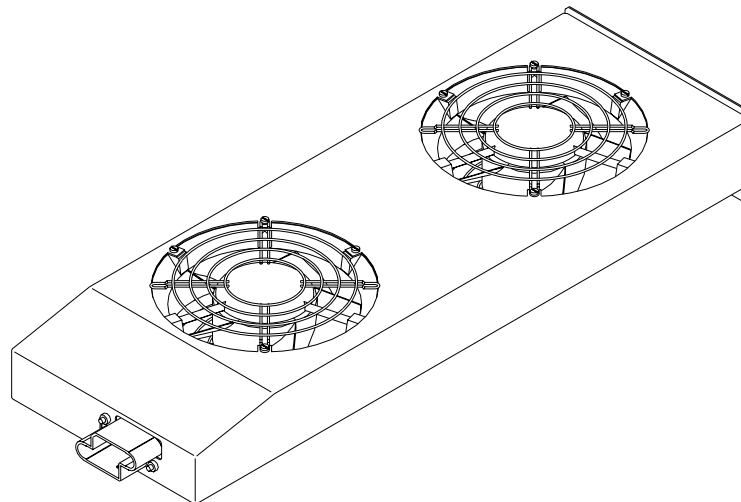


Figure A-17. Fan Box Assembly

# 37 U Rack Locations

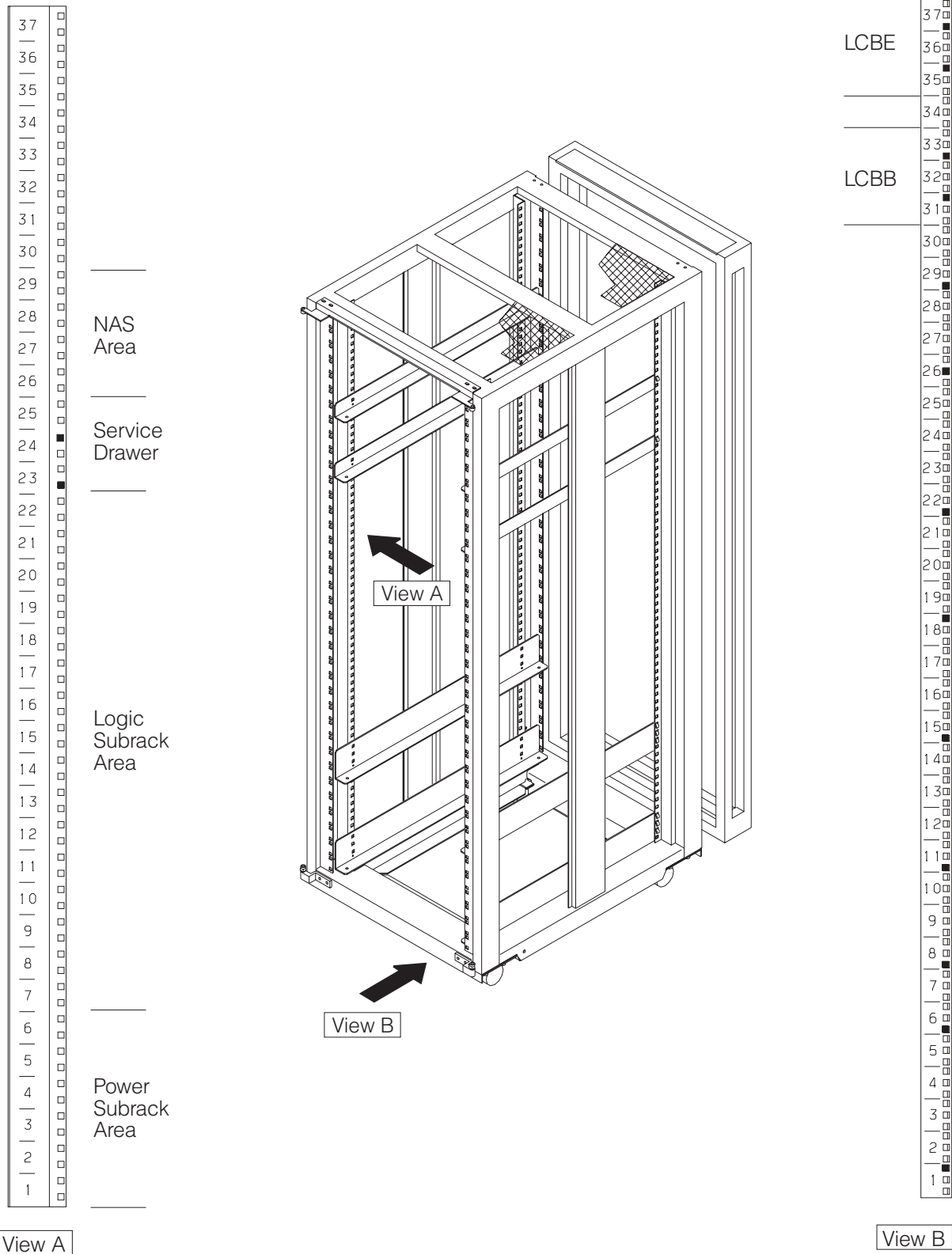


Figure A-18. Rack Labels and Locations in 37 U Rack (Front View)

# 29 U Rack Locations

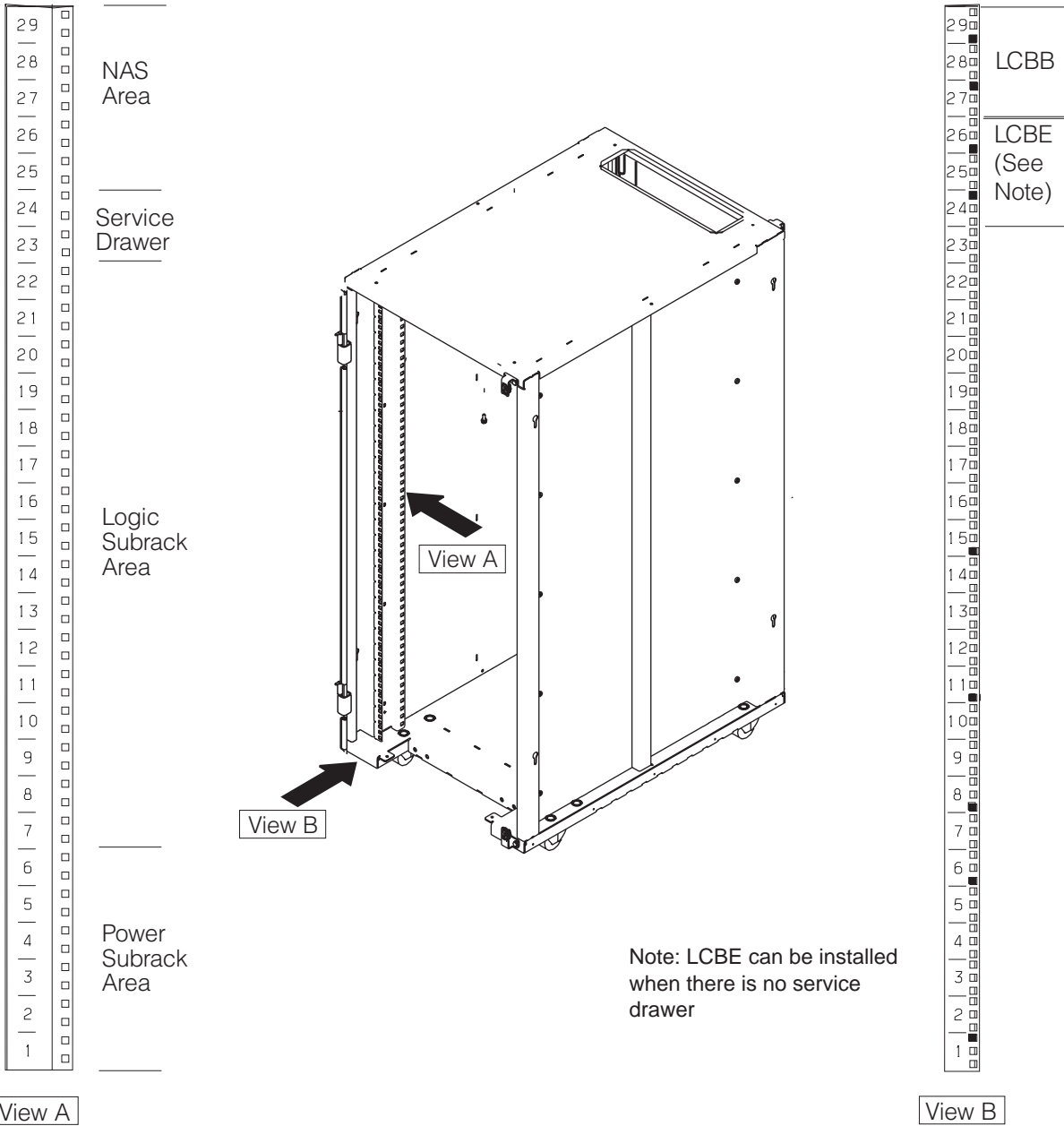


Figure A-19. Rack Labels and Locations in 29 U Rack (Front View)



## Appendix B. 2220 Power Consumption

### 2220 Power Limits

The total power consumption depends on the type of power source (ac or dc) and the number of power supply. Table B-1 shows the maximum total power consumption allowed.

