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AccessWare 2000 R1.1 Installation and Maintenance Guide

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DIE GERÄTE ERDEN

Diese Geräte müssen geerdet werden. Um die Gefahren eines Elektroschocks zu vermeiden, muß das Gerätegehäuse elektrisch geerdet werden. Verwenden Sie ausschließlich das mit dem Gerät mitgelieferte Anschlußkabel. Schließen Sie das Kabel nur an eine gehörend geerdete Steckdose mit 220-240 V, 50-60 Hz an.

AN- UND ABKUPPELN DER GERÄTE

BRI Linien sind SELV -Verbindungen und dürfen entweder unmittelbar an das öffentliche Netz angeschlossen werden, oder mittelbar über ein genehmigtes NT1. Für den Anschluß des RS-232 Bedienpult muß ein genehmigtes Modem eingesetzt werden.

G.703/G.704 1,544 Mbit/s Verbindungen, wie QDIU, PRIU und T1IU, sind SELV-Verbindungen, die nicht genügend Isolation enthalten, um unmittelbar an das Netz gekuppelt zu werden und daher eine genehmigte Schränke brauchen. Der SAIU darf nur an Terminalgeräte gekuppelt werden. Auf diese Kupplungen induzierte gefährliche Spannungen können andere Schnittstellen auf eine gefährliche Spannung bringen.

Nie Geräte in nassen oder feuchten Räumen ankuppeln.

Die Geräte abkuppeln, indem Sie das Stromkabel ziehen.

Das Stromkabel nie während eines Gewitters an- oder abkuppeln.

DAS GERÄT NICHT ÖFFNEN

Nie das Gerätegehäuse entfernen oder auf eine andere Weise das Gerät öffnen, es gibt keine Teile die vom Anwender gewartet werden können. Keine Finger oder irgendwelche Gegenstände in die Öffnungen der Rückseite einführen.

FÜR GERÄTE MIT EINER ERSETZBAREN LITHIUMBATTERIE

VORSICHT

Bei fehlerhaftem Ersatz der Batterie entsteht Explosionsgefahr. Die Batterie darf nur mit einer Batterie desselben Typs oder einer als gleichwertig vom Hersteller empfohlenen Batterie ersetzt werden. Die erschöpfte Batterien gemäß den Herstellervorschriften entsorgen.

NUR FÜR DAS MODELL 200 EX AccessSwitch

Sie müssen eine Verbindung mit einer verbesserten Sicherheitserdung herstellen für das Land, wo das System aufgestellt wird. Legen Sie einen #10 AWG Erdungsdraht von der Rückseite des AccessSwitch Rahmens an eine genehmigte Sicherheitserdung.

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MISE À LA TERRE DE L'INSTALLATION

Cette installation doit obligatoirement être mise à la terre. Pour réduire les risques de choc électrique, le châssis doit être relié à la terre. N'utiliser que le cordon d'alimentation électrique fourni avec l'installation. Brancher le cordon d'alimentation électrique uniquement dans une prise murale 220-240 V, 50-60 Hz, convenablement mise à la terre.

BRANCHEMENT ET DÉBRANCHEMENT DE L'INSTALLATION

Les lignes BRI sont des branchements SELV, lesquels peuvent être reliés au réseau soit directement, soit indirectement par le biais d'un NT1 agréé. Il y a lieu d'utiliser un modem agréé pour connecter la console de gestion R8-302.

Les connexions G.703/G.704 de 1.544 Mbit/s, telles la QDIU, la PRIU et la T1IU, sont des connections SELV insuffisamment isolées pour pouvoir être directement branchées sur le réseau. Il est dès lors recommandé d'utiliser une séparation agréée. La SAIU est conçue pour être connectée uniquement à un équipement terminal. Les hautes tensions auxquelles sont soumises ces connexions peuvent soumettre d'autres interfaces à des hautes tensions.

Ne jamais connecter l'installation en un lieu humide.

Déconnecter l'installation en ôtant le cordon d'alimentation électrique.

Ne jamais connecter ni déconnecter le cordon d'alimentation électrique par temps d'orage.

NE PAS OUVRIR LE CHÂSSIS

Ne jamais ôter le couvercle ni ouvrir le châssis de l'appareil. Il ne contient aucun élément susceptible d'être entretenu par l'utilisateur. Ne pas introduire de doigts ou autres objets par les orifices pratiqués dans le panneau arrière.

POUR LES APPAREILS NÉCESSITANT UNE PILE AU LITHIUM REMPLAÇABLE

ATTENTION

Il y a risque d'explosion si vous ne remplacez pas correctement la pile. Remplacez-la par une pile identique ou par une pile recommandée comme équivalente par le fabricant. Débarrassez-vous des piles usées conformément aux consignes du fabricant.

POUR LE MODÈLE 200_ZX AccessSwitch UNIQUEMENT

Il vous faut prévoir une mise à la terre améliorée pour le pays dans lequel le système est installé. Connecter un câble de terre #10 AWG à l'arrière du châssis de l'AccessSwitch à la terre réglementaire.

UNITED STATES OF AMERICA FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS

The FCC has established rules that permit Initia, Inc. (New Jersey) products to be connected to the telephone network through an approved barrier such as a CSU or modem. Standardized jacks (RJ48C) are used for these connections.

Initia products comply with Part 15 and Part 68 of FCC Rules. The FCC Registration Number is shown on a label located on the rear panel of the unit. The registration number must be provided to the telephone company if requested.

When ordering service, you must provide the following information to the telephone company:

Facility Interface Codes:	04DU9 - BN
	04DU9 - DN
	04DU9 - 1KN
	04DU9 - 1SN
	02LS5
Service Order Code:	6.0N, 6.0F
USOC Jack:	RJ48C

If requested, you must also provide the telephone company with the FCC Registration Number, make and model number, all of which appear on the label which is located on the outside of the equipment.

This equipment generates, uses, and can radiate radio frequency energy and may cause interference to radio communications if not installed and used in accordance with the instructions provided. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to subpart J of Part 15 of FCC Rules, which provide for reasonable protection against such interference in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. You would then be required to take whatever measures may be needed to correct the interference at your own expense.

This equipment is not intended for carrier-provided coin service, and is not to be connected to party lines.

If the telephone company should make any changes to their technical operations and/or procedures that would affect the compatibility or use of this device, the telephone company is required to give you adequate notice.

If this equipment malfunctions, it may cause harm to the telephone network. In such event, the equipment should be disconnected until the malfunction has been corrected. You are required to notify the telephone company whenever this equipment is disconnected from the network. If it is not disconnected during a malfunction, the telephone company may temporarily discontinue your service. The telephone company should notify you of the disconnect in advance if possible, or as soon as possible. They will also inform you of your right to file a complaint with the FCC.

If you experience trouble with this equipment, please contact the Initia National Support Center at the following address for information about obtaining service:

Initia, Inc. (New Jersey)
6 Industrial Way
Eatontwon, NJ 07724
800-822-4736

All repairs should only be performed by Initia, Inc. or an authorized agent of Initia, Inc. Furthermore, any unauthorized modifications or repairs of the equipment may result in the loss of your right to connect the equipment to the telephone network.

UNITED STATES OF AMERICA FEDERAL COMMUNICATIONS COMMISSION (FCC) NOTICES

- Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of part 68 of FCC rules.

PROPER ANSWER SUPERVISION IS WHEN:

A. This equipment returns answer supervision to the PSTN when DID calls are:

- Answered by the called station.
- Answered by the attendant
- Routed to a recorded announcement that can be administrated by the CPE user.
- Routed to a dial prompt.

B. This equipment returns answer supervision on all DID calls forwarded to the PSTN.
Permissible exceptions are as follows:

- A call is unanswered.
- A busy tone is received
- A reorder tone is received

Initia, Inc. (New Jersey) attests that this registered equipment is capable of providing users access to interstate providers of operator services though the use of equal access codes.

This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act " of 1990".

The software contained in IAP20, IAP60, IAP M200, and IAP M200EX has features which allow user access to the network. These features must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service.

Failure to upgrade premises systems or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customers employees from gaining access to the network and to these codes.

Bell Communications Research (Bellcore) publishes the North American Numbering Plan (NANP) information in paper, microfiche and tape. An abbreviated summary of the newly established area codes and exchange codes is also available. Bellcore may be contacted on (908) 699-6700 to obtain appropriate information to keep customer equipment upgraded.

Installation of an ac surge arrestor in the ac outlet to which the equipment is connected is recommended. Telephone companies report that as a major nationwide problem, electrical surges, typically lighting transients, are very destructive to terminal equipment connected to ac power sources.

CANADIAN DEPARTMENT OF COMMUNICATIONS (DOC) REQUIREMENTS

NOTICE

The Canadian DOC label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

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

CAUTION

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

NOTICE

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100."

The DOC label is located on the outside of the equipment.

IF YOU EXPERIENCE TROUBLE WITH THIS EQUIPMENT, PLEASE CONTACT THE INITIA NATIONAL SUPPORT CENTER FOR INFORMATION ABOUT OBTAINING SERVICE.

Initia, Inc. (New Jersey)
6 Industrial Way
Eatontown, New Jersey 07724 USA
800-822-4736

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WARNINGS

(FOR LOCATIONS OUTSIDE OF THE U.S. AND CANADA)

THE FOLLOWING PRECAUTIONS MUST BE OBSERVED BEFORE AND DURING ALL PHASES OF OPERATION OF THE EQUIPMENT. FAILURE TO COMPLY WITH THESE PRECAUTIONS OR SPECIFIC WARNINGS IN OTHER INITIA, INC. (NEW JERSEY) DOCUMENTATION MAY CAUSE PHYSICAL HARM TO THE OPERATOR OR TO THE EQUIPMENT. INITIA ASSUMES NO LIABILITY FOR FAILURE OF THE OPERATOR TO COMPLY WITH THESE REQUIREMENTS.

GROUND THE EQUIPMENT

This equipment must be earthed. To minimize shock hazard, the equipment chassis must be connected to an electrical ground. Use only the power cord provided with the equipment. Connect power cord only to a properly grounded wall outlet using 220-240V~, 50-60 Hz.

CONNECTING AND DISCONNECTING THE EQUIPMENT

BRI lines are SELV connections and are allowed to be connected to the network directly, or indirectly through an approved NT1. An approved modem must be used for the RS-232 management console connection.

G.703/G.704 1.544 Mbit/s connections, such as the QDIU, PRIU and T1IU, are SELV connections which do not contain sufficient insulation to connect directly to the network and therefore must use an approved barrier. The SAIU is intended for connection to terminal equipment only. Hazardous voltages induced on these connections may cause other interfaces to be at hazardous voltage.

Never connect equipment in a wet or damp location.

Disconnect equipment by detaching the power cord.

Never connect or disconnect the power cord during a lightning storm.

DO NOT OPEN THE CHASSIS

Never remove the equipment cover or otherwise open the chassis, no user serviceable parts are located inside. Do not insert fingers or other objects through rear panel holes.

FOR EQUIPMENT USING A REPLACEABLE LITHIUM BATTERY
CAUTION

Danger of explosion if batter is replaced incorrectly. Replace the battery only with the same battery or a battery which is recommended as equivalent by the manufacturer. Dispose of expired battery according to the manufacturer's instructions.

FOR MODEL 200_EX AccessSwitch ONLY

You must provide a connection to an improved safety ground for the country the system is installed.. Connect a #10 AWG ground wire to the rear of the AccessSwitch chassis to the approved safety ground.

WARNINGS

(U.S. AND CANADA)

THE FOLLOWING PRECAUTIONS MUST BE OBSERVED BEFORE AND DURING ALL PHASES OF OPERATION OF THE EQUIPMENT. FAILURE TO COMPLY WITH THESE PRECAUTIONS OR SPECIFIC WARNINGS IN OTHER INITIA, INC. DOCUMENTATION MAY CAUSE PHYSICAL HARM TO THE OPERATOR OR TO THE EQUIPMENT. INITIA, INC. ASSUMES NO LIABILITY FOR FAILURE OF THE OPERATOR TO COMPLY WITH THESE REQUIREMENTS.

GROUND THE EQUIPMENT

This equipment must be grounded. To minimize shock hazard, the equipment chassis must be connected to an electrical ground. Use only the three-conductor AC power cord provided with the equipment. The power cord must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adaptor with grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet.

CONNECTING AND DISCONNECTING THE EQUIPMENT

Do not connect equipment directly to the network; an approved barrier must be used. An approved CSU for PRI and T1 and/or a NT1 for BRI must be used. For the RS-232 management console connection an approved modem must be used.

Never connect equipment in a wet or damp location.

Disconnect equipment by detaching the power cord.

Never connect or disconnect the power cord during a lightning storm.

DO NOT OPEN THE CHASSIS

Never remove the equipment cover or otherwise open the chassis, no user serviceable parts are located inside. Do not insert fingers or other objects through rear panel holes.

FOR EQUIPMENT USING A REPLACEABLE LITHIUM BATTERY

CAUTION

Danger of explosion if battery is replaced incorrectly. Replace the battery only with the same battery or a battery which is recommended as equivalent by the manufacturer. Dispose of expired battery according to the manufacturer's instructions.

Contents

Chapter 1

Introduction

1.1 Introduction

The AccessSwitch is a high-capacity, high-performance network-access and switching system that is available in several expandable models. This manual describes the installation process, hardware, alarms, and the software upgrade procedure of the expandable slotted models.

The AccessSwitch product line consists of slotted hubs which are chassis-based configurable units designed for use with digital-network interface modules. These are available as either a 6-slot chassis (AccessSwitch 60) or 20-slot chassis (AccessSwitch 200).

The AccessSwitch (which runs AccessWare™ system software) is managed by the network management console - LMC/NMC. The network management console software contains extensive dial-plan and call-handling capabilities, allowing flexible network access to switched and dedicated networks, while offering a wide range of protocol and service conversions. Information on the network management console software is provided in the *LMC/NMC 10.0 User Guide*.

1.2 AccessSwitch Hardware Support for AccessWare 2000 R1.1 system software

AccessSwitch plug-in modules include digital-network interface cards to support T1, ISDN Primary Rate, and E1 Primary Rate high-speed synchronous data modules with, or without inverse-multiplexing, ISDN Basic Rate interface modules, and multipoint conference unit (MCU).

Table 1.1 shown below identifies the interface modules supported by AccessWare 2000 R1.1 system software. If any interface modules, other than those shown below, are installed in your system, please contact the Initia National Support Center at 1-800-822-4736 prior to installing AccessWare 2000 R1.1 system software.

Table 1.1 AccessWare 2000 R1.1 system software Interface Modules

Interface Modules
INP4D w/Redundant I/O INP4D w/RJ45 x 9 I/O EMI
DDIU_EX QDIU_EX
QEIU_EX DEIU_EX SEIU_EX
OBIU OBIU-U
MCU4
QRVX (4) IMUX X.21 EMI QRVX (4) IMUX V.35 EMI QRVX (4) IMUX RS449 EMI QRVX (0) X.21 EMI QRVX (0) V.35 EMI QRVX (0) RS449 EMI
DRVX (2) IMUX X.21 EMI DRVX (2) IMUX V.35 EMI DRVX (2) IMUX RS449 EMI DRVX (0) X.21 EMI DRVX (0) V.35 EMI DRVX (0) RS449 EMI

1.2.1 Included software applications

The following software programs are included with the AccessSwitch:

- AccessWare 2000 R1.1 system software

  AccessWare 2000 R1.1 is the system software that runs on the AccessSwitch.

- LMC/NMC Management Console software

  LMC/NMC software allows you to provision and manage the AccessSwitch. Over a serial connection (direct or modem), you are able to control and provision all network interaction, such as peripheral board network interfacing, multipoint videoconference control, inverse multiplexing, and call-by-call switching between all ISDN network trunks and ports. The console software runs on Microsoft Windows®.

- Installation Software

  Use Softload to upgrade the system software on the AccessSwitch.

1.3 AccessWare 2000 R1.1 features

AccessWare 2000 R1.1 system software contains the following new features:

- Support for Overlap Addressing on E1 trunks.

1.4 This guide at a glance

Before installing and provisioning the AccessSwitch, it is important that this manual is read in its entirety. This guide is divided into six chapters, each of which is described below, and contains a list of acronyms (Appendix A), a glossary (Appendix B), supplemental information on Code Download, SoftLoad instructions, and an index.

- *Chapter 1: Introduction*

  Chapter 1 provides a quick overview of the AccessSwitch.

- *Chapter 2: Installation*

  Chapter 2 provides information on locating and installing the AccessSwitch. Hardware instructions for connecting the network management ports are also included.

- *Chapter 3: Upgrading system software on the hub*

  Chapter 3 contains instructions for upgrading system software on an AccessSwitch system.

- *Chapter 4: Maintenance and Alarms*

  Chapter 4 describes the alarm LEDs on the board faceplates. A brief overview of the alarm unit is provided, and information on alarms and maintenance for specific boards is included. Also included in this chapter is a table which lists and describes all possible alarms.

- *Chapter 5: Hardware Description*

  Chapter 5 describes the chassis and power supplies contained in the system. Signal descriptions and pinout specifications are provided for each peripheral board and dialing interface. This chapter also provides cable specifications and descriptions.

- *Chapter 6: Technical Specifications*

  Chapter 6 contains information on peripheral board interface compatibility, system and peripheral board parameters, and Q.921 and Q.931 standards.

- *Appendix A: Acronyms*

  Appendix A contains a list of acronyms used throughout the AccessSwitch manuals.

- *Appendix B: Glossary*

  Appendix B contains words, acronyms, and common Wide Area Network (WAN) terms used throughout the AccessSwitch manuals.

- *Appendix C: SoftLoad*

  Appendix C contains detailed information about SoftLoad. Also included is troubleshooting information.

1.5 Related documentation

For additional related information on the AccessSwitch, refer to the following documentation:

- *LMC/NMC 10.0 User Guide*

  This guide describes the use of the LMC/NMC software required to operate the AccessSwitch. Instructions for installing the AccessWare2000 R1.1 system and LMC/NMC console software, provisioning the AccessSwitch, and operating all videoconferencing capabilities are included in this guide.

- *Quick Start Guide for AccessWare 2000 R1.1 and LMC/NMC 10.0*

  This Quick Start Guide contains specific information to help you install and configure the AccessWare 2000 R1.1 and LMC/NMC 10.0 software and provision your AccessSwitch quickly.

- *AccessWare 2000 R1.1 Release Notes*

  These notes contain updates and information which was not included in the manuals.

Chapter 2

Installation

2.1 Introduction

Warning: Read this chapter before attempting to power up the AccessSwitch. Equipment must be installed by authorized personnel only.

This chapter provides procedures for locating, loading, and starting up an AccessSwitch. Brief descriptions of the AccessSwitch chassis, power supplies, and peripheral boards are also provided.

Proper installation and configuration requires familiarity with the architecture of the AccessSwitch, its components, and the overall design of the network. We recommend that you read this chapter in its entirety before installing and configuring the AccessSwitch.

Note: Unless otherwise specified, this manual uses the product family name of AccessSwitch to describe the AccessSwitch 60 and the AccessSwitch 200.

2.2 Installation Overview

The following is a list of the procedures involved in installing and starting up the AccessSwitch. Complete the procedures in the order in which they appear; each one is described in detail in subsequent sections of this chapter.

1. Unpack the equipment.
2. Inspect all equipment.
3. Select an AccessSwitch installation location.
4. Provide power and grounding.
5. Mount the AccessSwitch chassis.
6. Install the management console software (NMC). Refer to the appropriate user guide for instructions on installing management software.
7. Power up and test the management console.
8. Install terminal equipment, cabling, and network connections.
9. Power up and test the AccessSwitch.

2.2.1 Installation precautions

Warning: This section provides important information about working with electrical equipment.

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations, unless the jacks are specifically designed for such use.
3. Never touch uninsulated telephone wires or terminals.
4. Use caution when installing or modifying telephone lines.
5. For locations outside of North America, BRI lines are low voltage (SELV) connections and may be connected directly or indirectly to the network via an approved NT1.
6. The RS232 network management console connection must use an approved modem/terminal adapter to connect to the network.
7. The G.703/G.704 1.544 Mbps connections are SELV connections and should only be connected to the network through an approved channel service unit (CSU).
8. The QRVX/DRVX peripheral cards are intended for connection to terminal equipment. Hazardous voltage induced on this connection may cause other interfaces to produce hazardous voltage.
9. Never remove the chassis cover. Hazardous voltage contained inside may result in injury. No user serviceable parts are contained inside.
10. Ensure the power cord and plug are approved for connection to mains.
11. Never connect equipment in a wet location.
12. Never connect or disconnect the AccessSwitch during a lightning storm.
13. To disconnect an AccessSwitch 60, turn the power switch (AC switch) to off. For an AccessSwitch 200, disconnect the unit by detaching the power cord from the electrical outlet.

14. The AccessSwitch must be grounded as described in Section 2.3.5.
15. A restricted access area must be provided for AccessSwitch 200 systems that contain a 48-volt DC power supply.
16. For the equipment to be compliant with FCC and European EMC requirements, all I/O cables must be shielded.

2.2.2 Preventing electrostatic discharge damage

Electrostatic discharge (ESD) damage, which can occur when electronic components are improperly handled, can result in complete or intermittent failures. AccessSwitch peripheral boards consist of a printed circuit board inserted in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps protect the boards from ESD, whenever the boards are handled, a preventative antistatic strap must be used. This strap is provided with each AccessSwitch.

The following guidelines are provided to help prevent ESD damage:

- Place the antistatic strap, supplied with your shipment, on your wrist. Connect the equipment end of the strap to an earth ground. On the AccessSwitch 200 chassis, connect the antistatic strap to one of the two ESD jacks located on the chassis. The ESD jacks serve as the earth ground. One ESD jack is located on the front top right corner, a second ESD jack is located on the rear bottom left of the AccessSwitch 200. On an AccessSwitch 60, connect the equipment end of the strap to the metal of the chassis.

  Figure 2.1 illustrates the AccessSwitch 200 chassis and the rear ESD jack connection.
- Ensure the antistatic wrist strap fits firmly around your wrist.
- If it becomes necessary to handle a peripheral board, ensure that only the edges of the board are touched. Never touch components on the board or the connector pins.
- If it becomes necessary to remove a peripheral board, place it on an antistatic surface or in a static shielding bag. If the board is to be returned, place it immediately in an antistatic shielded bag.
- Avoid contact between the peripheral board and clothing. The wrist strap only protects the board from ESD on the body. ESD on clothing can still cause damage.

In addition to preventing ESD damage, further steps are required to ground the system. Power outlets must have an associated ground block connected to an approved building ground. For detailed information on grounding requirements, see Section 2.3.5.

2.3 Installing the AccessSwitch

Once the previous sections have been read, you can begin installing the AccessSwitch.

2.3.1 Unpacking the equipment

The AccessSwitch is shipped with the peripheral boards installed in their proper locations within the AccessSwitch chassis. Carefully unpack the AccessSwitch chassis from its shipping carton and inspect the peripheral boards carefully for damage. Any visible damage should be reported to the carrier for adjustment. Verify that all cables and manuals are present by comparing the contents of the shipment to the enclosed packing list.

Retain the box and packing materials in case you should need to return the unit for servicing or repair.

Retain all paperwork supplied with the system.

2.3.2 Inspecting the equipment

Inspect all components for any obvious damage that may have occurred during shipping. Verify that all system components have been received as stated on the packing list. If you have not received a listed item, call Initia National Support Center at 1-800-822-4736.

2.3.3 Selecting a location

Before you begin installing the AccessSwitch, ensure that the room in which the AccessSwitch is to be housed meets the environmental guidelines which follow.

2.3.4 Environmental guidelines

- The mounting location must be level and free from vibration. DO NOT locate the AccessSwitch in an area in which it may be subject to excessive vibration or disturbed by moving equipment.
- The AccessSwitch must be installed in a well ventilated area. The air vents located on the sides and back of the AccessSwitch must be free from obstructions. The system should NOT be installed in an area in which air is contaminated with excessive dust, lint, carbon particles, paper fiber contaminants, metallic contaminants, or a highly corrosive environment.
- The AccessSwitch must be located in an area in which the ambient temperature is between 40 degrees and 130 degrees Fahrenheit (5 to 55 degrees Celsius). The relative humidity must be less than 90%, noncondensing.

2.3.5 Provide power and grounding

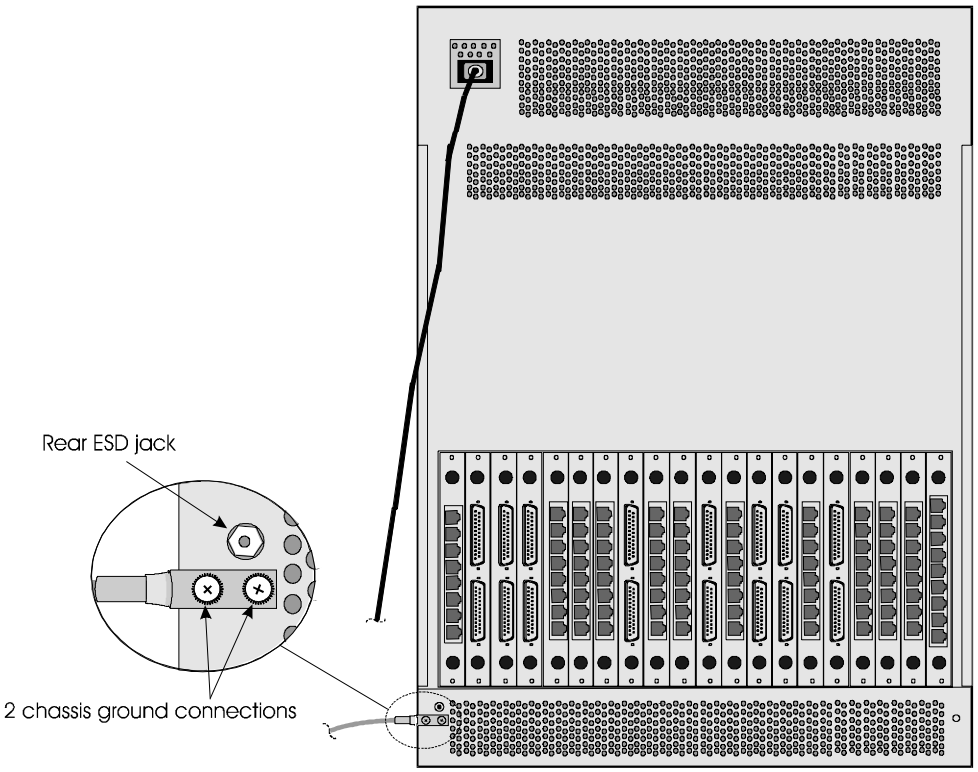
Warning: This section provides instructions for providing adequate power and grounding to the AccessSwitch. Care should be exercised when grounding and powering up electrical equipment.

The AccessSwitch requires a single phase 110 volt AC power outlet for North America and Japan, and 220-240 volt AC power outlet for Europe.

The power outlets must have an associated ground block connected to an approved building ground using a minimum of a #10 AWG and a maximum of a #6 AWG copper wire. This ground block is used as the system's single point of ground.

The AccessSwitch 200 chassis has a connection for grounding copper wire. It is located at the back and to the bottom left of the unit and consists of two 0.25-inch bolt holes spaced 0.75 inches apart for use with Panduit lug #LCC8-10A-L (see Figure 2.1).

Figure 2.1 ESD jack and 2 chassis ground connections



The AccessSwitch 200 chassis is also packaged with 8 thread-forming screws used for grounding certain racks. Rack mounted grounding is dependent upon the material from which the rack is constructed. Refer to the documentation that accompanies your rack for specific information.

The requirements for each AC power connection are given below:

- AccessSwitch 200 Chassis

  Requires a dedicated circuit fused for 15 amp service. A standard line cord is supplied with the AccessSwitch.

- AccessSwitch 60 Chassis

  Does not require a dedicated circuit fused for 15 amp service. Standard in-house wiring is suitable.

Note: A connection to an approved safety ground must be provided for the country in which the system is installed. Connect a #10 AWG ground wire to the rear of the AccessSwitch chassis to an approved safety ground.

- For an AccessSwitch 200 System:

  The AccessSwitch 200 chassis does not have an AC power switch, therefore, the AC power outlet must be located near the equipment and easily accessible. This allows the power cord to be used as a disconnect device.

2.3.6 Mounting the AccessSwitch chassis

After a mounting style and location have been chosen, using the guidelines provided in the next section, follow the appropriate procedures given for the mounting style selected.

2.3.7 Locating and mounting guidelines

The following items must be considered when selecting a mounting style and location for the AccessSwitch.

- The AccessSwitch 60 can be mounted in many configurations, including:

  Tabletop, floor, external cabinet enclosure, and an equipment rack on a shelf.

- The AccessSwitch 200 must be rack mounted.
- When using any of the aforementioned mounting styles, you must provide at least 2 feet (61 centimeters) of clearance in the front and back, and at least 1 foot of clearance on each side of the unit. The mounting style and location must allow clear access for installation and maintenance purposes. Space must be allocated for manageable connection of terminal equipment and AccessSwitch peripherals. Cable connection access is located on the rear of the AccessSwitch chassis.
- The wall behind the system must be clear of all objects that might interfere with the system installation. The area behind and to the side of the cabinet should be reserved for the cross connect field and cable access.

2.3.8 Floor mounting (AccessSwitch 60 only)

The AccessSwitch can be installed directly on the floor provided the area is level, stable, and free from vibration.

2.3.9 Bench/Tabletop mounting (AccessSwitch 60 only)

The AccessSwitch can be installed on a bench or tabletop provided the bench/tabletop is level, free from vibration, and stable enough to support the weight of the unit. At least 4 inches of empty bench/table space must exist on the sides and in front of the AccessSwitch chassis. At least 12 inches must exist behind the AccessSwitch chassis.

2.3.10 Equipment rack mounting

Warning: If the AccessSwitch is the only equipment installed in the rack, do not locate it above the middle of the rack (the weight of the unit could cause the rack to over-balance).

When you receive the AccessSwitch, it is ready to be mounted in an EIA standard 19-inch equipment rack. The rack must be sturdy enough to support a fully configured 20-slot AccessSwitch.

A fully configured AccessSwitch 200 weighs 135 pounds/60.8 kilograms, and requires 25 inches of vertical space within the rack.

A fully configured 6-slot AccessSwitch 60 system weighs 40 pounds, and requires 6 inches of vertical space within the rack.

The AccessSwitch 200 must be rack mounted.

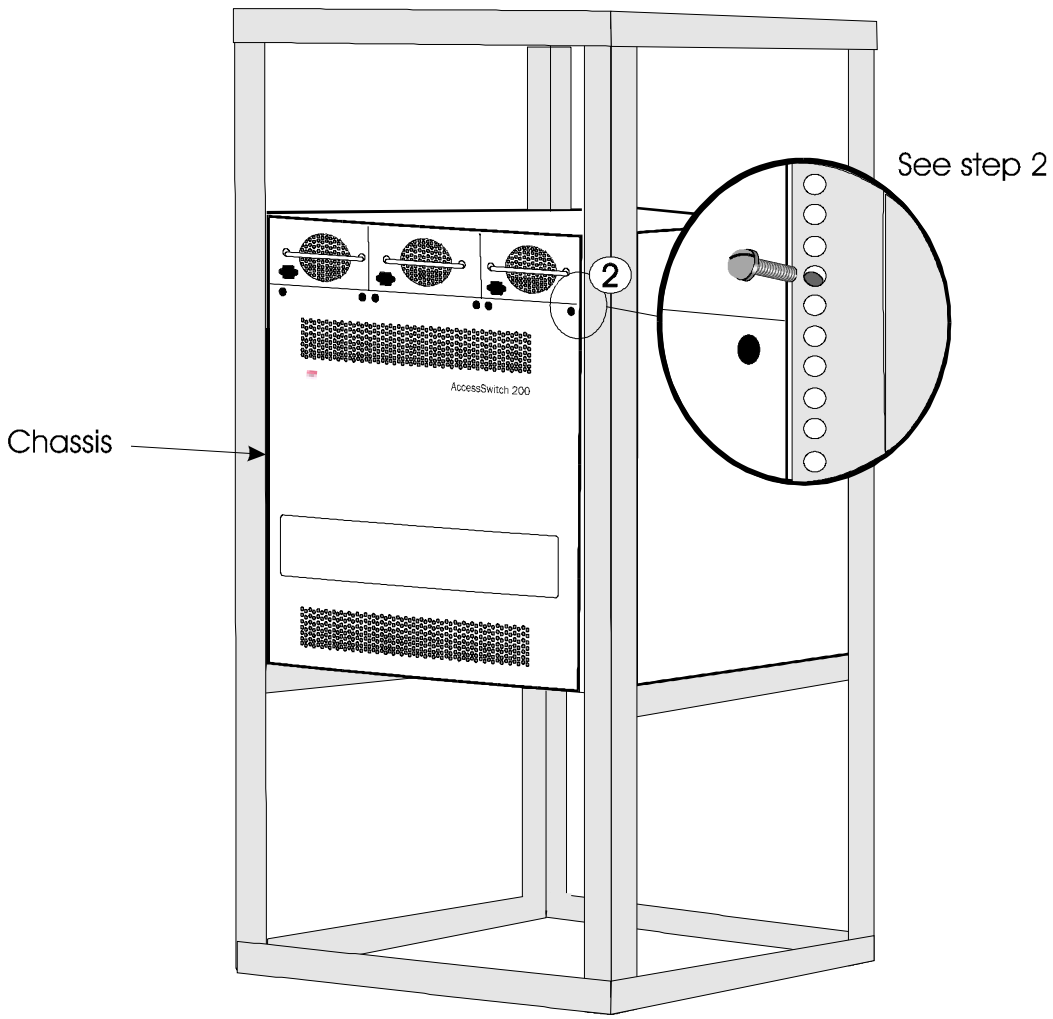
The AccessSwitch 60 can be optionally rack mounted.

2.3.11 AccessSwitch 200 front mount rack installation

This section details instructions for installing the AccessSwitch 200 flush with the front of the equipment rack. For rack installation, it is recommended that at least two people install the AccessSwitch. Figure 2.2 illustrates the front mount rack installation for the AccessSwitch 200. Attach the chassis, which includes the power supply, as described below.

1. Select a position for the chassis within the rack.
2. Align the AccessSwitch mounting holes with the equipment rack holes as shown in Figure 2.2. The chassis may have to be moved up or down to align all mounting holes.
3. Tighten all screws and washers to secure the chassis to the equipment rack. The type of screws and washers used is determined by the type of rack you have. This hardware is supplied by the rack manufacturer. A quantity of ten washers and screws is required.
4. Secure the chassis by attaching all of the mounting screws and tighten with a screwdriver.