<i>Table B-1. Maximum total consumption allowed.</i>			
Power supply type	Quantity	Total allowed (Watt)	Battery backup support (Watt)
ac	1 or 2	1350	1350 (note)
dc (-48v)	1 or 2	1550	n/a

**Note:** Every ac power has a battery backup. In this mode, the power consumption is up to 675 Watts per battery during 3 to 5 minutes.

### 2220 Base Machine and Modules Power Consumption

Table B-2 shows the base machine and modules power consumption.

<i>Table B-2 (Page 1 of 2). Base Machine and Module Power Consumption</i>		
Types	Feature Code	Consumption (Watt)
Base machine		
2220 Model 300	N/A	150
2220 Model 500		178
2220 Model 501		175
Trunk/Port Adapter		
Low-speed Type 1 (LSA1)	5410	35
Low-speed Type 2 (LSA2)	5440	45
Low-speed Type 3 (LSA3)	5460	38
High-speed Type 1 (HSA1)	5415	42
High-speed Type 2 (HSA2)	5445	55
High-speed Type 3 (HSA3)	5446	44
ATM Type 1 (ATMA1)	5450	41
ATM Type 2 (ATMA2)	5451	41
Voice Server Adapter (VSA)	5400	44
Switch		
2220 Model 300	5350	29
2220 Model 500	5340	57
2220 Model 501 (redrive)	5341	54
Clock		
2220 Model 300	5355	20
2220 Model 500	5355	20
2220 Model 501 (redrive)	5356	10

<i>Table B-2 (Page 2 of 2). Base Machine and Module Power Consumption</i>		
<b>Types</b>	<b>Feature Code</b>	<b>Consumption (Watt)</b>
Voice Server Expansion		
Type 1 (VSE1)	5501	35
Type 2 (VSE2)	5502	64
Line Interface Coupler		
511	5511	9
512	5512	17
513	5513	23
514	5514	18
515/516	5515/5516	19
517	5517	18
522/525	5522/5525	20
523	5523	26
530	5530	0
544	5544	43
545	5545	41
546	5546	40
551	5551	36
552	5552	53
553	5553	40
554	5554	26
555	5555	26
556	5556	26
562	5562	20
567	5567	24
Line Connection Box with:		
10m RVX cable + 15 x V.24 ARCs	5600/5601 + 5024	9.8
100m RVX cable + 15 x V.24 ARCs	5600/5601 + 5024	10.5
10m RVX cable + 15 x V.35 ARCs	5600/5601 + 5035	20
100m RVX cable + 15 x V.35 ARCs	5600/5601 + 5035	23.5
10m RVX cable + 15 x X.21 ARCs	5600/5601 + 5035	20
100m RVX cable + 15 x X.21 ARCs	5600/5601 + 5035	23.5
	5600/5601 + 5021	
	5600/5601 + 5021	

---

## Appendix C. Hone Sheet Example

Module, LIC, and Cable Locations . . . . .	C-2
ARC and Cable Locations . . . . .	C-4

---

## Module, LIC, and Cable Locations



1  
 NETWORK ID: LAGAUDE    PLACEMENT REPORT    NODE ID: PLUG    2220-500    September 7, 1994

SLOT#	TPA	LIC	PORT	CABLE	LINE NAME	CABLE DESCRIPTION
1	5445	5523	1	5251	PARIS / LONDON LINE1	515/513/523 BNC75 30M
	HSA 2		2		-	
	TRUNK	E2/E3/J2	3		-	
			4		-	
2	5445	5530	1	5283	PARIS / ROME	LIC 530 HSSI DCE 15M
	HSA 2		2		-	
	PORT	HSSI	3		-	
			4		-	
3	5410	5514	1	5244	PARIS / BERLIN	LIC 514 DB15 DSX-1 30M
	LSA 1		2		-	
	PORT	T1/J1	3		-	
			4		-	
4	5410	5511	1	5622	LOCATION 1	LIC511/LCBB CABLE 15M
	LSA 1		2	5623	LOCATION 2	LIC511/LCBB CABLE 35M
	PORT	RVX LCB/ARCS	3		-	
			4		-	
5	5410	5511	1	5624	LOCATION 3	LIC511/LCBB CABLE 70M
	LSA 1		2	5625	LOCATION 4	LIC511/LCBB CABLE 100M
	PORT	RVX LCB/ARCS	3		-	
			4		-	
6	5400	5501	1		-	
			2		-	
	VSA	VSE1	3		-	
			4		-	

1  
 NETWORK ID: LAGAUDE    PLACEMENT REPORT    NODE ID: PLUG    2220-500    September 7, 1994

SLOT#	TPA	LIC	PORT	CABLE	LINE NAME	CABLE DESCRIPTION
7	5400	5502	1		-	
			2		-	
	VSA	VSE2	3		-	
			4		-	
8			1		-	
			2		-	
			3		-	
			4		-	
9	5355	SWITCH			-	
	CLOCK	(BASIC)			-	
					-	
					-	
10	5440				-	
	LSA 2	5340			-	
		SWITCH			-	
	CP				-	
11	5355	APC			-	
	CLOCK	(BASIC)			-	
					-	
					-	
12	5440	POWER INPUT			-	
	LSA 2	A - 9500 AC			-	
					-	
	CP	B - 5520 DC			-	

---

## ARC and Cable Locations

1 LCB CONNECTION REPORT  
NETWORK ID: LAGAUE NODE ID: CLIP14 July 7, 1994  
LCBB 5600 LOCATION 1 2220-300 LIC SLOT 2 PORT 1  
SLOT ù CABLE ù ARC TYPE ù SPEED ù INTERFACE ù FUNCTION  
-----  
0 5634 4A3 9.6K X21 TRANS DCE  
1 5634 4A3 9.6K X21 TRANS DCE  
2 5635 4A4 9.6K X21 TRANS DCE  
3 5635 4A4 9.6K X21 TRANS DCE  
4 5631 4B 9.6K X21 DTE  
5 5631 4B 9.6K X21 DTE  
6 5632 4A1 9.6K X21 DCE  
7 5632 4A1 9.6K X21 DCE  
8 5633 4A2 9.6K X21 DCE  
9 5633 4A2 9.6K X21 DCE  
10  
11  
12  
13  
14  
LCBE 5610 LOCATION 1 2220-300 LIC SLOT 2 PORT 1  
SLOT ù CABLE ù ARC TYPE ù SPEED ù INTERFACE ù FUNCTION  
-----  
16 5634 4A3 9.6K X21 TRANS DCE  
17 5634 4A3 9.6K X21 TRANS DCE  
18 5635 4A4 9.6K X21 TRANS DCE  
19 5635 4A4 9.6K X21 TRANS DCE  
20 5631 4B 9.6K X21 DTE  
21 5631 4B 9.6K X21 DTE  
22 5632 4A1 9.6K X21 DCE  
23 5632 4A1 9.6K X21 DCE  
24 5633 4A2 9.6K X21 DCE  
25 5633 4A2 9.6K X21 DCE  
26  
27  
28  
29  
30

LCB CONNECTION REPORT

NETWORK ID: LAGAUE    NODE ID: CLIP14    July 7, 1994  
 LCBB 5600 LOCATION 2                    2220-300 LIC SLOT 2 PORT 2  
 SLOT ù CABLE ù ARC TYPE ù SPEED ù INTERFACE ù FUNCTION