Figure 2.2 AccessSwitch 200 front mount rack installation



2.3.12 AccessSwitch 200 optional center mount rack installation

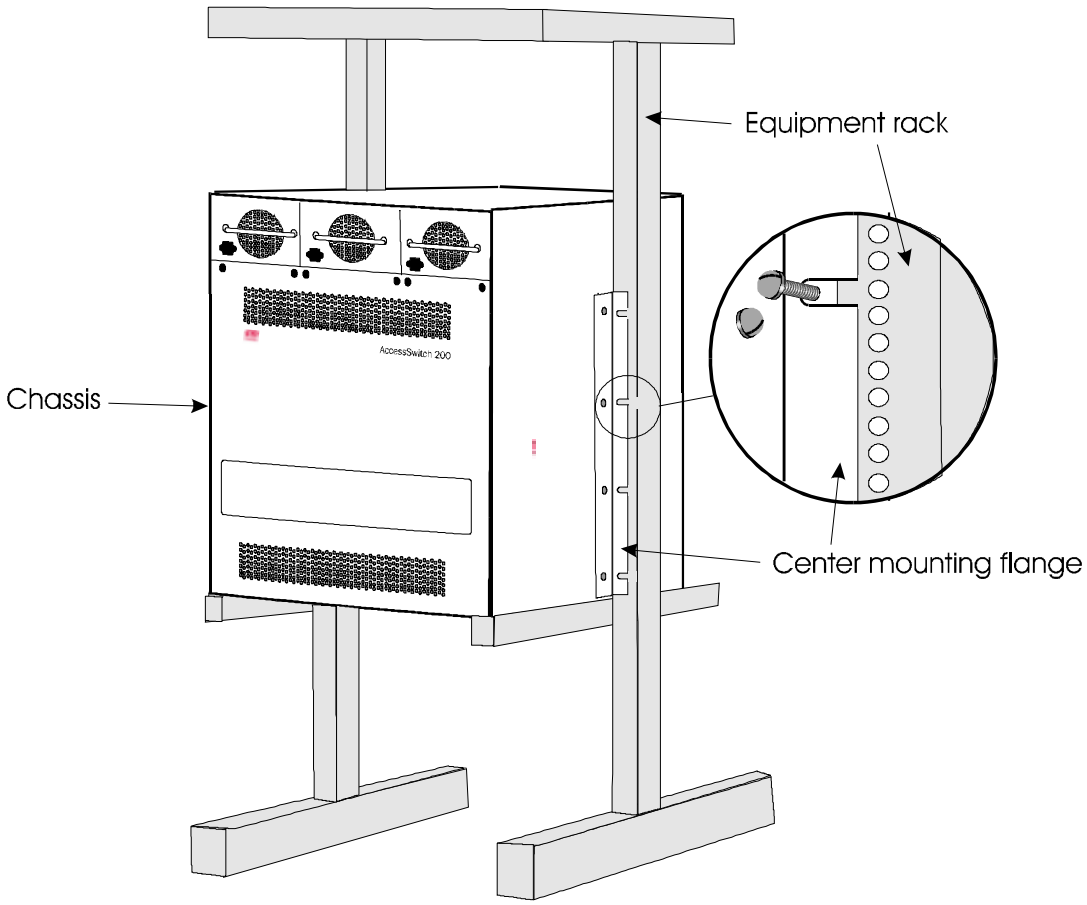
An optional Center Mounting Flange Kit is used to install the AccessSwitch 200 in the center of the equipment rack.

The Center Mounting Flange Kit contains the following hardware:

- 10-32 Pan Head Screws, .312" long, 8 each
- #10 Split Lock Washers, 8 each
- 2 Chassis Center Mount Bars

Figure 2.3 illustrates the AccessSwitch 200 chassis in a center mount rack installation. The power supply tray is included in the AccessSwitch 200 chassis, and does not have to be mounted separately.

Figure 2.3 AccessSwitch 200 optional center mount rack installation



Center mount the AccessSwitch 200 as follows:

1. Align the first center mounting flange on one side of the AccessSwitch.
   While the screws and washers are included with the Center Mounting Flange kit, you must supply the appropriate screws and washers that attach the chassis to the equipment rack.
2. Tighten four screws and washers to secure the flange to one side of the AccessSwitch.
3. Align the second center mounting flange to the opposite side of the AccessSwitch.

4. Tighten four screws and washers to secure the flange to the AccessSwitch.
5. Align the AccessSwitch mounting holes with the equipment rack holes.
6. Tighten all screws and washers to secure the chassis to the equipment rack.
7. The type of screws and washers used is determined by the type of rack you have. This hardware is supplied by the rack manufacturer. A quantity of eight washers and screws is required.

2.3.13 Installing the management console software

Information on installing the management console software can be found in the *LMC/NMC 10.0 User Guide* supplied with your management console software.

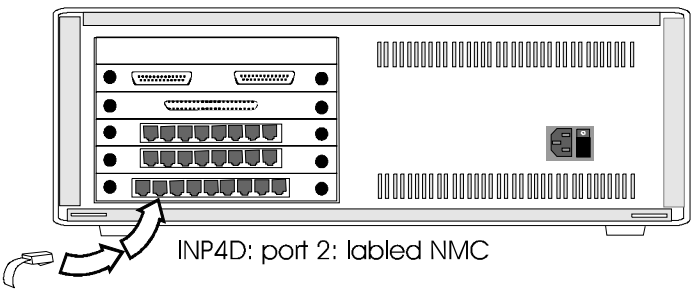
2.3.14 Connecting a modem to the AccessSwitch

If an AccessSwitch is accessed from the network management console software via dial-up connections, it must be connected to a modem. A plain old telephone service (POTS) line or direct inbound dial (DID) line (via a PBX) must be accessible from the AccessSwitch location for public network access for the modem.

To connect a modem to an AccessSwitch, follow the procedure below:

1. Locate the modem so that it can easily be connected to the AccessSwitch, to a standard power outlet, and to a wall jack for the POTS or DID line.
2. Connect the male DB25 end of a DCE cable to the female DB25 port on the rear of the modem.
3. Connect the RJ45 end of the cable into port #2, labeled "NMC", of the INP4D's back card (slot #1 of the AccessSwitch system). For an example, see Figure 2.4.

Figure 2.4 Cable connection to an AccessSwitch 60 with INP4D



4. An RJ11-to-RJ11 cable is provided to connect the modem to the wall jack. Connect one end of the cable to the port usually labeled "Wall" (or "Line") located on the rear of the modem. Connect the other end of the cable to the wall jack.
5. Connect the modem's end of the A/C adapter to the power connector on the rear of the modem. Connect the adapter to a standard wall outlet.
6. Move the modem's power switch to the ON position (if equipped with an on/off switch). Several LEDs on the front panel of the modem will be illuminated.

2.3.15 Connecting an LMC port on the AccessSwitch to a hyperterminal

Choose a location within 20 feet of the AccessSwitch for the LMC direct connection. This location should conform to the environmental guidelines found in section 2.3.4. You must have access to standard AC power outlets to accommodate peripherals.

For the management console PC, the RS232 interface is configured as a Data Communications Equipment (DCE) port. The AccessSwitch should connect directly to one of the RS232 communication ports on the rear of the management console PC. This port should be configured as a Data Terminal Equipment (DTE) port, without the need for null modems. Refer to section 2.3.18 for more information. Use the following steps to connect the LMC port of the AccessSwitch.

1. Connect the RJ45 end of the RJ45-to-DB9 DTE cable to port #1, labeled "LMC", of the INP4D back card.
2. Connect the female DB9 end of the DB9 PC cable to either of the male DB9 COM ports (COM 1 or COM 2) on the rear of the management console PC.The communications port selected for this connection (COM 1 or COM 2) must be the same port as provisioned via the hyperterminal window. For instructions concerning provisioning the communications port, refer to the *LMC/NMC 10.0 User Guide* that accompanies your system.

2.3.16 Connecting to serial ports on the INP4D backcard

Port #1 is known as the LMC or local port and port #2 is the NMC or remote port. The NMC port is used for the following purposes:

- The NMC Manager communicates with the AccessSwitch over the NMC port via a modem.

The LMC local port is used for the following:

- To communicate with the AccessSwitch via a direct connection. For information on a local network manager, see the *LMC/NMC 10.0 User Guide.*
- To communicate with the AccessSwitch via a LAN connection you need to use a serial to IP converter as described in the *LMC/NMC 10.0 User Guide.*

2.3.17 Connecting an AccessSwitch to an AccessSwitch

An AccessSwitch can easily be connected to another AccessSwitch using an RJ48CS cable. This cable is constructed of shielded twisted pair wire with two RJ45 connectors.

To connect two AccessSwitches together, follow the procedures outlined below:

1. Plug one RJ45 connector into one of the PRI/T1 ports on the first AccessSwitch.
2. Plug the other RJ45 connector into one of the PRI/T1 ports on the second AccessSwitch.The PRI/T1 ports are located on several peripheral boards to include: the INP4D in a non-redundant system, the QDIU_EX, and the DDIU_EX.
3. Adjust the DSX pre-emphasis, as needed, according to the length of the cable. Information on the DSX pre-emphasis option is located in Appendix A of the *LMC/NMC 10.0 User Guide.* See *"PRIU trunk provisioning".*

Refer to section 2.3.22 for specifications concerning the RJ48CS cable.

2.3.18 Serial interface configuration

The serial interface configuration of the LMC and NMC ports is configured as shown in Table 2.1.

Table 2.1 Serial interface configuration

Parameter	Setting
Speed	9600 Baud

Table 2.1 Serial interface configuration (Continued)

Parameter	Setting
Bits/Char	8
Parity	None
Parity Bit	0 (Space)
Stop Bits	1

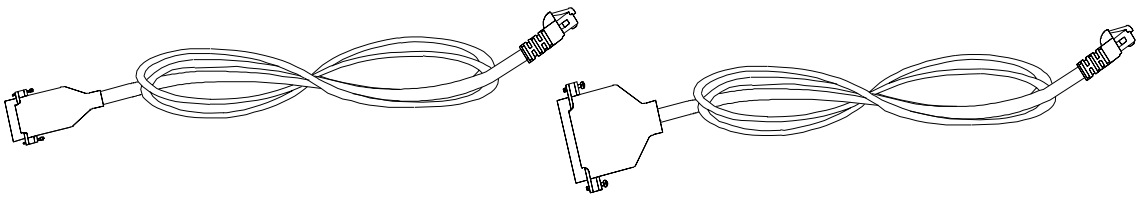
2.3.19 System cables

The following cables are provided with the AccessSwitch:

- RJ45-to-DB9 female
- RJ45-to-DB25 male

The RJ45-to-DB9 cable is used to connect the AccessSwitch to a local management console. The RJ45-to-DB25 connects to a modem. Both cables are shown in Figure 2.5.

Figure 2.5 RJ45-to-DB9F and RJ45-to-DB25 cables



Two optional cables are also available to make connections to the network termination block.

- RJ45-to-RJ45

  This 25 foot, 8 conductor, RJ45-to-RJ45 cable is used to connect the PRI S/T interface to the network via an RJ48C interface (USA standard) and an approved external CSU.

- RJ45-to-DB15

  This 25 foot, 8 conductor, RJ45-to-DB15 cable is used to connect the PRI S/T interface to the network via a CA81A interface (Canadian standard) and an approved external CSU.

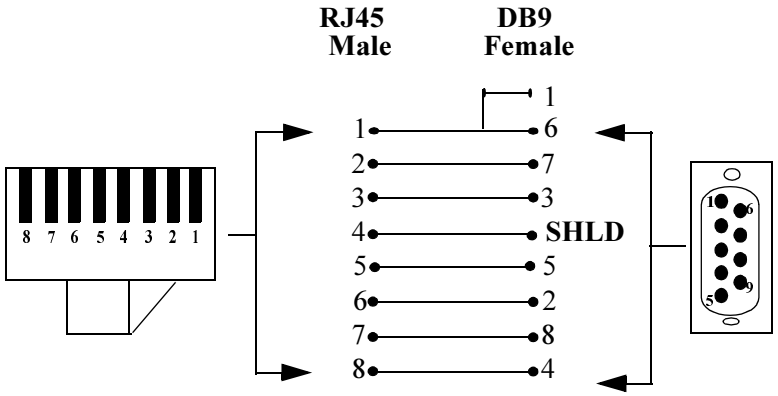
A variety of cables for the optional peripheral cards are available by contacting Initia Customer Service. These cables are explained in detail in Chapter 5 of this manual.

2.3.20 LMC port cable (local connection)

The LMC port provides direct access to the AccessSwitch. To connect the LMC port to the AccessSwitch, an RJ45-DB9 (DTE) cable is required.

The male RJ45 end of the cable connects to port #1 of the INP4D's 9-port back card. The female DB9 end of this cable connects to the male DB9 serial port on the rear of the management console PC. Pin-to-pin specifications for this cable are shown in Figure 2.6 below.

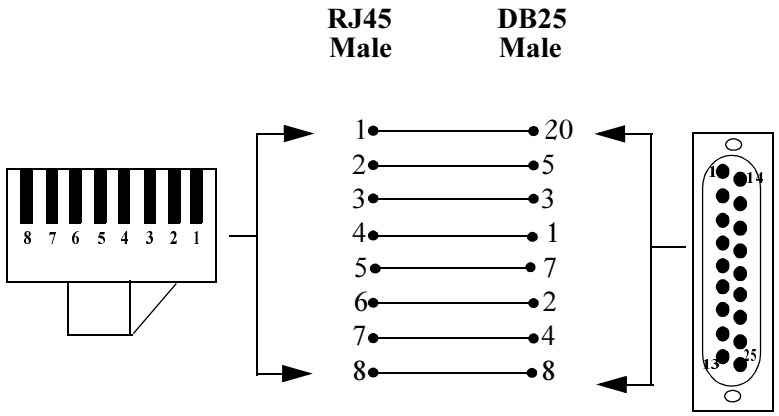
Figure 2.6 RJ45-to-DB9 LMC cable pin-to-pin specification



2.3.21 NMC Port Cable (Remote Connection)

The NMC port provides remote access to an AccessSwitch. A DCE cable is used to connect the computer port of a modem to the AccessSwitch. This cable is 14 feet long and has a male RJ45 (8 pin) connector on one end, and a male DB25 RS232 (25 pin) connector on the other end. This cable connects directly to a port on back card of the INP4D (AccessSwitch slot #1 or #2). Pin-to-pin specifications for this cable are shown in Figure 2.7.

Figure 2.7 RAK Cable pin-to-pin specification



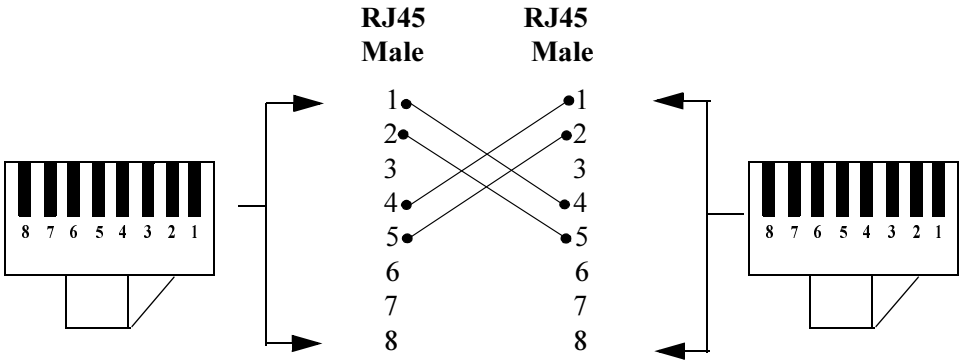
Note: Pins 1 and 7 must be jumpered in the DB25 connector.

2.3.22 RJ48CS S/T reference cable

The RJ48CS cable is used to connect two or more AccessSwitches. This cable consists of shielded twisted pair wire with two shielded RJ45 connectors. It is available in 10 and 25 foot lengths. The RJ45 connector is inserted into a PRI/T1 port on each AccessSwitch.

This cable is also used to connect certain CSUs and an AccessSwitch. The RJ48CS S/T reference cable should be used if the CSU interface provides the receive signals on pins 1 and 2. Here, one RJ45 connector is inserted into the CSU interface and the second RJ45 connector is inserted into a PRI/T1 port on the AccessSwitch. The pin out specifications for this cable are shown in Figure 2.8. Information regarding connecting AccessSwitches is located in section 2.3.17.

Figure 2.8 RJ45-to-RJ45 shielded twisted pair cable pin-to-pin specification

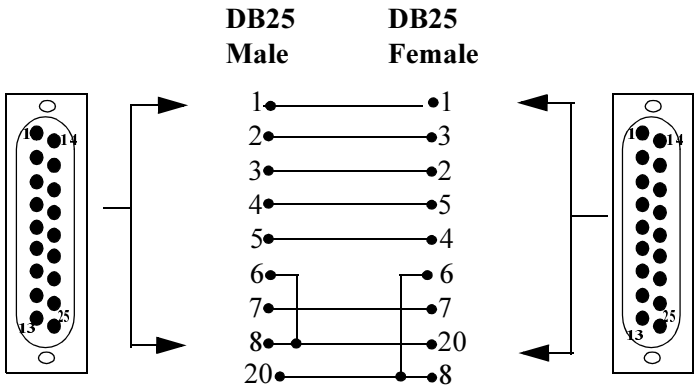


2.3.23 Null modem cable

If the network management console does not provide a DTE interface, a Null Modem is required. If you do not have a Null Modem, one can be created using a male DB25-to-female DB25 (25-pins on each end) cable, and following the pin-to-pin specifications shown in Figure 2.9.

Note: The male DB25-to-female DB25 cable is not provided with the AccessSwitch.

Figure 2.9 Null modem pin-to-pin specification



2.3.24 Powering up the system

Power up the system using the following procedures:

1. For an AccessSwitch 200:
   Plug the system in to an AC electrical outlet.

2. For an AccessSwitch 60:
   Plug the system in to an AC electrical outlet, and turn the chassis power button to the On position.

Faceplate and LEDs

Upon power up, the following LEDs will be illuminated:

- The fail, major, and minor LEDs on the INP4D faceplate will be illuminated.
- The INP4D LEDs will flash 3 times at one second intervals. This indicates the INP4D is performing a self-test.
- If a self-test failure is detected, the INP4D fail LED will remain illuminated, and an error message displays on the CallView window. Record the displayed information and call the Initia National Support Center at 1-800-822-4736.

If a failure is detected by the AccessSwitch, an error message is written to the CallView window. Record the displayed information and call the Initia National Support Center at 1-800-822-4736. If a redundant AccessSwitch system, (i.e., one that contains two INP4Ds), fails on power-up, call the Initia National Support Center at 1-800-822-4736.

2.4 Configuring Clocks in the AccessSwitch

When the Initia AccessSwitch is connected to a public network, it must operate as a timing reference to the public network in order to maintain synchronization and prevent data loss. Normally, this is achieved by selecting one of the network interface lines as the clock reference. When a network interface is used as the timing reference, it is referred to as the "Derived Clock Source."

Section 2.4 will discuss the following:

- Selecting the primary and secondary clock via the network console management software
- Priority of potential network clocks
- Allowable primary and secondary clock reference interfaces

2.4.1 System Clock Source in the INP4D

The INP4D is a single board master processor of the AccessSwitch; it controls the overall operation of the AccessSwitch. In order to function, every slotted hub must have one INP4D board. The INP4D can be slaved to one of two derived clock sources, or allowed to free run at the default factory setting of 1.544MHz. The INP4D has two derived clock bus signals that come from other cards in the chassis. The customer is responsible for selecting the primary and secondary clock references by using the network management console software to create a clocking configuration. The particular clocking source that should be used, and in the case of interface cards the lines that should be used, must be configured through the network management console. (Refer to Appendix A in the *LMC/NMC 10.0 User Guide* for more information on provisioning through the network management console software.) The customer then submits the configuration profile to the slotted hub chassis, which allows the hardware to route the correct clock source to the clock distribution logic. A line card in the chassis can be configured to drive one or both of the derived clock bus signals.

If you are connecting your AccessSwitch to the network via BRI interfaces, and in your country your network provider only activates BRI lines for incoming/outgoing calls (i.e., the lines become deactivated by the network as soon as the line is idle), you cannot continuously derive clock from the network unless you use the Floating Clock Support feature. In order to continuously derive clock from the network, the Floating Clock Support feature ensures that the clock reference source is switched to an active line each time a line is deactivated or a call is torn down. (If there are no active lines, the hub will Free Run.) When you provision floating clocks, leave the spare derived clock field empty, and select Floating Clock Support Enable. Floating clocks apply only to BRI trunk lines. The software automatically selects BRI trunk line from which to derive clock. Thus, it is not necessary to select a particular BRI line when enabling floating clock support.

The priority list of potential network clocks is (in order of highest priority):

1) Network derived clock source #1

2) Network derived clock source #2

Table 2.2 below describes allowable network primary and secondary clock interfaces.

Table 2.2 Allowable Primary and Secondary Clock Reference Interfaces

If...	Then...
PRI is the primary clock reference interface,	PRI, BRI, T1 or E1 can be used as the secondary clock reference interface.
BRI is the primary clock reference interface,	BRI, PRI, T1 or E1 can be used as the secondary clock reference interface.
T1 is the primary clock reference interface,	T1, E1, PRI or BRI can be used as the secondary clock reference interface.
E1 is the primary clock reference interface,	E1, T1, PRI or BRI can be used as the secondary clock reference interface.

2.4.2 Recommendations

The T1 clock signal should conform to the pulse template in the AT&T publication 62411, or the E1 or T1 signal as specified in CCITT G.703 recommendation. These specifications require a nominal high voltage level in the range of (+/-) 2.5 to 3 volts, the 0db output level.

2.5 AccessSwitch provisioning via the network management console software

After the installation process is complete, the AccessSwitch can be provisioned via the network management console. If you have purchased the NMC (Network Management Console) software, you may be using the LMC port (allows you a direct connection to your AccessSwitch) or the NMC port (you connect via a modem). The *LMC/NMC 10.0 User Guide* provides complete instructions on provisioning your AccessSwitch via the NMC.

After you enter the provisioning information into the console, it must be formatted and submitted (downloaded) to the AccessSwitch. The AccessSwitch then generates alarms for ports that do not have working terminal equipment or network equipment connected.This is normal and the alarms will be cleared when the interface equipment is installed and working correctly.

2.6 AccessSwitch 200 hookup instructions for 48 volt DC power supplies

Warning: This section provides hook-up instructions for an AccessSwitch 200 48 volt DC power supply. This option is available for the AccessSwitch 200 (IAP-200/48 volt) chassis only. Caution should be exercised when hooking-up electrical equipment.

The following information is provided in support of the optional AccessSwitch 200 (IAP-200/48v) with power system, model #ETR2U133-Q, manufactured by Unipower Corporation.

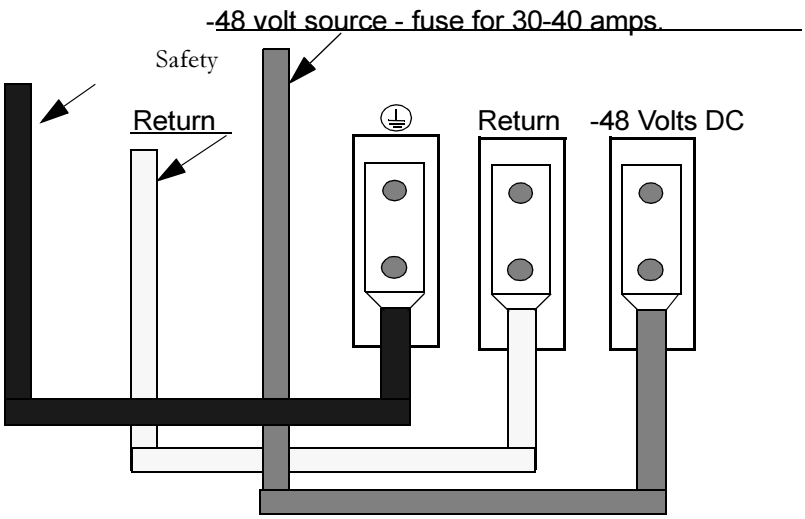
2.6.1 Site requirements and instructions for installing an AccessSwitch 200

- For permanently connected equipment, a readily accessible disconnect device must be incorporated in the fixed wiring.
- The AccessSwitch 200 (IAP-200/48v) must be protected with a 30-40 amp circuit breaker, or fuse.
- The AccessSwitch 200 (IAP-200/48v) is for use in a "Restricted Access Location" in accordance with Articles 110.16 and 110.18 of the *National Electrical Code ANSI/NFPA 70*.
- The AccessSwitch 200 (IAP-200/48v) requires three two hole lugs manufactured by Panduit, part number #LCC8-10A-L, to connect 48 volts DC to the power supply. Use Panduit Compression Connector, Tool Part #LCD 8-10A.
- 8AWG with a 90 degree Celsius temperature rating, or better must be used to supply power to the AccessSwitch 200 (IAP-200/48v).
- Torque screws on the 48 volt DC main connection to 20-25 in-lbs.

2.6.2 Hookup instructions for an AccessSwitch 200 (IAP-200/48v)

Figure 2.10 shows connections for an AccessSwitch 200 (IAP-200/48v). Verify the return source is fused for 30-40 amps.

Figure 2.10 Connections for an AccessSwitch 200 48 volt DC power supply



Chapter 3

Upgrading system software on the hub

3.1 Introduction

This chapter contains instructions to upgrade an AccessSwitch to the AccessWare 2000 R1.1 system software. AccessWare 2000 R1.1 system software enables you to manage your AccessSwitch using the LMC/NMC network management console software. AccessWare 2000 R1.1 system software allows you to use the peripheral boards contained in an AccessSwitch to access the network via Primary Rate, Basic Rate, and T1 lines.

Note: Before you perform the instructions in this chapter, you must contact your Initia sales representative to purchase an upgrade package.

3.2 Putting an AccessSwitch into SoftLoad mode

SoftLoad is a utility that you use to reprogram peripheral boards in your AccessSwitch. It can only be used through a serial connection, either local or remote, and is occasionally called Serial SoftLoad.

For detailed information on SoftLoad, please refer to Appendix C in this manual.

To upgrade your AccessSwitch, you must put it in SoftLoad mode. You can put your AccessSwitch into SoftLoad mode via a local or remote serial connection.

See section 3.2.1 for instructions on using a local connection.

Section 3.2.2 explains how to use a remote connection.

3.2.1 Putting an AccessSwitch into SoftLoad mode with a local LMC

Connect your AccessSwitch to the management console through a serial port (see Chapter 2 for detailed instructions). If the AccessSwitch onto which you want to install the system software also has a modem attached, disconnect to allow for the LMC connection. Then do the following:

1. If the main management console window is not active on your console screen, select *NetworkView* from the menu bar. Select the AccessSwitch you want to SoftLoad.
2. Select *Alarms* from the menu bar. The *Alarms* window for the selected AccessSwitch appears. If the *Console Link Status* text box does not display "Link Up to AccessSwitch", wait for this message to appear.
3. Select *Maintenance* > *Reset System*. The *System Reset* dialog box appears.
4. Click on the Reset for SoftLoad radio button and press the **OK** button. Wait for the console link to the AccessSwitch to be disconnected. (This disconnect can take up to one minute to occur; please wait until the *Console Link Status* text box displays "*Link Down to* AccessSwitch".)
5. From the *File* menu, select the *Terminate System* option. If there is an open configuration profile on the screen and it has not yet been submitted to the AccessSwitch, a warning dialog box appears. Click **OK**. The console software closes.
6. Move the RJ45 connector from the AccessSwitch's LMC port #1 to the NMC port #2 on the backcard of the INP4D in slot 1.
7. Go to section 3.3 for instructions to upgrade the INP4D.

After the SoftLoad procedure has completed, move the RJ45 connector of the serial cable back to the LMC port.

3.2.2 Putting an AccessSwitch into SoftLoad mode with a remote NMC

To ready an AccessSwitch using a remote NMC:

1. Double-click on the NMC icon and log onto the software.
2. Select *NetworkView* from the menu bar and select the AccessSwitch you want to download the system software to.
3. Initiate a modem connection, if it is not already established, with that particular AccessSwitch.
4. Once the connection is established, select *Alarms* from the menu bar. The Alarms window for the selected AccessSwitch appears. If the *Console Link Status* text box does not display "Link Up to AccessSwitch", wait for this message to appear.
5. Select *Maintenance* > *Reset System*. The *System Reset* dialog box appears.

6. Click on the *Reset for SoftLoad* radio button and press **OK**. You will notice that the NMC link to the AccessSwitch will be disconnected. (This disconnect can take up to one minute to occur; please wait until the *Console Link Status* text box displays "Link Down to AccessSwitch".) Although the NMC-to-AccessSwitch console link has been disconnected, the modem connection between the NMC and the AccessSwitch will remain established.
7. Select *File* > *Terminate System* (do not disconnect the modem connection). If there is an open configuration profile on the screen and it has not been submitted to the AccessSwitch, a warning dialog box appears. Click **OK**. The management console software closes.
8. Go to section 3.3 for instructions to upgrade the INP4D.

3.3 Upgrading the INP4D and peripheral cards

If you are upgrading from a release prior to AccessWare 2000 R1.1 system software, the SoftLoad utility should already reside on your Management Console PC in the C:\IAP directory. The LMC/NMC software installation created both the C:\IAP\BINS\XX-XX-XX.XX and the C:\IAP\BINS\DEFAULT directories on your hard disk (for which XX-XX-XX.XX represents the version number of the current system software update) and loaded the system software into each directory. The files in the \DEFAULT directory will be used when you do not specify a system software version number in the SoftLoad command line.

SoftLoad takes 20-30 minutes to upgrade the INP4D depending on the baud rate used. Therefore, if you do not plan to dedicate this amount of time to the SoftLoad procedure, do not continue beyond this step.

During the SoftLoad procedure, if SoftLoad is terminated abnormally, it is possible that the AccessSwitch will not operate as expected. In such a case, the SoftLoad procedure will need to be performed again from the beginning.

See section 3.2 for instructions on putting your AccessSwitch into SoftLoad mode.

To upgrade the INP4D and peripheral cards:

1. Open an MS DOS window on your management console.
2. Go to the C:\IAP directory, and
   - if you're upgrading using a local connection, type:

     □□□□□□□□□□□□□□□□□□□□□□
   - or, if you're upgrading using a remote connection, type:

     □□□□□□□□□□□□□□□□□□□□□

   where □□ is the name of the SoftLoad executable, □□□□□□□ or □□□□□□ is the baud rate for the transfer and □□ tells SoftLoad not to wait for a hub response.

Note: If you must terminate the SoftLoad procedure before you continue past this step, you can press either the ESC key (which places the AccessSwitch in normal operating mode before exiting), or CTRL + C (which exits SoftLoad without placing the AccessSwitch in normal operating mode).

   When prompted by the screen, press the □□□□□□□ key once again to continue the SoftLoad procedure.

3. SoftLoad will check that all the necessary files have been loaded onto the Management Console hard disk.

   If all the necessary files are present, SoftLoad will attempt to establish communication with the AccessSwitch.

   If all necessary files are not present, you will receive the following error message:

   □□

   □□□

   You must then install the system software and restart the SoftLoad update process.

4. When communication between the AccessSwitch and management console PC has been established, the following message appears on the screen.

The status for each slot in the AccessSwitch displays on the screen, as follows:

- SLOT EMPTY
- DONE
- READY
- FAILED!

When the SoftLoad process is complete, the Download Complete Screen displays a status of "DONE" for the boards. SoftLoad terminates and returns your management console screen to the DOS prompt. The SoftLoad status screen remains on the console, in the DOS window, to allow you to review the results of the SoftLoad procedure.

Note: After the SoftLoad procedure has completed, the AccessSwitch will perform a cold reset, which will invalidate the configuration profile stored on the AccessSwitch's INP4D. To resume normal AccessSwitch operation, you must submit a configuration profile from the Management Console to the AccessSwitch.

Note: For detailed information on SoftLoad, please refer to Appendix C.

Chapter 4

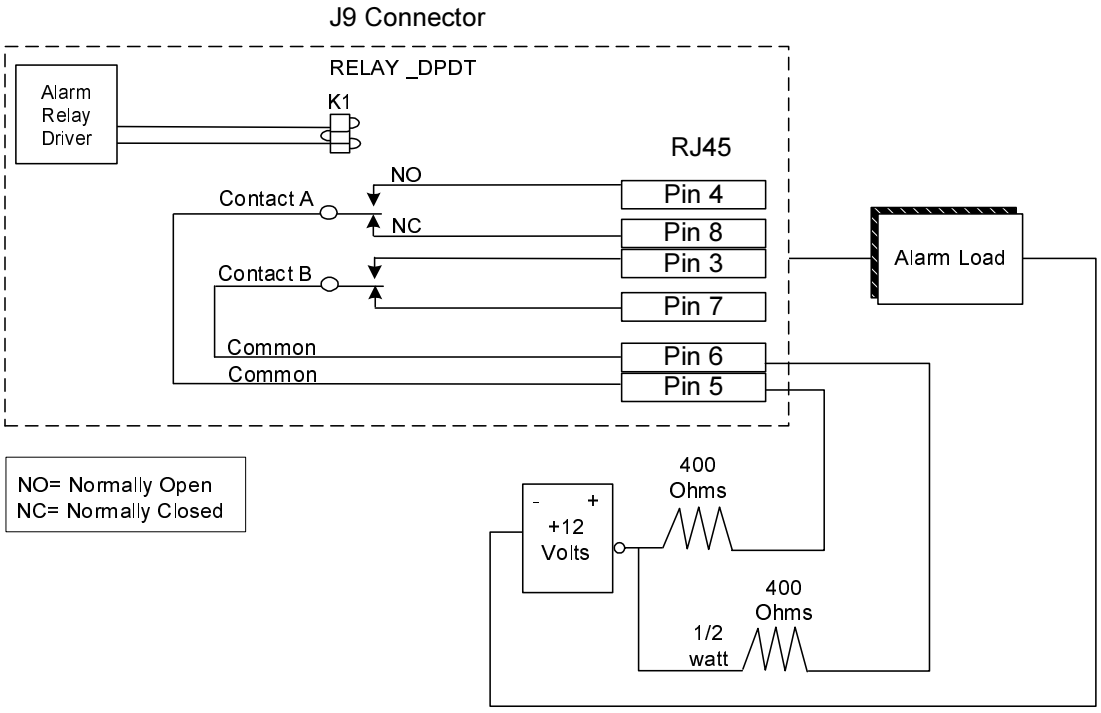
Maintenance and Alarms

4.1 Introduction

This section describes the maintenance and alarm function of the AccessSwitch product. The AccessSwitch autonomously monitors the health and status of the system and identifies failed replaceable units. You are notified of system problems via LEDs on each of the peripheral boards.

The network management console software offers a powerful user interface that provides detailed information about each alarm. The Alarms unit maintains a database of active alarms and an alarm history log. Alarms are used to draw attention to unusual operating conditions to allow the appropriate people to take corrective action. When an alarm condition exists, the alarm relay driver automatically turns on. For example, when a network trunk fails, an alarm is activated to notify someone that service over this trunk will not be available. The alarm contact allows activation of a physical device, such as a bell or light, to draw attention of the hub administrative operator to the condition that may otherwise go unnoticed. Below is a diagram of the alarm circuit. Note that everything inside of the dotted line indicates Initia hardware; everything outside of the dotted line indicates customer supplied hardware. The current drawn through the relay contacts should be limited to less than sixty milliamps. When a problem has been resolved, the system automatically removes the alarm from the active database. Conversely, entries in the alarm history database must be manually deleted. See the *LMC/NMC 10.0 User Guide* for specific information.

Figure 4.1 Alarm Circuit



While all maintenance procedures covered in this section can be locally performed (from the location of the AccessSwitch), there are certain limitations which apply to remote users. For example, all references in this section to troubleshooting via visual inspections of equipment (e.g., AccessSwitch peripheral LEDs, physical cable connections to the AccessSwitch) do not apply to remote users.

The LEDs located on each peripheral board are used to simplify maintenance procedures and to provide a summary of the status of each board. In addition, you are able to initiate diagnostic procedures to resolve the following system problems:

- Observation of alarm conditions.
- Analysis of error messages and test results.
- Replacement of system components.
- Performance of simple tests.

4.2 Alarm indication via faceplate LEDs

The LEDs on the faceplate of each peripheral board summarize the alarm status of the system as a whole. These LEDs are described in the following sections.

4.2.1 INP4D LEDs

The INP4D LEDs flash on and off when the system is reset and when the system is being reprogrammed by downloading AccessWare system software using SoftLoad. After the system has completed its power up or programming sequence, the LEDs on the INP4D faceplate are used to display the alarm information described below.

The faceplate of the INP4D board has the following LEDs:

- FAIL (red)

  An illuminated FAIL LED indicates that the board has failed and should be replaced.

- EXTERNAL (yellow)

  An illuminated EXTERNAL LED (Ext on the board's faceplate) indicates that the board is healthy but has detected an alarm condition on one of its external interfaces. Note that there are five EXTERNAL LEDs on the INP4D faceplate. The second one from the bottom represents the INP4D. The other four LEDs represent the four PRI/T1 lines.

- BUSY (green)

  An illuminated BUSY LED indicates that the peripheral board has at least one active call. Note that there are five BUSY LEDs on the INP4D faceplate. The fourth one from the top represents the INP4D. The other four on the lower part of the board represent the four PRI/T1 lines.

  In a redundant AccessSwitch system, the BUSY LED is continuously illuminated on the master INP4D. This serves as a means of identifying which INP4D is master.

- TEST (yellow)

  An illuminated TEST LED indicates that a test is currently being performed on the peripheral board.

- MAJOR (red)

  An illuminated MAJOR LED (Maj on the INP4D faceplate) indicates that the system is in a major alarm state. A major alarm is defined as a problem that affects at least 23 channels.

- MINOR (red)

  An illuminated MINOR LED (Min on the INP4D faceplate) indicates that the system is in a minor alarm state. A minor alarm is defined as a problem that affects less than 23 channels.

4.2.2 Peripheral board LEDs

- FAIL (red)

  An illuminated FAIL LED (Fail on the board's faceplate) indicates that there is either a profile mismatch, or that the peripheral board has failed and should be replaced.

- EXTERNAL FAIL (yellow)

  An illuminated EXTERNAL FAIL LED (Ext on the board's faceplate) indicates that the peripheral board is healthy but has detected an alarm condition on one of its external interfaces.

- BUSY (green)

  An illuminated BUSY LED (Busy on the board's faceplate) indicates that the peripheral board has at least one active call.

- TEST (yellow)

  An illuminated TEST LED (Test on the board's faceplate) indicates that a test is currently being performed on the peripheral board.

4.2.3 MCU4 board LEDs

- FAIL (red)

  An illuminated FAIL LED (Fail on the MCU4 board's faceplate) indicates that there is either a profile mismatch, or that the board has failed and should be replaced.

- EXTERNAL FAIL (yellow)

  Since the MCU4 board does not have an external interface, the Ext LED will be visible on the faceplate, but it will not be used.

- BUSY (green)

  An illuminated BUSY LED (Busy on the MCU4 board's faceplate) indicates that the MCU4 board has at least one active call.

- TEST (yellow)

  An illuminated TEST LED (Test on the MCU4 board's faceplate) indicates that a test is currently being performed on the board.

4.3 Alarms transmitted to the network manager software unit

The network manager displays all active alarms (you are able to work with alarms via this unit). When a problem is corrected, the alarm is automatically removed from the database. You cannot manually remove alarms from the active alarm database. Once the problem is corrected, the system deletes the alarm automatically.

For information regarding the network management software, see the appropriate user guide for your console software.

4.4 Link status

Link Status of the remote data link between the network manager and the AccessSwitch is always monitored. In the event that this link fails a "Remote Console Link Down" alarm is generated. If the network manager software is not running, the AccessSwitch will declare that the link has failed (you can view the link status via the network manager software).

When the data link is restored, all active alarms within the network manager software are cleared. The time and date that the data link is restored will display in the Alarm History window. The AccessSwitch will upload the currently active alarms to the network manager software when the data link is restored.

4.5 INP4D maintenance and alarm information

This section describes the maintenance and alarm features of the INP4D, the master processor of the AccessSwitch. The system will test the INP4D to detect and isolate failures. If these tests indicate the INP4D has failed, the system will illuminate the FAIL and MAJOR LEDs on the INP4D. An alarm will also be displayed on the Management Console to indicate the INP4D has failed.

The INP4D LEDs flash on and off when the system is reset and when the system is being reprogrammed by downloading SoftLoad Executables. After the system has completed its power up or programming sequence, the LEDs on the INP4D faceplate are used to display alarm information.

4.5.1 INP4D maintenance and alarm information

AccessSwitch systems featuring redundancy use dual INP4D main processors in the first two slots of a slotted system. The INP4D provides all the same bus arbitration, system clock generation and system health monitoring as the INP4. The master INP4D maintains control under normal operating conditions. If the master board should fail, the standby board engages, taking over system operation. Failures of the INP4D are detected by the INP4D itself, by either the master or the standby board depending on the circumstances of the failure.

Note: In the event of a master board failure, all active calls are dropped as the standby INP4D engages.

The INP4D processors must occupy Slots 1 and 2 in the AccessSwitch chassis; the first two slots from the left on the front of the AccessSwitch 200_EX; the first two slots from the bottom on the AccessSwitch 60 chassis.

The FAIL LED on the faceplate of the INP4D is illuminated if the system detects an INP4D has failed its diagnostic selftest. The system continues to test the INP4D until it is removed or passes the test.

The AccessSwitch system becomes redundant following a successful power-up. Once the system is powered-up, the dual INP4Ds communicate through a common, shared backcard which is unique to the INP4D processors. If the master INP4D, located in slot 1, should fail, the standby INP4D in slot 2 gains control of the system.

Through the shared backcard the master INP4D communicates the following information to the standby INP4D:

- the last profile loaded into the AccessSwitch through the network manager's *Configuration* menu.
- the last time of day the command was loaded into the AccessSwitch through the network manager's *Configuration* menu.

The following information is NOT passed from the master INP4D to the standby INP4D:

- System Routing Criteria for trunk group(s) which was changed.
- System Routing Criteria which is modified must be submitted through the Configuration menu's *File* > *Submit* profile. Refer to the appropriate user guide for your network management console software for more information.

In the event that the master INP4D fails, several alarms are generated and logged within the alarm reporting utilities of the network manager.

Note: Redundant INP4D virtual slot number: With one noted exception, alarms for an INP4D in a redundant system report a "virtual" slot number. The alarm is actually against the current Master INP4D, which may be in slot 1 or slot 2, depending on the status of the system.
The current master INP4D can be identified by checking the BUSY LED on the faceplate of the INP4D. In a redundant system, the BUSY LED is continuously illuminated on the master INP4D. The exception to this INP4D virtual slot reporting is the "INP Failed" alarm, which reports the actual slot number for the failed INP4D board.

Warning: In the event the master INP4D fails, where the standby INP4D gains control of the system, DO NOT reset the system. Contact the Initia National Support Center at 1-800-822-4736.

4.6 Peripheral board maintenance and alarm information

The system will continually test each peripheral board and associated interface line. If the system detects that a peripheral board has failed, that board's FAIL LED will be illuminated and an alarm message will display via the network manager software. The system will continue to test the board until it is removed or the tests pass. If the test passes, the board will be reset and put back into normal operation.

If the system detects that the board is healthy but the external line has failed, then the EXTERNAL FAIL LED on that peripheral board will be illuminated and an alarm message will display via the network manager software. The system will continue to test the line; if the line eventually passes the test it is put back in normal service.

4.7 MCU4 board maintenance and alarm information

The system will continually test the MCU4 board. If the system detects that the board has failed, that board's FAIL LED will be illuminated and an alarm message will display via the network manager software. The system will continue to test the board until it is removed or the tests pass. If the test passes, the board will be reset and put back into normal operation.

For a list of alarm definitions, refer to the *LMC/NMC 10.0 User Guide*.

4.8 Maintenance procedures

The AccessSwitch monitors its system components and its external interfaces continuously to identify and report problems. However, traditional troubleshooting methods are still useful even in a system as advanced as the AccessSwitch. These procedures include terminal substitution, visual inspection, continuity checks, and clarification of operating procedures with users. The first maintenance step is to attempt to reproduce the fault. If a fault can be reproduced, it can be more easily diagnosed, and its correction can be confirmed.

There are two categories of troubles pertinent to the maintenance of the AccessSwitch: system-detected problems and user-detected problems. All system-detected alarms should be cleared before diagnosing user-reported troubles. System-detected alarms are displayed via the network manager software. They are cleared automatically by the system when the trouble is corrected. The diagnostic flowcharts at the end of this section should be used for correcting system-detected alarms in conjunction with the alarm information provided by network manager software. The alarms are cleared by fixing the failed unit or by taking the affected unit out of service via network manager software. Taking a unit out of service does not fix the real trouble because the unit is not available for normal service. Thus, clearing active alarms should usually be accomplished by removing and/or replacing faulty units.

Clearing the most serious active alarm may clear some or all of the other active alarms. For example, a System Class alarm with a severity of 2 or 3 should be treated with the highest priority and should be traced before all other alarms (if several active alarms exist at the same time). Clearing the cause of such an alarm will often clear other alarms as well. The Alarm Severity and Alarm Description fields, provided on the alarm windows for each alarm, indicates the relative urgency.

4.8.1 General troubleshooting procedures for boards and power supplies

All system-detected alarms should be cleared before diagnosing user-reported troubles. The most severe alarms should be cleared first because clearing these problems generally clears many other problems as well.

Perform the following actions for system-detected troubles:

- Consult the network management console software alarm information.
  Consult the *LMC/NMC 10.0 User Guide* for specific information.
- Interpret the peripheral board and MCU4 board LEDs.
- Check the network manager's provisioning information of the suspected peripheral boards.
- Reseat and replace the suspected peripheral boards.
- Restart the system.

If a faulty unit is located during the process of clearing a problem, it must be replaced with a known good unit. The associated *software* record should be included with the unit when it is returned for repair. If the network management console is equipped with a printer, the alarm records can be printed instead of being manually recorded.

If the AccessSwitch indicates that a fault is with external equipment, the trouble must be isolated to the station itself or the wiring between the AccessSwitch or the interconnect panel and the station. A visual inspection of terminal wiring is suggested in cases of terminal trouble reports. A failed terminal can result from a station cord being pulled loose or when the wire is severed or crushed by furniture or traffic. Terminals can be swapped with known good terminals of the same type to help isolate the trouble. If the LEDs and network management software indicates that the peripheral board has failed or it is an external or internal fail, refer to the appropriate network management console user guide for alarm definitions.

After all system-detected alarms have been cleared, diagnose user-reported troubles. If the user-reported problem persists once all of the active alarms have been cleared, the user terminal equipment may be failed. Try resetting the terminal equipment. The terminal equipment should be tested with its own diagnostic tools to determine its status. If all else fails, try replacing the terminal with a known good spare.

User-reported problems usually result from service problems at individual terminals. The system should be tested in the following order for user-reported problems if there currently are no active alarms on the AccessSwitch:

1. terminal equipment
2. station wiring
3. peripheral boards/MCU4 boards
4. AccessSwitch common equipment board (INP4D)
5. power supply
6. chassis wiring
7. backplane

4.8.2 Consult network management software alarm information

The first step in diagnosing system detected troubles should be to consult the Active Alarm and the Alarm History windows via network management software and check the faceplate LEDs for alarm information. This information will give the current alarm status of the AccessSwitch and provides information on possible trouble areas. The highest severity alarms should be cleared first.

4.8.3 Peripheral board/INP4D/MCU4 board reseating and replacement

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

If the system indicates that an AccessSwitch board has failed, you should first attempt to clear the problem by removing the failed board and reseating it. Power can be left on when a board is reseated or replaced. When possible, boards should not be removed when the green BUSY LED on its faceplate is activated. Removing a board that is busy causes calls to be disconnected. It is normal to receive a severity 4 alarm with an alarm descriptor of "ICS Msg Dropped" when peripheral boards are not inserted or reset.

Note: When reseating and replacing the INP4D in a redundant system under power, it is necessary to perform these steps in this order:
1. First reseat the master INP4D in slot 1.
2. Reseat the standby INP4D in slot 2 within 5 seconds of completing step 1.
See additional information at the end of this section.

To remove a board, follow these steps:

1. Put on a wrist ground strap and attach it to the metal grounding block on the back of the AccessSwitch chassis to discharge static electricity.
2. Loosen the retaining screws on the faceplate of the appropriate board.
3. With the thumb of both hands, use the inserter/extractor level handles at the top and bottom of the board's faceplate to release the board from the backplane.

4. Use both hands to remove the peripheral board from the chassis.
5. Inspect the backplane and also the connectors for damage. If any connectors are damaged, replace the peripheral board with a spare unit.
6. To reseat the peripheral board, slide it firmly back into the slot. When it is almost in place, you will feel resistance and the inserter/extractor levers will start to catch.
7. Push the inserter/extractor levers all the way to the vertical position to firmly seat the peripheral board.
8. Tighten the faceplate retaining screws to secure the board into the chassis.
9. All LEDs on the peripheral board will illuminate and the peripheral board will perform its self test and blink its LEDs. If the problem persists after reseating the board, the original alarm message will occur again and the appropriate LEDs will stay illuminated. In this case, the board should be returned for repairs. Include all alarm information from the management console software, along with a description of the LED status when the peripheral board is returned.

In a redundant system under power, it is necessary to reseat the two INP4Ds in a specific order and timeframe. The master INP4D is inserted first in slot 1, within 5 seconds the standby INP4D must be inserted in slot 2. This process must be performed within the defined period of time. If this is not accomplished, it is possible the standby INP4D in slot 2 may assume Master INP4D status and inhibit the functioning of the INP4D in slot 1.

When reseating and replacing the INP4Ds in a redundant system under power, it is necessary to perform these steps:

1. First reseat the master INP4D in slot 1.
2. Reseat the standby INP4D in slot 2 within 5 seconds of completing step 1

4.8.4 Removing and restoring power

This section only applies if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

For AccessSwitch 60, remove power from the AccessSwitch chassis by setting the power switch on the rear of the AccessSwitch chassis to the OFF position. Once the repair or replacement has been completed, restore the power by setting the power switch back to the ON position.

ForAccessSwitch 200_EX, remove power by disconnecting the power cord. The system will automatically restart after power is restored.

4.8.5 Maintenance procedures using faceplate LEDs

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch. The faceplate LEDs aid in the maintenance procedures of the AccessSwitch. These LEDs are used in conjunction with the Management Console alarm messages to simplify the maintenance procedures. This section describes the maintenance procedures to be used when diagnosing the system via the faceplate LEDs. More information on the faceplate LEDs is given in section 4.2.

4.8.5.1 Power supply LEDs

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

Each power supply on an AccessSwitch 200 has a green LED that indicates the unit is functioning correctly if it is illuminated and a yellow LED which indicates a fault with the output power.

If the Power Supply green LED is not illuminated or the yellow LED is illuminated, follow these steps to troubleshoot the problem:

1. Check the AC power source to the AccessSwitch to ensure that power is being supplied to the system.
2. For AccessSwitch 60: If there is AC power, toggle the power switch on the rear of the chassis to reset the peripheral breaker.

   For AccessSwitch 200: This AccessSwitch version has a standby power supply switch on each power supply. This switch will shut off power going to the chassis. This will enable you to test the power from the power supply.

If this does not correct the power supply problem, replace the power supply assembly with a known good unit. If all else fails, call the National Support Center at 1-800-822-4736.

In addition to the LED indicators, the AccessSwitch also displays alarm messages via LMC/NMC software. This is only possible if the AccessSwitch is equipped with a redundant power supply option. The power supply assembly should be replaced if the system declares the power supply as failed.

4.8.5.2 INP4D LEDs in a non-redundant system

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch on a non-redundant system.

If the INP4D FAIL LED is illuminated, refer to the following procedure and the flowcharts at the end of this section to troubleshoot the problem. It is also possible for the INP4D Fail LED to be illuminated when the failure is actually caused by the backplane, or by another board in the system causing a short on the VME or TDM bus. Follow these steps to troubleshoot the problem:

1. Check the LEDs and/or alarm windows to see if there are multiple boards reporting the same system problem.
2. If there are multiple boards reporting the same problem, try removing boards one by one, always checking to see if the FAIL LED on the INP4D goes off.

Remove the boards in the following order:

1. Boards with their BOARD FAIL LED on.
2. Boards with their EXTERNAL FAIL LED on.
3. Boards with neither the BOARD FAIL LED nor the EXTERNAL FAIL LED on.
4. The INP4D in a non-redundant system: Reseat the INP4D. If the FAIL LED goes off, stop pulling out boards--you have found the failed board. Record the alarm information displayed via LMC/NMC software and return it with the board to be repaired.
5. Reseat all other boards that have been removed.

If removing boards does not solve the problem, call the Technical Assistance Center with all available alarm information.

4.8.5.3 INP4D in a redundant system

In a redundant system under power, it is necessary to reseat the two INP4Ds in a specific order. The master INP4D is inserted first in slot 1, followed by the standby INP4D in slot 2. These steps are performed within a defined period of time. If this is not accomplished, it is possible the standby INP4D in slot 2 may assume Master INP4D status and inhibit the functioning of the INP4D in slot 1.

When reseating and replacing the INP4Ds in a redundant system under power, it is necessary to perform these steps:

1. First reseat the master INP4D in slot 1.
2. Reseat the standby INP4D in slot 2 within 5 seconds of completing step 1.

4.8.5.4 Peripheral board LEDs

This section only applies if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

These LEDs indicate a problem with a peripheral board or an INP4D with PRI or T1 capability. If a board's FAIL LED is illuminated, check LMC/NMC software's *Alarm* and *Alarm History* windows and clear all alarms starting with the highest severity alarms first. Severity 1 alarms have the highest priority while severity 5 have the lowest priority. Check the provisioning information on the Management Console and verify that the slot for the unit is configured correctly. Use the maintenance flowcharts at the end of this section to diagnose and repair the system.

If a peripheral board's External FAIL LED is illuminated, and the INP4D's FAIL LED is also illuminated, debug the INP4D problem first as follows:

1. Check the LMC/NMC software's *Alarm History* window and delete all alarms, beginning with the highest severity alarms (i.e., severity 1).
2. Check the provisioning information via LMC/NMC software and verify that the slot for the unit is configured correctly. Use the maintenance flowcharts at the end of this section to diagnose and repair the system. Severity 1 alarms have the highest priority while severity 5 have the lowest priority.

If a board's BUSY LED is illuminated, removing the unit will result in active call(s) being dropped.

If a board's TEST LED stays on for an excessive period of time, there is usually a problem with the unit that makes it constantly reset. If you have confirmed that the peripheral board is constantly resetting, the board will have to be returned for repair. Please contact the National Support Center at 1-800-822-4736.

4.8.5.5 MCU4 board LEDs

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

These LEDs indicate a problem with the MCU4 board. If the board's FAIL LED is illuminated, check the network management software's *Active Alarm* and *Alarm History* windows and clear all alarms starting with the highest severity alarms first. Severity 1 alarms have the highest priority while severity 5 have the lowest priority. Check the provisioning information via network management software and verify that the slot for the unit is configured correctly. Use the maintenance flowcharts at the end of this section to diagnose and repair the system.

If the MCU4 board's External FAIL LED is illuminated, and the INP4D's FAIL LED is also illuminated, debug the INP4D problem first because it is a more severe problem.

1. Check the network management software's *Alarm History* window and delete all alarms, beginning with the highest severity alarms (i.e., severity 1).
2. Check the provisioning information via the network management software and verify that the slot for the unit is configured correctly. Use the maintenance flowcharts at the end of this section to diagnose and repair the system. Severity 1 alarms have the highest priority while severity 5 have the lowest priority.

If a board's BUSY LED is illuminated, removing the unit will result in active call(s) being dropped.

If a board's TEST LED stays on for an excessive period of time, there is usually a problem with the unit that makes it constantly reset. If you have confirmed that the peripheral board is constantly resetting, the board will have to be returned for repair. Please contact the Technical Assistance Center.

4.8.6 Troubleshooting other components

The following sections discuss troubleshooting procedures for components other than boards, including the Management Console and the backplane and chassis.

4.8.6.1 Management Console trouble

If the network management software or the communications link between the network management software and the AccessSwitch fails, try the following:

1. Check the cabling between the network management software and the AccessSwitch.
2. Reboot the PC and re-start the network management software.
3. Check your management system configuration.
4. If all of the above fails, call the Technical Assistance Center.

4.8.6.2 Backplane and chassis trouble

This section applies only if you are performing maintenance and diagnostic procedures from the same location as the AccessSwitch.

Manifestation of typical backplane problems include power supply failure, failure of one or more peripheral boards, or non-specific system troubles that cannot be isolated to a specific unit. Backplane troubles are usually caused by bent or broken connector pins. A visual inspection of the backplane may be adequate to determine if the connector is bad. The backplane and chassis are not field serviceable. If either of these components fail, the system must be returned for repair.

4.9 Error messages from the peripheral boards

Error messages occur when certain hardware self tests fail. If the INP4D fails its selftest, the failure status is reported in the Alarms screen in the network manager. Because the INP4D fails, it cannot poll the remaining boards in the AccessSwitch to report the selftest status of each board. The following error message may appear in the network management console under these conditions.

Table 4.1 System error message

Message	Description	Notes
INP4D Selftest 1 Failed	The INP4D has failed Selftest 1.	The INP4D will reset itself every 15 seconds until it has passed Selftest 1. This may occur on a system initialization, system reset, or on the insertion on an INP4D board while the system is powered. Call Technical Support for assistance.

The complete list of error messages is found in the *LMC/NMC 10.0 User Guide*.

4.10 Maintenance notes

Warning: Electrostatic Discharge (ESD) damage to integrated circuits via electrostatic discharge may not be immediately apparent. Technicians must always wear a wrist grounding strap when handling any components. The cord must be attached to a grounded surface, such as the grounding block on the rear of the AccessSwitch chassis.

4.10.1 Air filter replacement

The air filter is located at the rear of the AccessSwitch 200 chassis. The air filter should be inspected on any service call or once every 6 months, and replaced as needed. A clogged or dirty air filter can cause the chassis to overheat. To replace the air filter, pinch it in the center and pull straight out.

4.10.2 Calling the Technical Assistance Center for help

Before calling Technical Assistance Center for assistance, check the documentation and collect all information available about the problem. Make notes about any on-screen messages displayed when the problem occurs.

When calling for assistance have the following information available:

- your company name and telephone number.
- the product name.
- the product serial, or, identification number.
- all notes and alarm information to identify the problem.

The remote access number for the modem: 1-800-822-4736.

4.10.3 Returning a unit

If a part must be returned to the service center for repair, obtain a Return Materials Authorization (RMA) number from Technical Assistance Center before shipment and include all pertinent information with the part.

Figure 4.2 General maintenance flowchart (Start)

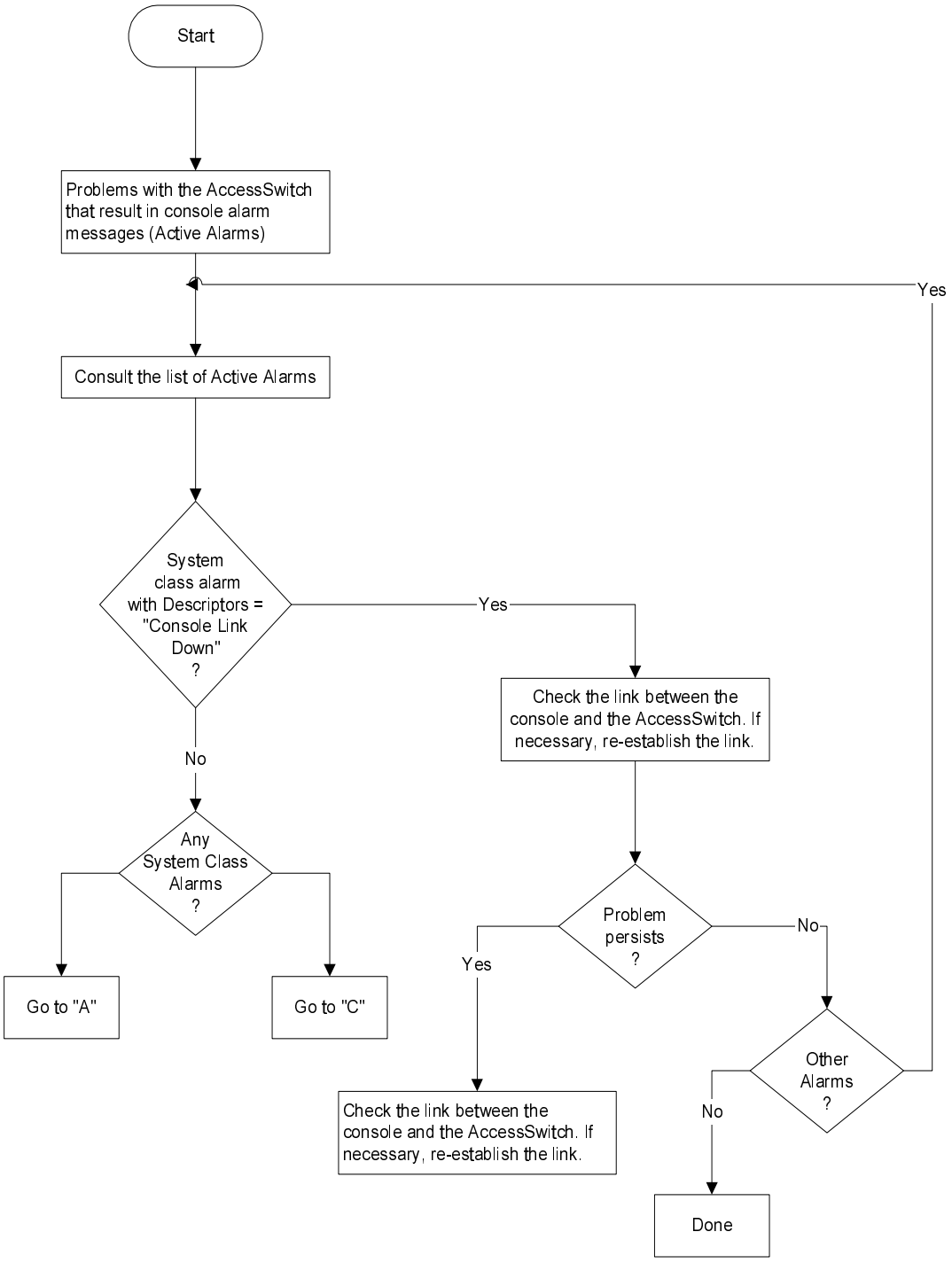


Figure 4.3 General maintenance flowchart for system problems (A)

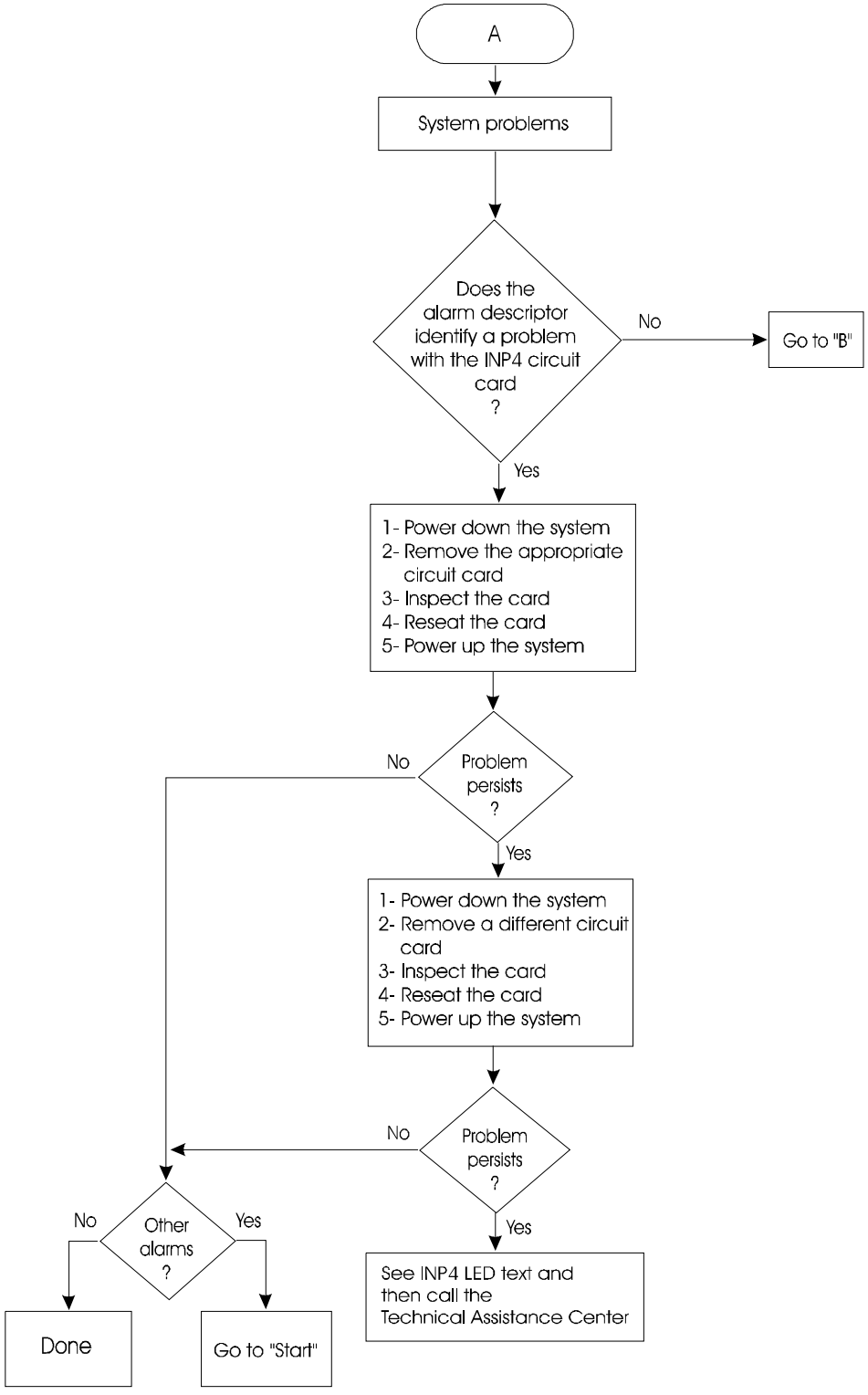


Figure 4.4 Maintenance flowchart for system problems (B)

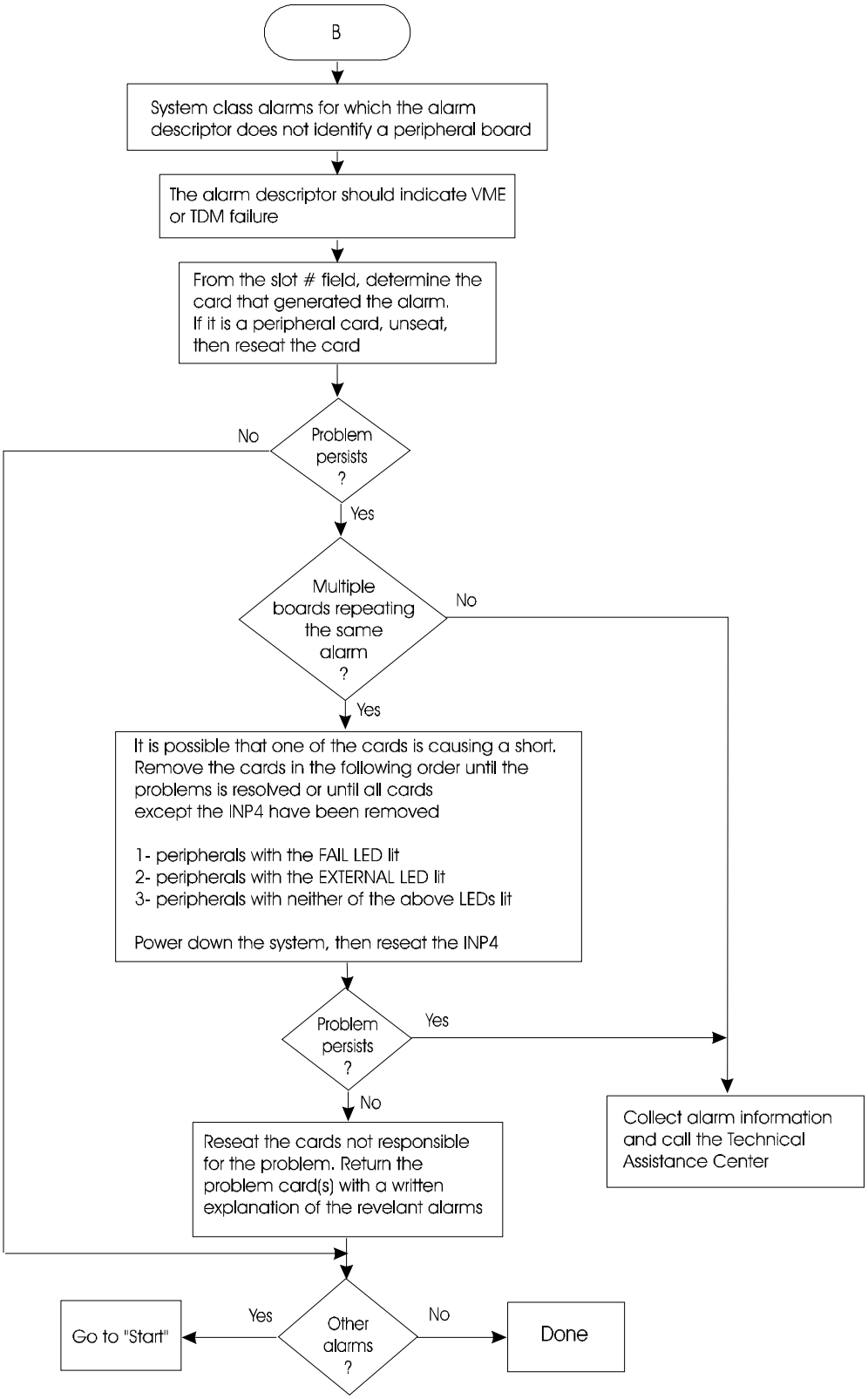


Figure 4.5 Maintenance flowchart for system problems (C)

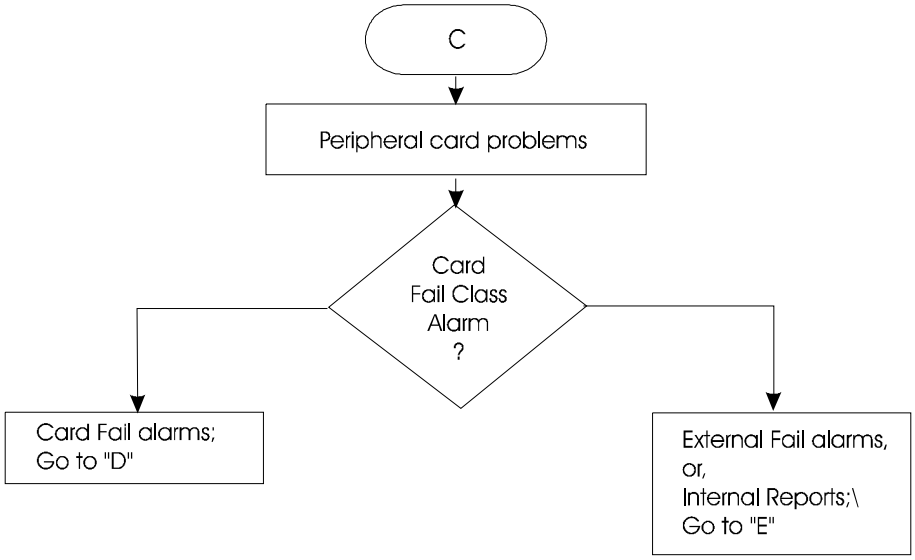


Figure 4.6 Maintenance flowchart for internal and external alarms (D)