---

0	5642	1A1	9.6K	V24	DCE
1	5642	1A1	9.6K	V24	DCE
2	5642	1A1	9.6K	V24	DCE
3	5642	1A1	9.6K	V24	DCE
4	5643	1A2	9.6K	V24	DCE
5	5643	1A2	9.6K	V24	DCE
6	5643	1A2	9.6K	V24	DCE
7	5643	1A2	9.6K	V24	DCE
8	5641	1B	9.6K	V24	DTE
9	5641	1B	9.6K	V24	DTE
10	5641	1B	9.6K	V24	DTE
11	5641	1B	9.6K	V24	DTE
12					
13					
14					

LCBB 5600 LOCATION 3                    2220-300 LIC SLOT 3 PORT 1  
 SLOT ù CABLE ù ARC TYPE ù SPEED ù INTERFACE ù FUNCTION

---

0	5651	3B	9.6K	V35	DTE
1	5651	3B	9.6K	V35	DTE
2	5651	3B	9.6K	V35	DTE
3	5651	3B	9.6K	V35	DTE
4	5652	3A1	9.6K	V35	DCE
5	5652	3A1	9.6K	V35	DCE
6	5652	3A1	9.6K	V35	DCE
7	5652	3A1	9.6K	V35	DCE
8					
9					
10					
11					
12					
13					
14					

1

LCB CONNECTION REPORT

NETWORK ID: LAGAUE    NODE ID: CLIP14    July 7, 1994  
 LCBB 5600 LOCATION 4                    2220-300 LIC SLOT 3 PORT 2  
 SLOT ù CABLE ù ARC TYPE ù SPEED ù INTERFACE ù FUNCTION

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0	5653	3A2	9.6K	V35	DCE
1	5653	3A2	9.6K	V35	DCE
2	5653	3A2	9.6K	V35	DCE
3	5653	3A2	9.6K	V35	DCE
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					



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## Appendix D. Seismic Hardening Feature Installation

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### Seismic Proof Installation

**Note:** To support this kind of installation the customer must have ordered the hardware feature code:

- **4502** for 2220 model **300** or **500**
- **4602** for 2220 model **501**

This feature provides:

- Stiffened rack.
- Parts kit to fasten the machine to the floor.

Two types of installation are feasible depending on where the machine is installed:

1. **On a specific earthquake proof raised floor** (Bellcore type), the installation meets class 4 or U.S. west coast requirement. **This is only available for 37 U rack.** For details, go to "Installing a 37 U Rack Machine on a Earthquake Proof Raised Floor" on page D-3.
2. **Directly on the floor**, the machine is directly attached to the concrete floor. For details, go to:
  - "Installing a 37 U Rack Machine Directly on the Floor" on page D-4 for 37 U rack.
  - "Installing a 29 U Rack Machine Directly on the Floor" on page D-5 for 29 U rack.

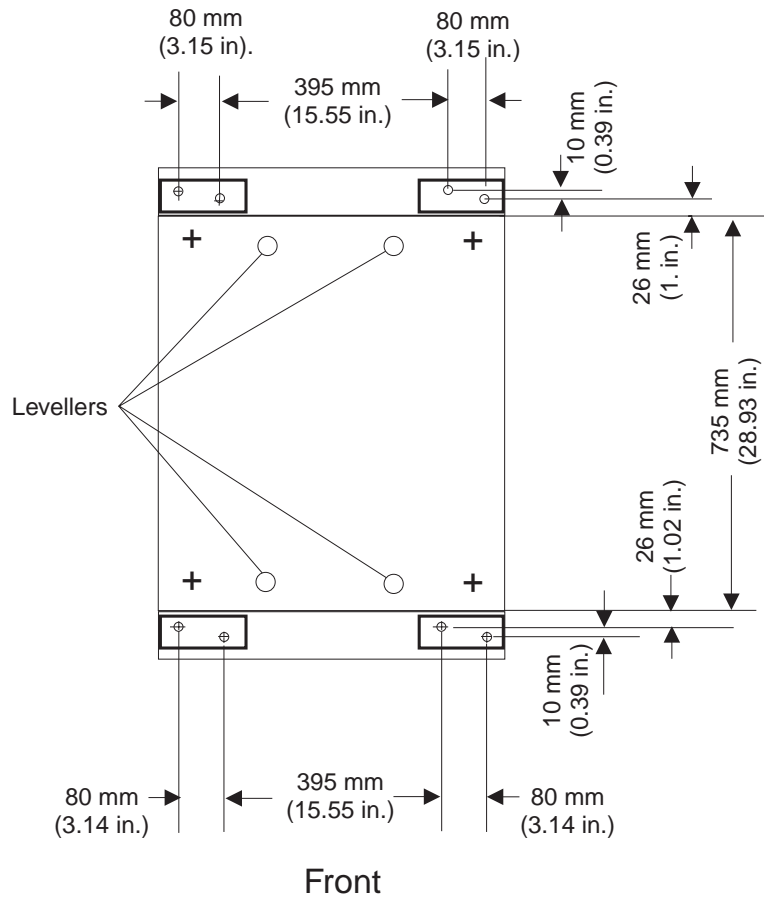


Figure D-1. Plan View for 37 U Rack

## Installing a 37 U Rack Machine on a Earthquake Proof Raised Floor

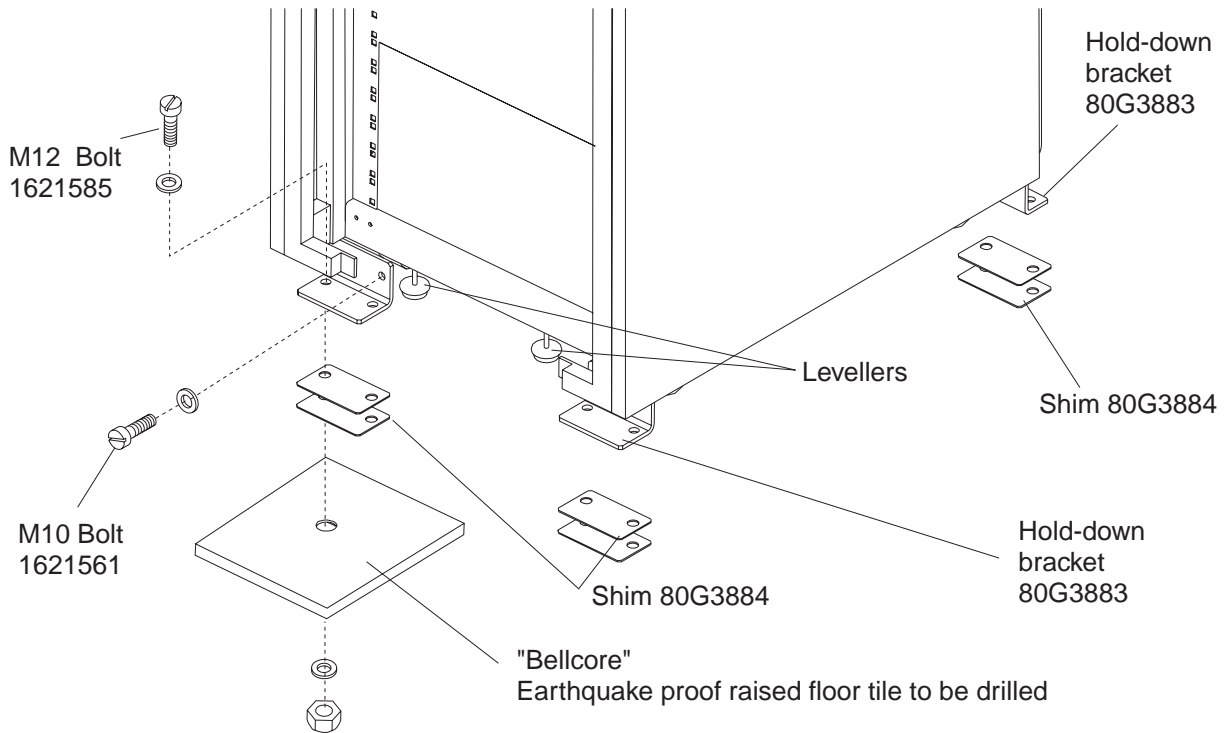


Figure D-2. Installing a Machine on a Specific Earthquake Proof Raised Floor (Rear Side)

1. Move the machine to its final position according to the draw marks on the floor.
  2. Preposition the three hold-down brackets on the machine as follows:
    - One on the front (PN 80G3881)
    - Two on the rear (PN 80G3883)
- Note:** You can open or remove the door to have a better access.
3. Mark the hole locations on the floor tiles (four on the front and two on each small rear corner bar).
  4. Remove the three hold-down brackets and withdraw the machine.
  5. Drill holes in tiles (holes between 14 to 17mm or 9/16" or 11/16").
  6. Accurately relocate the machine.
  7. Adjust the machine horizontally using the four levelers located in front and rear between casters.
- Note:** When several frames are bolted side to side, the height of the frames has to be adjusted.
8. Reinstall the three hold-down brackets and put shims (PN 80G3884 and PN 80G3882) if needed.
  9. Install the M12 and M10 bolts.
  10. When properly installed, fasten all bolts.
  11. If needed, reinstall doors and covers.