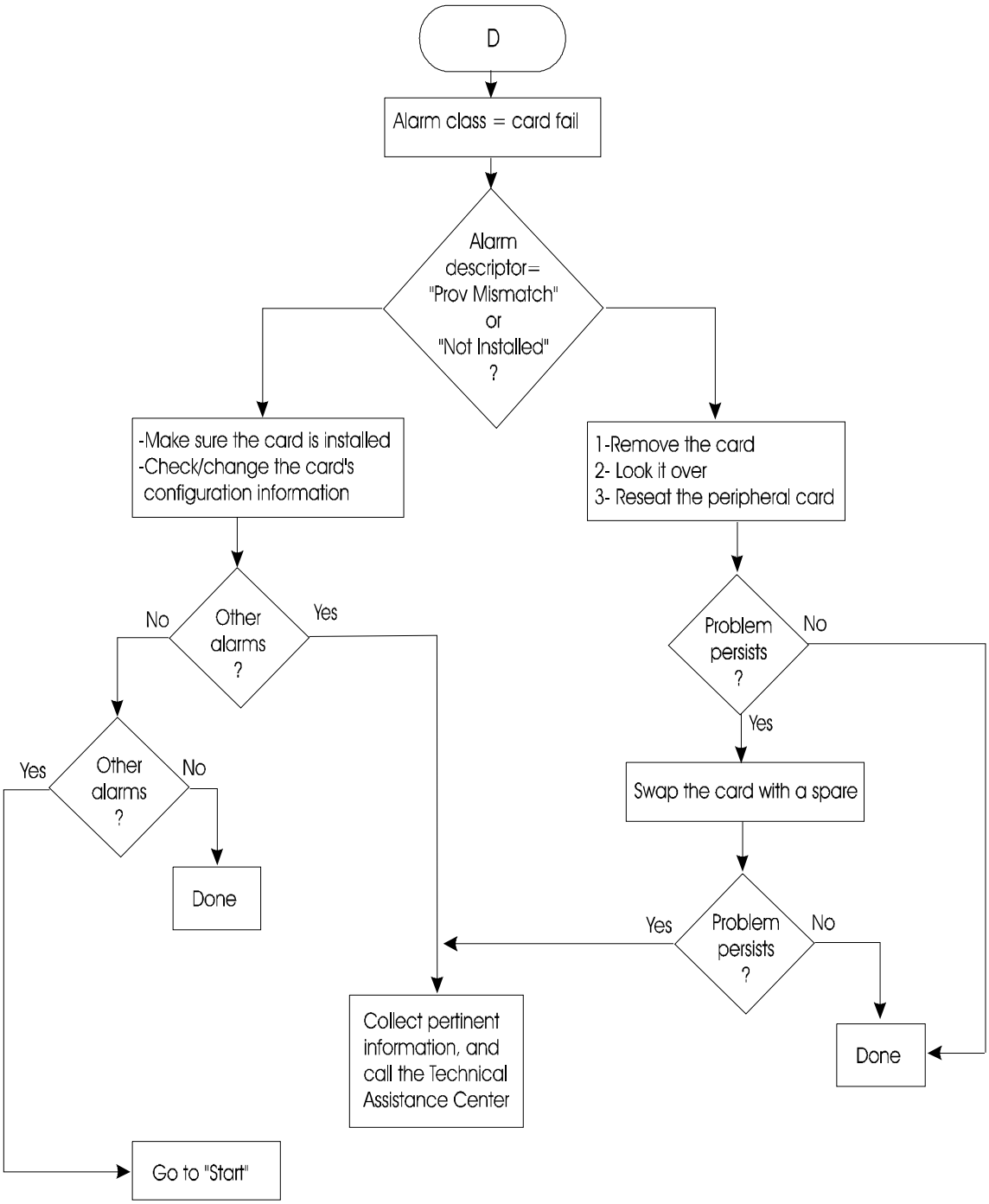
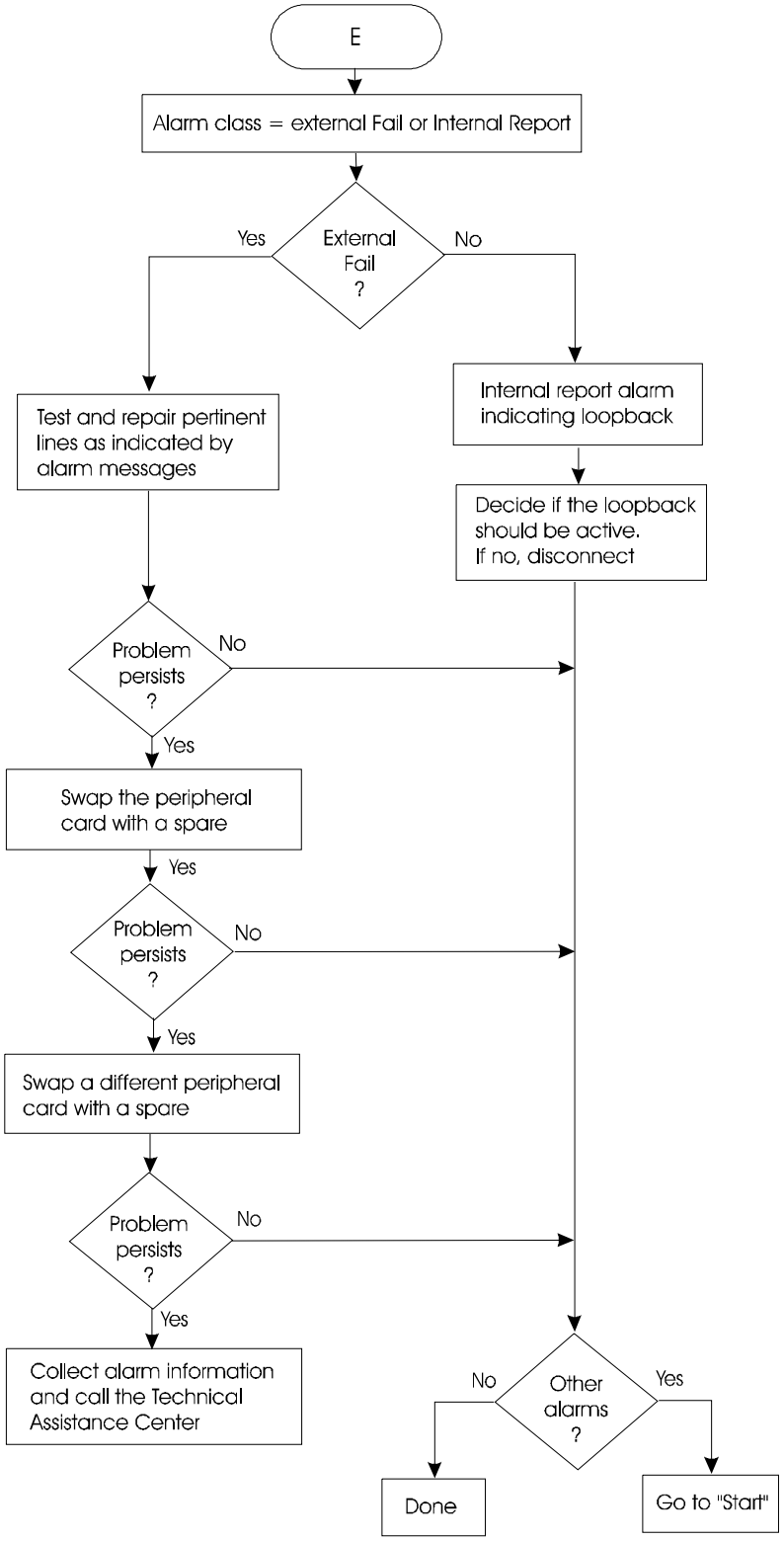


Figure 4.7 Maintenance flowchart for internal and external alarms (E)



Chapter 5

Hardware Description

5.1 Introduction

This chapter provides a description of the AccessSwitch hardware components and their functionality. Both required and optional components are described. Physical and environmental specifications can be found in *Chapter 6, Technical Specifications*.

5.2 Chassis

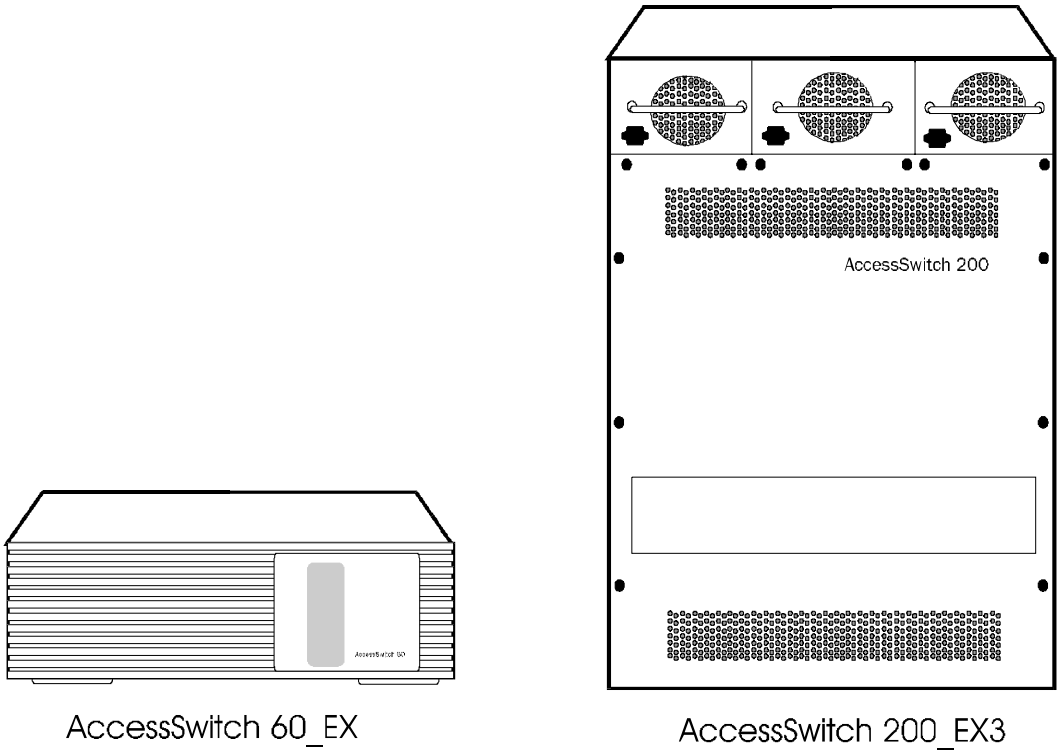
The AccessSwitch chassis is a self-contained housing for the master processor (INP4D) and other peripheral boards. The AccessSwitch is available in two chassis types to include a 20 slot "AccessSwitch 200_EX3" and a 6-slot "AccessSwitch 60_EX". As indicated in Table 5.1, different versions of AccessSwitch models are available, and are defined by the type of power supply used in the system.

Table 5.1 AccessSwitch models

AccessSwitch Type	Versions Available
AccessSwitch 60	AccessSwitch 60_EX
AccessSwitch 200	AccessSwitch 200_EX3

Figure 5.1 shows the chassis for the AccessSwitch 60_EX and the AccessSwitch 200_EX3. Both model types accommodate peripheral boards that are 14.5" (37 cm) in height and 9" (20 cm) in depth. The type of connectors used on the rear of the chassis vary between backcards. For information on the type of connectors used for each card see Table 5.7. The physical specifications for all AccessSwitch types are provided in *Chapter 6, Technical Specifications.*

Figure 5.1 AccessSwitch chassis



5.3 Power supplies

Power supplies differ between the various slotted AccessSwitch types. The AccessSwitch 200 chassis is available in several different versions, each version is dependent upon the type of power supply installed in the system. Up to three external power supplies can be installed in the AccessSwitch 200 system including a 48 volt DC option.

The AccessSwitch 60 contains a single built-in power supply. All AccessSwitch chassis models are described in the following sections. For power supply technical specifications, see *Chapter 6, Technical Specifications.*

5.3.1 AccessSwitch 60_EX

A single internal power supply is factory-installed in the AccessSwitch 60.

For AccessSwitch 60 power supply technical specifications, see *Chapter 6, Technical Specifications.*

5.3.2 AccessSwitch 200_EX3

This chassis' power supply housing is integrated as part of the complete chassis, and houses up to three independent front mounted power supplies: PS1 (left-hand power supply), PS2 (middle power supply), and PS3 (right-hand power supply). A corresponding power supply plug is located on the rear of the housing.

The system provides automatic cutover if one of the three power supplies is removed or becomes inoperable. Operator intervention is not required to replace a failed power supply with an operable one. The green LED, located on the faceplate of each power supply, indicates whether the power supply is functioning. If output power fails, system alarms are generated. If the system is equipped with more than one power supply, the INP4D detects and reports failures of single power supplies via the network management software. One power supply is included with the AccessSwitch. Additional power supplies are available to provide load-sharing and redundancy.

5.4 INP4D network processor

The INP4D is a single board and the master processor of the AccessSwitch. This board controls overall operation and performs all layer 3 processing. The INP4D provides bus arbitration, generates system clocks, monitors system status, and provides the capability of any combination of four T1/PRI trunk-side or port-side interfaces.

AccessWare 2000 R1.1 provides support for redundant and non-redundant systems. The INP4D can be used in both redundant and non-redundant systems. The AccessSwitch system becomes a redundant system when two INP4D boards are resident in the system upon a successful power-up.

In a non-redundant system, a single INP4D board occupies slot 1 (first slot from the left on the AccessSwitch 200; first slot from the bottom on the AccessSwitch 60 chassis).

AccessSwitch systems featuring redundancy must have dual INP4D boards installed in the first two slots of a slotted system. In a redundant system, dual INP4Ds provide the same bus arbitration, system clock generation and system status monitoring as a non-redundant system. However, for INP4D boards, the T1/PRI lines are inactive. Both processors have the ability to control system operations. The master INP4D maintains control under normal operating conditions, and the slave, or standby (INP4D), is used for backup in the event the master fails.

In a non-redundant system, the INP4D backcard has 9 RJ45 connections. Dual INP4Ds in a redundant system use a single, unique backcard that provides 9 RJ45 connections.

The RJ45 ports provide the same function in both redundant and non-redundant systems, with the exception discussed above for the INP4D, i.e., inactive TI/PRI ports.

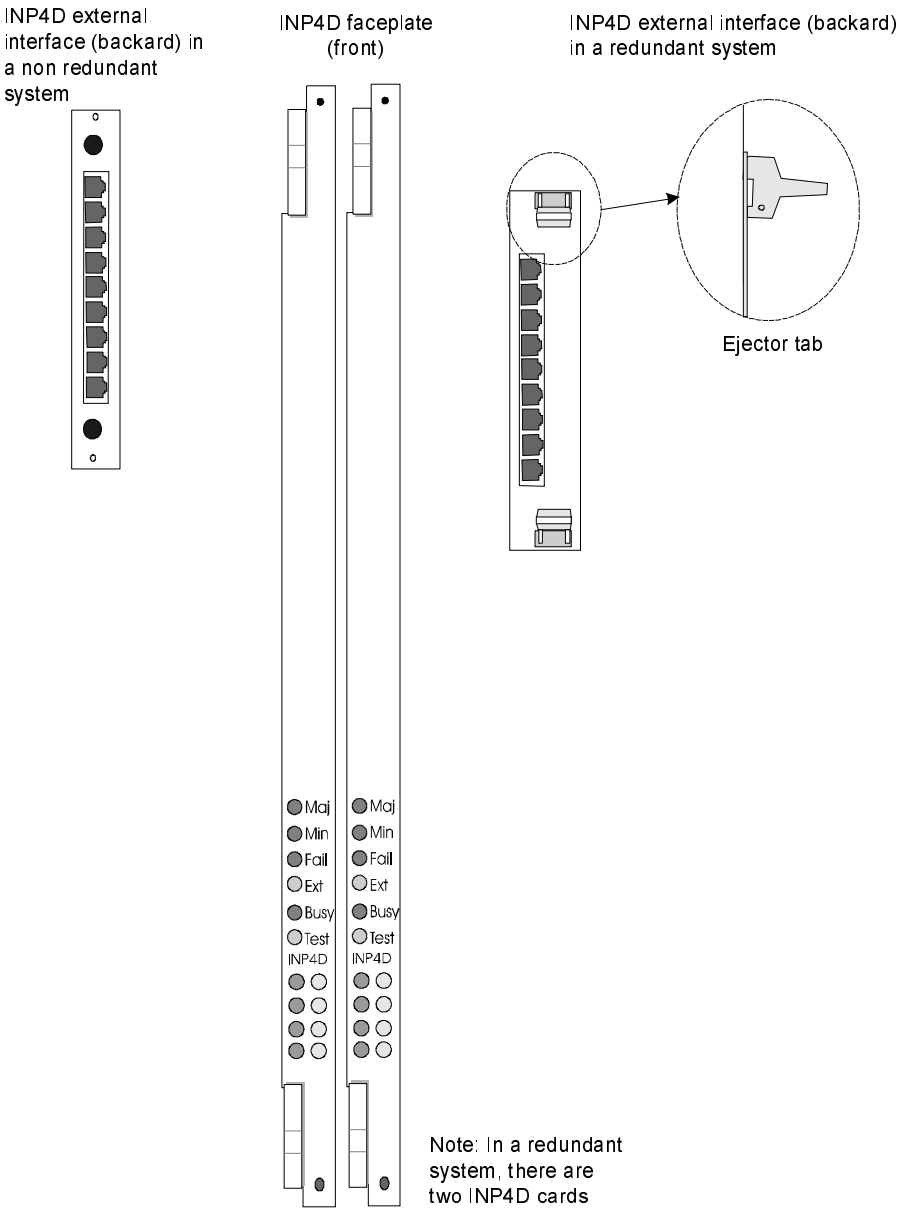
The INP4D RJ45 backcard ports include:

- Two RS232 ports: one for the local NMC and one for the modem.
- One alarm port with output pins which are typically connected to alarm telemetry equipment, audible or visual alarms (AccessSwitch LEDs for major/minor alarms - refer to *Chapter 4, Maintenance and Alarms* for more information on alarms), and input pins.
- One Ethernet port.
- Four ports marked as T1/PRI. (See note below for non-redundant and redundant systems.)

Note: T1/PRI ports are active in a non-redundant system, and inactive in a redundant system.

The INP4D peripheral board is shown in Figure 5.2. INP4D pinout specifications for 9-port RJ45 connectors are shown in Table 5.2.

Figure 5.2 INP4D peripheral board and backcard



5.4.1 INP4D I/O signal specifications

The 9-port modular connector, located on the backcard of all INP4D boards, is used to transmit and receive signals that control the overall operation of the AccessSwitch. INP4D signal descriptions can be found in Table 5.2.

Table 5.2 Signal definitions for the INP4D

Signal	Description
almout1+ (MAIN)	One side of closure #1 of a relay that is activated if the AccessSwitch is in an alarm state. The almout1+ and almout1- are typically connected to alarm telemetry equipment or visual alarms (AccessSwitch LEDs for major/minor alarms).
almout1- (MAIN)	The other side of closure #1 of a relay that is activated if the AccessSwitch is in an alarm state. The almout1+ and almout1- are typically connected to alarm telemetry equipment or visual alarms (AccessSwitch LEDs for major/minor alarms).
almout2+(SPARE)	One side of closure #2 of a relay that is activated if the AccessSwitch is in an alarm state. The almout2+ and almout2- are typically connected to alarm telemetry equipment or audible alarms.
almout2-(SPARE)	The other side of closure #2 of a relay that is activated if the AccessSwitch is in an alarm state. The almout2+ and almout2- are typically connected to alarm telemetry equipment or audible alarms.
fgndo	Frame ground.
xmt(ring)	The ring (negative) transmit lead of the S/T (DSX) interface that connects to the terminal equipment's or network's negative receive lead.
xmt(tip)	The tip (positive) transmit lead of the S/T (DSX) interface that connects to the terminal equipment's or network's positive receive lead.
rcv(tip)	The tip (positive) receive lead of the S/T (DSX) interface that connects to the terminal equipment's or network's positive transmit lead.
rcv(ring)	The ring (negative) receive lead of the S/T (DSX) interface that connects to the terminal equipment's or network's negative transmit lead.
B:fgnd	Remote LMC/NMC Port: frame ground
B:sgnd	Remote LMC/NMC Port: signal ground
B:rts	Remote LMC/NMC Port: request to send (in)
B:dcd	Remote LMC/NMC Port: data carrier detect (out)
B:rxd	Remote LMC/NMC Port: data receive (out)
B:txd	Remote LMC/NMC Port: data transmit (in)
B:dtr	Remote LMC/NMC Port: data terminal ready (in)
B:cts	Remote LMC/NMC Port: clear to send (out)

Table 5.2 Signal definitions for the INP4D (Continued)

Signal	Description
A:fgnd	LMC/NMC Port: frame ground
A:sgnd	LMC/NMC Port: signal ground
A:rts	LMC/NMC Port: request to send (in)
A:dsr, dcd	LMC/NMC Port: data set ready, data carrier detect (out)
A:rxd	LMC/NMC Port: receive (out)
A:txd	LMC/NMC Port: transmit (in)
A:dtr	LMC/NMC Port: data terminal ready (in)
A:cts	LMC/NMC Port: clear to send (out)
td+	Reserved for future use
td-	Reserved for future use
rd+	Reserved for future use
rd-	Reserved for future use

Table 5.3 INP4D pinouts for 9-port connectors

Signal	RJ45 port:pin	Signal	RJ45 port:pin
almout1+ (NC)	9:8	almout1- (CMN A)	9:5
12vdc	9:2	12vdc	9:1
almout2- CMN B)	9:6	almout2+(NC)	9:7
almout1+(NO)	9:4	almout2+ (NO)	9:3
D:xmt(ring)	8:4	D:xmt(tip)	8:5
D:rcv(tip)	8:2	D:rcv(ring)	8:1
no connect	8:6	no connect	8:3
no connect 8:8	8:8	no connect	8:7
C:xmt(ring)	7:4	C:xmt(tip)	7:5
C:rcv(tip)	7:2	C:rcv(ring)	7:1
no connect	7:6	no connect	7:3
no connect	7:8	no connect	7:7
B:xmt(ring)	6:4	B:xmt(tip)	6:5
B:rcv(tip)	6:2	B:rcv(ring)	6:1
no connect	6:6	no connect	6:3
no connect	6:8	no connect	6:7
A:xmt(ring)	5:4	A:xmt(tip)	5:5
A:rcv(tip)	5:2	A:rcv(ring)	5:1

Table 5.3 INP4D pinouts for 9-port connectors (Continued)

Signal	RJ45 port:pin	Signal	RJ45 port:pin
no connect	5:6	no connect	5:3
no connect	5:8	no connect	5:7
no connect	4:4	no connect	4:5
td-	4:2	td+	4:1
rd-	4:6	rd+	4:3
no connect	4:8	no connect	4:7
otul-	3:4	otul+	3:5
no connect	3:2	no connect	3:1
otu2-	3:6	otu2+	3:3
no connect	3:8	no connect	3:7
B:fgndo	2:4	B:sgnd	2:5
B:cts	2:2	B:dtr	2:1
B:txd	2:6	B:rxd	2:1
B:dsr	2:8	B:rts	2:7
A:fgndo	1:4	A:sgnt	1:5
A:cts	1:2	A:dtr	1:1
A:txd	1:6	A:rxd	1:3
A:dsr	1:8	A:rts	1:7

Relay Contacts:

NO= Normally Open

NC= Normally Closed

CMN= Common

5.4.2 INP4D RS232 port configuration

The RS232 interface parameters for all INPD4 serial interfaces are shown in Table 5.4.

Table 5.4 INP4 RS232 interface parameters

Parameter	Setting
Speed	9600 baud
Bits/Char	8
Parity	None
Parity bit	0 (Space)
Stop bits	1

5.5 MCU4 board

The MCU4 board is an optional plug-in module for the AccessSwitch that provides multipoint switching capability for videoconferencing. The MCU4 board is shown in Figure 5.3 and Figure 5.4 below. Each MCU4 board is a self-contained multipoint conferencing unit (MCU) that provides 4-port multipoint switching capability. The MCU4 board processes videoconferencing data from the AccessSwitch peripheral boards using an H.221 protocol.

The MCU4 board can occupy any slot other than those slots (#1 or #2) occupied by the INP4D boards. Unlike the peripheral boards used in the AccessSwitch, the MCU4 board does not have a backcard with an 8-port RJ45 connector through which terminal equipment is connected. Rather, the MCU4 board receives information internally from T1/PRI, E1, or other peripheral boards such as the QDIU_EX, DDIU_EX, QEIU_EX, DEIU_EX, QRVX, DRVX, and SEIU_EX boards.

Like other peripheral boards, the optional MCU4 plugs into an existing AccessSwitch 60 or AccessSwitch 200 chassis.

Figure 5.3 MCU4 board

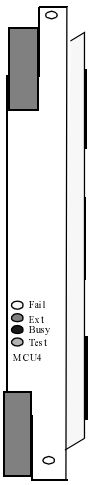
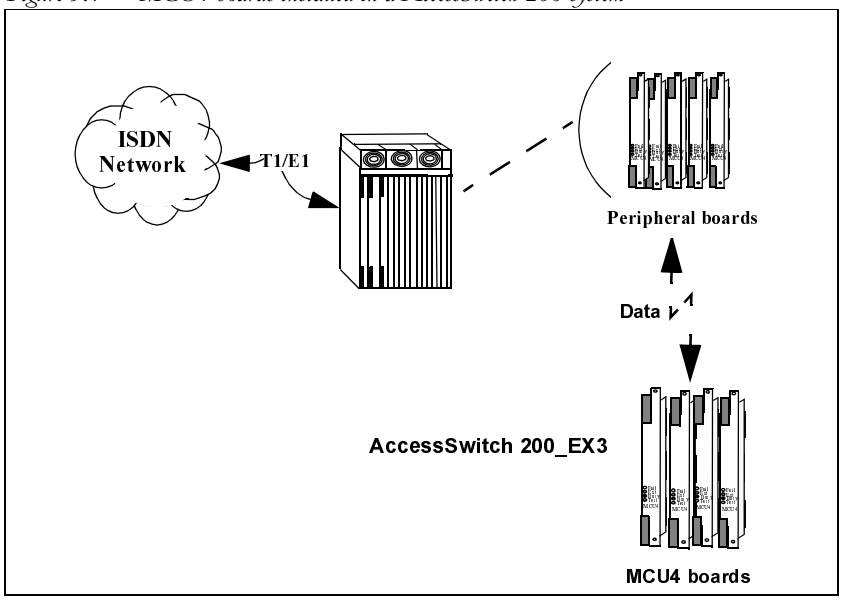


Figure 5.4 MCU4 boards installed in a AccessSwitch 200 system



Each MCU4 board supports four ports; the total number of ports supported is related to the number of MCU4 boards installed. A maximum of one conference per MCU4 board is supported. Refer to *Chapter 6, Technical Specifications*, for the specific MCU4 board parameters.

You can expand the MCU4 board's 4-port capability by using multiple MCU4 boards. The number of MCU4 boards and the number of conferences supported on the AccessSwitch are determined by the chassis size, power supply constraints, T1/E1 transfer rates, and peripheral boards the system requires. Specific hardware and network requirements may change the maximum number of MCU4 boards and conferences shown in Table 5.5.

Table 5.5 MCU4 board system capacities

AccessSwitch system	Max. # of MCU4 boards	Max. # of MCU ports	Max. # of ports in a conference	Max. # of conferences
AccessSwitch 60	2	8	8	2
AccessSwitch 60_EX	2	8	8	2
AccessSwitch 200_EX	3	12	12	3
AccessSwitch 200_EX2	3	12	12	3
AccessSwitch 200_EX3	3	12	12	3

Note: Specific hardware and network requirements may change the maximum number of MCU4 boards and conferences supported in an AccessSwitch system.

5.5.1 Transfer rates supported

A T1/PRI or E1 line coupled with an MCU4 board supports the following transfer rates:

Table 5.6 Transfer rates for a T1/PRI or E1 line with MCU4 board

Basic Transfer Rates	Bonding (Mode 1) Transfer Rates		Other Transfer Rates Supported
2x64	112Kbps	128Kbps	H0 Calls (6x64 Kbps channels)
2x56	168 Kbps	192 Kbps	
	224Kbps	256Kbps	
	336 Kbps	384 Kbps	

5.6 AccessSwitch peripheral boards and backcards

With the exception of the MCU board, all AccessSwitch boards consist of a peripheral board (or "personality" card) and a backcard. The combination of these two components create a card set. The descriptions provided in this manual for all AccessSwitch boards (the processor, network interface and customer equipment boards) do not categorize these boards separately, rather, the boards are described as card sets, as if they are a single unit.

The peripheral boards are inserted in the front of the chassis and perform all intelligent processing. These boards connect to the TDM and VME buses, power, and ground. All AccessWare 2000 R1.1 system software contained on the peripheral boards can be downloaded using the SoftLoad procedure.

The backcards provide the external interface connections, and are specifically configured for each type of board. For example, the OBIU board has eight Basic Rate ISDN interfaces, while the QRVX has four external interfaces. The external connections for the AccessSwitch backcards are shown in Table 5.7.

Table 5.7 AccessSwitch boards external connectors

Connector	Board
8 RJ45s	OBIU-U, OBIU, QDIU, DDIU_EX, QEIU_EX, DEIU_EX, SEIU_EX
9 RJ45s	INP4D
V.35/RS449	QRVX, DRVX
X.21	QRVX, DRVX
N/A	MCU4

Unlike other boards, the MCU4 does not have an external interface and, therefore, does not possess a backcard.

The INP4D is used in both redundant and non-redundant systems.

In a non-redundant AccessSwitch system, the non-redundant INP4D backcard occupies slot 1 and contains 9 RJ45 connections with 4 T1/PRI port connections.

In a redundant system, the INP4D uses a unique, common backcard through which the dual INP4Ds maintain communication with each other. The common backcard occupies slots 1 and 2, and is easily identified by the double-width and large ejector tabs located at the top and bottom of the backcard. The common backcard on an INP4D provides 9 RJ45 connections, but has no T1/PRI port connections. See Figure 5.2 for an illustration of the INP4D backcards.

5.7 Peripheral boards

Peripheral boards inserted into the system permit access to the network via Primary Rate, Basic Rate, and T1 lines. The type of peripheral board determines the number of lines available as well as the features available for each specific board.

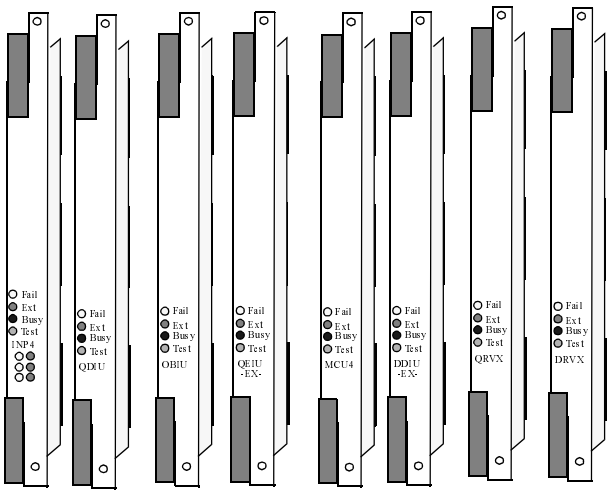
The name of a board provides information about the type of board installed in the system. That is, board names beginning with an "O" (octal) provide 8 lines. Board names starting with a "Q" ("quad") provide 4 lines. Board names starting with "D" (dual) provide 2 lines.

Peripheral boards are optional for the AccessSwitch and can occupy any slot other than slot #1 in non-redundant systems, and slots #1 and #2 in redundant systems. Peripheral boards can be inserted in any order and combination. A sampling of the peripheral boards is shown in Figure 5.5. A brief description of each board type follows.

Note: An AccessSwitch 200 has a system limitation of 18 peripheral boards, including the INP4(s). Depending on the types of peripheral boards you are using, your actual system limitation may be lower.

Warning: For locations outside North America, the QDIU_EX and DDIU_EX peripheral boards are not approved for connection to the public network. An approved interface must be used.

Figure 5.5 Sample peripheral boards



- Octal Basic Rate Interface Unit - OBIU

  The OBIU is an optional peripheral board for the AccessSwitch. Each OBIU provides 8 ISDN Basic Rate Interface circuits with S/T user (downstream) or network (upstream) interfaces. These modules provide the physical (layer 1) interface for each BRI, as well as complete data link (layer 2) protocol support. The S/T interface also provides for connection to the public network, or to a private network via an approved external NT1.

  Iach OBIU ST BRI line supports port-side and trunk-side routing for distances up to 3000 feet. Configuration for distances is accomplished automatically without any additional provisioning.

- Octal Basic Rate U Reference Interface Unit - OBIU-U

  The OBIU-U is an optional peripheral board for the AccessSwitch. Each OBIU-U provides 8 ISDN Basic Rate Interfaces, and U-reference circuits for line termination connections (upstream). These modules provide the physical layer (layer 1) interface for each BRI as well as a complete data link (layer 2) protocol support.

  Each OBIU-U BRI port supports port side routing for distances up to 18,000 feet. Configuration for distances is accomplished automatically without any additional provisioning. The OBIU-U is configured through the network manager as an OBIU. The OBIU-U board provides port side provisioning only.

- Quad DSX Interface Unit_EX - QDIU_EX

  The QDIU_EX is an optional peripheral board for the AccessSwitch. Each QDIU_EX provides 4 interfaces which are any combination of PRI and T1 interfaces. The type of interface used (PRI or T1) is specified on a line-by-line basis. PRI and T1 interfaces support the S/T interface which is designed for short distance connections (less than 660 feet) to other on-premises equipment. The S/T interface also provides for connection to the public network, or a private network via a long haul connection (greater than 660 feet) by using an approved external CSU. Configurations of distances up to 660 feet are accomplished through Layer 1 provisioning of DSX Pre-emphasis for line build-out in increments of 110 feet.

- Dual DSX Interface Unit_EX - DDIU_EX

  The DDIU_EX is an optional peripheral board for the AccessSwitch. Each DDIU_EX provides 2 interfaces which can be either PRI interfaces, T1 interfaces, or one PRI and T1 interface. The PRI and T1 interfaces support the S/T interface designed for short distance connections (less than 660 feet) to other on-premises equipment. The S/T interface also provides for connection to the public network, or to a private network long haul connection (greater than 660 feet) by using an approved external CSU. Configurations of distances up to 660 feet are accomplished through Layer 1 provisioning of DSX Pre-emphasis for line build-out in increments of 110 feet.

- Quad RS449/V.35/X.21 - QRVX

  The QRVX is an optional peripheral board for the AccessSwitch. This board is available in two versions: a QRVX 4-Imux which provides 4 Imux framers, and a QRVX 0-Imux which does not provide for Imux framers. The QRVX provides four V.35, RS449 or X.21 (as ordered) synchronous data interfaces that connect to various terminal equipment, and four RS366 or RS366A premises-side dialing interfaces. The Bonding Mode 1 algorithm is supported on the QRVX-4. In-band V.25bis dialing is also supported by the QRVX.

- Dual RS449/V.35/X.21 - DRVX

  The DRVX is an optional peripheral board for the AccessSwitch which is available in two versions: a DRVX 2-Imux, which provides 2 Imux framers, and a DRVX 0-Imux in which no framers are provided. The DRVX provides two V.35, RS449 or X.21 (as ordered) synchronous data interfaces that connect to various terminal equipment and two RS366 or RS366A premises-side dialing interfaces. The Bonding Mode 1 algorithm is supported on the DRVX-2. In-band V.25bis dialing is also supported by the DRVX.

- Quad E1 Interface Unit_EX - QEIU_EX

  The QEIU_EX is an optional peripheral board for the AccessSwitch. Each QEIU_EX has four 2048 Kbps E1 interfaces at the S and/or T reference point. (This conforms to CCITT Recommendations G.703, G.704, G.706, and I.431.) The S interface provides for short distance connections (less than 661 cable feet) to other on-premises equipment. The T interface provides for connection to the public ISDN, or to a private network. The QEIU_EX provides access to the network services based on NET 5 PRI or GloBanD. The maximum cable length to the network termination point is 653.4 feet. Configuration for distances is accomplished automatically without any additional provisioning.

Note: NET 5 PRI and GloBanD are European primary rate protocols.

- Dual E1 Interface Unit_EX - DEIU_EX

  The DEIU_EX is an optional peripheral board for the AccessSwitch. Each DEIU_EX has two 2048 Kbps E1 interfaces at the S and/or T reference point. (This conforms to CCITT Recommendations G.703, G.704, G.706, and I.431.) The S interface provides for short distance connections (less than 661 cable feet) to other on-premises equipment. The T interface provides for connection to the public ISDN, or to a private network. The DEIU_EX provides access to the network services based on NET 5 PRI or GloBanD. The maximum cable length to the network termination point is 653.4 feet. Configuration for distances is accomplished automatically without any additional provisioning.

- Single E1 Interface Unit_EX - SEIU_EX

  The SEIU_EX is an optional peripheral board for the AccessSwitch. Each SEIU_EX has one 2048 Kbps E1 interface at the S and/or T reference point. (This conforms to CCITT Recommendations G.703, G.704, G.706, and I.431.) The S interface provides for short distance connections (less than 661 cable feet) to other on-premises equipment. The T interface provides for connection to the public ISDN, or to a private network. The SEIU_EX provides access to the network services based on NET 5 PRI or GloBanD. The maximum cable length to the network termination point is 653.4 feet. Configuration for distances is accomplished automatically without any additional provisioning.