## Installing a 37 U Rack Machine Directly on the Floor

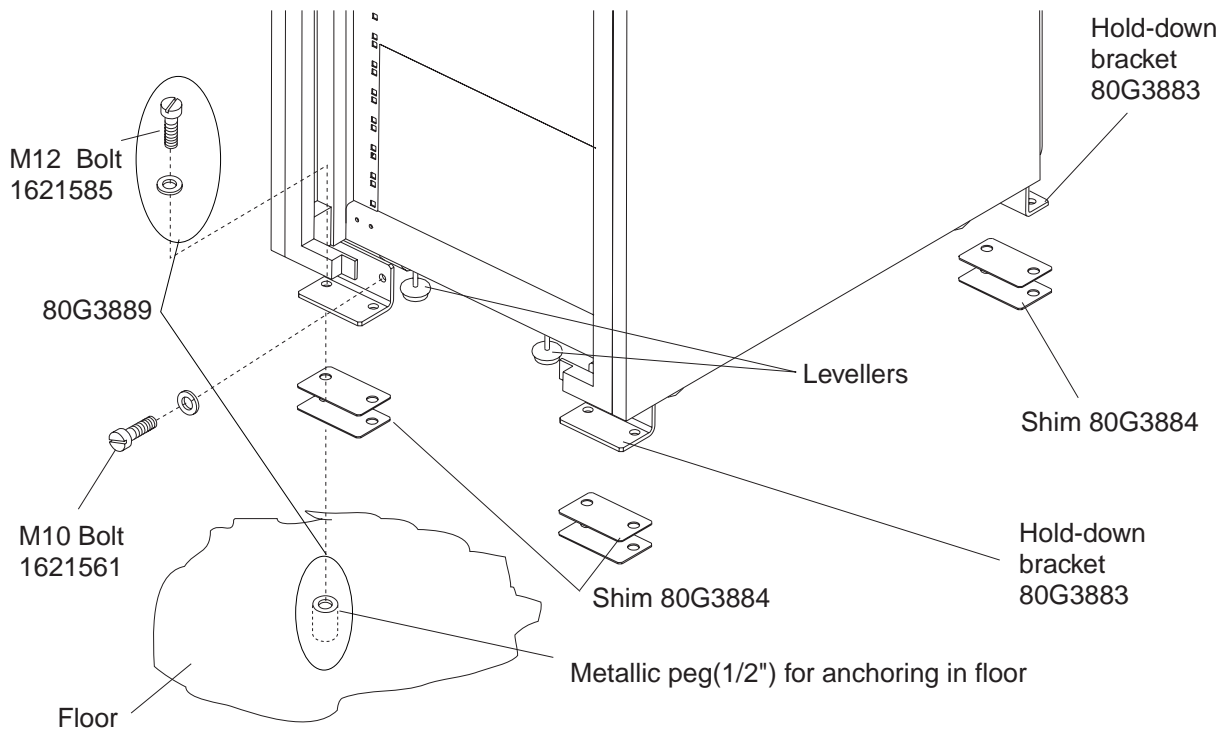


Figure D-3. Installing a 37 U Rack Machine on a Floor (Rear Side)

1. Move the machine to its final position according to the draw marks on the floor.
  2. Preposition the three hold-down brackets on the machine as follows:
    - One on the front (PN 80G3881)
    - Two on the rear (PN 80G3885)
- Note:** You can open or remove the door to have a better access.
3. Mark the hole locations on the floor tiles (four on the front and two on each small rear corner bar).
  4. Remove the three hold-down brackets and withdraw the machine.
  5. Drill holes at diameter 18mm (0.7 in.) in concrete floor to insert metallic peg.
  6. Accurately relocate the machine.
  7. Adjust the machine horizontally using the four levelers located in front and rear between casters..
- Note:** When several frames are bolted side to side, the height of the frames has to be adjusted.
8. Reinstall the three hold-down brackets and put shims (PN 80G3884 and PN 80G3882) if needed.
  9. Install the M12 and M10 bolts.
  10. When properly installed, fasten all bolts.
  11. If needed, reinstall doors and covers.



## Installing a 29 U Rack Machine Directly on the Floor

1. Move the machine to its final position according to the draw marks on the floor.

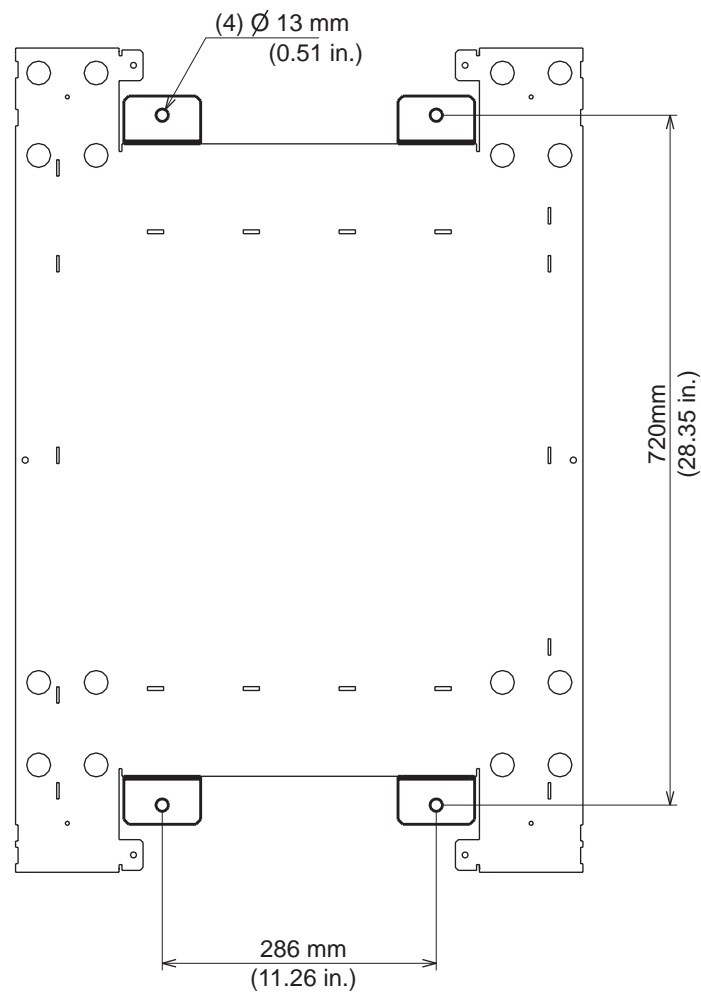


Figure D-4. Plan View for 29 U Rack

2. Preposition the four hold-down brackets on the machine.

**Note:** You can open or remove the door to have a better access.

3. Mark the hole locations on the floor tiles (two on the front and two on the rear).

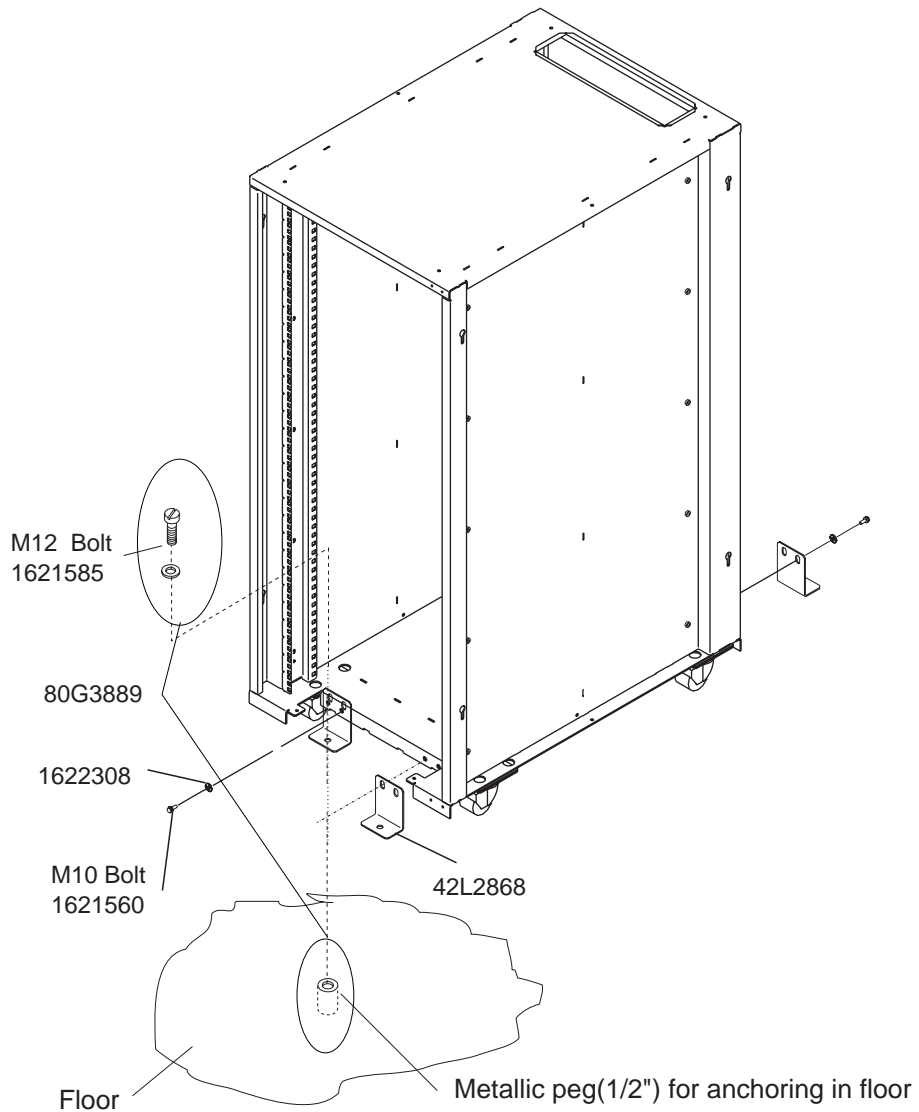


Figure D-5. Installing a 29 U Rack Machine on a Floor (Front Side)

4. Remove the four hold-down brackets and withdraw the machine.
5. Drill holes at diameter 18mm (0.7 in.) in concrete floor to insert metallic peg.
6. Accurately relocate the machine.
7. Reinstall the four hold-down brackets.
8. Install the M12 and M10 bolts.
9. When properly installed, fasten all bolts.
10. If needed, reinstall doors and covers.

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# Glossary

The following are the abbreviations and technical terms used in the 2220 Nways Switch library.

**2220.** The IBM 2220 Nways BroadBand Switch (also called Nways Switch) is a fast packet switch enabling high-speed communications over a broadband network. It implements the functions of the IBM Networking BroadBand Services (NBBS) architecture.

**2220-300.** 2220 Nways Switch Model 300.

**2220-500.** 2220 Nways Switch Model 500.

**2220-501.** 2220 Nways Switch Model 501.

**2220 NSM.** 2220 Nways Switch Manager

**AAL.** ATM adaptation layer.

**ABR.** Availability bit rate. A best effort service with a minimum bit rate and a maximum cell loss value.

**ac.** Alternating current.

**access services.** Functions that are performed by a port adapter of the IBM 2220 Nways BroadBand Switch to:

- Support the attachment of external user devices through port lines
- Prepare user data packets
- Control the input traffic on port lines
- Manage line protocols.

**active remote connector (ARC).** A connector that supplies the electrical and physical interfaces between a line interface coupler type 511 (LIC511) in an Nways Switch subrack and data circuit-terminating equipment (DCE) or data terminal equipment (DTE). ARCs are housed in line connection boxes (LCBs).

**adapter.** An Nways Switch module that can be used, depending on its hardware type and the code that it runs, as:

- Control point adapter
- Port adapter
- Trunk adapter
- Voice server adapter.

A trunk or port adapter is associated with a line interface coupler (LIC). A voice server adapter can be associated with a voice server extension (VSE).

**ADPCM.** Adaptive differential pulse code modulation.

**AIS.** Alarm indicator signal.

**AIX.** Advanced Interactive Executive.

**alarm and power control (APC).** In an Nways Switch, a module that connects the NAS, reports alarms, and controls the power supplies.

**Alert Manager.** An application that processes the SNA alerts received from IBM 3746s operating in IP mode.

**AMI.** Alternate mark inversion.

**ANSI.** American National Standards Institute.

**APC.** Alarm and power control (module).

**AR.** Access rate.

**ARC.** Active remote connector.

**asynchronous transfer mode (ATM).** A high-speed, connection-oriented switching and multiplexing protocol that transmits different types of traffic (voice, video, and data) simultaneously.

**ATM.** Asynchronous transfer mode.

**ATMA<sub>n</sub>.** ATM adapter type n (module).

**ATM adaptation layer (AAL).** In ATM devices, a set of protocols that adapt non-ATM devices to an ATM network. There are several classes of ATM adaptation layers which represent the main traffic types (for example, data, voice, and video).

**ATM network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical ATM port or trunk line. An ATM network interface sets up and maintains predefined ATM virtual connections.

**AT&T.** American Telephone & Telegraph (Company).

**B8ZS.** Bipolar eight-zero substitution.

**Bc.** Burst committed.

**Be.** Burst in excess.

**bearer service profile (BSP).** A set of parameters that defines a type of ISDN traffic (speech, audio, data, or video). One BSP is associated with each ISDN numbering plan table.

**BECN.** Backward explicit congestion notification.

**B-ICI.** Broadband inter-carrier interface.

**BMI.** Byte multiplexer interface.

**BNC.** Bayonet Niell-Concelman.

**bps.** Bit per second.

**bridge.** A functional unit that interconnects two local area networks. A bridge works at the data link level (layer 2) of the OSI reference model.

**broadband network.** A network that uses a large frequency band to transport different kinds of traffic (such as coded voice, video, and data) at the same time.

**BS.** Bearer services.

**BSC.** Binary synchronous communication.

**BSP.** Bearer service profile.

**BT.** Burst tolerance.

**bursty.** Refers to transmission at variable bit rate where the time between data transmissions is not always the same.

**CAC.** Connection admission control.

**CAS.** Channel associated signaling.

**CBR.** Constant bit rate.

**CCS.** (1) Common channel signaling (2) Change control server (also called CC server).

**CDB.** Configuration database.

**CDV.** Cell delay variation.

**CDVT.** Cell delay variation tolerance.

**cell loss priority (CLP).** A priority bit in the ATM cell header. When set, it indicates that the cell can be discarded during traffic congestion.

**centralized configuration database.** A database prepared with the Nways Switch Configuration Tool Version 2 (NCT2) on a configuration station. It stores the parameters of a 2220 network.

**CES.** Circuit emulation services.

**change control server (CCS or CC server).** A station that runs the IBM NetView Distribution Manager for AIX to store the Nways Switch Control Program and to manage code changes.

**CIR.** Committed information rate.

**circuit emulation services (CES).** An access service that emulates a leased line. It transports information

with a constant bit rate at the source and destination. The traffic can be PCM voice, video, fax, multimedia, or real-time synchronous data (such as BSC).

**CLIP.** Calling line identification presentation.

**CLIR.** Calling line identification restriction.

**CLK.** Clock (module).

**CLKRD.** Clock redrive (module).

**clock module (CLK).** A module of the 2220 Model 300 or 500 that transmits clock signals to the line interface couplers (LICs). It is optional and can have a backup.