5.8 OBIU board

The Octal Basic Rate Interface Unit (OBIU) is an optional peripheral board for the AccessSwitch. This board provides eight ISDN S/T user (downstream) or network (upstream) Basic Rate Interfaces (BRIs), and supports BRI trunk and port capabilities. The OBIU supports both point-to-point and multipoint passive bus configurations. The OBIU can occupy any slot other than slots 1 (non-redundant systems) and 2 (redundant system), and can be intermixed with any combination of peripheral boards. The OBIU provides an S/T interface that is suitable for distance connections up to 3000 feet.

5.8.1 OBIU I/O signals

The connector for a slot containing an OBIU is used to transmit and receive signals between the OBIU and the terminal equipment connected to the OBIU. Definitions for each OBIU I/O signal are provided in Table 5.8. Pinout specifications for the 8-port RJ45 connector are described in Table 5.9.

Table 5.8 I/O signal definitions for the OBIU board

Signal	Definition
xmt(x)+	The positive transmit lead that connects to the terminal equipment's positive receive lead.
xmt(x)-	The negative transmit lead that connects to the terminal equipment's negative receive lead.
rcv(x)+	The positive receive lead that connects to the terminal equipment's positive transmit lead.
rcv(x)-	The negative receive lead that connects to the terminal equipment's negative transmit lead.

Note: The value of (x) in each signal, shown above and below, can range from 1-4 and indicates a particular basic rate interface to which the I/O signal leads are connected.

Table 5.9 OBIU pinouts for 8 port, RJ45 connector

Signal	RJ45 port:pin	Signal	RJ45 port:pin
xmt8+	8:4	xmt8-	8:5
no connect	8:2	no connect	8:1
rcv8-	8:6	rcv8+	8:3
no connect	8:8	no connect	8:7
xmt7+	7:4	xmt7-	7:5
no connect	7:2	no connect	7:1
xmt6+	6:4	xmt6-	6:5
no connect	6:2	no connect	6:1
rcv6-	6:6	rcv6+	8:1

Table 5.9 OBIU pinouts for 8 port, RJ45 connector (Continued)

Signal	RJ45 port:pin	Signal	RJ45 port:pin
no connect	6:8	no connect	6:7
xmt5+	5:4	xmt5-	5:5
no connect	5:2	no connect	5:1
rcv5-	5:6	rcv5+	5:3
no connect	5:8	no connect	5:7
xmt4+	4:4	xmt4-	4:5
no connect	4:2	no connect	4:1
rcv4-	4:6	rcv4+	4:3
no connect	4:8	no connect	4:7
xmt3+	3:4	xmt3-	3:5
no connect	3:2	no connect	3:1
rcv3-	3:6	rcv3+	3:3
no connect	3:8	no connect	3:7
xmt2+	2:4	xmt2-	2:5
no connect	2:2	no connect	2:1
rcv2-	2:6	rcv2+	2:3
no connect	2:8	no connect	2:7
xmt1+	1:4	xmt1-	1:5
no connect	1:2	no connect	1:1
rcv1-	1:6	rcv1+	1:3
no connect	1:8	no connect	1:7

5.9 OBIU-U board

The Octal Basic Rate U-Interface Unit (OBIU-U) is an optional peripheral board for the AccessSwitch that provides eight ISDN U-interface line termination (upstream) basic rate interfaces (BRIs). The OBIU-U supports point-to-point configurations, and provides I/O connections and protocol switching between the network and functional control and switching matrix modules installed in the AccessSwitch. The OBIU-U can occupy any slot other than slot #1 for non-redundant systems, and slots #1 and #2 for redundant systems, and can be intermixed with any combination of peripheral boards.

The OBIU-U interface should not be installed in older model 200 chassis.The OBIU-U provides a U interface that is suitable for distance connections up to 18,000 cable feet.

The 8-port modular connector is used to transmit and receive signals between the OBIU-U and the network connected to the OBIU-U. Table 5.10 provides pinout specifications for the 8-port RJ45 connector.

Table 5.10 OBIU-U pinouts for 8-port RJ45 connector

Pin number	Function	Notes
1	Battery status	Optional battery status (not used)
2	Battery status	Optional battery status (not used)
3	No connection	Reserved
4	Signal	Tip or ring of the pair
5	Signal	Tip or ring of the pair
6	No connection	Reserved
7	Powering	Optional powering (not used)
8	Powering	Optional powering (not used)

5.9.1 Lightning and AC power fault protection for the OBIU-U

An AccessSwitch system containing OBIU-U boards is intended to be protected from lightning and AC power faults by 3-mil carbon blocks. In certain conditions, such as in a campus type environment where the AccessSwitch provides basic rate ISDN over a wide area, it is necessary for the user to provide this protection.

It is recommended that 3-mil carbon blocks be provided to protect the AccessSwitch system from lightning and AC power faults under the following circumstances:

- Lines exiting the OBIU-U are directed out of the building in which the OBIU-U is housed.
- Lines exiting the OBIU-U are exposed to the elements, such as when they are strung across poles for distribution in a campus environment.

3-mil carbon blocks are defined in the Bellcore Criteria TR-EOP-000001:June 1987, and TR-TSY-300:June 1986. 3-mil carbon blocks are also defined by Underwriters Laboratories document: UL-497. Please refer to these documents for specific information on 3-mil carbon blocks.

5.10 QDIU_EX and DDIU_EX boards

This section describes the hardware for the QDIU_EX and DDIU_EX boards.

The DDIU_EX provides two DSX interfaces that are independently configured as either ISDN PRI interfaces or T1 interfaces via the LMC/NMC.

Each QDIU_EX provides four DSX interfaces that are independently configured as either ISDN PRI interfaces or T1 interfaces via the LMC/NMC.

The DDIU_EX and QDIU_EX provide an S/T, or DSX-type interface, that is suitable for short distance connections (less than 660 cable feet).

Warning: For locations outside of North America, the QDIU_EX and DDIU_EX interface boards are not approved for connection to the public network. An approved barrier is required.

5.10.1 Signal specifications for the QDIU_EX and DDIU_EX I/O boards

The connector for a slot that contains either a QDIU_EX, or DDIU_EX is used to transmit and receive signals between the QDIU_EX, and/or DDIU_EX and either terminal equipment or the network. These signals are described in Table 5.11.

Table 5.11 I/O signal definitions for the QDIU_EX and DDIU_EX I/O boards

Signal	Definition
fgndo	Frame ground
xmt(ring)	The ring (negative) transmit lead of the S/T (DSX) interface that connects to the terminal equipment's or network's negative receive lead.
xmt(tip)	The tip (positive) transmit lead of the S/T (DSX) interface that connects to the terminal equipment's or network's positive receive lead.
rcv(tip)	The tip (positive) receive lead of the S/T (DSX) interface that connects to the terminal equipment's or network's positive transmit lead.
rcv(ring)	The ring (negative) receive lead of the S/T (DSX) interface that connects to the terminal equipment's or network's negative transmit lead.

The following tables provide the pinout specifications for the listed interface boards:

- Table 5.12 - contains the pinout specifications for the DDIU_EX 8-port connector.
- Table 5.13 - contains the pinout specifications for the QDIU_EX 8-port connector.

Table 5.12 Pinout specifications for the DDIU_EX 8 port RJ45 connector

Signal	RJ45 port:pin	Signal	RJ45 port:pin
fgndo	6:4	fgndo	6:5
no connect	6:2	no connect	6:1
no connect	6:6	no connect	6:3

Table 5.12 Pinout specifications for the DDIU_EX 8 port RJ45 connector (Continued)

Signal	RJ45 port:pin	Signal	RJ45 port:pin
no connect	6:8	no connect	6:7
fgndo	5:4	fgndo	5:5
no connect	5:2	no connect	5:1
no connect	5:6	no connect	5:3
no connect	5:8	no connect	5:7
no connect	4:4	no connect	4:5
no connect	4:2	no connect	4:1
no connect	4:6	no connect	4:3
no connect	4:8	no connect	4:7
no connect	3:4	no connect	3:5
no connect	3:2	no connect	3:1
no connect	3:6	no connect	3:3
no connect	3:8	no connect	3:7
xmt2 (ring)	2:4	xmt2 (tip)	2:5
rcv2 (tip)	2:2	rcv2 (ring)	2:1
no connect	2:6	no connect	2:3
no connect	2:8	no connect	2:7
xmt1 (ring)	1:4	xmt1 (tip)	1:5
rcv1 (tip)	1:2	rcv1 (ring)	1:1
no connect	1:6	no connect	1:3
no connect	1:8	no connect	1:7

Table 5.13 Pinout specifications for the QDIU_EX 8 port RJ45 connector

Signal	RJ45 port:pin	Signal	RJ45
fgndo	6:4	fgndo	6:5
no connect	6:2	no connect	6:1
no connect	6:6	no connect	6:3
no connect	6:8	no connect	6:7
fgndo	5:4	fgndo	5:5
no connect	5:2	no connect	5:1
no connect	5:6	no connect	5:3
no connect	5:8	no connect	5:7

Table 5.13 Pinout specifications for the QDIU_EX 8 port RJ45 connector (Continued)

Signal	RJ45 port:pin	Signal	RJ45
xmt4 (ring)	4:4	xmt4 (tip)	4:5
rcv4 (tip)	4:2	rcv4 (ring)	4:1
no connect	4:6	no connect	4:3
no connect	4:8	no connect	4:7
xmt3 (ring)	3:4	xmt3 (tip)	3:5
rcv3 (tip)	3:2	rcv3 (ring)	3:1
no connect	3:6	no connect	3:3
no connect	3:8	no connect	3:7
xmt2 (ring)	2:4	xmt2 (tip)	2:5
rcv2 (tip)	2:2	rcv2 (ring)	2:1
no connect	2:6	no connect	2:3
no connect	2:8	no connect	2:7
xmt1 (ring)	1:4	xmt1 (tip)	1:5
rcv1 (tip)	1:2	rcv1 (ring)	1:1
no connect	1:6	no connect	1:3
no connect	1:8	no connect	1:7

5.11 DEIU_EX, QEIU_EX, and SEIU_EX boards

This section describes the hardware for the QEIU_EX, DEIU_EX, and SEIU_EX peripheral boards. Each of these boards are optional for the AccessSwitch, and can occupy any AccessSwitch slot other than slot #1 in non-redundant systems, and slots 1 and 2 in redundant systems. The QEIU_EX, DEIU_EX, and SEIU_EX can be intermixed with other AccessSwitch peripheral boards as well.

- Each QEIU_EX provides four E1 interfaces.
- Each DEIU_EX provides two E1 interfaces.
- Each SEIU_EX provides one E1 interface.

The QEIU_EX/DEIU_EX/SEIU_EX provide 2048 Kbps E1 interfaces at the S and/or T reference point, conforming to CCITT Recommendations G.703, G.704, G.706, and I.431. The S interface provides for short distance connections (653.4 feet) to other on-premises equipment. The T interface provides for connection to the public ISDN, or to a private network.

Each E1 interface has two ports, one for transmit and one for receive. Frame ground can be isolated from or connected to the transmit and receive ports. By default, frame ground is connected to the transmit port and isolated from the receive port.

5.11.1 QEIU_EX, DEIU_EX, and SEIU_EX I/O signal specifications

The connector for a slot that contains either a QEIU_EX/DEIU_EX/SEIU_EX is used to transmit and receive signals between the QEIU_EX, DEIU_EX and/or SEIU_EX and either terminal equipment or the network.

Table 5.14 below provides I/O signal and pinout specifications for these boards.

Table 5.14 I/O signal specifications for the QEIU_EX, DEIU_EX, and SEIU_EX boards

Signal	Description
xmt(ring)	The ring (negative) transmit lead of the S/T E1 interface that connects to the terminal equipment's negative receive lead.
xmt(tip)	The tip (positive) transmit lead of the S/T E1 interface that connects to the terminal equipment's positive receive lead.
rcv(tip)	The tip (positive) receive lead of the S/T E1 interface that connects to the terminal equipment's positive transmit lead.
rcv(ring)	The ring (negative) receive lead of the S/T E1 interface that connects to the terminal equipment's negative transmit lead.

Table 5.15 Pinout specifications for the QEIU_EX boards

Signal	RJ45 port:pin	Signal	RJ45 port:pin
rcv (ring)	1:1	no connect	5:1
rcv (tip)	1:2	no connect	5:2
no connect	1:3	no connect	5:3
xmt (ring)	1:4	no connect	5:4
xmt (tip)	1:5	no connect	5:5

Table 5.15 Pinout specifications for the QEIU_EX boards (Continued)

Signal	RJ45 port:pin	Signal	RJ45 port:pin
no connect	1:6	no connect	5:6
no connect	1:7	no connect	5:7
no connect	1:8	no connect	5;8
rcv (ring)	2:1	no connect	6:1
rcv (tip)	2:2	no connect	6:2
no connect	2:3	no connect	6:3
xmt (ring)	2:4	no connect	6:4
xmt (tip)	2:5	no connect	6:5
no connect	2:6	no connect	6:6
no connect	2:7	no connect	6:7
no connect	2:8	no connect	6:8
rcv (ring)	3:1	no connect	7:1
rcv (tip)	3:2	no connect	7:2
no connect	3:3	no connect	7:3
xmt (ring)	3:4	no connect	7:4
xmt (tip)	3:5	no connect	7:5
no connect	3:6	no connect	7:6
no connect	3:7	no connect	7:7
no connect	3:8	no connect	7:8
rcv (ring)	4:1	no connect	8:1
rcv (tip)	4:2	no connect	8:2
no connect	4:3	no connect	8:3
xmt (ring)	4:4	no connect	8:4
xmt (tip)	4:5	no connect	8:5
no connect	4:6	no connect	8:6
no connect	4:7	no connect	8:7
no connect	4:8	no connect	8:8

Table 5.16 Pinout specifications for the DEIU_EX board

Signal	RJ45 port:pin	Signal	RJ45 port:pin
rcv (ring)	1:1	no connect	5:1
rcv (tip)	1:2	no connect	5:2

Table 5.16 Pinout specifications for the DEIU_EX board (Continued)

Signal	RJ45 port:pin	Signal	RJ45 port:pin
no connect	1:3	no connect	5:3
xmt (ring)	1:4	no connect	5:4
xmt (tip)	1:5	no connect	5:5
no connect	1:6	no connect	5:6
no connect	1:7	no connect	5:7
no connect	1:8	no connect	6:7
rcv (ring)	2:1	no connect	6:1
rcv (tip)	2:2	no connect	6:2
no connect	2:3	no connect	6:3
xmt (ring)	2:4	no connect	6:4
xmt (tip)	2:5	no connect	6:5
no connect	2:6	no connect	6:6
no connect	2:7	no connect	6:7
no connect	2:8	no connect	6:8
no connect	3:1	no connect	7:1
no connect	3:2	no connect	7:2
no connect	3:3	no connect	7:3
no connect	3:4	no connect	7:4
no connect	3:5	no connect	7:5
no connect	3:6	no connect	7:6
no connect	3:7	no connect	7:7
no connect	3:8	no connect	7:8
no connect	4:1	no connect	8:1
no connect	4:2	no connect	8:2
no connect	4:3	no connect	8:3
no connect	4:4	no connect	8:4
no connect	4:5	no connect	8:5
no connect	4:6	no connect	8:6
no connect	4:7	no connect	8:7
no connect	4:8	no connect	8:8

Table 5.17 Pinout specifications for the SEIU_EX boards

Signal	RJ45 port:pin	Signal	RJ45 port:pin
rcv (ring)	1:1	no connect	5:1
rcv (tip)	1:2	no connect	5:2
no connect	1:3	no connect	5:3
xmt (ring)	1:4	no connect	5:4
xmt (tip)	1:5	no connect	5:5
no connect	1:6	no connect	5:6
no connect	1:7	no connect	5:7
no connect	1:8	no connect	5:8
no connect	2:1	no connect	6:1
no connect	2:2	no connect	6:2
no connect	2:3	no connect	6:3
no connect	2:4	no connect	6:4
no connect	2:5	no connect	6:5
no connect	2:6	no connect	6:6
no connect	2:7	no connect	6:7
no connect	2:8	no connect	6:8
no connect	3:1	no connect	7:1
no connect	3:2	no connect	7:2
no connect	3:3	no connect	7:3
no connect	3:4	no connect	7:4
no connect	3:5	no connect	7:5
no connect	3:6	no connect	7:6
no connect	3:7	no connect	7:7
no connect	3:8	no connect	7:8
no connect	4:1	no connect	8:1
no connect	4:2	no connect	8:2
no connect	4:3	no connect	8:3
no connect	4:4	no connect	8:4
no connect	4:5	no connect	8:5
no connect	4:6	no connect	8:6
no connect	4:7	no connect	8:7
no connect	4:8	no connect	8:8

5.12 QRXV and DRVX boards

The QRVX and DRVX are optional peripheral boards for the AccessSwitch that provide 4 and 2, respectively, RS449, V.35, or X.21 data interfaces and the same number of dialing interfaces (RS366 or RS366A). The RS449 interface supports RS366A dialing, the V.35 interface supports RS366 dialing, and the X.21 interface supports X.21 dialing. The V.35 and RS449 interfaces also support in-band V.25bis dialing.

Each data port supports between 56 Kbps and 1536 Kbps in increments of Nx56 and Nx64 Kbps. You can configure the V.35 interface to provide "trunk" capability. This feature is described below in the following section.

The number of data rates supported is dependent on the inverse multiplexing (IMUX) capability. The Imux feature allows multiple B channels to be used to support Nx56 Kbps or Nx64 Kbps data rates (for which N = 2-31, inclusive). For example, the Imux feature enables attached peripheral equipment to support 384 Kbps (H0) calls over 6 individual 64 Kbps B channels, while maintaining bit sequence integrity.

5.12.1 QRVX/DRVX signal definitions

The pins of the two back card connectors for a slot containing a QRVX/DRVX peripheral board (four connectors for an X.21 QRVX/DRVX I/O back card) are used to transmit and receive signals between a QRVX/DRVX and terminal equipment. For V.35 and RS449, each connector carries data interfaces (2 for DRVX; 4 for QRVX) and dialing interfaces (2 for DRVX; 4 for QRVX). For X.21, four interfaces of a QRVX and the two interfaces of a DRVX are used for both data and dialing. The sections which follow describe the signal definitions for the RS449, V.35, X.21, RS366, and RS366A interfaces.

5.12.2 RS449 pinout specifications

EIA RS449 specifies a 37-pin connector and defines a combination of balanced and unbalanced signals for the interface. Table 5.18 defines the signal names of the RS449 and V.35 interfaces. Table 5.19 describes the first 68-pin connector and RS449 cable pinout specifications for the QRVX and DRVX board. Table 5.20 lists the second 68-pin connector for the QRVX only, and RS449 cable pinout specifications. Data terminal equipment (DTE) is any equipment attached to a QRVX or DRVX.

Table 5.18 RS449 and V.35 signal definitions

RS449 Signal	V.35 Signal	Definition
SG	SG	Signal Ground This circuit directly connects the DTE circuit to the QRVX/DRVX circuit ground to provide a conductive path between the DTE and QRVX/DRVX signal commons.
RD	RD	Receive Data This circuit transfers data signals generated by the QRVX/DRVX to the DTE.
SD	SD	Send Data This circuit transfers the data signals originated by the DTE to the QRVX/DRVX.
ST	SCT	Send Timing/Serial Clock Transmit (Transmit Clock) This circuit provides the DTE with signal element timing information for transmitting data from the QRVX/DRVX. The DTE provides a data signal on circuit SD when circuit ST transitions from OFF to ON.

Table 5.18 RS449 and V.35 signal definitions (Continued)

RS449 Signal	V.35 Signal	Definition
RT	SCR	Receive Timing/Serial Clock Receive (Receive Clock) This circuit provides the DTE with signal element timing for data received from the QRVX/DRVX. The transition from OFF to ON indicates the center of each bit on circuit RD.
N/A	SCTE	Serial Clock Transmit External (Terminal Timing) This circuit provides the QRVX/DRVX with a clock from the DTE. The ON to OFF transition indicates the center of each signal element on circuit SD.
IC	RI	Incoming Call/Ring Indicator This circuit indicates whether an incoming call signal is being received by the QRVX/DRVX. The ON condition indicates that an incoming call signal is being received by the QRVX/DRVX.
RS	RTS	Request to Send This circuit controls the transmit function of the local QRVX/DRVX. A transition from OFF to ON instructs the QRVX/DRVX to enter transmit mode. A transition from ON to OFF instructs the QRVX/DRVX to complete the transmission of all data that was previously transferred across the interface on circuit SD and then assume non-transmit mode. The QRVX/DRVX responds by turning off circuit CTS when it is prepared to again respond to a subsequent ON condition of circuit RS. The RTS/CTS handshaking option is enabled via the LMC/NMC.
CS	CTS	Clear to Send This circuit indicates that the QRVX/DRVX has been conditioned to transmit data over the communication channel. The ON condition together with the ON condition on Circuit's RTS, DSR and DTR indicates to the DTE that signals on Circuit SD will be transmitted to the data channel.
TR	DTR	Data Terminal Ready This circuit controls the QRVX/DRVX switching to and from the communications channel. The ON condition prepares the QRVX/DRVX for connection to a communication channel, the network, and maintains the connection. The OFF condition removes the QRVX/DRVX from the communication channel only after all data presented has been transferred to the DTE. This option is enabled via the LMC/NMC.
DM	DSR	Data Mode/Data Set Ready This circuit indicates the status of the QRVX/DRVX. The ON condition indicates the QRVX/DRVX is in data transfer mode. The ON condition does not indicate that a communications channel to the network has been established, or the status of DTE equipment. When the OFF condition occurs during the progress of a call before DTR (terminal ready) is turned OFF, the DTE interprets this as a lost or aborted connection and takes action to terminate the call. Any subsequent ON condition is considered to be a new call.

Table 5.18 RS449 and V.35 signal definitions (Continued)

RS449 Signal	V.35 Signal	Definition
RR	RLSD	Receive Ready/Receive Line Signal Detector (Data Carrier Detect) This circuit indicates the QRVX/DRVX is conditioned to receive signals from the data channel. The OFF condition causes circuit RD to be clamped to the marking condition.
TT	N/A	Terminal Timing This circuit provides the QRVX/DRVX with the signal element timing from the DTE. The ON to OFF transition indicates the center of each signal element on circuit SD. Terminal Timing must be synchronized with either ST or RT.
SC	N/A	Send Common This circuit connects to the DTE circuit ground (circuit common) and is used at the QRVX/DRVX as a reference potential for the circuit receivers.

Note: For Table 5.19 and Table 5.20, pin numbers correspond to the 37-pin connector.

Table 5.19 RS449 pinout specifications for AMP 1 of the QRVX/DRVX

Rear Panel Pin #	RS449 Pin # & Circuit #	Signal	Description	Direction
1	24:1	RD (A)	Receive Data	From QRVX/DRVX
2	26:1	RT (B)	Receive Timing	From QRVX/DRVX
2	23:1	ST (B)	Send Timing	From QRVX/DRVX
3	22:1	SD (B)	Send Data	To QRVX/DRVX
5	35:1	TT (B)	Terminal Timing	To QRVX/DRVX
6	25:1	RS (B)	Request to Send	To QRVX/DRVX
7	30:1	TR (B)	Terminal Ready	To QRVX/DRVX
8	13:1	RR (A)	Receiver Ready	From QRVX/DRVX
9	37:1	SC	Send Common	To QRVX/DRVX
18	15:2	IC	Incoming Call	From QRVX/DRVX
19	24:2	RD (A)	Receive Data	From QRVX/DRVX
20	26:2	RT (B)	Receive Timing	From QRVX/DRVX
20	23:2	ST (B)	Send Timing	From QRVX/DRVX
21	22:2	SD (B)	Send Data	To QRVX/DRVX
23	35:2	TT (B)	Terminal Timing	To QRVX/DRVX
24	25:2	RS (B)	Request to Send	To QRVX/DRVX

Table 5.19 RS449 pinout specifications for AMP 1 of the QRVX/DRVX (Continued)

Rear Panel Pin #	RS449 Pin # & Circuit #	Signal	Description	Direction
25	30:2	TR (B)	Terminal Ready	To QRVX/DRVX
26	13:2	RR (A)	Receiver Ready	From QRVX/DRVX
27	37:2	SC	Send Common	To QRVX/DRVX
35	6:1	RD (B)	Receive Data	From QRVX/DRVX
36	8:1	RT (A)	Receive Timing	From QRVX/DRVX
36	5:1	ST (A)	Send Timing	From QRVX/DRVX
37	4:1	SD (A)	Send Data	To QRVX/DRVX
39	17:1	TT (A)	Terminal Timing	To QRVX/DRVX
40	7:1	RS (A)	Request to Send	To QRVX/DRVX
41	12:1	TR (A)	Terminal Ready	To QRVX/DRVX
42	9:1	CS (A)	Clear to Send	From QRVX/DRVX
43	11:1	DM (A)	Data Mode	From QRVX/DRVX
45	31:1	RR (B)	Receiver Ready	From QRVX/DRVX
45	27:1	CS (B)	Clear to Send	From QRVX/DRVX
45	29:1	DM (B)	Data Mode	From QRVX/DRVX
45	19:1	SG	Signal Ground	N/A
45	13:2	RR(B)	Receiver Ready	From QRVX/DRVX
45	27:2	CS (B)	Clear to Send	From QRVX/DRVX
45	29:2	DM (B)	Data Mode	From QRVX/DRVX
45	19:2	SG	Signal Ground	N/A
46	15:1	IC	Incoming Call	From QRVX/DRVX
53	6:2	RD (B)	Receive Data	From QRVX/DRVX
54	8:2	RT (A)	Receive Timing	From QRVX/DRVX
55	4:2	SD (A)	Send Data	To QRVX/DRVX
56	5:2	ST (A)	Send Timing	From QRVX/DRVX
57	17:2	TT (A)	Terminal Timing	To QRVX/DRVX
58	7:2	RS (A)	Request to Send	To QRVX/DRVX
59	12:2	TR (A)	Terminal Ready	To QRVX/DRVX
60	9:2	CS (A)	Clear to Send	From QRVX/DRVX
61	11:2	DM (A)	Data Mode	From QRVX/DRVX

Table 5.20 RS449 pinout specifications for AMP 2 of the QRVX

Rear Panel Pin #	RS449 Pin # and Circuit #	Signal	Description	Direction
1	24:3	RD (A)	Receive Data	From QRVX
2	26:3	RT (B)	Receive Timing	From QRVX
2	23:3	ST (B)	Send Timing	From QRVX
3	22:3	SD (B)	Send Data	To QRVX
5	35:3	TT (B)	Terminal Timing	To QRVX
6	25:3	RS (B)	Request to Send	To QRVX
7	30:3	TR (B)	Terminal Ready	To QRVX
8	13:3	RR (A)	Receiver Ready	From QRVX
9	37:3	SC	Send Common	To QRVX
18	15:4	IC	Incoming Call	From QRVX
19	24:4	RD (A)	Receive Data	From QRVX
20	23:4	RT (B)	Receive Timing	From QRVX
20	26:4	ST (B)	Send Timing	From QRVX
21	22:4	SD (B)	Send Data	To QRVX
23	35:4	TT (B)	Terminal Timing	To QRVX
24	25:4	RS (B)	Request to Send	To QRVX
25	30:4	TR (B)	Terminal Ready	To QRVX
26	13:4	RR (A)	Receiver Ready	From QRVX
27	37:4	SC	Send Common	To QRVX
35	6:3	RD (B)	Receive Data	From QRVX
36	8:3	RT (A)	Receive Timing	From QRVX
36	5:3	ST (A)	Send Timing	From QRVX
37	4:3	SD (A)	Send Data	To QRVX
39	17:3	TT (A)	Terminal Timing	To QRVX
40	7:3	RS (A)	Request to Send	To QRVX
41	12:3	TR (A)	Terminal Ready	To QRVX
42	9:3	CS (A)	Clear to Send	From QRVX
43	11:3	DM (A)	Data Mode	From QRVX
45	31:3	RR (B)	Receiver Ready	From QRVX
45	27:3	CS (B)	Clear to Send	From QRVX
45	29:3	DM (B)	Data Mode	From QRVX
45	19:3	SG	Signal Ground	N/A

Table 5.20 RS449 pinout specifications for AMP 2 of the QRVX (Continued)

Rear Panel Pin #	RS449 Pin # and Circuit #	Signal	Description	Direction
45	31:4	RR (B)	Receiver Ready	From QRVX
45	27:4	CS (B)	Clear to Send	From QRVX
45	29:4	DM (B)	Data Mode	From QRVX
45	19:4	SG	Signal Ground	N/A
46	15:3	IC	Incoming Call	From QRVX
53	6:4	RD (B)	Receive Data	From QRVX
54	8:4	RT (A)	Receive Timing	From QRVX
55	4:4	SD (A)	Send Data	To QRVX
56	5:4	ST (A)	Send Timing	From QRVX
57	17:4	TT (A)	Terminal Timing	To QRVX
58	7:4	RS (A)	Request to Send	To QRVX
59	12:4	TR (A)	Terminal Ready	To QRVX
60	9:4	CS (A)	Clear to Send	From QRVX
61	11:4	DM (A)	Data Mode	From QRVX

5.12.3 V.35 pinout specifications for the QRVX and DRVX

The EIA V.35 calls out for a combination of balanced and unbalanced signals for the V.35 interface. See Table 5.18 for signal definitions. Table 5.21 provides the first 68-pin connector and V.35 cable pinout specifications. Table 5.22 provides the second 68-pin connector (QRVX only) and V.35 cable pinout specifications.

Note: For Table 5.21 and Table 5.22, the rear panel pin # refers to the amp connector pins.

Table 5.21 V.35 pinout specifications for AMP 1 of the QRVX/DRVX

Rear Panel Pin #	V.35 Pin # & Circuit #	Signal	Description	Direction
1	B:1	SG	Signal Ground	N/A
2	T:1	RD (B)	Receive Data	From QRVX/DRVX
3	X:1	SCR (B)	Serial Clock Receive	From QRVX/DRVX
4	S:1	SD (B)	Send Data	To QRVX/DRVX
5	AA:1	SCT (B)	Serial Clock Transmit	From QRVX/DRVX
6	W:1	SCTE (B)	Serial Clock Ext	To QRVX/DRVX

Table 5.21 V.35 pinout specifications for AMP 1 of the QRVX/DRVX (Continued)

Rear Panel Pin #	V.35 Pin # & Circuit #	Signal	Description	Direction
7	H:1	DTR	Data Terminal Ready	To QRVX/DRVX
8	F:1	RLSD	Receive Line Signal Detector	To QRVX/DRVX
9	K:1	LT	Test Mode	To QRVX/DRVX
11	B:2	SG	Signal Ground	N/A
19	T:2	RD (B)	Receive Data	From QRVX/DRVX
20	X:2	SCR (B)	Serial Clock Receive	From QRVX/DRVX
21	S:2	SD (B)	Send Data	To QRVX/DRVX
22	AA:2	SCT (B)	Serial Clock Transmit	From QRVX/DRVX
23	W:2	SCTE (B)	Serial Clock Ext	To QRVX/DRVX
24	H:2	DTR	Data Terminal Ready	To QRVX/DRVX
25	F:2	RLSD	Receive Line Signal Detector	To QRVX/DRVX
26	K:2	LT	Test Mode	To QRVX/DRVX
28	B:2	SG	Signal Ground	N/A
35	B:1	SG	Signal Ground	N/A
36	R:1	RD (A)	Receive Data	From QRVX/DRVX
37	V:1	SCR (A)	Serial Clock Receive	From QRVX/DRVX
38	P:1	SD (A)	Send Data	To QRVX/DRVX
39	Y:1	SCT (A)	Serial Clock Transmit	From QRVX/DRVX
40	U:1	SCTE (A)	Serial Clock Ext	To QRVX/DRVX
41	C:1	RTS	Request to Send	To QRVX/DRVX
42	D:1	CTS	Clear to Send	From QRVX/DRVX
43	E:1	DSR	Data Set Ready	From QRVX/DRVX
44	J:1	IC	Incoming Call	From QRVX/DRVX
45	BB:1	RL	Remote Loopback	To QRVX/DRVX
53	R:2	RD (A)	Receive Data	From QRVX/DRVX
54	V:2	SCR (A)	Serial Clock Receive	From QRVX/DRVX
55	P:2	SD (A)	Send Data	To QRVX/DRVX
56	Y:2	SCT (A)	Serial Clock Transmit	From QRVX/DRVX
57	U:2	SCTE (A)	Serial Clock Transmit Ext	To QRVX/DRVX
58	C:2	RTS	Request to Send	To QRVX/DRVX
59	D:2	CTS	Clear to Send	From QRVX/DRVX
60	E:2	DSR	Data Set Ready	From QRVX/DRVX

Table 5.21 V.35 pinout specifications for AMP 1 of the QRVX/DRVX (Continued)

Rear Panel Pin #	V.35 Pin # & Circuit #	Signal	Description	Direction
61	J:2	IC	Incoming Call	From QRVX/DRVX
62	BB:2	RL	Remote Loopback	To QRVX/DRVX

Table 5.22 V.35 pinout specifications for AMP 2 of the QRVX

Rear Panel Pin #	V.35 Pin # & Circuit #	Signal	Description	Direction
1	B:3	SG	Signal Ground	N/A
2	T:3	RD (B)	Receive Data	From QRVX
3	X:3	SCR (B)	Serial Clock Receive	From QRVX
4	S:3	SD (B)	Send Data	To QRVX
5	AA:3	SCT (B)	Serial Clock Transmit	From QRVX
6	W:3	SCTE (B)	Serial Clock Ext	To QRVX
7	H:3	DTR	Data Terminal Ready	To QRVX
8	F:3	RLSD	Receive Line Signal Detector	To QRVX
9	K:3	LT	Test Mode	To QRVX
11	B:4	SG	Signal Ground	N/A
19	T:4	RD (B)	Receive Data	From QRVX
20	X:4	SCR (B)	Serial Clock Receive	From QRVX
21	S:4	SD (B)	Send Data	To QRVX
22	AA:4	SCT (B)	Serial Clock Transmit	From QRVX
23	W:4	SCTE (B)	Serial Clock Ext	To QRVX
24	H:4	DTR	Data Terminal Ready	To QRVX
25	F:4	RLSD	Receive Line Signal Detector	To QRVX
26	K:4	LT	Test Mode	To QRVX
28	B:4	SG	Signal Ground	N/A
35	B:3	SG	Signal Ground	N/A
36	R:3	RD (A)	Receive Data	From QRVX
37	V:3	SCR (A)	Serial Clock Receive	From QRVX
38	P:3	SD (A)	Send Data	To QRVX
39	Y:3	SCT (A)	Serial Clock Transmit	From QRVX
40	U:3	SCTE (A)	Serial Clock Ext	To QRVX
41	C:3	RTS	Request to Send	To QRVX

Table 5.22 V.35 pinout specifications for AMP 2 of the QRVX (Continued)

Rear Panel Pin #	V.35 Pin # & Circuit #	Signal	Description	Direction
42	D:3	CTS	Clear to Send	From QRVX
43	E:3	DSR	Data Set Ready	From QRVX
44	J:3	IC	Incoming Call	From QRVX
45	BB:3	RL	Remote Loopback	To QRVX
53	R:4	RD (A)	Receive Data	From QRVX
54	V:4	SCR (A)	Serial Clock Receive	From QRVX
55	P:4	SD (A)	Send Data	To QRVX
56	Y:4	SCT (A)	Serial Clock Transmit	From QRVX
57	U:4	SCTE (A)	Serial Clock Transmit Ext	To QRVX
58	C:4	RTS	Request to Send	To QRVX
59	D:4	CTS	Clear to Send	From QRVX
60	E:4	DSR	Data Set Ready	From QRVX
61	J:4	IC	Incoming Call	From QRVX
62	BB:4	RL	Remote Loopback	To QRVX

5.12.4 RS366A signal definitions

These signals, in conjunction with IC, TR, DM, RS, and CS on the RS449 interface, are used to originate and answer a call.Table 5.23 contains the RS366A and RS366 signal definitions. Table 5.24 provides the first connector and RS366A cable pinout specifications. Table 5.25 provides second connector (QRVX only) and RS366A cable pinout specifications.

Table 5.23 RS366A and RS366 signal definitions

Signal	Definition
SG	Signal Ground This circuit directly connects the DTE circuit to the QRVX/DRVX circuit ground to provide a conductive path between the DTE and QRVX/DRVX signal commons.
CRQ	Call Request This circuit carries signals that are generated by the DTE circuit to request to QRVX/DRVX to originate a call.
PWI	Power Indication This circuit carries signals that indicate whether power is available within the QRVX/DRVX.
SC	Send Common This circuit connects to the DTE circuit ground (circuit common) and is used at the QRVX/DRVX as a reference potential for the circuit receivers.

Table 5.23 RS366A and RS366 signal definitions (Continued)

Signal	Definition
DSC	Distant Station Connected This circuit carries signals that indicate whether a connection has been established to a remote data station.
ACR	Abandon Call and Retry This circuit indicates whether a preset time has elapsed between successive events in the calling procedure. The ON condition indicates that the call should be abandoned.
NB1, NB2, NB4, NB8	Digital Signal Circuits The information on these signals may either be transmitted or used locally as a control signal. The DTE circuit supplies the dialed digits on these circuits.
Circuit PND	Present Next Digit Signals are generated by the QRVX/DRVX to control the presentation of digits on signals NB1, NB2, NB4, and NB8. The ON condition indicates that the QRVX/DRVX is ready to accept the next digit indicated on these circuits.
Circuit DPR	Digit Present Signals on this circuit are generated by the DTE to indicate that the QRVX/DRVX may read the code combination presented on signals NB1, NB2, NB4, and NB8.

Note: For Table 5.24 and Table 5.25, the rear panel pin number refers to the Amp connector pins.

Table 5.24 RS366A pinout specifications for AMP 1 of the QRVX and DRVX

Rear Panel Pin #	RS366A Pin # and Circuit #	Signal	Description	Direction
12	5:1	PND	Present next Digit	From QRVX/DRVX
13	6:1	PWI	Power Indicator	From QRVX/DRVX
13	6:2	PWI	Power Indicator	From QRVX/DRVX
14	13:1	DSC	Distant Station Connected	From QRVX/DRVX
15	19:1	SC	Send Common	To QRVX/DRVX
16	3:1	ACR	Abandon Call & Retry	From QRVX/DRVX
17	22:1	DLO	Data Line Occupied	From QRVX/DRVX
30	5:2	PND	Present Next Digit	From QRVX/DRVX
31	13:2	DSC	Distant Station Connected	From QRVX/DRVX
32	19:2	SC	Send Common	To QRVX/DRVX
33	3:2	ACR	Abandon Call & Retry	From QRVX/DRVX
34	22:2	DLO	Data Line Occupied	From QRVX/DRVX

Table 5.24 RS366A pinout specifications for AMP 1 of the QRVX and DRVX (Continued)

Rear Panel Pin #	RS366A Pin # and Circuit #	Signal	Description	Direction
45	7:1	SG	Signal Ground	N/A
45	7:2	SG	Signal Ground	N/A
45	18:1	RC	Receive Common	From QRVX/DRVX
45	18:2	RC	Receive Common	From QRVX/DRVX
47	4:1	CRQ	Call Request	To QRVX/DRVX
48	2:1	DPR	Digit Present	To QRVX/DRVX
49	14:1	NB1	Digit Signal Circuit	To QRVX/DRVX
50	15:1	NB2	Digit Signal Circuit	To QRVX/DRVX
51	16:1	NB4	Digit Signal Circuit	To QRVX/DRVX
52	17:1	NB8	Digit Signal Circuit	To QRVX/DRVX
63	4:2	CRQ	Call Request	To QRVX/DRVX
64	2:2	DPR	Digit Present	To QRVX/DRVX
65	14:2	NB1	Digit Signal Circuit	To QRVX/DRVX
66	15:2	NB2	Digit Signal Circuit	To QRVX/DRVX
67	16:2	NB4	Digit Signal Circuit	To QRVX/DRVX
68	17:2	NB8	Digit Signal Circuit	To QRVX/DRVX

Table 5.25 RS366A pinout specifications for AMP 2 of the QRVX

Rear Panel Pin #	RS366A Pin # and Circuit #	Signal	Description	Direction
12	5:3	PND	Present next Digit	From QRVX
13	6:3	PWI	Power Indicator	From QRVX
13	6:4	PWI	Power Indicator	From QRVX
14	13:3	DSC	Distant Station Connected	From QRVX
15	19:3	SC	Send Common	To QRVX
16	3:3	ACR	Abandon Call & Retry	From QRVX
17	22:3	DLO	Data Line Occupied	From QRVX
30	5:4	PND	Present Next Digit	From QRVX
31	13:4	DSC	Distant Station Connected	From QRVX
32	19:4	SC	Send Common	To QRVX
33	3:4	ACR	Abandon Call & Retry	From QRVX
34	22:4	DLO	Data Line Occupied	From QRVX

Table 5.25 RS366A pinout specifications for AMP 2 of the QRVX (Continued)

Rear Panel Pin #	RS366A Pin # and Circuit #	Signal	Description	Direction
47	4:3	CRQ	Call Request	To QRVX
48	2:3	DPR	Digit Present	To QRVX
49	14:3	NB1	Digit Signal Circuit	To QRVX
50	15:3	NB2	Digit Signal Circuit	To QRVX
51	16:3	NB4	Digit Signal Circuit	To QRVX
52	17:3	NB8	Digit Signal Circuit	To QRVX
63	4:4	CRQ	Call Request	To QRVX
64	2:4	DPR	Digit Present	To QRVX
65	14:4	NB1	Digit Signal Circuit	To QRVX
66	15:4	NB2	Digit Signal Circuit	To QRVX
67	16:4	NB4	Digit Signal Circuit	To QRVX
68	17:4	NB8	Digit Signal Circuit	To QRVX

5.12.5 RS366 signals

RS366 signals, in conjunction with either IC, DTR, DSR, RTS, and CTS on the V.35 interface, are used to originate and answer a call. See Table 5.23 for RS366A and RS366 signal descriptions. Table 5.26 provides the first connector and RS366 cable pinout specifications.

Table 5.27 provides the second connector (QRVX only) and RS366 cable pinout specifications.

Note: For Table 5.26 and Table 5.27, the rear panel pin number refers to the Amp connector pins.

Table 5.26 RS366 pinout specifications for AMP 1 of the QRVX/DRVX

Rear Panel Pin #	RS366 Pin # & Circuit #	Signal	Description	Direction
11	7:1	SG	Signal Ground	N/A
12	4:1	CRQ	Call Request	To QRVX/DRVX
13	5:1	PND	Present Next Digit	From QRVX/DRVX
14	13:1	DSC	Distant Station Connected	From QRVX/DRVX
15	3:1	ACR	Abandon Call & Retry	From QRVX/DRVX
16	22:1	DLO	Data Line Occupied	From QRVX/DRVX
17	6:1	PWI	Power Indicator	From QRVX/DRVX
28	7:2	SG	Signal Ground	N/A

Table 5.26 RS366 pinout specifications for AMP 1 of the QRVX/DRVX (Continued)

Rear Panel Pin #	RS366 Pin # & Circuit #	Signal	Description	Direction
29	4:2	CRQ	Call Request	To QRVX/DRVX
30	5:2	PND	Present Next Digit	From QRVX/DRVX
31	13:2	DSC	Distant Station Connected	From QRVX/DRVX
32	3:2	ACR	Abandon Call & Retry	From QRVX/DRVX
33	22:2	DLO	Data Line Occupied	From QRVX/DRVX
34	6:2	PWI	Power Indicator	From QRVX/DRVX
47	2:1	DPR	Digit Present	To QRVX/DRVX
48	14:1	NB1	Digit Signal Circuit	To QRVX/DRVX
49	15:1	NB2	Digit Signal Circuit	To QRVX/DRVX
50	16:1	NB4	Digit Signal Circuit	To QRVX/DRVX
51	17:1	NB8	Digit Signal Circuit	To QRVX/DRVX
64	2:2	DPR	Digit Present	To QRVX/DRVX
65	14:2	NB1	Digit Signal Circuit	To QRVX/DRVX
66	15L2	NB2	Digit Signal Circuit	To QRVX/DRVX
67	16:2	NB4	Digit Signal Circuit	To QRVX/DRVX
68	17:2	NB8	Digit Signal Circuit	To QRVX/DRVX

Table 5.27 RS366 pinout definitions for AMP 2 of the QRVX

Rear Panel Pin #	RS366 Pin # & Circuit #	Signal	Description	Direction
11	7:3	SG	Signal Ground	N/A
12	4:3	CRQ	Call Request	To QRVX
13	5:3	PND	Present Next Digit	From QRVX
14	13:3	DSC	Distant Station Connected	From QRVX
15	3:3	ACR	Abandon Call & Retry	From QRVX
16	22:3	DLO	Data Line Occupied	From QRVX
17	6:3	PWI	Power Indicator	From QRVX
28	7:4	SG	Signal Ground	N/A
29	4:4	CRQ	Call Request	To QRVX
30	5:4	PND	Present Next Digit	From QRVX
31	13:4	DSC	Distant Station Connected	From QRVX
32	3:4	ACR	Abandon Call & Retry	From QRVX

Table 5.27 RS366 pinout definitions for AMP 2 of the QRVX (Continued)

Rear Panel Pin #	RS366 Pin # & Circuit #	Signal	Description	Direction
33	22:4	DLO	Data Line Occupied	From QRVX
34	6:4	PWI	Power Indicator	From QRVX
46	7:3	SG	Signal Ground	N/A
47	2:3	DPR	Digit Present	To QRVX
48	14:3	NB1	Digit Signal Circuit	To QRVX
49	15:3	NB2	Digit Signal Circuit	To QRVX
50	16:3	NB4	Digit Signal Circuit	To QRVX
51	17:3	NB8	Digit Signal Circuit	To QRVX
63	7:4	SG	Signal Ground	To QRVX
64	2:4	DPR	Digit Present	To QRVX
65	14:4	NB1	Digit Signal Circuit	To QRVX
66	15:4	NB2	Digit Signal Circuit	To QRVX
67	16:4	NB4	Digit Signal Circuit	To QRVX
68	17:4	NB8	Digit Signal Circuit	To QRVX

5.12.6 X.21 signal definitions for the QRVX

Table 5.28 contains the X.21 circuit definition for the X.21 interface.Table 5.29 contains connector (slotted female DB15) and X.21 pinout specifications. These pinouts are the same for all four connectors.

Table 5.28 X.21 Circuit Definitions

Circuit	Definition
G	Signal Ground
Ga	DTE Common Return
Gb	DCE Common Return
T	Transmit
R	Receive
C	Control
I	Indication
S	Signal Element Timing (Clock)
B	Byte Timing
F	Frame Start Identification

Table 5.29 X.21 Connector Pinout Specification (the same for each of 4 connectors)

Rear Panel Pin #	Interchange Circuit	Signal	Description	Direction
1	Frame Gnd	FG	Signal Ground	From/To QRVX
2	T(A)	XMIT+	Transmit	To QRVX
3	C(A)	Con+	Control	To QRVX
4	R(A)	RCV+	Return Control	From QRVX
5	I(A)	IND+	Indication	To QRVX
6	S(A)	CLK+	Control	To QRVX
7	B(A)	N/A	N/A	N/A
8	G	SG	Signal Ground	From/To QRVX
9	T(B)	XMIT-	Transmit	To QRVX
10	C(B)	Con-	Control	To QRVX
11	R(B)	RCV-	Return Control	From QRVX
12	I(B)	IND-	Indication	To QRVX
13	S(B)	CLK-	Control	To QRVX
14	B(B)	N/A	N/A	N/A
15	Future Use			

5.13 Peripheral board cables

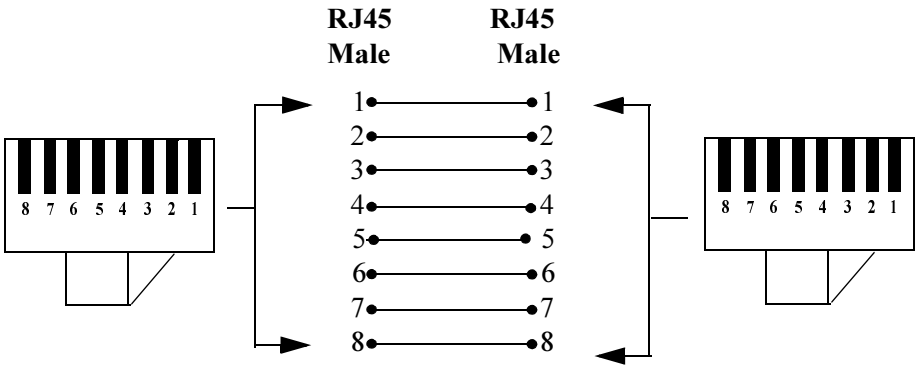
This section describes the cables used to connect various peripheral boards.

For information on system cables, see *Chapter 2, Installation*.

5.13.1 RJ45TRK BRI S/T reference point cable

The RJ45TRK S/T reference point cable provides a connection to the OBIU peripheral board at the ISDN S/T reference point for BRI trunks. This cable is a 14-foot long "straight through" cable with male RJ45 (8 pin) connectors on each end. One end of the RJ45 connector plugs into the DTE interface of an RJ48C-compliant device to be connected to the OBIU. The other RJ45 connector plugs directly into a port on the OBIU backcard. The appropriate ports are as follows, port #1 for line 1, port #2 for line 2, port #3 for line 3, and port #4 for line 4. RJ45TRK pin-to-pin specifications are shown in Figure 5.6 below.

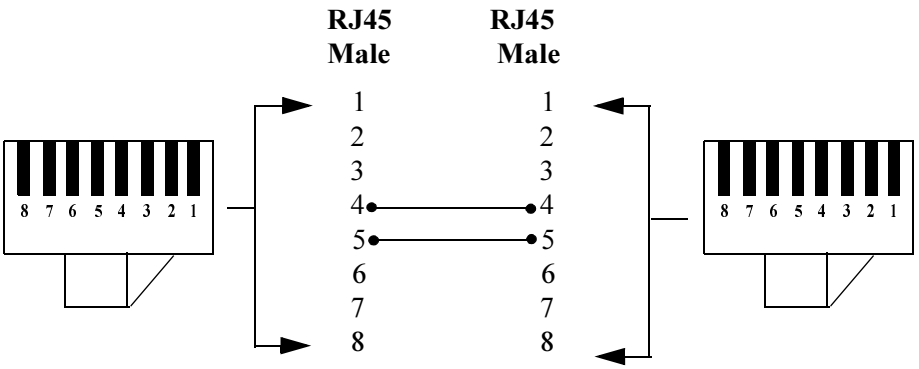
Figure 5.6 RJ45TRK BRI S/T reference point cable pin-to-pin specifications



5.13.2 RJ45 U reference point cable

The RJ45 U reference cable provides a connection to the OBIU-U at the ISDN U reference point. This cable is a 10 foot long straight through cable with male RJ45 (8 pin) connectors at both ends. Pin-to-pin specifications are shown in Figure 5.7 below.

Figure 5.7 RJ45 U reference point cable pin-to-pin specifications



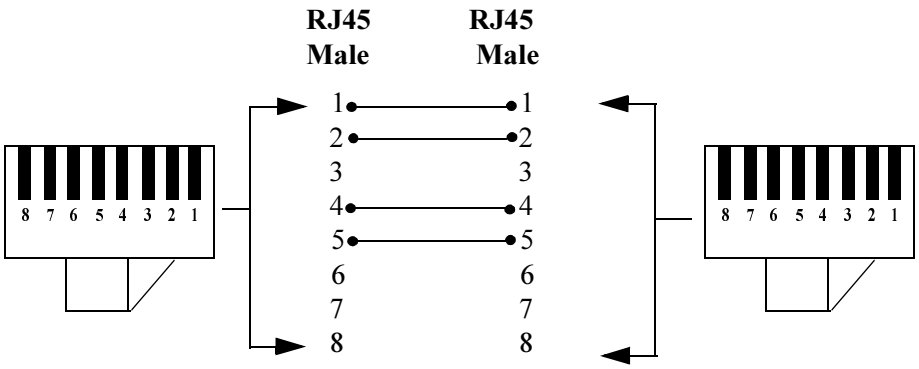
5.13.3 RJ48C PRI/T1 S/T reference point cable (DTE)

This cable provides a connection to the QDIU_EX/DDIU_EX at the ISDN S/T reference point, and complies with the RJ48C interface specification (North American standard). This cable is 25 feet long and has an RJ45 (8 pin) modular connector on each end. One of the RJ45 connectors plugs into the DTE interface of an RJ48C-compliant device to be connected to the QDIU_EX/DDIU_EX.

- For a DDIU-EX:
  Connect the other RJ45 connector into port #1 for line 1, or port #2 for line 2.
- For a QDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

Pin-to-pin specifications for a DTE RJ48C cable are shown in Figure 5.8.

Figure 5.8 RJ48C PRI/T1 S/T reference point cable (DTE) pin-to-pin specifications



5.13.4 RJ48C: E1/PRI/T1 S/T reference point cable (DCE)

The EI-PRI/TI S/T reference point cable provides EI-PRI/T1 connection at the ISDN S/T reference point. The E1-PRI/T1 S/T reference point cables are available in the two versions described below.

- PRI/T1

  This cable provides a connection to the QDIU_EX/DDIU_EX at the ISDN S/T reference point, and complies with the RJ48C interface specification (North American standard). This cable is 25 feet long and has an RJ45 (8 pin) modular connector on each end. One of the RJ45 connectors plugs into the DTE interface of an RJ48C-compliant device to be connected to the QDIU_EX/DDIU_EX.

  For a DDIU_EX:
  The other RJ45 connector plugs into port #1 for line 1, or port #2 for line 2.

  For a QDIU_EX:
  The other RJ45 connector plugs into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

- E1 S/T cable

  This cable provides a connection to the QEIU_EX, DEIU_EX, and SEIU_EX at the ISDN S/T reference point and complies with E1 standards (European first). This cable is 10 feet long and has an RJ45 (8 pin) modular connector on each end. One of the RJ45 connectors plugs into the DTE interface of an E1 compliant device to be connected to the QEIU_EX, DEIU_EX, or SEIU_EX.

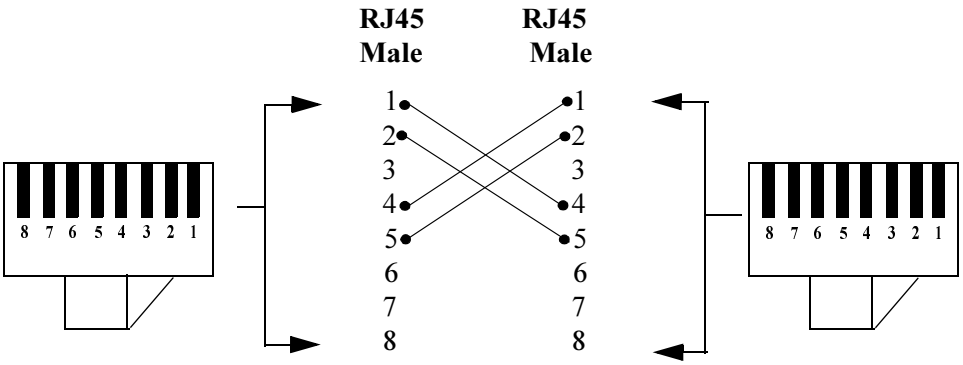
  For a DDIU-EX:
  Connect the other RJ45 connector directly into port #1 for line 1, or port #2 for line 2.

  For a QDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

  For an SEIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2.

  Pin-to-pin specifications for a DCE RJ48C cable for the ISDN S/T reference point are shown in Figure 5.9 below.

Figure 5.9 RJ48C PRI/T1 S/T reference point cable (DCE) pin-to-pin specifications



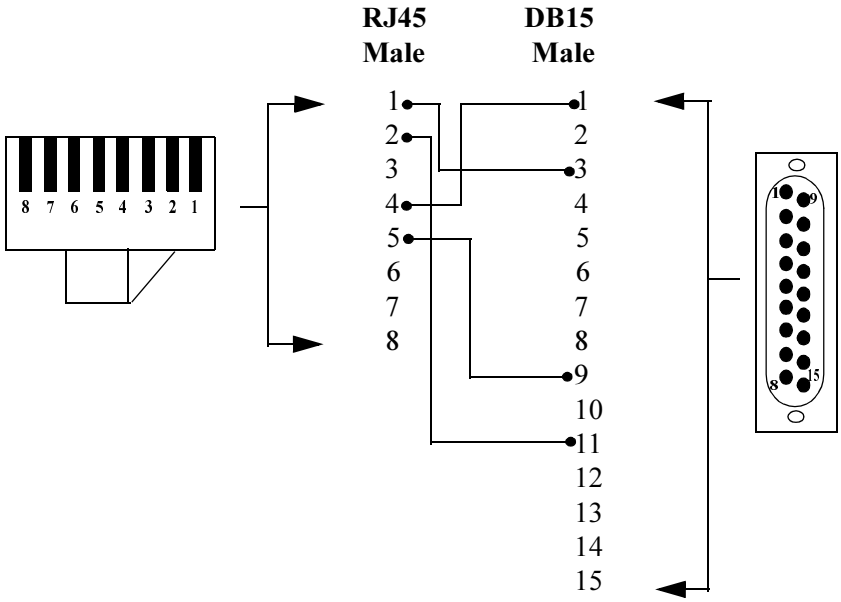
5.13.5 CA81A cable for PRI/T1 S/T reference point (DTE)

The CA81A cable provides a connection to the QDIU_EX and the DDIU_EX at the ISDN S/T reference point, and complies with the CA81A interface specification (Canadian standard). This cable is 25 feet long and has an RJ45 (8 pin) connector on one end and a DB15 (15 pin) connector on the other end. The DB15 connector plugs into the DTE interface of an CA81A-compliant device to be connected to the QDIU_EX/DDIU_EX.

- For a DDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, or port #2 for line 2.
- For a QDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

Pin-to-pin specifications for a DTE CA81A cable for the ISDN S/T reference point are shown in Figure 5.10.

Figure 5.10 CA81A PRI/T1 S/T reference point cable (DTE) pin-to-pin specifications



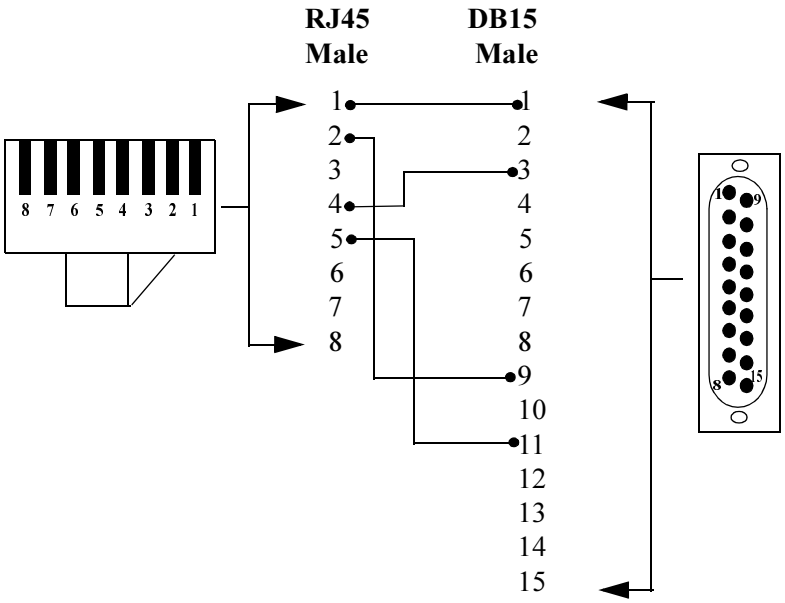
5.13.6 CA81A cable for PRI/T1 S/T reference point (DCE)

This cable provides connection to the QDIU_EX and DDIU_EX at the ISDN S/T reference point, and complies with the CA81A interface specification (Canadian standard). This cable is 25 feet long and has an RJ45 (8 pin) connector on one end, and a DB15 (15 pin) connector on the other end. The DB15 connector plugs into the DCE interface of a CA81A compliant device to be connected to the QDIU_EX/ DDIU_EX.

- For a DDIU-EX:
  Connect the other RJ45 connector into port #1 for line 1, or port #2 for line 2.
- For a QDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

The pin-to-pin specifications for a DCE CA81A cable for the ISDN S/T reference point are shown in Figure 5.11.

Figure 5.11 CA81A PRI/T1 S/T reference point cable (DCE) pin-to-pin specification



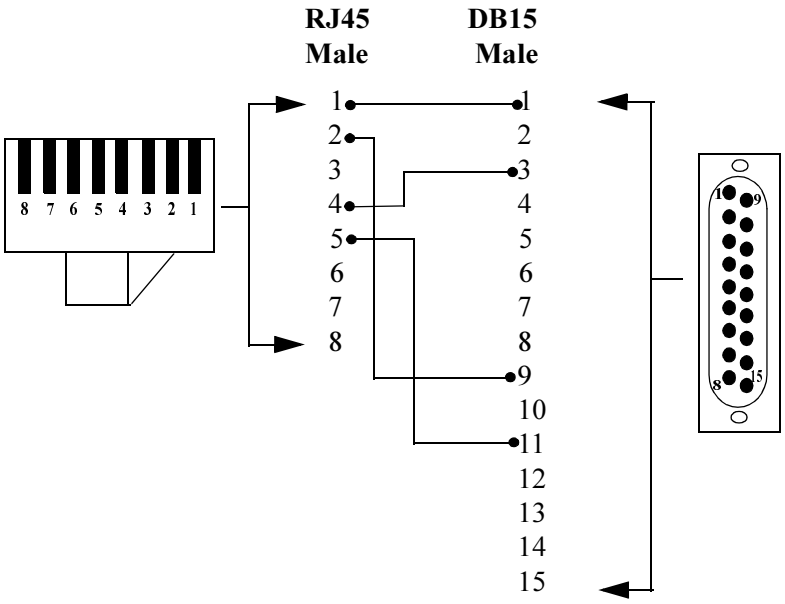
5.13.7 Loopback cable for PRI/T1 S/T reference point

This cable provides loopback for the QDIU_EX and the DDIU_EX at the ISDN S/T reference point. It has a single RJ45 (8 pin) connector. The RJ45 connector plugs directly into port #1 for line 1, or port #2 for line 2 on the rear of the DDIU_EX.

- For a QDIU_EX:
  Connect the other RJ45 connector into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

Pin-to-pin specifications for a PRI S/T reference point loopback cable are shown in Figure 5.12.

Figure 5.12 PRI/T1 S/T reference point loopback cable pin-to-pin specifications



5.13.8 QEIU_EX, QEIU_EX, and SEIU_EX trunk cable

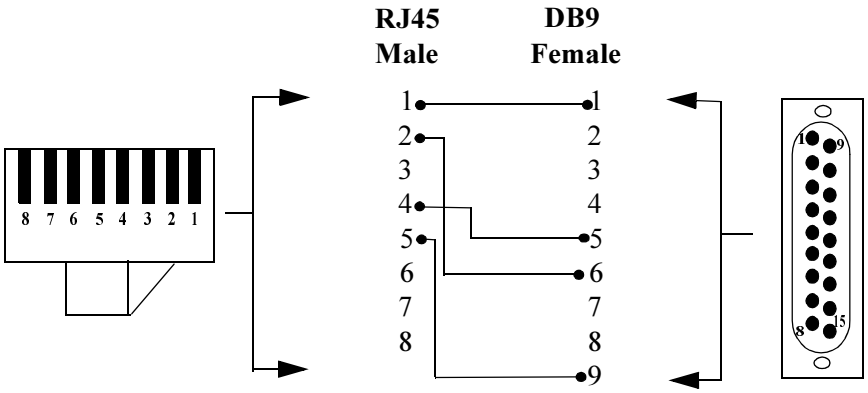
This cable provides a connection to the QEIU_EX, DEIU_EX, and SEIU_EX at the ISDN S/T reference point, and complies with E1 standards (European first). The cable is 10 feet long and has an RJ45 (8 pin) connector on one end, and a DB9 (9 pin) connector on the other end.

One of the RJ45 connectors plugs into the DTE interface of an E1 compliant device to be connected to the QEIU_EX/DEIU_EX/SEIU_EX. The other RJ45 connector plugs into port #1 of the SEIU_EX.

- For a DEIU_EX:
  The other RJ45 connector plugs into port #1 for line 1, or port #2 for line 2.
- For a QEIU_EX:
  The other RJ45 connector plugs into port #1 for line 1, port #2 for line 2, port #3 for line 3, or port #4 for line 4.

Pin-to-pin specifications for this cable are shown in Figure 5.13.

Figure 5.13 QEIU_EX/DEIU_EX/SEIU_EX trunk cable pin-to-pin specifications



5.14 Terminal BRI backcard

A terminal backcard changes transmit and receive signals from the network to a terminal. For certain network configurations, this backcard can be used in lieu of a straight through cable.

Chapter 6

Technical Specifications

6.1 Hardware Requirements

INP4D main processor

AccessSwitch 60 or AccessSwitch 200

6.2 Physical specifications

The following is a list of physical dimensions and weights of the AccessSwitch and its components:

- AccessSwitch peripheral board physical dimensions. These dimensions apply to the following boards

  OBIU, OBIU-U, QDIU_EX, DDIU_EX, QRVX, DRVX, INP4D, SEIU_EX, DEIU_EX, QEIU_EX, and MCU4.

  height: 14.5", 36.8 cm

  width: .75", 1.9 cm (1 slot per board)

  depth: 9.0", 23 cm

- AccessSwitch 200_EX3 (20-slot) chassis physical dimensions and weight

  Weight 80 lbs, 36 kgs (basic system with a single INP4D, power supply, no peripheral boards)

  Weight:135 lbs, 60.1 kgs (basic system, single INP4D, one power supply, all slots loaded)

- AccessSwitch 60_EX (6-slot) chassis physical dimensions and weight

  Weight: 20 lbs, 9.1 kgs (basic system, no peripheral boards)

  Weight:40 lbs, 18 kgs (all slots loaded)

  Height: 6.0", 15.2 cm

  Depth: 16.75", 42.5 cm

  Width: 17.5", 44.5 cm

6.3 Power specifications

6.3.1 Power supplies

Table 6.1and Table 6.2 list all power supply voltage/amp capabilities, as well as power supply physical specification according to AccessSwitch type.

Table 6.1 AccessSwitch 60 Power Supply Specifications

Chassis Type	Power Supply Voltage/ Amps/Watt Capability	Power Supply Physical Specifications
AccessSwitch 60_EX	AC: (115-240 vac); 40 amps of 5 VDC. 250 watts max.	Internal.

Table 6.2 AccessSwitch 200 Power Supply Specification

Chassis Type	Power Supply Voltage/ Amps/Watt Capability	Power Supply Tray Physical Specifications
AccessSwitch 200_EX3	Switching supply that provides AC capabilities, 600 watts max. See below. AC (50-60 Hz) With 1 power supply: 60 amps @ 5 vac; no redundancy With 2 power supplies: 120 amps @ 5 vac; full redundancy up to 60 amps or no redundancy @ 60+ amps; load sharing between modules. With 3 power supplies: 120 amps @ 5 vac; full redundancy DC (-48 or + VDC) With 1 power supply: 60 amps @5 vdc; no redundancy. With 2 power supplies: 120 amps @ 5 vdc; full redundancy with up to 60 amps or no redundancy @ 60+ amps. With 3 power supplies: 120 amps @ 5 vdc; full redundancy	Part of complete chassis specifications. Optional

6.4 Environmental requirements

The room in which the AccessSwitch resides must conform to the following environmental specifications:

- AccessSwitch Operational Requirements

  Temperature:40 to 130 degrees Fahrenheit.
  5 to 50 degrees Celsius.

  Humidity:20% to 80% non-condensing.

  Altitude:-200 to 10,000 feet, -61 to 3,048 meters

- AccessSwitch Storage Requirements

  Temperature:0 to 176 degrees Fahrenheit.
  -18 to 80 degrees Celsius.

  Humidity:90% non-condensing.

  Altitude:40,000 feet maximum, 12,192 meters maximum

6.5 Miscellaneous conformances

The AccessSwitch was designed to conform to the following specifications:

- CSA 22.2.
- FCC Part 15 Class A (industrial).
- UL 1459. Rev 2
- EN60950
- EN41003
- IEC950
- EN550221
- EN55022 Level B
- EN50081-1
- prEN55102
- BS5750

6.6 Signaling compatibility

This section contains AccessSwitch technical specifications information.

6.6.1 INP4D, QDIU_EX, and DDIU_EX interface compatibility

The physical interface of the INP4D, QDIU_EX, and DDIU_EX are identical. All are compatible with the North American T1 standards supported by interexchange and local exchange carriers.

Warning: For locations outside of North America, the following peripheral boards are not approved to be connected to the public network: QDIU_EX, and DDIU_EX. An approved interface is needed.

In addition, the INP4D, QDIU_EX, and DDIU_EX support the primary rate interface protocols listed in Table 6.3.

Note: When the INP4D is used in a redundant system, the T1/PRI lines are not active.

Table 6.3 INP4D, QDIU_EX, DDIU_EX Protocol/Signalling supported

INP4, QDIU_EX, DDIU_EX port or trunk	Protocols/ Signalling supported	Orientation
PRI Port	5ESS	Upstream
	4ESS	Symmetric Master Symmetric Slave
	DMS100	Upstream
	DMS250	Upstream
	SYS85	Upstream
	NTT	Upstream
PRI Trunk	5ESS	Upstream Downstream
	4ESS	Symmetric Master Symmetric Slave
	DMS100	Upstream Downstream
	DMS250	Upstream Downstream
	SYS85	Upstream Downstream
	NTT	Upstream Downstream

Table 6.3 INP4D, QDIU_EX, DDIU_EX Protocol/Signalling supported (Continued)

INP4, QDIU_EX, DDIU_EX port or trunk	Protocols/ Signalling supported	Orientation
T1I Port/Trunk	E&M/E&M Master	Upstream
	E&M/E&M Slave	Downstream
	DPO/Reverse Battery	Upstream
	DPT/Reverse Battery	Downstream
	FXO/Loop Start	Upstream
	FXS/Loop Start	Downstream
	FXO/Ground Start	Upstream
	FXS/Ground Start	Downstream

6.6.2 OBIU Basic Rate Interface (BRI) compatibility

The AccessSwitch supports the ISDN basic rate interface protocols listed in Table 6.4.

Table 6.4 OBIUOBIU-U Basic Rate protocols supported

Peripheral Board/ trunk or port	Protocols supported	
BRI Port	Euro-ISDN DMS100 NTT National ISDN 1 5ESS	
BRI Trunk	CCITT	France(VN2)
	ATT(5E8)	France(VN3)
	NTI (BCS34)	Hong Kong
	ETSI(ETS300)/VN4	Japan
	Belgium	Korea
	England	New Zealand
	Switzerland	Singapore

6.6.3 QEIU_EX, DEIU_EX, SEIU_EX interface compatibility

The physical interface of the QEIU_EX, DEIU_EX, and SEIU_EX are identical. All are compatible with functions of an E1 (European 1st Order) 2048 Kbps transceiver digital interface and adhere to CCITT Recommendations G.703, G.704, G.706, and I.431.

The QEIU_EX, DEIU_EX, and SEIU_EX also support the E1 interface protocols listed in Table 6.5.

Table 6.5 QEIU_EX, DEIU_EX, SEIU_EX protocols supported

Peripheral board type	Protocols supported	Orientation
QEIU_EX DEIU_EX SEIU_EX	ETSI(ETS300)	Upstream Downstream
	GloBanD	Upstream Downstream

6.7 System parameters

This section contains a list of maximum system parameters.