**clock redrive (CLKRD).** A module of the 2220 Model 501 that drives the signals from the Model 500 clock module to the adapters of the Model 501. The clock redrive is optional and can have a backup.

**clock references.** In an Nways Switch, the software function that controls the transmission of clock signals to the LICs where they are used for bit synchronization.

**CLP.** Cell loss priority.

**CMIP.** Common management information protocol.

**CMIS.** Common management information services.

**CMOT.** CMIP over TCP/IP.

**CNM.** Communication network management.

**code file.** A named set of records stored as a unit in a change control server. An Nways Switch code file can include data or internal code.

**COLP.** Connected line identification presentation.

**COLR.** Connected line identification restriction.

**configuration station.** See Nways Switch configuration station.

**control point (CP).** In an Nways Switch, a logical resource that provides network control functions. It can have a backup.

**CP.** Control point.

**CPA.** Control point adapter (module).

**CPE.** Customer premises equipment.

**CP spanning tree.** In a 2220 network, a distribution tree that connects the Nways Switch control points through trunk lines.

The CP spanning tree supplies a very fast and efficient way to multicast control messages such as network topology data.

**CRC.** Cyclic redundancy check.

**CSU.** Channel access unit.

**CTD.** Cell transfer delay.

**data circuit-terminating equipment (DCE).** An equipment installed on a user premises that provides all the functions required to establish, maintain, and terminate a connection, and to do the signal conversion and coding between a data terminal equipment (DTE) and a line. A DCE can be separate piece of equipment or part of other equipment.

**data terminal equipment (DTE).** That part of a data station that serves as data source, data sink, or both, and provides the data communication control function depending on the type of protocol used.

**dB.** Decibel.

**dBm.** Decibel based on 1 milliwatt.

**DC48.** Dc power input type -48V

**dc.** Direct current.

**DCD.** Dc distribution (module).

**DCE.** Data circuit-terminating equipment.

**DDI.** Direct dialing-in.

**DE.** Discard eligibility.

**decibel (dB).** (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels; if the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

**decibel based on 1 milliwatt (dBm).** A unit of absolute power measurement that is scaled such that 0 dBm equals 1 milliwatt.

**dialog box.** On the screen of a station, an area with entry fields and push buttons. (Also called dialog.)

**DLCI.** Data link connection identifier.

**DNPT.** Destination numbering plan table.

**DSP.** Digital service processor.

**DSU.** Data service unit.

**DTE.** Data terminal equipment.

**DTMF.** Dual-tone modulation frequency.

**DTR.** Data terminal ready.

**dummy module.** In an Nways Switch, a cover inserted in the place of a module to ensure correct air cooling inside a logic subrack. During normal operation, the dummy modules must not be removed.

**E1 standard.** A European standard for TDM digital transmission service at 2.048 Mbps.

**E3 standard.** A European standard for TDM digital transmission service at 34.368 Mbps. An E3 line can transport up to 16 E1 circuits.

**E&M.** Earth & mark.

**ECMA.** European Computers Manufacturers Association.

**EIA.** Electronics Industries Association.

**equivalent capacity.** The minimum amount of bandwidth needed by a connection to ensure that the packet loss ratio is below a specified threshold.

**ESF.** Extended status flags.

**ETS.** European telecommunication standard.

**FANB.** Fan box.

**FAT.** File allocation table.

**fax.** Document received from a facsimile machine. Synonym for telecopy.

**FCS.** Frame check sequence.

**FDDI.** Fiber Distributed Data Interface.

**FE1.** Fractional E1.

**FECN.** Forward explicit congestion notification.

**FEP.** Front-end processor.

**fiber.** Synonym for optical fiber.

**fiber budget.** The optical power loss as result of the number of connections in the optical fiber link subtracted from the working budget. The loss as a result of connections includes connector loss and splice loss. The fiber budget is expressed in decibels.

**Fiber Distributed Data Interface (FDDI).** A U.S. standard for 100 Mbps token-ring LANs using optical fiber cables over distances of several kilometers.

**fiber optic cable.** Synonym for optical fiber.

**FR.** Frame relay.

**FRAD.** Frame-relay access device.

**frame relay (FR).** A connection-oriented protocol to transport data frames over a fast packet-network with guaranteed end-to-end quality of service.

**FRFH.** Frame-relay frame handler.

**front-end processor (FEP).** A processor, such as the IBM 3745, 3746 Model 900 or 950, or 3174, that relieves a main frame from communication control tasks.

**FRTE.** Frame-relay terminal equipment.

**FRU.** Field replaceable unit.

**FT1.** Fractional T1.

**FTP.** File transfer protocol.

**Gbps.** Gigabit per second (10 to the power of 9 bits per second).

**GCRA.** Generic cell rate algorithm.

**GFP.** Generic function protocol.

**GFT.** Generic function transport.

**GSM.** Group special mobile.

**GUI.** Graphical user interface.

**HDB3.** High-density bipolar 3.

**HDLC.** High-level data link control.

**high-level data link control (HDLC).** A data network protocol.

**hot pluggable.** Refers to a hardware component that can be installed or removed without disturbing the operation of any other resource that is not connected to, or dependent, on this component.

**HPFS.** High-performance file system.

**HPRI.** High priority.

**HSA<sub>n</sub>.** High-speed adapter type n (module).

**HSDS.** High-speed digital services.

**HSSI.** High-speed serial interface.

**hub (intelligent).** A wiring concentrator, such as the IBM 8260, that supplies bridging and routing functions for LANs with different cables and protocols.

**hunt group.** See X.25 hunt group.

**IDNX.** Integrated Digital Network Exchange.

**IE.** Information element.

**ILMI.** Interim local management interface.

**IMU.** Inverse multiplexing unit

**Integrated Digital Network Exchange (IDNX).** A processor integrating voice, data, and image applications. It also manages transmission resources and connects to multiplexers and network management support systems. It permits integration of equipment from different vendors.

**integrated services digital network (ISDN).** A digital end-to-end public or private network that supports multiple services including, but not limited to, voice and data.

**IP.** Internet Protocol.

**IP gateway adapter.** In an Nways Switch, a port adapter that routes the IP control between the NAS and the network management station.

**ISDN.** Integrated services digital network.

**ISDN network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical ISDN or QSIG port line. An ISDN network interface sets up and maintains connections between calling ISDN terminal equipments and called terminal equipments attached through other Nways Switches.

**ISO.** International Organization for Standardization.

**isochronous.** Refers to transmission at a constant bit rate where there is a clock relationship between source and destination. The bit rates are the same on the destination and source.

**ITU-T.** International Telecommunication Union - Telecommunication (replaces CCITT).

**jitter.** Undesirable variations in the transmission delay of a digital signal. Also called cell delay variation (CDV).

**KB.** Kilobyte (storage capacity, 1024 bytes).

**kbps.** Kilobit per second (1000 bits per second).

**LAN.** Local area network.

**LAPB.** Link access procedure for B-channel.

**LAPD.** Link access procedure for D-channel.

**LCB.** Line connection box.

**LCBB.** Line connection box, base (LCEB and LCPB).

**LCBE.** Line connection box, expansion (LCEE and LCPE).

**LCEB.** Line connection enclosure, base.

**LCEE.** Line connection enclosure, expansion.

**LCPB.** Line connection power, base.

**LCPE.** Line connection power, expansion.

**LCR.** Least cost routing.

**LED.** Light-emitting diode.

**LICn.** Line interface coupler type n (module).

**line.** In a 2220 network, any physical medium, such as a telephone wire, microwave beam, or optical fiber, that transmits information. A line can be a trunk line or a port line.

**line connection box (LCB).** A metallic box that:

- Multiplexes up to 15 low-speed lines. There can be up to four LCBs per LIC type 511 for a total of 60 lines (two LCBs and 30 lines per LIC connector).
- Reduces cable lengths between Nways Switch and DCE or DTE locations.

An LCB fits in a standard 19-inch rack. Each one houses up to 15 active remote connectors (ARCs).

**line interface coupler (LIC).** In an Nways Switch, a module that physically attaches trunk or port lines. Each line interface coupler is associated with a trunk or port adapter, and supports specific line interfaces.