6.7.1 Numbers of full-duplex TDM bus time-slots available

In an AccessSwitch 60 chassis:

- 256: For calls between the QDIU and DDIU peripheral boards:

In an AccessSwitch 200 chassis:

- 256: For calls between the QDIU and DDIU peripheral boards.
- 256: For calls between an OBIU, QDIU_EX, DDIU_EX, or QRVX and an OBIU.
- 512: OBIU to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, SEIU_EX, DEIU_EX
- 512: QRVX to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, SEIU_EX, DEIU_EX
- 512: QDIU_EX to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, SEIU_EX, DEIU_EX
- 512: DDIU_EX to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, SEIU_EX, DEIU_EX
- 512: QEIU_EX to OBIU, QDIU_EX, DDIU_EX, QRVX, SEIU_EX, DEIU_EX
- 512: SEIU_EX to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, DEIU_EX
- 512: DEIU_EX to OBIU, QDIU_EX, DDIU_EX, QRVX, QEIU_EX, SEIU_EX
- Free Run Accuracy of Oscillators: Stratum 4 (± 32 ppm).
- Bandwidth of a TDM bus time-slot: 64K bits/sec.
- Maximum number of Trunk Groups provisionable on each AccessSwitch: up to 127.
- Maximum number of Dial Prefixes provisionable on each AccessSwitch: 25.
- Maximum number of channels allowed in an NFAS Signaling Group: 95B + D.
- Maximum number of Signaling Groups allowed on each AccessSwitch: 18.
- Maximum number of Directory Number Qualifiers provisionable on a Trunk Group: 255 Public; 255 Private.
- Maximum number of Directory Numbers provisionable for each AccessSwitch BRI Port: 10.
- Maximum number of Directory Numbers provisionable for each AccessSwitch PRI/T1 Port:24.
- Maximum number of Directory Numbers provisionable on each AccessSwitch: 255.
- Maximum number of Pooled DNs (for Imux) provisionable for each AccessSwitch: 32.
- Maximum number of Service Codes provisionable on each AccessSwitch: 32.
- Maximum number of Channels provisionable in a Trunk Group: 255.
- Maximum number of Public Speed Dial Numbers provisionable on each AccessSwitch: 20.
- Maximum number of call profiles provisionable per AccessSwitch: 100.
- Maximum number of directory numbers provisionable per Committed Information Rate (CIR) routing criteria: 256.
- Maximum number of AccessSwitch products provisionable per NMC: 25.

6.7.2 Peripheral boards

The table which follows lists the power each peripheral board draws from the system; you can use this table to help you determine how many peripheral boards you can use in your system. For system power supply specifications, see section 6.3.1.

Table 6.6 Peripheral board power draw

Peripheral board	Power draw from system
INP4	3.0 amps @ 5 volts DC
QDIU_EX	2.5 amps @ 5 volts DC
DDIU_EX	2.5 amps @ 5 volts DC
QRVX (V.35)	3.5 amps @ 5 volts DC
QRVX (RS449)	3.5 amps @ 5 volts DC
QRVX (x.21)	3.5 amps @ 5 volts DC
DRVX (V.35)	3.5 amps @ 5 volts DC
DRVX (RS449)	3.5 amps @ 5 volts DC
DRVX (X.21)	3.5 amps @ 5 volts DC
OBIU	2.5 amps @ 5 volts DC
MCU	5.0 amps @ 5 volts DC
OBIU-U	2.5 amps @ 5 volts DC
QEIU_EX	2.5 amps @ 5 volts DC
DEIU_EX	2.5 amps @ 5 volts DC
SEIU_EX	2.5 amps @ 5 volts DC

6.8 Profile size parameters

A configuration profile is a packet of information that corresponds to the configuration of a particular piece of equipment. The profile includes information about which slots are configured with peripheral boards (and associated lines), trunk groups, directory numbers, etc.

When you create a configuration profile via the network management software, it is submitted to the AccessSwitch as Profile 1 (filename.pf1). Profile 1 supports a maximum byte size of 100K (not compressed).

6.8.1 Calculate the Profile Size

The table in the next sub-section lists the byte size for each component you may want to add to a profile (e.g, lines, peripheral boards, trunk group, etc.). This byte size is added to Profile 1 of the profile. You can use this table to ensure that the total byte size for each part of the profile does not exceed the limits allotted before submitting it to the AccessSwitch. If the profile does exceed the limits, the profile will be rejected.

Calculate the approximate size of Profile 1 as follows:

1. Write down all components you want to add to the profile, including the corresponding byte size (using Table 6.7 as a reference) for Profile 1.
2. Add the bytes to obtain a total.
3. Divide the total by 1024. (Remember that 1024 bytes = 1 kilobyte)

For example, if Profile 1 equals 90,541 bytes, divide this amount by 1024. The total should be 88.4 kilobytes, which does not exceed the 100K limit. See below.

90,541 bytes / 1024 bytes = 88.4 kilobytes.

Table 6.7 Size in bytes of profile components

Profile Component	Byte Size Added to Profile 1
New Profile with INP4D	9396 bytes.
Add INP4D Board	Add 13 bytes.
Add MCU Board	Add 13 bytes.
+ 1 MCU Line	Add 246 bytes.
+ With 1 DN on MCU Line	Add 85 bytes.
Add QDIU_EX Board (or DDIU_EX)	Add 13 bytes.
+ 1 T1IU Port Line	Add 2454 bytes. 246 byes for new line 384 bytes for T1 signaling for 24 T1 channels 1824 bytes for 24 blank channel user records (The blank channel user records are not displayed when you create a text version of the profile.)

Table 6.7 Size in bytes of profile components (Continued)

Profile Component	Byte Size Added to Profile 1
+ 1 Channel User record to T1IU port line	Add 85 bytes for public DN. Add 85 bytes for private DN. 24 Blank channel user records are created when a new T1IU port line is configured. Each record is filled in with valid data when a user configures a channel user record.
+ 1 Hunt Group record to T1IU port line	Add 218 bytes. (48 bytes for T1 hunt record, 85 for private DN, 85 for public DN.)
+ 1 T1IU Trunk line	Add 630 bytes. (246 bytes for line, 384 bytes for T1 signaling.)
+ 1 Outgoing Trunk Group to T1IU trunk line	Add 78 bytes.
+ 1 Incoming Trunk Group to T1IU trunk line	Add 58 bytes.
+ 1 Trunk group	Add 417 bytes (324 bytes for 1 trunk record, +16 for channel map for 1 line, and 77 for the outgoing qualifier record.)
+ 1 Service Code	Add 28 bytes.
Add QEIU_EX Board	Add 13 bytes.
+ 1 SEIU_EX Line	Add 246 bytes.
Add QRVX Board	Add 13 bytes.
+ 1 QRVX Line	Add 309 bytes (246 for 1 line record).
+ 1 DN to QRVX Line (maximum of 100 DNs per QRVX are permitted)	Add 85 bytes.
Add OBIU/OBIU-U Board	Add 13 bytes.
+ 1 DN to BRI Port Line	Add 85 bytes.
Add a Dial Prefix	Add 33 bytes.
Add Min/Max Criteria	Add 51 bytes.
+ 1 Permanent Connection	Add 42 bytes.
+ 1 IMUX DN (Pooled DN associated with an IMUX DN)	Add 31 bytes.
+ Channels from 1 line to the Pooled DN.	Add 16 bytes.

6.9 Sample Profile Configuration

A sample profile configuration appears below. It contains the following profile components:

- INP4D Redundant System (contains 2 INP4D boards)
- 2 OBIU boards
- 4 BRI ports
- 2 DNS per BRI port
- 8 MCU boards
- 32 MCU port lines

See below for an approximate breakdown of the configuration, including how the total byte size was calculated.

Sample Profile Component	Byte Size Added to Profile 3	Byte Size Added to Profile 1
New Profile w/INP4D	+1501 bytes	+9396 bytes
1 INP4D Board (in slot 2)	No addition (Each INP4D board = 0 bytes)	+13 bytes (Each INP4D board = 13 bytes)
2 OBIU Boards	No addition (Each OBIU board = 0 bytes)	+26 bytes (13 bytes per OBIU board x 2 boards = 26)
4 BRI ports on each OBIU	+456 bytes (114 bytes per OBIU port x 4 ports = 456 bytes)	+984 bytes (246 bytes per OBIU port x 4 ports = 984 bytes)
2 DNs per BRI port	+272 bytes (34 bytes per DN x 8 = 272 bytes)	+680 bytes (85 bytes per DN x 8 DNs = 680 bytes)
8 MCU Boards	No addition (Each MCU board = no bytes)	+104 bytes (13 bytes per board x 8 boards = 104 bytes)
32 MCU Port Lines	+3648 (114 bytes per line x 32 lines = 3648 bytes)	+7872 bytes (246 bytes per line x 32 lines = 7872 bytes)
	Total Byte Size for Profile 3 = 5,877 bytes/5.7 kilobytes	Total Byte Size for Profile 1 =19,705 bytes/ 18.6 kilobytes

6.10 Peripheral boards Supported

For specific revision levels of the peripheral boards supported by AccessWare 2000 R1.1 system software, see *Customer Update AccessWare* 2000 R1.1 *Release Notes*.

6.10.1 OBIU parameters

The following is a list of OBIU hardware parameter values:

- Interface: S/T.
- Line lengths up to 3,000 feet.
- Number of BRIs (Trunk or Port) per OBIU board: 8.
- Number of HDLC channels per BRI port: 1 for D channel.
- Access to four of the system's TDM buses on the backplane.
- 24-bit address/16-bit data VME bus interface.
- Maximum number of Directory Numbers provisionable for each AccessSwitch BRI Port: 10.
- Number of Terminal Endpoint Identifiers (TEIs) per BRI: 20.

6.10.2 OBIU-U parameters

The following is a list of OBIU-U parameters:

- Interface: U-Interface.
- Line lengths up to 18,000 feet.
- Number of BRIs (Port) per OBIU board: 8.
- Number of HDLC channels per BRI port: 1 per D channel.
- Access to four of the system's TDM buses on the backplane.
- 24-bit address/16-bit data VME bus interface.
- Maximum number of Directory Numbers provisionable for each AccessSwitch BRI Port: 10.
- Number of Terminal Endpoint Identifiers (TEIs) per BRI: 20.

6.10.3 INP4D, QDIU_EX, and DDIU_EX parameters

The following is a list of INP4D, QDIU_EX, or DDIU_EX parameters values:

- Interface: S/T (DSX)
- Number of PRIs or T1s (Trunk or Port) per INP4D or QDIU_EX board: 4.
  Note: When the INP4D is used in a redundant system, the T1/PRI lines are not active.
- Number of PRIs or T1s (Trunk or Port) per DDIU_EX board: 2.
- Timing: loop or internal free run (software selectable).
- Free Run Clock Accuracy: 1.544 Mbps ± 32 ppm.
- Line Code: B8ZS, or Bit 7 stuffing (software selectable).
- Framing Format: 193S (D4) and 193E (ESF) (software selectable).
- D-Channel Data Rate (Not applicable for T1): 64 KHz or 56 KHz (software selectable).

- D-Channel Polarity (Not applicable for T1): Inverted or Non-inverted (software selectable).
- Jitter Transfer and Jitter Tolerance: Per AT&T PUB 62411.
- Surge Protection: Per AT&T PUB 43601, FCC Part 68.302, CSA C22.2.
- Input/Output Impedance: 100 ohms.
- S/T Interface Equalization: 0 to +6.0 dB (software selectable).
- S/T Interface Receiver Sensitivity: 0 dB to -10.0 dB.
- Access to 8 full duplex, 4 Megahertz, TDM buses on the backplane (a 4 Mhz bus can carry 64 eight bit D-channels).
- 24-bit address/16-bit data VME bus interface.
- Maximum number of Directory Numbers provisionable for each AccessSwitch PRI/T1 Port: 24.

6.10.4 QRVX and DRVX parameters

The following is a list of QRVX and DRVX hardware parameter values:

- Maximum number of lines per QRVX: 4.
- Maximum number of lines per DRVX: 2.
- Maximum number of inverse multiplexed lines per QRVX: 4 Imux Framers.
- Maximum number of inverse multiplexed lines per DRVX: 2 Imux Framers.
- Maximum number of Directory numbers provisionable for each RVX port: 24.
- Maximum number of logical channel connections per port: 1.
- Maximum number of physical inverse multiplexed calls through the network per port: 31.
- Minimum bandwidth per call: 56 Kbps (one 56 Kbps channel).
- Maximum bandwidth per call:

  -1920 Kbps (one 1920 Kbps H12 channel group), or

  -1984 Kbps (31 64 Kbps inverse multiplexed channels).
- Autodial numbers per QRVX: 4, DRVX: 2.
- QRVX/DRVX Inverse Multiplexing modes: 4.

  -BONDING, Mode 1, 64 Kbps (Nx64 Kbps) over 64 Kbps channels.

  -BONDING, Mode 1, 56 Kbps (Nx56 Kbps) over 56 Kbps channels.

  -Dynamic 64 Kbps [(N+1)x64 Kbps] over 64 Kbps channels.

  -Dynamic 56 Kbps [(N+1)x56 Kbps] over 56 Kbps channels.
- Inverse Multiplexing parameters:

  - Maximum differential delay: 512 msec.

  -Maximum number of multiplexed channels (DS0s): 31 per line.

- Data interface types supported: 3.

  - RS449 per Electronic Industries Association (EIA) RS-449, November 1977.

  - V.35 per CCITT V.35 Red Book, Vol. VIII.1.

  - X.21 per CCITT Recommendation X.21 and V.11.

- Dialing interface types supported: 4.

  - RS366 per Electronic Industries Association (EIA) RS-366.

  -RS366A per Electronic Industries Association (EIA) RS-366-A, March 1979.

  - V.25 bis per CCITT Blue Book Fascicle VIII.1 Series V Recommendations

  -X.21 per CCITT Recommendation X.21 and V.11.

6.10.5 QEIU_EX, DEIU_EX, and SEIU_EX parameters

The following is a list of QEIU_EX, DEIU_EX, and SEIU_EX parameter values:

- Interface: S and T for E1
- Number of E1s (Trunk) per QEIU_EX board: 4.
- Number of E1s (Trunk) per DEIU_EX board: 2.
- Number of E1s (Trunk) per SEIU_EX board: 1.
- Timing: loop or internal free run (software selectable).
- Free Run Clock Accuracy: 2.048 Mbps ± 32 ppm.
- Line Code: Compatible with NRZ, AMI and HDB3.
- Framing Format: 16-Frame with CRC-4 multiframe alignment signaling and 2-Frame without CRC-4.
- D-Channel Data Rate: 64 Kbps.
- D-Channel Polarity: Non-inverted.
- Jitter Transfer and Jitter Tolerance: Per AT&T PUB 62411.
- Surge Protection: Per ETS 300 046.
- Input/Output Impedance: 120 ohms.
- Interface Line Build Out: Per Rec. I.431.
- Interface Receiver Sensitivity: Per Rec. I.431.
- Access to 16 of the system's TDM buses on the backplane (QEIU_EX, DEIU_EX, SEIU_EX).
- 24-bit address/16-bit data VME bus interface.
- Number of B Channels (DS0s) accessible per QEIU_EX board: 120 + 4 D Channels.
- Number of B Channels (DS0s) accessible per DEIU_EX board: 60 + 2 D Channels.
- Number of B Channels (DS0s) accessible per SEIU_EX board: 30 + 1 D Channel.

6.10.6 MCU4 board parameters

The following is a list of MCU4 board parameter values:

- Supported rates: 2x56, 2x64, 112 Kbps, 128 Kbps, 168 Kbps, 192 Kbps, 224 Kbps, 256 Kbps, 336 Kbps, 384 Kbps, and H0.
- QCIF and CIF video formats.
- Frames per second supported: 30, 15, 10, 7.5
- Audio Rates: G.711, G.722, G.728

6.11 Q.921 parameters

The following is a list of CCITT Q.921 (layer 2) parameters for the AccessSwitch:

- Timer between Retransmissions (T200): 1 second.
- Timer between TEI ID checks (T201): 4 seconds.
- Timer for Retransmission TEI Requests (T202): 4 seconds.
- Timer for Idle Link Polling (T203): 30 seconds.
- Number of Retransmissions (N200): 3.
- Maximum Number of Octets in Information Field of an I frame (N201): 260.
- Window Sizes: Separately provisionable from 1-127 for SAPI 0, SAPI 16, SAPI 63.

6.12 Q.931 parameters

The following is a list of CCITT Q.931 (layer 3) parameters for the AccessSwitch:

- Inter-digit timer (T302): 20 seconds.
- Period Allowed for Response to Setup message (T303): 4 seconds.
- Period Allowed for Response to Disc message (T305): 4 seconds.
- Period Allowed for Response to Release message (T308): 4 seconds.
- Period Allowed for Follow Up Message to Call Proc message (T310): 10 seconds.
- Period Allowed for Response to Conn message (T313): 4 seconds.

Appendix A

Acronyms

A.1 Acronym list

The following list of acronyms provides descriptions of the abbreviations used throughout this manual.

ACO ..... Additional Call Offering
AMI ..... Alternate Mark Inversion
ANI ..... Automatic Number Identification
B7 ..... Bit 7 Stuffing
B8ZS ..... Bipolar 8 Zero Suppression
BOC ..... Bell Operating Company
BRI ..... Basic Rate Interface
CC ..... Country Code
CCITT ..... International Telephone & Telegraph Consultative Committee
CIR ..... Committed Information Rate
CIU ..... Command Interface Unit
CPN ..... Called Party Number
CMU ..... Configuration Management Unit
CO ..... Central Office
CPE ..... Customer Premises Equipment
CSU ..... Channel Service Unit
CTS ..... Clear to Send
CTS ..... Computer-to-Switch (MMACD product only)
DANS ..... Directory Name Assistance Service
DBA ..... Dynamic Bandwidth Allocation
DCE ..... Data Communications Equipment
DID ..... Direct Inward Dialing
DN ..... Directory Number
DNIS ..... Dialed Number Identification Service
DP ..... Dial Plan
DPO ..... Dial Pulse Originator
DPT ..... Dial Pulse Terminator
DRVX ..... Dual RS449/V.35/X.21
DTE ..... Data Terminal Equipment
DTMF ..... Dual Tone Multi-Frequency
DTR ..... Data Terminal Ready
EID ..... Exchange ID
EIU ..... Equipment Interface Unit
EN ..... Extension Number
ESF ..... Extended Superframe
FC ..... Flexible Calling
FCO ..... Flexible Call Offering
FMU ..... Fault Management Unit
FXO ..... Foreign Exchange Office

FXS ..... Foreign Exchange Subscriber
HDT ..... Hold, Drop, Transfer
IE..... Information Element
IEC ..... Inter-exchange Carrier
INP ..... ISDN Network Processor
IP ..... International Prefix
IP ..... Internet Protocol (MMACD product only)
ISDN ..... Integrated Services Digital Network
Kbps ..... Kilobits per Second
KHz..... Kilohertz
LAN ..... Local Area Network
LC ..... Location Code
LC_{min} ..... Minimum Location Code Length
LC_{max} ..... Maximum Location Code Length
LEC ..... Local Exchange Carrier
LLC ..... Logical Link Controller
LMC..... Local Management Console
Mbps ..... Megabits per Second
MCU ..... Multipoint Control Unit
MCU4 ..... Multipoint Control Unit 4 port card
MLB..... Multipoint LAN Bridge
NANP ..... North American Numbering Plan
NDC..... National Destination Code
NFAS ..... Non-Facility Associated Signaling
NMC ..... Network Management Console
NPI ..... Numbering Plan Identifier
NPN ..... Numbering Plan Number
NSF IE ..... Network Specific Facility Information Element
NSN ..... National Specific Number
NTI..... Northern Telecom, Inc.
NTP..... National Trunk Prefix
NTT..... Nippon Telephone & Telegraph
OBIU..... Octal BRI Interface Unit
OBIU-U ..... Octal BRI Interface Unit with U interface
PBX..... Private Branch Exchange
PDN ..... Pooled Directory Number
PIC ..... Preferred Interexchange Carrier
PRI ..... Primary Rate Interface
QRVX ..... Quad RS449/V.35/X.21
RAM ..... Random Access Memory
RBOC ..... Regional Bell Operating Company

ROM ..... Read-Only Memory
RTS ..... Ready to Send
SAPI..... Service Access Point Identifier
SID ..... Station Identification
SMU..... Security Management Unit
SN ..... Subscriber Number
SPID..... Service Profile Identifier
SW56P ..... Switched 56 Permissive
T1IU..... T1 Interface Unit
TC ..... Trunk Code
TCP ..... Transmission Control Protocol vc
TE ..... Terminal Endpoint
TEI ..... Terminal Endpoint Identifier
TM ..... Terminal Management
TNS IE ..... Transit Network Selector Information Element
TON ..... Type of Number
VPN ..... Virtual Private Network
VPNNP ..... Virtual Private Network Numbering Plan
VRSI ..... Video Reservation System Interface
WAN..... Wide Area Network

Appendix B

Glossary

B.1 Glossary

Auto Mode/Negotiation: A conference parameter (when enabled) which allows a participant to enter a conference *in progress* with different codec operating modes (e.g. video and audio) than the participants but permits the automatic renegotiation of all conference codecs to the lowest common video and audio operating mode.

Automatic Call Distribution: An AccessSwitch will perform Automatic Call Distribution to route and switch calls to call center attendants on command from a host computer.

ANI (Automatic Number Identification): ANI is the delivery of the Calling Party number to the terminal from the public network or other locations within the private network. This number can be the original directory number of the Calling Party or a special number inserted by the network (e.g., billing number).

B Channel: The B channel is a 64 Kbps information-carrying channel.

BRI: The Basic Rate Interface (BRI) is an ISDN interface referred to as 2B+D because it provides two 64 Kbps B channels and one 16 Kbps D channel.

Browse: Conference mode of operation where any participant can choose to look at any other participant independently of who the moderator has chosen to be seen; all other participants see whom the moderator has chosen. Initia does not currently support this feature.

Call: A call is a single end-to-end session during which voice, data, image and/or video is transmitted.

CallView: CallView is the powerful network diagnostics and management software module. It allows you to view internal operations of the AccessSwitch as well as layer 2 (Q.921) and layer 3 (Q.931) signaling on ISDN interfaces.

Cascading: An MCU networking scheme which allows an independent conference "A" on one MCU to connect to, and participate in, an independent conference "B" on another MCU. Often used to increase the number of participants in a single conference. Cascaded "port" becomes the "window" for conference "B" to see into conference "A".

Voice Activation: loudest speaker in B is seen at the window of A and vice versa.

Lecture Mode: selected speaker in B is seen at the window of A.

CC (Country Code): A Country Code is a mandatory 1 to 3 digit country identifier for calls beyond the North American Numbering Plan area.

CCITT: The International Telegraph and Telephone Consultative Committee (CCITT) is the body which sets standards for international communications.

Central Office: A central office is a telephone-company switching facility or center, usually a Class 5 end office, at which subscriber's local loops terminate. A central office handles a specific geographic area which is identified by the first 3 digits of the local telephone number.

Chair Control (or Lecture): Conference mode of operation where a conference moderator controls who is seen; occasionally referred to as "broadcast control" or "universal chair control (UCC)"; Initia uses Lecture Mode where speaker is seen by all; and speaker sees everyone in the audience on a rotating basis.

Channel: A channel is a physical or logical path allowing the transfer of information.

CIF (Common Interoperability Format): Format used to describe the video quality between rooms systems, desktops, and videophones (Full CIF, Quarter CIF). It is often used in conjunction with the video frame rate in terms of up to 30 frames per second (fps).

CIR (Committed Information Rate): The CIR specifies the number of channels within each trunk group that must always be available for calls that match the corresponding routing criteria.

CIU (Command Interface Unit): CIU allows you to execute calls from the selected QRVX/DRVX. You can provision up to 100 call profiles that can be dialed with a click of the mouse.

Clear Channel: A Clear channel indicates the channel's full bandwidth is available to the user.

CMU (Configuration Management Unit): The name CMU was used in previous software releases. It allows you to create one or more configuration profiles for each AccessSwitch in a network. A configuration profile controls the functionality of an AccessSwitch and its peer entities.

CO: A Central Office is a telephone exchange. See Central Office.

Conference: Basic building block of an MCU. A multi party meeting between 3 or more sites.

Conference Reservation System: System of managing videoconference resources; ensures participants that resources are ready; stars, modifies, and stops the conference.

Configuration Profile: A configuration profile contains information required for the AccessSwitch to control the functionality of its interface cards and trunk/port lines. You can create more than one configuration profile for each AccessSwitch. However, only one configuration profile per AccessSwitch can be active at one time.

Continuous Presence: A codec display feature that permits up to 4 participants to be viewed on a codec screen simultaneously regardless of who is speaking; similar to simultaneous speaking, this is a form of simultaneous viewing. Also referred to as “quadrature”. Initia does not currently support this feature.

CPE: Customer Premises Equipment is equipment which is located at the user's location and connects to the network or the AccessSwitch (e.g., PBX, video codec).

CSU (Channel Service Unit): A piece of equipment located at the customer's site which is used to terminate a digital circuit such as T1.

D Channel (DC): A D channel is a provision of bandwidth in addition to information-carrying channels for the exchange of control information (e.g, information required to setup calls) between the user and the network.

DDIU_EX (Dual DSX Interface Unit): A DDIU_EX is an interface card for the AccessSwitch which provides two interchangeable PRI and/or T1 interfaces.

DEIU_EX (Dual E1 Interface Unit_EX): A DEIU_EX is an interface card for the AccessSwitch which provides two E1 interfaces.

Desktop: Shorthand for PC based videoconference terminal.

Dial Out: A type of conference where participants are called by the MCU and added to it.

Dial Plan: A dial plan provides rules regarding the length and format of address digits which are received and processed by the AccessSwitch. The AccessSwitch supports two types of dial plans, public and private. The public dial plan supported is the North American Numbering Plan (NANP). The private dial plans supported are the International dial plan, the VPN Numbering Plan or Special private dial plan, and the Generic private dial plan.

Downstream: Refers to the AccessSwitch acting as the User side for LAPD/Q.931.

Drop-Side: An interface connected to Customer Premises Equipment (CPE).

Drop-Side Port: An interface that connects the AccessSwitch to a terminal device (e.g, video codec, telephone set).

Drop-Side Trunk: A line that connects the AccessSwitch to CPE switching equipment (e.g, PBX).

Drop-Side Trunk Groups: Channels from one or more BRI, PRI, or T1 lines connecting another premises switching device (e.g., PBX) to AccessSwitch interface cards with BRI, PRI, or T1 lines (configured as trunks) can be used in Drop-Side Trunk Groups.

DRVX (Dual RS449/V.35/X.21): The DRVX is an optional peripheral card which provides 2 synchronous data ports compatible with either RS449 or V.35 interfaces and supports one RS366 or RS366A dialing interface per port. In addition, data rates from 56 Kbps to 1536 Kbps, in increments of Nx56 and Nx64, are supported. The DRVX is also compliant with Bonding interoperability.

DS0: A DS0 is a telephony term for a 56 or 64 Kbps standard digital communications channel in the U.S. Channels on a T1 are DS0s.

DTMF: Dual Tone Multi-Frequency: The push button or Touch Tone signaling method by which each key, when pressed, generates two different audio output tones to represent dialed digits (as opposed to pulse dialing of rotary phones). DTMF is also referred to as Touch-Tone.

EIU (Equipment Interface Unit): This optional software module allows the AccessSwitch to communicate with video reservation systems.

FMU (Fault Management Unit): The name FMU was used in previous software releases. This module is now called Alarms and it allows you to access and manage alarm information for the selected AccessSwitch.

Gateway: A device that performs several of the various translation functions such as signal and speed conversions; and protocol translations needed to interface two or more dissimilar communications devices. For example, in order to permit LAN based video codecs to access the WAN, packets normally used on the LAN to encapsulate data would have to be disassembled and the data would have to be reformatted in the appropriate channelized format used by digital T1 or ISDN lines.

H0: H0 is an ISDN term for a 384 Kbps channel.

H11: H11 is an ISDN term for a 1536 Kbps channel.

IEC (Interexchange Carrier): A telephone company which provides long distance services.

INP4D (ISDN Network Processor): The INP4D is the common equipment card which controls the overall operation of the multi-slot AccessSwitch system.

ISDN (Integrated Services Digital Network): ISDN is a standardized digital wideband communications architecture for simultaneous voice, data, image, and video communications.

Kbps: Kilo (thousand) bits per second

Inverse Multiplexing: A “reverse multiplexing” technology used for videoconferencing which allows the aggregation of separately dialed, digital 64 kbps channels (typically 6) into a single bandwidth pipe. This scheme eliminates channel to channel delay which might exist across the separate wide area network paths used by the channels. For example, 6 digital channels provides a single bandwidth pipe at 384 kbps.

LAN AccessSwitch: An AccessSwitch that is defined as "LAN" will be dynamically connected to the NMC via a network connection. One LAN AccessSwitch can be connected to the NMC at a time. Once connected, bi-directional communication between the NMC and the AccessSwitch occurs as if the AccessSwitch was directly connected to a "local" console.

LAPD: Link Access Procedure for D channel is used for layer 2 data-link control. (Also referred to as Q.921).

LEC (Local Exchange Carrier): A local exchange carrier is a local phone company.

Lecture (or Chair Control): Conference mode of operation where a conference moderator controls who is seen; occasionally referred to as “broadcast control” or “universal chair control (UCC)”; Initia uses Lecture Mode where speaker is seen by all; and speaker sees everyone in the audience on a rotating basis.

Line: A physical network interface. A line contains a fixed number of channels.

LMC (Local Management Console): The LMC is the local version of the management software. The LMC communicates with the AccessSwitch via a dedicated RS232 link or modem link and is used to provision and operate one AccessSwitch locally. It can connect to one AccessSwitch and only one AccessSwitch. LMC also refers to the local serial port on the I/O card of the INP4D peripheral board.

Local AccessSwitch: An AccessSwitch that is defined as "local" to an LMC will be directly connected to a communications port on the LMC via an RS232 cable. Dedicated, bi-directional communication between the LMC and the AccessSwitch is then utilized to download/upload configuration information, monitor link status, initiate/terminate V.35/RS449 calls, and manage transmission facility allocation.

Management Console: A generic term for the terminal interface used to provision and operate the AccessSwitch.

MCU: Multipoint Control Unit. Also referred to as a “bridge”. Used for starting, stopping, and controlling multi-party videoconferences. Initia defines a single MCU as either a single AccessSwitch with multiple VideoSwitch cards capable of supporting up to 32 sites; or a single VideoSwitch Express.

MCU4: A plug in MCU (Multipoint Control Unit) module which provides four port videoconference capabilities. It can be used with the Model 60 and Model 200_EX AccessSwitch products.

Mbps: Mega (million) bits per second.

Meet Me: A type of conference where participants dial in, analogous to “chat room”.

NANP (North American Numbering Plan): The NANP dial plan defines a 10-digit scheme for identifying endpoints in the North American Public Switched Telephone Network.

Network Side: An interface connected to the network (e.g., IEC, LEC, Private) is considered network side.

Network-Side Trunk Groups: Channels from one or more BRI, PRI, or T1 lines connecting a Central Office Switch to AccessSwitch interface cards with BRI, PRI, or T1 lines (configured as trunks) can be used in Network-Side Trunk Groups.

Network-Side Trunk: An interface that connects the AccessSwitch to a central office switch is considered a network side trunk.

NFAS (Non-Facility Associated Signaling): NFAS is the capability to control multiple PRI lines via a single D channel. This frees the D channel on the other lines from signaling responsibilities and allows them to be used for data transmission.

NMC: The NMC is the remote version of the Management Console. The remote NMC communicates with one AccessSwitch at one time via a 9600 Bps modem and is used to provision and/or operate a AccessSwitch remotely. Up to 25 remote AccessSwitch systems can be accessed with one NMC.

OBIU: An OBIU is an interface card for the AccessSwitch which provides eight BRI trunk or port interfaces.

PBX: A Private Branch Exchange is a telephone switch located in a customer's premises that primarily establishes circuits over lines between individual users and the switched telephone network.

PDN (Pooled Directory Number): A PDN is an ordinary directory number, which when provisioned as a PDN is used to successfully execute Inverse Multiplexed calls.

Port: An interface that connects the AccessSwitch to a piece of terminal equipment (e.g., a video codec).

POTS (Plain Old Telephone Service): POTS refers to a standard set of analog public telephone services.

PRI (Primary Rate Interface): A PRI is an ISDN term for a Primary Rate interface. A Primary Rate interface consists of 23 B channels for transmitting information and 1 D channel for signaling.

Protocol: Protocol refers to a formal set of rules governing the format, timing, sequencing, and error control of exchanged messages on a data network.

Q.921: Q.921 is a CCITT standard for layer 2 protocol which provides the following functions: multiple links in the D channel, detection and recovery of transmission errors, flow control, sequential numbering and control, and transparency. Q.921 is synonymous with LAPD.

Q.931: Q.931 is a layer 3 protocol on the D channel which is used for transaction control such as network signaling and exchange of data between end systems.

QDIU (Quad DSX Interface Unit): A QDIU is a peripheral card which provides four interchangeable PRI and/or T1 interfaces.

QDIU_EX (Quad DSX Interface Unit_EX): A QDIU_EX is the latest version of the QDIU interface card.

QEIU_EX (Quad E1 Interface Unit _EX): A QEIU_EX is a peripheral card which provides four E1 interfaces.

QRVX (Quad RS449/V.35/X.21): The QRVX is an optional peripheral card which provides 4 synchronous data ports compatible with either RS449 or V.35 interfaces and supports one RS366 or RS366A dialing interface per port. In addition, data rates from 56 Kbps to 1536 Kbps, in increments of Nx56 and Nx64, are supported. The QRVX is also compliant with Bonding interoperability.

Remote Hub: An AccessSwitch that is defined as "remote" will be dynamically connected to the remote NMC via a dialed-up modem connection. One remote AccessSwitch can be connected to the remote NMC at a time. Once connected, bi-directional communication between the remote NMC and the AccessSwitch occurs as if the remote AccessSwitch was directly connected to a "local" console.

SEIU_EX: The SEIU_EX is an optional peripheral card which provides one E1 interface.

Simultaneous Conferences: 2 or more conferences occurring at the same time on the same MCU.

Simultaneous Speakers: A conference parameter which lets more than one person speak at the same time. Only the loudest of the speakers is seen by all.

SoftLoad: SoftLoad is the procedure by which new releases of software are installed. New software releases are first loaded onto the NMC, then downloaded to reprogram the AccessSwitch.

SMU (Security Management Unit): The name SMU was used in previous software releases. This module icon is now called NMC and it allows you to provision AccessSwitch names, directory numbers, NMC-to-AccessSwitch connection types, and security parameters for users.

TCP/IP: A transportation language a host computer will use to send commands to the AccessSwitch. This is only used with the Multimedia ACD product.

T1: A T1 is a non-ISDN digital interface which is made up of 24 DS0 channels which are 56 or 64 Kbps each. Therefore, the total bandwidth available on a T1 line is 1.544 Mbps.

TEI (Terminal Endpoint Identifier): A TEI is a unique numeric designation for a given endpoint on the network such as a terminal or phone.

Trunk: A trunk is an interface that connects the AccessSwitch to another piece of switching equipment (e.g., PBX, Central Office Switch).

Trunk Group: An AccessSwitch trunk group is a collection of BRI, PRI, or T1 channels (on corresponding lines configured as trunks) that are provisioned with common routing and call processing characteristics.

Upstream: Refers to the AccessSwitch acting as the Network side for LAPD/Q.931.

VC Wizard: A videoconferencing reservation system that can be used with the Model 60 and Model 200_EX AccessSwitch products to setup and control videoconferences.

Video codec: Another name for videoconference terminal or “endpoint” or “system”.

Videoconference: A visual wide area digital communications tool which includes video as well as audio. Used extensively in one-on-one, dialed, point-to-point calls, videoconferences can also be multi party calls if used with multipoint control units. A dialed (switched) digital communications medium, videoconferencing typically uses ISDN as its WAN medium. Videoconference speeds are typically either 112/128 kbps (narrowband) or 384 kbps (wideband). Dialed narrowband calls can be either dual dialed (using 2 phone numbers) or single line calls. Dialed wideband digital calls are invariably single line calls and often use inverse multiplexing technology.

VideoSwitch: The brand name for the MCU4 plug-in module for the AccessSwitch. See also MCU4 and MCU.

VideoSwitch Express: A stand-alone, combined WAN access and switching system with integral multipoint control unit.

Voice Activation: Conference mode of operation where the loudest speaker is seen by all. As a person speaks, their video is “broadcast” so that everyone can see them. The person speaking sees the previous speaker.

B.2 Video Networking Glossary of Terms

Video Networking Standards

One of the keys to ubiquitous, low-cost video networking is interoperability. For a long time, users could only establish videoconferencing links between endpoints (codecs) provided by the same company forcing them to invest in a private video network. To help eliminate this barrier, the International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) defined a suite of standards specifically for videoconferencing to better leverage and take advantage of other, well established communication standards and services. The umbrella standard - H.320 - encompasses a variety of sub-standards for audio, video and data signaling. While drafting a suite of standards can take years, the implementation of those standards by vendors can take far longer. Standards are often ambiguous, and contain both mandatory features and optional features. Frequently, a videoconferencing vendor may elect to support only a subset of the standards, making multi-vendor interoperability more difficult.

H.320 Narrow-Band Visual Telephone Systems and Terminal Equipment Recommendation

H.320, the umbrella standard, refers to many other Recommendations that collectively describe a visual communications system which enables a number of users to share voice, data, and real-time video over digital media with capacities ranging from 56 kilobits to 1,920 kilobits. H.320 defines terms, provides a system overview, lists operating modes and transmission speeds, describes procedures for call setup, call tear down and conference control.

H.323 Transmission of Voice, Video and Data over Packet Switched Networks using Internet Protocol (IP)

Videoconferencing standard ratified in 1996, which describes how to transmit voice and video data over the local area and wide area networks using TCP/IP as the transmission protocol. H.323 has the promise to significantly reduce the cost of desktop video connections and enable videoconferencing to become another LAN application.

H.221 Frame Structure for a 64 to 1920 Kbit/s Channel in Audio-Visual Teleservices

Recommendation H.221 outlines a framing protocol that enables the dividing of a transmission channel into sub-channels for voice, video, data and control signals.

H.230 Frame Synchronous Control and Indication Signals for Audio-Visual Systems

Recommendation H.230 provides a mechanism for control of the channel or status indication of the channel between two audio-visual devices.

H.231 Multipoint Control Units for Audio-Visual Systems Using Digital Channels up to 2 Mbit/s

Recommendation H.231 describes the network configuration for an MCU and provides a schematic for an MCU with a short overview of each element.

H.242 System for Establishing Communication between Audio-Visual Terminals Using Digital Channels up to 2/Mbits

Recommendation H.242 describes procedures for establishing point-to-point communication between two audio-visual terminal devices.

H.243 MCU Procedures for Establishing Communication Between Three or More Audio-Visual Terminals Using Digital Channels up to 2/Mbits

Recommendation H.243 describes procedures and functionality for multipoint communication.

H.261 Video Codec for Audiovisual Services at p x 64 Kbits/s

Recommendation H.261 describes a method for compressing video signals for transmission over digital media. H.261 also specifies a range of transmission speeds suitable for carrying the compressed video information.

G.711 Pulse Code Modulation (PCM) of Voice Frequencies

Recommendation G.711 describes the encoding of 3.1 kHz audio into a 64 kilobit digital channel. G.711 can use either A-law or μ-law companding.

G.722 7kHz Audio-Coding within 64 Kbit/s

Recommendation G.722 describes the use of sub-band adaptive differential pulse code modulation to transmit 7 kHz high-quality audio at 48, 56, or 64 kbps. This recommendation also enables the transmission of data at up to 16 kbps over a 64 kilobit channel, with 48 kilobits remaining for audio.

G.728 16 Kbits/Low Delay CELP

Recommendation G.728 describes an audio encoding method that enables near-PCM quality, 3.1 kHz voice using 16 kilobits of bandwidth.

T.120 Transmission Protocols for Multimedia Data

Multimedia Telecommunications involve the transport of information signals in a wide range of formats, efficiently, flexibly, and securely. Moreover, the communication protocol must not be confined to point-to-point operation between identical terminals but permit group working between many terminals which may be geographically dispersed and very diverse in their types.

Such a protocol is defined in a series of ITU Recommendations collectively referred to as "the T.120 series". This Recommendation contains a general description of the T.120 series recommendations showing the interrelationships between the constituent standards, and to the other standards for the systems in which the T.120 series is to be used. Recommendations T.120 defines a document conferencing technology that can exist within the H.320 framework. T.120 is built on a multi-layered approach with defined protocols and service definitions among the layers. Each layer in the architecture assumes the existence of the other layers.

T.122 Multipoint Communication Service for Audiographics Conferencing

The Multipoint Communication Service (MCS) is a generic service designed to support highly interactive multimedia conferencing applications. It supports full-duplex multipoint communication among an arbitrary number of connected application entities over a variety of networks as specified in Recommendation T.123.

T.123 Protocol Stacks for Audiographic and Audiovisual Teleconference Applications

Recommendation T.123 is the network specific transport protocol for T.120 and it defines how T.120 shares communications facilities with H.320 audio-visual traffic. This Recommendation, which defines common protocol stacks for terminals and MCUs, specifies network aspects in the form of profiles for each network identified. The rationale for this Recommendation is as follows: audiographic and video conferencing are intended to form part of the repertoire of ISDN services. Teleconferencing via ISDN involves the integration of multimedia (audio, video and data) in a connection which may be the aggregate of a number of physical channels. The provision of these services is not, however, limited to the ISDN, and a range of other network scenarios is identified. For instance, CSDN may provide a similar, though less flexible, service to that of the ISDN. In cases where the audio and video signals are provided separately, the data channel for control and enhancement of the teleconference may be provided via PSTN.

T.124 Generic Conference Control (GCC)

This Recommendation provides a high-level framework for conference management and control of audiographic and audiovisual terminals and multipoint control units (MCUs). It encompasses generic conference control (GCC) functions such as:

•conference establishment and termination

•managing the roster nodes, application protocols and capabilities within a conference

•registry services for use by Application Protocol Entities

•coordination of conference conductorship

•as well as other miscellaneous functions

GCC also provides coordination between the aspects of real-time audio and video, with the aspects of non real-time data within a multipoint conference.

T.125 Multipoint Communication Service Protocol Specification

This Recommendation defines a protocol operating through the hierarchy of a multipoint communication domain. It specifies the format of protocol messages and procedures governing their exchange over a set of transport connections. The purpose of the protocol is to implement the Multipoint Communication Service defined by ITU-T Rec. T.122.

T.126 Still Image Exchange and Annotation

Recommendation T.126 defines a protocol for shared whiteboard applications and still image conferencing with associated annotations. It uses services provided by T.122 and T.124 (GCC). Remote pointing and keyboard event exchanges are included so that terminals can implement application sharing, even if the applications are running on different platforms or operating systems. T.126 defines the protocol to be used by a broad set of user applications that require interoperable graphical information exchange in a multi-vendor environment. It can be employed by user applications requiring simple whiteboarding, annotated image exchange and hard copy image exchange as well as for more advanced functions such as remote computer application piloting and screen sharing. The protocol manages the conference-wide synchronization of multi-plane/multi-view graphical "workspaces". An extensible set of bitmap, pointer and parametric drawing primitives can be directed to these workspaces. Advanced options such as keyboard and pointing device signaling to support computer application remote piloting and screen sharing are also defined. All aspects of the protocol have provisions for in-band extensibility in conformance with the "Standards + Extensions" philosophy of the IMTC to allow any new or extended primitives that are not defined to be added and detected within a conference.

T.127 Multipoint Binary File Transfer

This recommendation defines a protocol to support the interchange of binary files within an interactive conferencing or group working environment where the T.120 suite of standards is in use. It provides mechanisms which facilitate distribution and retrieval of one or more files simultaneously using the primitives provided by T.122 (Multipoint Communications Service). T.127 is designed to offer a versatile, light weight protocol which provides the core functionality to allow interworking between applications requiring a basic file transfer capability and also has the flexibility to meet the demands of more sophisticated applications.

T.128 Audio Visual Control for Multipoint Multimedia Systems

The Audio-Visual Control application is the T.120 component that provides the framework for control and management of interactive Audio and Visual services within a multipoint multimedia communication environment. The recommendation provides a toolkit of functions that can be utilized to provide management, routing, identification and processing of Audio and Visual streams, together with remote device control and source selection.

Appendix C

SoftLoad

C.1 Introduction

This appendix explains how to use SoftLoad, the utility to install system software onto the peripheral boards in an AccessSwitch. For instructions on how to upgrade your AccessSwitch, please see the Upgrading system software on the hub chapter in this manual. If you are upgrading the INP4D in the hub from pre-2000 R1.1 system software to AccessWare 2000 R1.1, this section is helpful if you encounter problems during the procedure.

Note: If you are using the NMC console, you must use SoftLoad to upgrade the peripheral boards in your AccessSwitch.

The Unix operating system is not supported by SoftLoad.

When using SoftLoad, all boards in the AccessSwitch system are updated unless you specify a particular board type. After the SoftLoad procedure has completed, a cold reset (system turns off and on) will be performed by the AccessSwitch. A cold reset causes the configuration profile stored on the INP4D to be invalid. In order to use the AccessSwitch following SoftLoad, a configuration profile must first be submitted to it.

C.2 Putting an AccessSwitch into SoftLoad mode

To install new system software onto your AccessSwitch with SoftLoad, you must first put the switch into SoftLoad mode. You can do this remotely or locally, using the LMC/NMC.

C.2.1 Putting an AccessSwitch into SoftLoad mode with a local LMC

Connect your AccessSwitch to the management console through a serial port (see Chapter 2 for detailed instructions). If the AccessSwitch onto which you want to install the system software also has a modem attached, disconnect it. Then do the following:

1. If the main management console window is not active on your console screen, select *NetworkView* from the menu bar. Select the AccessSwitch you want to SoftLoad.
2. Select *Alarms* from the menu bar. The *Alarms* window for the selected AccessSwitch appears. If the *Console Link Status* text box does not display "*Link Up to* AccessSwitch", wait for this message to appear.
3. Select *Maintenance* > *Reset System*. The *System Reset* dialog box appears.
4. Click the *Reset for SoftLoad* radio button and click **OK**. Wait for the console link to the AccessSwitch to be disconnected. (This disconnect can take up to one minute to occur; please wait until the *Console Link Status* text box displays "*Link Down to* AccessSwitch".)
5. From the *File* menu, select the *Terminate System* option. If there is an open configuration profile on the screen and it has not yet been submitted to the AccessSwitch, a warning dialog box appears. Click **OK**. The console software closes.
6. Move the RJ45 connector from the AccessSwitch's LMC port #1 to the NMC port #2 on the backcard of the INP4D in slot 1.

After the SoftLoad procedure has completed, move the RJ45 connector of the serial cable back to the LMC port.

C.2.2 Putting an AccessSwitch into SoftLoad mode with a remote NMC

To ready an AccessSwitch using a remote NMC:

1. Double-click the *NMC* icon and log onto the software.
2. Select *NetworkView* from the menu bar and select the AccessSwitch you want to download the system software to.
3. Initiate a modem connection, if it is not already established, with that particular AccessSwitch.
4. Once the connection is established, select *Alarms* from the menu bar. The *Alarms* window for the selected AccessSwitch appears. If the *Console Link Status* text box does not display "*Link Up to* AccessSwitch", wait for this message to appear.
5. Select *Maintenance* > *Reset System*. The *System Reset* dialog box appears.
6. Click the *Reset for SoftLoad* radio button and click **OK**. You will notice that the NMC link to the AccessSwitch will be disconnected. (This disconnect can take up to one minute to occur; please wait until the *Console Link Status* text box displays "Link Down to AccessSwitch".) Although the NMC-to-AccessSwitch console link has been disconnected, the modem connection between the NMC and the AccessSwitch will remain established.
7. Select *File* > *Terminate System* (do not disconnect the modem connection). If there is an open configuration profile on the screen and it has not been submitted to the AccessSwitch, a warning dialog box appears. Click **OK**. The management console software closes.

You may now download the system software to the AccessSwitch.

C.2.3 Putting an AccessSwitch into SoftLoad mode using the patch memory command

The situations described below dictate that you must use hyperterminal to put your AccessSwitch into SoftLoad mode.

- The battery fails on the INP4D.
- The flash memory becomes corrupt
- The hub cannot boot up.

To put the hub into SoftLoad mode using hyperterminal, do the following:

1. Connect the management console through a serial port (typically COM1 or COM2) to the LMC port of the AccessSwitch.
2. From the Windows *Start* menu, select *Programs* > *Accessories* > *Hyperterminal*.
3. In the *C:\PROGRA~1\ACCESS~1\HYPERT~1* window, double-click the HYPERTRM.EXE icon.
4. In the *Connection Description* window, type a name for the AccessSwitch you are connecting to and select an icon to represent it. Click **OK**. The name and icon will be added later to your list of connections in the *C:\PROGRA~1\ACCESS~1\HYPERT~1* window.
5. In the *Phone Number* window, click the arrow for the *Connect using* drop-down menu. Select "Direct to COM1" or "Direct to COM2" depending on which of the COM ports on your PC you are using. Click **OK**.
6. In the *Properties* window for the COM port you selected, specify 9600 Bits per second. Leave all the other settings at their default values. Click **OK**.
7. The *HyperTerminal* window appears. (You will also notice an @ or # symbol appearing on the screen every few seconds. You can ignore these. They represent a signal sent by the hub to confirm that the connection is still live.) In the *Hyper Terminal* window, type:

   ▫▫▫▫▫▫▫▫▫▫▫▫ and press ▫▫▫▫▫▫▫▫▫

8. HyperTerminal displays a list of commands that you can use to view data about the AccessSwitch or to reconfigure the AccessSwitchcommand prompt. For now, type:

   ▫▫▫▫▫▫▫▫▫▫

   to enter into the Utilities command mode.

9. The Utilities command prompt appears:

   ▫▫▫▫▫▫▫▫▫▫▫▫▫

10. Type:

    ▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫

11. Then type:

    ▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫

The hub then resets into SoftLoad mode.You can now download the system software to your AccessSwitch, section C.3.

C.3 Running SoftLoad

If you are upgrading from a previous release of AccessWare 2000 R1.1 system software, the SoftLoad utility should already reside on the Management Console PC in the C:\IAP directory. If this is the first update you have run on your AccessSwitch, the original installation should have created both the C:\IAP\BINS\XX-XX-XX.XX and the C:\IAP\BINS\DEFAULT directories on your hard disk (for which XX-XX-XX.XX represents the version number of the current system software update) and loaded the AccessWare 2000 R1.1 system software into each directory. The files in the \XX-XX-XX.XX directory will be used when you specify an AccessWare 2000 R1.1 system software version number in step 1 of the SoftLoad procedure. If you do not specify a system software version, the files in the \DEFAULT directory will be used.

SoftLoad takes from 10 minutes to 2 hours to run completely, depending on the number of different peripheral boards in your AccessSwitch and the baud rate used. Therefore, if you do not plan to dedicate this amount of time to the SoftLoad procedure, do not continue beyond this step.

During the SoftLoad procedure, if SoftLoad is terminated abnormally, it is possible that the AccessSwitch will not operate as expected. In such a case, the SoftLoad procedure will need to be performed again from the beginning.

Note: Peripheral boards should not be inserted or removed while the SoftLoad procedure is running, because they may not be completely programmed by SoftLoad.

To run SoftLoad:

1. Open a DOS window, go to the C:\IAP directory, and type:

   □□□□□□□□□□□□

   where □□ is the name of the SoftLoad executable, □□□□□□ is the baud rate for the transfer, and □□ tells the console not to wait for a response from the AccessSwitch. Command line options are described in detail in the following section.

Figure C.1 SoftLoad introduction screen

Softload

Copyright 2001, Initia, Inc.

Version X.XX, X/XX/XX

This program allows you to download software to the Node. The software is distributed by Initia, Inc. via diskette. The software must be present on the hard disk for Softload to continue. Please install the Programming Plug on the Node and...

Press <ENTER> to CONTINUE.

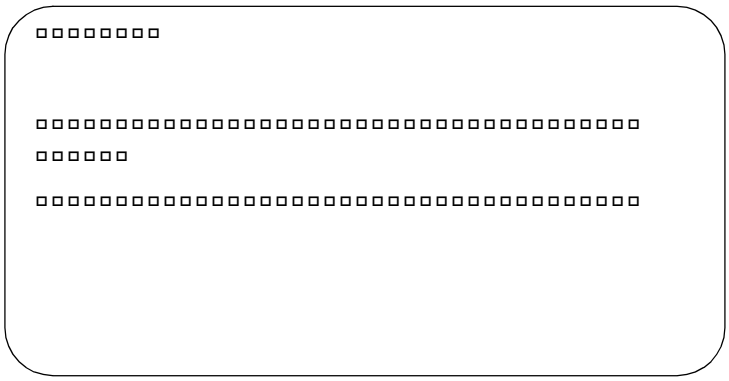
Press <ESC> to QUIT.

Note: If you must terminate the SoftLoad procedure before you continue past this step, you can press either the ESC key (which places the AccessSwitch in normal operating mode before exiting), or CTRL + C (which exits SoftLoad without placing the AccessSwitch in normal operating mode).

Press the □□□□□□□ key to continue the SoftLoad procedure.

2. SoftLoad will check that all the necessary files have been loaded onto the Management Console hard disk. See Figure C.2.

Figure C.2 Check data files screen



If all the necessary files are present, SoftLoad will attempt to establish communication with the AccessSwitch.

If all necessary files are not present, you will receive the following error message:

Directory C:\IAP\BINS\DEFAULT or data files do not exist.

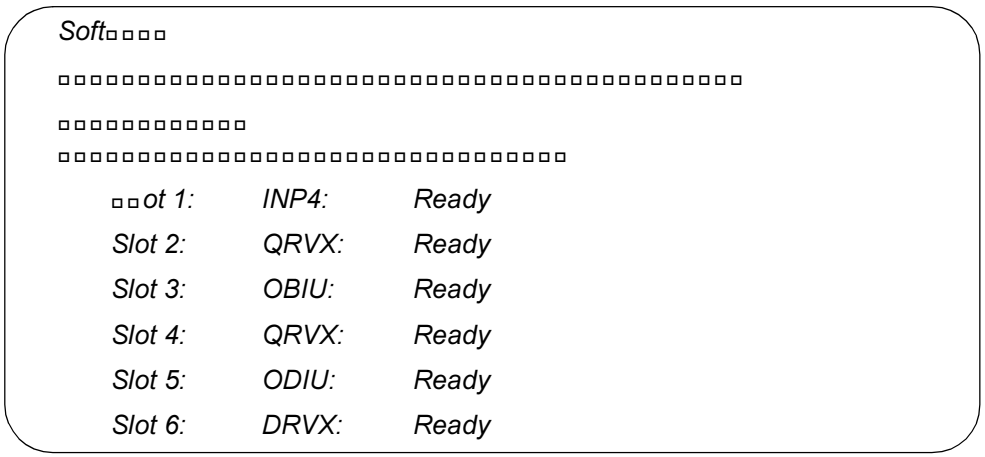
Please install the system software and execute SoftLoad again.

You must then install the AccessWare 2000 R1.1 system software and restart the SoftLoad update process.

3. When communication between the AccessSwitch and the management console PC has been established, the following message appears on the screen. See Figure C.3.

ESTABLISHING COMMUNICATION WITH THE IAP.....OK

Figure C.3 Board list and status screen for AccessSwitch 60, non-redundant system



Each peripheral board takes approximately 4 to 10 minutes to completely download.

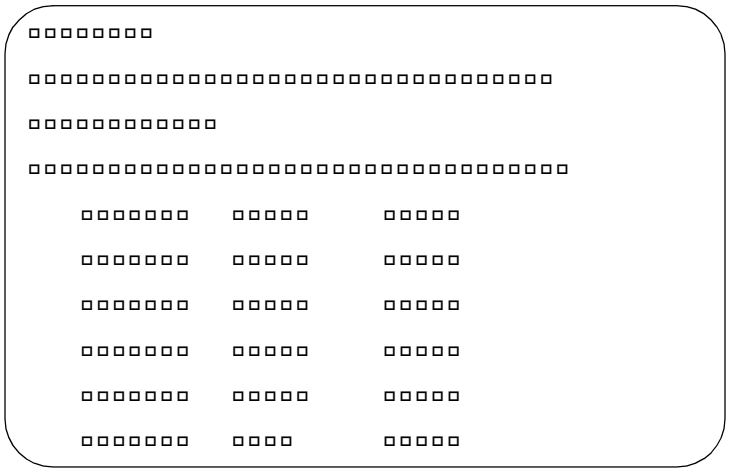
The upper left of the screen displays the status. The SoftLoad procedure loads only the required software into your system. For example, if you do not have any OBIU peripheral boards in your AccessSwitch, SoftLoad does not download the OBIU.BIN executable file.

The status for each slot in the AccessSwitch displays on the screen, as follows:

- SLOT EMPTY
  This slot does not contain any board. There will be no action taken on this slot and the status will remain as "SLOT EMPTY."
- DONE
  This slot contains a board that has already received the update from this SoftLoad process.
- READY
  The board in this slot has responded to the download command and is waiting for the code of same board type to be programmed.
- FAILED!
  Programming was attempted on the board in this slot and failed. Try the SoftLoad procedure again when the entire download is complete. If the board fails again, call the Technical Assistance Center.

When the SoftLoad process is complete, the *Download Complete* screen is displayed, as shown in Figure C.4.

Figure C.4 Download complete screen



SoftLoad terminates and returns your AccessWare screen to the DOS prompt. The screen shown in Figure C.4 remains on the console screen, above the DOS prompt, to allow you to review the results of the SoftLoad procedure.

Note: After the SoftLoad procedure has completed, the AccessSwitch will perform a cold reset, which will invalidate the configuration profile stored on the AccessSwitch's INP4D. To resume normal AccessSwitch operation, a configuration profile must be submitted from the Management Console to the AccessSwitch.

C.4 Peripheral board LED sequences for SoftLoad

During the SoftLoad process, the LED sequences on the faceplate of each board installed in your AccessSwitch reflect the action being performed. Table C.1 describes the condition of the peripheral boards when particular LED sequences appear. The peripheral boards reside in slots 2 through 6 in an AccessSwitch 60, and 2 through 20 in a 20-slot system. If your AccessSwitch is a redundant system, the INP4D in slot 2 will have the same LED conditions as the peripheral boards. Table C.2 lists the LED sequences of the INP4D in slot 1 of your AccessSwitch.

Table C.1 LED/peripheral board sequences during SoftLoad

LED condition				Condition description
FAIL	**EXT**	**BUSY**	**TEST**	
ON	ON	OFF	OFF	Peripheral board is ready to accept SoftLoad commands from the INP4.
ON	OFF	ON	OFF	Peripheral board is loading new code.
ON	OFF	OFF	ON	Peripheral board is verifying that the new code has been loaded successfully.

Table C.2 Slot 1 INP4D LED sequences during SoftLoad

LED condition							Condition description
MAJ	**MIN**	**FAIL**	**EXT**	**BUSY**	**TEST**	**PRI/ T1**	
ON	ON	OFF	OFF	OFF	FLASH	ON	SoftLoad is sending files to the INP4D.
ON	ON	OFF	OFF	FLASH	OFF	ON	SoftLoad is programming the INP4D.

C.5 SoftLoad command line options

SoftLoad command line options perform specific functions when included at the end of the SoftLoad command line. The command line switches are described in the sections that follow.

If you enter an invalid SoftLoad command, the Help screen appears, as shown in Figure C.5.

You can also invoke the Help screen through the ▫▫ command line switch, which is described in section C.5.7.

Figure C.5 SoftLoad command Help Screen

```
▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫
▫▫▫▫▫▫▫▫SL <switch options> <version identifier>
     Available <switch options> :
     -b[rate] or -B[rate] : "Selected baud rate."
       [rate] = 9600, 19200, or 38400
     -i or  -I : Skip INP[4] programming."
     -l or  -L : "Use logfile."
     -o or -O : "Legacy directory structure."
     -x or -X : "RAM download."
     -n or -N : "Don't wait for Hub response."
     -t or  -T : "Model 20 directory structure."
     -r or  -R : "Reset Hub."
     -h or -H : "Help"
     -p[board type] or -P[board type] : "Selected board type."
      [board type] = INP, INP4, INPD, BRIU, PRIU, T1IU, DS1U,
   TRIU-CTS, STIU-DEQ, STIU-STD, TRIU-MLB, E1IU, QRVX, DRVX
   OBIU, OBIU-U, MCU4, VTIU, TONE or DIAG
     -c[port] or -C[port] : "Selected COM port."
      [port] = 1 thru 8
     <version identifier> example: 16.9.1.2 or 16-9-1-2.
          Press RETURN to exit.
```

C.5.1 Baud rate

This command line switch allows you to specify the baud rate at which the system software files will be downloaded to the AccessSwitch. The possible baud rates are 9600 (default), 19200, and 38400.

```
▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫▫
▫▫▫▫▫▫   ▫▫▫▫▫▫▫▫▫▫▫▫▫
```

Using the above usage example, the AccessWare2000 R1.1 system software would be downloaded to the AccessSwitch at a rate of 19.2 Kbps. Similarly, if you do not specify a baud rate, the download will occur at the default rate of 9.6 Kbps. For a remote SoftLoad through an NMC, the default rate of 9.6 Kbps must be used.

C.5.2 Reset Hub

This command line switch enables you to reset the AccessSwitch. It is particularly useful for SoftLoad procedures preformed remotely.

The Reset Hub switch command can be used with the Baud rate (-r), Communications port (-c), and Don't Wait for Hub Response (-n) command line switches in a command line string. All other command line switches entered will be ignored.

If the SoftLoad process is interrupted, the AccessSwitch may be left in SoftLoad mode. The communications link will have established the baud rate based on the input you entered on the command line.

To re-establish the baud rate during an interrupt condition, you will need to enter the -R switch option followed by the -B switch option, specifying the same baud rate you entered previously.

C.5.3 Don't Wait for Hub Response

Use this command line option to override pre-existing protocols for earlier versions of the AccessSwitch. Always use with SoftLoad procedures for the release this manual supports.

C.5.4 Communications port

This command line switch allows you to use any of eight communications ports as the data link between the Management Console and the selected AccessSwitch. Table C.3 contains the communications port command line switches.

Table C.3 Communication port command line switch

Switch	Description
1	COM1base address 3F8, IRQ4 This is the default COM port setting.
2	COM2base address 2F8, IRQ3
3	COM3base address 3E8, IRQ4
4	COM4base address 2E8, IRQ3
5	COM5base address 3E8, IRQ2
6	COM6base address 2E8, IRQ2
7	COM7base address 3E8, IRQ5
8	COM8base address 2E8, IRQ5

Example:
If you use communications port 2 (COM2) instead of the default communications port (COM1), use -c2 or -C2 as the command line switch. □□□□□□ is a number from 1 to 8. 1 is the default.

The Management Console uses COM1 or COM2 for the Management Console-to-AccessSwitch connection (user selectable via the NMC software). The settings for COM3 through COM8 are not available for use on the Management Console; therefore, the port options 3 through 8 should not be used for the "-c" or "-C" command line switch.

C.5.5 Error Log File

This command line switch allows you to create the sl.log file, a standard text file in which all messages that occurred during the implementation of SoftLoad are recorded. The switch creates a sl.log file in the system software directory.

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□□□□□□ □□□□□□□□□□□□□□□□

C.5.6 SoftLoad without programming INP4D

This command line switch allows you to run the SoftLoad procedure without programming the INP4D. All other interface boards on the AccessSwitch will be programmed. The -I switch option is ignored if used with the -P switch option in the same command line.

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□□□□□□□ □□□□□□□□□□□□□□□

C.5.7 SoftLoad Help screen

This command line switch displays a Help screen listing all SoftLoad command line switches. This command line switch cannot be used in conjunction with any other command line switch.

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□□□□□□□ □□□□□

C.5.8 SoftLoad specified board type

This command line option allows you to specify the type of board whose system software you want to upgrade. If your system configuration contains several peripheral boards of the same type, the *-p* switch downloads the executable files to all of the boards in your system which are the specified type. The exception to this is the two INP4Ds in a redundant system, which must be handled in two SoftLoad sessions. To specify a board type, substitute the name for □□□□□□ in the command line. See Table C.4 for the board names.

The format for using the command line switch for specified board types is:

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□□ □□□□□□□□□□□□□□□□□□□□

To use the SoftLoad procedure specifically for the two INP4Ds in a redundant system, two SoftLoad sessions are necessary. The initial session specifies and loads the Master INP4D, using the □□□□ option. The second SoftLoad session uses the □□□□□ switch.

□□□□□□□□□□□□□□□
□□□□□□□
□□□□□□ the command for the initial SoftLoad session to upgrade the master INP4D:
□□□□□□□□□□□□□□□□□□□□□□
the command for the second SoftLoad session to upgrade the standby INP4D:
□□□□□□□□□□□□□□□□□□□□□□

The board types must be specified as listed in Table C.4.

Table C.4 Specified board type command line option

Switch	Description
INP4	INP4 in a non-redundant system or, Master INP4 in a redundant system
INP4D	Standby INP4D in a redundant system
DS1U	QDIU_EX and DDIU_EX
QRVX	Quad RS449/V.35/X.21 Interface Unit
DRVX	Dual RS449/V.35 Interface Unit
OBIU	Octal Basic Rate Interface, S/T interface Unit
OBIU-U	Octal Basic Rate, U-Interface Unit
E1IU	QEIU_EX, DEIU_EX, and SEIU_EX

Note: The -p command line switch allows you to upgrade one board type at a time. The -p command line switch does not accept strings of board types.

C.5.9 SoftLoad with previous AccessWare system software

This command line option allows you to use an older directory structure used by previous versions of system software by accessing the files in the C:\IAP\DATA\BINS\DEFAULT directory (instead of the current AccessWare system software stored in the C:\IAP\BINS\DEFAULT directory).

```
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□□□□□□□□□□□□□□□□□□□□□□□□□□
```

The command line option downloads the AccessWare system software version that is installed in the C:\IAP\DATA\BINS\DEFAULT directory. Therefore, you must either re-install the desired version from floppy disk or copy all the files from the appropriate directory to the C:\IAP\DATA\BINS\DEFAULT directory.

If you are not sure of the version number of the AccessWare2000 R1.1 system software you want to download to the AccessSwitch, you can go to the C:\IAP\DATA\BINS directory and type DIR. The available version numbers are shown as sub-directories, within which the system software is contained.

C.5.10 Specifying a system software version number

If you want to specify the system software version to SoftLoad onto the boards in your AccessSwitch, use the □□ command line switch. The version number 6.9.7.2 is for illustration purposes only.

```
□□□□□□□ □□□□□□□□□□
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
```

The system software resides in C:\IAP\BINS\DEFAULT and also C:\IAP\BINS\XX.XX.XX. For the above example, the system software would have installed in the DEFAULT and C:\IAP\BINS\6.9.7.2 directories. The C:\IAP\BINS\DEFAULT directory contains a copy of the last system software version used to SoftLoad an AccessSwitch. This structure allows several system software versions to reside on the management console. If you do not specify a system software version, the files in the \DEFAULT directory will be used.

Note: If the system software version you specify as the command line switch does not exist on the hard disk, the download will not be successful.

C.6 SoftLoad troubleshooting guide

The table in this section lists and explains the possible messages that will appear on the Management Console screen under certain conditions. When applicable, the possible causes and their solutions are also provided.

If a problem occurs that is not included in the table, or it cannot be solved with the possible solution(s) given, please contact the Technical Assistance Center.

Table C.5 SoftLoad error messages

Message	Description	Possible cause	Possible solution
DIRECTORY <PATH> OR DATA FILES DO NOT EXIST.	The directory specified in the message of the AccessWare2000 R1.1 system software is not present on the hard disk of the management system.		Use the original CD ROM or diskettes to re-install the system software files.
ERROR: INVALID RESPONSE RECEIVED... DISCARDING	Indicates the AccessSwitch and SoftLoad are out of sync.	The cable between the AccessSwitch and the management system is disconnected.	Check that the cable between the AccessSwitch and the management system is connected properly and begin SoftLoad again.
ERROR: CHECKSUMS DON'T MATCH CALCULATED 0xXXXXXXXX HEADER 0xXXXXXXXX	The system software file currently being downloaded has been corrupted.	The system software file currently being downloaded has been corrupted. A hard disk error has occurred.	Use the original CD ROM or diskettes to re-install the system software files.
ERROR: COMMUNCIATION LINK DOWN	The cable between the AccessSwitch and the management system is not properly connected.	The cable between the AccessSwitch and the management system is disconnected. If the problem continues, there may be an INP4D hardware problem.	Make sure the PC side of the cable is connected to same COM port as provisioned via the LMC/NMC software.
ERROR: COMMUNICATION LINK DOWN	The cable between the AccessSwitch and the management system is not properly connected.		Use the original CD ROM or diskettes to re-install the system software files.

Table C.5 SoftLoad error messages (Continued)

Message	Description	Possible cause	Possible solution
ERROR: File Access Error	The SoftLoad procedure has encountered a problem while trying to access one of the system software files.	The system software file currently being downloaded has been corrupted.	Use the original CD ROM or diskettes to re-install the system software files.
ERROR: Memory Allocation Error...Exiting	The management system does not have enough memory to run SoftLoad.	There are too many TSRs or device drivers open on the PC.	Restart the PC to free some PC memory. Then restart the SoftLoad procedure.
ERROR: TRANSMIT ERROR...ATTEMPT (#)	A minor error was detected in transmitting a block of data. If 5 consecutive errors occur, the Communication Sequence is restarted.	The cable between the AccessSwitch and the management system is disconnected.	Check that the cable between the AccessSwitch and the management system is connected properly.
ERROR:MEMORY ALLOCATION ERROR FROM NODE	The AccessSwitch is unable to allocate a message buffer.		Begin the SoftLoad procedure again, which will automatically reset the AccessSwitch.
EXITING WITHOUT SENDING RESET MESSAGE	The communication link between the AccessSwitch and the management system is down. The management system cannot send a RESET message to the AccessSwitch and SoftLoad terminates.		When this message appears, reset the AccessSwitch. The softload procedure was successful and need not be run again.
NODE DOES NOT CONTAIN BOARDS OF TYPE (board type)	The AccessSwitch does not contain the board type specified in this message		
COULD NOT LOCATE BOARDS OF TYPE xxxxxxx	SoftLoad no longer supports a particular type of board, i.e., the board has been upgraded or reconfigured for use with different software.	SoftLoad no longer supports a particular board, and cannot find the file associated with that board.	SoftLoad will continue to program the other boards installed in the AccessSwitch, and ignore the board it is unable to locate.

Table C.5 SoftLoad error messages (Continued)

Message	Description	Possible cause	Possible solution
NO RESPONSE	The SoftLoad procedure successfully transmitted a command to the AccessSwitch. The AccessSwitch did not acknowledge the command.		Allow the SoftLoad procedure to continue. The AccessSwitch and the management system will eventually sync up.
RELEASE DIRECTORY xxxxxxx DOES NOT EXIST	The SoftLoad procedure does not recognize the directory name.	The specified release directory does not exist as specified.	Verify the Release Directory name, and re-enter it on the command line.
RESTARTING COMMUNICATION SEQUENCE	Indicates a communication failure in the link between the AccessSwitch and the management system. Indicates the management system is attempting to re-establish the data link (i.e., resync) with the AccessSwitch.	This message usually follows most of the error messages explained in this table. Either the cable between the AccessSwitch and the management system is disconnected or the AccessSwitch has been reset.	Check that the cable between the AccessSwitch and the management system is connected properly and begin SoftLoad again. Power down the management system and the AccessSwitch. Begin SoftLoad again.
WAITING RESTARTING SEQUENCE. PLEASE WAIT...	The SoftLoad procedure is attempting to synchronize with the AccessSwitch. It is possible that this may take up to 30 attempts; therefore, please be patient.		

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