**LIV.** Link integrity verification.

**LMI.** Local management interface.

**local area network (LAN).** A computer network located on a user premises in a limited geographical area.

**logical port.** (Also called NBBS port.) A logical resource generated by the Nways Switch Control Program to provide access services to a physical port line (or channel of a TDM port line) using HDLC, FR, or CES protocol. A logical port sets up and maintains its predefined connections.

**logical trunk.** (Also called NBBS trunk.) A logical resource generated by the Nways Switch Control Program to provide transport services to a physical trunk line (or channel of a TDM trunk line). A logical trunk is mainly responsible for optimizing bandwidth and maintaining the CP spanning tree.

**LSAn.** Low-speed adapter type n (module).

**MA/SR.** Multi-access/sub-rate.

**management access.** Refers to an Nways Switch that connects a network management station or a change control server to a 2220 network through its service bus, which is a dedicated Ethernet LAN.

**MB.** Megabyte (storage capacity, 1 048 576 bytes).

**Mbps.** Megabit per second (10 to the power of 6 bits per second).

**MBS.** Maximum burst size.

**MLT.** Multiple logical trunks.

**module.** In an Nways Switch, a hardware unit plugged in a slot of the logic subrack. It houses, for example, an adapter, a line interface coupler, or a voice server extension. All modules are hot pluggable.

**ms.** Millisecond (1/1000 second).

**NAS.** Nways Switch administration station.

**NBBS.** Networking BroadBand Services (architecture).

**NBBS architecture.** See Networking BroadBand Services.

**NBBS connection.** See potential connection and virtual connection.

**NBBS network.** A network built with IBM 2220 Nways BroadBand Switches and conforming to the IBM Networking BroadBand Services (NBBS) architecture.

**NBBS port.** See logical port.

**NBBS trunk.** See logical trunk.

**NCT2.** Nways Switch Configuration Tool Version 2.

**NDPS.** Non-disruptive path switching.

**NEM.** Nways Enterprise Manager (see 2220 Nways Switch Manager).

**network control.** Functions that are performed by an Nways Switch control point to:

- Allocate and control the Nways Switch resources
- Provide topology and directory services

- Select routes
- Control congestion.

**network management station (NMS).** A station that runs IBM NetView for AIX and the 2220 Nways Switch Manager. It is used to manage network topology, accounting, performance, configuration, and error reporting.

**network node interface (NNI).** An interface between nodes in a communication network.

**Network Support Center (NSC).** A location from which IBM remotely supports 2220 networks.

**Networking BroadBand Services (NBBS).** An IBM architecture for high-speed networking that complements ATM standards and provides access services, transport services, and network control to user traffic.

**NIC.** Network Information Center.

**NMS.** Network management station.

**NNI.** Network node interface.

**NPT.** Numbering plan table.

**NR.** Non-reserved.

**NRT.** Non-real-time.

**NRZI.** Non-return-to-zero inverted recording.

**NRZ-1.** Non-return-to-zero change-on-ones recording.

**NSAP.** Network service address point.

**NSC.** Network Support Center.

**NSM.** (See 2220 Nways Switch Manager)

**NVDM.** NetView Distribution Manager for AIX.

**NTT.** Nippon Telegraph & Telephone (Corporation).

**numbering plan table (NPT).** A set of parameters, organized in origin NPT and destination NPT, that defines a type of called ISDN numbers. A numbering plan table is associated with each ISDN network interface.

**Nways 2220 Switch Manager (2220 Switch Manager).** An IBM licensed program that runs under NetView for AIX to manage the 2220 Nways Switch operation and configuration from a network management station. It replaces the Nways Enterprise Manager (NEM) which is no longer available.

**Nways BroadBand Switch.** Synonym for 2220 Nways BroadBand Switch.

**Nways Enterprise Manager (NEM).** An IBM licensed program that was used under NetView for AIX in a network management station to manage Nways Switches, routers, and bridges in a 2220 network (see 2220 Nways Switch Manager).

**Nways Switch.** Synonym for 2220 Nways BroadBand Switch.

**Nways Switch administration station (NAS).** A station attached to each 2220 to run the Control Program, and control and service the Nways Switch locally.

**Nways Switch configuration station.** A mandatory OS/2 or AIX station that runs a stand-alone version of the Nways Switch Configuration Tool Version 2 (NCT2) and stores the centralized configuration database of the NBBS network. An OS/2 station can be used as a remote user console.

**Nways Switch Configuration Tool Version 2 (NCT2).** A component of the Nways Switch Control Program that is used to configure physical and logical resources. It is also used in stand-alone version under OS/2 or AIX .

**Nways Switch Control Program.** The IBM licensed program that runs in the NAS and adapters of the 2220 Nways Switch. It includes a CMIP agent to work with the 2220 Switch Manager.

**Nways 2220 Switch Manager for AIX.** (See Nways 2220 Switch Manager)

**Nways Switch Resource Control.** A component of the Nways Switch Control Program. It is used from the NAS of an Nways Switch or from a remote user console to control resources and configuration files.

**OAM.** Operation, administration, and maintenance.

**OC3.** Optical carrier level 3.

**ONPT.** Origin numbering plan table.

**operation, administration, and maintenance (OAM).** A group of functions coded in specific ATM cells to handle alarms and loopback tests on ATM connections.

**optical fiber.** In fiber optics technology, a wave guide that propagates optical signals from light-generating transmitters to light-detecting receivers.

**OSI.** Open systems interconnection.

**packet loss ratio.** The probability that a packet will not reach its destination or not reach it in a specified



time. It is obtained by dividing the number of packets lost in transmission by the total number transmitted.

**packet transfer mode (PTM).** The native transfer mode of the NBBS architecture. PTM divides the traffic into packets of variable length.

**PBX.** Private branch exchange.

**PCM.** Pulse code modulation.

**PCR.** Peak cell rate.

**PDH.** Plesiochronous digital hierarchy.

**permanent virtual circuit (PVC).** A virtual circuit that has a logical channel permanently assigned to it at each item of data terminal equipment. It is activated by a program or by a network operator request.

**plesiochronous.** Refers to transmission at a nominal bit rate where the source and destination are controlled by different clocks. The bit rates are nearly the same.

**PLP.** Packet layer protocol.

**PNP.** Private numbering plan.

**port.** See logical port.

**port adapter.** In an Nways Switch, a module that provides access services to one or more port lines. Each port adapter is associated with a line interface coupler (LIC).

**port line.** A communication line that connects a device on user premises to an Nways Switch and serves as a port to the 2220 network. Port lines have different protocols and interfaces.

**position.** When configuring an Nways Switch, the position parameter indicates the line attachment number on the LIC module (1 to 8, depending on the LIC type).

**potential connection.** A predefined connection through a 2220 network between two HDLC, CES, or frame-relay devices.

**PPP.** Point-to-point protocol.

**PRA.** Primary Rate Access.

**private branch exchange (PBX).** A switching system located on a user premises that relays inside lines (extensions) and provides access to the public telephone network.

**PRS.** Primary reference source.

**PSDN.** Packet switched data network.

**PSN.** Public switched network.

**PSTN.** Public switched telephone network.

**PTF.** Program temporary fix.

**PTM.** Packet transfer mode.

**PTNX.** Private telecommunications network exchange.

**pulse code modulation (PCM).** A standard adopted for the digitalization of analog voice signals. In PCM, voice is sampled at a rate of 8 kHz and each sample is coded in an 8-bit frame.

**PVC.** Permanent virtual circuit.

**Q signaling (QSIG).** An international standard for signaling procedures in private telecommunication networks. It applies to the PBX-to-Nways Switch interface, which is called the Q reference point.

**QoS.** Quality of service.

**QSIG.** Q signaling.

**quality of service (QoS).** In a 2220 network, a set of parameters that guarantees the characteristics of a connection, mainly its end-to-end delay, delay variation, and packet loss tolerance.

**RABM.** Router and Bridge Manager.

**rack.** A metallic structure, with a standard 19-inch width, that houses the hardware elements of an Nways Switch, that is, logic subrack with modules, fan boxes, and power units.

When configuring an Nways Switch, the rack parameter indicates the 2220 Model (rack A is the Model 300 or 500, and rack B is the Model 501).

**RDI.** Remote defect indication.

**real-time processing.** Refers to the manipulations of data that are required, or generated, by certain process while the process is in operation. Usually, the results influence the process and, perhaps, related processes.

**remote user console.** A station running OS/2, TCP/IP, and Nways Switch Resource Control. It can be connected to the NAS of an Nways Switch to remotely control and service it.

**resource.** In an Nways Switch, a hardware element or a logical entity created by the Control Program. Adapters, modules, and line attachments are examples of physical resources. Control points, logical trunks, logical ports, and network interfaces are examples of logical resources.

**resource profile.** A record of the characteristics of an Nways Switch resource. It includes (for example) the

part number or module name, the change level, and the name and phone number of the person to contact when a problem occurs.

**RETAIN.** Remote Technical Assistance Information Network

**RIP.** Route Information Protocol.

**router.** An attaching device that connects two LAN segments of the same or different architectures. It can also be connected to a wide area network. A router works at the network level (layer 3) of the OSI reference model by determining the best paths for network traffic flows.

**Router And Bridge Manager.** An application that provides distributed management for routers such as the IBM 2210 or 2216, bridges such as the IBM 8229, and communication controllers such as the IBM 3746 in IP mode.

**RS.** Recommended specification.

**RSF.** Remote support facility.

**RSN.** Receive sequence number.

**RT.** Real-time.

**RVX.** RS/EIA-232, V.24/V.35, X.21.

**s.** Second.

**SCR.** Sustainable cell rate.

**SDH.** Synchronous digital hierarchy.

**SDLC.** Synchronous data link control.

**SDT.** Structured data transfer.

**serial line internet protocol (SLIP).** A TCP/IP protocol used on a point-to-point connection between two IP hosts over a serial line (for example, an RS/EIA-232 connection to a modem over a telephone line).

**SLA.** Serial link architecture.

**SLIP.** Serial line internet protocol.

**slot.** When configuring an Nways Switch, the slot parameter indicates the module location (1 to 12) in the logic subrack.

**SNA.** Systems Network Architecture.

**SNMP.** Simple Network Management Protocol.

**SONET.** Synchronous optical network.

**spanning tree.** See CP spanning tree.

**SRC.** System reference code.

**SSN.** Send sequence number.

**station.** A microcomputer that is connected to a host or a network and at which a user can run applications.

**STM-1.** Synchronous transport module type 1.

**STS-3c.** Synchronous transport signal type 3 concatenated.

**SUB.** Subaddress.

**subrack.** A metallic structure installed in an Nways Switch rack. A logic subrack holds modules. A power subrack holds power supply components.

**SVC.** Switched virtual circuit.

**SW.** Switch (module).

**switch module (SW).** A module of the 2220 Model 300 or 500 that interconnects the adapters through an ATM cell switch. It can have a backup.

**switch redrive (SWRD).** A module of the 2220 Model 501 that drives the signals from the switch module in the Model 500 to the adapters of the Model 501. It can have a backup.

**SWRD.** switch redrive (module)

**switched virtual circuit (SVC).** A connection set up from a calling address to a called address following a call establishment protocol. It is released when a clear request signal is received.

**synchronous digital hierarchy (SDH).** A international recommendation for the internal operation of carrier optical networks.

**synchronous optical network (SONET).** A U.S. standard for transmitting digital information over optical interfaces. It is closely related to the international recommendation for synchronous digital hierarchy (SDH).

**T1 standard.** A TDM digital transmission service with a basic rate of 1.544 Mbps. Also called DS-1.

**T3 standard.** A TDM digital transmission service with a basic rate of 44.736 Mbps. A T3 line can transport up to 28 T1 circuits. Also called DS-3.

**TCPA.** Trunk and control point adapter.

**TCP/IP.** Transmission Control Protocol/ Internet Protocol.

**TDM.** Time division multiplexing.

**TE.** Terminal equipment.

**Telnet.** In TCP/IP, an application protocol that allows a user at one site to access a remote system as if the display station were locally attached. Telnet uses the Transmission Control Protocol (TCP) as the underlying protocol.

**time division multiplexing (TDM).** The process of breaking the bandwidth on a communication line into a number of channels, possibly of different size.

**TME.** Tivoli Management Environment.

**TMN.** Telecommunication Management Network.

**TPA.** Trunk or port adapter.

**Transmission Control Protocol/ Internet Protocol (TCP/IP).** A set of communication protocols that support peer-to-peer connections over both local and wide area networks.

**transport services.** Functions that are performed by a trunk adapter of an Nways Switch to:

- Support the attachment of trunk lines
- Maximize bandwidth utilization
- Guarantee the quality of service of a connection
- Transfer packets between Nways Switches
- Manage logical queues and schedule transmission.

**trunk.** See logical trunk.

**trunk adapter.** In an Nways Switch, a module that provides transport services to one or more trunk lines. Each trunk adapter is associated with a line interface coupler (LIC).

**trunk line.** In a 2220 network, a high-speed line connecting two Nways Switches. It can be, for example, a copper cable, optical fiber, or radio wave guide and can be leased from telecommunication companies.

**UBR.** Unspecified bit rate. A best effort service with no quality commitment.

**UNI.** User network interface.

**UPC.** Usage parameter control.

**URL.** Uniform resource locator.

**user network interface (UNI).** A standardized interface between a user and a communication network.

**UTC.** Universal time, coordinated.

**UUS.** User-user signaling.

**VBR.** Variable bit rate.

**VC.** Virtual channel.

**VCC.** Virtual channel connection.

**VCI.** Virtual channel identifier.

**VCN.** Virtual circuit number.

**virtual channel (VC).** In ATM, a unidirectional route between two ATM devices. Virtual channels always come in pairs, one in each direction. They follow virtual paths.

**virtual channel connection (VCC).** In ATM, a unidirectional connection established over a virtual channel. Virtual channel connections always come in pairs, one VCC in each direction.

**virtual channel identifier (VCI).** In ATM, the unique numeric tag that identifies every channel. It is defined by a 16-bit field in the ATM cell header.

**virtual connection.** In frame relay, the return path of an FR potential connection.

**virtual path (VP).** In ATM, a group of virtual channels that are switched together as one unit. (Also called VC service.)

**virtual path connection (VPC).** In ATM, a connection established over a virtual path. Virtual path connections always come in pairs, one VPC in each direction. (Also called VP service.)

**virtual path identifier (VPI).** In ATM, an 8-bit field in the ATM cell header that indicates the virtual path over which the cell is to be routed.

**voice server adapter (VSA).** In an Nways Switch, a module that supplies additional voice functions to voice connections operating in pulse code modulation at 64 kbps. It can attach a voice server extension (VSE).

**voice server extension (VSE).** In an Nways Switch, a module associated with a voice server adapter (VSA) to supply voice functions to an extended number of PCM voice connections.

**VP.** Virtual path.

**VPC.** Virtual path connection.

**VPD.** Vital product data.

**VPI.** Virtual path identifier.

**VPN.** Virtual private network.

**VSA.** Voice server adapter (module).

**VSEn.** Voice server extension type n (module).

**WAN.** Wide area network.

**wide area network (WAN).** A network that provides communication services to a large geographic area. It can use or provide public communication facilities.

**window.** On the screen of a station, an area with a title bar, a menu bar, and scroll bars.

**X.25 hunt group.** A group of X.25 network interfaces associated with one common subscriber address. If an interface is busy, the connection searches (hunts) for

the other interfaces of the group until a free one is found.

**X.25 network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical X.25 port line. An X.25 network interface sets up and maintains connections between calling X.25 subscribers and called subscribers attached to other Nways Switches.

**X.25 Recommendation.** An international standard for the interface between data terminal equipments and packet-switched networks.

**X.25 subscriber.** An X.25 end-user connected to an X.25 network interface through a DTE. A subscriber is defined by an address and a logical name.

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This section lists prerequisite and related publications.

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- *How to use the NAS*, online tutorial<sup>1</sup>
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- *IBM Nways 2220 Switch Manager User's Guide*, online manual<sup>2</sup>

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<sup>1</sup> Online documentation delivered with the 2220 Nways Switch Control Program.

<sup>2</sup> Online documentation delivered with the Nways 2220 Switch Manager product.

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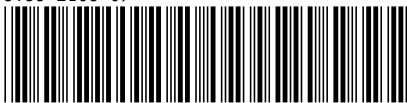




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